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January 9, 1998

James McNulty, Esq.
Prothonotary
PA Public Utility Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

** Via Hand Delivery **

Re: Duquesne Light Company Application for Approval of a Restructuring Plan,
Docket No. ~~R-0097104~~ R-0097 4104

Dear Mr. McNulty:

Please find enclosed the following documents, pursuant to ALJ Corbett's Sixth Interim Order in the above captioned case, paragraphs 1f - 1h. These are being filed pursuant to stipulation by the parties, in lieu of offering them to the court reporter at the hearings.

We enclose the following, per the ALJ's Sixth Order:

1f. Two (2) copies of our testimony and exhibits, as identified in the index appearing below, which index appears in the First Joint Stipulation, Stip. Ex. No. 4, Environmentalists (the 22d through 24th pages thereof). Duquesne Light Co. filed said Stipulation on or about January 7, 1997.

1g. A true and correct copy of the Stipulation, signed by counsel for Duquesne Light Co., and signed by the undersigned counsel, attaching the indices of all of the intervenors' testimony and exhibits, and agreeing to the admission into the record of same, and waiving all cross examination thereon. (We are attaching all the indices in the Stipulation filing of January 7, 1998, totaling about 54 pages.)

Service is being accomplished as follows, pursuant to the 6th Order:

1h. A proof of service showing service of a signed copy of the Stipulation and the complete set of indices upon ALJ Corbett and John Moot, counsel for Duquesne Light Co. and the Stipulation and the cover page for the indices upon all other parties (who all have the balance of the 54-page listing).

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DOCUMENT
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This is the index of the Environmentalists' testimony and exhibits in the above-referenced proceeding:

Exhibit	Description	Date Identified	Date Admitted
Environmentalists' Statement No. 1	Direct Testimony of David Schoengold		
Ex. DS-1	Resume of David Schoengold		
Ex. DS-2	<i>Environmentalists' Vision for the New Electricity Marketplace</i>		
Ex. DS-3	Return on the Investment to Date for Stockholders		
Ex. DS-4	Total Return to Date for Stockholders		
Ex. DS-5	Methodology for Determining Total Return Of and On Investment for Stockholders Through End of Transition Period		
Ex. DS-6	Proposed Draft for Net Billing Tariff		
Environmentalists' Statement No. 1-S	Surrebuttal Testimony of David Schoengold		
Environmentalists' Statement No. 2	Direct Testimony of Bruce Biewald		
Ex. BEB-1	Resume of Bruce Biewald		
Ex. BEB-2	Graph of TLG Decommissioning Estimates: 1977-1995		
Ex. BEB-3	<i>Full Environmental Disclosure for Electricity: Tracking and Reporting Key Information, March 1997</i>		
Ex. BEB-4	Better Choice Plan - Three Examples		
Environmentalists' Statement 2-S	Surrebuttal Testimony of Bruce Biewald		

Ex. BEB-5	Economic Analysis of Duquesne Light Company's Perry 1 Investment		
Ex. BEB-6	Economic Analysis of Duquesne Light Company's Beaver Valley 2 Investment		
Ex. BEB-7	Assumptions for Economic Analysis for Perry 1 and Beaver Valley 2		
City of Pittsburgh <i>et al.</i> Statement No. 2 (cosponsored with the Environmentalists)	Direct Testimony of Roger Colton		
Ex. RDC-1	Resume of Roger Colton		
Ex. RDC-2	Summary of Roger Colton's Restructuring Work		
Ex. RDC-3	Summary of Roger Colton's Energy Efficiency Work		
Ex. RDC-4	Number and Percentage of LIHEAP Recipients by Income Range		
Ex. RDC-5	Summary of the BOSS and Earned Income Tax Credit Outreach		
Ex. RDC-6	Estimate of Universal Service Program Costs		
Ex. RDC-7	Summary of Universal Service Recommendations		
Ex. RDC-8	Summary of Consumer Research Section of Consumer Education Plan		
Ex. RDC-9	Four Phase Consumer Education Program		
Ex. RDC-10	Consumer Education Evaluation Process		
Ex. RDC-11	Summary of Consumer Education Recommendations		
Ex. RDC-12	Proposed Universal Service Budget		

Environmentalists' Index of Testimony and Exhibits
January 7, 1998
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City of Pittsburgh <i>et al.</i> Statement No. 3-S (cosponsored with the Environmentalists)	Surrebuttal Testimony of Roger Colton		
Ex. RDC-1-S	Memorandum of Residential Mobility and the <i>Low Income Consumer</i>		
Ex. RDC-2-S	Prepayment Meters and Low Income Consumers		

I have also sent this document to counsel for Duquesne Light Co., Mr. John Moot, by e-mail at "jmoot@skadden.com".

Sincerely,

/s

Roger E. Clark
Attorney for the Environmentalists

Cc: All parties of record

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File Copy 1/7/98
Environmentalists

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DIRECT DIAL
371-7310

January 7, 1998

Via Facsimile and Overnight Mail

James J. McNulty
 Prothonotary
 Pennsylvania Public Utility Commission
 North Office Building
 Commonwealth Ave. and North St.
 Harrisburg, Pa. 17120

Re: Duquesne Light Company Restructuring
Proceeding, Docket No. R-00974104

Dear Mr. McNulty:

Pursuant to the Presiding Judge's Sixth Interim Order (dated December 30, 1997), enclosed is the First Joint Stipulation of the parties to this case. The stipulation includes an index of testimony and exhibits from all intervenor parties except: (i) the Community Action Coalition, as that party has not supplied such an index to Duquesne; and (ii) David Hughes, as the index submitted by that party is both incomplete and includes documents not filed in this case. If and when these matters are resolved, a second joint stipulation will be filed.

Sincerely,



John S. Moot
 Counsel for
 Duquesne Light Company

PROTHONOTARY'S OFFICE

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RECEIVED

cc: All parties (w/enclosure)
 Presiding Judge Corbett (w/enclosure)

DOCUMENT
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FROM: John S. Moot

DATE: 1/7/98

DIRECT DIAL: 202/371-7310

FLOOR/OFFICE NO.: 702

DIRECT FACSIMILE: 202/371-7939

REFERENCE NUMBER: 194330

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FIRM: Hangley Aronchick

TELEPHONE NO.: 215/496-7037

32. NAME: David Boonin

FACSIMILE NO.: 215/563-9292

FIRM: New Energy Ventures East

TELEPHONE NO.: 215/545-5058 563-9290

33. NAME: Alan Barak

FACSIMILE NO.: 717/541-1970

FIRM: Environmentalists

TELEPHONE NO.: 717/540-5106

34. NAME: Roger Clark

FACSIMILE NO.: 215/628-2630

FIRM: Environmentalists

TELEPHONE NO.: 215/643-2364

35. NAME: Scott Rubin

FACSIMILE NO.: 717/743-8145

FIRM: IBEW, Sys. Council U-10

TELEPHONE NO.: 717/743-2233

36. NAME: John O'Brien

FACSIMILE NO.: 516/390-7628

FIRM: Wheeled Elec. Power Co.

TELEPHONE NO.: 516/390-7600

37. NAME: Patricia Armstrong

FACSIMILE NO.: 717/236-8278

FIRM: Thomas, Thomas, Armstrong

TELEPHONE NO.: 717/255-7600

38. NAME: Daniel Clearfield/Andy Kohler

FACSIMILE NO.: 717/237-7161

FIRM: Wolf, Block

TELEPHONE NO.: 717/237-7181

39. NAME: James Steffes

FACSIMILE NO.: 713/646-8160

FIRM: Enron Power Marketing

TELEPHONE NO.: 713/853-7500

40. NAME: Albert Benincasa

FACSIMILE NO.: 516/676-6984

FIRM: Skipping Stone

TELEPHONE NO.: 516/674-4186

41. NAME: Brian Kalcic

FACSIMILE NO.: 314/725-2022

FIRM: Excel Consulting

TELEPHONE NO.: 314/725-2511

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility)
Commission,)
)
v.) Docket No. R-00974104
)
Duquesne Light Company)
Application to approve)
restructuring plan pursuant)
to 66 Pa. C.S. § 2806(d))

FIRST JOINT STIPULATION

Pursuant to an agreement of all parties to this case and as required by the Sixth Interim Order issued by the Presiding Judge on December 30, 1997, Duquesne Light Company ("Duquesne") and the intervenor parties hereby agree and stipulate to the following:

1. Each party to this Stipulation agrees that the testimony and exhibits itemized on the Stipulation Exhibits attached hereto shall be admitted into the record of this case.
2. Each party to this Stipulation agrees to waive its right to cross-examine the witnesses sponsoring the testimony and exhibits itemized on the Stipulation Exhibits attached hereto.

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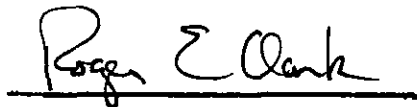
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3. Each party to this Stipulation agrees to execute a copy of this Stipulation by causing counsel of record for each party (or the party itself if that party is unrepresented by counsel) to place its signature on the appropriate line below. Each party further agrees to file an executed version thereof with the Commission's Secretary and Prothonotary at the time it submits two copies of its testimony and exhibits to the Secretary and Prothonotary, as prescribed by the Sixth Interim Order.

Counsel for Duquesne Light:


John S. Moot

Counsel for Intervenor Party:



Name of Intervenor Party:

THE ENVIRONMENTALISTS

Dated: January 7, 1998

**FIRST JOINT STIPULATION
INDICES OF TESTIMONY & EXHIBITS**

<u>Exhibit No.</u>	<u>Description</u>
1	City of Pittsburgh
2	Duquesne Industrial Intervenors (DII)
3	Enron Power Marketing, Inc. (ENRON)
4	Environmentalists (ENV)
5	Hospital Shared Services & Administrative Resources, Inc. (HSS/ARI)
6	International Brotherhood of Electrical Workers (IBEW)
7	Mid-Atlantic Power Supply Association (MAPSA)
8	New Energy Ventures (NEV)
9	Office of Business Advocate (OSBA)
10	Office of Consumer Advocate (OCA)
11	Office of Trial Staff (OTS)
12	Pennsylvania Retailers Association (PRA)

7. 1998 6:43PM

SASMF

NO. 9176 P. 6/34

**FIRST JOINT STIPULATION
EXHIBIT NO. 1**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

DUQUESNE LIGHT COMPANY

Application of Duquesne Light Company
for Approval of a Restructuring Plan
Under Section 2806 of the Public Utility Code
Docket No. R-009/4104

CITY OF PITTSBURGH
INDEX OF TESTIMONY AND EXHIBITS

Exhibit	Brief Description
City Statement No. 1	Direct Testimony of Christopher D. Seiple (addressing issues pertaining to the Company's general overview/recovery plan and stranded costs).
City Exhibit No. 1	Resource Data International Background & History.
City Exhibit No. 2	RDI Market & Competitor Intelligence
City Exhibit No. 3 (incl. Tables 1-3)	Capacity Factor Analysis
City Exhibit No. 4	Delivered Output Analysis
City Exhibit No. 5	Early Plant Shutdown Savings Analysis
City of Pittsburgh, <i>et al.</i> Statement No. 2	Direct Testimony of Roger D. Colton (addressing issues pertaining to universal service, low income programs, energy conservation, consumer education, and phase-in).
Exhibit RDC-1	Resume of Roger D. Colton
Exhibit RDC-2	Summary of Colton electricity restructuring experience.
Exhibit RDC-3	Summary of Colton experience pertaining to design of low-income affordability programs.
Exhibit RDC-4	Number and Percent of LIHEAP Recipients by Income Range and Annual Electric Burdens.
Exhibit RDC-5	Recommendations pertaining to utility universal service programs which can help increase incomes of low-income consumers.
Exhibit RDC-6	Estimate of Universal Service Costs at 50 Percent CAP Participation.

Exhibit RDC-7	Summary of Universal Service Recommendations.
Exhibit RDC-8	Recommendations for Consumer Research section of an Education Plan
Exhibit RDC-9	Model 4-Phase Consumer Education Program
Exhibit RDC-10	Proposed Evaluation Process for Consumer Education Activities
Exhibit RDC-11	Summary of Consumer Education Recommendations
Exhibit RDC-12	Proposed Budget for Universal Service Programs

**FIRST JOINT STIPULATION
EXHIBIT NO. 2**

**DUQUESNE INDUSTRIAL INTERVENORS
INDEX OF TESTIMONY AND EXHIBITS**

Page 1 of 4

Exhibit	Description	Date Identified	Date Admitted
DII Statement No. 1	Direct Testimony of Stephen J. Baron (Summary of Stranded Cost Analysis; Regulatory Policy Issues; Rate Design Issues)		
Exhibit SJB-1	Expert Testimony Appearances		
Exhibit SJB-2	DII Summary of Recommended Stranded Costs		
Exhibit SJB 3	Example of DII Stranded Generation Sharing Analysis		
Exhibit SJB-4	DII Calculation of Adjusted Rate of Return		
Exhibit SJB-5	DII Summary of Estimated CTC Revenues by Rate Class		
Exhibit SJB-6	DII Load-weighted Market Prices		
Exhibit SJB-7	DII Unbundling Analysis for Rate RS		
Exhibit SJB-8	DII Unbundling Analysis for Rate L		
Exhibit SJB-9	DII Unbundling Analysis for Rate HVPS		

DUQUESNE INDUSTRIAL INTERVENORS INDEX OF TESTIMONY AND EXHIBITS

Page 2 of 4

Exhibit	Description	Date Identified	Date Admitted
DII Statement No. 1R	Rebuttal Testimony of Stephen J. Baron (Universal Service Cost Recovery Mechanism; Issues Regarding the Calculation of Market Prices and Stranded Cost; Response to OCA Regarding Unbundling Issues)		
DII Statement No. 1S	Surrebuttal Testimony of Stephen J. Baron (Responses to Company Witnesses Regarding Divestiture, Stranded Cost Sharing, CTC Calculation, and Rate Design Issues; Response to OSBA Witness Regarding CTC Calculation and Recovery)		
DII Statement No. 2	Direct Testimony of Randall J. Falkenberg (Calculation of Company Generation Stranded Cost; Analysis of Duquesne and ECAR Market Prices)		
Exhibit RJF-1	Qualifications of Randall J. Falkenberg		
Exhibit RJF-2	Production Cost Model Studies and Benchmarks		
Exhibit RJF-3	Comparison of Market Price Model Results of K&A Model v. MAPS, IPM and PMDAM		
Exhibit RJF-4	DII Calculation of Company's Annual Revenue Requirements for Generation		
Exhibit RJF-5a	DII Total Generation Stranded Cost Calculation		
Exhibit RJF-5b	DII Calculation of Net Present Value of Contribution Margins		
Exhibit RJF-5c	DII Summary of Market Prices, Fuel Cost, Operating Margin and Generation by Plant		

**DUQUESNE INDUSTRIAL INTERVENORS
INDEX OF TESTIMONY AND EXHIBITS**

Page 3 of 4

Exhibit	Description	Date Identified	Date Admitted
DII Statement No. 2S	Surrebuttal Testimony of Randall J. Falkenberg (Updated Calculation of Generation Stranded Costs; Responses to Company Witnesses Regarding Market Price Forecasts)		
Exhibit RJF-6a	DII Updated Total Generation Stranded Cost Calculation		
Exhibit RJF 6b	DII Updated Calculation of Net Present Value of Contribution Margins		
Exhibit RJF-6c	DII Updated Summary of Market Prices, Fuel Cost, Operating Margin and Generation by Plant		
DII Statement No. 3	Direct Testimony of Lane Kollen (Regulatory Assets; Transition Costs; Fossil Decommissioning; Nuclear Decommissioning; Securitization)		
Exhibit LK-1	Resume of Lane Kollen		
Exhibit LK-2	Excerpts from Company Exhibits Illustrating Double Counting of FAS 109 Asset Related to Perry and Beaver Valley 1		
Exhibit LK-3	Excerpt from Company First Quarter 1997 SEC 10-Q Related to Deferred Coal		
Exhibit LK-4	Net Present Value of Deferred Rate Synchronization Costs at 12/31/98		
Exhibit LK-5	Duquesne Nuclear Decommissioning for Stranded Cost and Revenue Requirement (Beaver Valley 1, Beaver Valley 2, and Perry)		

**DUQUESNE INDUSTRIAL INTERVENORS
INDEX OF TESTIMONY AND EXHIBITS**

Page 4 of 4

Exhibit	Description	Date Identified	Date Admitted
DII Statement No. 3S	Surrebuttal Testimony of Lance Kollen (Responses to Company Witnesses Regarding Stranded Cost Methodology, Unamortized Debt Costs, Beaver Valley 2 Sale/Leaseback Refinancing Premium, Preaccrued Nuclear Outages, Deferred Employee Costs, Deferred Coal SFAS 106, Deferred Rate Synchronization Costs, Fossil Decommissioning, Securitization)		
DII Cross Exh. 1	Response of Company Witness Hoffmann to Environmentalists' Interrogatories Set I, Number 23	12/18/97	12/18/97
DII Cross Exh. 2	Response of Company Witness Hoffmann to On-the-Record Data Request Concerning Customer Segment Contribution to Non-Coincident Peak Load		
DII Cross Exh. 3	Response of Company Witness Hoffmann to On-the-Record Data Request Concerning Mining, Construction, and Agriculture Customer Segments		

On-the-Record Data Request

Witness: Hoffmann

Page 1 of 1

DUQUESNE LIGHT COMPANY

On-the-Record Data Requests

3. Provide a non-coincident peak calculation in form that is analogous to the coincident peak calculation provided in response to Data Request ENV-1-23.

Response:

Attached is a modified version of DLC's response to ENV-1-23 which list the non-coincidental peak load contribution for each customer group/segment associated with the proposed phase-in methodology.

Non-Coincidental Peak Load Contribution by Customer Class and Segment

Customer Class	Customer Group/Segment	Non-Coincidental Peak Contribution	Percentage Contribution to Non-Coincidental Peak
Residential	Group A - Accumulated Wealth	41	1.14%
	Group B - Mainstream Families	374	10.42%
	Group C - Mainstream Singles	273	7.60%
	Group D - Conservative Classics	49	1.36%
	Group E - Sustaining Families	49	1.36%
	Group F - Sustaining Singles	65	1.82%
	Group G - All Others	21	0.58%
	Subtotal Residential	871	24.28%
Commercial	Utility Services	155	4.33%
	Wholesale Trade	53	1.47%
	Retail Trade - Food	71	1.99%
	Retail Trade - Restaurants	85	2.36%
	Retail Trade - Merchandise	177	4.94%
	Office Buildings	399	11.13%
	Healthcare	142	3.95%
	Education	214	5.98%
	Services	283	7.89%
	Government	82	2.29%
	Small Business	324	9.04%
	Subtotal Commercial	1,986	55.36%
Industrial	Industrial - Chemical	68	1.88%
	Industrial - Plastic	14	0.39%
	Industrial - Glass	39	1.08%
	Industrial - Steel	449	12.52%
	Industrial - Other	161	4.48%
	Subtotal Industrial	730	20.36%
	TOTALS	3,587	100.00%

On-the-Record Data Request

Witness: Hoffmann

Page 1 of 1

DUQUESNE LIGHT COMPANY

On-the-Record Data Requests

4. Provide breakdown of numbers for mining, construction and agriculture segments on FAH-4 in a manner comparable to that provided in response to ENV-1-23.

Response:

The market segments listed on FAH-4 as "Mining" and "Construction" are classified as "Industrial-Other" on the response to ENV-1-23. Similarly, "Agriculture" was classified within the "services" market segment.

**FIRST JOINT STIPULATION
EXHIBIT NO. 3**

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

DUQUESNE LIGHT COMPANY

Application for Approval of a Restructuring Plan
Pursuant to 66 Pa. C.S. § 2806(d)
Docket No. R-00974104

ENRON POWER MARKETING, INC.
INDEX OF TESTIMONY AND EXHIBITS

Exhibit	Description	Date Identified	Date Admitted
Enron Cross Examination Exhibit No. 1	CFR Uniform System of Accounts: Accounts 908 and 909.	12/17/97	12/17/97
Enron Statement No. 1	Direct Testimony of James D. Steffes General overview of competitive services; the Portland General Code of Conduct.		
Exhibit 1 JDS-1	Market share of utilities/affiliates in Retail Access Programs.		
Exhibit 1 JDS-2	Portland General Electric Company Tariff Code of Conduct.		
Exhibit 1 JDS-3	Market share of affiliates in Retail Access Programs.		
Enron Statement No. 2	Direct Testimony of Paul D. Reising Rates for unbundled services of Transmission, Ancillary, Energy Delivery and Revenue cycles separately computed and stated.		
Exhibit 2 PDR-1	Educational and employment background of P.D. Reising.		
Exhibit 2 PDR-2	Definition and Description of Ancillary Services.		

Exhibit 2 PDR-3	Summary of Functional Costs.		
Exhibit 2 PDR-4	EPMI Proposed Class Rates		
Exhibit 2 PDR-5	EPMI Class Cos: Summary		
Exhibit 2 PDR-6	pro forma Distribution Services Tariff		
Exhibit 2 PDR-7	Energy Delivery Rate Design		
Enron Statement No. 3	Direct Testimony of Jeffrey A. Brown Non-wire services, metering, meter-reading, billing and information services. "Open architecture" communication systems.		
Exhibit 3 JAB-1	Customer Account Services: Billing System Opportunities (representative example)		
Exhibit 3 JAB-2	Customer Account Services: Third Party Billing Services (representative example)		
Exhibit 3 JAB-3	Non-Wire Products and Services: "Endless Possibilities"		
Exhibit 3 JAB-4	Non-Wire Communications Network Conceptual Model		
Exhibit 3 JAB-5	Metering and Billing Cycle		
Enron Statement No. 4	Direct Testimony of Gayle Muench Unbundling of billing and bill format; billing options ("Supplier Complete Bill Option"); phase-in of competition; customer selection and "slamming"; customer information ("Customer Education Program"); Duquesne's Universal Service Program in a competitive environment.		
Exhibit 4 GM-1	DQE Position on Competition		
Exhibit 4 GM-2	DQE Overview of Competition		
Enron Statement No. 5	Direct Testimony of Lynn R. Coles "Pro Forma Supplier Tariff." Access to point-to-point transmission service. EDC charges; minimum contract periods; planning reserves.		

Exhibit 5 LRC-1	Summary of educational background and general experience in electric utility industry.		
Exhibit 5 LRC-2	Proposed Electric Generation Supplier Tariff.		
Exhibit 5 LRC-3	GPU Market Line: Energy market prices; viability payments, all-in market line; market clearing prices.		
Enron Statement No. 1.1	Surrebuttal Testimony of James D. Steffes Response to Duquesne witnesses Hoffman and Allison.		
Enron Statement No. 2.1	Surrebuttal Testimony of Paul D. Reising Responses to rebuttal testimony of Duquesne witness Lahtinen; IBEW witness Moran; and OCA witness Alexander.		
Exhibit 2.1 PDR-8	Revised functional cost of service summary.		
Exhibit 2.1 PDR-9	Revised versions of class-based T & D charges (original Exhibit 2 PDR-4).		
Exhibit 2.1 PDR-10	Revised versions of voltage differentiated rates (original Exhibit 2 PDR-5).		
Enron Statement No. 3.1	Surrebuttal Testimony of Jeffrey A. Brown Responses to Duquesne witness Allison; and IBEW witnesses Schmidt and Moran.		
Enron Statement No. 4.1	Surrebuttal Testimony of Gayle Muench Responses to Duquesne witnesses Allison, Hoffman and Flynn; OCA witness Alexander; and IBEW witness Moran.		
Enron Statement No. 5.1	Surrebuttal Testimony of Lynn R. Coles Responses to rebuttal testimony of IBEW witness Moran; and witnesses Irvin and Karl.		

**FIRST JOINT STIPULATION
EXHIBIT NO. 4**

Roger E. Clark, Esq.
Attorney for The Environmentalists

805 Denston Drive
 Ambler, PA 19002-3801
 phone: 215.643.2364
 fax: 215.628.2630
 e-mail: rclark@libertynet.org

January 7, 1998

John Moot
 Skadden, Arps, Slate, Meagher & Flom LLP
 1440 New York Avenue, N.W.
 Washington, D.C. 20005-2111

Re: Duquesne Light Company Application for
 Approval of a Restructuring Plan,
 Docket No. R-0097104.

Dear Mr. Moot:

Thank you for catching our oversight regarding Roger Colton's surrebuttal testimony. In accordance with the Sixth Interim Order issued by Judge Corbett on December 30, 1997, I am sending you the following updated index of the Environmentalists' testimony and exhibits in the above-referenced proceeding:

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January 7, 1998

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Environmentalists' Index of Testimony and Exhibits

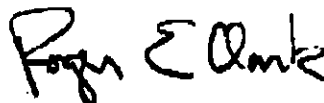
January 7, 1998

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Ex. RDC-12	Proposed Universal Service Budget		
City of Pittsburgh <i>et al.</i> Statement No. 3-S (cosponsored with the Environmentalists)	Surrebuttal Testimony of Roger Colton		
Ex. RDC-1-S	Memorandum of Residential Mobility and the Low Income Consumer		
Ex. RDC-2-S	Prepayment Meters and Low Income Consumers		

I have also sent this document to you by e-mail at "jmoot@skadden.com". Copies of this letter are being served on all parties of record by facsimile.

Sincerely,



Roger E. Clark

Attorney for the Environmentalists

Copies: All parties of record

JAN. 7. 1998 8:52PM

SASMF

NO. 7176 2. 25/54

**FIRST JOINT STIPULATION
EXHIBIT NO. 5**

**HSS AND ARI
INDEX OF TESTIMONY AND EXHIBITS**

Exhibit	Description	Date Identified	Date Admitted
	Prepared Direct Testimony of Dr. Robert B. Weisenmiller, Volume I		
RBW-1	Supplemental Response to Item Nos. HSS-1-001, 21 (Supp.), etc. (corrections to Duquesne's case-in-chief)		
RBW-2	Skadden, Arps letter forwarding narrative prepared by Northbridge Group regarding discovery requests HSS-3-008 and HSS-3-009		
RBW-3	"Generating Assets," April 1995 (Duquesne study re: possible sales of its generating assets)		
RBW-4	Chart, "Best Practices Reduce Total Personnel By 45%"		
RBW-5	Duquesne Fossil Generating Business Unit, Development of a GENCO, Dec. 1996		
RBW-6	Presentation to Project Lead Team - Project Update, July 15, 1996		
RBW-7	Presentation to Project Lead Team - Preliminary Valuation and Operating Cost Allocation, August 5, 1996		
RBW-8	Presentation to Project Lead Team - Asset Valuation and Strategic Options, August 16, 1996		
RBW-9	Presentation to Project Lead Team - Regulatory Recommendations and GENCO Structure, Sept. 13, 1996		
RBW-10	CS First Boston, Materials Prepared for Discussion, Nov. 21, 1996		
RBW-11	Charts, "Generating Costs For Duquesne"		
RBW-12	Table, To Go Cost of Generation, etc.		
RBW-13	Chart, Duquesne System Lambda, 1996		
RBW-14	Duquesne Response to Interrogatory No. HSS-1-72/73 (revised) and attachments (re: RFP bids, etc.)		
RBW-15	Duquesne letter regarding RFPs and bid forms		

Exhibit	Description	Date Identified	Date Admitted
RBW-16	Duquesne Response to Interrogatory No. HSS-1-016 (revised) (Testimony of D.W. Marshall, Investigation into Electric Power Competition, I-940032, filed Nov. 6, 1995)		
RBW-17	West Penn Power Docket No. R-00973981 Interrogatories (AYP Energy, Inc.'s RFP bids)		
RBW-18	Duquesne Response to Interrogatory No. OCA-3-016 (current ECR charge is 12.822 mill/kWh)		
RBW-19	Duquesne Response to Interrogatory No. HSS-1-026		
RBW-20	Excerpts from Alexander Galatic, Written Rebutal Testimony on Behalf of West Penn Power Company		
RBW-21	Duquesne's Response to HSS-1-015 (revised) -- Protected Materials		
RBW-22	Duquesne's Response to HSS-1-015 (revised) -- Protected Materials		
RBW-23	Duquesne Response to Interrogatory No. OCA-3-001 (credit rating reports)		
RBW-24	Table, Utility Comparison		
RBW-25	Chart, Ranking of DLCo & APS Coal Plants with PJM Coal Plants, Based on Total Expenditures per Net MWh - 1995		
RBW-26	A Report on The Review of Potential Stranded Costs, Duquesne Light Company, August 1997		
RBW-27	Duquesne Response to Interrogatory No. DH-1-28 (settlement agreement between GE and <i>inter alia</i> , Duquesne)		
RBW-28	Executive Summary, Duquesne Light Company (1996 rating agency presentation)		
RBW-29	Tables, DQE 12-month Results; Continued Earnings and Dividend Growth; Consistent Financial Performance -- NatWest Securities Mid-Atlantic/New England Utility Seminar, Sept. 23, 1997		
RBW-30	Duquesne Financial, Sales and Operating Information (1996 rating agency presentation)		
RBW-31	Duquesne Rating Agency Presentation, August 1996		

Exhibit	Description	Date Identified	Date Admitted
RBW-32	Duquesne Response to Interrogatory Nos. HSS-3-01 and HSS-3-02 (explanation of ratepayer benefits)		
RBW-33	Duquesne Response to Interrogatory No. OCA-1-007 (regulatory assets and decommissioning expenses)		
RBW-34	Duquesne Response to Interrogatory No. HSS-1-044 (regulatory assets in rate base)		
RBW-35	Duquesne Response to Interrogatory No. HSS-1-043 (Supp.) (authorization for claimed regulatory assets: excerpts from 860378 order)		
RBW-36	Duquesne Response to Interrogatory No. HSS-1-043 (Supp.) (authorization for claimed regulatory assets: excerpts from R-870222 order)		
RBW-37	Duquesne Response to Interrogatory of David Hughes Set I, Item No. DH-1-10 (excerpts from Duquesne's 1995 and 1995 Form 10-Ks)		
RBW-38	Duquesne Response to Interrogatory No. HSS-1-030 (revised) (excerpts from Ft. Martin amended proposal re: deferred costs)		
RBW-39	Excerpts from Duquesne 1996 Form 10-K		
RBW-40	Excerpts from Duquesne Response to Interrogatory No. DH-1-18 (Feb. 17, 1983 letter to Duquesne Shareholders)		
RBW-41	Duquesne Response to Interrogatory No DH-1-10 (excerpts from Duquesne's 1995 and 1995 Form 10-Ks)		
RBW-42	Duquesne Response to Interrogatory No. OCA-1-040 (Brunot Island rate base treatment)		
RBW-43	Duquesne Response to Interrogatory No. OCA-3-042 (Brunot Island and Phillips units—no plans to return cold service units to service)		
RBW-44	Duquesne Response to Interrogatory No. ENV-1-024 (excerpts from Sept. 1997 Integrated Resource Plan)		
RBW-45	Duquesne Response to Interrogatory No. HSS-3-03 (excerpts from Pennsylvania PUC Order in P-900485)		
RBW-46	Duquesne Response to Interrogatory No. OCA-1-018 (future use or sale of Brunot Island and Phillips units)		

Exhibit	Description	Date Identified	Date Admitted
RBW-47	Duquesne Response to Interrogatory No. OCA-1-008 (Chart, Annual Amortization Amounts)		
RBW-48	Table, All-In Costs of Combined Cycle Plants		
RBW-49	Duquesne Response to Interrogatory No. HSS-1-091 (Schnitzer's natural gas market price forecasts)		
RBW-50	Tables, Wellhead (lower 48) Natural Gas Price Projections (1995)		
RBW-51	Duquesne Response to Interrogatory No. HSS-2-38 (gas transportation costs forecast)		
RBW-52	Duquesne Response to Interrogatory No. HSS-2-34 (2.5% inflation factor sources)		
RBW-53	Table, Percent Change from Previous Period—GDP PPD		
RBW-54	Excerpts from Duquesne Resource Planning Report, July 1, 1996		
RBW-55	Presentation to Project Lead Team - Preliminary Recommendations, August 30, 1996		
RBW-56	Presentation to DQE, Inc. Regarding the Sale of Certain Generating Assets, June 16, 1995		
RBW-57	Table, Comparison of Estimates of Market-Clearing Prices		
	Prepared Surrebuttal Testimony of Dr. Robert B. Weisenmiller, Volume IV		
RBW-58	Presentation to Gary Brandenberger - Draft Presentation for Fall Planning Council, Sept. 5, 1996 (Metzler)		
RBW-59	Presentation to Gary Brandenberger - Draft Presentation for Fall Planning Council, Sept. 5, 1996 (Metzler)		
RBW-60	Petition of Duquesne to discontinue normal operation of Phillips Power Station, South Heights, Pennsylvania		
RBW-61	Calpine Acquires 120 MW Gas-Fired Facility, Non-Nuclear Electric Power Generation, etc.		

Exhibit	Description	Date Identified	Date Admitted
KBW-62	Errata to Prepared Testimony of Dr. Robert B. Weisenmiller		

ERRATA

The following corrections should be made to the testimony of Dr. Robert B. Weisenmiller:

(a) Prepared Direct Testimony:

1. At page 41, line 12, after "effect" insert "See Exh. RBW-18."
2. At page 118, line 16, change "West Penn's" to read "Duquesne's".
3. At page 123, line 5, change "EIA, Penelec, PECO, AYP" to read "EIA, Penelec, AYP".

(b) Prepared Surrebuttal Testimony:

1. At page 1, add the following entities to the list of HSS and ARI members sponsoring Dr. Weisenmiller's testimony:

South Hills Health System (all locations)
University of Pittsburgh Medical Center (all locations)

**FIRST JOINT STIPULATION
EXHIBIT NO. 6**

**SYSTEM COUNCIL U-10, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS
INDEX OF TESTIMONY AND EXHIBITS**

<i>Exhibit</i>	<i>Description</i>	<i>Date Identified</i>	<i>Date Admitted</i>
IBEW Statement No. 1	Rebuttal Testimony of Timothy Moran (Generation suppliers should not be allowed to provide metering, billing, and other customer service functions. Duquesne should not be required to sell or shut down any of its power plants.)		
Schedule TM-1	Rebuttal testimony of William Schmitt from the PP&L Restructuring Case		
Schedule TM-2	Number of Duquesne Light Company employees by year from 1986-1996 (HSS-2-017)		
Schedule TM-3	Duquesne Light Company Distribution of Salaries and Wages for 1996 (FERC Form 1, pages 354-355)		

**FIRST JOINT STIPULATION
EXHIBIT NO. 7**

PENNSYLVANIA PUBLIC UTILITY COMMISSION
v.
DUQUESNE LIGHT COMPANY

Application for Approval of a Restructuring Plan
Pursuant to 66 Pa. C.S. §2806(d)
Docket No. R-00974104

INDEX OF MAPSA TESTIMONY AND EXHIBITS

<i>Exhibit</i>	<i>Description</i>	<i>Date Identified</i>	<i>Date Admitted</i>
MAPSA Statement No. 1	Direct Testimony of Whitfield A. Russell (Addressing competitive issues raised by Duquesne's Customer Choice Plan)		
Exhibit WAR-1	Whitfield A. Russell Curriculum Vitae		
Exhibit WAR-2	Chart Showing Monthly Firm Available Transmission Capacity for Allegheny Power		
Exhibit WAR-3	1996 Duquesne System Lambda		
Exhibit WAR-4	Calculation of Duquesne CGC Based Upon 1999 CCGT [1]		
Exhibit WAR-5	ERRATA to Prepared Direct Testimony of Whitfield A. Russell		
MAPSA Statement No.1-SR	Prepared Surrebuttal Testimony of Whitfield A. Russell		

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NO. 7176 P. 36/54

**FIRST JOINT STIPULATION
EXHIBIT NO. 8**

**INDEX OF TESTIMONY AND EXHIBITS
OF INTERVENOR NEV EAST, L.L.C.,
SUBMITTED PURSUANT TO SIXTH INTERIM ORDER**

<i>Statement/Exhibit</i>	<i>Description</i>
NEV Statement No. 1	Direct Testimony of David Magnus Boonin (regarding the unbundled rate for generation, CTC methodology, unbundling of all tariffs, and billing and metering issues)
Exhibit NEV/DMB #1	Resume of David Magnus Boonin
Exhibit NEV/DMB #2	Chart setting forth methodology for reconciling the CTC
NEV Statement No. 2	Direct Testimony of Nancy I. Day (regarding the importance of unbundling distribution services to the formation of a competitive energy market)
Exhibit NEV/NID #1	Resume of Nancy I. Day

*Pursuant to the December 30, 1997 Order of Administrative Law Judge John H. Corbett, Jr. and agreement of the parties, the foregoing testimony will be admitted into the record by stipulation and without cross-examination.

**FIRST JOINT STIPULATION
EXHIBIT NO. 9**

OFFICE OF SMALL BUSINESS ADVOCATE
INDEX OF TESTIMONY AND EXHIBITS

<u>Statement/Exhibit</u>	<u>Description</u>
OSBA Statement No. 1*	Direct testimony and Exhibit of Brian Kalcic (recommending adjustments in Duquesne's distribution-related revenue requirements and its rate redesign plan, and offering comments on Duquesne's proposed Phase-In plan.)
OSBA Exhibit No. 1* (with Schedules BK-1, BK-2 and BK-3)	Schedules summarizing Duquesne's functionalized revenue requirements including OSBA's proposed adjustments
OSBA Statement No. 1R**	Rebuttal Testimony and Exhibit of Brian Kalcic (addressing issues raised by other witnesses regarding the pace of stranded cost recovery, the determination of CTC, allocation of universal service costs and proposals for phase-in)
OSBA Exhibit No. 1R** (Schedule BK-1R)	Amortization of DII recommended stranded costs over 4 versus 7 years
OSBA Statement No. 1S***	Surrebuttal Testimony of Brian Kalcic (responding to Co. witness Lahtinen regarding use of realized rather than claimed rate of return for unbundling rates and DII witness Baron regarding allocation of CTC revenue responsibility to all classes)

* Served November 7, 1997

** Served December 2, 1997

*** Served December 11, 1997

**FIRST JOINT STIPULATION
EXHIBIT NO. 10**

**OFFICE OF CONSUMER ADVOCATE
INDEX OF TESTIMONY AND EXHIBITS**

<i>Exhibit</i>	<i>Description</i>	<i>Date Identified</i>	<i>Date Admitted</i>
OCA Statement No. 1	Direct Testimony of Matthew I. Kahal (Evaluation of Duquesne's proposed stranded cost plan)		
Schedule MIK-1	OCA Overall Stranded Cost Summary		
Schedule MIK-2	Excess Pre-Tax Earnings During Transition Period		
Schedule MIK-3	Retail Rate Comparisons for 1996		
Schedule MIK-4	DRJ vs. Duquesne Inflation Rate Forecasts		
Schedule MIK-5	Derivation of the Discount Rate		
Schedule MIK-6	Productivity Enhancement Savings		
Schedule MIK-7	PECO and West Penn Power Life-Extension Costs for Coal Plants		
Schedule MIK-8	Cheswick Life Extension Costs and Net Benefits		
Schedule MIK-9	Generation Net Merger		
OCA Statement No. 1B	Surrebuttal Testimony of Matthew I. Kahal (Response to Rebuttal Testimony on stranded cost issues)		
Schedule MIK-1 UPDATE	OCA Overall Stranded Cost Summary		
Schedule MIK-6 UPDATE	Productivity Enhancement Savings		
Schedule MIK-10	Projected Pre-Tax Operating Losses During Transition		
OCA Statement No. 2	Direct Testimony of Douglas C. Smith (Market Price Analysis)		
Exhibit DCS-1	Resume of Douglas C. Smith		
Exhibit DCS-2A	New Combined Cycle Non-Fuel Cost Assumptions		

Exhibit DCS-2B	New Combustion Turbine Non-Fuel Cost Assumptions		
Exhibit DCS-3	Spring 1997 DRI Fuel Price Escalation Rates		
Exhibit DCS-4	APS-DQL Market Price Estimate		
Exhibit DCS-5	DQL Weighted Generation Price		
OCA Statement No. 2S	Surrebuttal Testimony of Douglas C. Smith (Response to rebuttal testimony on market price issues)		
OCA Statement No. 3	Direct Testimony of Thomas S. Catlin (Regulatory asset issues, nuclear and fossil decommissioning, taxes and other transition costs)		
Schedule TSC-1	Summary of Regulatory Assets and Other Transition Expenses		
Schedule TSC-2	Summary of Decommissioning Funding Requirements as of 12/31/98		
OCA Statement No. 3S	Surrebuttal Testimony of Thomas S. Catlin (Response to rebuttal testimony on proccured nuclear outage costs and unamortized debt costs)		
OCA Statement No. 4	Direct Testimony of Lee Smith (Rate design, unbundling, cost allocation, and CTC design)		
Exhibit LS-1	Summary of Qualifications and Experience		
Exhibit LS-2	Calculation of Market Price		
Exhibit LS-3	1996 Administrative & General Expenses		
Exhibit LS-4	Retail Cost of Service CTC Proposal		
Exhibit LS-5	Retail CTC/Calculation of Levelized CTC		
Exhibit LS-6	Unbundled Rate Design Residential - Rate RS		
OCA Statement No. 4S	Surrebuttal Testimony of Lee Smith (Response to testimony on treatment of ancillary service costs, line losses, A&G adder, and rates of return)		
Exhibit LS-7	Revised LS-4 (Retail Cost of Service)		

Exhibit LS-8	Revised LS-2 (Calculation of Market Price)		
Exhibit LS-9	Revised LS-5 (Retail CTC)		
Exhibit LS-10	Revised LS-6 (Unbundled Rate Design)		
OCA Statement No. 5	Direct Testimony of Barbara Alexander (Consumer education and consumer protection issues)		
Exhibit BA-1	Resume of Barbara Alexander		
Exhibit BA-2	Vermont Consumer Information and Education Plan		
Exhibit BA-3	California Statewide Consumer Education Plan		
Exhibit BA-4	Massachusetts Department of Public Utilities Code of Conduct		
OCA Statement No. 5R	Rebuttal Testimony of Barbara Alexander (Response to testimony on provision of generation services to default customers and supplier-only bill option)		
OCA Statement No. 5S	Surrebuttal Testimony of Barbara Alexander		
Exhibit BA-S-1	Executive Summary of New Hampshire Pilot Program Survey Report		
Exhibit BA-S-2	CAPUC Fact Sheets on Consumer Education Plan		
Exhibit BA-S-3	Recommendations of the Maine Consumer Education Advisory Board		
OCA Statement No. 6	Direct Testimony of Nancy Brockway (Universal Service Issues)		
Exhibit NB-Duq-1	Resume and Curriculum Vitae of Nancy Brockway		
Exhibit NB-Duq-2	Duquesne Estimation of Potential CAP Eligible Customers		
Exhibit NB-Duq-3	Universal Service Costs - Per kWh Allocator		
Exhibit NB-Duq-4	Development of Non-Production Revenue Allocator		

OCA Statement No. 68	Surrebuttal Testimony of Nancy Brockway (Universal Service Issues)		
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**FIRST JOINT STIPULATION
EXHIBIT NO. 11**

Pennsylvania Public Utility Commission

v.

Duquesne Light Company

Docket No. R-00974104

Index* of OTS Testimony And Exhibits Not Yet Admitted

Exhibit	Description	Date Identified	Date Admitted
OTS Statement No. 3	Direct Testimony of Paul M. Yarolin (concerning Universal Service and rate unbundling)		
OTS Cross Examination Exhibit No. 3	On-the-Record Data Request Response (O'Brien Number 1) concerning the difference in balances associated with cold reserve units		
OTS Cross Examination Exhibit No. 4	On-the-Record Data Request Response (O'Brien Number 4) concerning recovery of decommissioning costs		
OTS Cross Examination Exhibit No. 5	On-the-Record Data Request Response (O'Brien Number 5)** concerning recovery of decommissioning costs		

* OTS reserves the right to request admission of additional exhibits upon receipt of all responses to On-the-Record Data Requests.

