COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF WATER SERVICE CORPORATION OF KENTUCKY FOR A GENERAL ADJUSTMENT IN EXISTING RATES	))))	CASE NO. 2020-00160

NOTICE OF FILING

Notice is given to all parties that the following materials have been filed into the record of this proceeding:

- The digital video recording of the evidentiary hearing conducted on November 12, 2020 in this proceeding;

- Certification of the accuracy and correctness of the digital video recording;

- All exhibits introduced at the evidentiary hearing conducted on November 12, 2020 in this proceeding;

- A written log listing, inter alia, the date and time of where each witness' testimony begins and ends on the digital video recording of the evidentiary hearing conducted on November 12, 2020.

A copy of this Notice, the certification of the digital video record, and hearing log have been served upon all persons listed at the end of this Notice. Parties desiring to view the digital video recording of the hearing may do so at https://youtu.be/WRk4zPuzMFY.

Parties wishing an annotated digital video recording may submit a written request by electronic mail to pscfilings@ky.gov. A minimal fee will be assessed for a copy of this recording.

Done at Frankfort, Kentucky, this 10th day of December 2020.

Linda C. Bridwell
Executive Director
Public Service Commission of Kentucky

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In the Matter of:

ELECTRONIC APPLICATION OF WATER SERVICE CORPORATION OF KENTUCKY FOR A GENERAL ADJUSTMENT IN EXISTING RATE	)))	CASE NO. 2020-00160

CERTIFICATION

I, Candace H. Sacre, hereby certify that:

1. The attached DVD contains a digital recording of the Formal Hearing conducted in the above-styled proceeding on November 12, 2020. The Formal Hearing Log, Exhibits, and Exhibit List are included with the recording on November 12, 2020;

2. I am responsible for the preparation of the digital recording;

3. The digital recording accurately and correctly depicts the Formal Hearing of November 12, 2020; and

4. The Formal Hearing Log attached to this Certificate accurately and correctly states the events that occurred at the Formal Hearing of November 12, 2020, and the time at which each occurred.

Signed this 8th day of December, 2020.

Candace H. Sacre
Administrative Specialist III

Stephanie Schweighardt
Notary Public State at Large ID#: 614400
Commission Expires: January 14, 2023

Session Report - Detail

2020-00160 12Nov2020

Water Service Corporation of Kentucky (Water Service Kentucky)

Date:	Type:	Location:	Department:
11/12/2020	Public Hearing\Public Comments	Hearing Room 1	Hearing Room 1 (HR 1)

Witness: Baryenbruch; Perry Brown; Dickson; Shawn Elicegui; Robert Guttormsen; Lane Kollen; Steven Lubertozzi; Shannon Payne; Stephen Vaughn
Judge: Kent Chandler; Talina Mathews; Michael Schmitt
Clerk: Candace Sacre

Event Time	Log Event	
9:08:24 AM	Session Started	
9:08:29 AM	Chairman Schmitt	
	Note: Sacre, Candace	Opening of record in Case No. 2020-00160, Electronic Application of Water Service Corporation of Kentucky for a General Adjustment in Existing Rates.
9:08:47 AM	Chairman Schmitt	
	Note: Sacre, Candace	Michael Schmitt, Chairman of Public Service Commission, presiding today.
9:08:53 AM	Chairman Schmitt	
	Note: Sacre, Candace	Introduction of Vice Chairman Kent Chandler and Dr. Talina Mathews, joining by videoconference.
9:09:01 AM	Chairman Schmitt	
	Note: Sacre, Candace	General videoconferencing and COVID recommendations.
9:11:05 AM	Chairman Schmitt	
	Note: Sacre, Candace	Purpose of hearing today taking evidence on Water Service Kentucky's Application for a Rate Adjustment.
9:11:13 AM	Chairman Schmitt	
	Note: Sacre, Candace	Counsel for parties to introduce themselves, their clients, and witnesses to testify, beginning with Water Service Kentucky.
9:11:29 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Todd Osterloh, along with Jim Gardner, Sturgill Turner Barker and Maloney, 333 West Vine St Ste 1500, Lexington KY 40507, representing Water Service Corporation of Kentucky, Applicant, and witnesses Shawn Elicegui, Patrick Baryenbruch, Perry Brown, Andrew Dickson, Robert Guttormsen, Stephen Vaughn, and Steven Lubertozzi.
9:12:07 AM	Chairman Schmitt	
	Note: Sacre, Candace	Office of Attorney General?
9:12:19 AM	Asst Atty General Goad	
	Note: Sacre, Candace	Angela Goad, Attorney General's Office, Mr. Lane Kollen testifying.
9:12:32 AM	Chairman Schmitt	
	Note: Sacre, Candace	City of Clinton?
9:12:34 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Mary Potter, City of Clinton, 113 North Washington St, Clinton KY 42031, one witness today, Shannon Payne.
9:12:56 AM	Chairman Schmitt	
	Note: Sacre, Candace	For Staff?
9:12:58 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Brittany Koenig, Commission Staff.

9:13:02 AM	Chairman Schmitt	
	Note: Sacre, Candace	Notice given and evidence filed.
9:13:19 AM	Chairman Schmitt	
	Note: Sacre, Candace	Proceeding opened for public comment, no callers.
9:14:53 AM	Chairman Schmitt	
	Note: Sacre, Candace	Outstanding confidentiality motion discussed.
9:15:51 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh, first witness?
9:15:56 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Presentation first two witnesses Mr. Gardner.
9:16:01 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Gardner?
9:16:11 AM	Atty Gardner Water Service Kentucky	
	Note: Sacre, Candace	Shawn Elicegui.
9:16:15 AM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
9:16:26 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Gardner, you may ask.
9:16:30 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Direct Examination. Name?
9:16:35 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Business address?
9:16:47 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Title?
9:16:56 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Prepare/filed written testimony?
9:17:03 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?
9:17:09 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Asked same questions, answers be same?
9:17:20 AM	Atty Gardner Water Service Kentucky - witness Elicegui	
	Note: Sacre, Candace	Adopt testimony and Responses?
9:17:28 AM	Atty Gardner Water Service Kentucky	
	Note: Sacre, Candace	May ask.
9:17:30 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
9:17:32 AM	Asst Atty General Goad	
	Note: Sacre, Candace	Yes, thank you.
9:17:34 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Cross Examination. Direct testimony, footnote 1, no page number, Corix Regulated Utilities, Inc., previously known Utilities, Inc. changed name in 2019?
9:17:58 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Footnote 1, also stated, Corix Regulated Utilities, Inc., owns company's outstanding stock; refer to company, Water Service Kentucky?
9:18:26 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Discovery Responses, stated Corix Regulated Utilities (US) Inc., does not own stock Utilities, Inc.; Utilities, Inc. changed name, Corix Regulated Utilities (US) Inc., entity formerly known as Utilities, Inc.?
9:19:00 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Why continuously referred to as Utilities, Inc.?

9:19:29 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Response to discovery, June 30, 2020, Water Service Kentucky 1000 shares common stock, 100 issued/outstanding, Corix owned issued/outstanding?
9:20:01 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Issuing other shares?
9:20:18 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Testimony SME-1, US Organization Chart, parent company of Water Service Kentucky on chart?
9:21:16 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Top of chart, Corix Infrastructure Inc., parent company Water Service Kentucky?
9:21:26 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Infrastructure Inc. headquarters located?
9:21:42 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Infrastructure Inc. large, medium, small company?
9:21:55 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Under Corix Infrastructure Inc. says Corix Infrastructure (US) Inc., how affiliated with Water Service Kentucky?
9:22:34 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Infrastructure (US) Inc., headquarters located?
9:22:44 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Infrastructure (US) Inc., large, mid-size, small company?
9:23:11 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Inland Pacific Resources, how affiliated Water Service Kentucky?
9:23:32 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Utilities (Illinois) LLC, how connected Water Service Kentucky?
9:23:53 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Hydro Star, LLC, Hydro Star Holdings Corporation, how connected Water Service Kentucky?
9:24:08 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Corix Regulated Utilities (US) Inc., how connected Water Service Kentucky?
9:24:24 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Offshoot of that Water Service Corporation, how connected Water Service Kentucky?
9:24:59 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Under corporate structure, 35 companies listed?
9:25:10 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	WSK one of 35?
9:25:17 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	How all companies connected to/affiliated WSK?
9:25:47 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Review Kollen testimony?
9:25:59 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Aware Kollen referenced Public Service Commission South Carolina decision granting 7.46 ROE?
9:26:18 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Name of water company?
9:26:27 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Organization chart, Blue Granite Water Company listed?
9:26:42 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Blue Granite affiliate/sibling/sister company Water Service Kentucky?

9:26:54 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	File testimony Blue Granite case?
9:27:02 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Read Lubertozzi rebuttal testimony pending case?
9:27:11 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Lubertozzi, Kollen mentions ROE granted in SC, relevance to this case? Stated no, on appeal. Why Lubertozzi/Water Service Kentucky not mention Blue Granite sister company?
9:28:08 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Think pertinent information to Kentucky Commission?
9:28:24 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Lubertozzi/you offered more information about Blue Granite case Kollen cited?
9:28:37 AM	Atty Gardner Water Service Kentucky	
	Note: Sacre, Candace	Object, Lubertozzi witness.
9:29:01 AM	Chairman Schmitt	
	Note: Sacre, Candace	Sustained.
9:29:02 AM	Asst Atty General Goad	
	Note: Sacre, Candace	Will rephrase.
9:29:03 AM	Asst Atty General Goad - witness Elicegui	
	Note: Sacre, Candace	Why not file rebuttal testimony since filed testimony in Blue Granite and given PSC more info on case?
9:29:23 AM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
9:29:27 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
9:29:30 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Thank you.
9:29:36 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Cross Examination. Define mid-sized?
9:30:07 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Billion with a B?
9:30:13 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Response on chart, Corix Infrastructure Inc. in blue, all companies under in orange, no employees?
9:30:44 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Next, in red, Corix Regulated Utilities US, employees?
9:30:58 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Direct testimony, what each group renders to Water Services, Inc., Question Q-21, financial services Corix provided WSC, who is doing that?
9:31:52 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Asked who has employees, none of orange companies, contract out?
9:32:53 AM	Atty Potter City of Clinton - witness Elicegui	
	Note: Sacre, Candace	Companies look like children of grandparents, family talking about?
9:33:33 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Don't think have further.
9:33:38 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
9:33:40 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Thank you.
9:33:51 AM	Staff Atty Koenig PSC - witness Elicegui	
	Note: Sacre, Candace	Cross Examination. Something happen different recently WSK claim costs from parent company?

9:34:54 AM	Staff Atty Koenig PSC - witness Elicegui	
	Note: Sacre, Candace	Tier allocation cost allocation manual developed 2018, always existence services, provided were not charged?
9:35:29 AM	Staff Atty Koenig PSC - witness Elicegui	
	Note: Sacre, Candace	Decision Corix Infrastructure Inc., who made decision?
9:36:04 AM	Staff Atty Koenig PSC - witness Elicegui	
	Note: Sacre, Candace	Services customers/ratepayers Kentucky receiving WSK never changed?
9:37:21 AM	Staff Atty Koenig PSC - witness Elicegui	
	Note: Sacre, Candace	Services not replicated, services same as always, now just charging?
9:38:57 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No further.
9:39:00 AM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
9:39:04 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.
9:39:05 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Examination. Said two major business functions sold, what entities?
9:39:24 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Corix Infrastructure Inc. allocates percentage costs to subsidiaries?
9:39:37 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Agreement/cost allocation manual charging WSK in 2018, filed with Commission prior to allocated/charged?
9:40:58 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Responses nothing changed services provided but now charge, agreement allowed services procurred. Procurred begin with?
9:41:53 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Benefit WSK have ability parent company acquire debt from market?
9:42:18 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Debt related to capital available for WSK to invest?
9:42:26 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	WSK net investment rate base gone down, WSK not investing capital, what benefit from debt issuance?
9:43:10 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	CII no longer taking conservative approach?
9:43:47 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	CII could have attempted allocate costs to WSK prior 2018?
9:44:28 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Agree conservative approach, messy, allocate costs between regulated/unregulated?
9:44:48 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Costs reduced sold two business lines started allocating costs to subsidiaries?
9:46:29 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Portion CII revenue two business lines represent?
9:47:04 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	May ask in post-hearing request.
9:47:05 AM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	VICE CHAIRMAN CHANDLER - WITNESS ELICEGUI
	Note: Sacre, Candace	PORTION OF CII REVENUE TWO SOLD BUSINESS LINES REPRESENT
9:47:12 AM	Vice Chairman Chandler - witness Elicegui	
	Note: Sacre, Candace	Purpose intermediary holding companies?

9:47:19 AM	Vice Chairman Chandler - witness Elicegui		
	Note: Sacre, Candace	Other than tax basis, purpose intermediary holding companies?	
9:47:53 AM	Vice Chairman Chandler - witness Elicegui		
	Note: Sacre, Candace	How many taxable entities, how many pass through, mixture?	
9:48:12 AM	Vice Chairman Chandler - witness Elicegui		
	Note: Sacre, Candace	WSK file taxes consolidated or stand-alone basis?	
9:48:28 AM	Vice Chairman Chandler - witness Elicegui		
	Note: Sacre, Candace	Taxable entities could represent pass-through cost to subsidiaries like WSK?	
9:48:49 AM	Vice Chairman Chandler - witness Elicegui		
	Note: Sacre, Candace	Intermediary companies taxable entities, represent cost to WSK?	
9:49:17 AM	Vice Chairman Chandler		
	Note: Sacre, Candace	All questions.	
9:49:19 AM	Chairman Schmitt		
	Note: Sacre, Candace	Dr. Mathews?	
9:49:23 AM	Commissioner Mathews		
	Note: Sacre, Candace	Not have any.	
9:49:25 AM	Chairman Schmitt		
	Note: Sacre, Candace	Have none. Mr. Gardner?	
9:49:33 AM	Atty Gardner Water Service Kentucky		
	Note: Sacre, Candace	No further.	
9:49:36 AM	Chairman Schmitt		
	Note: Sacre, Candace	Witness be excused?	
9:49:43 AM	Chairman Schmitt		
	Note: Sacre, Candace	Excused, step down.	
9:49:49 AM	Chairman Schmitt		
	Note: Sacre, Candace	Next witness?	
9:49:53 AM	Atty Gardner Water Service Kentucky		
	Note: Sacre, Candace	Patrick Baryenbruch.	
9:49:58 AM	Chairman Schmitt		
	Note: Sacre, Candace	Witness is sworn.	
9:50:27 AM	Chairman Schmitt		
	Note: Sacre, Candace	Mr. Gardner?	
9:50:29 AM	Atty Gardner Water Service Kentucky		
	Note: Sacre, Candace	Thank you.	
9:50:30 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Direct Examination. Name?	
9:50:36 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Business address?	
9:50:47 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Title?	
9:50:54 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Prepare/filed written testimony?	
9:51:01 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?	
9:51:08 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Asked same questions, answers be same?	
9:51:18 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch		
	Note: Sacre, Candace	Adopt testimony and Responses?	
9:51:25 AM	Atty Gardner Water Service Kentucky		
	Note: Sacre, Candace	May ask.	
9:51:27 AM	Chairman Schmitt		
	Note: Sacre, Candace	Ms. Goad?	

9:51:29 AM	Asst Atty General Goad	
	Note: Sacre, Candace	No questions.
9:51:32 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
9:51:37 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No questions.
9:51:40 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
9:51:42 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes.
9:51:43 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	Cross Examination. Direct testimony, comparing positions allocation to Corix and hourly prices similar positions. Process positions and tasks not duplicated?
9:54:32 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	If comparision year earlier, comparing to free? Can't get lower than that?
9:55:08 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	Established decision made at Corix Infrastructure Inc. level?
9:55:28 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	No Water Service Corporation employees peforming same services?
9:57:12 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	Compared outside cost, half cost outside source. Where numbers?
9:58:12 AM	Staff Atty Koenig PSC - witness Baryenbruch	
	Note: Sacre, Candace	Comparable areas Kentucky services provided in Kentucky, publicly available hourly information?
9:59:46 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No further.
9:59:49 AM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
9:59:54 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.
9:59:56 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Examination. Assessment performed for WSK, performed other companies
10:00:26 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	On behalf of company?
10:00:33 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Look at necessity of services and reasonableness of charges?
10:00:44 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Testimony, eight core questions, understand what referring to?
10:01:02 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Methodology, for company, provide example found services provided by utility, situations found other utilities to answer negative?
10:03:20 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 1, answered negative before?
10:04:17 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 2, affirmative?
10:04:34 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Previous other utilities, answered negative?
10:04:45 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 3, answered negative?
10:05:08 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Previous other utilities, answered affirmative?

10:05:46 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Ever found duplicative to point not recoverable?
10:06:01 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 4, answered affirmative?
10:06:19 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Previous other utilities, answered negative?
10:07:43 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Test year charges, affirmative. Previous other utilities, answered negative?
10:08:44 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Out of line, operating company no employees, all services performed by parent affiliate, more expensive?
10:10:14 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Overall cost more but not cost specific services?
10:10:55 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Cost per service is comparable, what question asked?
10:11:28 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Hypothetical accountant, operating company no worse off?
10:12:11 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Paying same service provided?
10:12:23 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 5.
10:13:14 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Methodology, lead to alternative answer Question 5, metric variable of calculation affected by services performed by service company?
10:14:45 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Answered negative, inordinate number tasks service companies compared peers, not lead to WSC answered in negative?
10:17:43 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Only instance negative, no employees?
10:18:03 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 6, answered affirmative, asking on a per-service rather than overall basis?
10:19:22 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Answered affirmative?
10:19:31 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Experience other entities found to be not the case?
10:21:18 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	In-house legal costs higher outside counsel, recommend adjustment?
10:21:48 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Question 7, answer that affirmative?
10:22:22 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Negative before other utilities?
10:22:42 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Says comparable, use of word beneficial, describe as comparable, standard deviation, neighborhood, purely average?
10:23:28 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Made determination, any utilities engaged you, costs not comparable as relates to question?
10:24:38 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Comparably same definition as in Question 7?
10:26:36 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Make sure no most favored nation?

10:26:47 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	How answer this case, equitably distributed amongst operating companies?
10:27:50 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Which pages PLB-2?
10:28:43 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	How this show calculation?
10:29:46 AM	Camera Lock Video Conference Activated	
10:31:39 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Allocation correlates to percentage of customers WSK compared other either operating company's customers or companies receiving allocated costs?
10:31:44 AM	Camera Lock Deactivated	
10:33:15 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Test on other metrics Corix operating companies difference in ERCs?
10:34:38 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Absolute percent difference what you look at?
10:35:19 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Average percent difference 1.3 percent?
10:35:28 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Skewed by one data point absolute differentiation over 50 percent?
10:35:44 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Use one percent as determination what is reasonable absolute percentage basis?
10:37:24 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Other questions attempt indicate necessity services and reasonableness of charges relative other entities same/similar or same or similar outside. Question 8, absolute basis or relative basis whether answer question affirmative or negative?
10:38:38 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	How determine reasonableness?
10:39:11 AM	Vice Chairman Chandler - witnes Baryenbruch	
	Note: Sacre, Candace	Determine very close, how know .9 percent very close?
10:41:07 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Benefit other data points?
10:41:19 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Dozens of other utilities on exhibit.
10:41:55 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Wanting Commission WSK allocation good because .9 percent off or allocation cost to Kentucky reasonable in line allocation other operating companies?
10:42:41 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	This is a tie of CII allocation of shared costs/shared services?
10:43:01 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Left-hand column cutting pie on equivalent residential customer basis, middle columns cutting pie based on dollar allocation each operator?
10:43:23 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Third column percentage difference first column and second column?
10:43:35 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Trying prove in Exhibit reasonable difference in two metrics as relates to Water Service or difference between them as relates all other slices of pie?

10:44:15 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Relative test relative to other operating companies of CII?
10:44:49 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Majority differences vast number data points 76 out of 80 operating companies, less than one percent difference ERC basis and dollar basis?
10:45:18 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Water Service paying more because entity likeTammimment, Line 319, per customer basis/ECR only allocated 1.3 percent, less than half in dollars denominated amounts than ERC equivalent?
10:47:27 AM	Vice Chairman Chandler - witness Baryenbruch	
	Note: Sacre, Candace	Close to each other or close individually?
10:47:50 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	All questions.
10:47:52 AM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
10:47:56 AM	Commissioner Mathews	
	Note: Sacre, Candace	Not have any.
10:48:00 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Gardner?
10:48:03 AM	Atty Gardner Water Service Kentucky	
	Note: Sacre, Candace	Thank you, one general.
10:48:10 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Redirect Examination. Prepared studies in over 100 cases?
10:48:22 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Not first time before Commission?
10:48:29 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Not first time respect WSK?
10:48:39 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Testified how many times?
10:48:53 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Modify methodology to satisfy Commission's requirements?
10:51:20 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Last year, testimony Kentucky American Water?
10:51:34 AM	Atty Gardner Water Service Kentucky - witness Baryenbruch	
	Note: Sacre, Candace	Commission not give directions modify study facts, accepted study?
10:52:20 AM	Atty Gardner Water Service Kentucky	
	Note: Sacre, Candace	All have, thank you.
10:52:23 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Chandler?
10:52:28 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
10:52:30 AM	Staff Atty Goad OAG	
	Note: Sacre, Candace	No, thank you.
10:52:31 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No, thank you.
10:52:31 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
10:52:35 AM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?
10:52:38 AM	Chairman Schmitt	
	Note: Sacre, Candace	Excused, thank you.
10:52:41 AM	Chairman Schmitt	
	Note: Sacre, Candace	Break, back at five minutes after 11.

10:52:53 AM	Session Paused	
11:06:52 AM	Session Resumed	
11:07:10 AM	Chairman Schmitt	
	Note: Sacre, Candace	Back on record.
11:07:13 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh, next witness?
11:07:18 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Perry Brown.
11:07:21 AM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
11:07:23 AM	Camera Lock Deactivated	
11:07:35 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
11:07:37 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Thank you.
11:07:38 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Direct Examination. Name?
11:07:42 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Business address?
11:07:53 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Title?
11:07:58 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Prepare/filed written testimony?
11:08:03 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?
11:08:10 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Asked same questions, answers same?
11:08:17 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Adopt testimony and Responses?
11:08:25 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Available for cross.
11:08:28 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
11:08:31 AM	Staff Atty Goad OAG	
	Note: Sacre, Candace	Few, thank you.
11:08:33 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Cross Examination. Explain Fusion Project?
11:08:58 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Check discovery, sponsored discovery request?
11:09:41 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Price Fusion Project?
11:09:54 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	AG Second Request for Information, Question 25(a), did sponsor answers Fusion questions AG had, time to look at that?
11:10:27 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Have with you?
11:11:12 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Total cost Fusion Project?
11:11:33 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Changed since discovery Response?
11:11:43 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Elaborate, why changed?
11:12:09 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	More than $14,290,000 than stated in Responses?