** OTS has requested that this On-the-Record Data Request Response be supplemented to properly respond to the request.

**FIRST JOINT STIPULATION
EXHIBIT NO. 12**

**PENNSYLVANIA RETAILERS ASSOCIATION
INDEX OF TESTIMONY**

EXHIBIT	DESCRIPTION	DATE IDENTIFIED	DATE ADMITTED
PRA Statement No. 1	Direct Testimony of Chris K. Albrecht (Phase-in Procedure for retail competition)		


BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Pennsylvania Public Utility)	
Commission)	
)	
v.)	Docket No. R-00974104
)	
Duquesne Light Company)	
Application for Approval of)	
a Restructuring Plan Pursuant)	
to 66 Pa. C.S. § 2806(d))	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a true copy of the foregoing document, by facsimile, upon the participants on the attached service list in accordance with Section 1.54 of the Commission's regulations.

Dated this 7th day of January, 1998.



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BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

APPLICATIONS OF DUQUESNE LIGHT COMPANY
AND WEST PENN POWER COMPANY
FOR APPROVAL OF THEIR
RESTRUCTURING PLANS UNDER SECTION 2806 OF THE
PUBLIC UTILITY CODE

DOCKET NO. R-00974104

DOCKET NO. R-00973981

PREPARED TESTIMONY AND
EXHIBITS OF
DAVID SCHOENGOLD

NOVEMBER 7, 1997

DOCKETED

JAN 14 1998

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1 **Q. Please state your name and business address.**

A. My name is David Schoengold. My business address is MSB Energy
3 Associates, 7507 Hubbard Avenue, Middleton, WI 53562.

5 **Q. On whose behalf are you testifying?**

A. I am testifying on behalf of the Environmentalists.

7

Q. Please describe your background and experience in electric utility issues.

9 A. I have worked in the electric utility field since 1974, first at the Wisconsin Public
11 Service Commission, and then as a consultant. I spent sixteen years at the
13 Wisconsin Public Service Commission, including nine years as the Director of the
15 Systems Analysis Bureau which was responsible for electricity forecasting,
17 generation and transmission planning, demand-side analysis, system modeling,
19 fuel costs, renewable and alternative energy resources, natural gas planning,
21 and emission reduction strategies. Among other assignments at the Wisconsin
23 Commission, I was responsible for the studies which convinced the Commission
25 to order the utilities to avoid a massive commitment to nuclear power and the
27 resulting problems experienced by so many utilities that followed that direction.

As a consultant I have analyzed the impact of restructuring in a number of
states. I have also provided technical expertise to planning collaboratives,
reviewed utility integrated resource plans and supply-side plans, developed
independent integrated resource plans, analyzed sales promotion practices,
reviewed and developed avoided costs, analyzed the impact of resource
alternatives on pollutant emissions, reviewed utility transmission planning
studies, and developed alternative transmission plans including distributed
resources as an option.

1 I have served clients in 25 states and testified in ten. I helped to lead the
development of an EPA-funded study of integrated planning for the PJM system.
3 I drafted the Environmentalists' comments on Pennsylvania utility competition
pilot programs earlier this year and submitted testimony in that docket. I have
5 also submitted testimony for the Environmentalists in both the PP&L
restructuring case, the PECO restructuring case, and the GPU restructuring
7 cases. A complete copy of my vita is attached as Exhibit DS-1.

9 **Q. What is the purpose of your testimony today?**

11 A. I will present the Environmentalists' perspective on a number of issues related to
Duquesne's and West Penn Power's restructuring proposals. In my testimony I
will generally be addressing both Duquesne and West Penn Power, since many
13 of the issues will be the same. If a section of my testimony is intended to
address only one of the utilities, I will so indicate. Otherwise my testimony
15 should be viewed as addressing both.

17
INTRODUCTION

19 **Q. Is there a theme to your testimony?**

21 A. Yes. The Environmentalists have adopted a Vision for the New Electricity
Marketplace which I consulted in developing my testimony. I provided input to
23 the Vision Statement as the Environmentalists group developed it. I attach it as
Exhibit DS-2 in order to inform the Commission of an important consideration in
25 my views. I advise the Commission to use this Vision Statement as a guide.

1

Q. What are the key issues you intend to address today?

3

A. I will address the following issues:

5

Issues Related to Both Duquesne and West Penn Power

7

- Environmental comparability
- Renewable Resources
- True-up of CTC
- Extension of CTC past the transition period
- Lack of immediate rate reduction
- Sharing the stranded cost burden

9

11

13

Duquesne Issues

15

17

- Rate design
- Inconsistencies in the stranded cost collection figures
- Impact of failure to collect stranded costs on Pennsylvania business

19

21

West Penn Power Issues

23

- Riskiness of utility investment
- Market price analysis

25

ISSUES CONCERNING BOTH DUQUESNE AND WEST PENN POWER

27

ENVIRONMENTAL COMPARABILITY

29

Q. What is meant by environmental comparability?

31

A. Environmental comparability means the comparative environmental performance of power plants. In the context of restructuring it refers to whether plants will be held to the same standards of environmental performance.

33

1 **Q. What is the status of environmental comparability under the Duquesne and**
 West Penn Power restructuring proposals?

3 A. There is no environmental *comparability*. New power plants built by new
 entrants to the power market must meet higher standards of environmental
5 performance than existing plants. As a result, existing plants are granted a
 regulatory based economic advantage. Builders of new plants must make
7 significant investments in order to meet standards which existing plants do not
 have to meet. This distorts the market for power. The result is that existing
9 plants are more likely to continue to operate and to keep newer generation from
 being built. Improvements to the environment which newer, cleaner plants would
11 have brought about do not occur.

13 **Q. Haven't the utilities planned on improving the environmental performance**
 of their existing power plants?

15 A. The utilities have included some environmental upgrades in their plans in order
 to meet expected changes in federal standards. However, I have seen no
17 indication in the filings that the plants will be upgraded to meet the same
 standards as new plants have to meet.

19 **Q. Why should the Commission be concerned about air pollution effects?**

21 A. Higher emissions will make it more difficult to maintain air quality at levels
 sufficient to protect human health and property. This may impose restrictions on
23 economic development, constraining the siting of manufacturing operations or
 competitive power producers.

25 **Q. What can the Commission do about environmental comparability?**

1 A. There are two things the Commission can do. The first step would be to require
environmental disclosure of the impacts of generation from each power provider.
3 This step is absolutely vital so that customers can understand the environmental
consequences of their purchase decisions. I will not discuss this any further
5 because the Environmentalists' witness, Bruce Biewald, has addressed this
issue in great detail in his testimony (Environmentalists' Statement 2) distributed
7 November 7, 1997.

9 The next step which the Commission can take is to actually require
environmental standards for power sold in Pennsylvania. I am recommending
11 that the Commission require that all power sold in Pennsylvania come from
plants which meet the emissions standards for new plants. This will have two
13 important impacts.

- 15 ● It will improve the air quality in Pennsylvania.
- 17 ● It will help to level the playing field between new generation and existing
generation.

19

RENEWABLE RESOURCES

21

23 Q. Do the Duquesne and West Penn Power restructuring plans provide for the
encouragement of renewable, sustainable resources?

A. No. There is nothing in the restructuring plans addressing renewable resources.

1

Q. Why are renewable resources important as part of the restructuring package?

3

A. Renewable resources are important for several reasons.

5

- Renewable resources, especially small localized units, will reduce the environmental impacts of power generation.
- Renewable resources will have a positive impact on the local economy.
- Renewable resources, especially small localized units, can reduce the need for transmission and distribution investment.

7

9

11

Q. Are market forces sufficient to enhance the availability of environmentally appropriate power sources for the Company's service territory?

13

A. No. And for that reason I propose that the Commission require the adoption by the Companies of three measures in return for any stranded cost or other beneficial restructuring regulatory treatment.

15

17

Q. What is the purpose of your recommendations?

19

A. As my testimony, and that of Mr. Biewald, explains, historical subsidies for fossil and nuclear generation technologies and investments have disadvantaged environmentally benign power sources, like renewables and distributed power fuel cells. My proposals offer a very modest way for those employing such technologies to take part in the restructured energy market of the Companies' service territories. My first proposal, for "net metering" removes a tariff barrier. My second, for a Company development fund provides a source of capital to deliver direct benefits to the service territory, boosting development and jobs, while avoiding the environmental problems that Midwest coal-fired generation poses for the service territory.

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1 **Q. What is your first renewable development recommendation?**

2 **A.** I recommend that the Companies be required to file a tariff that would facilitate
3 *the customers' use of modest environmentally benign self-generation, like solar*
4 *and fuel cells. I propose the attached tariff, Exhibit DS-6, or something very*
5 *similar to it, to address residential, commercial, and small industrial self-*
6 *generation of 10 kW or less. The tariff would remove doubts about high*
7 *connection fees and would provide for a "net metering" of sorts.*

9 **Q. What is the net metering that your tariff proposal offers?**

10 **A.** *These small self-generating customers would, in effect, be able to run their*
11 *meters two ways. When they buy power from the system they would pay system*
12 *retail rates for their "normal" customer class. If they generated power, as on*
13 *sunny days for a rooftop solar unit, they would be (1) taking less power from the*
14 *grid, or (2) actually providing power to the grid, reversing the meter's flow and*
15 *cutting their monthly bill. If they netted an outflow of power at the end of the 12-*
16 *month billing period the Company would credit their account at the wholesale net*
17 *interchange average rate.*

19 **Q. What resources would the net metering proposal cover?**

20 **A.** I propose including solar, wind, low head hydro, biomass, methane field or coal
21 mine-based methane gas, and fuel cell generation. While net metering has often
22 been applied to or proposed for solar, I would expand it to these other
23 renewables and the distributed power fuel cells that may provide system
reinforcement benefits to the T&D company.

1

Q. What extra charges would apply?

3

A. Only very modest charges would apply to application and inspection. — \$35 for a solar unit and \$250 for another type of unit. Because present technology provides for safe interconnection of such self-generation to utility systems the tariff provides that the utility would absorb any costs up to \$1,000 for the connection. (See IEEE Standard 929-1988 as amended and UL Publication 1741, "Power Conditioning Units for Use in Residential Photovoltaic Power Systems"). For instance, a simplified inspection can confirm that the systems meet IEEE and UL standards.

5

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11

Q. What specific Commission action do you recommend?

13

A. I propose that the Commission require the Companies to file the proposed tariff, slightly modified to identify the relevant general rate tariffs for each rate class.

15

Q. What is your second proposal?

17

A. I recommend that the Commission require the Companies to undertake, as, *effectively, stranded cost mitigation measures, the following three investment measures:*

19

21

1. The Companies should become **full partners in the U.S. Department of Energy's Million Solar Roofs program**, respond to the RFP issued by the UPVG and should, beginning in 1998, provide financial assistance, including low-interest loans, to owners of solar PV installations in the Companies' service territory at rates not 0.5% more than the Company cost of money for periods similar to those of the loans.

23

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29

2. The Companies should invest in an independent, charitable **Sustainable Development Fund** a minimum of 1.0 percent of its gross revenues in conservation, demand-side energy efficiency, and renewable resources in order to ensure that clean sustainable energy sources are available to its customers.

31

1 An independently administered and controlled entity should determine the
appropriate utilization of the money, governed by a board consisting of the
3 following customer interests: OCA, OTS, OSBA, Industrials, other commercials,
environmental groups, consumer groups, low income groups, and municipal
5 customers. If the large industrials opposed such funding, as they have, for
instance, participation in DSM program funding, their large industrial rates would
7 not be assessed these modest charges and they would not participate in the
board.

9
3. The Companies should also invest in an **Energy Conservation Loan Fund**.
11 Two percent (2.0%) of all stranded costs the Company recovers should be
placed in an escrow account to create an energy conservation loan fund
13 available to all Company T&D customers for purposes of making energy
conservation improvements to new and existing facilities. The fund would be
15 administered by an experienced local development fund and governed by a
board composed of public representatives of the public parties in this case,
17 OCA, OTS, OSBA, Industrials, other commercials, environmental groups,
consumer groups, low income groups, and municipal customers. Loans would
19 be given priority on the basis of percentage of electrical energy to be saved,
system reliability benefits, customer class contributions, and need. Loan
21 recipients would be charged interest at a rate at or below the prime interest rate,
as the board determined. After the seven-year transition to competition, any part
23 of the escrowed account not committed to loans at that time, plus any earnings
the account had made, would revert to the Sustainable Development Fund.
25 Outstanding loan payment earnings would then credit to the Sustainable
Development Fund, which would continue to offer such energy conservation
27 loans.

29 **Q. Are there any other steps the Commission should take to encourage
renewable resources?**

31 A. Yes. The Commission should adopt the Better Choice Plan presented by Mr.
Bruce Biewald in his testimony for allocating default customers -- those who do
33 not actively choose a supplier of electricity. The Better Choice Plan contains
additional measures which will encourage renewable resources.

1 **TRUE-UP OF THE COMPETITIVE TRANSITION CHARGE**

3 **Q. Both Duquesne and West Penn Power have testified that it is not possible**
5 **for the Commission to determine the level of stranded cost and competitive**
7 **transition charges (CTC) ahead of time because the market price is not**
9 **predictable. Do you agree with this testimony?**

11 A. Yes. We currently do not have a competitive marketplace for power. Instead we
13 have a marketplace in which regulated utilities with guaranteed recovery of their
15 fixed costs sell small quantities of excess power. Behavior of prices in such a
17 marketplace is unlikely to have much resemblance to the behavior of prices in a
19 real competitive marketplace. Thus, we cannot reliably extrapolate from current
21 market prices to estimate future market prices. While we have theoretical
23 models of how the markets are supposed to work, theoretical models do not
25 always predict real world behavior. Small differences in market prices can make
27 large differences in stranded costs. It is best to wait and see what the actual
market prices are and calculate stranded costs after the fact, rather than guess
at market prices ahead of time and lock into probable mistakes.

19 **Q. The utilities have proposed a mechanism for dealing with the market price**
21 **uncertainty and the resultant stranded cost uncertainty. Do you agree with**
23 **their proposals?**

25 A. I think there are major problems with their proposed mechanism. Also, there are
27 also certain parts of their proposals which are unclear. I will deal first with the
unclear elements.

25 Unclear Elements: While the utilities say that they intend to true-up CTC
27 collection to reflect market price uncertainty, it is not clear whether they also

1 intend to true up CTC collection to reflect changes in sales levels. If there are
going to be true-ups, these true-ups should adjust for both market price and
3 sales uncertainty. Otherwise, the utilities will gain the benefit of sales greater
than those used in determining the CTC level. Also uncertain is what the utility
5 plans call for at the end of the transition period if the CTC collection has not been
sufficient to fully recover 100% of the stranded costs. This situation is discussed
7 more fully in the next section of my testimony.

9 **Q. With what parts of the utility true-up mechanism do you disagree?**

11 A. My biggest problem is with the mechanism proposed for determining the market
price of power each year. While Duquesne's proposal to sell a block of power
each year on the open market seems at first glance to be a reasonable method
13 of obtaining the market price of power (West Penn Power intends to use that
price as well), there are real problems with this approach:

15 1. Since the annual power sale will be for only a portion of Duquesne's
17 power, it is not clear how well the sale price will reflect the overall market price.

19 2. Since the power sale will take place in the context of a mixed
21 competitive/regulated market, it is unlikely that the price will accurately reflect a
true market price. Duquesne as the seller, other competitive sellers, and most
23 potential buyers will have regulated sources of power and monopoly customers
as well. As a result, the market price is likely to be controlled as much by the still
regulated side of the power business as it is by the competitive side.

25 3. As long as buyers and sellers in the marketplace are receiving stranded
27 cost recovery in a regulated setting, it is likely that the market price will be
artificially low. To see why, consider the following equation for stranded cost:

29
$$\text{Stranded Cost} = \text{Utility Cost} - \text{Market Cost}.$$

1 This is the equation almost all Commissions and utilities are using to determine
2 stranded costs. The problem is that once the stranded costs have been set, the
3 same equation can be rewritten as follows:

$$5 \quad \text{Market Cost} = \text{Utility Cost} - \text{Stranded Cost.}$$

7 The act of setting a stranded cost level determines the market price. While this
8 is moderated to some extent under the Duquesne and West Penn Power
9 approaches which allow for the trueing up of the stranded cost, it is very likely
10 that the market price will be heavily weighted towards the initial value used as
11 the estimated market price. If utilities were not allowed recovery of stranded
12 cost, then the price which developed in the competitive marketplace would be a
13 true market price. In the presence of stranded cost recovery, a true market price
14 is unlikely to develop.

15
16 **Q. Is there any solution to the problem of a market price that is not really a**
17 **competitive market price?**

18 **A.** There is no real solution as long as utilities are allowed recovery of stranded
19 costs outside the marketplace. However, there are steps to take which can
20 reduce the problem. Allowing for a true-up, as Duquesne and West Penn Power
21 have proposed, is one important step.

23 Another important step is to use an initial market price estimate on the high side
24 rather than the low side. The initial market price estimate is used in the
25 Commission's initial determination of estimated stranded costs (see the equation
26 for stranded cost set forth above). As part of the unbundling of rates required by
27 the restructuring Act, it is necessary to set a certain amount of the rates as a
28 CTC for stranded cost recovery. This is a portion of rates which all customers
29 will pay, no matter whom they choose as their electricity supplier. The size of the
30 stranded cost recovery portion of the rates will affect the likelihood of new
31 suppliers being able to win customers.

1 While it is true that, under the Duquesne and West Penn Power proposals, the
stranded cost recovery will be adjusted depending on the actual market price of
3 power, it remains the fact that initial customer decisions on whether to choose a
competitive supplier will be based on the initial estimate of stranded cost. A low
5 initial estimate of market price will lead to a high initial estimate of stranded
costs, a high CTC, and less likelihood of customers choosing competitive
7 suppliers. A high initial estimate of market price will have the opposite effect. An
initial higher market price estimate would encourage competition:

- 9
- 11 1. A higher initial market price estimate is more likely to bring
additional competitive suppliers into the market. More suppliers will mean
13 a more competitive market.
 - 15 2. A higher initial market price estimate leads to a lower CTC. A lower
CTC means that less of the utility cost is being recovered outside the
17 marketplace, and thus the market prices are likely to be closer to what
they would be in a true competitive market.

19 Since the utilities will be made whole for stranded cost collection, the level of the
target market price should not matter to them in the long run.

21

23 Another important step is to defer the trueing up of the stranded costs until later
in the transition period rather than to true up each year. This step helps to make
the market more closely approximate a real competitive market than one in
25 which the participants are made whole each year for their market failures.

1
3
EXTENDING THE CTC COLLECTION PERIOD

5 **Q. How long does the Competition Act allow for the collection of Competitive
Transition Charges (CTC)?**

7 A. The Act allows for the collection of a CTC for nine years from the date of the Act.
9 Since the Act was adopted in 1996, this means that CTCs are allowed through
11 2005. Since utilities will not be starting to collect CTCs until 1999, the effective
collection period is up to seven years. In case of securitization, the ITC for
payment of the transition bonds can be collected for 10 years. There are some
exceptions included in the Act, but the basic time periods are seven and 10
years.

13 **Q. Are Duquesne and West Penn Power asking to extend the collection period
15 for the CTC?**

17 A. It isn't exactly clear. Both utilities discuss the potential for still having uncollected
19 stranded costs at the end of the transition period. While they do not specifically
call for extending the CTC to continue collecting stranded costs, such a request
is implied.

21 **Q. Do you support the idea of extending the CTC?**

23 A. No. The purpose of the Competition Act is to bring the benefits of competition --
25 reduced costs -- to customers. Customers will receive no such benefits as long
as the CTC is in place, since the CTC essentially negates any of the benefits of
27 competition. The Pennsylvania General Assembly in its adoption of the
Competition Act, allowed for a reasonable time period -- seven years -- during
which the benefits which customers might otherwise receive from competition

1 could be used to cover the utility costs which result from the move to
2 competition. Assuming some level of stranded cost recovery is allowed, it is
3 inappropriate to extend the CTC collection period beyond the period called for by
4 the Legislature and to postpone the time when customers will receive the
5 benefits of competition.

7 **Q. Assuming some level of stranded cost recovery is allowed, are there any
8 circumstances under which it may be appropriate to extend the collection
9 period for the CTC beyond the statutory seven year period?**

11 A. There are some circumstances under which it may be appropriate to extend the
12 collection period for the CTC. For example, it may be necessary to extend the
13 period in order to get a reasonable level of rate relief for customers. However,
14 neither Duquesne nor West Penn Power are including any rate relief at all for
15 their customers during the CTC collection period in their restructuring proposals.
16 In these cases extending the CTC collection brings no customer benefit as a
17 trade-off.

19 **LACK OF IMMEDIATE RATE RELIEF FOR CUSTOMERS**

21 **Q. Are either Duquesne or West Penn Power proposing any immediate rate
22 relief for their customers in the restructuring proposals?**

23 A. No. Both companies are calling for a continuation of the current rate levels
through the scheduled end of the transition period in 2005.

1

Q. **Do you support the lack of any customer rate relief in the restructuring plans?**

3

A. No. Under these restructuring plans there will be no benefits of competition for customers for over eight years. If, as it appears likely, Duquesne and West Penn Power ask to extend the collection period for the CTC, savings to the customers will be delayed even longer. While customers can choose other suppliers, they will be unlikely to see any benefit from so choosing because of the continuation of the current rate levels.

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Q. **Will providing immediate rate relief to customers affect the utilities' recovery of stranded costs?**

13

A. Yes, it probably will. However, even PECO, which has extremely large claimed stranded cost levels, has offered an immediate 7% rate cut, and sliding scale downward, as part of its 10-year restructuring settlement proposal. Enron, seeking to take on that utility's customers, is offering a 20% rate cut, with a sliding scale and a 10-year CTC.

15

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19

TARGETED AREA PLANNING/DISTRIBUTED UTILITY PLANNING

21

Q. **What is targeted area planning or distributed utility planning?**

23

A. Targeted Area Planning (TAP) is an approach to transmission and distribution planning under which localized resource options are evaluated as alternatives to the building of new transmission and distribution facilities for meeting localized needs in an *integrated* approach.

25

27

1 **Q. What do Duquesne and West Penn Power need to do in order to implement**
an integrated approach to distribution planning?

3 A. An integrated approach to distribution planning means focusing on finding the
least-cost solution to problems, whether that solution is a reinforcement of the
5 distribution system, localized generation, demand-side management
approaches, or renewable resources. Targeted Area Planning responds to a
7 two-fold flaw with any assumption that distribution reinforcement is the
appropriate solution to problems. One, this "solution" may well lead to higher
9 costs to customers. Two, there are adverse environmental impacts from
increased distribution construction and required maintenance.

11

**Q. How can localized generation, demand-side management, and renewable
13 resources reduce the need for distribution investments?**

15 A. Distribution investment is only needed to ensure a distribution capability
adequate to reliably bring needed power to an area from outside that area.
Localized resources reduce the need for outside power supplies (by increasing
17 the locally supplied total) and thus reduce the overall need for T&D capability to
that area.

19

Q. Are localized resources less expensive than distribution reinforcements?

21 A. Sometimes they are, and sometimes they are not. It is not possible to prejudge
the situation. That is why it is necessary to use a planning approach which
23 investigates the full range of options rather than just assume that the distribution
solution is best. Furthermore, it is important to include public input into the
25 process so that customers can have a meaningful say in planning. Sometimes,
even when the initial cost of distributed reinforcements appear to be more
27 expensive than new transmission and distribution lines in first cost, the direct

1 cost, and also the environmental cost, of wholesale tree-trimming and other
required maintenance of traditional line reinforcements can outweigh the initial
3 cost savings of the traditional approach.

5 **Q. What will be required for the utilities to do targeted area planning?**

6 A. Targeted area planning requires that the utility collect local load data, detailed
7 information on the condition and capability of local feeders, etc. It also requires
that each utility develop area-specific avoided costs. If this is not now being
9 done, it should begin immediately. The Commission should require a public
planning process, with meaningful public participation, including a utility-funded
11 discovery/information system, 90 days for customers to review published plans
and backup, transcribed public hearings or technical meetings, and a publicly
13 published final plan. Since the Commission is the *de facto* guarantor of local
T&D reliability, I propose that the Commission oversee this process.

15
17 **SHARING OF THE BURDEN OF STRANDED COSTS-- PRINCIPLES AND
METHODOLOGY**

19 **Q. How is this section of your testimony structured?**

21 A. The general discussion of sharing of responsibility for stranded costs between
stockholders and customers is addressed to both utilities. Specific calculations
23 of return on investment are done for each utility.

1

Q. In this section of your testimony, which stranded costs are you addressing?

3

A. I am addressing the stranded costs related to utility investment in power plants. I am not addressing the stranded costs related to regulatory assets and other elements of stranded cost claims.

5

7

Q. Does this mean that you are supporting the utility claims for recovery of stranded costs related to those categories?

9

A. No. It just means that I have not studied these categories.

11

Q. Have you reviewed the underlying calculations supporting the utility claims for how much stranded generating assets they will have?

13

A. No. I have not analyzed the market price assumptions in detail to determine whether the stranded cost values suggested by the utilities are accurate or overstated. My analysis of the sharing of the stranded cost burden is based on the utilities' statements of their levels of stranded cost. The methodology I have used, however, would be applicable to a different estimate of stranded costs, and my recommendation with respect to sharing of the stranded cost burden would also apply. In other words, I am not accepting, or recommending the recovery of, the utilities' claimed stranded costs.

15

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Q. Why is it fair for utility stockholders to share in the losses due to stranding of costs?

25

A. The amount of stranded generating assets represents a large economic loss. There are large amounts of wasted dollars which will not produce anything of value, but must be dealt with. I do not believe it is correct to hold the customers

27

1 entirely responsible for this loss. To do so would be to treat the stockholders as
if there were no economic loss at all. I believe a sharing of the economic loss is
3 appropriate.

5 **Q. How should one begin to analyze sharing the economic loss?**

A. The first thing to remember is that the customers have been paying returns to
7 stockholders for many years already. The stockholders have already received a
return on their investment in the generating assets -- even on that investment
9 which has turned out to be valueless. It is necessary to take this into
consideration when determining how to share the economic loss.

11 **Q. How much money have the stockholders already been authorized to**
13 **receive in payment for their investment in the stranded assets?**

A. This question is difficult to answer precisely, since a detailed answer would
15 require an extremely intensive review of utility books over the past decades.
However, we can approximate the answer in a fairly straightforward way.

17
The first point is that stockholders have already received a significant portion of
19 their investment back through already booked depreciation. **I estimate that**
Duquesne stockholders have already recovered 41% of their investment in
21 **generating plant, while West Penn Power stockholders have already**
recovered 34.4% of their investment in generating plant. In addition,
23 stockholders have been authorized to earn returns on their investment since it
was put into the rate base.

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Q. How much have the stockholders been authorized to receive in return for their investment in production plant?

A. I have developed a model to estimate stockholder returns to date. This is shown in Exhibits DS-3 and DS-4. This model looks at the depreciation, remaining rate base, and returns on rate base year by year. Exhibit DS-3 shows that, by the time Duquesne's accumulated depreciation has reached 41 percent of the initial investment, the authorized returns on investment have totaled 126.5 percent of the initial investment. For Duquesne, the initial stockholder investment was \$0.835 billion (\$2.084 billion of production plant, times the equity fraction of 40.1%). The total authorized returns have been \$1.057 billion (\$0.835 billion times 126.5%). The total dollars to Duquesne stockholders (depreciation plus return) have been \$1.4 billion).

For West Penn Power, the same Exhibit shows that, by the time the accumulated depreciation has reached 34.4%, the authorized returns on investment have totaled 112.4% of the initial investment. For West Penn Power, the initial stockholder investment was \$0.847 billion (\$1.63 billion of production plant, times the equity fraction of 48.1%). The total authorized returns have been \$0.952 billion (\$0.847 billion times 112.4%).

The total authorized dollars to Duquesne stockholders (depreciation plus return) have been \$1.24 billion).As Schedule 1 of Exhibit DS-4 shows, the Duquesne stockholder authorized internal rate of return on their investment to date has been approximately 8.8 percent.

1 For West Penn Power, Schedule 2 of Exhibit DS-4 shows that the authorized
internal rate of return on their investment to date has been approximately 7.1
3 percent.¹

5 **Q. Does this mean that, even if the Commission allows no recovery of
stranded generating asset costs, the Duquesne stockholders will end up
7 with a return on their investment of 8.8 percent and West Penn Power
stockholders will end up with a return on investment of 7.1 percent?**

9 A. No. The companies will be required to make payments to debt holders for
amortization and interest. If the Commission allows no recovery of stranded
11 generating costs from ratepayers, the stockholders will have to generate the
money to pay off the debt holders. Thus, if the Commission allows for zero
13 recovery, the stockholders' overall return, rather than holding constant, will go
down.

15 **Q. You speak in your testimony of returns that the stockholders have been
17 authorized to earn. Have the stockholders actually earned the authorized
return over the years?**

19 A. Whether or not the stockholders have earned the authorized return is not
relevant, and I have therefore not investigated whether or not they have. It is not
21 relevant because the Commission does not guarantee a return or an earned rate
of return. Rather, it sets tariffs in rate cases under which the utility and its
23 stockholders have the opportunity to earn the authorized return if the

¹ The model used for developing these estimates is a spreadsheet model in Quattro Pro 4. A copy of the model has been provided to the counsels for the utilities by email. Any other party wishing to get a copy of the model can contact me directly by either phone or e-mail. Phone number: 608-831-1127 x.303. E-mail: schoengo@msbnrg.com.

1 management runs the Company properly. If the management does not run the
Company properly, the stockholders may not earn the authorized return. That,
3 however, is not the fault of the Commission and the customers, and they should
bear no responsibility for such mismanagement.

5
**Q. What level of stranded generating asset cost recovery are you
7 recommending?**

9 A. I am recommending that the Commission allow for the recovery of no more than
60 percent of the level of stranded generating assets which it determines are
appropriately recoverable. This is a reasonable level which allows the
11 stockholders a reasonable authorized return on investment. As Exhibit DS-5
shows, the stockholders will end up having made a reasonable return (9.0
13 percent for Duquesne and 8.8 percent for West Penn Power) on bad
investments, but will not have to generate their own funds to pay the debt
15 holders. Customers should have an opportunity to see real reductions in their
cost of electricity. I believe that these results are in line with the intent of the
17 Competition Act.

19 **Q. Have you determined the rate adjustments which result from your
proposed method for dealing with stranded costs?**

21 A. No. Determining the a rate adjustments would require an initial determination,
not only of the level of stranded cost recovery allowed, but also the initial
23 stranded cost level. As I previously stated, I have not determined the actual
stranded cost level for either utility.

25
However, once the initial stranded cost level is determined by the Commission, it
27 is then a straightforward task to determine the resultant rate adjustment. The

1 allowed level of stranded costs, plus the return allowed on those stranded costs,
should be amortized over the seven-year recovery period specified in the
3 Competition Act (1999 through 2005) using the utility's cost of money. A
reasonable assumption for expected load growth over that seven-year period
5 should be used to determine expected annual sales. The Competitive Transition
Cost per kWh is simply the stranded cost recovery in each year divided by the
7 expected sales in that year. If the stranded costs are securitized (not proposed
at this time by the utilities, but also not ruled out), the amortization of the
9 securitization bonds determines the year-by-year cost.

11 **DUQUESNE ISSUES**

13 **RATE DESIGN**

15 **Q. Please describe the key elements of Duquesne's proposed new rate
17 design.**

19 A. The essence of Duquesne's new proposed rate design is a shift of costs from
volume-based charges to fixed customer charges. This rate is designed to
21 promote the sale of additional electricity. I recommend that the Commission
reject this rate *redesign* as an inappropriate interference in the transition to
market.

23 **Q. Is this change in rate design cost-based?**

25 A. While Duquesne claims that it is, the Company has presented only limited
studies to demonstrate that it is cost-based. Generally, in rate cases where the
27 utility wants to completely redesign rates away from the rate design principles

1 which have been followed for a long period of time, extensive and detailed
2 studies are require to justify the change. I do not believe that the justification
3 provided in this docket would be adequate to support such a major change in
4 rate design if this were a rate case. The restructuring docket should not be used
5 as an opportunity for Duquesne to implement rate design changes without
6 proper and adequate scrutiny.

7
Q. Are there problems with Duquesne's proposed new rate design?

9 **A.** Yes. There are many problems.

11 ● Each customer will have a different rate structure, causing problems with
12 fairness and comparability.

13 ● There will be negative environmental impacts from increased air pollution
14 resulting from the promotional character of the new rate design. This is
15 especially likely since the source of power is likely to be coal-fired plants
16 in the ECAR region. Increased air pollution in the Pittsburgh area
17 resulting from the increased operation of the ECAR coal-fired power
18 plants may put a brake to Pittsburgh's economic growth.

21 ● The new rate design undermines efforts to promote energy efficiency and
22 customer-owned renewable resources.

23 ● The new rate design undermines efforts to reduce inefficient use of
24 energy in low-income households with older, less efficient appliances.

27 **Q. Are there any other potential problems with the Duquesne proposed rate
28 design?**

29 **A.** Yes. It is not clear how the proposed rate design fits with the rate cap which is
30 required under the Competition Act. An apparent violation is that it appears that
31 Duquesne would permit itself to adjust rates for those who increase their usage
of electricity so that the rate for the present level of usage would be higher than

1 the current rate. When combined with a rate for incremental usage which is
2 lower than the current rate, the average rate for these customers could be kept
3 below the rate cap, even while the rate for the present level of usage has been
4 increased.

5
Q. Does Duquesne claim any intention to adjust its rates in such a manner?

7 A. Duquesne has stated that it will not do so. I would recommend that, if the
8 Commission adopts the proposed Duquesne rate design, it should expressly
9 forbid the utility from adjusting its rates in the manner I have described. My
10 primary recommendation, however, is to reject this Duquesne proposal.

11
STRANDED COST, DEPRECIATION, AND AMORTIZATION

15 **Q. Have you reviewed Duquesne's claims with respect to its level of stranded
16 cost and the amortization and depreciation of those stranded costs?**

17 A. Yes I have, and there appear to be unexplained inconsistencies in the Duquesne
18 claims. Some witnesses (David Marshall, Donald Clayton) state that Duquesne
19 will amortize and depreciate a minimum of \$1.7 billion of assets by the end of
20 2005. However, a review of Witness Clayton's Exhibit DJC-3 indicates that
21 Duquesne will have a total net rate base of \$1.228 billion of generating assets
22 and \$0.296 billion of generation related regulatory assets, for a total of \$1.525
23 billion of generating assets net rate base. However, Mr. Clayton's testimony
24 claims that after depreciating and amortizing \$1.7 billion on the \$1.525 billion
25 rate base, there will still be \$0.535 billion of net book value at the end of 2005.
26 We reviewed the proposed plant additions over the same time period (from
27 Witness Nelson's Exhibit RLN-5) to see if these were responsible for the

1 apparent inconsistency, but there are not enough additions to make up for the
differential.

3
Q. **Are you saying that Duquesne's claim for the existence of stranded costs
5 appears to be overstated?**

7
A. Yes.

9 **FINANCIAL IMPACT OF NON-RECOVERY OF STRANDED COSTS ON
CUSTOMERS AND OTHER PENNSYLVANIA BUSINESSES**

11
Q. **In his testimony Mr. Morgan O'Brien suggests that failure of the
13 Commission to allow recovery of stranded costs will harm any business in
Pennsylvania which is trying to raise money. Does Mr. O'Brien actually
15 provide any evidence to support this position?**

17
A. No. While Mr. O'Brien states that he will demonstrate the problem, he goes on
to discuss the negative financial impact on Duquesne of failure to recover
19 stranded costs. Mr. O'Brien provides no evidence to suggest that the impact will
be any wider than on the Duquesne stockholders.

21
Q. **Isn't it the case that financial difficulties in one company can lead to
financial difficulties in others?**

23
A. This sometimes happens. Nevertheless, businesses fail all of the time, and
failure of one business does not often lead to failure other businesses unless the
25 failed business owes them money. An important element of our system of
capitalism is that businesses sometimes fail, but the system does not.

1 **Q. Would Duquesne financial problems harm the customers?**

3 A. Not to any great extent. In a truly competitive electric industry the customers will
5 not be harmed by non-recovery of stranded costs. On the contrary, the
7 customers will be better off, since they will not have to bear the burden of paying
9 those stranded costs. There are several reasons why the customers will not be
11 hurt.

13 1. The customers require the facilities which Duquesne owns in order to
15 receive their power but do not require that Duquesne own them. If financial
17 problems hurt Duquesne, under the worst case scenario the Company will be
19 forced to sell off its facilities to another business entity. That entity would
21 continue to provide service to the customers.

23 2. The Duquesne generating plants would still exist. Financial difficulties
25 would not cause the plants disappear. Instead they would be bought by other
27 companies who would continue to run the plants to produce and sell power to
customers in the marketplace. Indeed, we already have GPU and PECO Energy
volunteering to divest themselves of generation, presumably for competitive
advantage.

3. Retail power suppliers (either new providers or the remaining retail sales
portion of the original utility) would be able to buy power in the marketplace for
their retail customers.

4. Customers would continue to receive power, much as they have in the
past, although other companies would produce that power.

29 **Q. Are you suggesting that the Commission should not worry about the
financial health of the utilities in a restructured environment?**

31 A. No. I am not suggesting that at all. However, I believe it is important to point out
33 that stranded cost recovery is not beneficial to the customers. It is also important
to look past the issues of overvalued generation to the competitive environment,
one in which regulation will focus on T&D services.

1 **WEST PENN POWER ISSUES**

3 **RISKINESS OF UTILITY INVESTMENT**

5 **Q. Dr. William Avera, in his testimony on underlying economic assumptions,**
7 **states that the sluggishness of electric utility stock performance in recent**
9 **years demonstrates that utility investment has become riskier. What are**
11 **the implications of this stock behavior?**

13 A. I have not examined the stock performance myself, but instead rely on Dr.
15 Avera's characterization. I have, of course, as a professional working in the area
17 of utility regulation, watched the utility-related behavior of investors, and have
19 addressed investment issues in rate and other cases. If, as Dr. Avera states,
21 electric utility stock performance has been sluggish in recent years, it suggests
23 that stockholders have, in fact, recognized the risk of change in the industry and
25 adjusted their behavior accordingly. This would suggest that the stockholders
27 may have already made their adjustments for the possibility of lost load and
stranded cost. Put differently, the market may have already adjusted for
stranded investment claims, relieving the "pressure" of decision-making from
regulators.

21 **MARKET PRICE ESTIMATES**

23 **Q. In his testimony on market prices, Dr. Howard Pifer makes several**
25 **statements on the performance of the electric power market. Could you**
27 **please discuss these statements.**

A. Dr. Pifer makes the following claims:

- 1 ● The price in the market will be based on the incremental cost of the last
plant called on;
- 3 ● In the long-run the market price must cover the capital and fixed O&M
costs for new capacity;
- 5 ● The market will be an energy-only market without capacity costs;
- 7 ● When the market is stretched for being able to provide enough capacity
(such as during peak times), price will provide the necessary reliability.

9 These statements do not appear to be internally consistent. Dr. Pifer is wrong on
market price. A market price based on the incremental cost of the last plant
11 called on would only coincidentally provide enough revenue to support the
capital and fixed O&M costs of a new entrant.

13
Dr. Pifer is also wrong on reliability. If the market prices only energy and not
15 capacity, the incremental cost of producing that energy at peak periods may not
be sufficiently high to ration the demand and thus provide for reliability. Such an
17 equivalence would again be only coincidental.

19 **Q. What is the implication of the fact that statements made by Dr. Pifer about
the market could only coincidentally be all valid?**

21 A. The implication is that the market model Dr. Pifer presents cannot be a complete
representation of the market. As a result, it cannot be relied upon to produce
23 correct market price estimates. I understand that West Penn Power has
introduced the Pifer market model for informational purposes and not as a final
25 determinant of market prices (which will come from the Duquesne power sales).
Nevertheless, the inconsistencies I have pointed out support the Commission's
27 declining to use the Pifer estimates for the initial market price estimates.

29

1 **CONCLUSIONS, AND RECOMMENDATIONS**

3 **Q. Would you please summarize your conclusions?**

4 A. Yes. I have reached the following conclusions with respect to the Duquesne and
5 West Penn Power restructuring proposals:

- 7 ● Neither proposal provides adequate environmental protection for the
people of Pennsylvania;
- 9 ● Neither proposal provides adequate encouragement of renewable,
sustainable resources;
- 11 ● Neither proposal sufficiently encourages meaningful and beneficial
competition;
- 13 ● The method proposed by Duquesne (and utilized by West Penn Power as
well) to determine market prices is likely to underestimate those market
15 prices. The use of those underestimated market prices will most likely
have a negative impact on competition;
- 17 ● Neither proposal provides rate relief to customers;
- 19 ● Both utility proposals call for too much recovery of stranded costs from
customers;
- 21 ● The Duquesne proposal to redesign its rates will lead to increased air
pollution and will discourage energy efficiency and renewable resources;

23 **Q. Do you have recommendations for the Commission?**

24 A. Yes. Given the problems I have identified with the Duquesne and West Penn
25 Power proposals, I have the following recommendations for the Commission:

- 27 ● The Commission should require that all power sold in Pennsylvania meet
the same environmental standards as for new generating plants;
- 29 ● In order to encourage renewable energy resources, the Commission
should adopt the net metering and interconnection standards I have set
31 forth;
- 33 ● The Commission should require the utilities to adopt the renewable
resource investment measures described in my testimony;
- 35 ● The Commission should not extend the CTC collection period beyond the
seven years specified in the Competition Act, unless significant rate relief
is provided as a *quid pro quo*.

- 1 ● The Commission should require the institution of a targeted area planning
3 process so that cost effective alternatives to traditional T&D investments
 can be identified and implemented;
- 5 ● The Commission should not assign the burden of stranded costs solely to
 the customers, but should instead allocate a portion of that burden to
 stockholders;
- 7 ● The Commission should reject Duquesne's proposal to redesign its retail
9 rates in order to promote the sale of additional electricity.

11 **Q. Does that conclude your testimony?**

13 **A. Yes.**

Exhibit DS-1

to Environmentalists' Statement No. 1

Resume of David Schoengold

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
and West Penn Power Company
for Approval of their
Restructuring Plans under Section 2806 of the
Public Utility Code

DOCKETED
JAN 14 1998

**DOCUMENT
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DAVID SCHOENGOLD
Principal
MSB Energy Associates

EXPERIENCE

MSB Energy Associates, 1988 to present.
Consultant to the Government of Tunisia, 1985.
Wisconsin Public Service Commission, 1974 to 1990.
University of Wisconsin, Institute for Environmental Studies, 1973 to 1974.
United States Peace Corps, Philippines, 1970 to 1972.
Argonne National Laboratories, Applied Mathematics Division, 1968 to 1970.

EDUCATION

BA in Physics, Rutgers University, 1966.
Graduate Study in Physics and Computer Science, University of Chicago, 1966-68.

UTILITY PLANNING AND REGULATORY EXPERIENCE

David Schoengold co-founded MSB Energy Associates in 1988 to provide planning and analytical services to public utility commissions, state energy offices, public interest groups, and others with an interest in public utility policy. Since co-founding MSB Energy Associates Mr. Schoengold has served clients in Arizona, California, Connecticut, the District of Columbia, Georgia, Hawaii, Illinois, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, West Virginia, and Wisconsin. Recently he has analyzed the impact of utility restructuring proposals in California, Illinois, Iowa, Michigan, New York, and Ohio. He has provided technical expertise to planning collaboratives, reviewed utility integrated resource plans and supply-side plans, developed independent integrated resource plans, analyzed sales promotion practices, reviewed and developed avoided costs, analyzed the impact of resource alternatives on emissions of pollutants, reviewed utility transmission planning studies, and developed alternative transmission plans including distributed resources as an option. He has presented testimony in the District of Columbia, Georgia, Illinois, Iowa, Michigan, Minnesota, New York, Ohio, Pennsylvania, West Virginia, and Wisconsin. In addition he has presented workshops and seminars on various aspects of utility planning for numerous groups.

Mr. Schoengold has testified in cases involving rates, resource planning, facility certification, administrative rules, externalities, independent power projects, public policy, and civil damages. He has testified on the need for, alternatives to, and system planning implications of utility plans and proposals, rate design, buy-back rates for cogenerators, energy forecasts, fuel costs, planning budgets, and power plant prudence.

Mr. Schoengold has been involved in utility planning and regulation since 1974 when he joined the Wisconsin Public Service Commission staff. He spent sixteen years at the Wisconsin Commission, including nine years as the Director of the Systems Analysis Bureau which was responsible for electricity forecasting, generation and transmission planning, demand-side analysis, system modeling, fuel costs, renewable and alternative energy resources, natural gas planning, and emission reduction strategies. At

the Wisconsin Commission Mr. Schoengold played a major role in the development of the Wisconsin advance planning process, integrated resource planning, statewide integrated transmission planning and access, and the inclusion of externalities in resource planning. He directed one of the first studies of conservation and renewable resources as least-cost alternatives to traditional utility generation. He performed the analytical work which resulted in Wisconsin abandoning its plans for a heavily nuclear dependent future, enabling the state to avoid the nuclear financial problems common to many states.

TESTIMONY

- New York State Public Service Commission (1997)
Dockets 96-E-0909, 96-E-0897, 96-E-0891, 96-E-0900, 96-E-0898
Regulatory principles for distribution utilities under restructuring for five major New York utilities
- Michigan Public Service Commission (1997)
Docket U-11290
Testimony before the Commission on the impact of different restructuring approaches on electricity utility customers. Comments on staff restructuring report.
- Public Service Commission of Wisconsin (1996)
Docket 6630-UR-109
Appropriate rates for industrial interruptible customers
- Public Service Commission of Wisconsin (1996)
Docket 6690-UR-110
Appropriate buyback rates for power from a small hydroelectric facility
- Minnesota Legislature (1996)
Testimony before the Senate Taxation Committee
Cost and environmental impacts of a proposed cogeneration facility
- Public Service Commission of Wisconsin (1996)
Dockets 6630-CE-197/209 (Point Beach Projects)
Cost-benefit analysis of nuclear plant steam generator repairs
- Minnesota Legislature (1995)
Testimony before the House Energy Committee
Cost and environmental impacts of a proposed cogeneration facility
- Public Service Commission of Wisconsin (1995)
Docket 05-EP-7 (Advance Plans for Electric Utilities)
Cost-benefit analysis of nuclear plant repairs
- Public Service Commission of Wisconsin (1994)
Docket 6690-UR-109
Appropriate buyback rates for power from a small hydroelectric facility
- Illinois Commerce Commission (1994)
Docket 92-0121

Need for and alternatives to a proposed 138 kV transmission line

- Illinois Commerce Commission (1993, 1994)
Docket 92-0221
Need for and alternatives to a proposed 138 kV transmission line
- Public Service Commission of Wisconsin (1992, 1993)
Docket 05-EP-6 (Advance Plans for Electric Utilities)
Cogeneration policies, buy-back rates, and avoided cost methods
- Minnesota Legislature (1992)
Testimony before the Joint Energy Committee
Savings from joint or shared planning among Minnesota utilities
- Georgia Public Service Commission (1992)
Dockets 4031-U and 4034-U
Review of the integrated resource plans of Georgia Power and Savannah Electric Power and development of alternative long-range expansion plans
- Georgia Public Service Commission (1991)
Docket 4047-U
Rules for the preparation and filing of integrated resource plans
- Civil Court, Iron County, Michigan (1991)
AGA Connor Forest Products vs Indeck Energy
Civil damages related to a canceled cogeneration plant
- Minnesota Public Service Commission (1991)
Docket E-002/CN-91-19
Economics analysis of dry-cask storage for spent nuclear fuel at the Prairie Island Nuclear Power Plant and alternative power sources
- District of Columbia Public Service Commission (1991)
Case 905
Cost allocation for a large customer of Potomac Electric Power Company
- Public Service Commission of Wisconsin (1990)
Docket 9990-EP-100
Load management practices of Wisconsin utilities
- Illinois Commerce Commission (1990)
Docket 90-0041
Review of the least-cost plans and planning policies of Central Illinois Light Company
- Illinois Commerce Commission (1990)
Docket 88-0139
Proper use of economic dispatch on the Commonwealth Edison system in the face of complex coal contracts. Testimony, while prepared, was not given due to a settlement in the case.

- West Virginia Public Service Commission (1990)
Docket 89-239-G-PW, et al
Analysis of the conditions under which sales promotion activities should be allowed for gas and electric utilities
- Public Utilities Commission of Ohio (1990)
Dockets 90-659-EL-FOR and 90-660-EL-FOR
Analysis of forecasts and long range plans for Ohio Power and Columbus Southern, including alternative long-range expansion plans for the companies. Testimony, while prepared, was not given due to a settlement of the case.

Mr. Schoengold also testified in numerous cases as a senior staff witness at the Wisconsin Public Service Commission.

- Advance Plans 1 through 5 (Dockets 05-EP-1 through 05-EP-5 -- on numerous occasions between 1977 and 1990)
A wide variety of planning issues including forecasts, nuclear vs coal power, alternative energy, load management, transmission planning, demand-side management resources, cost allocation, cogeneration, avoided costs, demand-side vs supply-side resources, principles and methods of integrated resource planning, and principles and impacts of sales promotion
- Rate Cases (numerous occasions between 1975 and 1990)
 - Wisconsin Electric Power
 - Wisconsin Power and Light
 - Madison Gas and Electric
 - Wisconsin Public Service
 - Northern States Power
 - Proctor and Gamble Cogeneration Buyback ratesFuel costs, cost allocations, sales promotion, demand-side management, time-of-use pricing, avoided costs, and incentive regulation
- Construction Cases
 - Germantown Combustion Turbines (1976-1977)
 - Pleasant Prairie Power Plant (1978)
 - Tyrone Nuclear Power Plant (1978)
 - Weston 3 (1979)
 - Edgewater 5 (1980)
 - Prairie Island -- Eau Claire Transmission Line (1981-1982)
 - Point Beach Nuclear Plant Steam Generator Replacement (1982)Need for power, appropriateness of the utility proposals, and the comparative economics of alternatives
- Generic Investigations
 - Time-of-Use Rates (1978)
 - Load Management (1980)
 - Avoided Cost Methodology (1980)
 - Electric Sales Promotion (1983)
 - Interruptible Rates (1988)

Costs and benefits of various proposals, system planning impacts of load management, and the impacts of resource alternatives

SELECTED REPORTS AND MANUSCRIPTS

"Electric Industry Restructuring in Iowa: Residential and Low Income Customer Impacts," 1996.

"Integrating Clean Air Policy to Improve Air Quality and Reduce Pollution Control Costs for the Electric Power Industry," Report to the Boston Edison DSM Settlement Board, 1996 (co-author).

"Regulation of Distribution Monopolies," Report from the California Regulatory Research Project of the Center for Energy Efficiency and Renewable Technologies, August 1996 (co-author).

"Major Tax Subsidies to Investor-Owned Electric Utilities and the Cost to the U.S. Treasury -- 1994," Report to the American Public Power Association, 1996.

"Explaining Public Power's Low Rates: A Critical Review of the EEI-Sponsored Report: 'Subsidies and Unfair Competitive Advantages Available to Publicly Owned and Cooperative Utilities'," Report to the American Public Power Association, 1996.

"Application of the Distributed Utility Concept to the Boston Edison Company: Creating Additional Value for the Customer," 1995.

"Major Tax Subsidies to Investor-Owned Electric Utilities and the Cost to the U.S. Treasury," Report to the American Public Power Association, 1995.

"The Impact of Nuclear Retirements on Commonwealth Edison and the Eastern Wisconsin Utilities," Report to the Environmental Law and Policy Center of the Midwest, 1995.

"Allocating the Cost of Generating Capacity -- a Discussion Paper of Interclass Subsidies," 1994.

"Energy Efficiency and Renewable Energy -- Opportunities from Title IV of the Clean Air Act," United States Environmental Protection Agency, 1994.

"Planning for Environmental Constraints on the PJM System," 1993.

"Avoided Costs for Electric Utilities -- a Theoretical and Practical Handbook," 1993.

"Spare the Stick and Spoil the Carrot: Why DSM Incentives for Shareholders Aren't Necessary," invited chapter in, Regulatory Incentives for Demand-Side Management, Steven Nadel, Michael Reid, and David Walcott, editors, American Council for an Energy Efficient Economy, 1992 (with Steven Kihm and Paul Newman).

"Final Report on the New Orleans Integrated Resource Planning Project," 1992.

"Assessment of Tradeable Sulfur Dioxide Allowances Generated by Selected Energy Conservation Initiatives," 1991.

"Tertiary Sector Energy Use Model for the Tunisian Energy Planning Project," Resource Management Associates, 1985.

"Alternative Electric Power Supply Study -- Update 1985," Wisconsin Public Service Commission, 1985.

"Alternative Electric Power Supply Study for the Year 2000," Wisconsin Public Service Commission, 1982.

PRESENTATIONS

"Distributed Generation on the Boston Edison System," presentation to the Boston Edison Settlement Board Distributed Utility Workshop, 1995.

"Major Tax Subsidies to Investor-Owned Electric Utilities," presentation to the American Public Power Association, 1995.

"*Planning in the Face of Environmental Constraints*," presentation to the Public Utilities Institute of the University of Wisconsin, 1994.

"Avoided Cost Methods," presentation to the Pennsylvania Public Utility Commission, 1993.

"Avoided Cost Methods," presentation to the Public Utilities Institute of the University of Wisconsin, 1993.

"Modeling Methods for Least-Cost Planning," presentation at the NARUC Least-Cost Planning Training Seminars, 1990.

"Principles of Electric Utility Planning," presentation at the University of Wisconsin -- Eau Claire, 1985.

Exhibit DS-2

to Environmentalists' Statement No. 1

Environmentalists'

**Vision for the
New Electricity Marketplace**

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
and West Penn Power Company
for Approval of their
Restructuring Plans under Section 2806 of the
Public Utility Code

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The Environmentalists' Vision for the New Electricity Marketplace

Fundamental Goal

The fundamental goal of restructuring is to provide a marketplace where consumers have access to adequate, safe, clean, reliable and efficient energy services at fair and reasonable prices at the lowest long-term cost to society.

Public Interest

The marketplace will provide energy services which minimize the long term cost to society rather than maximize the short term monetary gain. The marketplace will not simply be a frenzy for the next cheap kilowatthour, but will also promote public interest concerns such as the environment, public health, universal service, energy security, local economic development, etc. An industry that continues to shift environmental costs to the public is not efficient. Structural changes will be encouraged when they result in improved economic efficiency and serve the broader public interest. Barriers to utilizing life cycle economic analysis will be minimized. Industry/community partnerships will be strengthened to promote such things as energy efficiency in housing and community development.

The public benefits of energy efficiency, renewable resource technologies and research and development should be maintained through existing and new mechanisms. Energy efficiency, renewable resource technologies and research and development provide significant economic and other benefits for Pennsylvania and are critical to achieving a long-term sustainable and efficient electricity future.

Robust Market

The potential for competition to improve economic efficiency and to reduce long-term costs rests on having robust competition in the marketplace. Robust competition requires multiple service providers in the marketplace in order that customers have real choice.

All power generation will face full and fair competition. The utilities will not enjoy competitive advantage, either through massive stranded cost write-offs or other anti-competitive actions. There will be no unreasonable barriers to entry into the marketplace. Market development will be guided in a way that increases the role of competition among energy service providers and the role of choice for customers. The concentration of ownership of generating capacity in the marketplace will be limited in order to minimize opportunities for abuse of market power.

Shared Benefits

Electric industry restructuring is done in a way that benefits all customer classes fairly and does not unduly disadvantage any customer class nor preserve any undue cross-class subsidy. Mechanisms will be developed which enable small users to enjoy the same benefits of the marketplace as large users.

Consumer Choice

Consumers will have the opportunity to make informed choice among electricity providers and services. The marketplace will provide power choices equitably among consumers and customer classes. Similar choices should be available to all consumers under similar terms and costs. There will be no captive customers, either as a result of institutional arrangements or on a *de facto* basis as a result of lack of interest on the part of suppliers to serve certain consumers or groups of consumers.

Consumer Information and Education

Consumers are provided with information concerning their energy purchases that is factual, objective, and understandable, so they can make informed choices. This information includes objective data on the mix of generation sources as well as air and water emissions and other waste generation. This

information is in all promotional materials and billing statements in an easy-to-understand label.

Consumer Protection

Consumers are protected from anti-competitive behavior, undue discrimination, poor service and unfair billing and disconnection practices. The marketplace is obligated to connect and provide service to customers on reasonable terms available to all customers.

Universal Service

Because electricity is vital for health, safety and economic opportunity, universal energy services will be available at just, reasonable and affordable rates to all households needing assistance. Appropriate assistance will be flexible and targeted to include energy conservation, bill payment assistance, budget counseling, energy education, renewable energy and other tools to enable all Pennsylvanians to afford a reasonable level of energy services. Permanent energy assistance in the form of energy conservation will be a strong part of the universal service strategy. Universal service programs will be credited with the savings they cause in collection costs and bad debt write-offs.

In order to leverage additional resources and to maximize their effectiveness, universal service programs will be offered in a broader context of human services through community-based providers.

Network Integrity

The safety, reliability, quality and sustainability of electric service will be maintained or improved in a restructured electric industry. Market-based decisions, driven by economics and competition alone, could jeopardize critical safety and reliability of long-term strategic resource and facility planning. Public policy should ensure the integrity of the electric grid and encourage prudent long-term resource planning, acquisition and utilization.

There will be open interconnection access with the grid in a transparent and user-friendly process. The utilization of distributed energy systems will be facilitated through such strategies such as net metering for small-scale renewable and clean energy

systems. The grid will be operated by a truly Independent System Operator (ISO), providing open access to the transmission system to support a vigorous and competitive power market.

The distribution system will use integrated targeted area resource planning to determine the least cost strategies to upgrade the distribution system. Building more lines will be the option of choice only when it is cheaper than the other alternatives. Parties implementing conservation or distributed energy which benefits power flows on the distribution system and avoids or postpones upgrades will receive some of the savings they have made possible. The same will be true for the transmission system.

Stranded Costs

The consideration of stranded costs will seek to balance the ratepayers' expectations of access to the benefits of restructuring and competitive energy supplies and services with the shareholders' reasonable expectations of an economic return. The analysis will involve a three step process of (1) the identification and quantification of the stranded cost claim, (2) the review of the adequacy of each utility's efforts to mitigate its stranded costs, and (3) the appropriate sharing of the stranded costs between ratepayers and shareholders.

Decommissioning costs will be adequately funded in a manner that is fair and efficient. Nuclear plant operators will be responsible for some portion of the decommissioning costs and will have an interest in controlling those costs.

Dated: June 18, 1997

Exhibit DS-3

to Environmentalists' Statement No. 1

**Return on Investment To-Date
for Stockholders**

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
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Table DS-3. Simple Return Model
(per unit of investment)

Plant Life = 35
Return on Equity = 11.5%

	Accumulated Depreciation	Rate Base	Return	Cumulative Return
1	0.029	0.971	0.112	0.112
2	0.057	0.943	0.108	0.220
3	0.086	0.914	0.105	0.325
4	0.114	0.886	0.102	0.427
5	0.143	0.857	0.099	0.526
6	0.171	0.829	0.095	0.621
7	0.200	0.800	0.092	0.713
8	0.229	0.771	0.089	0.802
9	0.257	0.743	0.085	0.887
10	0.286	0.714	0.082	0.969
11	0.314	0.686	0.079	1.048
12	0.343	0.657	0.076	1.124
13	0.371	0.629	0.072	1.196
14	0.400	0.600	0.069	1.265
15	0.429	0.571	0.066	1.331
16	0.457	0.543	0.062	1.393
17	0.486	0.514	0.059	1.452
18	0.514	0.486	0.056	1.508
19	0.543	0.457	0.053	1.561
20	0.571	0.429	0.049	1.610
21	0.600	0.400	0.046	1.656
22	0.629	0.371	0.043	1.699
23	0.657	0.343	0.039	1.738
24	0.686	0.314	0.036	1.774
25	0.714	0.286	0.033	1.807
26	0.743	0.257	0.030	1.837
27	0.771	0.229	0.026	1.863
28	0.800	0.200	0.023	1.986
29	0.829	0.171	0.020	1.906
30	0.857	0.143	0.016	1.922
31	0.886	0.114	0.013	1.935
32	0.914	0.086	0.010	1.945
33	0.943	0.057	0.007	1.952
34	0.971	0.029	0.003	1.955
35	1.000	-0.000	-0.000	1.955

Exhibit DS-4

to Environmentalists' Statement No. 1

**Total Return to-Date
for Stockholders**

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
and West Penn Power Company
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Table DS-4/1. Internal Rate of Return to-Date -- Duquesne
(costs in \$billions)

Year	Initial Investment	Cumulative Depreciation	Rate Base	Return	Return Plus Depreciation	Total To-Date	Equity Holders Cash Flow	
1	-0.835	0.024	0.811	0.047	0.071	0.071	-0.765	IRR To-Date 8.8%
2		0.048	0.788	0.091	0.114	0.185	0.114	
3		0.072	0.764	0.088	0.112	0.297	0.112	
4		0.095	0.740	0.085	0.109	0.406	0.109	
5		0.119	0.716	0.082	0.106	0.512	0.106	
6		0.143	0.692	0.080	0.103	0.615	0.103	
7		0.167	0.668	0.077	0.101	0.716	0.101	
8		0.191	0.644	0.074	0.098	0.814	0.098	
9		0.215	0.620	0.071	0.095	0.909	0.095	
10		0.239	0.597	0.069	0.092	1.002	0.092	
11		0.263	0.573	0.066	0.090	1.091	0.090	
12		0.286	0.549	0.063	0.087	1.178	0.087	
13		0.310	0.525	0.060	0.084	1.263	0.084	
14		0.334	0.501	0.058	0.081	1.344	0.081	

Table DS-4/2. Internal Rate of Return to-Date -- West Penn Power
(costs in \$billions)

Year	Initial Investment	Cumulative Depreciation	Rate Base	Return	Return Plus Depreciation	Total To-Date	Equity Holders Cash Flow	
1	-0.847	0.024	0.823	0.047	0.072	0.072	-0.776	IRR To-Date 7.1%
2		0.024	0.799	0.092	0.116	0.188	0.116	
3		0.024	0.775	0.089	0.113	0.301	0.113	
4		0.024	0.751	0.086	0.111	0.412	0.111	
5		0.024	0.726	0.084	0.108	0.519	0.108	
6		0.024	0.702	0.081	0.105	0.624	0.105	
7		0.024	0.678	0.078	0.102	0.726	0.102	
8		0.024	0.654	0.075	0.099	0.826	0.099	
9		0.024	0.630	0.072	0.097	0.922	0.097	
10		0.024	0.605	0.070	0.094	1.016	0.094	
11		0.024	0.581	0.067	0.091	1.107	0.091	
12		0.024	0.557	0.064	0.088	1.196	0.088	

Exhibit DS-5

to Environmentalists' Statement No. 1

**Methodology for Determining
Total Return of and on Investment
for Stockholders
Through End of Transition Period**

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
and West Penn Power Company
for Approval of their
Restructuring Plans under Section 2806 of the
Public Utility Code

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Table 1. Total Return of and on Investment to Stockholders
Duquesne Light Company
Allowed Recovery Fraction: 60.0%

Costs in Billions

-----	-----
Production plant in service (1)	2.084
Equity fraction (2)	40.1%
Equity cost (3)	0.835
Debt fraction (includes pref) (4)	59.9%
Depreciation fraction (to date). (5)	41.1%
Depreciation to-date (6)	0.856
Equity share to-date (7)	0.343
Net Production Plant (current) (8)	1.228
Market value (current) (9)	0.000
Net stranded cost (current) (10)	1.228
Cumulative return to-date fraction (11)	126.5%
Cumulative return to-date (12)	1.057
Total to equity holders to date (13)	1.400
Fraction returned to date (14)	167.6%
Equity holder IRR to-date (15)	8.8%
-----	-----
Stranded asset allowed fraction (16)	60.0%
Allowed future depreciation (17)	0.737
Allowed future return on capital (18)	0.215
Total to be collected in the CTC (19)	0.951
Total CTC collection plus market value (20)	0.951
To be paid to retire debt principal (21)	0.736
To be paid to interest (22)	0.188
Total to be paid to debt holders (23)	0.924
Residual for equity holders (24)	0.028
Overall total to equity holders (25)	1.427
Total recovery fraction (26)	170.9%
Equity holder IRR after transition (27)	9.0%

Table 2. Total Return of and on Investment to Stockholders
West Penn Power

Allowed Recovery Fraction: 60.0%

Costs in Billions

-----	-----
Production plant in service (1)	1.633
Equity fraction (2)	51.9%
Equity cost (3)	0.847
Debt fraction (includes pref) (4)	48.1%
Depreciation fraction (to date) (5)	34.4%
Depreciation to-date (6)	0.561
Equity share to-date (7)	0.291
Net Production Plant (current) (8)	1.072
Market value (current) (9)	0.000
Net stranded cost (current) (10)	1.072
Cumulative return to-date fraction (11)	112.4%
Cumulative return to-date (12)	0.952
Total to equity holders to date (13)	1.244
Fraction returned to date (14)	146.8%
Equity holder IRR to-date (15)	7.1%
-----	-----
Stranded asset allowed fraction (16)	60.0%
Allowed future depreciation (17)	0.643
Allowed future return on capital (18)	0.181
Total to be collected in the CTC (19)	0.824
Total CTC collection plus market value (20)	0.824
To be paid to retire debt principal (21)	0.515
To be paid to interest (22)	0.110
Total to be paid to debt holders (23)	0.626
Residual for equity holders (24)	0.199
Overall total to equity holders (25)	1.442
Total recovery fraction (26)	170.2%
Equity holder IRR after transition (27)	8.8%

Table 3. Internal Rate of Return Methodology (costs in billions of dollars)
Duquesne Light Company
Through End of Transition Period

Year	Initial Investment	Cumulative Depreciation	Rate Base	Return	Return Plus Depreciation	Future Return Plus Depreciation	Equity Holders Cash Flow	
1	-0.835	0.024	0.811	0.047	0.071	0	-0.765	Total IRR
2		0.024	0.788	0.091	0.114	0	0.114	9.0%
3		0.024	0.764	0.088	0.112	0	0.112	
4		0.024	0.740	0.085	0.109	0	0.109	IRR To-Date
5		0.024	0.716	0.082	0.106	0	0.106	8.8%
6		0.024	0.692	0.080	0.103	0	0.103	
7		0.024	0.668	0.077	0.101	0	0.101	
8		0.024	0.644	0.074	0.098	0	0.098	
9		0.024	0.620	0.071	0.095	0	0.095	
10		0.024	0.597	0.069	0.092	0	0.092	
11		0.024	0.573	0.066	0.090	0	0.090	
12		0.024	0.549	0.063	0.087	0	0.087	
13		0.024	0.525	0.060	0.084	0	0.084	
14		0.024	0.501	0.058	0.081	0	0.081	
15						0.004	0.004	
16						0.004	0.004	
17						0.004	0.004	
18						0.004	0.004	
19						0.004	0.004	
20						0.004	0.004	
21						0.004	0.004	

Table 4. Internal Rate of Return Methodology (costs in billions of dollars)
West Penn Power
Through End of Transition Period

Year	Initial Investment	Cumulative Depreciation	Rate Base	Return	Return Plus Depreciation	Future Return Plus Depreciation	Equity Holders Cash Flow	
1	-0.847	0.024	0.823	0.047	0.072	0	-0.776	Total IRR
2		0.024	0.799	0.092	0.116	0	0.116	8.8%
3		0.024	0.775	0.089	0.113	0	0.113	
4		0.024	0.751	0.086	0.111	0	0.111	IRR To-Date
5		0.024	0.726	0.084	0.108	0	0.108	7.1%
6		0.024	0.702	0.081	0.105	0	0.105	
7		0.024	0.678	0.077	0.102	0	0.102	
8		0.024	0.654	0.075	0.099	0	0.099	
9		0.024	0.630	0.072	0.097	0	0.097	
10		0.024	0.605	0.070	0.094	0	0.094	
11		0.024	0.581	0.067	0.091	0	0.091	
12		0.024	0.557	0.064	0.088	0	0.088	
13						0.028	0.028	
14						0.028	0.028	
15						0.028	0.028	
16						0.028	0.028	
17						0.028	0.028	
18						0.028	0.028	
19						0.028	0.028	

Exhibit DS-6

to Environmentalists' Statement No. 1

Proposed Draft for Net Billing Tariff

Docket No. R-00973981

Docket No. R-00974104

Applications of Duquesne Light Company
and West Penn Power Company
for Approval of their
Restructuring Plans under Section 2806 of the
Public Utility Code

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TARIFF ELECTRIC DELIVERY PA. P.U.C. NO. 1

XXX Company ORIGINAL PAGE NO. XXRATE xxx - SMALL RENEWABLE ENERGY SERVICE

AVAILABILITY

Single-phase electric service in the entire territory of the Company for a Customer served under Rate xxx [residential], Rate xxx [commercial] or Rate xxx [small industrial], that has installed a device or devices that are a bona fide technology for use in generating electricity from qualifying renewable energy installations not exceeding 10 kW, and that will be operated in parallel with the Company's system. Qualifying renewable energy installations include solar panels, wind, low head hydro, biomass, methane field or coal mine-based methane gas, and fuel cell generation. The customer's equipment must conform to the installation requirements contained in the Company's published requirements for parallel operation of non-utility generation, or similar document.

LIMITATIONS ON FEES AND CHARGES

The Company shall evaluate system interconnections according to current IEEE standards and shall absorb costs up to \$1,000 for any system upgrades it finds are necessary. In addition, administrative charges for the application fee, application and/or engineering review and inspection costs shall be limited to the lesser of cost or: (1) \$35 for a photovoltaic installation; or (2) \$ 250 per installation for other than a photovoltaic installation. This paragraph's limitations for single charges apply to multiple installations at one site using similar equipment.

(Not available when the source of supply is service purchased from a neighboring utility company under Rate xxx for borderline interchange service.)

METERING/BILLING PROVISIONS

A customer may select one of the following three billing and metering options in conjunction with the Applicable Rates xxx and their charges. None of these options shall include an additional monthly meter reading charge.

- (a) A non-ratcheted, bidirectional meter may be used to record net energy sales to the customer.
- (b) A smart meter may be installed that measures energy delivered by the Company to the customer and also measures the energy delivered to the Company from the customer that is generated by the customer's qualified renewable energy installation.
- (c) Two meters may be installed. One will measure the energy delivered by the Company that the customer uses, and the other will measure the energy delivered to the Company from the customer that is generated by the customer's qualified renewable energy installation.

If, in any billing month, the amount of energy delivered by the Company that the customer uses is greater than the amount of energy the customer delivered to the Company, the Company will bill the customer for the difference. If, in any billing month, the amount of energy delivered by the Company that the customer uses is less than the amount of energy the customer delivered to the Company, the Company will allow the customer to carry forward a credit for up to 12 months, at which point the Company will pay the customer for the excess using the monthly average net interchange billing rate for the period.

A customer may sell any excess energy to an Electric Generation Supplier other than the Company, including a broker or aggregator, and the passing of title to the power shall not affect the provisions of this tariff.

CURRENT CHARACTERISTICS.

Standard single-phase secondary service.

MONTHLY RATE TABLE FOR NET ENERGY USED BY CUSTOMER. (See Applicable Rate xxx, Rate xxx or Rate xxx for charges.)

MINIMUM CHARGE: The minimum charge per month will be the Fixed Distribution Service Charge for the applicable Rate xxx, Rate xxx, or Rate xxx Service for residential, commercial and small industrial customers.

STATE TAX ADJUSTMENT CLAUSE, COMPETITIVE, AND ANY INTANGIBLE TRANSITION CHARGES apply to customers taking service under this rate.

CONTRACT TERM.

Not less than 12 months.

PAYMENT TERMS.

Standard

BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION

APPLICATION OF DUQUESNE LIGHT COMPANY
FOR APPROVAL OF
RESTRUCTURING PLANS UNDER SECTION 2806 OF THE
PUBLIC UTILITY CODE

DOCKET NO. R-00974104

PREPARED SURREBUTTAL TESTIMONY
OF DAVID SCHOENGOLD

DECEMBER 11, 1997

DOCKETED
JAN 14 1998

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1 **Q. Please state your name and business address.**

2 A. My name is David Schoengold. My business address is MSB Energy
3 Associates, 7507 Hubbard Avenue, Middleton, WI 53562.

4 **Q. On whose behalf are you offering surrebuttal testimony?**

5 A. On behalf of the Environmentalists.

6 **Q. Are you the same David Schoengold who has offered direct testimony in
7 this docket?**

8 A. Yes.

9 **Q. Have you previously provided a description of your background and
10 experience in electric utility issues?**

11 A. Yes. I will not repeat it here.

12 **Q. What is the purpose of your surrebuttal testimony today?**

13 A. I will respond to the rebuttal testimony of Mr. Donald J. Clayton of Duquesne
14 Light Company.

15 **Q. What part of Mr. Clayton's testimony are you rebutting?**

16 A. Mr. Clayton claims at page 43 of his rebuttal testimony that it is impossible to
17 carve out specific assets when assessing stockholder returns, because investors
18 invest in the company as a whole. This claim is inaccurate and misleading.
19 While it is true that stockholders invest in the company as a whole and not in
20 individual assets, the perspective of the Public Utility Commission is quite
21 different from that of the stockholders. The PUC makes judgments on individual
22 assets all the time. If an investment is disallowed, this is a judgment on an

1 individual asset. If a rate case is delayed, the assets added since the
2 determination of the rate base in the last rate case are treated differently than
3 those already in the rate base. As a result, the return on investment on the rate
4 base is hardly ever the same as the return on investment in the entirety of the
5 utility's capital.

6
7 As another example, when utility assets are treated as below-the-line
8 investments, the treatment of those assets is different than above-the-line
9 investments. To take this example even further, in the case of a utility owned by
10 a holding company with no public ownership of the utility stock (but, instead, only
11 public ownership of the holding company), stockholder return on investment is
12 only indirectly related to return on the regulated utility portion of investment. I
13 believe the evidence is clear that stockholders can deal with the situation of
14 differential treatment of different portions of their investment.

15
16 Thus, the approach I recommended in my direct testimony is based on common
17 practice.

18 **Q. Does that complete your rebuttal testimony?**

19 **A. Yes**

Environmentalists' Statement No. 2

Before the

Pennsylvania Public Utility Commission

**Duquesne Light Company and
West Penn Power Company
Restructuring Plans**

Dockets R-00974104 and R-00973981

Testimony and Exhibits of

Bruce Edward Biewald

**Synapse Energy Economics, Inc.
22 Crescent Street, Cambridge, MA 02138
phone: 617-661-3248; fax: 617-661-0599
biewald@synapse-energy.com**

November 7, 1997

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JAN 14 1998

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35		<i>Information, March 1997.</i>
36	Exhibit BEB-4	<i>Better Choice Plan: Three Examples</i>

1 **1. Qualifications**

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 renewables, efficiency, environmental quality, and nuclear power.

10 **Q. What are your qualifications with regard to energy policy?**

11 A. I graduated from the Massachusetts Institute of Technology in 1981, where I
12 studied energy use in buildings. I was employed for 15 years at the Tellus
13 Institute, where I was Manager of the Electricity Program, responsible for studies
14 on a broad range of electric system regulatory and policy issues. I have testified
15 on energy issues in more than 35 cases in regulatory proceedings in 18 states
16 and two Canadian provinces. I have co-authored approximately 80 reports,
17 including studies for the Electric Power Research Institute, the U.S. Department
18 of Energy, U.S. Environmental Protection Agency, the Office of Technology
19 Assessment, the New England Governors' Conference, the New England
20 Conference of Public Utility Commissioners, and the National Association of
21 Regulatory Utility Commissioners. My papers have been published in the
22 Electricity Journal, Energy Journal, Energy Policy, Public Utilities Fortnightly and
23 numerous conference proceedings, and I have made presentations on the
24 economic and environmental dimensions of energy throughout the U.S. and
25 internationally. My resume is provided here as Exhibit BEB-1.

26 **Q. What is your experience with regard to environmental disclosure for**
27 **electricity?**

28 A. I have analyzed the issue on behalf of the Vermont Department of Public
29 Service and the Regulatory Assistance Project. The paper that I coauthored for
30 RAP on environmental disclosure is provided here as Exhibit BEB-3. I have also
31 made presentations on this issue at workshops sponsored by the Center for
32 Clean Air Policy, the Energy Foundation, and the American Wind Energy
33 Association.

34 **Q. What was your role in preparing the report provided as Exhibit BEB-3?**

1 A. Synapse Energy Economics worked as a contractor to the Regulatory
2 Assistance Project. I was involved in conceptualizing the issues, preparing
3 drafts, editing the entire report, and finalizing it. I am prepared to answer
4 questions about any aspect of the report.

5 **Q. What is your experience with regard electric utility restructuring and the**
6 **Pennsylvania Commission's docket?**

7 A. In Pennsylvania this year, I have prepared testimony on behalf of the
8 Environmentalists for the following cases:

9 PECO Energy's securitization case (February 28),
10 PECO Energy's restructuring case (June 17),
11 PP&L's restructuring case (June 30) and surrebuttal (August 15),
12 Met-Ed and Penelec restructuring cases (September 19), and
13 PECO Energy's settlement (September 29).

14 I also worked on a review of the pilot program proposals.

15 **Q. What is your experience specifically with regard to nuclear**
16 **decommissioning costs?**

17 A. I have investigated, studied and testified on the topic of nuclear power plant
18 economics and decommissioning costs since 1982. I have testified on the
19 projected costs and funding of nuclear plant decommissioning in state regulatory
20 proceedings in Arizona, California, New Hampshire, and Wisconsin. I have been
21 invited to speak on decommissioning by the National Association of State Utility
22 Consumer Advocates (NASUCA), and my papers on the subject have been
23 published in the Energy Journal and Public Utilities Fortnightly. I have compiled
24 and analyzed a database of nuclear plant decommissioning cost estimates that
25 were prepared by TLG Engineering, Duquesne's decommissioning consultant in
26 this case. A graph of that data is presented in Exhibit BEB-2.

27 **Q. Has your testimony served as the basis for regulatory commission**
28 **decisions?**

29 A. Yes. The Michigan Public Service Commission has adjusted Consumers
30 Power Company and Detroit Edison Company projections of power costs based
31 upon my projections of fuel costs, purchased power costs and sales revenues.
32 The Massachusetts Department of Public Utilities adopted the set of monetary
33 values for air pollutants recommended in my testimony. The California Public
34 Utilities Commission adjusted a TLG Engineering, Inc. estimate of nuclear
35 decommissioning costs by approximately \$100 million, based upon my
36 testimony. In addition, my recommendations have been reflected in several

1 settlement agreements in cases on excess capacity, avoided costs and power
2 plant performance.

1 **2. Summary and Recommendations**

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

3 A. I was retained by the parties to this case collectively known as "The
4 Environmentalists" to comment on environmental disclosure for electricity, on
5 nuclear plant decommissioning, and on the Environmentalists' proposal for a
6 "Better Choice Plan" to enhance the likelihood of robust competition in the
7 Companies' service territories. My testimony should also be considered in
8 conjunction with that of David Schoengold who will be presenting the
9 Environmentalists' perspective on other issues in this docket.

10 **Q. Which utility companies does this testimony address?**

11 A. This testimony addresses Duquesne Light Company, also referred to as
12 "Duquesne," and West Penn Power Company, also referred to as "West Penn."
13 Where I mean to refer to both companies, I use the term "the Companies."

14 **Q. What is the foundation of the Environmentalists' view of electric
15 competition for this case and this company?**

16 A. As the Environmentalists envision the future with a market characterized by
17 robust competition,

- 18 ● customers will be well informed of their generation options, including price,
19 risk and environmental attributes,
- 20 ● "clean electricity" options in which customers can make a real and positive
21 change to the region's resource mix will be developed and marketed
22 effectively,
- 23 ● a robust wholesale market will develop in which smaller companies will
24 compete on fair terms with larger companies, and all customers will have an
25 opportunity to benefit,
- 26 ● nuclear plant decommissioning will be adequately funded to provide
27 assurance of the availability of funds for eventual plant dismantlements,
- 28 ● nuclear plant decommissioning costs will be managed carefully and shared
29 equitably,
- 30 ● any stranded cost recovery that is allowed will be recovered fairly, with all
31 customers bearing their share of the burden.

32 **Summary of environmental disclosure and consumer education**

33 **Q. Please summarize your conclusions and recommendations with regard
34 to environmental disclosure for electricity and consumer education.**

1 A. Disclosure. The Commission should require all retail electricity suppliers
2 selling in Pennsylvania to disclose their fuel mix and key air and other waste
3 emissions to consumers in a standard and easy to comprehend label.
4 Disclosure should be mandatory for all suppliers. These requirements should
5 apply to Duquesne and West Penn. The tracking of transactions to support
6 disclosure and labeling should be done by the Independent System Operator
7 (ISO).

8 Adoption of Objectives. I recommend that a set of objectives be adopted to
9 guide the design and implementation of a fuel mix and environmental disclosure
10 system. Specifically, the system should be effective, accurate, comprehensive,
11 flexible, simple, expandable, inclusive and credible. It is essential that the
12 system be created in such a way that customers who pay more for clean
13 electricity actually make a difference to the resource mix.

14 Consumer Education. A comprehensive program of consumer education on the
15 environmental effects of electricity production and use should be implemented to
16 complement disclosure. The Company and the Commission should include the
17 Environmentalists and other interested parties in the process of developing and
18 reviewing consumer education plans and materials.

19 Disclosure and consumer education issues are discussed in Section 3 of my
20 testimony, below.

21 **Summary of nuclear decommissioning**

22 **Q. Please summarize your findings and conclusions with regard to nuclear**
23 **decommissioning costs.**

24 A. My findings on the treatment of nuclear decommissioning costs in this case
25 are the following:

- 26 ● The currently approved cost amount for nuclear decommissioning obligations
27 is about \$9 million per year for Duquesne (page 17, direct testimony of
28 Morgan K. O'Brien, Duquesne Statement No. 4).
- 29 ● The Company's total estimated nuclear decommissioning obligation as of
30 year-end 1996, is estimated to be \$312 million in year-end 1996 dollars, of
31 which only \$34 million is funded (page 17, direct testimony of Morgan K.
32 O'Brien, Duquesne Statement No. 4).
- 33 ● The Company proposes to continue to collect \$9 million per year as part of its
34 stranded cost recovery toward its nuclear decommissioning obligation, and
35 that in January, 2006, the unfunded balance will be treated as "a reduction in

- 1 any residual value of its generating plant (page 17, direct testimony of
2 Morgan K. O'Brien, Duquesne Statement No. 4).
- 3 ● The Companies have not demonstrated mitigation of the nuclear
4 decommissioning portion of their stranded costs.
 - 5 ● Mitigation is difficult to do or to demonstrate at this point in time for nuclear
6 decommissioning costs, since the key activities will occur so far into the
7 future.

8 My key, but more general, points on nuclear decommissioning costs are the
9 following:

- 10 ● Duquesne's nuclear decommissioning cost obligation is large, very uncertain,
11 and to some extent within the control of the plant owner.
- 12 ● Duquesne's nuclear decommissioning consultant, Mr. Thomas LaGuardia,
13 has been estimating decommissioning costs for 20 years. Even after
14 adjusting for inflation, his recent estimates are roughly six times his 1976 cost
15 estimate for dismantling a large pressurized water reactor, and the average
16 annual rate of escalation in his estimates has out paced inflation by about 10
17 percent per year over the past two decades (see Exhibit BEB-2).
- 18 ● To some extent costs can spill over between nuclear decommissioning and
19 the costs of operation and the costs of spent fuel disposal.
- 20 ● Some decommissioning costs are the result of the continued operation of the
21 facilities.
- 22 ● It is difficult to make a specific plan now for nuclear decommissioning costs
23 that are so uncertain and that will be incurred so far into the future.
- 24 ● The principles that should guide sound nuclear decommissioning policy are:
25 (1) **assurance** that adequate funds will be available to decommission the
26 plants in a safe and timely manner, (2) **equity** between customers and
27 shareholders, and across generations, and (3) **efficiency**, primarily provided
28 by creating a framework in which the plant operator has an appropriate
29 incentive to control the costs of the decommissioning project.

30 **Q. Please summarize your recommendations with regard to nuclear**
31 **decommissioning costs.**

32 A. I recommend the following:

- 33 ● For any additional costs for decommissioning that Duquesne is allowed to
34 recover through the CTC, or to include in its stranded cost calculations,
35 Duquesne should be required to demonstrate that it will -- and has -- placed
36 the funds into its external decommissioning fund.
- 37 ● The Commission should require an adequate plan from Duquesne for the
38 mitigation of its decommissioning costs.
- 39 ● Procedures should be put in place to ensure that the plant is operated in such

- 1 a way that the decommissioning cost obligation is not increased.
- 2 ● The Company should be responsible for an equitable portion of any
 - 3 decommissioning costs in excess of current projections, and be responsible
 - 4 for all excess costs not demonstrated to be prudently incurred.
 - 5 ● In the event that decommissioning costs are less than expected, customers
 - 6 should receive an appropriate refund.
 - 7 ● If any nuclear decommissioning funding is provided as part of stranded cost
 - 8 recovery, there should be a requirement for a cost-benefit analysis of
 - 9 continued operation of the unit and demonstration of efficient management
 - 10 as part of any request for increased decommissioning funding.
 - 11 ● The Commission should address the complicated technical and policy issues
 - 12 of nuclear decommissioning in a generic case, in which limited regulatory
 - 13 resources can be used efficiently and a consistent policy can be developed
 - 14 that does not unfairly disadvantage one company relative to another.
 - 15 ● The Commission should carefully weigh the costs, benefits, and risks before
 - 16 assigning nuclear decommissioning to the wires business. It should consider
 - 17 the problems that occurred in the past when cost-based regulation was
 - 18 applied to the large, complex, expensive, and uncertain project of nuclear
 - 19 plant construction. It should consider the benefits of an incentive framework
 - 20 for nuclear decommissioning costs, in which the risks are shared between the
 - 21 Company and its customers.
 - 22 ● The Commission should require that, in future proceedings if the utility seeks
 - 23 to increase its collections for nuclear decommissioning on the ground that the
 - 24 decommissioning fund is underfunded, a material proposition of the case
 - 25 shall be the extent to which a life cycle cost analysis of the facility warrants its
 - 26 continued operation, including incurring further nuclear liabilities.

27 Nuclear decommissioning and waste storage issues are discussed in Section 4
28 of my testimony.

29 **Summary of the Better Choice Plan for competition**

30 **Q. Please summarize your recommendations with regard to the Better**
31 **Choice Plan for robust competition.**

32 A. First let me state the goal of this part of my testimony. While there are many
33 important issues to resolve in the current proceeding, the Commission should
34 keep its sights on the primary goal of the Electricity Generation Customer Choice
35 and Competition Act (the Act):¹ to create a robust, competitive electricity market
36 that provides all customers with meaningful choices of electricity suppliers while

¹66 Pa.C.S. §§ 2801 *et seq.*

1 maintaining a safe and reliable electric system for all parties.² Which firms wind
2 up with the large numbers of customers who have defaulted, who have not
3 selected a supplier, will play a critical role in the transition to competition.