11:12:33 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Take place of another computer system?
11:13:11 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	How much WSK forced to pay Fusion Project?
11:13:28 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Exact number, refer 25(b)?
11:13:54 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Number change based on ERCs?
11:14:10 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Number go up?
11:14:29 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	In test year?
11:14:34 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Go up in future?
11:14:38 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	When know how much project cost?
11:14:48 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Won't know how much actually allocated Water Service Kentucky until know project cost?
11:15:01 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Responses asserted Commission denied recovery Project Phoenix and J. D. Edwards costs?
11:15:16 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Why WSK requesting include expenses Project Phoenix and J. D. Edwards?
11:15:48 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Believe inluding costs complies prior Commission decisions?
11:16:09 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Response stated Commission denied recovery costs Project Phoenix and J. D. Edwards, recall?
11:16:24 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Requesting certain expenses included?
11:16:34 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	How including costs compliant?
11:16:57 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Why WSK requesting expenses included?
11:17:14 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Confirm WSK erroneously included preventative maintenance/repair costs Middlesboro hydrants pending case?
11:17:28 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Monetary amount removed revenue request?
11:17:42 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Refer AG Second Request for Information, Question 42(b), take your time.
11:18:31 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Response, stated erroneous inclusion of hydrant maintenance produce revenue $26,585? AG Second Question 39 subpart (c).
11:19:00 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Agree based on error WSK should reduce request $26,585?
11:19:23 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Confirm WSK erroneously included vehicles depreciation expense already fully depreciated?
11:19:34 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Total removed from revenue requirement associated with error?

11:19:50 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Refer AG Second Request Question 40 subpart (c).
11:20:19 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Confirm removal depreciation expense revenue reduction $101,230?
11:20:31 AM	Asst Atty General Goad - witness Brown	
	Note: Sacre, Candace	Agree erroneously included and be removed?
11:20:36 AM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
11:20:39 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
11:20:41 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Yes, thank you.
11:20:45 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Cross Examination. Comparison other companies, what comparing?
11:21:18 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	What number be using?
11:21:33 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Customers Water Services have?
11:21:49 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Said 2500 customers, go up to10,000 customers, be range?
11:22:23 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Companies that do annual reports?
11:22:29 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Water companies that do annual reports?
11:22:36 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Not include city owned?
11:22:56 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	25 companies?
11:23:00 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Refer to distribution chart, direct testimony answer Question 12, what that means, bell curve?
11:23:56 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Cost of waiver Water Services 68 percent cost of every company?
11:24:33 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	67 percent cheaper and 34 percent higher?
11:24:57 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Question 14 direct testimony, what reimbursement?
11:25:25 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Nothing to do with fees customers pay, different category?
11:25:45 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Question 16, lose customers, less work, less maintenance?
11:26:48 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Hypothetical, investments in my city?
11:27:36 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Direct testimony same question, operating expense dropped almost half?
11:27:56 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	What does that mean?
11:28:25 AM	Atty Potter City of Clinton - witness Brown	
	Note: Sacre, Candace	Lose 400 customers, reduce staff?
11:28:34 AM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No further.
11:28:38 AM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?

11:28:42 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Thank you.
11:28:47 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Cross Examination. Refer Staff Second Request for Information Item 10(f) Response Excel spreadsheet, confirm eliminated computer depreciation Project Phoenix and J. D. Edwards listed include accumulated depreciation restatement other computer assets fully depreciated?
11:30:44 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Post-hearing data request revised spreadsheet include depreciation restatement all computer assets?
11:31:06 AM	Chairman Schmitt	
	Note: Sacre, Candace	Don't have to ask permission.
11:31:08 AM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS BROWN
	Note: Sacre, Candace	REVISED SPREADSHEET TO INCLUDE DEPRECIATION RESTATEMENT OF ALL COMPUTER ASSETS
11:31:50 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Staff Second Request Item 38(e) Response, find that?
11:32:24 AM	Camera Lock Video Conference Activated	
11:32:36 AM	Camera Lock Deactivated	
11:33:16 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Increase to outside services, (e) in table, compares 12/31/17 test year accrual to 3/31/20 test year accrual, maintenance expenses outsides services $183,711?
11:34:09 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Expense increase corporate cost allocations to Corix or other expenses involved?
11:34:36 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Major driver but not expenses?
11:34:46 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Next to $183,711 shows 361.934 pecent increase test year accrual 2017?
11:35:05 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Provide in post-hearing data request detail on what other expenses included?
11:35:16 AM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS BROWN
	Note: Sacre, Candace	DETAIL OTHER EXPENSES INCLUDED IN INCREASE TO OUTSIDE SERVICES
11:36:23 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Salary analysis in house?
11:36:30 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Responses referred to other Orders, referenced today 2018-00208 Order for Water Service and 2010-00476 case?
11:36:58 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	2010-00476 Order, changed comparison to align with Order, failed to compare wage increases with local, regional, and state wage trends, changed analysis?
11:37:40 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Several testified wage increases, main person?
11:38:09 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Did try to adjust analysis comply with Order?

11:38:26 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Generally, submit in Application employee wage increases, discuss consequences if WSK did not give annual wage increases to employees, considered that?
11:39:21 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Evaluation tied to annual wage incease, just standard increase?
11:39:52 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No further questions.
11:39:55 AM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
11:39:58 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.
11:40:00 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Examination. Walk me through salary study?
11:41:32 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Aware any 2500 more or less than WSK investor-owned water utilities?
11:41:53 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Have 7000 customers?
11:42:00 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Expect have more than 9500 customers?
11:42:07 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Not be included in this?
11:42:11 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Rest not investor-owned utilities?
11:42:18 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Direct labor costs, taken from annual reports?
11:42:24 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Provide that list of utilities not screened out of plus 2500/minus 2500, ones that made it into analysis, Excel?
11:42:26 AM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	VICE CHAIRMAN CHANDLER - WITNESS BROWN
	Note: Sacre, Candace	LIST OF UTILITIES IN ANALYSIS
11:43:16 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Ensure not anomalous data? Min, max average. Do median?
11:43:41 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Table provided min max average forecasted salaries, information median, have information or create?
11:44:22 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Entity with 8,600 customers, what entity?
11:44:36 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Officers, directors WSK, allocated costs, direct costs?
11:44:49 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Table, page 5. left-hand column, Company Name, Minimum Maximum, Average, see that?
11:45:04 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Minimum, Year End Customers, 4,734. information to right related to company or minimum different categories entire data set?
11:45:41 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	See $270,015?
11:45:49 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Company Name, on left, Minimum, to right, minimum entire data set?

11:46:14 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	WSK customer count 7,088, largest officers, directors costs?
11:46:35 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Pension and benefits, WSCK costs, direct WSCK costs or costs incurred by WSCK directly or allocated?
11:46:59 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Employees costs, officers/directors costs, pension/benefit costs, payroll taxes, total allocated $1,298,471 for WSCK?
11:47:31 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Customer monthly cost $15.20 from cost per customer per year divided by 12?
11:47:43 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Cost per customer monthly above minimum all data $5.83 and max $30?
11:48:01 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	WSK cost per customer within one standard deviation average of amount entire data set?
11:48:20 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	All, thank you.
11:48:23 AM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
11:48:27 AM	Commissioner Mathews	
	Note: Sacre, Candace	Not have any.
11:48:31 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
11:48:33 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Yes.
11:48:37 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Redirect Examination. Discussing expenses be recovered by utility related Fusion?
11:48:49 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Mentioned Response to PSC 2-25, recover $333,496 for project?
11:49:05 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Based on allocation ERC factor?
11:49:12 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	If Corix Regulated Utilities (US) Inc. acquired other systems, added new customers outside Kentucky, how impact WSK ERC factor?
11:49:47 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Possible future rate cases ask lower cost project because ERC factor changing?
11:50:00 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Salary study, information analyzed from annual reports on file?
11:50:15 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Limit data set utilities regulated by Commission?
11:50:25 AM	Atty Osterloh Water Service Kentucky - witness Brown	
	Note: Sacre, Candace	Methodology utilized, same WSCK used last rate case?
11:50:39 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	No further.
11:50:42 AM	Chairman Schmitt	
	Note: Sacre, Candace	Intervenors, Staff, or Commission?
11:50:47 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	One.

11:50:52 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Recross Examination. Study, survey compare wages, salary, benefits, other compensation non-utility local/regional enterprises?
11:51:14 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Why not?
11:51:53 AM	Staff Atty Koenig PSC - witness Brown	
	Note: Sacre, Candace	Limited what talked with Osterloh, not what Commission explaining other Order?
11:52:08 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Thank you.
11:52:09 AM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman?
11:52:11 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	One.
11:52:14 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Examination. Took 2018 year-end data proxy group and updated for 2020?
11:52:42 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Use inflation measure, what you did and why think reasonable?
11:53:21 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Customer growth rate between years 2012 and 2018 or an annual average growth rate between all years?
11:53:35 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	All seven years?
11:53:43 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Salaries/wages, how project 2019-2020 figures?
11:54:04 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Wage salary pension officers and directors and payroll taxes increased by geometric mean of each cost category?
11:54:45 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Explain?
11:55:21 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Explain what number applied geometric mean to?
11:55:36 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Direct labor cost include officers/directors?
11:55:42 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Aware officers/directors/commissioner water district level limited by statute?
11:56:02 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Agree payroll taxes directly correlated specific way to salaries?
11:56:29 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Apply sum all types cost categories, entire direct labor as whole, distinction?
11:56:52 AM	Vice Chairman Chandler - witness Brown	
	Note: Sacre, Candace	Payroll taxes include in sum, apply by average growth rate, different correlation?
11:57:20 AM	Vice Chairman Chandler	
	Note: Sacre, Candace	All have.
11:57:22 AM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh, further?
11:57:24 AM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Nothing further.
11:57:25 AM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?

11:57:26 AM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes.
11:57:28 AM	Chairman Schmitt	
	Note: Sacre, Candace	Thank you, excused.
11:57:30 AM	Chairman Schmitt	
	Note: Sacre, Candace	One-hour lunch break, recess until 1 o'clock.
11:57:52 AM	Session Paused	
1:01:40 PM	Session Resumed	
1:01:47 PM	Chairman Schmitt	
	Note: Sacre, Candace	Back on record, all counsel present?
1:01:51 PM	Camera Lock Deactivated	
1:01:53 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Gardner, Mr. Osterloh, another witness?
1:01:58 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Andrew Dickson.
1:02:03 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
1:02:15 PM	Chairman Schmitt	
	Note: Sacre, Candace	Counsel?
1:02:17 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Thank you.
1:02:18 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Direct Examination. Name?
1:02:23 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Business address?
1:02:50 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Title?
1:02:57 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Prepare/filed written testimony?
1:03:03 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Correction filed?
1:03:18 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Another correction?
1:03:20 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Describe correction?
1:04:02 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?
1:04:08 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Asked same questions, same answers?
1:04:19 PM	Atty Osterloh Water Service Kentucky - witness Dickson	
	Note: Sacre, Candace	Adopt testimony/Responses?
1:04:29 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Available for cross.
1:04:34 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
1:04:36 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Yes, thank you.
1:04:38 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Cross Examination. In testimony state wholesale water rate in tariff $2.214 includes electric cost, purchase water cost, chemical cost, et cetera, correct?
1:05:00 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Why Application Exhibit 3 Customer Notice states $2.20?