4 **Q. How should the Commission provide for the assignment of non-**
5 **choosing customers when competition arrives in 1999?**

6 A. The Commission should allocate those customers according to a simple two-
7 step process. The alternative, assigning all default customers to a single
8 generation supplier, would provide that supplier with a significant competitive
9 advantage over its competitors. A great many of the Company's electricity
10 customers are unlikely to make any choice at all regarding their electricity
11 supplier, for reasons described below. If the Company is designated the default
12 supplier of these customers, then it will be granted a significant market share
13 without incurring the marketing and transaction costs that would be required of
14 competitive utilities. This formidable advantage would add to the numerous
15 tangible and intangible competitive advantages that are typically enjoyed by
16 incumbent utilities. Designating me other supplier as the default generation
17 supplier would provide that firmn (instead of the Company) with an unfair
18 competitive advantage over other generation companies.

19 **Q. What do you recommend?**

20 A. I recommend that the Commission ensure that no provider be given an unfair
21 advantage by default. In order to avoid market domination, I urge the
22 Commission to establish a mechanism to allocate customers who fail to select a
23 provider among all of the non-Company competitors. Of course, any such
24 "default" customer would thereafter be free to switch suppliers. I refer to this
25 proposal as the "Better Choice" plan because it will lead to a greater amount of
26 customer choice over the long term than proposals now before the Commission
27 in the PECO docket.

28 **Q. Please summarize your proposal.**

29 A. I recommend that the Commission establish a system for allocating default
30 customers to all generation companies serving the Company's service territory.
31 In this way, no single entity would be afforded this significant competitive
32 advantage, and all generation companies will be able to play a larger role in a
33 more competitive marketplace. I recommend a two-step process.

34 ***The initial customer selection process.*** First, electricity customers would

²See, for example, 66 Pa.C.S. §§ 2802 (3), (12), and (21).

1 be given the option to select alternative generation customers according to
2 the schedule set forth in the Act. The Company would publish the results of
3 the selection process, including the percentage of the generation market that
4 was obtained by each generation company.

5 ***The allocation of default customers.*** Second, if more than 50 percent of
6 customers fail to switch to generation suppliers other than the Company, a
7 second step of the process would be implemented to allocate all of the
8 default customers among the non-incumbent generation companies. All non-
9 incumbent suppliers that were chosen by customers in the initial selection
10 process would be given an opportunity to receive a portion of the default
11 customers. The number of default customers allocated to each non-
12 incumbent generation supplier would be proportional to the market share that
13 supplier achieved in the customer selection process.

14 ***Conditions required to be allocated default customers.*** In order to be
15 eligible to be allocated a percentage of the default customers, each
16 generation company must first agree to provide generation services to those
17 customers under the following conditions:

18 1. The price for the generation services will be no higher than the
19 unbundled generation rate (also known as the "generation credit") that
20 the Company will be allowed to charge.

21 2. The generation supplier will agree that any of its default customers
22 who elect to switch generation suppliers will not be charged a contract
23 termination fee or other penalty.

24 3. The generation supplier will agree that the energy and capacity it
25 offers to serve default customers meet an environmental baseline
26 comparable to the applicable Pennsylvania environmental regulations.

27 4. The generation supplier will offer a resource mix which includes at
28 least one percent (1.0%) renewable resources and the supplier has a
29 net billing (or "net metering") tariff and other policies to facilitate the
30 interconnection of small-scale, clean and renewable energy
31 generation.

32 5. The generation supplier will inform customers about the fuel mix, air
33 emissions and other wastes (radioactive, solid and liquid) of all of its
34 power sold in Pennsylvania, in a simple, uniform format.

35 6. The generation supplier will contribute one-half percent (0.5%) of its
36 total Pennsylvania power revenues to the Pennsylvania Sustainable
37 Development Fund.

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7. The generation supplier will provide customers with information regarding the number and percentage of its work force employed in Pennsylvania.

In sum, my recommendations will reduce the incumbent's otherwise unfair competitive advantage at the critical outset of competition, in 1999, will allow all generation companies a practical opportunity to serve a larger share of the market, and will provide customers and society with environmental and consumer protection benefits consistent with the Act.

1 **3. Environmental Disclosure and Consumer Education**

2 ***Environmental Disclosure***

3 **Q. What is disclosure and how would it apply in the case of electricity and**
4 **its environmental attributes?**

5 A. Disclosure is the process by which consumers are informed about their
6 electricity suppliers' sources of electricity. With environmental disclosure
7 requirements for electricity, retail suppliers in the state would report their
8 resource mix and key environmental attributes of their resource portfolio to their
9 customers. Customer education is also very important -- and should be
10 coordinated with disclosure so that consumers have the information they need to
11 make decisions and the knowledge to understand that information.

12 **Q. Why is environmental disclosure for electricity sound public policy?**

13 **Environmental Impacts**

14 A. First, electricity generation has extraordinary impacts on the environment. In
15 the U.S. electricity generation is responsible for roughly two thirds of the total
16 SO₂ emissions, nearly one third of total NO_x emissions, and more than one third
17 of total CO₂ emissions. Fossil fueled electricity generating plants also emit
18 heavy metals, and fine particulates, and have a number of impacts associated
19 with mining and the creation of waste in the fuel cycle. Nuclear plants present
20 different environmental and health risks, associated with accidents, nuclear fuel
21 mining, fabrication and enrichment, spent nuclear fuel transportation and
22 storage, and decommissioning. Land and water use of power plants can be
23 substantial.

24 **Research Substantiation**

25 These and other impacts of electric power have been well studied. For example,
26 I managed a large project for the Boston Edison Company Settlement Board that
27 surveyed these impacts and quantified them where possible, for power plants in
28 New England (*Non-Price Benefits of BECo Demand-Side Management*
29 *Programs*). I also participated in a major study of the environmental externalities
30 of electric power plants in New York (*New York State Environmental Externalities*
31 *Cost Study*, for the Empire State Electric Energy Research Corporation and the
32 New York State Energy Research and Development Authority). The U.S.
33 Department of Energy conducted a major study of the environmental damages
34 from electricity generation (*Estimating Fuel Cycle Externalities: Analytical*
35 *Methods and Issues, Report Number 2 on the External Costs and Benefits of*
36 *Fuel Cycles: A Study by the U.S. Department of Energy and the Commission of*

1 *the European Communities*). In addition to such overview studies, many specific
2 research projects have focused on particular impacts of power generation.

3 **Evidence of Public Concern**

4 The second reason to implement disclosure for electricity is that many
5 consumers are interested in the environmental implications of their purchasing
6 decisions. Surveys repeatedly show a high degree of public support for and
7 interest in clean energy sources. For example, a 1996 report by Farhar and
8 Houston reviews data from more than 700 polls and concludes that the public
9 supports renewable energy, backed by a willingness to pay \$6 to \$25 per month
10 more for electricity from less harmful sources by 76 percent of those surveyed.
11 The Sustainable Energy Coalition survey revealed bipartisan support for
12 renewables, stating that 57 percent of the 1200 registered voters surveyed would
13 like Congress to require a renewable portfolio standard. National consumer
14 surveys conducted for the Edison Electric Institute concluded that 77 percent of
15 consumers surveyed in 1993 stated that they make "changes in daily consumer
16 behavior because of environmental concerns."

17 **Environmentally Superior Alternatives**

18 Third, many electricity suppliers are interested in marketing a "clean product" or
19 portraying themselves as a "green company." For example, in the New
20 Hampshire pilot program, many suppliers used environmental language in their
21 marketing. A list of the environmental claims made by suppliers in the
22 Massachusetts and New Hampshire pilot programs is provided in Table 1 on
23 page 6 of Exhibit BEB-3. These range from specific information about the power
24 supply sources (e.g., "more than 90 percent of the electricity in Green Mountain
25 Energy Partners' supply comes from hydropower sources") to general
26 statements (e.g., "its the beginning of our long-term commitment to you and the
27 earth").

28 **Meaningful Customer Choice**

29 Fourth, with competition in electricity customers have an opportunity to choose
30 their supplier. In order for this choice to be most meaningful the customers
31 should have basic information about the suppliers in a standardized, easy-to-
32 understand format. Fuel mix and environmental information can be disclosed
33 along with standardized information on price and price volatility.

34 **Q. What position has the Pennsylvania Public Utilities Commission taken**
35 **with regard to disclosure for electricity?**

36 A. The Pennsylvania Commission articulated an interim policy on disclosure in

1 its July 10, 1997 "Interim Requirements for Customer Information" (Docket No.
2 M-00960890F0008). This policy includes a supplier's mandatory disclosure to its
3 customers of the supply mix (page 43) and verification of specific environmental
4 claims.

5 **Q. In your opinion, is the policy for disclosure put forward by the**
6 **Commission in its interim requirements sound public policy ?**

7 A. Yes, I believe that the Commission has taken an important and necessary
8 step toward ensuring that customers receive basic information about the sources
9 of their supplier's electricity. The fuel mix disclosure requirement will require a
10 system of tracking transactions to attribute generation at power plants to sales at
11 retail.

12
13 **Q. In your opinion, should the Commission go further?**

14 A. Yes. The mandatory disclosure policy should be extended beyond fuel mix to
15 key environmental attributes. It is a relatively simple matter to extend the fuel
16 mix disclosure system to key environmental attributes, since the basic protocols
17 for tracking will be in place. The mandatory disclosure requirement can and
18 should be extended to include key impacts of fossil, nuclear, and hydro
19 generation. The Environmentalists are available to assist the Commission in
20 expanding the disclosure system at an appropriate time. I hope that this will be
21 done soon. Some ideas for how to expand the disclosure to air emissions and
22 waste are presented below.

23
24 **Q. Are regulators in other states requiring disclosure for electricity**
25 **suppliers?**

26 A. Yes. Other state regulatory commissions are requiring disclosure for
27 electricity suppliers. These include fuel mix, as has been required by the
28 Pennsylvania Commission. In many cases regulators increasingly go beyond
29 fuel mix to include environmental attributes of the sources of generation.

30 State regulatory commissions in Vermont and Massachusetts have included
31 mandatory disclosure provisions in their December 1996 electric industry
32 restructuring orders. The Vermont Public Service Board's order calls for
33 disclosure of "resource mix and **environmental characteristics**" (pages 120
34 and 121 of Vermont PSB Order in Docket No. 5854). The Massachusetts
35 Department of Public Utilities called for disclosure of "fuel mix" and "**air**
36 **pollutants**" (page 128 of Massachusetts DPU Model Rules and Legislative
37 Proposal in D.P.U. 96-100).

38 The National Association of Regulatory Utility Commissioners (NARUC) passed
39 a "resolution in support of customer 'right-to-know' and product labeling

1 standards for retail marketing of electricity." NARUC "urges states adopting retail
2 direct access programs to include enforceable standards of disclosure and
3 labeling that would allow retail consumers easily to compare the price, price
4 variability, resource mix, **and environmental characteristics** of their electricity
5 purchases" (emphasis added). NARUC's resolution is provided in full in
6 Appendix A on page 26 of the report provided as Exhibit BEB-3.

7 The New England Governors' Conference on June 3, 1997, adopted a similar
8 "resolution in support of customer 'right-to-know' and product labeling standards
9 for the retail marketing of electricity in New England." This resolution calls for
10 uniform disclosure standards for "price, fuel **and emissions**."

11 The Long Island Power Authority issued a "Policy Statement on Clean Energy"
12 on September 17, 1997, in order to begin the process of "formally supplementing
13 LIPA-developed programs on energy conservation, renewable technologies and
14 the environment". (The policy statement and the release announcing the
15 October 15, 1997, public hearing on it, appear at the Authority's web site,
16 http://www.lipa.state.ny.us/09_17_97.htm.) The statement went beyond an
17 "Environmental Disclosure" process to address: environmentally appropriate and
18 cost effective alternatives to distribution system upgrades; establishing a \$32
19 million clean energy fund and advisory committee for renewables and energy
20 efficiency; and implementing a power plant emissions review process.

21 **Q. What should the objectives of an environmental disclosure system be?**

22 A. I recommend that the following set of objectives be used in designing an
23 environmental disclosure and tracking system for Duquesne and West Penn:

- 24 ● Effective: it should make a difference in the actual mix of electricity
25 resources.
- 26 ● Accurate: It should provide consumers good, objective, and quantitative
27 information about their supplier's sources of electricity.
- 28 ● Comprehensive: It should allow for the disclosure of a wide range of
29 environmental impacts, and fuel-type information.
- 30 ● Flexible: It should encourage innovation in technology, contracting and
31 marketing.
- 32 ● Simple: It should be straightforward and readily understandable.
- 33 ● Expandable: It should be adaptable to various scales so that it can start small
34 and grow geographically.
- 35 ● Inclusive: It should provide opportunities for both existing utilities and new
36 players to offer renewable resources.
- 37 ● Credible: It must be trustworthy both initially and over time. To the extent that
38 the system embodies subjective value judgments, they must be made by an

1 independent entity with individuals who have a proven track record for
2 objectivity.

3 These criteria depend on each other and in some ways conflict with each other.
4 They should be seen as design objectives for the system, and the inevitable
5 tradeoffs among them should be made carefully.

6 **Q. Which of the objectives do you consider to be most important?**

7 A. In my view the objectives listed first (effective) and last (credible) are the most
8 important. If the system is not effective at "making a difference," then it is a
9 waste of time---or worse. That is, if a customer pays more for "clean electricity"
10 thinking that this is influencing the resource mix, then the transaction should
11 actually influence the resource mix in a manner that is reasonably similar to what
12 the customer believes to be the case.

13 The objective of "credibility" is related to this. The system must be credible in
14 order to work. It must "make a difference" in order to be credible.

15 **Q. Why should environmental disclosure be mandatory?**

16 A. Disclosure should be mandatory for electricity because: (1) the environmental
17 impacts of electricity are so large, (2) consumers have no experience making
18 electricity purchasing decisions, (3) there is no word-of-mouth experience to
19 glean information from friends and no published comparative guides, (4) some
20 suppliers are so new that they have little or no track record, and (5) the existence
21 of mandatory, uniform disclosure can act as a deterrent to false and misleading
22 claims.

23 If disclosure is "voluntary" then the information provided to consumers will be
24 incomplete and non-standardized -- and much less useful than full information
25 presented in a standard format.

26 This is analogous to food labeling: the front of the box typically has claims such
27 as "low fat" while the back of the box has the standard mandatory label with
28 ingredients and nutritional information. For electricity we will need to address
29 both. The voluntary claims ("front of the box") will need some rules and
30 guidelines. The mandatory and comprehensive information ("back of the box") is
31 what disclosure addresses.

32 **Q. What should be disclosed?**

33 A. In general, and for Duquesne and West Penn specifically, the basic
34 information that should be disclosed is the fuel mix, key air emissions, and waste
35 creation. A standardized point of comparison, such as the regional average level

1 of pollution per kWh, should be indicated for reference.

2 **Q. How would air emissions disclosure work?**

3 A. Disclosure of air emissions is straightforward, and can be based upon the
4 information currently reported to state air quality regulators and the U.S.
5 Environmental Protection Agency. The procedures for air emissions disclosure
6 have been developed and discussed widely, and are addressed in the report
7 provided here as Exhibit BEB-3. I propose that air emissions disclosure include
8 at least SO₂, NO_x, and CO₂, since reliable information on these is readily
9 available.

10 **Q. How might disclosure of waste creation work?**

11 A. Perhaps the most important type of waste from electricity generation is high-
12 level radioactive waste, or spent nuclear fuel. It would be a reasonably
13 straightforward matter to include high-level radioactive waste in an electricity
14 disclosure system. One way to do this would be to use a generic figure for the
15 average "burnup" (the amount of energy obtained from the fuel) and allow
16 companies to claim lower figures for high-level radioactive waste produced if they
17 can document that their facility is better than the default figure. In 1994, the
18 average burnup was 41 gigawattdays thermal per metric ton of uranium for
19 pressurized water reactors and 33 gigawattdays thermal per metric ton of
20 uranium for boiling water reactors (source: page 21, Energy Information
21 Administration "Spent Nuclear Fuel Discharges from U.S. Reactors 1994,"
22 February, 1996).

23 **Q. What mechanisms should be used for communicating information to**
24 **consumers?**

25 A. The information can be disclosed in various formats and through various
26 channels. The format for disclosure should probably follow the example of
27 nutritional labeling: a straightforward standardized layout using percentages and
28 relating technical information to commonly understood benchmarks. Research is
29 currently underway to determine what information electricity consumers will want
30 and be able to process. This is funded by the National Council on Competition
31 and the Electric Industry, and is being coordinated by the Regulatory Assistance
32 Project.

33 A sample label for electricity is provided on page 9 of Exhibit BEB-3. This is
34 provided as a suggestion of what information might be included and how it might
35 be presented. The specific design, format, and content should be developed
36 with some input from Pennsylvania consumers. The label must balance the
37 desire of some consumers for a great deal of detailed information with the desire

1 of many for simple and quick summary information.

2 The appropriate level of detail would also vary with the different communication
3 formats. For example, the information disclosed on a bill might differ from the
4 information required to be disclosed in marketing materials. It would also be
5 appropriate to have a very detailed set of information provided to regulators on a
6 periodic basis, to help in verifying claims, to ensure timeliness of the information
7 being used to make marketplace decisions, and to provide to those consumers
8 and consumer agencies that request detailed information.

9 The mechanism for disclosure should include the bills that are sent to customers
10 and the promotional materials that suppliers develop for marketing. The roles for
11 industry, government and others need to be formulated. At one extreme, a
12 disclosure system could conceivably be entirely voluntary, designed and
13 implemented by the market participants. At the other extreme, government
14 agencies could undertake the bulk of the activities themselves -- collecting data,
15 calculating attributes, verifying and enforcing the system. Another model would
16 rely upon independent parties to rate suppliers -- along the lines of "Consumer
17 Reports."

18 The most successful approaches will probably draw upon all of these actors.
19 The minimum role for suppliers would involve making the essential data
20 (primarily quantities of energy transactions) available. Independent third-party
21 rating systems are likely to develop in one form or another on their own accord.
22 Government should assume the role of outlining information requirements for
23 industry to comply with, and then to spot check on disclosure accuracy and
24 timeliness.

25 **Q. What time scales should a tracking and disclosure system use ?**

26 A. There is first the issue of how frequently the information should be put in front
27 of the customer. This issue should be researched along with the design of
28 electricity labels.

29 A separate issue is the matter of time period for performing any calculations.
30 For example, a system that tracks transactions on an hourly basis will yield a
31 different result than one based on annual averages. It may be that quarterly
32 estimates provide the right balance between accuracy and burden.

33 Finally, there is the timing issue of prospective versus retrospective information.
34 A disclosure system might base information on recent history, adjusted for major
35 expected changes such as the expiration of a contract or a major plant outage.
36 Utility rate cases often use actual data for a "test year," and then adjust it for
37 "known and measurable changes." Perhaps an analogous approach could be
38 developed for electricity disclosure. Alternatively, it may be preferable to use an

1 approach with true-ups, where the information reported would be reconciled with
2 actuals over time.

3 **Q. Is the tracking of transactions to support disclosure feasible?**

4 A. Yes. Electricity markets already involve numerous transactions among
5 numerous market participants. These numbers and the overall complexity of the
6 market are increasing. Nonetheless, it is entirely possible to track these
7 transactions. Indeed, tracking is and must be done in order to resolve the
8 financial obligations. The fuel mix and environmental attributes can be tracked
9 using a system that builds upon the existing information systems.

10 **Q. How would a system of tracking and disclosure work in an electricity**
11 **market with a spot market or power exchange?**

12 A. Electric power pools have FERC-approved system agreements that lay out
13 protocols for dispatching power plants and for billing. A typical arrangement has
14 the actual dispatch optimized on a combined basis; that is, all of the available
15 generators are used in a least-cost manner to serve total pool hourly loads.
16 Then, for accounting purposes, each company is assigned its own units first
17 toward its own load. The result will be that some companies generate more than
18 their own load and some companies generate less. Energy transactions are
19 then assumed in order to balance the system, and buyers compensate sellers
20 according to the pricing provisions in the system agreement (marginal cost plus
21 ten percent and "split-savings" are two pricing schemes).

22 The pooling agreement and accounting systems could be modified for a
23 disclosure/tracking system to unambiguously allocate generation from each
24 company's owned units, either to its own load or to sales. In situations where a
25 number of companies sell in the pool (perhaps to several buyers) the sources of
26 generation would be known, and attributed to the buyers, perhaps on a *pro rata*
27 basis. With restructuring, much of this will remain the same, but dispatch will in
28 many cases be based on bids rather than costs.

29 In effect, the tracking system can work by "following the dollars." For any time
30 period, there is a known amount of electricity generated, and a known amount of
31 electricity consumed. These should be equal, after accounting for losses in the
32 transmission and distribution systems. Retail buyers compensate the
33 generators, perhaps in some cases with several intermediaries. By following the
34 contracts and the flow of money from retail consumers to generators, one can
35 develop a reasonable measure of accountability.

36 **Q. Is there a single approach that is theoretically superior to all others for**
37 **tracking the attributes of generation to the point of retail sale?**

1 A. No, there is no single unambiguously preferable approach. There are,
2 however, several approaches to tracking, each with its strengths and
3 weaknesses. The most important consideration may be simply to agree on one
4 system that can be applied consistently. Ideally the system would be applied at
5 least on the scale of the PJM system, and perhaps even coordinated with
6 neighboring systems. The Commission in Pennsylvania should simultaneously
7 (1) establish the disclosure requirement for retail sellers in the State, and (2)
8 work with other states and the Midwest ISOs to implement a tracking system for
9 ECAR as a whole. It should unambiguously express its intention to do so when it
10 issues the order in this case, providing that Duquesne and West Penn conform
11 their public information to that requirement.

12 **Q. What approach to disclosure and tracking do you recommend?**

13 A. I recommend that the state and the region adopt a company-based tracking
14 system in which wholesale sales are allocated before retail sales. I believe that
15 this is the most readily implementable approach.

16 **Q. Why do you recommend a company approach?**

17 A. A system that requires disclosure of provider companies is preferable to one
18 that discloses individual "products" (or contracts). First, the company approach
19 will be easier to implement. It will have a smaller number of "entities" for which
20 information must be tracked, and hence a more manageable amount of data and
21 computation requirements.

22 More importantly, company-based disclosure is more meaningful than product
23 disclosure. A statement that the supplier has a certain resource mix is
24 meaningful and reasonably straightforward. With product-based disclosure
25 suppliers can simply allocate on paper their clean generation to a "clean product"
26 and their dirty generation to a "cheap product." Customers paying more for the
27 clean product may be just receiving reallocated existing resources, and hence
28 are not making a difference (See Objective Number 1, above).

29 **Q. What do you mean by a tracking system that allocates wholesale sales
30 first?**

31 A. There are a variety of ways to approach the treatment of transactions in an
32 environmental disclosure system for electricity. The most straightforward, and
33 ultimately perhaps the best, approach is described below -- a company-based
34 system with generation allocated to wholesale sales first. With this system each
35 company would allocate its generation to its wholesale sales, and then allocate
36 its remaining resource mix (generation and wholesale purchases) to its retail
37 sales.

1 This simple system divides electric companies into their production and retail
2 functions. Wholesale sales are assumed to be from the producer's own
3 generation, unless the producer sells more at wholesale than it produces. If
4 wholesale sales exceed one's own generation, then the extra is assumed to
5 correspond proportionately to the companies from which the producer
6 purchases. This approach allows the complex web of electricity transactions to
7 be dealt with in a straightforward manner, thus avoiding the difficulties and
8 ambiguities of tracing power transactions back through several companies.

9 By separating the production and retail functions, this simple system provides
10 great flexibility in representing the many types of entities and transactions that
11 will occur in the market. Transactions from outside of the system might be
12 treated differently than transactions within the system. For example, it may be
13 appropriate to attribute marginal emissions and fuel mix to imports.

14 **Q. Are there other systems that could be used for tracking transactions?**

15 A. The "wholesale transactions first" approach is the most straightforward way to
16 account for transactions, but other approaches that account for the web of
17 transactions in a more subtle way are conceivable. For example, a retail sales
18 first convention might be adopted. Or alternatively, each company might be
19 seen as selling a slice of its own generation and its purchases -- both to its
20 wholesale customers and its own retail customers. However, because the
21 transactions compose a complex web, and not a uni-directional chain, these
22 approaches are more complex. They can involve working back through
23 sometimes many companies to find the mix for a single buying company. The
24 implementation of some of these approaches would require sophisticated
25 mathematical tools (e.g., linear programming) to implement.

26 **Q. You mentioned that consistency is important in a tracking system. Why
27 is that?**

28 A. Without a consistent tracking system, some of the power generated from
29 dirtier sources might not be disclosed. Or the same clean power might be sold
30 more than once. Consistency over the largest possible area helps to reduce the
31 possibilities for gaming the system. Ideally, the neighboring systems (or their
32 ISO equivalents) will adopt tracking systems that are identical or at least
33 reasonably consistent.

34 **Q. What data are required to implement a tracking system?**

35 A. The essential data for a disclosure system include generation (by plant), the
36 buyer, seller, and quantity of energy for each transaction. These data are, in
37 general, currently made available to government agencies. There are, however,

1 some gaps in what is reported, and there is an unacceptably long time lag before
2 some data are publicly available.

3 Moreover, electricity market participants are becoming increasingly sensitive
4 about making information available. Procedures should be implemented that
5 respect the legitimate confidentiality concerns of market participants while
6 ensuring that sufficient data are available to implement an environmental
7 tracking system-- and to allow regulatory oversight of market power and electric
8 system reliability.

9 Relevant data are currently provided to the Energy Information Administration,
10 the Environmental Protection Agency, the Federal Energy Regulatory
11 Commission, and various state agencies. Data sources and issues are
12 discussed in Exhibit BEB-3 on pages 17 to 19, and Appendix C.

13 **Q. Who should be responsible for implementing the tracking system to**
14 **support disclosure?**

15 A. The Independent System Operator should play the key role in implementing
16 the tracking aspect of environmental disclosure. ISOs have the technical
17 expertise, the necessary information on generation and transactions, procedures
18 for handling sensitive data appropriately, and the independent status for
19 credibility. It is important that Pennsylvania utilities and the Pennsylvania Public
20 Utility Commission encourage that the tracking function be included in the
21 mandate of the appropriate regional ISO, and that provisions for tracking fuel mix
22 and key environmental attributes be included in current system management
23 software upgrades. If the Commission can clearly and satisfactorily delegate the
24 tracking and reporting function to the ISO, it can essentially assure that good
25 information flows automatically to retail sellers and aggregators, which would
26 report the information to customers. An important issue for Duquesne and West
27 Penn is whether these companies will cooperatively enter into ISO relationships.
28 I cannot with assurance state that they will do other than seek to create their own
29 ISO, for an integrated APS system.

30 **Q. Is environmental disclosure for electricity a substitute for other**
31 **environmental policies?**

32 A. Absolutely not. Environmental disclosure for electricity is an important policy
33 that can provide useful information to consumers about their electricity
34 purchasing decisions. Other regulations, such as portfolio standards and
35 emission caps, are necessary and appropriate, and in no way in conflict either
36 with disclosure specifically, or with electricity markets generally. Restructuring of
37 the electricity industry can and should be implemented in a way that improves
38 Pennsylvania's environmental quality.

1 One environmental policy under consideration elsewhere is the emissions
2 performance standard (sometimes called a generation performance standard)
3 whereby retail electricity suppliers would be required to meet a standard for air
4 emissions from their resource portfolio. Such a standard is under consideration
5 in New Jersey. Pennsylvania should consider adopting a similar standard -- and
6 coordinating its standard to fit with policies in New Jersey and other nearby
7 states. This would be particularly important for companies such as Duquesne
8 and West Penn that do business in more than one state.

9 ***Consumer Education***

10 **Q. What requirements in the Act relate to disclosure and consumer**
11 **education?**

12 A. The Act includes several requirements that should be addressed through an
13 education program. First, the Act requires

14 each distribution company, electricity supplier, marketer,
15 aggregator and broker to provide adequate and accurate
16 customer information to enable customers to make informed
17 choices regarding the purchase of all electricity services
18 offered by that provider. Information shall be provided to
19 consumers in an understandable format that enables
20 consumers to compare prices and services on a uniform
21 basis. (Section 2807 (d) (2))

22 Second, energy conservation services must be available in all distribution service
23 territories (Section 2804 (9)).

24 Third, customers must be informed of the changes in the electric industry
25 (Section 2807 (d)(3)).

26 **Q. What criteria should the Commission use to evaluate the**
27 **appropriateness of Duquesne and West Penn's education programs?**

28 A. In order to be worthy of Commission approval, an education program must be
29 effective, accurate, accessible, comprehensive and unbiased. Therefore,
30 Duquesne and West Penn's education programs should cover a broad range of
31 options and issues, from pricing, billing and metering options to consumer
32 protection and environmental impact information. In addition, the program
33 should make educational materials accessible to all consumers, which will
34 require information in multiple languages. Finally, the information that Duquesne
35 and West Penn use for consumer education must not include language that

1 could inappropriately influence customers to choose to remain with their
2 incumbent utility. I recommend that the Commission take strong leadership in
3 this area, setting precise protocols and content requirements to prevent
4 Duquesne and West Penn, and other utilities, from charging captive customers
5 for tens of millions of dollars of "customer information" that may turn out to be
6 little more than marketing.

7 **Q. How does consumer education relate to disclosure for electricity?**

8 A. Pennsylvania consumers will, for the first time, be presented with a choice of
9 electricity supplier, and -- through a disclosure requirement -- be presented with
10 information about the fuel mix and environmental impacts of electricity
11 generation. A comprehensive program of consumer education should be
12 developed to assist buyers in comprehending electricity restructuring, comparing
13 offers, and understanding the environmental impacts of their choices. The
14 consumer education initiative should be coordinated with and complement the
15 disclosure and labeling requirement.

16 **Q. Do you have any other recommendations regarding the conduct of**
17 **consumer education?**

18 A. Yes. I recommend that the Commission require the Company to empower a
19 **Consumer Education Joint Committee** consisting of Company and public
20 representatives to control the content and timing of the Company's consumer
21 education efforts relating to restructuring.

22 **Q. Do you mean a consumer advisory panel?**

23 A. No, this would not be merely an advisory group. The purpose here is to
24 insure public confidence and meaningful public information through the control of
25 a publicly representative group.

26 **Q. Who would be members of this Committee?**

27 A. The Committee would consist of two representatives from the Company and
28 each of the following customer interests: OCA, OTS, OSBA, Industrials, other
29 commercials, environmental groups, consumer groups, low income groups, and
30 municipal customers. The parties representing each of these interest groups
31 should be given responsibility to appoint the two voting representatives each to
32 this body. Other interested consumer and public representatives with experience
33 in education and/or energy conservation may be added to the Group upon a
34 majority vote of the members.

35 **Q. What would the Committee's power and responsibility cover?**

1 A. The Company's consumer education budget and efforts would be the
2 responsibility area of the Committee. This Committee would act as a
3 management board or committee, supervising generally the Company's conduct
4 of its consumer education efforts.

5 **Q. How would the Committee function?**

6 A. Meetings would be publicly noticed and transcribed. The Company's budget
7 would cover the ordinary expenses of the group, including travel and meetings,
8 copying and communications. Decisions would be made by majority vote, and
9 the group would report to the Commission on a quarterly basis, with those
10 reports posted on the Company and PUC web sites. At the end of the seven-
11 year transition period in which the CTC is in effect the Committee would issue its
12 final report and dissolve.

13 **Q. Please discuss some of the Committee's initial responsibilities.**

14 A. It is important that the consumer education efforts be evaluated promptly and
15 "fixed" as soon as problems, if any, appear. The Company's consumer
16 education program should include a plan for evaluation of the effectiveness of
17 the overall program and its individual strategies in reaching the program's goals
18 and objectives. Cost-effective means to educate the public are important. The
19 Committee should require the Company to provide a complete menu of
20 alternatives to expensive TV, radio and newspaper media. These might include
21 web pages, materials written for community and nonprofit newsletters, and
22 individual visits to community, business and other group meetings. In any event,
23 the Committee should have ultimate authority to determine the most effective
24 consumer education measures for the Company.

25 *Duquesne*

26 **Q. Do you agree with Mr. Hoffman that customer education is separate**
27 **from marketing?**

28 A. Absolutely. Mr. Hoffman, Duquesne's General Manager for Marketing and
29 Sales, points out that "consumer education should inform customers about
30 restructuring, customer choices and changes in bill format, without seeking to
31 influence customer decisions about power suppliers" (pages 14-15, direct
32 testimony of Frank A. Hoffman, Duquesne Statement No. 6). Mr. Hoffman states
33 that the "Company will seek to provide unbiased, credible and understandable
34 educational information" (page 15, direct testimony of Frank A. Hoffman,
35 Duquesne Statement No. 6). A customer education program that presents clear
36 and unbiased information to consumers is essential for meaningful choice.

1 **Q. Does Duquesne plan to include environmental information in its**
2 **customer choice education materials?**

3 A. Duquesne does not currently plan to include environmental information "as a
4 specific segment" in its restructuring education materials (see Response to
5 Environmentalist Interrogatory Set II number 68). However, in general materials
6 (provided in Attachment ENV-2-068) not related to restructuring, the Company
7 does communicate about the environment. As stated above and supported in
8 the Company's "advertorials" (see Response to Environmentalist Interrogatory
9 Set II number 72, Attachment ENV-2-072), restructuring education materials
10 should inform customers about consumer choices. The Company has already
11 pointed out many types of choices that customers will have, such as home
12 energy management, consolidated billing, real-time usage analysis, and multi-
13 service energy marketing companies (page 10 of 10, Attachment ENV-2-072).

14 It is surprising and disturbing that a company that promotes environmental
15 stewardship through award programs and community outreach (see Response to
16 Environmentalist Interrogatory Set II number 68, Attachment ENV-2-068) would
17 fail to inform its customers about the opportunity to choose a supplier that uses
18 environmentally benign technologies such as renewables. The Company points
19 out that its customers are far more likely than national benchmark customers to
20 know about environmental issues (see Response to Environmentalist
21 Interrogatory Set II number 70, Attachment ENV-2-070). This makes it even
22 more surprising that the Company would not provide information about a choice
23 that many of its customers would undoubtedly be interested in. I recommend
24 that the Commission consider the Company's failure to provide good
25 environmental information to its customers, particularly in light of the Pittsburgh
26 area's proximity to the border with non-OTR Ohio and West Virginia and the
27 effect of their power choices on area air quality, and should weigh the failure
28 against it when evaluating the extent to which the Company's generation assets
29 constitute stranded assets.

30 **Q. Does the Company plan to include any community based organizations**
31 **in the development process of consumer education materials?**

32 A. Mr. Hoffman states that working with community based organizations
33 ("CBOs") and providing groups with prepared materials on restructuring would
34 enable "the Company to enhance its educational efforts by partnering with
35 respected community organizations to deliver understandable information to
36 consumers" (page 13, direct testimony of Frank A. Hoffman, Duquesne
37 Statement No. 6). Mr. Hoffman mentions offering information workshops on
38 direct access to community organizations (page 13). Also, Mr. Hoffman states
39 (see Response to Environmentalist Interrogatory Set II number 77, Item No.
40 ENV-2-077), when asked if the Company would include CBOs in the

1 development of education materials, that the partnerships provide insights into
2 the needs of the CBOs but that due to the compressed time schedules to
3 develop educational materials, there was not an official process for outside input.
4 It is not clear how the Company will proceed with including outside organizations
5 in its consumer education efforts and whether the "partnerships" and "insights"
6 will be meaningful. In contrast, for example, PP&L's consumer education plan is
7 much more specific and inclusive.

8 My clients in this case -- the Environmentalists -- should be included in
9 Duquesne's customer education materials development process, since their
10 perspective and expertise on environmental issues and communication will be
11 valuable. The key customer education materials developed by Duquesne should
12 be subject to Commission review, including a process for parties to comment as
13 they are developed. If an appropriately representative advisory committee does
14 not approve the Company's materials, the Commission should prohibit use of
15 ratepayer dollars or the inclusion of any Commission *imprimatur*.

16 **West Penn**

17 **Q. Does West Penn plan to include environmental information in its**
18 **customer choice education materials?**

19 A. West Penn currently includes some environmental information in its
20 restructuring education materials (see Response to Environmentalist
21 Interrogatory Set III number 125). For example, in the packet of information sent
22 to Customer Choice pilot participants, the "Shoppers Guide to Electricity"
23 contains a scorecard for comparing competitive suppliers. One column is
24 designated for information on "How Power is Made." This is a reasonable first
25 step for a distribution company to take to inform customers about the
26 environment. However, more information is needed for customers to be able to
27 understand the implications of their choices.

28 West Penn did present evidence that its customers are concerned about the
29 environment. The results of focus groups conducted in April 1997 show that
30 13.3 percent of Allegheny Power customers said that "environmental
31 responsibility would motivate them to switch suppliers" (see Response to
32 Environmentalist Interrogatory Set III number 127).

33 **Q. Does West Penn plan to include any community based organizations in**
34 **the development process of consumer education materials?**

35 A. It appears that the Company does not. In his direct testimony, Mr. Ault
36 mentions the "potential use of outside agencies . . . to help customers
37 understand their options under the Act" but does not indicate coordination with

1 such agencies on the development of consumer education materials (page 16,
2 direct testimony of Charles S. Ault, West Penn Statement No. 2). In response to
3 an interrogatory, the Company states that "Because of the tight time frame for
4 distributing the pilot educational materials, there was not sufficient time to
5 include input from outside organizations into each specific piece of literature"
6 (see Response to Environmentalist Interrogatory Set III number 134). In
7 addition, Mr. Ault states that the Company's consultant, Environmental Futures,
8 "has considered environmental issues in advising and participating in the
9 development of consumer education materials" (see Response to
10 Environmentalist Interrogatory Set III number 135). While the development of
11 educational materials for the pilot program may be complete, there is still time for
12 ample involvement from outside agencies in the development of materials to
13 help consumers understand retail choice over the next three to four years.

14 My clients in this case -- the Environmentalists -- should be included in West
15 Penn's customer education materials development process, since their
16 perspective and expertise on environmental issues and communication will be
17 valuable. The key customer education materials developed by West Penn
18 should be subject to Commission review, including a process for parties to
19 comment as they are developed. If an appropriately representative advisory
20 committee does not approve the Company's materials, the Commission should
21 prohibit use of ratepayer dollars or the inclusion of any Commission *imprimatur*.

1 **4. Nuclear Decommissioning Costs**

2 ***Findings and recommendations with regard to nuclear decommissioning***
3 ***costs***

4 **Q. What are your key points with regard to nuclear decommissioning**
5 **costs?**

6 A. The Environmentalists' vision is that decommissioning costs will be
7 adequately funded in a manner that is fair and efficient -- nuclear plant operators
8 will be responsible for an equitable portion of the decommissioning costs and will
9 have an interest in minimizing those costs.

10 My findings on the treatment of nuclear decommissioning costs in this case are
11 the following:

- 12 ● The currently approved cost amount for nuclear decommissioning obligations
13 is about \$9 million per year for Duquesne (page 17, direct testimony of
14 Morgan K. O'Brien, Duquesne Statement No. 4).
15 ● The Company's total estimated nuclear decommissioning obligation as of
16 year-end 1996, is estimated to be \$312 million in year-end 1996 dollars, of
17 which only \$34 million is funded (page 17, direct testimony of Morgan K.
18 O'Brien, Duquesne Statement No. 4).
19 ● The Company proposes to continue to collect \$9 million per year as part of its
20 stranded cost recovery toward its nuclear decommissioning obligation, and
21 that in January, 2006, the unfunded balance will be treated as "a reduction in
22 any residual value of its generating plant (page 17, direct testimony of
23 Morgan K. O'Brien, Duquesne Statement No. 4).
24 ● The Companies have not demonstrated mitigation of the nuclear
25 decommissioning portion of their stranded costs.
26 ● Mitigation is difficult to do or to demonstrate at this point in time for nuclear
27 decommissioning costs, since the key activities will occur so far into the
28 future.

29 My key, but more general, points on nuclear decommissioning costs are the
30 following:

- 31 ● Duquesne's nuclear decommissioning cost obligation is large, very uncertain,
32 and to some extent within the control of the plant owner.
33 ● Duquesne's nuclear decommissioning consultant, Mr. Thomas LaGuardia,
34 has been estimating decommissioning costs for 20 years. Even after
35 adjusting for inflation, his recent estimates are roughly six times his 1976 cost
36 estimate for dismantling a large pressurized water reactor, and the average
37 annual rate of escalation in his estimates has out paced inflation by about 10

- 1 percent per year over the past two decades (see Exhibit BEB-2).
- 2 ● To some extent costs can spill over between nuclear decommissioning and
- 3 the costs of operation and the costs of spent fuel disposal.
- 4 ● Some decommissioning costs are the result of the continued operation of the
- 5 facilities.
- 6 ● It is difficult to make a specific plan now for nuclear decommissioning costs
- 7 that are so uncertain and that will be incurred so far into the future.
- 8 ● The principles that should guide sound nuclear decommissioning policy are:
- 9 (1) **assurance** that adequate funds will be available to decommission the
- 10 plants in a safe and timely manner, (2) **equity** between customers and
- 11 shareholders, and across generations, and (3) **efficiency**, primarily provided
- 12 by creating a framework in which the plant operator has an appropriate
- 13 incentive to control the costs of the decommissioning project.

14 **Q. Please summarize your recommendations with regard to nuclear**

15 **decommissioning costs.**

16 A. I recommend the following:

- 17 ● For any additional costs for decommissioning that Duquesne is allowed to
- 18 recover through the CTC, or to include in its stranded cost calculations,
- 19 Duquesne should be required to demonstrate that it will -- and has -- placed
- 20 the funds into its external decommissioning fund.
- 21 ● The Commission should require an adequate plan from Duquesne for the
- 22 mitigation of its decommissioning costs.
- 23 ● Procedures should be put in place to ensure that the plant is operated in such
- 24 a way that the decommissioning cost obligation is not increased.
- 25 ● The Company should be responsible for an equitable portion of any
- 26 decommissioning costs in excess of current projections, and be responsible
- 27 for all excess costs not demonstrated to be prudently incurred.
- 28 ● In the event that decommissioning costs are less than expected, customers
- 29 should receive an appropriate refund.
- 30 ● If any nuclear decommissioning funding is provided as part of stranded cost
- 31 recovery, there should be a requirement for a cost-benefit analysis of
- 32 continued operation of the unit and demonstration of efficient management
- 33 as part of any request for increased decommissioning funding.
- 34 ● The Commission should address the complicated technical and policy issues
- 35 of nuclear decommissioning in a generic case, in which limited regulatory
- 36 resources can be used efficiently and a consistent policy can be developed
- 37 that does not unfairly disadvantage one company relative to another.
- 38 ● The Commission should carefully weigh the costs, benefits, and risks before
- 39 assigning nuclear decommissioning to the wires business. It should consider
- 40 the problems that occurred in the past when cost-based regulation was
- 41 applied to the large, complex, expensive, and uncertain project of nuclear

1 plant construction. It should consider the benefits of an incentive framework
2 for nuclear decommissioning costs, in which the risks are shared between the
3 Company and its customers.

- 4 ● The Commission should require that, in future proceedings if the utility seeks
5 to increase its collections for nuclear decommissioning on the ground that the
6 decommissioning fund is underfunded, a material proposition of the case
7 shall be the extent to which a life cycle cost analysis of the facility warrants its
8 continued operation, including incurring further nuclear liabilities.

9 **Q. Do the Environmentalists have concerns that there are problems with**
10 **spent nuclear fuel storage and disposal, and with low level radioactive**
11 **waste storage and disposal?**

12 A. Yes. The Environmentalists have concerns that spent fuel storage costs are
13 included in the decommissioning cost estimates, and that spent fuel storage and
14 disposal will not be adequately funded and/or taken care of in a safe and timely
15 manner. With regard to low level radioactive waste storage, the
16 Environmentalists are concerned that the rate treatment proposed by Duquesne
17 creates incentives for excessive storage of waste on site.