1:05:23 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Vaughan testimony pg 12, asserts wholesale water rate $2.20, realize that?
1:05:37 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	In testimony supported calculation of rate?
1:05:45 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	What wholesale rate to be?
1:06:12 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	WSK proposing $2.214 instead of $2.20?
1:06:33 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Direct testimony new opt-in low-income rate?
1:06:47 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	New program to increase affordability for customers?
1:06:55 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Are you an attorney?
1:07:01 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Respond discovery request, AG's First Request, Question 28(a), opt-in low-income rate not afoul KRS 278.170?
1:07:40 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Objection, discuss legalities post-hearing brief, not best for fact witness.
1:07:49 PM	Chairman Schmitt	
	Note: Sacre, Candace	Sustained, brief it.
1:07:54 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Respond to question discovery?
1:08:03 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Aware other utility in Kentucky has low income rate?
1:08:12 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Inquire why?
1:08:21 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Know anyone WSK made that inquiry?
1:08:37 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	AG discovery asked question not answered, if Commission approved low-income rate, low-income customers receive discounted volumetric rate, rest of customers subsidizing or WSK shareholders/parent company/affiliates contribute lost revenue?
1:09:31 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	WSK receive same revenue but program shifted to customers who don't qualify?
1:09:50 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	WSK/parent companies/affiliate companies none contribute to loss?
1:10:13 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	36 percent customers living below poverty line?
1:10:25 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Median income WSK area $25,455?
1:10:36 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Large amount poverty, instead low income volumetric rate, better serve customers WSK limit expenses and come for less frequent rate cases?
1:10:58 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Every couple of years, sometimes less, consider that not often?
1:11:25 PM	Asst Atty General Goad - witness Dickson	
	Note: Sacre, Candace	Elaborate how limit expenses, costs?

1:12:06 PM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
1:12:09 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
1:12:12 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Thank you, yes.
1:12:14 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Cross Examination. Low-income rate, neutral third party company would use?
1:12:35 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Example of somebody?
1:13:18 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Who pay for income verification?
1:13:35 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	With 36 percent ratepayers under poverty line, this plan undercut third of additional income?
1:14:01 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Commercial/business customers subsidizing program?
1:14:23 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	How long to set up?
1:14:38 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Someone here needs lower rate, up to them to go to who designate?
1:15:08 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	When go to third party vendor, vendor responsible for getting amount to WSK?
1:15:24 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Would send message and say, yes, is in or, no, not in?
1:15:35 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Then up to programmers/billing make change in billing?
1:15:55 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Then within twelve months do it again?
1:16:05 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Assistance to low rate payers if got behind as in not cutting off services?
1:16:22 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Wholesale water sales, from area, have sold water to Pineville?
1:16:44 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Pine Valley?
1:16:53 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Already interconnected, going to sell them water through a pipeline?
1:17:10 PM	Atty Potter City of Clinton - witness Dickson	
	Note: Sacre, Candace	Already have wholesale water rate?
1:17:31 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No further.
1:17:36 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
1:17:37 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Thank you.
1:17:38 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Cross Examination. Leak adjustment policy, explain reasoning choosing duplicate leak adjustment policy of Kentucky American Water?

1:18:15 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Involved in decision process?
1:18:34 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Other factors relevant in comparing their policy to WSCK and customers?
1:19:12 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Customer service and communication, involved, or Guttormsen?
1:19:28 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Customer service/customer communication, involved or heading up department or questions better to Guttormsen or Lubertozzi?
1:20:04 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	Comments, examples customers commenting lack of leak adjustment policy?
1:20:31 PM	Staff Atty Koenig PSC - witness Dickson	
	Note: Sacre, Candace	No further.
1:20:32 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
1:20:35 PM	VIce Chairman Chandler	
	Note: Sacre, Candace	A few.
1:20:38 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Examination. Leak adjustment policy, test year amount included assuming certain number leak adjustments given year?
1:20:52 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Who ask ensure no test year amount assumption of leak adjustments?
1:21:11 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	WSK not sold water to Pineville?
1:21:24 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	WSK sell water to Pineville in 2020?
1:21:44 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Wholesale rate, participation?
1:21:58 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Where come in wholesale rate?
1:22:21 PM	Vice Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Wholesale rate taken from cost of service study most recent rate case?
1:22:32 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	How calculate appropriate wholesale rate for Pineville?
1:22:57 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Wholesale rate just marginal cost of production?
1:23:03 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	No benefit retail customers whether sell more water to Pineville?
1:23:16 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Why appropriate calculation of wholesale rate?
1:23:51 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Trying to make wholesale rate not harm company but provides no benefit to customers?
1:24:17 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Trying to ensure between rate cases, if sell water, at rate not cost company?
1:24:28 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Calculation of revenue requirement or cost of service, no benefit to customers for use of facilities paying for?

1:24:47 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Provide calculation variable cost included in $2.214 rate?
1:25:01 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Include any variable O&M expense?
1:25:07 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Include additional depreciation/wear and tear on property?
1:25:18 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Vaughn person to talk to leak adjustment?
1:25:27 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Inclusion of leak adjustment, whether included in revenue requirement calculation?
1:25:37 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Any WSK affiliates low income rate similar in this case other jurisdictions?
1:26:04 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	None of operating companies currently has one?
1:26:17 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Which operating company?
1:26:22 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Pending or currently have it or in effect subject to refund?
1:26:39 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	In determination, expect impact to bad debt expense offering low-income rate?
1:27:01 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Virginia Operating Company, any impact on bad debt expense?
1:27:11 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Looked at effect on bad debt or saying you have not looked?
1:27:24 PM	VIce Chairman Chandler - witness Dickson	
	Note: Sacre, Candace	Haven't looked at it or has no impact?
1:27:40 PM	VIce Chairman Chandler	
	Note: Sacre, Candace	Thank you.
1:27:43 PM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
1:27:45 PM	Commissioner Mathews	
	Note: Sacre, Candace	Not have any.
1:27:47 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
1:27:51 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Do not.
1:27:55 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?
1:27:59 PM	Chairman Schmitt	
	Note: Sacre, Candace	Excused.
1:28:02 PM	Chairman Schmitt	
	Note: Sacre, Candace	Next witness?
1:28:05 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Robert Guttormsen.
1:28:11 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
1:28:25 PM	Chairman Schmitt	
	Note: Sacre, Candace	Counsel?
1:28:27 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Thank you.

1:28:28 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Direct Examination. Name?
1:28:32 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Business address?
1:28:39 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Title?
1:28:45 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Prepare/filed written testimony?
1:28:51 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?
1:28:57 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Asked same questions, same answers?
1:29:05 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Adopt testimony/Responses?
1:29:13 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Available for cross.
1:29:16 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
1:29:17 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Thank you.
1:29:21 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Cross Examination. Brown deferred questions to you Fusion Project, explain what Fusion Project entails?
1:30:16 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Sofware, describe?
1:30:28 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Replacing something previously used?
1:30:43 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Asked Brown total cost Fusion Project, state $14,290,000 date of Response to AG's Data Request but could go up, elaborate?
1:31:48 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Asked Brown total cost WSK customers Fusion Project, stated $333,496, only good date of Request and could go up. Foresee going up?
1:32:24 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Above $15 million, what do you mean?
1:32:35 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Idea how much would add to WSK allocation?
1:32:50 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Think $333,496 plus more fairly large amount WSK pay just over 6,000 customers in Kentucky?
1:33:30 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Lower cost options than Fusion?
1:34:27 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Direct testimony post-test year expenses included pending rate request?
1:34:43 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Specific amount total post-test year expenses in pending rate case?
1:35:19 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Total amount?
1:35:34 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Never saw actual total amount, estimation?
1:37:02 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	$629,000 total post-test year expenses WSK including rate case?

1:37:16 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	WSK did file historic test year?
1:37:37 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Explain how including post-test year expenses meets Commission criteria of known/measurable?
1:37:55 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	In general?
1:39:12 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Accurate in testimony salary/wage expense increased by $191,415 projected salaries, taxes, benefits employees?
1:39:44 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Discovery Responses, average raises WSK 2015 '16 '19 and '20 between three and three-point-six percent?
1:40:09 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	2017 and '18 average raise WSK 12.78 and 12.75 percent?
1:41:05 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Asking 2015 '16 and '20 and average raise 3 and 3.6 percent, '17 and '18 was 7.8 and 7.5 percent?
1:41:53 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Believe 12.78 percent pretty high?
1:42:31 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Discussed with Dickson average raises high, where located?
1:42:54 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Subjective, Chicago not be a large raise but areas WSK serves 36 percent poverty rate, seem excessive?
1:43:31 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	WSK discussed awarding raises 2021?
1:43:47 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Better witness, or be involved with discussions raises given?
1:44:14 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	WSK consider economic impact COVID on economy when award raises for 2021?
1:45:21 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Believe WSK and parent take into consideration?
1:45:52 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	WSK include $52,464 incentive compensation test period?
1:46:08 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Percentage long-term compensation plan related financial objectives?
1:47:00 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Why WSK ratepayers pay incentive compensation tied to company financial performance, not directly benefit customers?
1:48:24 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Indirect benefit, admit no direct benefits to customers?
1:49:01 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Why four new positions necessary when WSK operated without?
1:52:00 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Heard say four new positions potentially create cost savings, compare future salaries and benefits balance potential cost savings against present expenses?
1:53:51 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Commission approve four positions, next case, AG ask actual benefits from positions balance against costs. Testimony and Responses, true Business Development Manager and Director of Engineering and Asset Management filled?

1:54:28 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	VP Regulatory Affairs and Business Development position filled?
1:54:38 PM	Asst Atty General Goad - witnes Guttormsen	
	Note: Sacre, Candace	Why not filled?
1:55:39 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	WSK did include cost of VP Regulatory Affairs and Business Development in pending rate case?
1:55:51 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Why WSK customers pay for new and vacant position?
1:56:32 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Today, November 12 2020, do not have anyone in role?
1:56:46 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Suspension date Dec 8 or so, three weeks, paying it then?
1:57:10 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Not agree amount vacant position removed from rate case?
1:57:34 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Midwest Project Manager filled?
1:57:40 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Why not filled?
1:57:46 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Why ratepayers pay salary/benefit expense for new/vacant position?
1:58:30 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Some reason positions delayed, WSK customers paying and no one in job?
1:59:16 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Discovery, cost WSK remove from rate case if Commission hold virtual hearing, remember how responded amount that be removed?
1:59:50 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Have noted $7,400, sound correct?
1:59:57 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Any other cost be removed?
2:00:13 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Proposed QIP, AG First Request, Question 9(c), WSK anticipates replacing one mile pipeline every calendar year, recall?
2:00:41 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Pull it up, AG's First Request, Question 9(c).
2:01:46 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Confirm WSK replacing one mile of piepeline every calendar year if QIP approved?
2:02:18 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Provided WSK water loss percentage discovery Responses, recall?
2:02:37 PM	Asst Atty General Goad - witness Guttormsen	
	Note: Sacre, Candace	Establish, AG First Request, responded Question 17, asked all water loss percentages 2010 to 2020; since 2011, highest 13 percent, sound familiar?
2:03:25 PM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
2:03:34 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
2:03:36 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Yes, please.
2:03:39 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Cross Examination. Company using cloud-based program J. D. Edwards?

2:04:05 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Using any cloud-based?
2:04:11 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Who has platform?
2:04:28 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Fusion over-reaching just-your-company platform?
2:05:02 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Using right now or not?
2:05:08 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Are using right now?
2:05:12 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Proposing Kentucky pay two-and-a-half percent cost of program?
2:05:41 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Are Financial Planning and Analysis Manager of WSCK, other titles?
2:06:26 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Also include management regulatory accounting procedures for sister companies?
2:06:47 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Midwest one entity for your purposes or seven pieces?
2:07:18 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Figure out where WSK fits in chart; went to work for Utilities Inc. in 2011?
2:07:47 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	When go to work for WSCK?
2:08:35 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Response, Staff DR 1.2, US Organization Chart, Exhibit SME-1, look up.
2:09:20 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Perform services all companies Utilities Services of Illinois to Provinces Utilities?
2:09:51 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Ones far right, not your problem?
2:10:18 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Materials on line, employment, handbook submitted as exhibit, all under Corix?
2:10:43 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	When someone hired as Midwest Manager, would get Corix handbook?
2:10:55 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Would get Corix benefit plan?
2:11:11 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Positions discussed Goad, applied for any other states on list, positions approved by, say, Illinois?
2:11:56 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Reason not filled not that nobody approved; because COVID presented issues in hiring?
2:12:19 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Positions disapproved by other states?
2:12:38 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	No, haven't, or no, don't know?
2:12:52 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Commission approves positions, how allocate costs for Project Manager across Midwest Division?

2:13:45 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Repeat, please?
2:14:20 PM	Atty Potter City of Clinton - witness Guttormsen	
	Note: Sacre, Candace	Project Manager involved project in Illinois, all salary from Illinois or continue be allocated amongst three states?
2:15:41 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No further.
2:15:45 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
2:15:47 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes, thank you.
2:15:50 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Cross Examination. Commission Order dated June 26 2020, Item 3, Response to Staff DR 1.3, what looking at?
2:16:36 PM	Camera Lock Video Conference Activated	
2:16:39 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Interject, updated on Sept 28; based on line of questioning just in case that comes up, an issue. (Click on link for futher discussion.)
2:17:25 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Something needs update, let me know.
2:17:40 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Staff wants clarification track new positions on spreadsheet. Identify pro forma salary for VP Regulatory Affairs and Business Development?
2:19:10 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Understand positions not filled, no confidential territory?
2:19:46 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Could ask in post-hearing data request?
2:20:13 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	$185,400?
2:20:22 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Let's just stop.
2:20:26 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	You think confidential?
2:20:28 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Certainly getting on certain grounds may intrude into confidentiality, partly reason made confidential affects business operations and competitive nature, and others see that.
2:21:14 PM	Chairman Schmitt	
	Note: Sacre, Candace	Confidential session?
2:21:19 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	That, or post-hearing data response.
2:21:25 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Fine with that, would take less time, can certainly follow up.
2:21:35 PM	Camera Lock Deactivated	
2:21:54 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Follow up post-hearing data response.
2:21:58 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Okay, will do that.
2:21:59 PM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS GUTTORMSEN
	Note: Sacre, Candace	TRACK NEW POSITIONS ON SPREADSHEET, IDENTIFY PRO FORMA SALARIES

2:22:01 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Specifically, VP Regulatory Affairs and Business Development position, reading. (Click on link for further comments.) Explain why not descibed as lobbyist?
2:23:11 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Staff Second Request, Item 26(b), Response, reading (Click on link for further comments.) Any salary Business Development Manager charged WSK for failed acquisition evaluation?
2:23:52 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Don't know, or wasn't?
2:24:03 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Salary Business Development Manager directly assignable WSK or 100 percent allocated all subsidiaries?
2:24:40 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	2.33 percent discussing with Potter?
2:25:14 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	13.67 percent Business Development Manager salary split seven states - not among operating subsidiaries - regions and then further breakdown?
2:25:50 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Willing provide further breakdown/detail allocations, how assignable on business development project level, post-hearing data request?
2:26:12 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Go ahead.
2:27:44 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Ask Lubertozzi about Business Development and VP Regulatory Affairs?
2:28:57 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Saying lobbying part of position, not main part?
2:29:24 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Leak adjustment policy, explain reasoning choosing to duplicate policy Kentucky American Water?
2:30:17 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Know why billing rate of 25 percent applicable tier rate chosen as leak rate, or just copied from Kentucky American policy?
2:30:46 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Know if WSK investigated customer interest in proposed leak adjustment policy?
2:31:19 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Something's better than nothing, what Dickson said?
2:31:47 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Speaking of policy, clarify, proposed tariff Kentucky American policy based on no more than two leak adjustments, third adjustment entire water service line replaced, customer expected pay for replacement?
2:32:48 PM	Camera Lock Video Conference Activated	
2:32:59 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Needs clarified more?
2:33:18 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Thinking Dickson and Lubertozzi, too, handle customer service or customer communications?
2:33:25 PM	Camera Lock Deactivated	
2:34:21 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Provided table customer responses, helping with customer calls, looked at public comments made this case?

2:34:23 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Several, same thing, complained about 1-800 number, in charge of that, or centralized customer service?
2:35:04 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Anything done address claimed extremely long wait times, hang up weren't getting response, complained office hours?
2:36:16 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Lubertozzi in charge communicating, did emails/press releases about COVID, do that as well with customers?
2:37:04 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	Who is over 1-800 number, seems some break in communication, all of you communicating with each other, public comments and City of Clinton and people in Kentucky, disconnect?
2:38:58 PM	Staff Atty Koenig PSC - witness Guttormsen	
	Note: Sacre, Candace	How, if couldn't wait long, long time, couldn't get to office hours, how would ever know? Can't fix it, if don't know about it?
2:40:12 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Nothing further.
2:40:25 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
2:40:27 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.
2:40:28 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Examination. Historic or future test year this case?
2:40:35 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Ends end March 2020?
2:40:41 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Positions filled by end 2020, Dec 31 2020, not pertinent to test year since historic test year?
2:41:06 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Difference between test year and rate year?
2:41:38 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Rates based on historical test year with pro forma adjustments?
2:41:46 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	What role rate year play setting rates?
2:42:34 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Making argument costs incurred 12 months following forecasted test period or time period new rates in effect, portion of basis for pro forma adjustment?
2:42:54 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Used term rate year way to underpin pro forma adjustments?
2:43:17 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Not incurring costs positions discussed earlier, using this specific cost in rate year as basis for pro forma adjustment for position, whereas just said pro forma adjustments drive cost in rate year, both ways?
2:44:04 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Commission not approve cost for position or allocated portion for Kentucky, saying company not hire positions?
2:44:56 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Moving to position, what cost to companies attempting expand business?
2:45:11 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Entities own Water Service to hire people to grow Water Service and affiliates?

2:45:49 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Looking to hire, pass cost on to customers, and build business up?
2:46:06 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Maybe?
2:46:35 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Talk about expanding number customers so spread cost additional people, ignores variable costs increase in customers, but take into account expected increase cost related to service new customers?
2:47:23 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Not need more accountants, more attorneys, more financial folks as add more customers?
2:47:57 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Saying savings inherent growing WSCK and affiliates or customers?
2:48:29 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Basis at least some positions?
2:48:39 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	May be shared savings but guaranteeing going to be cost?
2:49:16 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Asking customers incur entirety of costs in attempt to drive savings?
2:49:31 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Company not proposing incur any costs to grow business?
2:50:13 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Attempting to charge customers to grow business, make bigger company, and make more money?
2:51:04 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Certainly unique perspective on monopoly regulation, using customer base in attempt to hire and pass on costs to make business larger, serve additional customers, and allocating that amongst multiple jurisdictions?
2:51:45 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Benefits, possibility win/win, but cost to drive benefits not pay/pay situation, customers pay entire costs, companies win/win with benefits?
2:53:27 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Project $15 million, Oracle-based web system?
2:54:36 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Fusion a capitalized cost?
2:54:48 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	What entity's books Fusion an asset?
2:54:55 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Corix incurs depreciation expense on Fusion, allocate depreciation expense out to affiliates?
2:55:16 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	When WSCK gets allocation of depreciation, pass through between CII and WSCK?
2:55:40 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Lower level of Potter's colorful chart, all operating companies share it?
2:56:00 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	All entities that have ERC?
2:56:14 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Allocated everybody with ERC?
2:56:41 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Water Service Corporation both allocates costs to WSCK and other affiliates but it and WSCK subsidiaries of Corix?

2:57:01 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	WSCK allocated portion of Fusion and direct and also get WSC portion of its allocation of Fusion?
2:57:56 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Lubertozzi allocates portion of time in litigating this docket as rate case expense?
2:58:13 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Utility provides updates rate case expense, inclusion direct allocation of costs for Lubertozzi provided in error? Impression was allocated time, maybe must Baryenbruch?
2:58:53 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	No employee of WSCK, WSC, or any affiliates allocates time for direct expense as rate case expense?
2:59:11 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Leak adjustment, assumption of test year amount leak adjustments included in revenue requirement/cost of service calculation?
2:59:33 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Have Response referenced earlier, Company Response, AG 1-20?
3:00:04 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	1-20 discusses EIP and attachments?
3:00:15 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Page 5 of attachment, talking to Goad percentage EIP relates to financial performance and may said 50 percent EIP related financial performance?
3:00:48 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Page 5, company performance factors and, page 6, personal performance factors, agree of company performance factors of EIP, 70 percent related to financial performance?
3:02:10 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Way Fusion costs allocated, ultimately to WSCK, show as operating expenses income statement?
3:02:31 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Allocated cost included in operating ratio or considered in operating ratio?
3:03:00 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	If allocated depreciation expense, included operating expense and included operating ratio?
3:03:22 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Number of states perform same functions as for WSCK, testimony/participate rate matters before jurisdictions other states?
3:03:46 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Rough percentage, other states determine return portion Corix subsidiaries, how done in different states?
3:05:12 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Operating companies in states work about same size, larger, significantly larger Water Service?
3:06:20 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Other states, ad hoc basis ROE testimony when file?
3:06:47 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Ad hoc basis each rate case, last five years, three years, jurisdictions group of small utilities, determine ROE overall, change depending on specific details, apply to group, or duke it out each case?
3:08:07 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.

3:08:11 PM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
3:08:17 PM	Commissioner Mathews	
	Note: Sacre, Candace	No.
3:08:20 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
3:08:23 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	One topic.
3:08:29 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Redirect Examination. Public comments filed in case?
3:08:40 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Also addressed previous Data Request?
3:08:49 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Able to see on screen AG Second Request, Question 11?
3:09:03 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Relates to comments made including may take 30 minutes or longer get CSR, highlighted sentence, see that?
3:09:25 PM	Atty Osterloh Water Service Kentucky - witness Guttormsen	
	Note: Sacre, Candace	Read aloud?
3:09:43 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	All questions.
3:09:49 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Follow up?
3:09:52 PM	Chairman Schmitt	
	Note: Sacre, Candace	Go ahead.
3:09:54 PM	Vice Chairman Chandler - witness Guttormsen	
	Note: Sacre, Candace	Examination. Provide range of wait times within one-two standard deviations of average?
3:09:57 PM	POST-HEARING DATA REQUEST	
	Note: Sacre, Candace	VICE CHAIRMAN CHANDLER - WITNESS GUTTORMSEN
	Note: Sacre, Candace	RANGE OF WAIT TIMES FOR CUSTOMER SERVICE
3:10:12 PM	Chairman Schmitt	
	Note: Sacre, Candace	Further questions?
3:10:16 PM	Chairman Schmitt	
	Note: Sacre, Candace	Excused, thank you.
3:10:20 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh, how many additional witnesses?
3:10:24 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Two.
3:10:28 PM	Chairman Schmitt	
	Note: Sacre, Candace	Recess until 3:20.
3:10:46 PM	Session Paused	
3:23:22 PM	Session Resumed	
3:23:35 PM	Chairman Schmitt	
	Note: Sacre, Candace	Back on record. Mr. Osterloh, want to explain comment. (Click on link for further comments.)
3:23:40 PM	Camera Lock Deactivated	
3:24:50 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Thank you.
3:24:51 PM	Chairman Schmitt	
	Note: Sacre, Candace	Next witness?
3:24:53 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Steven Vaughn.