18 ***Nuclear decommissioning costs and stranded cost mitigation***

19 **Q. What is the estimated magnitude of Duquesne's nuclear**
20 **decommissioning costs?**

21 A. The Company's decommissioning consultant has estimated its nuclear
22 decommissioning cost obligations to be \$312 million (at year-end 1996 in year-
23 end 1996 dollars).

24 **Q. Do you believe this to be an accurate estimate of nuclear**
25 **decommissioning costs?**

26 A. No. The Company's nuclear capacity has operating licenses that expire well
27 into the next century. The license expiration dates are 2026, 2016, and 2027 for
28 Perry 1, Beaver Valley 1, and Beaver Valley 2, respectively. Dismantling large,
29 highly radioactive nuclear units is a large, complex undertaking for which
30 experience is currently quite limited, and regulations continue to evolve. It is not
31 possible now to produce an accurate estimate for the cost of decommissioning
32 Duquesne's nuclear capacity. Any current estimate of nuclear decommissioning
33 costs is subject to considerable uncertainty -- technical, economic, and
34 regulatory.

35 **Q. Please describe the basis for this conclusion.**

1 A. I have reviewed many engineering estimates of nuclear decommissioning
2 costs over the past 15 years. While the state of the art of nuclear
3 decommissioning cost estimation has improved over the past 15 years, there are
4 still important deficiencies. I have found that even the more recent cost
5 estimates are inherently based upon a number of uncertain or unsupported
6 assumptions. For example, it is typical to assume a hypothetical facility will be
7 available for the acceptance of low level radioactive waste. In this case, the
8 decommissioning estimates assume that the low-level radioactive waste would
9 be shipped to a currently operating facility in Barnwell, South Carolina (page 12,
10 direct testimony of Thomas S. LaGuardia, Duquesne Statement No. 13). It is far
11 from clear that this facility, or one closer to the units at comparable prices, will be
12 operating when dismantlements of Perry and Beaver Valley actually occur.

13 The method and timing of decommissioning are also major sources of
14 uncertainty. Even if one could say for certain that the Perry and Beaver Valley
15 units will operate to the end of their current licenses, it is not possible to say with
16 confidence whether the plants will be dismantled five years or 50 years after that
17 date.

18 The dismantlement process itself involves considerable uncertainty, as
19 experience dismantling commercial nuclear reactors is limited to smaller units or
20 special cases, such as the Shoreham unit in Long Island, which operated only at
21 low power for a short period of time. Dismantling a full-scale nuclear unit that
22 has operated for many years will present new challenges.

23 **Q. Have U.S. utility industry nuclear decommissioning cost estimates been**
24 **accurate in the past?**

25 A. No. Engineering estimates of nuclear power plant decommissioning costs
26 emanating from American utilities have a poor track record. The Company's
27 decommissioning consultant, on whose judgment they rely for their estimates of
28 nuclear decommissioning costs, is Mr. Thomas LaGuardia, of TLG Engineering.
29 Mr. LaGuardia has prepared dozens of nuclear power plant decommissioning
30 cost estimates over the past 20 years.

31 **Q. How do Mr. LaGuardia's estimates from 20 years ago compare with his**
32 **estimates today?**

33 a. Mr. LaGuardia's current decommissioning cost estimates are in the range of
34 15 times greater than his 1976 estimate for dismantling a large pressurized water
35 reactor. Adjusted for inflation, the recent cost estimates are approximately 6
36 times higher than the older estimate. This is an escalation in cost of 600
37 percent.

1 The 1976 study that I refer to is an engineering analysis of the decommissioning
2 cost of a large nuclear power plant for the Atomic Industrial Forum (*An*
3 *Engineering Evaluation of Nuclear Power Reactor Decommissioning*
4 *Alternatives*, AIF/NESP-009) in which Mr. LaGuardia estimated the cost to be
5 \$26.9 million (in 1975 dollars for immediate dismantlement of a generic 1160
6 MW pressurized water reactor). In today's dollars that would amount to about
7 \$70 million. In contrast, Mr. LaGuardia's recent site-specific estimates filed by
8 Duquesne in this case average \$459 million (\$727.8 million for two units at
9 Beaver Valley and \$650 million for Perry Unit 1; page 4, direct testimony of
10 Thomas LaGuardia, Duquesne Statement No. 13).

11 **Q. What has the trend been in Mr. LaGuardia's estimates between 1976**
12 **and the present?**

13 A. The trend is for continually increasing decommissioning cost estimates, at an
14 alarming rate of escalation. I have compiled a database of about 180 of Mr.
15 LaGuardia's site-specific estimates done between 1977 and 1995, all for the
16 "immediate dismantlement" method of decommissioning. I have adjusted these
17 for inflation, and have plotted them in Exhibit BEB-2. As the graph shows, the
18 engineering estimates have been increasing rapidly over time. The two lines in
19 the graph are linear and log-linear fits to the data. The average annual rate of
20 increase is roughly 10% faster than inflation over this period. This amounts to a
21 doubling of the estimates every 7 or 8 years.

22 **Q. Why is the growth in Mr. LaGuardia's estimates relevant to his current**
23 **decommissioning cost estimates for Duquesne's nuclear capacity?**

24 A. The escalation in Mr. LaGuardia's estimates is important for at least two
25 reasons. First, it shows that decommissioning cost estimation is not a mature,
26 stable undertaking. While progress has been made over the last 20 years, and
27 decommissioning estimates are now generally presented in a standardized
28 format, the alarming rate of change in the estimates indicates considerable
29 uncertainty in the current estimates. Second, the decommissioning cost
30 estimates do not simply show volatility -- there has been a clear upward trend.
31 Decommissioning policy and stranded cost policy should not ignore this trend. A
32 head-in-the-sand approach will not be productive. Rather, understanding the
33 past trends, the driving factors, and the implications for the future
34 decommissioning costs is essential to making sound policy decisions.

35 **Q. Would it, therefore, be appropriate for the Commission to simply adjust**
36 **Mr. LaGuardia's Perry and Beaver Valley estimates with a 10% increase and**
37 **proceed with the balance of its stranded cost review?**

38 A. This would not be adequate. A 10% increase (the historical rate of increase)

1 would account for only one year of cost escalation. Moreover, while the past
2 rates of increase must be considered, it is not reasonable to simply state that
3 decommissioning cost estimates will continue to increase at the rate that they
4 have in the past. What is needed is the establishment of a framework for
5 decommissioning that ensures that the needed funds will be available in a timely
6 manner, that provides for customers and shareholders to bear their fair share of
7 the costs over time, and that provides incentives for the plant owner to control
8 the magnitude of decommissioning costs.

9 **Q. Are there other considerations that point to the possibility of further**
10 **increases in the nuclear decommissioning cost estimates?**

11 A. I believe that some of the factors that have driven past increases in the
12 decommissioning cost estimates will continue to influence nuclear
13 decommissioning costs in the future. For example, the cost of low-level
14 radioactive waste disposal has increased rapidly over the past two decades, and
15 could continue to do so. A substantial portion of the increases in
16 decommissioning cost estimates has been related to spent nuclear fuel. While
17 the cost of transportation and long-term storage of spent fuel is generally not
18 included in the decommissioning cost estimates, the delays in the Department of
19 Energy's schedule for accepting spent fuel from commercial nuclear reactors
20 have driven decommissioning cost estimates upward due to the on-site
21 implications of spent fuel handling and storage upon the scope and timing of
22 decommissioning activities.

23 In addition, there is a general pattern of cost underestimation for large, complex
24 projects, particularly those that involve institutional uncertainties. This
25 phenomenon was evident in the case of nuclear power plant construction costs.
26 The trends to date for nuclear decommissioning cost estimates suggest a similar,
27 albeit somewhat different, set of factors at work. As large, fully radioactive
28 nuclear power plants begin to be decommissioned, regulations and technology
29 will evolve together . . . in most cases leading to higher costs.

30 **Q. In addition to escalation of the cost estimates, are there other reasons**
31 **to be concerned about the adequacy of nuclear decommissioning funding?**

32 A. Yes. The possibility of nuclear plant shutdown prior to the license
33 termination date is a major concern. Several units have shut down already, and
34 further shutdowns are likely as nuclear plants are increasingly subjected to
35 market forces. I have analyzed the operating economics of nuclear power plants
36 in many regulatory proceedings over the last 15 years. While on average,
37 capacity factors have improved, the low market prices for electricity render some
38 existing power plants uneconomic on an operating cost basis. This is true
39 particularly for some nuclear plants.

1 In a paper authored for the January/February 1997 *Electricity Journal*, I
2 concluded that there are about 10 nuclear plants in the U.S. that may be
3 uneconomical to operate, based upon 1995 data. Other observers of the utility
4 industry have reported similar conclusions. For example, a 1995 report by
5 Moody's Investors Service stated that "there are at least 10 nuclear plants (out of
6 109 in the U.S.) that might be closed in the event of deregulation" (*Stranded
7 Costs Will Threaten Credit Quality of U.S. Electrics*, August, 1995).

8 More recently, Moody's found that "The propensity for certain nuclear plants to
9 require expensive capital additions to comply with the standards of their Nuclear
10 Regulatory Commission (NRC) operating license increases the likelihood that the
11 number of early shutdowns might be even greater than those 10 originally
12 identified" (*Moody's Assesses Nuclear Power Risks in A More Competitive
13 Market*, November, 1996). Similarly, a report by the INGAA Foundation found
14 that 40 percent of the nation's nuclear capacity is "vulnerable to shutdown" with
15 increasing competition in the electric industry (*Nuclear Power Plants and
16 Implications of Early Shutdown for Future Natural Gas Demand*, 1997).

17 With decommissioning funding based upon the full license period, if a nuclear
18 unit is retired prior to the license termination date, there will be a funding
19 deficiency, in some cases of considerable magnitude. In particular, if the Perry
20 or Beaver Valley units shut down early there would likely be a significant net
21 deficit in the funding available for decommissioning.

22 **Q. Is it conceivable that a nuclear plant operator might find itself bankrupt
23 or otherwise unable to carry out decommissioning for lack of funds?**

24 A. It is possible that a nuclear plant owner could, after the shutdown of the plant,
25 find that the funds set aside for decommissioning are inadequate for the task --
26 as a result of premature shutdown and/or higher than expected decommissioning
27 cost. This may come at a time when the Company is financially stressed as a
28 result of the loss of generating capacity and the associated income stream. The
29 Nuclear Regulatory Commission has taken this possibility seriously, and has set
30 up external funding requirements to avoid such a situation. The NRC is also
31 considering the implications of electric industry restructuring upon the adequacy
32 of nuclear decommissioning funding.

33 **Q. Does Duquesne have an obligation to mitigate with regard to its nuclear
34 decommissioning costs?**

35 A. As a regulatory technical person, I read the Act to say "Yes." The legal
36 interpretation is properly left to the Commission and the lawyers who argue this
37 case.

1 Even independently, as a matter of regulatory policy, the Commission should
2 require as a precondition to providing stranded cost recovery, that the utility has
3 taken all reasonable and prudent measures to mitigate its stranded costs.
4 Nuclear decommissioning represents a large portion of stranded costs.

5 I assume that the Commission will look to the Pennsylvania's Electricity
6 Generation Customer Choice and Competition Act "transition or stranded costs"
7 definition in Section 2808. It defines stranded costs as those "...which the
8 commission determines will remain following mitigation by the electric utility."
9 Nuclear decommissioning should not be an exception -- if stranded cost recovery
10 is to be allowed then these costs should be aggressively mitigated.

11 **Q. How might Duquesne mitigate its stranded costs as they relate to**
12 **nuclear decommissioning?**

13 A. One way to mitigate the decommissioning portion of stranded costs is to
14 contribute shareholder dollars to the fund, reducing the deficiency. Accelerating
15 decommissioning funding in order to reduce the fund deficiency is another
16 approach.

17 Since decommissioning is a process that hasn't taken place yet, there are
18 additional opportunities for mitigation that are not possible for uneconomic plant
19 construction costs. For example, good planning and cost control measures for
20 the decommissioning process that reduce the total cost exposure for
21 decommissioning would translate into stranded cost reductions. I have not seen
22 evidence of a comprehensive Duquesne program to minimize the cost of this de-
23 construction program. This would be hands-on mitigation, not just shifting costs
24 in time or among the various parties.

25 **Q. What do you conclude regarding stranded cost mitigation and nuclear**
26 **decommissioning?**

27 A. I believe that Duquesne has not addressed the issue of stranded cost
28 mitigation as it relates to nuclear decommissioning, and that the Commission
29 should require a plan for and evidence of such mitigation prior to approving CTC
30 recovery of stranded costs. Duquesne's decommissioning obligation as currently
31 forecast by the Company is large. It could be larger still, with further increases in
32 nuclear decommissioning cost estimates and further requirements for spent fuel
33 storage and disposal. Therefore, I recommend that the Commission require of
34 Duquesne that it undertake clear and significant efforts to mitigate its future
35 nuclear stranded investment.

36 ***Responsibility for nuclear obligations***

1 **Q. Are you recommending that Duquesne's customers pay additional**
2 **amounts to the cover nuclear decommissioning costs?**

3 A. No. This is exactly what I am concerned about. Providing assurance of
4 adequate funding for safe and timely nuclear decommissioning is imperative. At
5 the same time, customers should not be saddled with an open-ended obligation
6 to bear these costs. I am concerned that Duquesne's customers will be asked in
7 the future to pay for additional, as-yet-unfunded nuclear decommissioning costs.
8 I am also concerned that the Commission avoid enabling the same kind of cost-
9 plus de-construction that plagued the nuclear power industry's construction
10 efforts, contributing to the high costs of nuclear capacity.

11 **Q. Is it efficient for Duquesne to bear responsibility for the cost of**
12 **decommissioning its nuclear capacity?**

13 A. Yes, it is efficient in several different ways. First, there is the fuzzy line
14 between operating costs and decommissioning costs.

15 It is possible to run a nuclear unit in a very clean manner, with somewhat higher
16 operating costs but lower decommissioning costs. For example, by thoroughly
17 decontaminating equipment and by removing radioactive wastes from the site
18 during the plant's operating life, decommissioning costs will be lower.
19 Conversely, if operating costs are kept low by only doing essential
20 decontamination and by storing radioactive wastes at the plant site,
21 decommissioning costs will be higher. Unfortunately, the competitive market that
22 Duquesne is entering will tend to encourage the operators toward shifting such
23 costs into the future.

24 If operating costs and decommissioning costs are treated differently (e.g., the
25 former recovered in market prices and the latter recovered in a wires charge, like
26 the CTC) then inefficient decisions may result. Certainly, it would be an
27 important, if somewhat burdensome, regulatory necessity to watch carefully the
28 boundary between operations and decommissioning.

29 Also, an efficient incentive structure would have the nuclear plant owner
30 responsible for at least some of the decommissioning costs. Cost-based
31 regulation is arguably responsible for the nuclear plant construction cost debacle.
32 Electricity restructuring is motivated in large measure by a desire to move away
33 from a system in which a utility's cost recovery is based on what it spends. By
34 allocating substantial decommissioning costs to operators instead of to
35 customers, the Commission would help ameliorate some of the pressures toward
36 higher decommissioning costs.

1 We should not rely on the cost-plus, customer-pays system for a cost as large
2 and important as nuclear plant decommissioning. Rather, the nuclear plant
3 owner should bear its rightful responsibility for the costs of decommissioning, in a
4 sensible, fair and efficient framework, in which there are reasonable incentives to
5 control decommissioning costs.

6 A further concern is the reorganization of the electricity industry, including what
7 we presently know as Duquesne. For instance, Duquesne may in the future spin
8 its nuclear assets off into generating companies that lack the solid funding of the
9 T&D monopoly. As the nuclear units ended their useful lives, we could find the
10 nuclear generating companies undercapitalized, unable to handle the true cost of
11 decommissioning and waste storage/disposal. It is safer, and more equitable, if
12 society now invests in the decommissioning of the nuclear plants, rather than
13 saddling our children with the cost responsibility. This investment should be
14 fairly shared.

15 The worst case scenario is a future in which "hot" shut-down nuclear plants
16 remain in place, for lack of funds to properly dismantle them and store the
17 radioactive waste. Pennsylvania cannot afford the burden of untended nuclear
18 derelicts in the 21st century; and the state will not have the option of letting them
19 sit relatively unattended, as it has with many old non-radioactive steel-making
20 facilities. As a component of a restructuring plan, requiring the present nuclear
21 owner and operator to "mitigate" by reducing unfunded obligations with
22 shareholder funds is a reasonable expectation.

23 **Q. Duquesne proposes that the Commission allow recovery of**
24 **decommissioning costs as part of stranded costs, and then in 2006 take**
25 **the unfunded balance as an adjustment to the residual value. Do you agree**
26 **with this proposal?**

27 A. Duquesne's proposal is for decommissioning cost recovery as part of
28 stranded costs, with a reckoning in January of 2006 as part of the residual value
29 calculation (page 17, direct testimony of Morgan K. O'Brien, Duquesne
30 Statement No. 4). I agree with Duquesne's proposal in part. It may be
31 reasonable to have a "wires charge" for a portion of the decommissioning
32 funding.

33 It is not reasonable, however, to have the wires charge be the sole means for
34 funding the Company's nuclear decommissioning obligations, with full
35 reconciliation as part of the residual value calculation. This would, in effect,
36 provide a subsidy to the continued operation of the plant. It would also relieve
37 the plant operator from the burden of controlling decommissioning costs.

38 The Commission should develop a decommissioning policy in which the

1 obligation to pay for nuclear decommissioning costs is shared in an equitable
2 and efficient manner between the customers (in a wires charge) and the
3 generation portion of the company (which could attempt to recover these costs in
4 the market prices charged for electricity). In this way, the operator of the nuclear
5 units would have a direct financial interest in managing the magnitude of the
6 decommissioning cost. With any system, all of the costs that are collected for
7 decommissioning -- those from the wires charge and those from the plant
8 operator -- should be placed in one or more external funds to ensure that they
9 are available for plant decommissioning when needed.

10 Before approving long-term recovery of nuclear decommissioning costs, the
11 Commission should consider its policy options and the merits of sharing the
12 responsibility for decommissioning between shareholders and customers.

13 **Q. Does your proposal create a risk that decommissioning will not be**
14 **adequately funded?**

15 A. A policy that the nuclear plant owner will be responsible for a share of the
16 decommissioning costs might, if implemented irresponsibly, create significant
17 added risk of fund inadequacy. However, I believe that if the sharing mechanism
18 is well designed, and the Company acts responsibly, there is little added risk.

19 In my view there is some substantial benefit to having the owner "involved" in the
20 funding, making decommissioning a central concern of management rather than
21 a diversion of attention with costs that will be passed directly through to captive
22 customers in a wires charge. Moreover, the utility's share of the
23 decommissioning obligation can and should be placed into the external fund, in
24 order to provide added assurance of the availability of funds. I understand that
25 the Nuclear Regulatory Commission, which has an important role in assuring that
26 decommissioning funding is in place, would not have a problem with such a
27 proposal.

28 **Q. How should the Commission go about developing a policy to address**
29 **this difficult situation?**

30 A. I recommend that the Commission undertake a process to establish this
31 policy, ideally on a generic basis, for all of the utilities in the state with nuclear
32 investments. In effect, this would continue the informal or collaborative effort,
33 begun by Commission technical staff just a few years ago, that involved public
34 technical meetings, with participation of the OCA, industrial intervenor
35 representatives and environmental representatives, among others. The following
36 information should be collected from the companies and considered in
37 developing the specific approach:

- 1 ● estimation of the amount of decommissioning cost that is dependent upon
- 2 continued operation of the plants,
- 3 ● analysis of the degree of uncertainty in the current decommissioning
- 4 estimates,
- 5 ● identification of the activities and costs that are in the "grey area" between
- 6 nuclear decommissioning and plant operations and the development of
- 7 protocols for ensuring that costs that should be a part of ongoing plant
- 8 operation do not slip into decommissioning,
- 9 ● examination of the implications of national spent fuel disposal policy upon
- 10 decommissioning timing and cost,
- 11 ● analysis of the tax implications of a shared funding approach, and
- 12 ● analysis of the funding assurance implications, including the connection with
- 13 any NRC decisions on decommissioning funding for utilities in a restructured
- 14 environment.

15 The Commission should arrange for the information to be made publicly
16 available, as through its web site, and should provide for periodic technical
17 meetings to allow full discussion of the relevant issues. Once the pace of the
18 restructuring cases abates, the Commission should begin a formal proceeding to
19 address the ratemaking and other PUC treatment of decommissioning cost
20 obligations. The outcome of that proceeding should be an explicit order for the
21 sharing of decommissioning cost increases by shareholders, and a procedure for
22 insuring that nuclear facility managers do not imprudently put off cost mitigation
23 measures.

24 ***Customer increases in nuclear decommissioning fund contributions***

25 **Q. Could you please summarize your recommendation regarding the**
26 **procedures that the Commission should undertake for the augmentation of**
27 **nuclear decommissioning funds?**

28 A. Yes. In my view, the Commission should require that, in future proceedings in
29 which the utility seeks to increase its collections for nuclear decommissioning on
30 the ground that the decommissioning fund is underfunded, a material proposition
31 of the case shall be the extent to which a life cycle cost analysis of the facility
32 warrants its continued operation, including incurring further nuclear liabilities.

33 **Q. Are you in fact recommending the customers pay additional amounts**
34 **for the decommissioning of a nuclear facility, regardless of whether**
35 **Duquesne continues to own it or contract for its power?**

36 A. I am not making such an independent recommendation at this time. Rather, I
37 am addressing this contingency — the T&D utility seeks to collect additional

1 ratepayer contributions to a nuclear decommissioning fund. I will leave to the
2 lawyers whether, and in what circumstances, such an assessment would be
3 lawful. This section of my testimony assumes that such a contingency is realized
4 and the regulated utility is presenting the Commission with a request to assess
5 the captive customers.

6 **Q. What do you believe the elements of a nuclear decommissioning**
7 **assessment increase ought to be?**

8 A. As my testimony suggests above, the utility should be required to prove that:

- 9 ● it is securing the power reasonably and prudently;
- 10 ● the power is reasonably priced;
- 11 ● the utility has taken all reasonable measures to minimize decommissioning
12 cost increases;
- 13 ● the projections of the decommissioning work are based on projections of
14 reasonable and prudent management of the effort;
- 15 ● the cost claim reflects a reasonable sharing of responsibility among the
16 customers, the utility's shareholders, and, if different, the genco owner and
17 operator; and
- 18 ● in light of the life cycle costs of the nuclear facility, and in comparison with
19 reasonably available alternatives, it is more cost-effective for the customers
20 to pay the requested increased charges than to simply stop production and
21 begin decommissioning immediately.

22 **Q. What do you mean by the "life cycle costs" factor of this analysis?**

23 A. I recommend that the Commission undertake the same kind of cost
24 comparison that any business would undertake when faced with a decision to
25 increase capital expenditures — a comparison of alternatives. An "engineering
26 analysis" or "to-go cost analysis" is a well understood planning tool in the
27 business of electric power production. The Commission should demand that the
28 customers be treated no worse than a prudent manufacturer's management
29 would treat its shareholders before committing additional funds.

30 **Q. How would you have the matter addressed?**

31 A. I would require the utility to include in its decommissioning charge increase
32 application such a cost analysis comparison, with appropriate work papers and
33 other backup. I would assign to the utility the burden of proving its case for the
34 request. Other parties would be given an opportunity to undertake discovery and
35 present their own cases.

36 **Q. Would you set a lower dollar limit on a request, one that would trigger**

1 **this analysis presentation?**

2 A. No. Indeed, I would hope that the utility, as a buyer of genco power, or as a
3 nuclear owner, would maintain and update such an analysis. I would require the
4 filing of such an analysis with each decommissioning rate request, leaving it up
5 to the utility to make the decision when to file.

6 **5. The Better Choice Plan**

7 **The potential for skewing the market through customers' non-choices.**

8 **Q. What is your concern about customers choosing alternative suppliers in**
9 **1999, when electric competition begins in full force?**

10 A. With competition, many customers might not choose alternative electricity
11 suppliers -- even after they are afforded the opportunity. When telephone
12 customers first had the opportunity to choose among long-distance carriers,
13 the majority did not switch to a new carrier. Electricity customers are likely to
14 follow the same pattern. There are many reasons why customers might not
15 choose alternative electricity supplies once retail access is allowed.

16 **Customer Confusion.** *It is likely that the confusion now experienced by*
17 *many customers at the start of the pilot programs may continue. The pilot*
18 *program advertising offered a bewildering assault, which has done little to*
19 *help consumers understand their options. In the midst of such cognitive*
20 *noise, people feel ill-equipped to make an intelligent choice. Frequently they*
21 *are afraid they will make the wrong choice or are overwhelmed by the hassle*
22 *of it all.*

23 Many consumers may not want to be pioneers in this new age of competition.
24 Having no historical experience in selecting an electric company, they may
25 prefer to wait until there is a body of customer experience to draw on, word-
26 of-mouth recommendations they can tap, or independent *Consumer Reports*-
27 like evaluators that can assist them in making that decision.

28 **Lack of Meaningful Choice.** *Medium- and low-volume customers might not*
29 *be offered alternative electric generation services by many competitors*
30 *because of the high transaction costs and low profit potential of serving that*
31 *segment of the market. Medium- and low-volume customers are considered*
32 *by many to be costly to market and to service. My point is illustrated by an*
33 *executive vice president of New Energy Ventures, one of the leading new*

1 large energy providers based in California, who was recently quoted as
2 saying that NEV would serve residential customers if they were aggregated
3 into buying groups, because they are "very expensive to serve because they
4 are peak customers and what you need to do is serve them in bulk."³

5 **Lack of Useful Information.** Many medium- and low-volume customers
6 might have less information and the less practical ability to effectively shop
7 among competing generation suppliers than high-volume industrial
8 customers. Customers might not be aware of the choices available, or might
9 simply not have the time or resources to evaluate competing proposals.
10 Some customers might not be motivated to actively shop because the size of
11 their bill is not large enough to warrant much attention.

12 **Why Change?** Whether it is brand loyalty, risk aversion or the comfort of the
13 familiar, many customers might not choose alternative electricity suppliers
14 simply out of years of habit with the existing electric company, and/or out of
15 distrust of new, unfamiliar generation companies. The fact that Enron is so
16 interested in acting as the default provider for PECO Energy indicates that it
17 believes that (a) the segment of customers who do not choose alternative
18 generation providers could be quite large, and (b) serving this segment of
19 customers (without the associated marketing costs) could be quite lucrative.

20 **Q. Why should the Commission be concerned if a large portion of**
21 **customers does not choose alternative generation suppliers?**

22 A. If a large portion of electricity customers do not choose an alternative
23 supplier, and a single default generation supplier immediately serves these
24 customers, then the default generation supplier would be granted an unfair
25 competitive advantage over alternative generation suppliers. Alternative
26 generation companies would essentially be left out of this important share of
27 the market. Consequently, these suppliers will not have as much opportunity
28 to establish and develop their position. This market domination would have a
29 strong chilling effect on potential suppliers, which might reasonably decide
30 against getting into the market.

31 Assigning a single entity the opportunity to serve all default customers
32 essentially institutionalizes a competitive advantage for that entity.

33 **Enhancing competition with the Better Choice Plan**

³ *Deregulation Plan: 15% Cut in Power Bills*, Boston Globe, October 30, 1997.

1 **Q. What should the Commission do to mitigate against the potential anti-**
2 **competitive effects created by assigning default customers to one**
3 **company?**

4 A. The Company's default customers provide generation suppliers with an
5 important opportunity to establish themselves in the generation business and
6 increase their market share. My main point is that the Commission should
7 mitigate the anti-competitive implications of assigning all of the default customers
8 to a single generation supplier. I recommend that the Commission establish a
9 system for allocating the default customers among a number of viable generation
10 companies. This measure will significantly enhance the degree of competition in
11 the Company's service territory.

12 **Q. How do you propose to allocate the default customers to more than one**
13 **generation supplier?**

14 A. Mr. Schoengold, Mr. Colton and I have worked with the Environmentalists to
15 develop the Better Choice Plan as a means to address the anti-competitive
16 problem created by the default customers, by allocating the default customers to
17 more than one generation company. I recommend the Commission require the
18 adoption of the Better Choice Plan as a condition for the Company to secure the
19 principle benefits under the Act, such as stranded investment recovery and
20 securitization.

21 **Q. Please describe your Better Choice proposal.**

22 A. The Better Choice Plan consists of two distinct steps in the process of
23 providing generation companies with access to retail electricity customers in the
24 Company's service territory:

- 25 ● The first step is the initial customer selection process that will take
26 place in any event as part of introducing direct access to a competitive
27 generation market.
- 28 ● The second step is the allocation of default customers among those
29 generation companies that are selected in the initial customer
30 selection process.

31 ***The Initial Customer Selection Process***

32 **Q. Please describe the initial customer selection process.**

33 A. In the first step of the Better Choice Plan, electricity customers would be
34 given the option to select alternative generation customers according to the
35 schedule set forth in the Act. The Act spoke of a three-step three year
36 phase-in beginning January 1, 1999, but a valid reading of it may accelerate
37 this by providing market access to one-third on January 1, 1999, the second
38 third on January 2, 1999, and the final third on January 2, 2000. The

1 Environmentalists support this accelerated phase-in schedule as a valid
2 reading of the Act. This selection process would proceed in these two
3 stages, per the Act, with two additional elements.

4 **Q. What is the first element you recommend be added to the selection**
5 **process?**

6 A. The Commission should take certain measures to encourage and facilitate
7 customer action in selecting among competing generation supplier proposals.
8 At a minimum, the Commission should ensure that all customers are provided
9 with comprehensive, truthful, timely, and consistent information regarding
10 their choices of electricity suppliers. Accurate and useful customer
11 information is one of the cornerstones necessary for developing a competitive
12 market. If customers are unaware, misinformed or confused about
13 alternative generation companies, then competition will be meaningless for
14 them and the primary objective of the Act will not be achieved. There are
15 many specific measures to insure that the system provides customers with
16 unbiased and effective information. However, a detailed exposition of such
17 measures is beyond the scope of my testimony in this proceeding. If the
18 Commission accepts the Better Choice Plan I recommend it require this issue
19 to be timely addressed.
20

21 **Q. Why is it so important that the Commission encourage customer choice**
22 **in the initial customer selection process?**

23 A. A competitive market will only bring benefits to customers to the extent that
24 they face meaningful choices and they make conscious, informed decisions
25 based on those choices. Informed customer interest and participation in
26 evaluating and choosing among generation companies is essential to ensure
27 that the companies are provided with the incentive to operate efficiently and
28 continually strive to provide customers with quality service at low costs.

29 **Q. Do you believe that measures to facilitate customer involvement in the**
30 **initial customer selection process should only be applied in The**
31 **Company's service territory?**

32 A. No. It will be important to facilitate customer involvement in the selection
33 process in all service territories in Pennsylvania -- regardless of whether the
34 Commission adopts the Better Choice Plan or any other proposal. As I
35 mentioned above, greater customer involvement will increase competition
36 and provide benefits to all electricity customers. I am advocating in this
37 testimony measures to facilitate informed customer involvement because
38 they represent an important element of the Better Choice Plan.

39 **Q. What is the second element you recommend be added to the selection**
40 **process?**

41 A. The Company would publish the results of the selection process, including

1 the percentage of the generation market that was obtained by each
2 generation company. This information will be necessary to implement the
3 second step of the Better Choice Plan.

4 ***The Allocation of Default Customers Among All Eligible Generation***
5 ***Companies***

6 **Q. Please describe the second step in your Better Choice proposal.**

7 A. In the second step, if the Company's market share from (a) explicit customer
8 selection and (b) default the non-choosers to it were to exceed 50% of the
9 customers, the non-choosing customers would be allocated among the
10 various generation suppliers serving the other customers, rather than being
11 assigned to a single default provider.

12 **Q. How do you define default customers?**

13 A. Default or non-choosing customers are defined as those customers who do
14 not make an affirmative choice to purchase electricity from the Company or
15 another generation supplier.

16 In the initial customer selection process, customers would be provided with a
17 ballot with which they could select their generation supplier. All customers
18 who did not check off a particular supplier on the ballot would be considered
19 default customers and would be assigned to a default supplier.

20 **Q. Would customers be able to choose to continue to be served by the**
21 **Company?**

22 A. Yes. The Company would be included on the ballot as one source for
23 purchasing generation services. The Company would offer generation
24 services for an unbundled generation price equal to the "generation credit"
25 that is unbundled from the total electricity price. The size of the unbundled
26 generation credit will be determined by the Commission in this proceeding.

27 **Q. Would calculating the The Company market share threshold of 50%**
28 **include those customers who choose to be serviced by the Company or**
29 **its affiliated generation companies, if any?**

30 A. Yes, it would. The objective of the 50 percent threshold is simply to identify
31 the point at which the Company enterprise is likely to have too large a market
32 share, particularly through taking the default customers. The market share
33 threshold that is used to trigger the default customer allocation process
34 should include those customers who choose to be served by The Company
35 as well as those who are the default customers. The market share
36 threshold of 50% should also include those customers who choose to be
37 served by the Company's affiliates. Thus the allocation process is triggered

1 with this equation: The Company + The Company affiliates + defaults =>
2 50% of customers. ("=>" means "equals or is greater than".)

3 **Q. How would the default customers be allocated among electricity**
4 **suppliers?**

5 A. Default customers would be allocated only among those alternative electricity
6 suppliers that were successful in obtaining customers in the initial selection
7 process. Each electricity supplier would be allocated a share of the default
8 customers in proportion to the share of customers it obtained in the initial
9 selection process. In determining these proportional shares, the computation
10 of percentages would exclude both the the Company affiliates and those
11 suppliers which did not choose to participate in the allocation process. A
12 number of numeric examples of various allocations are provided in Exhibit
13 BEB-4.

14 The principal rationale for this allocation approach is that the customers'
15 decisions in the initial selection process provide a tangible indication of
16 general customer preference that should be applied to default customers as
17 well. Further rationales are that this allocation factor is simple, and may be
18 determined mechanically.

19 **Q. Would any of the default customers be allocated to the Company?**

20 A. No. I recommend that the Company not be allocated any of the default
21 customers. The Company should be making the transition toward becoming
22 a local distribution company. The only reason to include the Company on the
23 customer choice ballot in the first place is to give customers the option of
24 remaining with the electricity company that they are most familiar with, or if
25 they explicitly prefer to do so. If the Company wishes to continue to expand
26 its generation business, it should do so through properly isolated generation
27 affiliates. It is important to note that none of the customers who make an
28 affirmative choice of the Company or its affiliates would be denied their
29 choice and reassigned to another supplier. We only propose to assign the
30 non-choosing default customers to the default suppliers.

31 **Q. Would the the Company generation affiliates be allocated any of the**
32 **default customers, if it were to obtain customers during the initial**
33 **selection process?**

34 A. I recommend that any Company generation affiliates should not be allocated
35 any of the default customers, even if they obtain some customers during the
36 initial selection process. The Company generation affiliates are likely to have
37 some degree of competitive advantage over other generation companies as a
38 result of the affiliation with the Company, regardless of any codes of conduct
39 or affiliate transaction standards that the Commission might implement.

1 **Q. Under what circumstances might it be reasonable to allocate some of**
2 **the default customers to the Company generation affiliates?**

3 A. Only in carefully determined circumstances. There must be in place
4 unassailable firewalls between the Company's distribution arm and its
5 generation affiliates in order to protect distribution company ratepayers and
6 competitors against cross-subsidization and other improper monopoly-related
7 behavior. The Commission must issue and enforce safeguards, whether
8 through a Code of Conduct or otherwise, which include stiff sanctions. The
9 enforcement commitment must be meaningful -- specific and supported by
10 fully authorized staff. Unenforced safeguards will not serve as a deterrent
11 against anti-competitive behavior. If, for example, sound functional and
12 accounting separations requirements were in place, and meaningfully
13 enforced with adequate Commission resources before introduction of the
14 statutory first phase of competition, such a default market allocation to the
15 Company generation affiliates might be reasonable.

16 Experience in other industries demonstrates that in practice it is extremely
17 difficult to create such firewalls and to ensure compliance with them, and that
18 affiliate transaction abuse can remain a significant problem. Therefore, as a
19 working presumption, I do not consider it prudent to allocate the Company
20 affiliates a portion of the default customers.

21 **Q. Once a supplier is allocated a certain share of the default customers,**
22 **how would it be assigned specific default customers?**

23 A. The default customers would be allocated separately by residential,
24 commercial and industrial classes. For each of these three customer
25 classes, each generation supplier would be allocated a share of the default
26 customers in that class proportional to the share of customers in that class
27 that the generation supplier obtained in the initial customer selection process.
28 This is most easily understood by working through the examples given in
29 BEB-4. I expect that the majority of the default customers will be residential
30 customers, with some commercial customers, and some small industrial
31 customers.

32 The specific customers could then be allocated to the alternative suppliers on
33 a random basis. A random allocation avoids the appearance of unfairness of
34 some generation companies receiving more-desirable or less-desirable
35 default customers because of their location on the distribution grid or load
36 characteristics.

37 Allocating the default customers to the various alternative suppliers would be
38 performed by the Company in a process subject to oversight by the
39 Commission and inspection by the alternative suppliers. This would take
40 place months before the onset of competition (January 1).

1 **Q. Would all generation suppliers that obtain customers in the initial**
2 **selection process be required to pick up default customers through the**
3 **allocation process that you propose?**

4 A. No. Supplier participation in the process would be entirely voluntary. Each
5 generation supplier that obtained customers in the initial selection process
6 would be given the option to be allocated default customers. I expect that
7 every, or almost every, supplier would welcome an allocation of default
8 customers because the supplier's market share would be increased without
9 incurring marketing costs.

10 Some suppliers might not participate because the Plan requires a "quid" for
11 the "quo". In exchange for the private benefit -- avoiding marketing costs to
12 increase customer base -- the supplier must help the Commission advance
13 certain public interest objectives. (I discuss this just below.) Those
14 generation suppliers that decline to meet the Plan's public benefit conditions
15 would simply not be allocated any of the default customers. Consistently, the
16 market shares of those non-participating suppliers would be ignored in
17 calculating the proportional allocation shares of the alternative suppliers that
18 do choose to participate in the Plan.

19 Further, if a generation company that obtains customers in the initial selection
20 process subsequently declines to serve its default customers or fails to
21 comply with the Plan's minimum conditions, the default customers that would
22 have been allocated to that company would then be allocated to the other
23 eligible generation companies, based on their proportional shares of the
24 market after the initial selection process. (In determining these revised
25 proportional shares, the computation of percentages would also exclude The
26 Company and its affiliates and those suppliers which had declined to
27 participate in the allocation process.)

28 ***Conditions That Must Be Met In Order To Be Allocated Default Customers***

29 **Q. What are the conditions a supplier must meet in order to be allocated a**
30 **share of the default customers?**

31 A. In order to be eligible to receive a percentage of the default customers, each
32 generation company must first agree to provide generation services to the
33 default customers under the following conditions:

- 34 1. The price for the generation services will be no higher than the
35 *unbundled generation rate (also known as the "generation credit")* that
36 The Company will be allowed to charge. This provision is necessary to
37 ensure that default customers will not have their prices increased as a
38 result of being allocated to an alternative supplier.

- 1 2. The generation supplier will agree that any of its default customers
2 who elect to switch generation suppliers will not be charged a contract
3 termination fee or other penalty. Customers who are assigned to a
4 default supplier should be able to make an affirmative choice to switch
5 to another supplier, even to The Company, without penalty.
- 6 3. The generation supplier will agree that the energy and capacity it
7 offers to serve default customers meet an environmental baseline
8 comparable to the applicable Pennsylvania environmental regulations.
9 This helps create a level geographic playing field for suppliers.
- 10 4. The generation supplier will offer a resource mix which includes at
11 least one percent (1.0%) renewable resources, and the supplier
12 employs a net billing, or net metering, tariff and other policies to
13 facilitate the interconnection of small-scale, clean and renewable
14 energy generation. For the purpose of this condition, renewable
15 resources would not include electricity generated by the combustion of
16 solid waste. Generation suppliers would be able to use purchases of
17 renewable energy to qualify for this condition.
- 18 5. The generation supplier will inform customers about the fuel mix, air
19 emissions and other wastes (radioactive, solid and liquid) of all of its
20 power sold in Pennsylvania, in a simple, uniform format. This
21 information is important to ensure effective competition by providing
22 customers with relevant facts that may influence their choice of
23 electricity supplier.⁴ It is also necessary to prevent misleading or
24 confusing claims about environmental impacts or green power
25 services.
- 26 6. The generation supplier will contribute 0.5 percent of its total
27 Pennsylvania power revenues to the Pennsylvania Sustainable

⁴ The National Association of Regulatory Utility Commissioners (NARUC) recognizes the importance of the role of customer information in encouraging an effective, competitive generation market. In a recent resolution NARUC found that “clear and uniform disclosure will promote efficiency through informed product comparisons; and informed customer choice cannot occur in a retail electricity market without full disclosure of all relevant and important facts.” NARUC went on to resolve that it supports “initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases.” (NARUC, *Resolution in Support of “Right-to-Know” and Product Labeling Standards for Retail Marketing of Electricity*, the 108th Annual NARUC Convention in San Francisco.)

1 Development Fund. The rationale and proposed design of this Fund is
2 addressed in David Schoengold's testimony (Environmentalists'
3 Statements 1-S and 1-E).

- 4 7. The generation supplier will provide customers with information
5 regarding the number and percentage of its work force that is
6 employed in Pennsylvania. This provision is consistent with the Act's
7 recognition that during this transition to a competitive electric market,
8 the Commonwealth has a stake in protecting jobs,⁵ promoting an
9 experienced and expert work force⁶ and being sensitive to changes
10 that might otherwise entail the closure of facilities or reductions in
11 employee levels.⁷

12 **Q. Why should a supplier be required to meet the conditions outlined**
13 **above?**

- 14 A. The default customers represent an opportunity for a generation company to
15 increase market share, enhance its name recognition, increase its profits
16 through increased sales, diversify its customer base, improve its customers'
17 load factor, and reduce operating risks through diversification -- all for little or
18 no marketing and transaction costs to obtain those customers. (See Mr.
19 Colton's testimony on the substantial marketing cost avoidance.) In the
20 newly restructured electricity industry, the primary competitive strategy will be
21 to increase market share. I expect that many generation companies will be
22 very interested in serving these default customers. Enron's petition in the
23 PECO docket is compelling evidence of this interest.

24 Consequently, I believe that the generation companies should provide
25 something to customers in return for this desirable marketing opportunity. I
26 expect that the conditions listed above are relatively modest compared with
27 the low-cost marketing opportunities associated with serving the default
28 customers, and that most, if not all, generation companies would be willing to
29 meet these conditions in order to obtain those opportunities. In any event,
30 participation in the allocation process is their free choice.

31 ***The Threshold For Allocating Default Customers***

- 32 **Q. What if it turns out that the Company's market share is less than 50**

⁵e.g. § 2802 (7).

⁶e.g. § 2802 (11).

⁷e.g. § 2802 (18).

1 **percent (i.e. more than half of the Company's customers explicitly**
2 **choose a non-Company alternative generation supplier once they are**
3 **allowed retail access)? Would you still propose to allocate the default**
4 **customers among the alternative suppliers?**

- 5 A. No. If it turns out that more than 50 percent of the Company's customers
6 choose an alternative electricity supplier(s), I do not recommend the
7 allocation of the default customers.

8 In this way, my proposal does not require that the Commission be convinced
9 now that the majority of electricity customers in mid-1998, or later, will fail to
10 explicitly choose a generation supplier. If it turns out that I am wrong, the
11 default customer allocation process will not be applied and no effort lost. If I
12 am correct about customers not choosing alternative suppliers, then the need
13 for the default customer allocation process will be obvious and the Better
14 Choice Plan will be in place to help achieve the Act's goal of creating a truly
15 competitive electricity market in Pennsylvania.

16 **Q. Why have you chosen for the Company a market share threshold of 50**
17 **percent for implementing your recommendation to allocate default**
18 **customers?**

- 19 A. It is useful to have some reasonable threshold that indicates the extent to
20 which the Company has an unfair competitive advantage as a result of being
21 allocated all of the default customers. The objective of the threshold is to
22 provide an indication of when the Company as the default supplier would
23 have too large a share of the market, i.e., that it would hold a dominant
24 position in the market. I believe that 50 percent is a rough, simple threshold
25 that will be reasonable, easy for the Commission to apply and easy for the
26 public and the parties to understand.

27 **Q. Please elaborate. In a competitive environment what would be the ideal**
28 **number of customers that are provided generation services by The**
29 **Company?**

- 30 A. Ideally, the Company should not be providing any customers with generation
31 services once retail competition is fully established. The Company should
32 make the transition into a local distribution company. The only need for the
33 Company to provide generation services to customers over the long-term
34 would be as the Provider of Last Resort, as described further below in my
35 testimony. If the Company wants to operate in the generation market, it
36 should do so through its generation affiliates. As long as the Company (in its
37 capacity as the distribution company) is providing generation services to
38 customers (other than provider of last resort), it is limiting the opportunities for
39 competitive generation companies to serve those customers, and it is
40 therefore hindering the development of competition in its service territory.

1 **Q. Why do you believe that the threshold should be a market share of 50**
2 **percent?**

3 A. There are many factors that should be taken into account in assessing
4 whether any one entity has a dominant position in the market. Economic
5 theory suggests that in order for a workably competitive market there needs
6 to be, among other factors, a large number of firms competing in each
7 market. However, there is no simple formula for determining what that
8 number should be. It would depend upon many other factors that are unique
9 to each market -- the market share of each firm, the ease of entry and exit in
10 the market, the potential for any one firm to influence the market price, the
11 potential for firms to collude, the potential for firms to use affiliate transactions
12 to their competitive advantage, and more.

13 Nevertheless, numerical indications of market power can sometimes be used
14 to provide approximate indications of whether a particular market is too highly
15 concentrated among too few firms. One of the commonly used numerical
16 indicators of market concentration is the Hirfindahl-Hirschmann Index (HHI).
17 The HHI is used by the U.S. Department of Justice (DOJ) in reviewing market
18 power issues in the context of mergers. The Federal Energy Regulatory
19 Commission (FERC) also uses the HHI as a guideline in evaluating market
20 power in the context of mergers between electric companies.

21 **Q. Please briefly describe how the HHI is calculated and applied.**

22 A. The HHI is defined as the sum of the squares of the market share of each
23 firm operating in a particular market. For example, a market with four firms
24 each with 25 percent of the market would have an HHI of 2,500. A high HHI
25 implies a high concentration in the marketplace. The squaring of the market
26 shares of each firm ascribes more weight to the larger firms, which leads to a
27 higher HHI. A market with only one firm with a 100 percent market share
28 would result in an HHI of 10,000, which is the highest possible HHI result.

29 There is some debate about what level of HHI indicates that a market is
30 overly concentrated. According to the DOJ guidelines, a market is deemed
31 to be "unconcentrated" if the HHI is less than 1,000; "moderately
32 concentrated" if the HHI lies between 1,000 and 1,800; and "highly
33 concentrated" if the HHI is greater than 1,800.⁸

34 Dr. Paul Joskow, in advising FERC on determining whether market-based

⁸ For the purpose of reference, a market with ten identically sized firms will have an HHI of 1,000, while a market with five identically sized firms will have an HHI of 2,000. For a given number of firms in a market, the HHI assumes its lowest value when the firms have identical market shares, and increases as the market shares of individual firms increase.

1 pricing can be applied in certain wholesale generation markets,
2 recommended the following guidelines:⁹

- 3 1. A *market* should be considered "low risk" (i.e., collective market power
4 would not be a problem) if the HHI is less than or equal to 2,500.
- 5 2. An *individual firm* should be considered at low risk of possessing
6 market dominance if it has less than or equal to 20 percent of market
7 share, regardless of the HHI for the market.
- 8 3. An *individual firm* should be considered at low risk of possessing
9 market dominance if it has less than or equal to 35 percent of market
10 share, and the HHI for the relevant market is less than or equal to
11 2,500.

12 Dr. Joskow's guidelines account for both the concentration of the entire
13 market and the concentration of a particular firm of interest. It is important to
14 note that Dr. Joskow's guidelines were developed for wholesale electricity
15 markets, and not the retail electricity market that we are discussing in this
16 proceeding. Guidelines for retail markets might require some different
17 considerations. Also, I am not presenting Dr. Joskow's guidelines here to
18 support them or advocate that they be adopted. I am simply presenting them
19 as an industry standard that can shed light on the market dominance issue
20 created by assigning default customers to a single entity.

21 **Q. What would the HHI analysis indicate about your proposed 50 percent**
22 **threshold for determining whether to allocate default customers to a**
23 **number of generation companies?**

- 24 A. It is not possible to calculate an HHI in the abstract, without knowing how
25 many firms will compete and what their market share will be. However, it is
26 possible to make various hypothetical calculations that illustrate the
27 implications of the 50 percent threshold.

28 For example, if the Company had a 50 percent market share of the retail
29 generation market in its service territory and there were five other competitors
30 with equal shares in the market, the HHI would be 3,000. According to either
31 the DOJ or Dr. Joskow's guidelines, this result indicates that there would be
32 excessive concentration in the market and that the Company would possess
33 market dominance. In fact, even under the best of circumstances, if there
34 were a very large number of firms operating in the Company's service
35 territory, if the Company had 50 percent or more of the market share, then
36 the lowest that the HHI could possibly be would be 2,500. Again, this would

⁹ Joskow, *Horizontal Market Power in Wholesale Power Markets*, August 1995.

1 imply that the Company would possess market dominance.

2 Furthermore, Dr. Joskow's guidelines suggest that it is important to consider
3 the size of market shares of individual firms, as well as the HHI for the entire
4 industry. His guidelines suggest that if The Company were to have as much
5 as 50 percent of the retail generation market, then it would possess market
6 dominance, regardless of how low the HHI index was.

7 This simple application of the HHI demonstrates that my threshold of 50
8 percent is actually quite conservative, and that the Company might possess
9 market dominance even before this threshold is reached.

10 **Q. Do you recommend that the Commission conduct a study of market**
11 **power, including an HHI analysis, to determine whether to allocate the**
12 **default customers to alternative generation providers?**

13 A. No, I do not. I am discussing the HHI analysis here simply to provide a rough
14 illustration of what my 50 percent threshold implies about market dominance.
15 The HHI only provides a very rough, initial indication of market power. A
16 thorough market power analysis would require a more detailed study of the
17 retail generation market in the Company's service territory.

18 It is important to remember that the 50% figure acts merely as a trigger for a
19 process; it does not require the Commission to undertake an antitrust-type
20 remedy. For the purposes of implementing the Better Choice Plan, the
21 Commission does not need to conduct a detailed market power analysis. All
22 the Commission needs to know is that point beyond which the Company
23 would possess an unacceptable dominant market position as a consequence
24 of the default customers. I believe that a 50 percent market share represents
25 a clear, unquestionable position of market dominance that can be used by
26 the Commission to trigger the Better Choice Plan's allocation process.

27 **Q. Are you aware of any other situations where a 50 percent market share**
28 **was used to indicate market dominance of one firm.**

29 A. Yes. When the Bell system was broken up and competition was introduced
30 into the long-distance telephone market, the FCC used a 50 percent
31 threshold to determine the duration of its continued regulatory authority over
32 AT&T as the dominant long-distance carrier. It was AT&T, the former long-
33 distance operation of the Bell system, which emerged as the incumbent long-
34 distance carrier as a result of divestiture.

35 *Other Implementation Issues*

36 **Q. Will customers who are allocated to alternative generation suppliers**

1 **have the option of switching to other generation companies?**

2 A. Yes. Any default customer who has been allocated to a generation supplier
3 will always have the option to switch to any generation supplier of his or her
4 choice. And any other supplier will be free to compete for that customer's
5 business. My proposal is not meant to limit customer options in any way -- it
6 is meant to increase them.

7 However, I expect that most default customers are unlikely to switch from the
8 generation supplier to which they are allocated, because they will have
9 already demonstrated a lack of interest by failing to choose an alternative in
10 the first place. If the very act of being allocated to a new supplier catches a
11 customer's interest and encourages him or her to choose an alternative
12 provider, then I would consider that a positive outcome -- increased customer
13 awareness and increased competition among suppliers.

14 **Q. Under the Better Choice Plan, would the generation companies that are**
15 **allocated the default customers serve as the Provider of Last Resort?**

16 A. No. The Provider of Last Resort and the default supplier are two
17 fundamentally different concepts. I try not to confuse them. In my view these
18 two functions do not have to be served by the same entity.

19 **Q. Please describe the difference between the default suppliers and the**
20 **Provider of Last Resort.**

21 A. The Provider of Last Resort is an entity that is assigned the responsibility of
22 ensuring that all electricity customers will have access to a reliable supply of
23 electricity at reasonable prices, terms and conditions. The Act notes that
24 electricity is a necessary commodity for many customers, and no citizen
25 should be denied access to this important service.¹⁰ However, in a
26 deregulated generation market, generation companies do not have a
27 responsibility to serve any and all customers the way that vertically integrated
28 utilities do.

29 Consequently, some customers may find that they cannot obtain generation
30 services, either because (a) they are simply denied service by the generator
31 of their choice for any number of reasons (e.g. the generator does not have
32 sufficient generation capacity), (b) they are not marketed to by generation
33 companies because they are perceived as offering low profits or high risks,
34 (c) their generation company goes bankrupt on short notice, or (d) they are
35 subject to other reasons that are difficult to anticipate until the competitive
36 electricity market is up and operating. A Provider of Last Resort would be
37 required to serve these customers if the need arose.

¹⁰ 66 Pa.C.S. §§ 2802(9) and 2802(12).

1 A default supplier, on the other hand, is one that serves those customers who
2 have not pro-actively chosen an alternative generation supplier. A default
3 supplier serves those customers who have had a choice of generation
4 options, but (for whatever reason) have not chosen any of them. A Provider
5 of Last Resort serves those customers who (for whatever reason) do not
6 have a choice of generation suppliers.

7 **Q. Are you suggesting that consumer protections or standards do not**
8 **apply to suppliers?**

9 A. Not at all. On a generic basis, the Commission is evaluating a host of
10 consumer protection issues, standards and guidelines, including the supplier
11 licensing requirements, the Code of Conduct and other rules of the road. The
12 Environmentalists have taken the consistent position that such consumer
13 protections are necessary and that the Commission must play a role through
14 them in the developing market.

15 **Q. Why is the distinction between default supplier and Provider of Last**
16 **Resort so important in understanding the Better Choice Plan?**

17 A. Some generation companies may not wish to act as the Provider of Last
18 Resort. This role may require additional costs and additional risks, may
19 require substantially greater reliability planning, or may require services that
20 are not a part of the generation company's core business. A generation
21 company that acts as the Provider of Last Resort may be less competitive
22 than those which are free of this responsibility. The Act requires the
23 Commission to establish a funding mechanism to support the Provider of Last
24 Resort, but such funding may not be sufficient to overcome the objections
25 that some competitive generation companies might have to this
26 responsibility.¹¹

27 The Better Choice Plan makes a distinction between the default supplier and
28 the Provider of Last Resort in order to create the opportunity for all generation
29 companies to act as a default supplier without the obstacle of having to serve
30 as the Provider of Last Resort. As described throughout my testimony, there
31 are many benefits to having a number of generation companies act as default
32 suppliers. In contrast, it is more practical, efficient and simple to have a
33 single entity act as the Provider of Last Resort.

34 **Q. Who do you recommend act as the Provider of Last Resort?**

35 A. I recommend that the Company act as the Provider of Last Resort. As the
36 monopoly transmission and distribution company, the Company will be
37 regulated by the Commission, and can be required to provide those services
38 that may not be provided by the competitive market. In addition, because

¹¹ 66 Pa.C.S. § 2802(17).

1 The Company will already be required to provide access to transmission and
2 distribution services to all customers in its service territory, it is not a great
3 leap for it to provide access to some form of generation service as the
4 Provider of Last Resort. The Act requires that the Company should be the
5 Provider of Last Resort in its service territory, "unless another Provider of Last
6 Resort is approved by the Commission."¹² At this time, I am not aware of any
7 entity that could serve as the Provider of Last Resort any more effectively or
8 efficiently than the Company.

9 ***Timing: The ability to implement over a period of months***

10 **Q. Must the Commission identify and resolve all specific logistics entailed**
11 **in the Better Choice Plan in its order resolving this proceeding?**

12 **A.** No. Given the January 1 and 2, 1999, commencement dates for competition,
13 the Commission has several months in which to address those logistics. At
14 this point I would urge the Commission to adopt the broad outlines of the
15 Better Choice Plan — order the parties to work toward the result the
16 Commission seeks, articulate the objectives, and adopt the general principles
17 and requirements stated in the Environmentalists' testimony. The parties
18 would be required to work closely with the Commission's designee(s) in
19 following a work plan that would generate a mid-year customer balloting, with
20 allocations of default customers, if the trigger is met, by September 1, 1998.
21 This would give the allocated suppliers three months in which to complete all
22 arrangements to meet the energy needs of these customers.

23 **Conclusions regarding the Better Choice Plan**

24 **Q. Is your Better Choice Plan a substitute for other environmental policies?**

25 **A.** No, it is not. The Better Choice Plan can provide substantial environmental
26 and consumer protection benefits, but it is not a substitute for an integrated
27 policy to protect and enhance the environment. Restructuring of the
28 electricity industry can and should be implemented in a way that improves
29 environmental quality for Pennsylvanians. The Environmentalists' other
30 environmental recommendations are contained in David Schoengold's
31 testimony and in the balance of my testimony. Mr. Colton also addresses
32 environmental concerns.

¹² 66 Pa.C.S. § 2802(16).

1 Q. Does this conclude your testimony?
2 A. Yes.

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PROFESSIONAL EXPERIENCE

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President, 1996 to present:

Consulting on issues of energy economics, environmental impacts, and utility regulatory policy, including electric industry restructuring, electric power system planning, performance-based regulation, stranded costs, system benefits, market power, nuclear and fossil power plant costs and performance, renewable resources, power supply contracts, and performance standards, green marketing of electricity, environmental disclosure, nuclear plant decommissioning and radioactive waste issues, climate change policy, environmental externalities valuation, energy conservation and demand-side management, electric power system reliability, avoided costs, fuel prices, purchased power availability and cost, dispatch modeling, economic analysis of power plants and resource plans, and risk analysis.

Tellus Institute, Boston, MA

Senior Scientist and Manager of the Electricity Program, 1989 to 1996:

Responsible for research and consulting on all aspects of electric system planning, regulation, and restructuring.

Research Associate, later Associate Scientist, 1980 to 1988.

EDUCATION

Massachusetts Institute of Technology

BS 1981, Architecture, Building Technology, Energy Use in Buildings.

Harvard University Extension School

1989/90, Graduate courses in micro and macroeconomics.

SUMMARY OF TESTIMONY, PUBLICATIONS, AND PRESENTATIONS

Expert testimony on energy, economic, and environmental issues in 37 regulatory proceedings in 18 different states and 2 Canadian provinces.

Co-author of approximately 80 reports, including studies for the Electric Power Research Institute, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Office of Technology Assessment, the New England Governors' Conference, and the National Association of Regulatory Utility Commissioners.

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Papers published in the Electricity Journal, the Energy Journal, Energy Policy, Public Utilities Fortnightly, and numerous conference proceedings.

Invited to speak by American Society of Mechanical Engineers, International Atomic Energy Agency, National Association of Regulatory Utility Commissioners, National Association of State Utility Consumer Advocates, National Consumer Law Center, the Latin American Energy Association (OLADE), the Swedish Environmental Protection Agency (SNV), the U.S. Environmental Protection Agency, and others.

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Maryland Public Service Commission (8199) – October 1989

Performance standards for coal, oil, and nuclear power plants.

Michigan Public Service Commission (U-9172) – April 1989

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Pennsylvania Public Utility Commission (P-870216, P-880283, P-880284, and P-880286) – March 1989

Allegheny Power System planning and avoided costs.

Michigan Public Service Commission (U-8880) – February 1988

Detroit Edison Company power supply costs, economics of Fermi "buy-back" purchase, nuclear fuel expense, oil costs, and power transactions.

Michigan Public Service Commission (U-8866) – December 1987

Consumers Power Company power supply costs, including projections of oil prices and purchased power costs.

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Review of Consumers Power Company system operations during 1985 and economic evaluation of the Big Rock Point nuclear unit.

Michigan Public Service Commission (U-8291) – April 1986

Detroit Edison Company power supply costs, application of a multi-area dispatch model.

Michigan Public Service Commission (U-8286) – February 1986

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(Note: Presentations that were accompanied by a written paper are listed in the section for "papers," above.)

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Exhibit BEB-2

to Environmentalists' Statement No. 2

Graph of TLG Decommissioning Estimates: 1977 to 1995

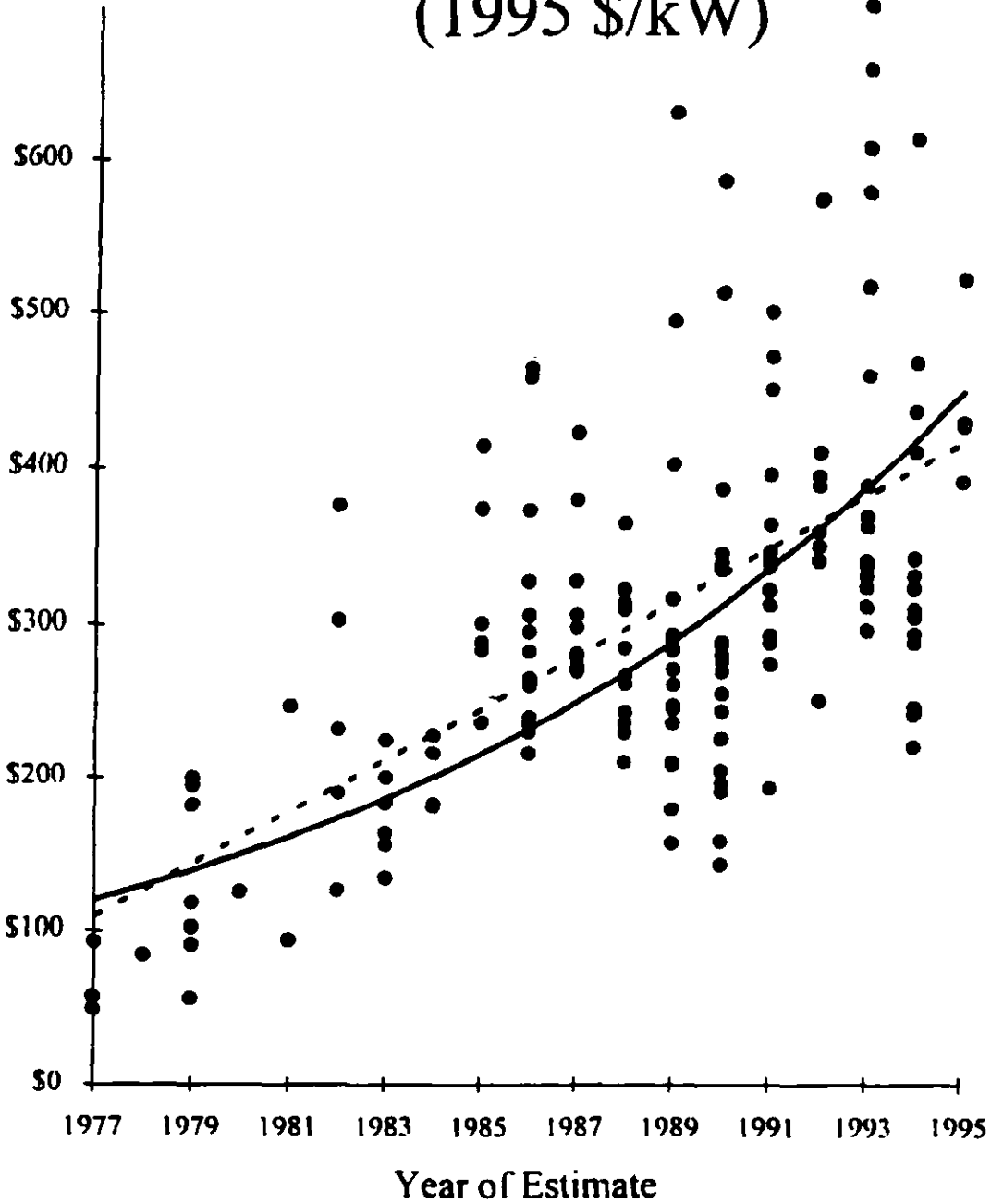
Docket No. R-00973953

**Joint Petition for Partial Settlement
of PECO Energy Company's
Proposed Restructuring Plan
and Application for a Qualified Rate Order**

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JAN 14 1998

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TLG Decommissioning Estimates (1995 \$/kW)



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1. Introduction and Summary

Customer choice is happening quickly. In 1998 millions of retail customers in half a dozen or more states will, for the first time, choose their own suppliers of electricity. The hope is that competitive markets and customer choice will outdo traditional regulatory oversight in lowering costs, allocating risks and choosing new and clean resources. For this to happen, electricity customers — like customers in any competitive market — must be well informed. Lessons from other markets and early experience from pilot retail competition projects have shown that giving customers reliable information, preferably in a standardized format, is critical. Reflecting this, the National Association of Regulatory Utility Commissioners (NARUC) recently passed a resolution calling for the uniform disclosure standards including price, price variability, resource mix and the environmental characteristics of electricity purchases.¹ The resolution's conclusion

The National Association of Regulatory Utility Commissioners (NARUC), ... believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and

NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and

NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.

The full resolution can be found in Appendix A.

The limited retail choice pilot programs to date have featured a wide array of environmental claims by marketers (see Table 1). Power marketers often stress the environmental advantages of their product for one reason — many customers prefer environmentally benign power sources. Publicly available independent customer surveys (and presumably the marketers' own research) show that many customers prefer clean power sources and are sometimes willing to spend more to get them. As a result, environmental claims for electricity products may become a fixture of the competitive landscape.

¹Disclosure is factual and objective. For example a particular purchase might be 40 percent coal, 30 percent gas and 30 percent geothermal power. It does not address subjective claims, such as whether a particular purchase is good or bad, clean or dirty.

A uniform disclosure mechanism would give customers an accurate, objective basis for comparing the environmental (and other) claims of competitive suppliers. On the other hand, without the common language of uniform disclosure, customers must continue to sift through the vague, unverifiable, and often misleading claims that have been common in the pilots. Customer focus groups conducted with pilot program participants in New Hampshire and Massachusetts confirm consumer dissatisfaction with the "apples to oranges" comparisons they have been asked to make.

An environmental disclosure policy is desirable for many reasons. Besides giving customers an objective basis by which to compare products, it protects suppliers from unfair trade practices claims by setting clear rules of the road. It protects against customer backlash aimed at environmentally-benign resources by helping to insure that customers get what they pay for. Depending on the level of customer demand, it can result in cleaner resources and less pollution.

The main purpose of this paper is to describe how a retail electricity seller's resource mix and environmental characteristics can be tracked and disclosed to consumers. Its main conclusions are:

- 1) A uniform mechanism for disclosing emissions and fuel mix is feasible.
- 2) The long established methods of measuring generation, demand and contract rights were developed to track dollar flows and associated fuel mix and emission characteristics. These same methods can be easily adapted to provide the basis for disclosure. While many of the electric utility industry's existing institutions and market structures will change, the basic building blocks of existing settlement processes will remain and can be used for disclosure purposes.²
- 3) All of the necessary generation, fuel use and emission information needed to support disclosure is already collected. With very few exceptions the information is publicly available through federal and state agencies. For a number of reasons, we suggest that existing data and definitions be used but that new market structures or institutions, such as POOLS or ISOs collect and disseminate the information.

There are clearly a number of important tasks remaining to be done:

²While developing a credible disclosure protocol is not conceptually difficult, it does require making choices and resolving many details. To add concreteness to the discussion, the report is based on some initial opinions about what might work best. For example, our discussion of tracking assumes a label like the increasingly familiar and well researched "Nutrition Facts" affixed to food provides would be used to disclose the fuel mix and environmental emissions associated with electricity purchases. See Table 2. In other instances, the choices and issues are described, and resolution is left to await the results of other ongoing research sponsored by the National Council on Competition in the Electric Industry.

- 1) The National Council on Competition in the Electric Utility Industry (National Council) is taking a leadership role developing disclosure standards and guidelines. A multi-part disclosure related research effort coordinated by the National Council is underway. The research is being aided by a DOE-convened interagency task force consisting of representatives from DOE, FERC, EIA, EPA, FTC and FDA. Reports will be widely disseminated as work is completed.
- 2) State commissions, particularly those considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional efforts to identify options and issues and implement disclosure requirements in a timely manner. Input should be gathered from a broad cross section of stakeholders.
- 3) Federal and state commissions should carefully assess the extent to which the public interest in full disclosure outweighs requests for trade secret status.
- 4) Federal and state commissions should recognize that the formative stage of new market institutions, such as power pools and ISOs, is the best time to examine how operations can efficiently improve consumer access to key information.

2. Disclosure

2.1. What is Special about Electricity?

Why require uniform disclosure of electricity instead of relying on marketing by sellers and existing federal and state advertising laws to inform consumers? There are several answers. Uniform consumer-friendly labeling or disclosure is required in many areas. Some of most common of which are food, appliance and automobile labels and standard disclosure for consumer loans. In each case, the history (or likelihood) or customer confusion combined with societal interest in having an informed public to produce uniform disclosure.

There are several reasons that consumer protection requires full disclosure of key attributes of competitive electricity sales. Shopping for electricity is a new experience for consumers. The intangible nature of the commodity and the inability to distinguish one kWh from another will make it nearly impossible for individuals to independently determine the source of the power or to verify whether claims are true. Complex price structures make it very difficult to even compare the price of competing offers.³ Finally, experience with the pilot programs shows a high

³We believe uniform labels should include a common measure of price, combining customer charges, demand charges, complex time-of-use charges and sign-up bonuses to something like an average price for typical residential consumer. Because this part of a label does not require any form of tracking (even if it does require clear standards for calculation), it is not discussed more in this report.

level of consumer confusion.

Giving consumers the information is important from a societal perspective as well. The scale of the industry's environmental impacts are far reaching, ranging from very small impacts for most renewables and new gas-fired technologies to much larger impacts for older coal-fired facilities. If electricity restructuring is to give retail customers the opportunity to make meaningful choices regarding the source or environmental nature of their electricity purchases, customers will need reliable and consistently developed information based on some sort of tracking and verification system. Likewise, to abide by state and federal truth in advertising laws, generators or marketers of electricity will need a tracking and reporting system to substantiate any environmental claims.

The challenge is to develop a workable system of environmental disclosure so that customers can make informed choices. To be workable, disclosure should provide a common standard that facilitates comparisons between suppliers in a way that balances simplicity and accuracy.

2.2. Types of Environmental Claims

It is clear from early experience with retail competition pilot programs that environmental or green marketing may be a primary tool to attract customers.⁴ Retail competition pilot programs are now underway, and the promotional literature is quite useful in providing a sense of the types of claims that companies will make. Many competitors are making environmental claims presumably because they believe environmental considerations are an important factor to customers when they shop for electricity.

A list of environmental claims made by competitors in the New Hampshire and Massachusetts pilot programs, sorted by type of claim, is provided in Table 1.

This paper deals primarily with the first group of claims — those directly related to power supply, some of which can be misleading. For example, the claim that a particular supplier has no coal, nuclear or Hydro Quebec in its mix is dubious and undocumented. The implied claim that pumped storage hydro is 100 percent hydropower is probably false, given that pumped

⁴In addition to the pilot programs, a number of "green pricing" programs are underway, prior to the introduction of retail choice of supplier. For example, Wisconsin Electric's "Energy for Tomorrow Renewable Energy Program" offers customers an opportunity to "purchase electricity generated by renewable resources" with an option allowing 25 percent, 50 percent or 100 percent of "the electricity used in your home will be displaced by renewable energy." Many of the same disclosure issues apply to either case (green marketing in a retail choice context or green pricing in a monopoly context), but the problems are somewhat more complex in a market environment due to the increased number of suppliers and aggregators, the new types of transactions (spot market, futures, etc.) and the wider array of green offerings.

storage facilities require energy from other power plants for pumping.⁵

2.3. What to Disclose?

The most fundamental questions are what to disclose generally and what to disclose in the form of a simple label. Ongoing research and decisions by regulators have begun to identify a long list of information that will be required to be disclosed to consumers (Alexander 1996). This may include consumer rights, complaint process and disconnection and payment policies. With effort, a standard one or two page document might be prepared to help consumers understand and compare key terms.

Our focus, however, is on a uniform label which, like food labels, conveys key but very limited amounts of information. Our experience suggests that a useful label (Table 2) might convey information about price, resource mix and certain environmental characteristics. This is supported by recent regulatory decisions in Vermont, Massachusetts and Maine and the recent NARUC resolution referenced earlier.

3. Tracking Transactions

3.1. Feasibility: What is it Possible to Track?

Is it possible to know where electricity at a customer's meter came from? This simple question has a complex answer because electricity follows the laws of physics, not the computations of accountants. With an interconnected grid, the power flow over the transmission system is ambiguous. About the best one can say is that power is put into the grid at certain points and taken out at other points. Which generator produced the power that went through a particular customer's meter is, in a physical sense, indeterminate, except in certain unrealistic cases.

The fact that electrons cannot be traced from a customer back to a source has not impaired the ability of power producers and power suppliers to plan their systems, choose what to build and what to buy, inform consumers and others of the supplier's fuel mix or emissions, or most important, transact hundreds of billions of dollars of transactions. For market purposes, it is sufficient to know which firms were selling into the grid, which were buying from it and where losses were occurring.

Long before "restructuring" entered the lexicon, to assure a smoothly functioning market, utilities developed mechanisms and settlements processes to track who generates, who consumes

⁵The New Hampshire ad from Northfield Energy was one of this year's winners of the Center for Science in the Public Interests Harlan Page Hubbard Lemon award for deceptive advertising.

and who buys. While the details vary from place to place, they all share a common basic design. For each buyer, the electrical energy taken from the system must be matched by an amount equal to the buyer's purchases, plus losses incurred in delivering such amounts to the buyer's system by the sellers. This is the basis for the dollar payments.

In looking at the dollar flow for wholesale purchases and sales, energy flow data is essentially irrelevant. Buyers pay for kWhs received from the system at a particular place; sellers are paid for

Table 1

Environmental Claims in the New Hampshire and Massachusetts Pilot Programs

Directly related to power supply:

- 100 percent hydropower (Northfield Mountain Energy)
- Working Assets Green Power does not rely on nuclear power, coal or Hydro-Quebec (Working Assets)
- "Our power sources are diversified both in fuels and geographic location. They include long-term contracts with Canadian provinces, several New England nuclear plants, and hydroelectricity from New York, Vermont and Quebec. We also get power from our own small hydroelectric generating stations, wood burning plants in Vermont as well from a variety of independent power producers in Vermont and New Hampshire." (Central VT)
- "There's no perfect way to produce electricity. There's always an impact on the earth's resources. That's why Green Mountain Energy Partners relies heavily on renewable energy sources, like hydroelectric power, that offer the most environmentally sound forms of electric generation." and "More than 90 percent of the electricity in Green Mountain Energy Partners' supply comes from hydropower sources. These sources produce zero air emissions." (GMEP)
- "...we have an unusual approach to energy-making: Water is pumped up the mountain at night and flows down during the day to drive our generators located deep inside the mountain. It's quite efficient. So much so that we pass the savings on to you." (Northfield Mountain Energy)

Indirectly related to power supply:

- permanent retirement of SO2 emissions credits (AllEnergy)
- community-based solar systems (AllEnergy)
- energy/environmental survey (Enova Energy, Northfield Mountain Energy and others)
- quarterly usage reports and rewards (Enova Energy)
- energy conservation products and services (Northfield Mountain Energy, Freedom Energy/Xenergy, Green Mountain Energy Partners, and others)

Unrelated to power supply:

- donations to environmental projects and organizations (Enova Energy, Northfield Mountain Energy, Working Assets and others)
- raffled electric vehicles (Enova Energy)

General statements:

- "solid environmental record" (Central Maine Power)
- "only energy supplier in the pilot to receive the President's Environment and Conservation Challenge Award for our long-standing commitment to protecting the environment" (Granite State Energy)
- "A company which, since its very first hydroelectric facility began operating in 1909, has treated our environment with the respect and care it deserves — planting more than a million trees; preserving our properties and their surrounding recreational lands, trails, and water supplies; helping wildlife through habitat preservation; and much more. In fact, since 1987 we have invested *over \$550 million* in conservation efforts — more than any other utility in New England." (Granite State Energy)
- "A history of environmental leadership, including the installation of 'clean coal' technology at the Merrimack station, which received EPA and Governor's Energy Office awards" (PSNH Energy)
- "You'll save money, use cleaner power and..." (Working Assets)
- "Choose Wisely. It's A Small Planet" (Green Mountain Energy Partners)
- "Now is the time to start saving money and saving the planet." (Green Mountain Energy Partners)
- "It's the beginning of our long-term commitment to you and the earth." (Green Mountain Energy Partners)

kWhs delivered to the system. Except for questions of system reliability, and sometimes transmission pricing, the dollar flow is more important than energy flow. Dollar flows dictate financial risks and rewards of power plant investment, expansion, operation and retirement decisions, and these are the decisions that result in more or less environmental harm.

3.2. Settlements Procedures

The tracking system for emissions and resource mix works by following the dollars. We assume that the electricity a vendor sells and therefore the consumer "uses" is the electricity for which she pays.

For any period, there is a known amount of electricity generated and a known amount of electricity consumed. After accounting for losses and storage, these must be equal. Ultimately, the retail buyers compensate the generators, in some cases through one or more intermediaries. By following the contracts and the flow of money from retail consumers to generators, one can develop a reasonable idea of accountability.

Because of the large number of power plants, the volume and diversity of transactions and the huge flow in dollars, tracking dollars for settlement purposes is and has always been a large task. The metering and data requirements are substantial. Nevertheless, it is a task being done everywhere in the country, and one that will continue, perhaps with even greater urgency, after restructuring. Dollars are tracked in the wholesale market using the following information:

- ▶ Metered output of generators. All generators delivering power to the utility grid, regardless of location or ownership, are metered in considerable detail (hourly kWh recordings at a minimum).
- ▶ Metered load of buyers. In today's environment wholesale buyers are mostly monopoly utilities. Utility load is generally metered at the substation where power is delivered to the distribution system. In the future there will be many different types of buyers. While metering approaches will vary, all buyers will be metered in some fashion.
- ▶ Metered interconnections. All interconnections between utility systems are metered. The net flow into a service territory plus "local" generation (generation located within the service area no matter who owns it) provides a measure of the load plus losses within the service territory.
- ▶ Supply rights. Ownership rights and contractual agreements determine who has the rights to specific power sources. These will determine what sources, wherever they may be, are used to meet the load requirements in a service area.

Nationwide billions of dollars change hands based on these few pieces of data.

The following example illustrates the tracing of dollars. Figure 1 shows three utilities that

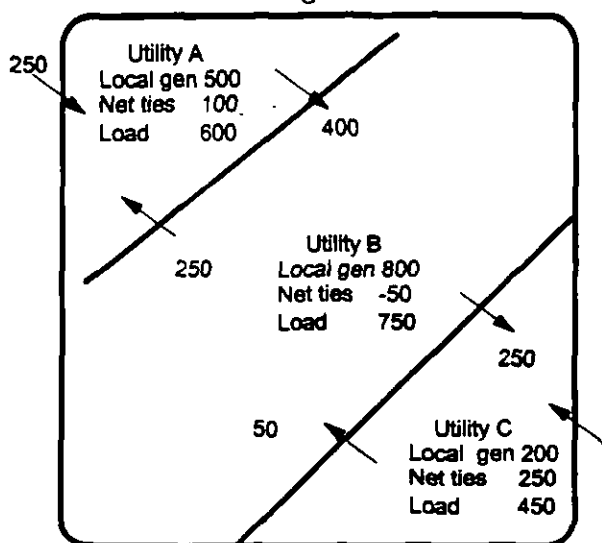
**Table 2
Illustrative Environmental Labeling**

Fuel Facts	
Your electricity is generated from	
Nuclear	XX%
Oil	
XX%	
Natural gas	XX%
Renewables	XX%

Air Emission Facts	
Each of your KWh produces	
	<small>% above or below regional average</small>
Sulfur Dioxides YYmg	XX%
Oxides of Nitrogen YYmg	XX%
Mercury YYmg	XX%
Fine Particulates YYmg	XX%
Carbon Dioxide YYmg	XX%

operate in a state or region with internal and external ties. For a particular hour, Utility A has a total load of 600 MW metered at all of its substations. This represents the aggregate load of all retail consumers within A's territory. Ignoring losses in the distribution system, summing the metered load of each individual retail consumer would equal the same 600 MW (assuming every consumer had real-time meters).

Figure 1



On a physical basis, A's 600 MW load is being met by 500 MW of local generation (generation physically in A's service territory, regardless of who has the rights to the output) plus 100 MW of net interchange with its interstate and intrastate interconnections.

The second half of tracing dollars and the associated supply characteristics requires knowing A's supply rights (owned generation and contracts) and balancing the dollar flow associated with A's load and supply.

In this example A, B and C are meeting their customers' needs through a mix of their own power plants and contracts from suppliers

inside and outside the region. As the electric utility industry changes, A, B and C may be utilities, marketers, brokers, aggregators or deregulated generators of one type or another. Whatever their make-up, each will have an hourly demand measured or estimated at the point of retail sale. Each seller will meet its hourly demand through some combination of its own power plants and contracts for supplies from others, possibly including purchases from a spot market.

Tables 1 and 2 provide the needed information to track through our example. Table 1 provides an overview of the supply rights for A, B, and C. The first column begins with the major power flows shown in figure 1. The second column shows the supply rights. Thus we show that of the 500 of local generation in A's territory 400 MW are owned by A and 100 are owned by B.

Tables 3 and 4 provide the needed information to track through our example. Table 3 provides an overview of the supply rights for A, B and C. The first column begins with the major power flows shown in Figure 1. The second column shows the supply rights. Thus, we show that of the 500 MW of local generation in A's territory, 400 MW are owned by A and 100 MW are owned by B.

Imports and exports from metered interconnections are more complicated. A has 500 MW of incoming power flow and 400 MW of outgoing flow giving a net import of 100 MW.⁶ The second column of Table 3 shows the supply rights associated with the imports and exports. The third column of Table 3 shows how each part of A's supply rights could be reflected in a disclosure statement.

⁶A has a 250 MW inflow from X, outside the region, and a 150 MW net outflow to B producing to an overall inflow of 100 MW.

Table 4 goes to the next level of detail and for each supply (owned or contract) shows the type of contract, the fuel type and emission characteristics for two pollutants. With respect to fuel mix and emissions, our example shows the source of the data depends on the type of contract. For unit contracts, the supply characteristics are those of the plants or plants involved. For system contracts, the average supply characteristics of the supplying entity can be a reasonable power from a spot electricity market.⁷

⁷ In some cases, instead of being measured, hourly demand will be imputed based upon statistical load profile information or some agreed upon protocol.

Table 3

Source	Ownership/Contract	Disclosure Basis
Imports from X (outside region) Net flow X to A = 250 MW	50 MW unit contract to A 100 MW unit contract to B 100 MW unit contract to C	Part of A's average system X's average system on B's Disclosure Part of C's average system
Area A Local Generation Local generation = 500 MW	400 MW owned by A 100 MW owned by B	Part of A's average system Part of B's average system
Interchange A to B Line 1 = -250 MW Line 2 = 400 MW Net flow = 150 MW	-50 MW A generation in B area -100 MW economy purchase B to A 100 MW B's generation in A's area 100 MW pass through of X to B 100 MW pass through X to C	Part of A's average system B's average in A's Disclosure Part of B's average system See B's disclosure See C's disclosure
Area B Local Generation = 800 MW	50 MW owned by A 750 MW owned by B	Part of A's average system 650 MW Part of B's average system
Interchange B to C Line 1 = -50 MW Line 2 = 250 MW Net flow = 200 MW	100 MW unit contract from X to C 100 MW unit contract from B to C	Part of C's average system Part of C's average system
Area C Local Generation = 200 MW	200 MW owned by C	Part of C's average system
Import from Y (outside region) Net flow Y to C = 50 MW	50 MW contracted to C	Part of C's average system

Summary of Table 3:

	Firm A	Firm B	Firm C
Owned Generation - Local	400 MW	650 MW net*	
200 MW			
Owned Generation - External	50	100	
Purchase from X	50	100	100
Purchase from B	100		100
Purchase from Y			50
Sale to A		-100	
	600 MW	750 MW	450 MW
Load			

*excludes joint ownership and unit contract

Combining loads shown in Figure 1 and supplies shown in Tables 3 and 4, we arrive at the supply characteristics for this hour for A, B and C shown in Table 5.⁸

This example focused on a single hour. In practice, the settlement process is done over a longer period, usually monthly.

⁸In this example the mix of one seller depends on the mix of one or more other sellers, so computing the values for the label requires the solution of several simultaneous equations. As the number of participants and transactions between participants grows, the mathematical complexity increases. There are several options to simplify the calculations. For example, one could adopt a simplifying convention and assume sales to be from producer's own generation, unless the producer sells more at wholesale than it produces. If wholesale sales exceed a supplier's own generation, then the extra is assumed to come proportionately from the companies the producer purchases from. This approach allows the complex web of electricity transactions to be dealt with in a straightforward manner, avoiding the difficulties and ambiguities of tracing power transactions back through several companies.

Appendix B is a set of equations describing this system for attributing generation to retail sales in order to attribute emissions and fuel mix. The "balancing equations" describe the relationships between generation, wholesale transactions, internal sales and retail sales. All of the data required for the "balancing equations" is available from EIA, including electricity production by generating unit and owner ($P_{p,g}$), the amounts of energy and participants in wholesale transactions ($W_{p,r}$) and retail sales by company (S_r).

The "environmental equations" relate the emissions factors and fuel mix of the generating units to retail sales. These equations are simply weighted averages of the characteristics of the generators, as assigned to internal sales and wholesale transactions. The data for emissions and fuel mix are available from EPA (state and federal) and EIA, respectively.

Table 4

	A	B	C
Plant 1	owned	owned	owned
Size/output level	500 MW plant located in area A. 400 MW owned by A and 100 MW owned by B	800 MW plant located in area B. 750 owned by B, 50 owned by A, and 100 MW to C by unit contract	200 MW plant located in area C
Fuel	coal	nuclear	gas
Emissions NOx	4500 lbs/GWH	0	1
CO₂	2100 lbs/MWH	0	1
Plant 2	unit contract	system contract	unit contract
Size/output	50 MW IPP located outside region X	100 MW from X located outside region	50 MW from Y outside region
Fuel	biomass	X's average 50% coal 50% gas	coal
Emissions NOx	2500 lbs/GWH	3000 lbs/GWH	4500 lbs/GWH
CO₂	0	1500 lbs/MWH	2100 lbs/MWH
Plant 3	system contract	Owned	unit contract
Size/output	100 MW system purchase from B	100 MW ownership in part of A's 500 MW coal plant	100 MW unit contract from X outside region
Fuel	B's average	coal	hydro
Emissions NOx	1500 lbs/GWH	4000 lbs/GWH	0
CO₂	1000 lbs/MWH	2000 lbs/MWH	0
Plant 4	owned		unit contract
Size/output	50 MW joint ownership in B's nuclear plant		100 MW from B's nuclear plant
Fuel	nuclear		nuclear
Emissions NOx	0		0
CO₂	0		0
Total supply	600 MW	850 MW	450 MW
Local demand	600 MW	750 MW	450 MW
Off system demand	0 MW	100 MW	0 MW

Table 5

	A	B	C
Coal	70%	18%	11%
Nuclear	21%	76%	22%
Gas	1%	6%	44%
Renewables	8%	0%	22%
NOx (% of regional avg)	120%	60%	25%
CO₂ (% of regional avg)	125%	15%	10%

NEPOOL Example

The basic structure of the tracking system is the same in markets based on power pools, markets based on bilateral contracts, or any blend of the two. In markets limited to bilateral contracts, tracking is conceptually straightforward, since every transaction has an identified buyer and seller. But tracking for a power pool is not difficult. The New England Power Pool (NEPOOL) provides a good example because it consists of a complex web of buyers, sellers, generation, and contract types. It is also a good example because it functions like a competitive retail market in which financial contracts, including contracts for differences, operate independently from actual power plant operations or power flows.