3:24:59 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
3:25:09 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
3:25:12 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Direct Examination. Name?
3:25:16 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Business address?
3:25:24 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Title?
3:25:27 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Prepare/filed written testimony?
3:25:33 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Also prepare/filed rebuttal testimony?
3:25:39 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Sponsor Responses to Requests for Information?
3:25:44 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Asked same questions, same answers?
3:25:52 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Describe?
3:26:08 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	With change, asked same questions, same answers?
3:26:19 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Adopt as corrected?
3:26:27 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Available for cross.
3:26:30 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
3:26:32 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Yes, thank you.
3:26:34 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Cross Examination. WSK requesting revenue increase over million dollars year pending rate case?
3:26:56 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Application, pg 4, states revenue increase $1,080,300?
3:27:12 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	38.2 percent increase revenues?
3:27:23 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Pending case, WSK asking monthly residential charges raised from $11.45 to $15.84?
3:27:40 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Accurate WSK received over half-million-dollar rate increase plus customer charge increase from Commission Feb 11 2019?
3:28:10 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	$535,327 rate increase according Final Order 2018-00208, customer charge from $10 to $11.45, agree numbers quite significant?
3:28:53 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Clarify, percentage overly inflated or 38.2 percent increase revenues or customer charge?
3:29:14 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Agree revenue increase alone 38.2 percent?
3:29:25 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Agree especially significant increase considering WSK just had a rate increase last year?

3:29:51 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	State Manager WSK, aware high poverty service area?
3:30:04 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	36 percent residents WSK area at or below poverty line?
3:30:24 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	In Middlesboro whole life?
3:30:32 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Relay information for WSK to corporate structure major economic decline areas serving?
3:31:02 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Questions deferred QIP, stated discovery Response, WSK replacing one mile pipeline calendar year?
3:31:49 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Water loss percentages, AG First Request, Question 17, WSK referred to Response Staff DR 2.5, Water Loss Percentages?
3:32:21 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	2011 to present not anything over 13.98, is the highest, lot of very low years?
3:32:45 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	QIP necessary replacing one mile pipieline year and historically low levels water loss?
3:33:41 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	WSK commended low water loss percentages, across state very high, not understand continue do what do now, replace pipe when need, proactively, keep water loss percentages low, not have QIP surcharge?
3:34:55 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	WSK already replaces mains/lines need replaced without QIP?
3:35:18 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Customer complaints filed, reviewed those?
3:35:36 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Reviewed every one, significant objections/complaints filed?
3:36:08 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Initial complaint, object to rate increase, different reasons, also common continuation complaints 1-800 number, customer service issues, addessed any issues or will address?
3:37:34 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Guttormsen thought addressed, know if addressed or not at this point?
3:38:10 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Find out in post-hearing data request if issues addressed?
3:38:21 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Defer question Lubertozzi and then post-hearing.
3:38:36 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Lubertozzi stated you review all allocated expenses received and determine appropriate?
3:38:51 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	WSK anyone else on staff review allocations or exclusively your responsibility?
3:39:07 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	WSK refused to pay allocated charge 2015 to 2020?
3:39:24 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Reasonable never refused to pay allocated charge 2015 '16 '17 '18 '19 and '20?

3:39:44 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	AG asked discovery, never provided, verification?
3:40:08 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Responses to discovery, WSK asserted 2015 to 2020 no allocated expense ever refused?
3:40:31 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Sound reasonable?
3:41:15 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Feel pressure approve allocated expenses from parent companies and sister companies?
3:41:40 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Do not think allocated expense reasonable/necessary WSK ratepayers, think would be acceptable parent companies, sibling companies?
3:42:06 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	WSK very small company, large company with corporate structure, ever contemplated more then one person review allocated costs, checks and balances?
3:42:32 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	You proposed or discussed?
3:42:43 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Include estimated costs Middlesboro and Clinton tank rehabilitation projects in Application?
3:43:00 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Provide actual cost?
3:43:07 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Application estimated costs versus supplemental testimony actual costs after bids?
3:43:18 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	How much less actual bids/cost?
3:43:37 PM	Asst Atty General Goad - witness Vaughn	
	Note: Sacre, Candace	Couple hundred thousand dollars removed from rate case?
3:44:11 PM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
3:44:14 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
3:44:16 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Thank you.
3:44:17 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Cross Examination. Live in Middlesboro?
3:44:25 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Looked at list complaints?
3:44:38 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Seen list of complaints?
3:44:43 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Recognize names?
3:44:56 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Did people reach out, ask for assistance?
3:45:11 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	As in, can't get through about bill, what do?
3:45:22 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Want to complain Middlesboro, where go?
3:45:33 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Who talk to?

3:45:38 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Nobody called your office?
3:45:48 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Nobody complained hanging on line 30 minutes to you?
3:46:06 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Middlesboro customer service office?
3:46:11 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Where office go?
3:46:29 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	In office every day?
3:46:39 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	In Clinton office?
3:46:48 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Not aware ratepayers Middlesboro complained waiting 30 minutes, hung up on?
3:47:01 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Other than reading comments?
3:47:08 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Aware public notice to ratepayers in Middlesboro said Clinton?
3:47:25 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	What do about it?
3:47:35 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Anyone Middlesboro speak to you?
3:47:49 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Anyone complain rate increase?
3:48:04 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Working since 2009?
3:48:10 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Large iron pipes throughout Middlesboro?
3:48:20 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	How many times pipes replaced, any in Middlesboro?
3:48:32 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	How many left to replace?
3:48:56 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Submitted plan replace pipes?
3:49:29 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Complete plan when pipes are replaced Middlesboro?
3:49:43 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Is there plan?
3:49:46 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	You don't have plan, company doesn't have plan?
3:49:55 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Testified lines in ground over hundred years Middlesboro?
3:50:05 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	With company since 2009 and company not come up with plan?
3:50:23 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Clinton, pipes in ground since horse and buggy town, plan replace pipes?
3:50:41 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Entire distribution system?
3:50:44 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Is or is not?

3:50:49 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Get what want from Commission, will be a plan replac pipes sequential manner?
3:51:03 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Working on that now?
3:51:08 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Don't have plan but working on a plan?
3:51:14 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	How far along is plan?
3:51:25 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Submitted in any filing with Commission to show progress?
3:51:38 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Request upgrading assets, plan to upgrade water towers?
3:51:51 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Tanks in Middlesboro and tanks in Clinton?
3:51:57 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	One tank Clinton?
3:52:02 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Nothing in plan replace aging iron pipes?
3:52:19 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Why Clay Street first?
3:52:35 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Dirty water as in iron?
3:52:50 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Rusting lines portion reason leaks in line? Major reason water loss Middlesboro?
3:53:15 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	In Clinton?
3:53:22 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Multiple trips to Commission, increases every two years, you/company started program prior years out working on lines, supervising new lines?
3:53:54 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Mention testimony, refer to Direct, several people annual meeting complimented water quality?
3:54:15 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Which meeting?
3:54:33 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Sign-up sheet for meetings?
3:54:40 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Last know, one person there, not to compliment you, is it Middlesboro pleased water quality, meeting?
3:55:03 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Nobody there complain water quality?
3:55:09 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Nobody there complain customer service?
3:55:29 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Tank reconditioning, tanks danger leaking/collapsing or just maintenance?
3:55:57 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	How old tank?
3:56:08 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Plans to replace tank, too expensive?

3:56:26 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	How often serviced manner asking Commission approve?
3:56:36 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Done once, twice last 20 years?
3:57:33 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Testimony Middlesboro reserviced 2004 and 2005?
3:57:48 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Clinton 2015?
3:57:54 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Grubbs, when last time done?
3:58:05 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	On plan resurface Grubbs?
3:58:20 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Regularly inspected yearly, part your job?
3:58:32 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Every five years?
3:58:47 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Hasn't happened?
3:58:57 PM	Atty Potter City of Clinton - witness Vaughn	
	Note: Sacre, Candace	Inspected 2009 Middlesboro tank was fine?
3:59:23 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No further.
3:59:27 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
3:59:28 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes.
3:59:29 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	Cross Examination. Introduce two exhibits, Cover letters, Staff Inspections, one Clinton, one Middlesboro, familiar with inspections?
4:00:04 PM	Camera Lock Video Conference Activated	
4:00:23 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	Summarize, PSC Exhibit 1, letter from Investigator, one deficiency, followed with staffing plan approved DOW?
4:01:00 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	Look at July 22 2019 inspection letter Middlesboro, do not have responded, two deficiencies, where are with those?
4:02:06 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	The 300 meters?
4:02:21 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	On target for?
4:02:30 PM	Staff Atty Koenig PSC - witness Vaughn	
	Note: Sacre, Candace	Reason making part of exhibit, while public record, difficult access to inpections, PSC Exhibit 2, move to be admitted.
4:02:36 PM	Camera Lock Deactivated	
4:03:41 PM	Chairman Schmitt	
	Note: Sacre, Candace	Objection?
4:03:58 PM	Chairman Schmitt	
	Note: Sacre, Candace	Sustained.
4:04:00 PM	PSC EXHIBITS 1	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS VAUGHN
	Note: Sacre, Candace	PERIODIC WATER INSPECTION WATER SERVICE CORP (CLINTON) WATER SYSTEM
4:04:01 PM	PSC EXHIBIT 2	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS VAUGHN

	Note: Sacre, Candace	PERIODIC WATER INSPECTION WATER SERVICE CORP OF KENTUCKY WATER SYSTEM BELL COUNTY KY
4:05:19 PM	Chairman Schmitt	
	Note: Sacre, Candace	Recess until 10 minutes after 4.
4:05:29 PM	Camera Lock PTZ Activated	
4:05:31 PM	Session Paused	
4:07:46 PM	Session Resumed	
4:08:02 PM	Chairman Schmitt	
	Note: Sacre, Candace	Back on record. Ms. Koenig?
4:08:12 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No further.
4:08:16 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
4:09:35 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	No.
4:09:37 PM	Chairman Schmitt	
	Note: Sacre, Candace	Commissioner Mathews?
4:09:40 PM	Commissioner Mathews	
	Note: Sacre, Candace	No.
4:09:42 PM	Chairman Schmitt	
	Note: Sacre, Candace	I have no questions. Mr. Osterloh?
4:09:47 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Few.
4:09:48 PM	Camera Lock Deactivated	
4:09:50 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Redirect Examination. Earlier witness, projects in Clinton, describe?
4:10:20 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Since 2012, utility 400 less customers, fewer water quality standards now than eight years ago?
4:10:53 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Fewer water quality standards if reduce customer level?
4:11:05 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Reduce staffing level if reduction in customers?
4:11:16 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Connection to Pineville system, emergency use connection?
4:12:01 PM	Atty Osterloh Water Service Kentucky - witness Vaughn	
	Note: Sacre, Candace	Something happens, able to help citizens Bell County water service?
4:12:10 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	All questions.
4:12:13 PM	Chairman Schmitt	
	Note: Sacre, Candace	Other questions?
4:12:18 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No.
4:12:19 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?
4:12:20 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes.
4:12:21 PM	Chairman Schmitt	
	Note: Sacre, Candace	Thank you, excused.
4:12:23 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
4:12:25 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Steven Lubertozzi.