Currently, NEPOOL centrally dispatches all power plants in a six-state region to minimize the total operating cost of meeting demand. Least-cost dispatch occurs without regard to plant ownership or contracts. Except for special cases, internal purchases or sales of plant ownership, contracts for plant output or contracts for system power do not affect which plant actually operates. Contract and plant ownership will affect dollar flows and, as discussed earlier, these dollar flows ultimately dictate expansion and retirement decisions.

Despite the complexity and large number of participants and contracts, all of the dollar flows in New England are based on the metering described in connection with Figure 1. The rights and obligations of each participant are written and clearly understood. This allows buyers, sellers and generators to conduct daily operations with confidence that generators will be paid, although at any particular hour, they may not know which buyer will pay the bill. The NEPOOL settlements or billing process clears monthly as is the case with bank accounts and consumer credit card

statements. This monthly accounting process is, in essence, the tracking process.

NEPOOL is an especially interesting example because the many hundreds of contracts between participants take many forms (unit, system, interruptible). Yet, because the system is centrally dispatched, all of the contracts are essentially financial. This has not impaired the ability of each participant to report its own fuel mix to EIA and display it prominently in annual corporate reports.⁹

POOLCOs and Bilateral Structures

New competitive structures and new terminology do not affect the underlying need for, or the basic methods of, tracking dollars. For example, in a pure POOLCO model, aggregator A could have a power supply contract with supplier X. Assume the contract does not constrain X's operations in any way so X will be free to meet A's supply requirements as X sees fit. This means X will operate only during hours that pool prices are greater than X's operating costs. X's obligation to meet A's load during other hours will be met with purchases from the pool.

The settlements process would trace dollars based on the same basic informational building blocks as described earlier: A's metered demand; X's metered generation and the contract between A and X. POOLCO will know A's demand and X's level of operation each hour. POOLCO will also know the key terms of the contract between A and X. (This is particularly true if pool rules require sellers to meet reserve requirements by owning or contracting for minimum amounts of capacity.)

The tracking system for disclosure would work much like the tracking system for dollars. A is buying power with X's characteristics to the extent X is running. The remainder of A's needs are met with power from the pool. The pool's characteristics are the averages of all power received that POOLCO has not matched to a seller.

⁹Annual reports to shareholders often include color graphs showing utility fuel mix and how it has changed historically. Resource diversity and particular types of supply mix are touted as reasons investors should be happy with the company. For example, after graphically displaying its 1980 and 1990 fuel mix, Central Maine Power Company's (CMP) annual report to shareholders says:

"CMP's new resource additions are a great help in continuing our long-standing policy of diversifying our energy mix, tapping renewable and indigenous resources, promoting cost effective conservation, and reducing our dependence on oil. ... The oil-fired portion of CMP's net generation dropped to 16% in 1990, the lowest level since the early 1950s. CMP's progress, which will continue, offers economic and environmental benefits for the State of Maine at large, as well as for our customers and investors."

Suppose the market structure was bilateral with an ISO or some other settlement agent and no pool. The basic building blocks are the same: metered customer load, metered generation and contracts. Assuming the same actors as our POOLCO example, aggregator A buys from seller X. X will operate or will make separate bilateral contracts with other sellers to match X's demand. The ISO will have hourly information on X's output and on A's load. The ISO will also have basic information on A's contract with X. The information is needed because X's output (including any of X's bilateral support contracts) may be higher or lower than A's demand. To deal with this, X will buy an ancillary, balancing service from the ISO. The ISO needs the contract information to know who to charge for the balancing services.

The example can be made more complex if aggregator A buys from sellers X, Y and Z, and A sells green electricity to some consumers and regular electricity to others. In this case A's purchases are metered as are the deliveries from X, Y and Z. A's total fuel mix is determined by the relative deliveries from X, Y and Z, and the nature of the contracts. The only limitation on A's selling two products is that the weighted average mix of A's green and regular sales must match A's total mix. (See section 4.1 for discussion of sellers offering more than one product.)

Market structures, including any of the examples above, might also adopt simplifying conventions. For example, as described above, the POOL, or spot market in a region would compute and disclose the average POOL characteristics. All sellers could be given the option of using the POOL average in their own disclosures. As was the case above, the POOL average would reflect the average characteristics of all resources not specifically committed to a buyer.

In a fully competitive retail market, the information to be traced will increase significantly as the number of sellers, buyers, and transactions increases. Nevertheless, the basic building blocks of metered load, metered generation and contract administration remain the same. The details of the future settlement processes will vary depending on the market structure adopted. Some market structures will have pools, and some will not. The one constant is that all market systems and related settlements will be based on metered loads, metered output and contracts.

Suppliers A, B and C will be joined by suppliers D through Z. Those joining may be generators, marketers, brokers and aggregators. Each supplier will need to know its load just as A, B and C did. Metering may be different for different sellers, but each seller will be subject to a clearly written agreement outlining how its load will be tracked. A combination of real-time meters and simpler metering with agreed upon load profiles will be required for each supplier.¹⁰

Competitive markets might also include a variety of financial contracts (as distinguished from power sales contracts) that operate outside the power market and have no direct bearing on the settlements process or disclosure. For example, beyond A's power sales contract with X, A could

¹⁰The use of load profiles raises issues with respect to which entity takes the risk for errors in these profiles. These issues are beyond the scope of this paper.

sign an insurance policy (or contract for differences) with financial institution Y that reduces X's price volatility. Neither X nor any ISO or POOLCO would need to be aware of this side contract. Supplier X might also have a financial contract, a futures contract for example, to protect against X's risk of meeting A's load at agreed upon prices. Again, neither A nor any POOLCO or ISO would need to know about the futures contract, and if these contracts were purely financial, they would not be reflected in the disclosed fuel mix.

3.4. Data Availability Issues

The data needs for a disclosure system raise two issues. First, will disclosure require the collection of data that is not presently collected? Here the answer is a simple no. For practical purposes all of the data needed to implement resource mix and environmental labeling is already collected.¹¹

Second, is the data publicly available? Here the answer is more complex. In all but a few instances the data is publicly reported somewhere. A detailed description of sources of available data is presented in Appendix C. The problems are:

- 1) The information is not all available on a timely basis, and it is scattered among different federal and state agencies. Data is measured and reported to the EPA, FERC, EIA or the relevant state environmental agency.
- 2) Some entities including some IPPs, cogenerators and power marketers either do not report all of the needed data or the data is aggregated in a way that is not useful for disclosure purposes.
- 3) There is a growing trend for all types of market participants to request that reported data be kept confidential.

These issues are discussed below, but our review of the issues and data suggests that an effective disclosure system can rely on current definitions and the raw data already collected. However, while no new measurements are anticipated, speedier availability of useable data is critical. To simplify the collection and reconciliation of existing data bases, the best option is to coordinate with market institutions (power exchanges and ISOs) that are starting to specify the computer software to be used in the tracking process. Software should be designed to handle resource mix and environmental information, along with all other data needed for the safe and efficient operation of the new system.

3.5. Timing

¹¹In some cases, data used for disclosure purposes will be precisely measured or metered data, and in other cases, it may include estimates such as emission factors applied to fuel input and average heat rates. In either case, the necessary degree of accuracy, probably plus or minus 10 percent can be achieved.

The time required for data to be publicly available can be considerable. The FERC Form No. 1 data, for instance, is filed in the spring for the prior calendar year. The bulk power database, a very useful compilation of information on power transactions from various forms, is currently available roughly a year after the end of the data year. In January 1997, the 1995 EIA-767 data (generation and estimated air emissions by plant) was not yet available. The quality checks done by the EPA for continuous emissions monitoring data can take six to nine months. An August 1996 EIA report discusses the data compiled from EIA Forms 860 and 861 (on generators and utilities, respectively) and states that "Data for 1993 are available at no charge on the FedWorld electronic bulletin board" (page 27, EIA, August 1996). A lag time of more than two years is probably too long for reasonable use in an environmental disclosure system for electricity customers.

State environmental agencies issue air emission licenses for essentially all stationary sources. These licenses generally require quarterly filings to be made within weeks of the close of each quarter. Emission, fuel use and generation (or a close proxy) information is publicly available from these filings, but there is no national or regional collection system to simplify collation of the information.

3.6. Coverage and Aggregation

The aggregation of transactions is currently only a problem in a very limited number of cases. The bulk power database includes detailed transaction reporting in an unambiguous way. The reporting requirements for power marketers include prices and quantities of electricity bought and sold. However, the quarterly reports of power marketers appear to lump some transactions together, even when they occur in different regions. For example, the report for a transaction between Coastal Electric Services Company and Electric Clearinghouse in the 4th quarter of 1995 lists a single quantity of electricity transacted at three delivery points: Mid Columbia, Palo Verde and PJM (January 30, 1996 letter from Michael A. Woytowich of Coastal Electric Services to Lois D. Cashell, Secretary, FERC). A disclosure system will need information on a disaggregated basis, at least differentiating by region of the country.

Non-utility generators are also significant participants in the nation's electricity supply. Disaggregated data (on generation, fuel use and emissions) for these sources is publicly available only from state environmental agencies.

3.7. Data Confidentiality Issues

Market participants, emphasizing the changing nature of the industry, are increasingly requesting that various data not be provided or, alternatively, be provided under a protective agreement. A recent and very alarming study surveyed state utility commissions and found that requests for trade secret protection for a wide variety of types of data are being routinely granted (Vine, 1996).

Three facts provide some comfort that widespread and broad-based granting of confidential treatment will not persist. First, most if not all of the requests and commission approvals have occurred before commissions began to focus on the need for consumer information to allow competitive markets to operate efficiently. Second, most requests were unopposed, and it appears they were approved more for administrative ease than as a result of a serious examination of trade secret law.

Finally, the essential data for a disclosure system includes historical generation by unit, the emissions and fuel use associated with generating resources and the buyer, seller and quantity of energy for each transaction. The preliminary conclusion of an upcoming report entitled "Full Consumer Disclosure: Confidentiality vs. Public Right to Know" is that the type of information needed for environmental and other consumer disclosure would not be protected by trade secret laws.

Some agencies, most importantly the FERC, has been more reluctant to approve requests for confidential treatment. The FERC considered and rejected utility arguments that the current information filing requirements (including the generation and transaction data necessary for a disclosure system) are unfair and should be cut back for utilities. The FERC decided that it

"will not adopt the suggestion made by a number of commenters that we now eliminate the public disclosure of allegedly competitively sensitive, proprietary, or otherwise confidential data submitted to the Commission on Form No. 1, as well as on other Commission forms. The information that we collect for public utilities is necessary to carry out our jurisdictional responsibilities of cost-based rates subject to our jurisdiction and the operation of power markets...

Accordingly, at this time, we will not change our information reporting requirements. As the industry becomes more competitive, we will monitor our reporting requirements to make sure that they are needed, fair to all segments of the industry, and consistent with the workings of a competitive environment." (pages 631 and 633, FERC, 1996).

The FERC has also recently reaffirmed the public reporting of discount rate information.¹² The Natural Gas Act requires a pipeline company to report certain information to FERC, including a shipper's name and the terms of the shipping contract.¹³ Two pipeline companies objected to this level of disclosure, arguing that it unduly compromised trade secrets. They presented FERC with two options: cease the public disclosure of information that had been included in the discount

¹²FERC Order No. 581-A, issued February 29, 1996.

¹³15 U.S.C. 717c(c).

rate reports filed by regulated gas pipeline companies and substitute customer codes for customer names in order to protect the confidentiality of customer-specific information.

FERC rejected both requests. The discount rate information was found to be necessary to the agency's efforts to prevent discriminatory pricing. Supplying customer names serves a similar purpose of enabling competing shippers to determine whether they are entitled to similar treatment. Thus the FERC concluded that the interests of the emerging competitive markets outweighed the value of keeping the terms of transactions or the identity customers confidential.

3.8. The ISO Role in Disclosure

In many regions of the country, new entities are being created (or existing entities are being modified) to support evolving electric power markets. The types of entities include regional transmission groups, power exchanges and independent system operators (ISO). The details and the roles of the various entities are currently being negotiated and will surely differ by region. In all cases, some entity or combination of entities, will be responsible for the settlement process to make sure all generation is accounted for and billed accordingly. For ease of presentation, we will refer to the entity with this responsibility as the ISO.

Masiello and Willis (1996) summarize the software development requirements for implementation of ISO functions, concluding that "the ISO's task will be an order of magnitude greater than that faced by existing utility control center operators" and will need new software integrating the capability to "track several thousand transactions daily" with "advanced power systems analysis technologies" to insure economical and secure operation of the system.

The ISO software for tracking power transactions could be required to be able to keep track of the original generating source and identify the environmental attributes of electricity at the point of retail sale. This should be built into the institutional mission of the ISO and built into ISO's computational capabilities. Over the next few years, ISOs will be obtaining hardware and software to carry out their system operation mandate. The technical specifications for the software should allow for environmental tracking — even as the details of how the tracking system will work are developed. Retrofitting the environmental tracking system into the software could be much more expensive after a system without the capability has been developed, installed, tested and paid for.

4. Other Disclosure Issues

4.1. Disclosure for Products or Companies?

A fundamental question is whether reporting should be done for particular products or for suppliers. Product disclosure allows a large company with a number of polluting power plants to develop and offer a green product. For example, under a product approach a supplier with a small wind project and 99 percent of its generation from coal could offer two products. One,

amounting to one percent of its output, would be the full output of the wind project with a disclosure statement showing 100 percent renewable sources and zero emissions. The other, would be all coal, with emissions disclosure based the coal plant's performance. With supplier (or company) disclosure, on the other hand, all of the firm's sales would carry a single disclosure label based on the combined operation of the wind and coal plants. Under this approach, all subsidiaries or divisions of the same corporate parent would carry the same disclosure label. In pilots in New Hampshire and Massachusetts, four suppliers provided this type of company disclosure, which is also termed generation profile.

Our review of tracking systems shows that it is possible to report on either a supplier or a product basis, although the likelihood of there being far fewer suppliers than products makes the data requirements simpler for the supplier approach.¹⁴ The examples used in this report nevertheless assume the more complex product approach is used.¹⁵

The main advantage of product disclosure is that it provides a meaningful opportunity for a large, existing company to develop and offer a green project. For example, a large existing company with little or no renewables now would have little incentive to invest in a new renewable technologies under a supplier approach because the renewable source would be too small to have any significant impact on the overall company disclosure statement.

The main policy disadvantage to product disclosure is that it could result in simply allocating clean resources to those customers who preferred it without resulting in any real change in the electricity supply system. For example, if the existing amount of renewable electricity is sufficient to "satisfy the demand" of customers who want renewable electricity, then disclosure

¹⁴If a product approach to disclosure is taken, power contracts must clearly state the source of power, a practice that does not reflect current contracting conventions. Some contracts specify a source, others specify that power is from a system rather than from a particular source, and many are vague. Determining the fuel mix and environmental implications of the many types of contracts may be difficult and subject to some level of internally inconsistent treatment. A reason these problems exist now is that contracts are already included in utility fuel mix and emission reports.

There are also two reasons current practices might change in ways that make the product approach easier. First, current contracting practices take place in an industry in which fuel mix and emission characteristics are less important than they will be when disclosure and full retail competition are in place. Second, in the future to simplify retail disclosure, wholesale sales might be required to specify the associated fuel mix and environmental characteristics at the time of a sale.

¹⁵It may be possible to construct a disclosure system that draws upon both the product and supplier approaches, getting the benefits of each. Disclosure of the fuel mix and key environmental characteristics by all suppliers can be required on a company-wide basis, including affiliates. "Renewable" for purposes of this supplier disclosure requirement might be defined relatively loosely. This can be combined with an optional part of the label for renewables and other green options.

will not encourage the addition of new renewables.¹⁶

4.2. Mandatory vs. Optional Disclosure

Should disclosure be required of all sellers or only those that choose to make environmental claims or otherwise voluntarily disclose? There are many policy arguments on both sides of the question, most of which were argued at length during debates over food, car mileage, appliance labels and disclosure statements for loans and securities. Mandatory disclosure combines consumer desire to be able to compare all supply options with the public policy interest in an informed public.

Some who object to mandatory disclosure argue that it is impossible to track the required information and that disclosure should be limited to those who choose to make environmental claims. Thus, Working Assets, who buys power from NEES and sells power that includes "no nuclear, coal, or Hydro Quebec" or Northfield Energy, a subsidiary of NU, that sells "100 percent hydro" would have to disclose fuel mix and environmental characteristics, but others would not. We have two responses to this approach. First, the FTC and state consumer protection laws require that environmental claims be verifiable and substantiated no matter whether disclosure is mandatory or optional.¹⁷ A tracking system will probably be needed if environmental claims of the type we have seen thus far are to be made by any sellers. Second, to disclose fuel mix and environmental characteristics on a voluntary basis requires the adoption of the same credible, verifiable tracking system that would be needed to support disclosure for all sellers.

Assuming a product approach is used and companies are allowed to sell their green supplies to some customers and their less environmentally-preferred supplies to others, two important considerations arise. Unlike other green products, the nature of electricity means if a supplier sells the green part of its mix to some customers, the remainder of its mix automatically becomes browner. Thus, supplier X may have a system that consists of green and not-so-green supplies. If X heavily markets its green supplies, and shows fuel mix accordingly, and then sells the remainder of its supply without any disclosure whatever, consumers may either believe that all of X's products are green or at least be unaware that X's green resources are no longer part of X's mix. To protect consumers and to reveal to them the status of X's sales of green power, disclosure of all products may be needed.

¹⁶A second possible disadvantage is that a product approach may undermine label credibility if suppliers that are predominantly fossil based market a green product. Consumers might believe that power comes from all of the supplier's plants, not simply a few nominally earmarked for particular customers. This possibility is being tested in consumer research

¹⁷See Federal Trade Commission. *Guides for the Use of Environmental Marketing Claims*. (1996) 16 CFR 260

An important and related issue is the need to assure consumers that the same power is not being sold more than once. For example, if supplier A has 100 kW of "green" power, it should not be able to sell its green power to five different 100 kW customers. Likewise as wholesale sales of "system power" to other suppliers, B should not include any of the same green power already sold at retail. To make sure this is the case, the tracking system would need to account for all sales in a way that can reconcile the sum of the parts, or products, with the whole.

4.3 Disclosure of Wholesale Transitions

Since retail disclosure requires knowing the environmental and fuel profiles of all of the retail supplier's sources, a retail seller needs to know the mix of their wholesale suppliers. The best solution is simply to require all suppliers, wholesale and retail, to disclose their mix.

4.4 Communicating Information to Customers

What should the labels look like and where should they appear? The final answer to both questions must await completion of consumer research, but some lessons can be gleaned from the rich history of food labeling. For example, the format for disclosure should be standardized and designed to allow customers to make easy comparisons between competing suppliers. The information should be conveyed in terms that consumers understand (percentages rather than micrograms), and the information should be provided for only the most important characteristics

Disclosure statements could be made available to customers at key decision points.

Where and how often should consumers receive the information? Customers need the information when they are faced with a buying decision. At a minimum, this means labels should appear in marketing materials and any other solicitations. Because consumers are likely to receive solicitations to switch suppliers and because fuel mix and emission information changes, customers should also receive periodic, perhaps quarterly, reminders and updates.

4.5 Treatment of Energy Efficiency and Offsets

The retail pilot programs show that environmental claims and marketing approaches often include energy efficiency and emissions offsets though other actions, not directly related to generating plants. For example, a firm might offer to plant enough trees to offset carbon dioxide emissions of their power plants. Should the disclosure labels simply reflect the emissions from generation or should the effects of energy efficiency and offsets be netted out?

For this report we focus on a disclosure and labeling system that ties retail electricity sales to generation, reporting physical attributes of that generation mix. It may be possible to include these offset options in labels, but the need to act quickly caused us to focus first on electricity sales. Clearly, firms should be at liberty to market and report energy efficiency, retirement of SO₂ emission credits, procurement of CO₂ offsets and other "environmental currency."

4.6. Timing Issues

How often should disclosure figures be recalculated? Fuel mix and emissions levels change constantly. As a practical matter, annual data, updated quarterly is probably as frequent as needed.

How often should customers receive disclosure information? Disclosure at the time of signing on with a supplier is a necessary first step. After that, suppliers could periodically notify customers of the availability of updates.

Should the information disclosed be historic or prospective? The simpler approach might be to base disclosure on actual performance in a recent historical period. The example used in this report assumes disclosure is based on periodically updated historical data.¹⁸

4.7. Enforcement

We do not expect enforcement of disclosure requirements to involve a large regulatory commitment. In the first instance, electricity suppliers should be responsible for determining and reporting their disclosure information, much as food suppliers are responsible for the "Nutritional Facts" labels affixed to most food items. There may be a role for a government or independent entity, such as the ISO, to monitor and spot check the information. In most, if not all cases, this could be done using information which is already being reported to various government agencies such as FERC, EPA and EIA.

5. Conclusion

Can we trace electrons or kWh from source to delivery? No.

Can we trace dollars? Yes. In fact, if we cannot trace dollars, we cannot have a competitive electricity market.

Can established dollar tracing methods be used to give consumers meaningful information about and control over the environmental consequences of their purchase decisions? Yes, but with the understanding that the information may not be 100 percent precise when viewed in the very short run (hours). When customers chose a particular supplier, they are, in essence, deciding which firm they will pay for their electricity. In making that decision, they are deciding how much and

¹⁸While this might be adequate in most cases, there will be circumstances where a supplier's resource mix changes dramatically, for example due to the construction of new resources and/or the retirement of existing plants. Simple hybrid approaches can be designed to address this. A firm could base its disclosure on a prior year's actual data, but could, as an option, use its own projections. However, if the actual results were much worse than its projections, it might be required to notify consumers or be subject to a penalty of some kind.

what type of resources the firm will need to own or purchase to provide that service. The link between the purchase decision and environmental consequences is clear.

Is it practical to give consumers information? Yes. Giving consumers fuel mix and emission information is clearly practical if the information is aggregated and averaged over months or a year. Depending on the precise form of future pools, ISOs and settlement processes information, it may be practical to provide the information on a more timely basis.

Finally, what are the most important next steps? There are at least three:

- 1) State commissions, particularly those considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional workgroups to identify local implementation options and issues. Input should be gathered from a broad cross section of stakeholders.
- 2) Federal and state commissions should carefully assess the extent to which the public interest in full disclosure outweighs requests for trade secret status
- 3) Federal and state commissions should recognize that the formative stages of new market institutions, such as ISOs, are the best times to examine how operations can efficiently improve consumer access to key information.

Appendix A

NARUC Resolution

RESOLUTION IN SUPPORT OF CUSTOMER "RIGHT-TO-KNOW" AND PRODUCT LABELING STANDARDS FOR RETAIL MARKETING OF ELECTRICITY

WHEREAS, at least 30 million consumers in six states will begin choosing among competitive electricity providers in early 1998 and retail access to competing electricity suppliers is under consideration in many other states; and

WHEREAS, electricity purchases make up a significant portion of the budget of many households;

WHEREAS, the production of electricity imposes very substantial environmental impacts; and

WHEREAS, pilot retail access programs have shown that customer confusion and misleading claims are highly likely; and

WHEREAS, clear and uniform disclosure will promote efficiency through informed product comparisons; and informed customer choice cannot occur in a retail electricity market without full disclosure of all relevant and important facts; and

WHEREAS, the desirability and feasibility of such disclosure is clearly established in nutrition labeling, uniform food pricing, truth-in-lending and many other federal consumer protection programs; and

WHEREAS, the National Association of Regulatory Utility Commissioners (NARUC) at its November, 1994 meeting adopted a resolution on competition and stranded benefits calling for new proposals to preserve environmental and diversity benefits in a more competitive marketplace; and

WHEREAS, The NARUC at its July, 1996 meeting adopted principles to guide the restructuring of the electric utility industry which included market-based mechanisms to promote effective consumer choice and to preserve renewable resources, resource diversity, and environmental protection; now therefore be it

RESOLVED, that The National Association of Regulatory Utility Commissioners (NARUC), convened at its 108th Annual Convention in San Francisco, California believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and be it further

RESOLVED that the NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and be it further

RESOLVED that the NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.

Appendix B

Equations for Attributing Emissions and Fuel Mix to Retail Sales

Balancing Equations:

Producer total generation

$$G_p = \sum_g P_{p,g}$$

Producer sales; internal and wholesale

$$I_{p,r} = G_p - \sum_{(r \neq p)} W_{p,r}$$

Retailer sales; from internal and wholesale sources

$$S_r = (1 - L_{r,r}) I_{p,r} + \sum_{(p \neq r)} (1 - L_{p,r}) W_{p,r}$$

Environmental Equations:

Producer emission factors

$$PE_{p,e} = (\sum_g E_{p,e,g} P_{p,g}) / G_p$$

Retailer emission factors

$$RE_{r,e} = (PE_{r,e} I_{p,r} + \sum_{(p \neq r)} PE_{p,e} W_{p,r}) / S_r$$

Producer fuel mix

$$PF_{p,f} = (\sum_g F_{p,f,g} P_{p,g}) / G_p$$

Retailer fuel Mix

$$RF_{r,f} = (PF_{r,f} I_{p,r} + \sum_{(p \neq r)} PF_{p,f} W_{p,r}) / S_r$$

Variables:

$E_{p,e,g}$	Emission factor of type e for generating facility g of producer p
$F_{p,f,g}$	Fuel fraction of type f for generating facility g of producer p
G_p	Total generation for producer p
$I_{p,r}$	Internal company sales
$L_{p,r}$	Loss factor associated with transfers from p to r
$P_{p,g}$	Production from generating facility g of producer p
$PE_{p,e}$	Producer average emission factor
$RE_{r,e}$	Retailer average emission factor
$PF_{p,f}$	Producer average fuel mix factor
$RF_{r,f}$	Retailer average fuel mix factor
S_r	Retailer r sales
$W_{p,r}$	Wholesale sales from producer p to retailer r

Subscripts:

e	Environmental impact category (e.g. SO _x , NO _x , CO ₂ , ...)
f	Fuel type (e.g. Coal, Oil, Gas, Hydro, Nuclear, ...)
g	Generating facility
p	Producer
r	Retailer (p=r means same company)

Appendix C Available Data

Environmental Data

Data on air emissions from power plants is measured by utilities using continuous emissions monitoring systems (CEMS). This data is collected by the EPA and entered into the EPA's emission tracking system (ETS). The coverage of power plants is good. A "complete" database should be available for 1996, omitting only units less than 25 MW and some cogenerators and independent power producers. The EPA conducts quality control checks, summarizes the information and makes it available on the Internet. The EPA has developed specific technical rules for continuous emissions monitoring including the treatment of missing data, record keeping, quality assurance and reporting (40 CFR Parts 9, 72, and 75, *Federal Register*, Volume 60, No. 95, May 17, 1995). The data include emissions of SO₂, NO_x, and CO₂, as well as the heat input of the fuel used. Sources of information on emissions data include EPA reports (EPA, 1995, and personal communication with Richard Morgan, Manager, Utility Regulatory Program, Acid Rain Division, US EPA).

There is also a voluntary program for reporting greenhouse gas emissions. While 12 of the 15 highest emitting utilities reported their CO₂ emissions for 1995, the overall coverage of this program is poor, with reported utility CO₂ emissions at only 43 percent of estimated national total electric utility CO₂ emissions (EIA, July 1996).

A great deal of environmental information is available at the state level. Any facility, utility or non-utility, requiring an air emission licence reports all major emissions and fuel input. The data generally reported quarterly, within a few weeks of the close of a quarter.

Generation and Fuel Use Data

The EIA collects and publishes data on electric power plants in the US, specifying the owner, capacity, fuel type and other parameters. Form EIA-860, collected on an annual basis from 900 electric utilities, is summarized and made available in print (EIA, October 1995) or electronic form (<http://www.eia.doe.gov>). Information specifically on renewable generation is published by the EIA in its *Renewable Energy Annual* (EIA, December 1995) and in the Renewable Electric Project Information System (REPIS) developed by the National Renewable Energy Laboratory

(described in Appendix DISCO of EIA, December 1995). A key limitation of these sources appears to be that they focus upon capacity and do not provide figures for energy generation.

The EIA also collects a great deal of information on fuel use for power generation, most notably the Uranium Industry Annual Survey (Form EIA-858), the Monthly Report of Cost and Quality of Fuels for Electric Plants (Form FERC-423), EIA Form -860 The Annual Electric Generator Report, EIA-759 The Monthly Power Plant Report, and the Annual Report of Major Electric Utilities, Licensees, and Others (Form FERC-1). A private company summarizes key data from the FERC-1 and offers the information for sale on disk (see, for example, UDI, 1996).

A useful summary of data for steam generators in the U.S. is the EIA-767. This is collected annually from 893 respondents and includes information on generators, including owner, generation by unit, fuel use by type and boiler, boiler efficiency, in-service year, emissions control equipment and air emissions. This data is available on disk from the EIA.

Data on generation from plants that are not owned by electric utilities is collected from 1400 non-utility power producers on Form EIA-867. This data includes capacity, fuel use and generation. It is made available only in highly aggregated form (e.g., on a state-level) and so is not very useful for an environmental disclosure system.

Data is also available at the state level. Any generator requiring an air emission license reports fuel input data from which generation can be estimated. In addition, if IPPs or QFs sell to regulated utilities, monthly generation and payments may be available in reports to PUCs.

Electricity Transaction Data

Data on wholesale electricity transactions is collected on seven different forms:

- FERC Form 1 — Annual Report of Major Electric Utilities, Licensees and Others
- FERC Form 1-FERC — Annual Report of Nonmajor Public Utilities and Licensees
- Form EIA-412 — Annual Report of Public Electric Utilities
- Form EIA-861 — Annual Electric Utility Report
- Form FE-781R — Annual Report of International Electrical Export/Import Data

- REA Form 7 — Financial and Statistical Reports (Electric Distribution Borrowers)
- REA Form 12 — Financial and Statistical Reports (Electric Power Supply Borrowers and Electric Distribution Borrowers with Generating Facilities)

The EIA summarizes this information and publishes it in printed form (Electric Trade in the United States 1992, EIA September 1994). Even better, the electronic version of this data is available on-line and with standard EIA codes for companies that make it possible to link the transaction database with other EIA data (e.g., Form EIA-860).

The wholesale electric trade data, also sometimes referred to as the bulk power trade data, is comprehensive, even redundant in its coverage. For most transactions, it has information reported by both the buyer and the seller, providing an opportunity to check for consistency. Transactions are identified as exchanges, purchased power, sales for resale or wheeling. The main limitation on the usefulness of the trade data is that it takes a year or more for the EIA to pull the database together.

Another potentially useful source of information on power transactions is the FERC Form No. 714, the "Annual Electric Control and Planning Area Report." This includes identification of generating plants in the control area, monthly aggregate outages, monthly loads and transactions, hourly loads and marginal costs. The hourly information is provided in electronic form. The high level of aggregation (control areas such as PJM, NYPP and NEPOOL are made up of many companies) makes this data unsuitable as a basic source of information for disclosure. The control area data may, however, be useful as a supplementary source, perhaps for assigning attributes to imported power from a neighboring control area that is not functioning under the same disclosure protocols.

Finally, power marketers, whose numbers are increasing rapidly, file their transaction information in quarterly power marketer reports to FERC. It seems likely that over time, the information filing requirements for power marketers and for utilities will converge. A standardized requirement for monthly or quarterly reporting would probably work better for environmental disclosure than annual reporting.

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Exhibit BEB-3

to Environmentalists' Statement No. 2

***Full Environmental Disclosure for Electricity:
Tracking and Reporting Key Information***

Docket No. R-00973953

**Joint Petition for Partial Settlement
of PECO Energy Company's
Proposed Restructuring Plan
and Application for a Qualified Rate Order**

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Full Environmental Disclosure for Electricity: Tracking and Reporting Key Information

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1. Introduction and Summary

Customer choice is happening quickly. In 1998 millions of retail customers in half a dozen or more states will, for the first time, choose their own suppliers of electricity. The hope is that competitive markets and customer choice will outdo traditional regulatory oversight in lowering costs, allocating risks and choosing new and clean resources. For this to happen, electricity customers — like customers in any competitive market — must be well informed. Lessons from other markets and early experience from pilot retail competition projects have shown that giving customers reliable information, preferably in a standardized format, is critical. Reflecting this, the National Association of Regulatory Utility Commissioners (NARUC) recently passed a resolution calling for the uniform disclosure standards including price, price variability, resource mix and the environmental characteristics of electricity purchases.¹ The resolution's conclusion

The National Association of Regulatory Utility Commissioners (NARUC), ... believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and

NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and

NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.

The full resolution can be found in Appendix A.

The limited retail choice pilot programs to date have featured a wide array of environmental claims by marketers (see Table 1). Power marketers often stress the environmental advantages of their product for one reason — many customers prefer environmentally benign power sources. Publicly available independent customer surveys (and presumably the marketers' own research) show that many customers prefer clean power sources and are sometimes willing to spend more to get them. As a result, environmental claims for electricity products may become a fixture of the competitive landscape.

¹Disclosure is factual and objective. For example a particular purchase might be 40 percent coal, 30 percent gas and 30 percent geothermal power. It does not address subjective claims, such as whether a particular purchase is good or bad, clean or dirty.

A uniform disclosure mechanism would give customers an accurate, objective basis for comparing the environmental (and other) claims of competitive suppliers. On the other hand, without the common language of uniform disclosure, customers must continue to sift through the vague, unverifiable, and often misleading claims that have been common in the pilots. Customer focus groups conducted with pilot program participants in New Hampshire and Massachusetts confirm consumer dissatisfaction with the "apples to oranges" comparisons they have been asked to make.

An environmental disclosure policy is desirable for many reasons. Besides giving customers an objective basis by which to compare products, it protects suppliers from unfair trade practices claims by setting clear rules of the road. It protects against customer backlash aimed at environmentally-benign resources by helping to insure that customers get what they pay for. Depending on the level of customer demand, it can result in cleaner resources and less pollution.

The main purpose of this paper is to describe how a retail electricity seller's resource mix and environmental characteristics can be tracked and disclosed to consumers. Its main conclusions are:

- 1) A uniform mechanism for disclosing emissions and fuel mix is feasible.
- 2) The long established methods of measuring generation, demand and contract rights were developed to track dollar flows and associated fuel mix and emission characteristics. These same methods can be easily adapted to provide the basis for disclosure. While many of the electric utility industry's existing institutions and market structures will change, the basic building blocks of existing settlement processes will remain and can be used for disclosure purposes.²
- 3) All of the necessary generation, fuel use and emission information needed to support disclosure is already collected. With very few exceptions the information is publicly available through federal and state agencies. For a number of reasons, we suggest that existing data and definitions be used but that new market structures or institutions, such as POOLS or ISOs collect and disseminate the information.

There are clearly a number of important tasks remaining to be done:

²While developing a credible disclosure protocol is not conceptually difficult, it does require making choices and resolving many details. To add concreteness to the discussion, the report is based on some initial opinions about what might work best. For example, our discussion of tracking assumes a label like the increasingly familiar and well researched "Nutrition Facts" affixed to food provides would be used to disclose the fuel mix and environmental emissions associated with electricity purchases. See Table 2. In other instances, the choices and issues are described, and resolution is left to await the results of other ongoing research sponsored by the National Council on Competition in the Electric Industry.

- 1) The National Council on Competition in the Electric Utility Industry (National Council) is taking a leadership role developing disclosure standards and guidelines. A multi-part disclosure related research effort coordinated by the National Council is underway. The research is being aided by a DOE-convened interagency task force consisting of representatives from DOE, FERC, EIA, EPA, FTC and FDA. Reports will be widely disseminated as work is completed.
- 2) State commissions, particularly those considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional efforts to identify options and issues and implement disclosure requirements in a timely manner. Input should be gathered from a broad cross section of stakeholders.
- 3) Federal and state commissions should carefully assess the extent to which the public interest in full disclosure outweighs requests for trade secret status.
- 4) Federal and state commissions should recognize that the formative stage of new market institutions, such as power pools and ISOs, is the best time to examine how operations can efficiently improve consumer access to key information.

2. Disclosure

2.1. What is Special about Electricity?

Why require uniform disclosure of electricity instead of relying on marketing by sellers and existing federal and state advertising laws to inform consumers? There are several answers. Uniform consumer-friendly labeling or disclosure is required in many areas. Some of most common of which are food, appliance and automobile labels and standard disclosure for consumer loans. In each case, the history (or likelihood) or customer confusion combined with societal interest in having an informed public to produce uniform disclosure.

There are several reasons that consumer protection requires full disclosure of key attributes of competitive electricity sales. Shopping for electricity is a new experience for consumers. The intangible nature of the commodity and the inability to distinguish one kWh from another will make it nearly impossible for individuals to independently determine the source of the power or to verify whether claims are true. Complex price structures make it very difficult to even compare the price of competing offers.³ Finally, experience with the pilot programs shows a high

³We believe uniform labels should include a common measure of price, combining customer charges, demand charges, complex time-of-use charges and sign-up bonuses to something like an average price for typical residential consumer. Because this part of a label does not require any form of tracking (even if it does require clear standards for calculation), it is not discussed more in this report.

level of consumer confusion.

Giving consumers the information is important from a societal perspective as well. The scale of the industry's environmental impacts are far reaching, ranging from very small impacts for most renewables and new gas-fired technologies to much larger impacts for older coal-fired facilities. If electricity restructuring is to give retail customers the opportunity to make meaningful choices regarding the source or environmental nature of their electricity purchases, customers will need reliable and consistently developed information based on some sort of tracking and verification system. Likewise, to abide by state and federal truth in advertising laws, generators or marketers of electricity will need a tracking and reporting system to substantiate any environmental claims.

The challenge is to develop a workable system of environmental disclosure so that customers can make informed choices. To be workable, disclosure should provide a common standard that facilitates comparisons between suppliers in a way that balances simplicity and accuracy.

2.2. Types of Environmental Claims

It is clear from early experience with retail competition pilot programs that environmental or green marketing may be a primary tool to attract customers.⁴ Retail competition pilot programs are now underway, and the promotional literature is quite useful in providing a sense of the types of claims that companies will make. Many competitors are making environmental claims presumably because they believe environmental considerations are an important factor to customers when they shop for electricity.

A list of environmental claims made by competitors in the New Hampshire and Massachusetts pilot programs, sorted by type of claim, is provided in Table 1.

This paper deals primarily with the first group of claims — those directly related to power supply, some of which can be misleading. For example, the claim that a particular supplier has no coal, nuclear or Hydro Quebec in its mix is dubious and undocumented. The implied claim that pumped storage hydro is 100 percent hydropower is probably false, given that pumped

⁴In addition to the pilot programs, a number of "green pricing" programs are underway, prior to the introduction of retail choice of supplier. For example, Wisconsin Electric's "Energy for Tomorrow Renewable Energy Program" offers customers an opportunity to "purchase electricity generated by renewable resources" with an option allowing 25 percent, 50 percent or 100 percent of "the electricity used in your home will be displaced by renewable energy." Many of the same disclosure issues apply to either case (green marketing in a retail choice context or green pricing in a monopoly context), but the problems are somewhat more complex in a market environment due to the increased number of suppliers and aggregators, the new types of transactions (spot market, futures, etc.) and the wider array of green offerings.

storage facilities require energy from other power plants for pumping.⁵

2.3. What to Disclose?

The most fundamental questions are what to disclose generally and what to disclose in the form of a simple label. Ongoing research and decisions by regulators have begun to identify a long list of information that will be required to be disclosed to consumers (Alexander 1996). This may include consumer rights, complaint process and disconnection and payment policies. With effort, a standard one or two page document might be prepared to help consumers understand and compare key terms.

Our focus, however, is on a uniform label which, like food labels, conveys key but very limited amounts of information. Our experience suggests that a useful label (Table 2) might convey information about price, resource mix and certain environmental characteristics. This is supported by recent regulatory decisions in Vermont, Massachusetts and Maine and the recent NARUC resolution referenced earlier.

3. Tracking Transactions

3.1. Feasibility: What is it Possible to Track?

Is it possible to know where electricity at a customer's meter came from? This simple question has a complex answer because electricity follows the laws of physics, not the computations of accountants. With an interconnected grid, the power flow over the transmission system is ambiguous. About the best one can say is that power is put into the grid at certain points and taken out at other points. Which generator produced the power that went through a particular customer's meter is, in a physical sense, indeterminate, except in certain unrealistic cases.

The fact that electrons cannot be traced from a customer back to a source has not impaired the ability of power producers and power suppliers to plan their systems, choose what to build and what to buy, inform consumers and others of the supplier's fuel mix or emissions, or most important, transact hundreds of billions of dollars of transactions. For market purposes, it is sufficient to know which firms were selling into the grid, which were buying from it and where losses were occurring.

Long before "restructuring" entered the lexicon, to assure a smoothly functioning market, utilities developed mechanisms and settlements processes to track who generates, who consumes

⁵The New Hampshire ad from Northfield Energy was one of this year's winners of the Center for Science in the Public Interests Harlan Page Hubbard Lemon award for deceptive advertizing.

and who buys. While the details vary from place to place, they all share a common basic design. For each buyer, the electrical energy taken from the system must be matched by an amount equal to the buyer's purchases, plus losses incurred in delivering such amounts to the buyer's system by the sellers. This is the basis for the dollar payments.

In looking at the dollar flow for wholesale purchases and sales, energy flow data is essentially irrelevant. Buyers pay for kWhs received from the system at a particular place; sellers are paid for

Table 1

Environmental Claims in the New Hampshire and Massachusetts Pilot Programs

Directly related to power supply:

- 100 percent hydropower (Northfield Mountain Energy)
- Working Assets Green Power does not rely on nuclear power, coal or Hydro-Quebec (Working Assets)
- "Our power sources are diversified both in fuels and geographic location. They include long-term contracts with Canadian provinces, several New England nuclear plants, and hydroelectricity from New York, Vermont and Quebec. We also get power from our own small hydroelectric generating stations, wood burning plants in Vermont as well from a variety of independent power producers in Vermont and New Hampshire." (Central VT)
- "There's no perfect way to produce electricity. There's always an impact on the earth's resources. That's why Green Mountain Energy Partners relies heavily on renewable energy sources, like hydroelectric power, that offer the most environmentally sound forms of electric generation." and "More than 90 percent of the electricity in Green Mountain Energy Partners' supply comes from hydropower sources. These sources produce zero air emissions." (GMEP)
- "...we have an unusual approach to energy-making: Water is pumped up the mountain at night and flows down during the day to drive our generators located deep inside the mountain. It's quite efficient. So much so that we pass the savings on to you." (Northfield Mountain Energy)

Indirectly related to power supply:

- permanent retirement of SO2 emissions credits (AllEnergy)
- community-based solar systems (AllEnergy)
- energy/environmental survey (Enova Energy, Northfield Mountain Energy and others)
- quarterly usage reports and rewards (Enova Energy)
- energy conservation products and services (Northfield Mountain Energy, Freedom Energy/Xenergy, Green Mountain Energy Partners, and others)

Unrelated to power supply:

- donations to environmental projects and organizations (Enova Energy, Northfield Mountain Energy, Working Assets and others)
- raffled electric vehicles (Enova Energy)

General statements:

- "solid environmental record" (Central Maine Power)
- "only energy supplier in the pilot to receive the President's Environment and Conservation Challenge Award for our long-standing commitment to protecting the environment" (Granite State Energy)
- "A company which, since its very first hydroelectric facility began operating in 1909, has treated our environment with the respect and care it deserves — planting more than a million trees; preserving our properties and their surrounding recreational lands, trails, and water supplies; helping wildlife through habitat preservation; and much more. In fact, since 1987 we have invested over \$550 million in conservation efforts — more than any other utility in New England." (Granite State Energy)
- "A history of environmental leadership, including the installation of 'clean coal' technology at the Merrimack station, which received EPA and Governor's Energy Office awards" (PSNH Energy)
- "You'll save money, use cleaner power and..." (Working Assets)
- "Choose Wisely. It's A Small Planet" (Green Mountain Energy Partners)
- "Now is the time to start saving money and saving the planet." (Green Mountain Energy Partners)
- "It's the beginning of our long-term commitment to you and the earth." (Green Mountain Energy Partners)

kWhs delivered to the system. Except for questions of system reliability, and sometimes transmission pricing, the dollar flow is more important than energy flow. Dollar flows dictate financial risks and rewards of power plant investment, expansion, operation and retirement decisions, and these are the decisions that result in more or less environmental harm.