4:12:29 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
4:12:39 PM	Chairman Schmitt	
	Note: Sacre, Candace	May ask.
4:12:42 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Direct Examination. Name?
4:12:46 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Business address?
4:12:54 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Title?
4:12:57 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Prepare/filed written testimony?
4:13:05 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Prepare/filed written rebuttal testimony?
4:13:12 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Sponsor Responses to Requests?
4:13:17 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Asked same questions, same answers?
4:13:27 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Adopt testimony and Responses?
4:13:34 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Available for cross.
4:13:38 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
4:13:40 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Yes, thank you.
4:13:42 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Cross Examination. Discussion with Vaughn customer complaints, objections rate case?
4:14:04 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Aware common thread holding long periods, nobody local level questions/service issues, steps resolve issues?
4:16:28 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Are taking steps ensure no issues, WSK resolve wait times1-800 number?
4:18:40 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Understand smart phone app not feasible older people, young people not enough money, 1-800 integral?
4:20:06 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Local office, no one locally, customer walk in?
4:22:06 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Local staff WSK trained to direct customer to customer service?
4:23:16 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	WSK discussed raises for 2021?
4:25:09 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Definitely raises, or COVID taken into account if raises?
4:25:52 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	shareholder or shareholders that would dictate raises
4:26:17 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Referencing ultimate shareholder or old parent company?
4:27:04 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Read Lane Kollen direct testimony?

4:27:15 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Kollen recommend reject WSK request operating margin methodology approach?
4:27:40 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree Kollen stated?
4:27:50 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Confirm rebuttal filed Nov 3 2020 responded Kollen direct?
4:28:07 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal filed responding to Kollen direct?
4:28:17 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Have rebuttal in front of you?
4:28:27 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal, two primary reasons continue operating margin?
4:29:06 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	WSK requested 88 percent operating margin?
4:29:18 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	WSK performed studies/analyses to support?
4:29:39 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	WSK did not?
4:29:56 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	confirm affiliated company WSK operating margin approach or using ROE?
4:31:00 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Referencing between VC and Guttormsen?
4:31:27 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Pg 4, Rebuttal, Commission must allow WSK 88 percent operating margin methodology?
4:32:39 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Line 18, reading. (Click on link for further comments.) See that?
4:33:05 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Saying not think Commission ability require WSK use ROE approach?
4:34:06 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Commission continue operating margin methodology believe adopt operating ratio greater 88 percent?
4:34:51 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal, WSK 2008-00563 AG opposed use ROE?
4:35:14 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal, state AG argued 2008 rate case WSK utilized operating ratio methodology?
4:35:45 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	2008 rate case, Commission accepted WSK use ROE approach?
4:36:03 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal testimony, Exhibit 2, confirm AG Post-hearing Brief?
4:36:45 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	First page, Respectfully submitted?
4:36:54 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Not Kentucky resident?
4:36:59 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Read second two lines?
4:37:21 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Know current AG is?
4:37:33 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	No longer Jack Conway?

4:37:45 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree 12 years passed?
4:38:07 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree 12 years ago brief filed?
4:38:10 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree ROE decade ago much higher than past couple years?
4:38:36 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Exhibit 1 Rebuttal, Final Order 2008-00563, page 21?
4:39:22 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	See Return on Equity?
4:39:29 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Read first sentence?
4:39:53 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Pg 24 Commission Order, read second last sentence, first paragraph?
4:40:26 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	After reading, recall Kollen testimony referenced Order rate case electric company 9.25 ROE?
4:40:46 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree 10.6 percent ROE awarded Water Service 2008 rate case significantly higher than 9.25 percent ROE just awarded electric company?
4:41:07 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Recall Kollen testimony equivalent to ROE 14.1?
4:41:27 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal, not address Kollen calculation?
4:41:56 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Calculation made it would equate14.1 percent, simple mathematical calculation?
4:42:29 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Not find errors with calculation?
4:42:36 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree 14.1 higher than 9.25 awarded this year?
4:43:12 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Not agree 14.1 out of line recent Commissions decisions?
4:43:31 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Summarize, different AG than 2008, 12 years passed, ROE signicantly lower since 2008 rate case, rebuttal, not agree AG every right change position?
4:44:24 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal state WSK save ratepayers $50,000 rate case expense not hiring ROE expert?
4:44:44 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	How arrive $50,000?
4:45:11 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Other states, less than $50,000?
4:45:46 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Recall Kollen testimony Commission adopts 9.25 or less would lower WSK requested rate increase by $200,000?
4:46:08 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Specifically $205,652, for the record. Not agree with ROE expert, WSK customers receive financial benefit ROE approach?
4:46:37 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	ROE expert $50,000?

4:46:40 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Kollen testimony Commission required WSK use ROE 9.25 or less save $205,652?
4:47:36 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Agree WSK hired ROE expert, having lower ROE, saving over $200,000, customers still receive financial benefit?
4:48:24 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Rebuttal, Commission finds more reasonable use ROE approach, recommend approve rates 88 percent operating margin, encourage Water Service use ROE approach in future? Rebuttal, pg 9.
4:48:56 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Commission approves continuation, WSK equivalent 14.1 ROE fair just and reasonable rates?
4:49:55 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Recall Kollen testimony referenced SC decision 7.46 ROE?
4:50:15 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Name of water company?
4:50:30 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Elicegui testimony in case, hear discussion?
4:50:50 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Why in rebuttal not more transparent? Direct to rebuttal testimony, pg 7, read PSC SC decision.
4:51:33 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Question 20, read question and answer?
4:52:03 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Why not state case was affiliate to WSK?
4:52:52 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Had provided info Blue Granite was affiliate?
4:53:07 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Not response to discovery request, testimony?
4:53:33 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Not relevant because appealed?
4:53:39 PM	Chairman Schmitt	
	Note: Sacre, Candace	Understand situation, read testimony, different area of cross.
4:54:01 PM	Asst Atty General Goad	
	Note: Sacre, Candace	One last question.
4:54:07 PM	Chairman Schmitt	
	Note: Sacre, Candace	Go ahead and finish.
4:54:24 PM	Asst Atty General Goad - witness Lubertozzi	
	Note: Sacre, Candace	Said not relevant because appealed, why appealed make not relevant?
4:55:31 PM	Asst Atty General Goad	
	Note: Sacre, Candace	No further.
4:55:43 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
4:55:56 PM	Atty Potter City of Clinton - witness Lubertozzi	
	Note: Sacre, Candace	Cross Examination. Where on chart is Utilities Inc.?
4:58:12 PM	Atty Potter City of Clinton - witness Lubertozzi	
	Note: Sacre, Candace	Direct, pg 1, employed by Utilities Inc. since 2001?
4:58:35 PM	Atty Potter City of Clinton - witness Lubertozzi	
	Note: Sacre, Candace	Affiliate company?
4:59:00 PM	Atty Potter City of Clinton - witness Lubertozzi	
	Note: Sacre, Candace	Got my water bill today, return address is Utilities Inc.

4:59:11 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Website, want to complain, uiwater.com?
4:59:19 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Mail bill back, goes to Lewiston Maine, understand customer confusion, who complain to?
5:01:02 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Witness called Corix mid-sized company, agree?
5:01:37 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Also talked about small company, Water Service Corp small company?
5:02:01 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Part of family, put into mid-sized category?
5:02:48 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	What states made decision, looked at issue?
5:03:17 PM	Atty Potter City of Clinton - witness Lubertozzi		
		Note: Sacre, Candace	Planning replacement mains?
5:04:54 PM	Atty Potter City of Clinton		
		Note: Sacre, Candace	No other.
5:04:56 PM	Chairman Schmitt		
		Note: Sacre, Candace	Ms. Koenig?
5:04:56 PM	Staff Atty Koenig PSC		
		Note: Sacre, Candace	Yes.
5:05:29 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Cross Examination. Leak adjustment policy, clarify more than two leaks who pays for replacement, can you clarify?
5:08:28 PM	Staff Atty Koenig PSC		
		Note: Sacre, Candace	Final Order 2018-00358, enter as PSC Exhibit 3.
5:09:08 PM	Chairman Schmitt		
		Note: Sacre, Candace	Objection?
5:09:17 PM	Chairman Schmitt		
		Note: Sacre, Candace	Filed/entered PSC Exhibit 3.
5:09:25 PM	PSC EXHIBIT 3		
		Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
		Note: Sacre, Candace	KENTUCKY AMERICAN 2018-00358 FINAL ORDER
5:09:36 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Pg 66 Final Order references 9.7 ROE, discussed appropriate ROE determined case-by-case basis, 9.7 ROE and 14.1 Kollen testimony, feel risk profile WSK significantly different ROE 440 basis points higher warranted?
5:10:11 PM	Camera Lock Video Conference Activated		
5:11:45 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Rebuttal, not sufficient opportunity submit market data and discuss?
5:12:07 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Operating ratio 88 percent, testified used 88 percent operating ratio because Commission accepted and relied on that?
5:12:36 PM	Camera Lock Deactivated		
5:12:36 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Not aware policy/directive must be 88 percent?
5:12:56 PM	Staff Atty Koenig PSC		
		Note: Sacre, Candace	Market data discussed Goad, Treasury Bond Yield Chart, PSC Exhibit 4, and Federal Reserve Press Release, PSC Exhibit 5.
5:13:51 PM	Chairman Schmitt		
		Note: Sacre, Candace	Mr. Osterloh, objection?