3.2. Settlements Procedures

The tracking system for emissions and resource mix works by following the dollars. We assume that the electricity a vendor sells and therefore the consumer "uses" is the electricity for which she pays.

For any period, there is a known amount of electricity generated and a known amount of electricity consumed. After accounting for losses and storage, these must be equal. Ultimately, the retail buyers compensate the generators, in some cases through one or more intermediaries. By following the contracts and the flow of money from retail consumers to generators, one can develop a reasonable idea of accountability.

Because of the large number of power plants, the volume and diversity of transactions and the huge flow in dollars, tracking dollars for settlement purposes is and has always been a large task. The metering and data requirements are substantial. Nevertheless, it is a task being done everywhere in the country, and one that will continue, perhaps with even greater urgency, after restructuring. Dollars are tracked in the wholesale market using the following information:

- ▶ Metered output of generators. All generators delivering power to the utility grid, regardless of location or ownership, are metered in considerable detail (hourly kWh recordings at a minimum).
- ▶ Metered load of buyers. In today's environment wholesale buyers are mostly monopoly utilities. Utility load is generally metered at the substation where power is delivered to the distribution system. In the future there will be many different types of buyers. While metering approaches will vary, all buyers will be metered in some fashion.
- ▶ Metered interconnections. All interconnections between utility systems are metered. The net flow into a service territory plus "local" generation (generation located within the service area no matter who owns it) provides a measure of the load plus losses within the service territory.
- ▶ Supply rights. Ownership rights and contractual agreements determine who has the rights to specific power sources. These will determine what sources, wherever they may be, are used to meet the load requirements in a service area.

Nationwide billions of dollars change hands based on these few pieces of data.

The following example illustrates the tracing of dollars. Figure 1 shows three utilities that

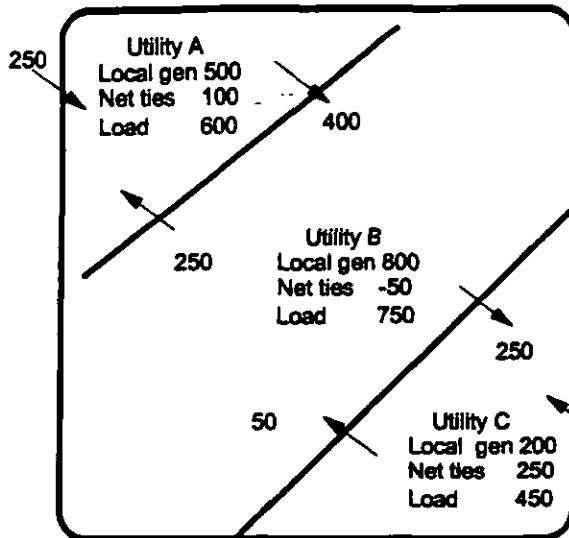
**Table 2
Illustrative Environmental Labeling**

Fuel Facts	
Your electricity is generated from	
Nuclear	XX%
Oil	
XX%	
Natural gas	XX%
Renewables	XX%

Air Emission Facts	
Each of your KWh produces	
	% above or below regional average
Sulfur Dioxides YYmg	XX%
Oxides of Nitrogen YYmg	XX%
Mercury YYmg	XX%
Fine Particulates YYmg	XX%
Carbon Dioxide YYmg	XX%

operate in a state or region with internal and external ties. For a particular hour, Utility A has a total load of 600 MW metered at all of its substations. This represents the aggregate load of all retail consumers within A's territory. Ignoring losses in the distribution system, summing the metered load of each individual retail consumer would equal the same 600 MW (assuming every consumer had real-time meters).

Figure 1



On a physical basis, A's 600 MW load is being met by 500 MW of local generation (generation physically in A's service territory, regardless of who has the rights to the output) plus 100 MW of net interchange with its interstate and intrastate interconnections.

The second half of tracing dollars and the associated supply characteristics requires knowing A's supply rights (owned generation and contracts) and balancing the dollar flow associated with A's load and supply.

In this example A, B and C are meeting their customers' needs through a mix of their own power plants and contracts from suppliers

inside and outside the region. As the electric utility industry changes, A, B and C may be utilities, marketers, brokers, aggregators or deregulated generators of one type or another. Whatever their make-up, each will have an hourly demand measured or estimated at the point of retail sale. Each seller will meet its hourly demand through some combination of its own power plants and contracts for supplies from others, possibly including purchases from a spot market.

Tables 1 and 2 provide the needed information to track through our example. Table 1 provides an overview of the supply rights for A, B, and C. The first column begins with the major power flows shown in figure 1. The second column shows the supply rights. Thus we show that of the 500 of local generation in A's territory 400 MW are owned by A and 100 are owned by B.

Tables 3 and 4 provide the needed information to track through our example. Table 3 provides an overview of the supply rights for A, B and C. The first column begins with the major power flows shown in Figure 1. The second column shows the supply rights. Thus, we show that of the 500 MW of local generation in A's territory, 400 MW are owned by A and 100 MW are owned by B.

Imports and exports from metered interconnections are more complicated. A has 500 MW of incoming power flow and 400 MW of outgoing flow giving a net import of 100 MW.⁶ The second column of Table 3 shows the supply rights associated with the imports and exports. The third column of Table 3 shows how each part of A's supply rights could be reflected in a disclosure statement.

⁶A has a 250 MW inflow from X, outside the region, and a 150 MW net outflow to B producing to an overall inflow of 100 MW.

Table 4 goes to the next level of detail and for each supply (owned or contract) shows the type of contract, the fuel type and emission characteristics for two pollutants. With respect to fuel mix and emissions, our example shows the source of the data depends on the type of contract. For unit contracts, the supply characteristics are those of the plants or plants involved. For system contracts, the average supply characteristics of the supplying entity can be a reasonable power from a spot electricity market.⁷

⁷ In some cases, instead of being measured, hourly demand will be imputed based upon statistical load profile information or some agreed upon protocol.

Table 3

Source	Ownership/Contract	Disclosure Basis
Imports from X (outside region) Net flow X to A = 250 MW	50 MW unit contract to A 100 MW unit contract to B 100 MW unit contract to C	Part of A's average system X's average system on B's Disclosure Part of C's average system
Area A Local Generation Local generation = 500 MW	400 MW owned by A 100 MW owned by B	Part of A's average system Part of B's average system
Interchange A to B Line 1 = -250 MW Line 2 = 400 MW Net flow = 150 MW	-50 MW A generation in B area -100 MW economy purchase B to A 100 MW B's generation in A's area 100 MW pass through of X to B 100 MW pass through X to C	Part of A's average system B's average in A's Disclosure Part of B's average system See B's disclosure See C's disclosure
Area B Local Generation = 800 MW	50 MW owned by A 750 MW owned by B	Part of A's average system 650 MW Part of B's average system
Interchange B to C Line 1 = -50 MW Line 2 = 250 MW Net flow = 200 MW	100 MW unit contract from X to C 100 MW unit contract from B to C	Part of C's average system Part of C's average system
Area C Local Generation = 200 MW	200 MW owned by C	Part of C's average system
Import from Y (outside region) Net flow Y to C = 50 MW	50 MW contracted to C	Part of C's average system

Summary of Table 3:

	Firm A	Firm B	Firm C
Owned Generation - Local 200 MW	400 MW	650 MW net*	
Owned Generation - External	50	100	
Purchase from X	50	100	100
Purchase from B	100		100
Purchase from Y			50
Sale to A		-100	
Load	600 MW	750 MW	450 MW

*excludes joint ownership and unit contract

Combining loads shown in Figure 1 and supplies shown in Tables 3 and 4, we arrive at the supply characteristics for this hour for A, B and C shown in Table 5.⁸

This example focused on a single hour. In practice, the settlement process is done over a longer period, usually monthly.

⁸In this example the mix of one seller depends on the mix of one or more other sellers, so computing the values for the label requires the solution of several simultaneous equations. As the number of participants and transactions between participants grows, the mathematical complexity increases. There are several options to simplify the calculations. For example, one could adopt a simplifying convention and assume sales to be from producer's own generation, unless the producer sells more at wholesale than it produces. If wholesale sales exceed a supplier's own generation, then the extra is assumed to come proportionately from the companies the producer purchases from. This approach allows the complex web of electricity transactions to be dealt with in a straightforward manner, avoiding the difficulties and ambiguities of tracing power transactions back through several companies.

Appendix B is a set of equations describing this system for attributing generation to retail sales in order to attribute emissions and fuel mix. The "balancing equations" describe the relationships between generation, wholesale transactions, internal sales and retail sales. All of the data required for the "balancing equations" is available from EIA, including electricity production by generating unit and owner ($P_{p,u}$), the amounts of energy and participants in wholesale transactions ($W_{p,r}$) and retail sales by company (S_r).

The "environmental equations" relate the emissions factors and fuel mix of the generating units to retail sales. These equations are simply weighted averages of the characteristics of the generators, as assigned to internal sales and wholesale transactions. The data for emissions and fuel mix are available from EPA (state and federal) and EIA, respectively.

Table 4

	A	B	C
Plant 1	owned	owned	owned
Size/output level	500 MW plant located in area A. 400 MW owned by A and 100 MW owned by B	800 MW plant located in area B. 750 owned by B, 50 owned by A, and 100 MW to C by unit contract	200 MW plant located in area C
Fuel	coal	nuclear	gas
Emissions NOx	4500 lbs/GWH	0	1
CO₂	2100 lbs/MWH	0	1
Plant 2	unit contract	system contract	unit contract
Size/output	50 MW IPP located outside region X	100 MW from X located outside region	50 MW from Y outside region
Fuel	biomass	X's average 50% coal 50% gas	coal
Emissions NOx	2500 lbs/GWH	3000 lbs/GWH	4500 lbs/GWH
CO₂	0	1500 lbs/MWH	2100 lbs/MWH
Plant 3	system contract	Owned	unit contract
Size/output	100 MW system purchase from B	100 MW ownership in part of A's 500 MW coal plant	100 MW unit contract from X outside region
Fuel	B's average	coal	hydro
Emissions NOx	1500 lbs/GWH	4000 lbs/GWH	0
CO₂	1000 lbs/MWH	2000 lbs/MWH	0
Plant 4	owned		unit contract
Size/output	50 MW joint ownership in B's nuclear plant		100 MW from B's nuclear plant
Fuel	nuclear		nuclear
Emissions NOx	0		0
CO₂	0		0
Total supply	600 MW	850 MW	450 MW
Local demand	600 MW	750 MW	450 MW
Off system demand	0 MW	100 MW	0 MW

Table 5

	A	B	C
Coal	70%	18%	11%
Nuclear	21%	76%	22%
Gas	1%	6%	44%
Renewables	8%	0%	22%
NOx (% of regional avg)	120%	60%	25%
CO₂ (% of regional avg)	125%	15%	10%

NEPOOL Example

The basic structure of the tracking system is the same in markets based on power pools, markets based on bilateral contracts, or any blend of the two. In markets limited to bilateral contracts, tracking is conceptually straightforward, since every transaction has an identified buyer and seller. But tracking for a power pool is not difficult. The New England Power Pool (NEPOOL) provides a good example because it consists of a complex web of buyers, sellers, generation, and contract types. It is also a good example because it functions like a competitive retail market in which financial contracts, including contracts for differences, operate independently from actual power plant operations or power flows.

Currently, NEPOOL centrally dispatches all power plants in a six-state region to minimize the total operating cost of meeting demand. Least-cost dispatch occurs without regard to plant ownership or contracts. Except for special cases, internal purchases or sales of plant ownership, contracts for plant output or contracts for system power do not affect which plant actually operates. Contract and plant ownership will affect dollar flows and, as discussed earlier, these dollar flows ultimately dictate expansion and retirement decisions.

Despite the complexity and large number of participants and contracts, all of the dollar flows in New England are based on the metering described in connection with Figure 1. The rights and obligations of each participant are written and clearly understood. This allows buyers, sellers and generators to conduct daily operations with confidence that generators will be paid, although at any particular hour, they may not know which buyer will pay the bill. The NEPOOL settlements or billing process clears monthly as is the case with bank accounts and consumer credit card

statements. This monthly accounting process is, in essence, the tracking process.

NEPOOL is an especially interesting example because the many hundreds of contracts between participants take many forms (unit, system, interruptible). Yet, because the system is centrally dispatched, all of the contracts are essentially financial. This has not impaired the ability of each participant to report its own fuel mix to EIA and display it prominently in annual corporate reports.⁹

POOLCOs and Bilateral Structures

New competitive structures and new terminology do not affect the underlying need for, or the basic methods of, tracking dollars. For example, in a pure POOLCO model, aggregator A could have a power supply contract with supplier X. Assume the contract does not constrain X's operations in any way so X will be free to meet A's supply requirements as X sees fit. This means X will operate only during hours that pool prices are greater than X's operating costs. X's obligation to meet A's load during other hours will be met with purchases from the pool.

The settlements process would trace dollars based on the same basic informational building blocks as described earlier: A's metered demand, X's metered generation and the contract between A and X. POOLCO will know A's demand and X's level of operation each hour. POOLCO will also know the key terms of the contract between A and X. (This is particularly true if pool rules require sellers to meet reserve requirements by owning or contracting for minimum amounts of capacity.)

The tracking system for disclosure would work much like the tracking system for dollars. A is buying power with X's characteristics to the extent X is running. The remainder of A's needs are met with power from the pool. The pool's characteristics are the averages of all power received that POOLCO has not matched to a seller.

⁹Annual reports to shareholders often include color graphs showing utility fuel mix and how it has changed historically. Resource diversity and particular types of supply mix are touted as reasons investors should be happy with the company. For example, after graphically displaying its 1980 and 1990 fuel mix, Central Maine Power Company's (CMP) annual report to shareholders says:

"CMP's new resource additions are a great help in continuing our long-standing policy of diversifying our energy mix, tapping renewable and indigenous resources, promoting cost effective conservation, and reducing our dependence on oil. ... The oil-fired portion of CMP's net generation dropped to 16% in 1990, the lowest level since the early 1950s. CMP's progress, which will continue, offers economic and environmental benefits for the State of Maine at large, as well as for our customers and investors."

Suppose the market structure was bilateral with an ISO or some other settlement agent and no pool. The basic building blocks are the same: metered customer load, metered generation and contracts. Assuming the same actors as our POOLCO example, aggregator A buys from seller X. X will operate or will make separate bilateral contracts with other sellers to match X's demand. The ISO will have hourly information on X's output and on A's load. The ISO will also have basic information on A's contract with X. The information is needed because X's output (including any of X's bilateral support contracts) may be higher or lower than A's demand. To deal with this, X will buy an ancillary, balancing service from the ISO. The ISO needs the contract information to know who to charge for the balancing services.

The example can be made more complex if aggregator A buys from sellers X, Y and Z, and A sells green electricity to some consumers and regular electricity to others. In this case A's purchases are metered as are the deliveries from X, Y and Z. A's total fuel mix is determined by the relative deliveries from X, Y and Z, and the nature of the contracts. The only limitation on A's selling two products is that the weighted average mix of A's green and regular sales must match A's total mix. (See section 4.1 for discussion of sellers offering more than one product.)

Market structures, including any of the examples above, might also adopt simplifying conventions. For example, as described above, the POOL, or spot market in a region would compute and disclose the average POOL characteristics. All sellers could be given the option of using the POOL average in their own disclosures. As was the case above, the POOL average would reflect the average characteristics of all resources not specifically committed to a buyer.

In a fully competitive retail market, the information to be traced will increase significantly as the number of sellers, buyers, and transactions increases. Nevertheless, the basic building blocks of metered load, metered generation and contract administration remain the same. The details of the future settlement processes will vary depending on the market structure adopted. Some market structures will have pools, and some will not. The one constant is that all market systems and related settlements will be based on metered loads, metered output and contracts.

Suppliers A, B and C will be joined by suppliers D through Z. Those joining may be generators, marketers, brokers and aggregators. Each supplier will need to know its load just as A, B and C did. Metering may be different for different sellers, but each seller will be subject to a clearly written agreement outlining how its load will be tracked. A combination of real-time meters and simpler metering with agreed upon load profiles will be required for each supplier.¹⁰

Competitive markets might also include a variety of financial contracts (as distinguished from power sales contracts) that operate outside the power market and have no direct bearing on the settlements process or disclosure. For example, beyond A's power sales contract with X, A could

¹⁰The use of load profiles raises issues with respect to which entity takes the risk for errors in these profiles. These issues are beyond the scope of this paper.

sign an insurance policy (or contract for differences) with financial institution Y that reduces X's price volatility. Neither X nor any ISO or POOLCO would need to be aware of this side contract. Supplier X might also have a financial contract, a futures contract for example, to protect against X's risk of meeting A's load at agreed upon prices. Again, neither A nor any POOLCO or ISO would need to know about the futures contract, and if these contracts were purely financial, they would not be reflected in the disclosed fuel mix.

3.4. Data Availability Issues

The data needs for a disclosure system raise two issues. First, will disclosure require the collection of data that is not presently collected? Here the answer is a simple no. For practical purposes all of the data needed to implement resource mix and environmental labeling is already collected.¹¹

Second, is the data publicly available? Here the answer is more complex. In all but a few instances the data is publicly reported somewhere. A detailed description of sources of available data is presented in Appendix C. The problems are:

- 1) The information is not all available on a timely basis, and it is scattered among different federal and state agencies. Data is measured and reported to the EPA, FERC, EIA or the relevant state environmental agency.
- 2) Some entities including some IPPs, cogenerators and power marketers either do not report all of the needed data or the data is aggregated in a way that is not useful for disclosure purposes.
- 3) There is a growing trend for all types of market participants to request that reported data be kept confidential.

These issues are discussed below, but our review of the issues and data suggests that an effective disclosure system can rely on current definitions and the raw data already collected. However, while no new measurements are anticipated, speedier availability of useable data is critical. To simplify the collection and reconciliation of existing data bases, the best option is to coordinate with market institutions (power exchanges and ISOs) that are starting to specify the computer software to be used in the tracking process. Software should be designed to handle resource mix and environmental information, along with all other data needed for the safe and efficient operation of the new system.

3.5. Timing

¹¹In some cases, data used for disclosure purposes will be precisely measured or metered data, and in other cases, it may include estimates such as emission factors applied to fuel input and average heat rates. In either case, the necessary degree of accuracy, probably plus or minus 10 percent can be achieved.

The time required for data to be publicly available can be considerable. The FERC Form No. 1 data, for instance, is filed in the spring for the prior calendar year. The bulk power database, a very useful compilation of information on power transactions from various forms, is currently available roughly a year after the end of the data year. In January 1997, the 1995 EIA-767 data (generation and estimated air emissions by plant) was not yet available. The quality checks done by the EPA for continuous emissions monitoring data can take six to nine months. An August 1996 EIA report discusses the data compiled from EIA Forms 860 and 861 (on generators and utilities, respectively) and states that "Data for 1993 are available at no charge on the FedWorld electronic bulletin board" (page 27, EIA, August 1996). A lag time of more than two years is probably too long for reasonable use in an environmental disclosure system for electricity customers.

State environmental agencies issue air emission licenses for essentially all stationary sources. These licenses generally require quarterly filings to be made within weeks of the close of each quarter. Emission, fuel use and generation (or a close proxy) information is publicly available from these filings, but there is no national or regional collection system to simplify collation of the information.

3.6. Coverage and Aggregation

The aggregation of transactions is currently only a problem in a very limited number of cases. The bulk power database includes detailed transaction reporting in an unambiguous way. The reporting requirements for power marketers include prices and quantities of electricity bought and sold. However, the quarterly reports of power marketers appear to lump some transactions together, even when they occur in different regions. For example, the report for a transaction between Coastal Electric Services Company and Electric Clearinghouse in the 4th quarter of 1995 lists a single quantity of electricity transacted at three delivery points: Mid Columbia, Palo Verde and PJM (January 30, 1996 letter from Michael A. Woytowich of Coastal Electric Services to Lois D. Cashell, Secretary, FERC). A disclosure system will need information on a disaggregated basis, at least differentiating by region of the country.

Non-utility generators are also significant participants in the nation's electricity supply. Disaggregated data (on generation, fuel use and emissions) for these sources is publicly available only from state environmental agencies.

3.7. Data Confidentiality Issues

Market participants, emphasizing the changing nature of the industry, are increasingly requesting that various data not be provided or, alternatively, be provided under a protective agreement. A recent and very alarming study surveyed state utility commissions and found that requests for trade secret protection for a wide variety of types of data are being routinely granted (Vine, 1996).

Three facts provide some comfort that widespread and broad-based granting of confidential treatment will not persist. First, most if not all of the requests and commission approvals have occurred before commissions began to focus on the need for consumer information to allow competitive markets to operate efficiently. Second, most requests were unopposed, and it appears they were approved more for administrative ease than as a result of a serious examination of trade secret law.

Finally, the essential data for a disclosure system includes historical generation by unit, the emissions and fuel use associated with generating resources and the buyer, seller and quantity of energy for each transaction. The preliminary conclusion of an upcoming report entitled "Full Consumer Disclosure: Confidentiality vs. Public Right to Know" is that the type of information needed for environmental and other consumer disclosure would not be protected by trade secret laws.

Some agencies, most importantly the FERC, has been more reluctant to approve requests for confidential treatment. The FERC considered and rejected utility arguments that the current information filing requirements (including the generation and transaction data necessary for a disclosure system) are unfair and should be cut back for utilities. The FERC decided that it

"will not adopt the suggestion made by a number of commenters that we now eliminate the public disclosure of allegedly competitively sensitive, proprietary, or otherwise confidential data submitted to the Commission on Form No. 1, as well as on other Commission forms. The information that we collect for public utilities is necessary to carry out our jurisdictional responsibilities of cost-based rates subject to our jurisdiction and the operation of power markets...

Accordingly, at this time, we will not change our information reporting requirements. As the industry becomes more competitive, we will monitor our reporting requirements to make sure that they are needed, fair to all segments of the industry, and consistent with the workings of a competitive environment." (pages 631 and 633, FERC, 1996).

The FERC has also recently reaffirmed the public reporting of discount rate information.¹² The Natural Gas Act requires a pipeline company to report certain information to FERC, including a shipper's name and the terms of the shipping contract.¹³ Two pipeline companies objected to this level of disclosure, arguing that it unduly compromised trade secrets. They presented FERC with two options: cease the public disclosure of information that had been included in the discount

¹²FERC Order No. 581-A, issued February 29, 1996.

¹³15 U.S.C. 717c(c).

rate reports filed by regulated gas pipeline companies and substitute customer codes for customer names in order to protect the confidentiality of customer-specific information.

FERC rejected both requests. The discount rate information was found to be necessary to the agency's efforts to prevent discriminatory pricing. Supplying customer names serves a similar purpose of enabling competing shippers to determine whether they are entitled to similar treatment. Thus the FERC concluded that the interests of the emerging competitive markets outweighed the value of keeping the terms of transactions or the identity customers confidential.

3.8. The ISO Role in Disclosure

In many regions of the country, new entities are being created (or existing entities are being modified) to support evolving electric power markets. The types of entities include regional transmission groups, power exchanges and independent system operators (ISO). The details and the roles of the various entities are currently being negotiated and will surely differ by region. In all cases, some entity or combination of entities, will be responsible for the settlement process to make sure all generation is accounted for and billed accordingly. For ease of presentation, we will refer to the entity with this responsibility as the ISO.

Masiello and Willis (1996) summarize the software development requirements for implementation of ISO functions, concluding that "the ISO's task will be an order of magnitude greater than that faced by existing utility control center operators" and will need new software integrating the capability to "track several thousand transactions daily" with "advanced power systems analysis technologies" to insure economical and secure operation of the system.

The ISO software for tracking power transactions could be required to be able to keep track of the original generating source and identify the environmental attributes of electricity at the point of retail sale. This should be built into the institutional mission of the ISO and built into ISO's computational capabilities. Over the next few years, ISOs will be obtaining hardware and software to carry out their system operation mandate. The technical specifications for the software should allow for environmental tracking — even as the details of how the tracking system will work are developed. Retrofitting the environmental tracking system into the software could be much more expensive after a system without the capability has been developed, installed, tested and paid for.

4. Other Disclosure Issues

4.1. Disclosure for Products or Companies?

A fundamental question is whether reporting should be done for particular products or for suppliers. Product disclosure allows a large company with a number of polluting power plants to develop and offer a green product. For example, under a product approach a supplier with a small wind project and 99 percent of its generation from coal could offer two products. One,

amounting to one percent of its output, would be the full output of the wind project with a disclosure statement showing 100 percent renewable sources and zero emissions. The other, would be all coal, with emissions disclosure based the coal plant's performance. With supplier (or company) disclosure, on the other hand, all of the firm's sales would carry a single disclosure label based on the combined operation of the wind and coal plants. Under this approach, all subsidiaries or divisions of the same corporate parent would carry the same disclosure label. In pilots in New Hampshire and Massachusetts, four suppliers provided this type of company disclosure, which is also termed generation profile.

Our review of tracking systems shows that it is possible to report on either a supplier or a product basis, although the likelihood of there being far fewer suppliers than products makes the data requirements simpler for the supplier approach.¹⁴ The examples used in this report nevertheless assume the more complex product approach is used.¹⁵

The main advantage of product disclosure is that it provides a meaningful opportunity for a large, existing company to develop and offer a green project. For example, a large existing company with little or no renewables now would have little incentive to invest in a new renewable technologies under a supplier approach because the renewable source would be too small to have any significant impact on the overall company disclosure statement.

The main policy disadvantage to product disclosure is that it could result in simply allocating clean resources to those customers who preferred it without resulting in any real change in the electricity supply system. For example, if the existing amount of renewable electricity is sufficient to "satisfy the demand" of customers who want renewable electricity, then disclosure

¹⁴If a product approach to disclosure is taken, power contracts must clearly state the source of power, a practice that does not reflect current contracting conventions. Some contracts specify a source, others specify that power is from a system rather than from a particular source, and many are vague. Determining the fuel mix and environmental implications of the many types of contracts may be difficult and subject to some level of internally inconsistent treatment. A reason these problems exist now is that contracts are already included in utility fuel mix and emission reports.

There are also two reasons current practices might change in ways that make the product approach easier. First, current contracting practices take place in an industry in which fuel mix and emission characteristics are less important than they will be when disclosure and full retail competition are in place. Second, in the future to simplify retail disclosure, wholesale sales might be required to specify the associated fuel mix and environmental characteristics at the time of a sale.

¹⁵It may be possible to construct a disclosure system that draws upon both the product and supplier approaches, getting the benefits of each. Disclosure of the fuel mix and key environmental characteristics by all suppliers can be required on a company-wide basis, including affiliates. "Renewable" for purposes of this supplier disclosure requirement might be defined relatively loosely. This can be combined with an optional part of the label for renewables and other green options.

will not encourage the addition of new renewables.¹⁶

4.2. Mandatory vs. Optional Disclosure

Should disclosure be required of all sellers or only those that choose to make environmental claims or otherwise voluntarily disclose? There are many policy arguments on both sides of the question, most of which were argued at length during debates over food, car mileage, appliance labels and disclosure statements for loans and securities. Mandatory disclosure combines consumer desire to be able to compare all supply options with the public policy interest in an informed public.

Some who object to mandatory disclosure argue that it is impossible to track the required information and that disclosure should be limited to those who choose to make environmental claims. Thus, Working Assets, who buys power from NEES and sells power that includes "no nuclear, coal, or Hydro Quebec" or Northfield Energy, a subsidiary of NU, that sells "100 percent hydro" would have to disclose fuel mix and environmental characteristics, but others would not. We have two responses to this approach. First, the FTC and state consumer protection laws require that environmental claims be verifiable and substantiated no matter whether disclosure is mandatory or optional.¹⁷ A tracking system will probably be needed if environmental claims of the type we have seen thus far are to be made by any sellers. Second, to disclose fuel mix and environmental characteristics on a voluntary basis requires the adoption of the same credible, verifiable tracking system that would be needed to support disclosure for all sellers.

Assuming a product approach is used and companies are allowed to sell their green supplies to some customers and their less environmentally-preferred supplies to others, two important considerations arise. Unlike other green products, the nature of electricity means if a supplier sells the green part of its mix to some customers, the remainder of its mix automatically becomes browner. Thus, supplier X may have a system that consists of green and not-so-green supplies. If X heavily markets its green supplies, and shows fuel mix accordingly, and then sells the remainder of its supply without any disclosure whatever, consumers may either believe that all of X's products are green or at least be unaware that X's green resources are no longer part of X's mix. To protect consumers and to reveal to them the status of X's sales of green power, disclosure of all products may be needed.

¹⁶A second possible disadvantage is that a product approach may undermine label credibility if suppliers that are predominantly fossil based market a green product. Consumers might believe that power comes from all of the supplier's plants, not simply a few nominally earmarked for particular customers. This possibility is being tested in consumer research

¹⁷See Federal Trade Commission. *Guides for the Use of Environmental Marketing Claims*. (1996) 16 CFR 260

An important and related issue is the need to assure consumers that the same power is not being sold more than once. For example, if supplier A has 100 kW of "green" power, it should not be able to sell its green power to five different 100 kW customers. Likewise as wholesale sales of "system power" to other suppliers, B should not include any of the same green power already sold at retail. To make sure this is the case, the tracking system would need to account for all sales in a way that can reconcile the sum of the parts, or products, with the whole.

4.3 Disclosure of Wholesale Transitions

Since retail disclosure requires knowing the environmental and fuel profiles of all of the retail supplier's sources, a retail seller needs to know the mix of their wholesale suppliers. The best solution is simply to require all suppliers, wholesale and retail, to disclose their mix.

4.4 Communicating Information to Customers

What should the labels look like and where should they appear? The final answer to both questions must await completion of consumer research, but some lessons can be gleaned from the rich history of food labeling. For example, the format for disclosure should be standardized and designed to allow customers to make easy comparisons between competing suppliers. The information should be conveyed in terms that consumers understand (percentages rather than micrograms), and the information should be provided for only the most important characteristics

Disclosure statements could be made available to customers at key decision points.

Where and how often should consumers receive the information? Customers need the information when they are faced with a buying decision. At a minimum, this means labels should appear in marketing materials and any other solicitations. Because consumers are likely to receive solicitations to switch suppliers and because fuel mix and emission information changes, customers should also receive periodic, perhaps quarterly, reminders and updates.

4.5 Treatment of Energy Efficiency and Offsets

The retail pilot programs show that environmental claims and marketing approaches often include energy efficiency and emissions offsets though other actions, not directly related to generating plants. For example, a firm might offer to plant enough trees to offset carbon dioxide emissions of their power plants. Should the disclosure labels simply reflect the emissions from generation or should the effects of energy efficiency and offsets be netted out?

For this report we focus on a disclosure and labeling system that ties retail electricity sales to generation, reporting physical attributes of that generation mix. It may be possible to include these offset options in labels, but the need to act quickly caused us to focus first on electricity sales. Clearly, firms should be at liberty to market and report energy efficiency, retirement of SO₂ emission credits, procurement of CO₂ offsets and other "environmental currency."

4.6. Timing Issues

How often should disclosure figures be recalculated? Fuel mix and emissions levels change constantly. As a practical matter, annual data, updated quarterly is probably as frequent as needed.

How often should customers receive disclosure information? Disclosure at the time of signing on with a supplier is a necessary first step. After that, suppliers could periodically notify customers of the availability of updates.

Should the information disclosed be historic or prospective? The simpler approach might be to base disclosure on actual performance in a recent historical period. The example used in this report assumes disclosure is based on periodically updated historical data.¹⁸

4.7. Enforcement

We do not expect enforcement of disclosure requirements to involve a large regulatory commitment. In the first instance, electricity suppliers should be responsible for determining and reporting their disclosure information, much as food suppliers are responsible for the "Nutritional Facts" labels affixed to most food items. There may be a role for a government or independent entity, such as the ISO, to monitor and spot check the information. In most, if not all cases, this could be done using information which is already being reported to various government agencies such as FERC, EPA and EIA.

5. Conclusion

Can we trace electrons or kWh from source to delivery? No.

Can we trace dollars? Yes. In fact, if we cannot trace dollars, we cannot have a competitive electricity market.

Can established dollar tracing methods be used to give consumers meaningful information about and control over the environmental consequences of their purchase decisions? Yes, but with the understanding that the information may not be 100 percent precise when viewed in the very short run (hours). When customers chose a particular supplier, they are, in essence, deciding which firm they will pay for their electricity. In making that decision, they are deciding how much and

¹⁸While this might be adequate in most cases, there will be circumstances where a supplier's resource mix changes dramatically, for example due to the construction of new resources and/or the retirement of existing plants. Simple hybrid approaches can be designed to address this. A firm could base its disclosure on a prior year's actual data, but could, as an option, use its own projections. However, if the actual results were much worse than its projections, it might be required to notify consumers or be subject to a penalty of some kind.

what type of resources the firm will need to own or purchase to provide that service. The link between the purchase decision and environmental consequences is clear.

Is it practical to give consumers information? Yes. Giving consumers fuel mix and emission information is clearly practical if the information is aggregated and averaged over months or a year. Depending on the precise form of future pools, ISOs and settlement processes information, it may be practical to provide the information on a more timely basis.

Finally, what are the most important next steps? There are at least three:

- 1) State commissions, particularly those considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional workgroups to identify local implementation options and issues. Input should be gathered from a broad cross section of stakeholders.
- 2) Federal and state commissions should carefully assess the extent to which the public interest in full disclosure outweighs requests for trade secret status
- 3) Federal and state commissions should recognize that the formative stages of new market institutions, such as ISOs, are the best times to examine how operations can efficiently improve consumer access to key information.

Appendix A

NARUC Resolution

**RESOLUTION IN SUPPORT OF CUSTOMER "RIGHT-TO-KNOW"
AND PRODUCT LABELING
STANDARDS FOR RETAIL MARKETING OF ELECTRICITY**

WHEREAS, at least 30 million consumers in six states will begin choosing among competitive electricity providers in early 1998 and retail access to competing electricity suppliers is under consideration in many other states; and

WHEREAS, electricity purchases make up a significant portion of the budget of many households;

WHEREAS, the production of electricity imposes very substantial environmental impacts; and

WHEREAS, pilot retail access programs have shown that customer confusion and misleading claims are highly likely; and

WHEREAS, clear and uniform disclosure will promote efficiency through informed product comparisons; and informed customer choice cannot occur in a retail electricity market without full disclosure of all relevant and important facts; and

WHEREAS, the desirability and feasibility of such disclosure is clearly established in nutrition labeling, uniform food pricing, truth-in-lending and many other federal consumer protection programs; and

WHEREAS, the National Association of Regulatory Utility Commissioners (NARUC) at its November, 1994 meeting adopted a resolution on competition and stranded benefits calling for new proposals to preserve environmental and diversity benefits in a more competitive marketplace; and

WHEREAS, The NARUC at its July, 1996 meeting adopted principles to guide the restructuring of the electric utility industry which included market-based mechanisms to promote effective consumer choice and to preserve renewable resources, resource diversity, and environmental protection; now therefore be it

RESOLVED, that The National Association of Regulatory Utility Commissioners (NARUC), convened at its 108th Annual Convention in San Francisco, California believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and be it further

RESOLVED that the NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and be it further

RESOLVED that the NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.

Appendix B

Equations for Attributing Emissions and Fuel Mix to Retail Sales

Balancing Equations:

Producer total generation

$$G_p = \sum_g P_{p,g}$$

Producer sales; internal and wholesale

$$I_{p,r} = G_p - \sum_{r(p)} W_{p,r}$$

Retailer sales; from internal and wholesale sources

$$S_r = (1 - L_{r,r}) I_{p,r} + \sum_{p(r)} (1 - L_{p,r}) W_{p,r}$$

Environmental Equations:

Producer emission factors

$$PE_{p,e} = (\sum_g E_{p,e,g} P_{p,g}) / G_p$$

Retailer emission factors

$$RE_{r,e} = (PE_{r,e} I_{p,r} + \sum_{p(r)} PE_{p,e} W_{p,r}) / S_r$$

Producer fuel mix

$$PF_{p,f} = (\sum_g F_{p,f,g} P_{p,g}) / G_p$$

Retailer fuel Mix

$$RF_{r,f} = (PF_{r,f} I_{p,r} + \sum_{p(r)} PF_{p,f} W_{p,r}) / S_r$$

Variables:

$E_{p,e,g}$	Emission factor of type e for generating facility g of producer p
$F_{p,f,g}$	Fuel fraction of type f for generating facility g of producer p
G_p	Total generation for producer p
$I_{p,r}$	Internal company sales
$L_{p,r}$	Loss factor associated with transfers from p to r
$P_{p,g}$	Production from generating facility g of producer p
$PE_{p,e}$	Producer average emission factor
$RE_{r,e}$	Retailer average emission factor
$PF_{p,f}$	Producer average fuel mix factor
$RF_{r,f}$	Retailer average fuel mix factor
S_r	Retailer r sales
$W_{p,r}$	Wholesale sales from producer p to retailer r

Subscripts:

e	Environmental impact category (e.g. SOx, NOx, CO2. ...)
f	Fuel type (e.g. Coal, Oil, Gas, Hydro, Nuclear, ...)
g	Generating facility
p	Producer
r	Retailer (p=r means same company)

Appendix C Available Data

Environmental Data

Data on air emissions from power plants is measured by utilities using continuous emissions monitoring systems (CEMS). This data is collected by the EPA and entered into the EPA's emission tracking system (ETS). The coverage of power plants is good. A "complete" database should be available for 1996, omitting only units less than 25 MW and some cogenerators and independent power producers. The EPA conducts quality control checks, summarizes the information and makes it available on the Internet. The EPA has developed specific technical rules for continuous emissions monitoring including the treatment of missing data, record keeping, quality assurance and reporting (40 CFR Parts 9, 72, and 75, *Federal Register*, Volume 60, No. 95, May 17, 1995). The data include emissions of SO₂, NO_x, and CO₂, as well as the heat input of the fuel used. Sources of information on emissions data include EPA reports (EPA, 1995, and personal communication with Richard Morgan, Manager, Utility Regulatory Program, Acid Rain Division, US EPA).

There is also a voluntary program for reporting greenhouse gas emissions. While 12 of the 15 highest emitting utilities reported their CO₂ emissions for 1995, the overall coverage of this program is poor, with reported utility CO₂ emissions at only 43 percent of estimated national total electric utility CO₂ emissions (EIA, July 1996).

A great deal of environmental information is available at the state level. Any facility, utility or non-utility, requiring an air emission licence reports all major emissions and fuel input. The data generally reported quarterly, within a few weeks of the close of a quarter.

Generation and Fuel Use Data

The EIA collects and publishes data on electric power plants in the US, specifying the owner, capacity, fuel type and other parameters. Form EIA-860, collected on an annual basis from 900 electric utilities, is summarized and made available in print (EIA, October 1995) or electronic form (<http://www.eia.doe.gov>). Information specifically on renewable generation is published by the EIA in its Renewable Energy Annual (EIA, December 1995) and in the Renewable Electric Project Information System (REPIS) developed by the National Renewable Energy Laboratory

(described in Appendix DISCO of EIA, December 1995). A key limitation of these sources appears to be that they focus upon capacity and do not provide figures for energy generation.

The EIA also collects a great deal of information on fuel use for power generation, most notably the Uranium Industry Annual Survey (Form EIA-858), the Monthly Report of Cost and Quality of Fuels for Electric Plants (Form FERC-423), EIA Form -860 The Annual Electric Generator Report, EIA-759 The Monthly Power Plant Report, and the Annual Report of Major Electric Utilities, Licensees, and Others (Form FERC-1). A private company summarizes key data from the FERC-1 and offers the information for sale on disk (see, for example, UDI, 1996).

A useful summary of data for steam generators in the U.S. is the EIA-767. This is collected annually from 893 respondents and includes information on generators, including owner, generation by unit, fuel use by type and boiler, boiler efficiency, in-service year, emissions control equipment and air emissions. This data is available on disk from the EIA.

Data on generation from plants that are not owned by electric utilities is collected from 1400 non-utility power producers on Form EIA-867. This data includes capacity, fuel use and generation. It is made available only in highly aggregated form (e.g., on a state-level) and so is not very useful for an environmental disclosure system.

Data is also available at the state level. Any generator requiring an air emission license reports fuel input data from which generation can be estimated. In addition, if IPPs or QFs sell to regulated utilities, monthly generation and payments may be available in reports to PUCs.

Electricity Transaction Data

Data on wholesale electricity transactions is collected on seven different forms:

- FERC Form 1 — Annual Report of Major Electric Utilities, Licensees and Others
- FERC Form 1-FERC — Annual Report of Nonmajor Public Utilities and Licensees
- Form EIA-412 — Annual Report of Public Electric Utilities
- Form EIA-861 — Annual Electric Utility Report
- Form FE-781R — Annual Report of International Electrical Export/Import Data

- REA Form 7 — Financial and Statistical Reports (Electric Distribution Borrowers)
- REA Form 12 — Financial and Statistical Reports (Electric Power Supply Borrowers and Electric Distribution Borrowers with Generating Facilities)

The EIA summarizes this information and publishes it in printed form (Electric Trade in the United States 1992, EIA September 1994). Even better, the electronic version of this data is available on-line and with standard EIA codes for companies that make it possible to link the transaction database with other EIA data (e.g., Form EIA-860).

The wholesale electric trade data, also sometimes referred to as the bulk power trade data, is comprehensive, even redundant in its coverage. For most transactions, it has information reported by both the buyer and the seller, providing an opportunity to check for consistency. Transactions are identified as exchanges, purchased power, sales for resale or wheeling. The main limitation on the usefulness of the trade data is that it takes a year or more for the EIA to pull the database together.

Another potentially useful source of information on power transactions is the FERC Form No. 714, the "Annual Electric Control and Planning Area Report." This includes identification of generating plants in the control area, monthly aggregate outages, monthly loads and transactions, hourly loads and marginal costs. The hourly information is provided in electronic form. The high level of aggregation (control areas such as PJM, NYPP and NEPOOL are made up of many companies) makes this data unsuitable as a basic source of information for disclosure. The control area data may, however, be useful as a supplementary source, perhaps for assigning attributes to imported power from a neighboring control area that is not functioning under the same disclosure protocols.

Finally, power marketers, whose numbers are increasing rapidly, file their transaction information in quarterly power marketer reports to FERC. It seems likely that over time, the information filing requirements for power marketers and for utilities will converge. A standardized requirement for monthly or quarterly reporting would probably work better for environmental disclosure than annual reporting.

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