5:13:54 PM	Atty Osterloh Water Service Kentucky		
		Note: Sacre, Candace	Exhibit 4, Macro Trends, not sure foundation, object; Exhibit 5, public record, no objection.
5:14:12 PM	Chairman Schmitt		
		Note: Sacre, Candace	What is Exhibit 4?
5:14:13 PM	Staff Atty Koenig PSC		
		Note: Sacre, Candace	Just chart, Exhibit 4, only allow save all.
5:15:08 PM	Camera Lock Video Conference Activated		
5:15:16 PM	Chairman Schmitt		
		Note: Sacre, Candace	May be noted reliable market data that would abe admissible, may not be.
5:15:25 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Not able pull up Macro Trends.
5:15:44 PM	Chairman Schmitt		
		Note: Sacre, Candace	Exhibit 4 for identification not into evidence, Exhibit 5 admitted into evidence.
5:15:50 PM	PSC EXHIBIT 4 (identification purposes only)		
		Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
		Note: Sacre, Candace	MACRO TRENDS TREASURY BOND YIELD CHART
5:15:51 PM	PSC EXHIBIT 5		
		Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
		Note: Sacre, Candace	FEDERAL RESERVE PRESS RELEASE NOVEMBER 5, 2020
5:16:06 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Agree interest rates trending down?
5:16:34 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Federal Press Release Nov 5 2020, see same thing?
5:18:40 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Difference risk water utility and risk electric utility, opinion?
5:19:55 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Exhibits 4 and 5 trends over time, and not agree general direction interest rates reflected in chart?
5:20:54 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Direct, SC case 2002, operating ratio and calculating revenue requirement, fundamental process, pg 7, read lines 8 through 11?
5:21:15 PM	Camera Lock Deactivated		
5:22:05 PM	Staff Atty Koenig PSC - witness Lubertozzi		
		Note: Sacre, Candace	Supplied additional literature, Appendix - Article of Accounting for Public Utilities, pg 3, 14 of 28 PDF, operating ratio approach, reading. (Click on link for further comments.) Deemed necessary, qualifier?
5:22:48 PM	Camera Lock Video Conference Activated		
5:23:20 PM	Staff Atty Koenig PSC		
		Note: Sacre, Candace	Ask SC Docket No. 2000-0210-W/S Direct Testimony Steven M. Lubertozzi admitted, Exhibit 6.
5:23:31 PM	Chairman Schmitt		
		Note: Sacre, Candace	Mr. Osterloh?
5:23:33 PM	Atty Osterloh Water Service Kentucky		
		Note: Sacre, Candace	No objection.
5:23:34 PM	Chairman Schmitt		
		Note: Sacre, Candace	Sustained, entered. (Click on link for further comments.)
5:23:50 PM	Camera Lock Deactivated		
5:24:35 PM	PSC EXHIBIT 6		
		Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
		Note: Sacre, Candace	SC DOCKET NO. 2000-0210-W/S DIRECT TESTIMONY STEVEN M. LUBERTOZZI

5:25:06 PM	Camera Lock Video Conference Activated	
5:25:47 PM	Camera Lock Deactivated	
5:27:05 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	Exhibit 7, familiar with report?
5:28:12 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	PDF 59, pg 43, reading. Pg 44, read? (Click on link for further comments.)
5:29:29 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	Does not mention what target ratio should be?
5:29:35 PM	PSC EXHIBIT 7	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
	Note: Sacre, Candace	NRRI COST ALLOCATION AND RATE DESIGN FOR WATER UTILITIES DECEMBER 1990
5:29:43 PM	Camera Lock Video Conference Activated	
5:29:59 PM	Camera Lock Deactivated	
5:30:28 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	What just read, ROE compensation past ten years, repeat?
5:30:47 PM	Camera Lock Video Conference Activated	
5:31:13 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	Agree since 2010 expenses increased?
5:31:48 PM	Staff Atty Koenig PSC - witness Lubertozzi	
	Note: Sacre, Candace	Explanation/add, Rebuttal, pg 8, line 1, water utility Kentucky higher risk than electric utility, explain further?
5:33:06 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Ask chart prepared by Staff, expenses increased 67 percent, entered Exhibit 8.
5:33:11 PM	Camera Lock Deactivated	
5:33:28 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
5:33:29 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	No objection.
5:33:30 PM	Chairman Schmitt	
	Note: Sacre, Candace	Sustained, entered.
5:33:31 PM	PSC EXHIBIT 8	
	Note: Sacre, Candace	STAFF ATTY KOENIG PSC - WITNESS LUBERTOZZI
	Note: Sacre, Candace	2020-00160 WSCK COMPARATIVE ANALYSIS REQUESTED ROEs - STAFF SUMMARY
5:33:35 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	No further.
5:33:40 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
5:33:45 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Thank you.
5:33:50 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Examination. Agree operating ratio function of expense?
5:34:13 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	ROE function of invested capital?
5:34:33 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Invested capital, accumulated depreciation percentage overall capital, ROE return portion of capital, overall rate of return?
5:35:06 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Cash working capital, more invested rate base and accumulated depreciation but large chunk?

5:36:16 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Application, this case, total rate base books, March 2020, Schedule A, Net Utility Plant, line 13, $6.995 million, function of water plant service less accumulated depreciation?
5:36:27 PM	Camera Lock Video Conference Activated	
5:37:22 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	2018-00208, recent rate case, Schedule A, Application Exhibit 4, Plant In Service, Net Utility Plant, Water Plant in Service, Net Accumulated Depreciation, $7,020,687?
5:38:47 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	2017, yeah, so 28 months all'18, all '19, first three months of 2020, difference this Schedule A and one just saw?
5:39:26 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Difference $25,000 net investment rate base, net utility plant?
5:39:58 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Net investment/net utility plant gone down, Schedule B, Income Statement?
5:40:16 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Operating ratio function of expenses?
5:40:30 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Operating expenses end 2017 $2.114 million?
5:40:45 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Actual operating expenses per books 2017?
5:40:54 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Schedule A, this case, actual expenses March 31 2020, total operating expenses $2.76 million, line 46?
5:41:24 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Pro forma adjustment, $3.335 million?
5:41:36 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Actual expenses end 2017, operating $2.11 million, Guttormsen testimony, rate year proposing operating expenses $3.354 million<
5:42:17 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Increase more than $1.2 million, more than 50 percent increase?
5:42:32 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Disagree a firm earns return basis operating expenses financially incentivized increase operarting expenses maximize shareholder/firm value?
5:42:57 PM	Camera Lock Deactivated	
5:43:30 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	What operating ratio does making return function of operating expenses?
5:44:04 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Basis of rate return, incentivize utility to invest benefit of public service?
5:44:22 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Why does government care?
5:44:32 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Encouraged/incentivized invest?
5:44:49 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Agree premise rate of return, regulation incentivezes to invest by providing return on investment?

5:45:16 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Giving rate of return on investment inherently incentivizing to increase factor, why operating ratio uses operating expenses calculating return not attempting incent utility increase operating expenses?
5:45:55 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Specifically downside leads to possibility inflating operating expenses?
5:46:08 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Provides same incentive increase operating expenses the same way rate of return reg incentivizes increase investment increase firm value?
5:47:18 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Fact WSCK calculates rates basis operating ratio a driver at all 50 plus percent increase operating expenses end 2017 books and current pro form adjustments?
5:48:07 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Net utility plant not increasing, function two values, function gross plant and function of accumulated depreciation?
5:48:27 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Accumulated depreciation recovery allows company reinvest own system?
5:49:00 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Saying unusable as form of cheap capital reinvest in system?
5:49:32 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	March 31 2020 plant in service $13.3 million, $12.7 end 2017, increase in gross plant 27 months $600,000, approximately five percent?
5:50:22 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Proposed QIP?
5:50:32 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Not anything to do with ROE earned or incentivizing utilities invest in system?
5:51:44 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Water Service want to use rate of return in next base rate case?
5:53:01 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Question Koenig, 30-year Treasury rate, involved in number of rate cases current/previous positions?
5:53:22 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Aware CAPM analysis uses risk-free rate of return?
5:53:36 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	20-year Treasury bill occasionally used as risk-free rate of return?
5:54:07 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	What is Tamiment?
5:54:53 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Description reason why at 50 percent, difference between ERC and revenue?
5:55:31 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Moved from Northbrook, Illinois, to Chicago?
5:55:39 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	More or less expensive move to Chicago?
5:56:45 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	How much more Chicago location?

5:58:43 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Other than tax basis, purpose so many intermediary holding companies?
6:00:06 PM	Vice Chairman Chandler - witness Lubertozzi	
	Note: Sacre, Candace	Costs having all holding companies?
6:00:46 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	All questions.
6:00:50 PM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
6:00:53 PM	Commissioner Mathews	
	Note: Sacre, Candace	One.
6:01:06 PM	Commissioner Mathews - witness Lubertozzi	
	Note: Sacre, Candace	Examination. QIP, would have asked for had not the Commission given Kentucky American?
6:02:46 PM	Commissioner Mathews - witness Lubertozzi	
	Note: Sacre, Candace	Aware changes Commission toward QIP between time approved and first filing Kentucky American?
6:03:07 PM	Commissioner Mathews - witness Lubertozzi	
	Note: Sacre, Candace	Limited to aging cast-iron mains and company demonstrated aging mains accounting for most water loss?
6:03:31 PM	Commissioner Mathews - witness Lubertozzi	
	Note: Sacre, Candace	Case in Clinton and Middlesboro systems?
6:03:58 PM	Commissioner Mathews - witness Lubertozzi	
	Note: Sacre, Candace	Responsibility provide safe and reliable service?
6:04:14 PM	Commissioner Mathews	
	Note: Sacre, Candace	All have.
6:04:19 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
6:04:22 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Yes.
6:04:32 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Redirect Examination. Questions Staff Exhibit, Column A, five most recent rate cases?
6:04:44 PM	Camera Lock Video Conference Activated	
6:05:02 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	All five, company proposed operating ratio methodology calculate revenue?
6:05:21 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Column C, amounts requested net operating income?
6:05:35 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Calculation Column M ROE based on requested not what approved in Final Order?
6:05:57 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Earlier, time period, company earned less than two percent ROE calculated?
6:05:58 PM	Camera Lock Deactivated	
6:06:15 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Highest ROE achieved since utilizing 88 percent operating ratio?
6:06:36 PM	Atty Osterloh Water Service Kentucky - witness Lubertozzi	
	Note: Sacre, Candace	Full disclosure 8.5 percent highest one-month period, also mentioned some months negative?
6:06:58 PM	Atty Osterloh Water Service Corporation	
	Note: Sacre, Candace	All questions.

6:07:00 PM	Chairman Schmitt	
	Note: Sacre, Candace	Questions anyone else?
6:07:03 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?
6:07:14 PM	Chairman Schmitt	
	Note: Sacre, Candace	Continuation of hearing/order of scheduled witnesses. (Click on link for further comments.)
6:08:38 PM	Session Paused	
6:20:59 PM	Session Resumed	
6:21:20 PM	Chairman Schmitt	
	Note: Sacre, Candace	Back on record. Ms. Potter put on Ms. Payne, finish in an hour.
6:21:55 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Fine, no cross Kollen.
6:22:00 PM	Chairman Schmitt	
	Note: Sacre, Candace	City of Clinton's witness, Ms. Potter?
6:22:26 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Shannon Payne.
6:22:43 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
6:22:55 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
6:22:56 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Thank you.
6:22:59 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Direct Examination. Name?
6:23:07 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Business address?
6:23:19 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Occupation?
6:23:28 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Direct testimony filed?
6:23:37 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Updates/corrections?
6:23:47 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Asked same questions, same answers?
6:24:01 PM	Atty Potter City of Clinton - witness Payne	
	Note: Sacre, Candace	Adopt testimony?
6:24:12 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Ready for cross.
6:24:15 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh, Mr. Gardner?
6:24:22 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Not have questions.
6:24:24 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
6:24:26 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Not have questions.
6:24:31 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
6:24:32 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Not have questions.
6:24:36 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?

6:24:41 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	A couple.
6:24:42 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Examination. Read rebuttal testimony?
6:24:50 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Aware Lubertozzi responded issues raised in direct testimony?
6:25:06 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Pgs 9 and 10, Lubertozzi testimony, late payments utility bills, transition Northbrook to Chicago, your testimony audited financial statements resolved, agree?
6:25:54 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Explain?
6:26:19 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Don't agree issue resolved?
6:26:27 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Monthly reporting City of Clinton timely basis now?
6:26:41 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Agree Vaughan testimony City of Clinton Fire Department?
6:27:05 PM	Vice Chairman Chandler - witness Payne	
	Note: Sacre, Candace	Ignoring KU issue, anything outstanding not addressed by WSCK?
6:27:36 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	All questions.
6:27:40 PM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
6:27:43 PM	Commissioner Mathews	
	Note: Sacre, Candace	Don't have any.
6:27:45 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
6:27:50 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Do not.
6:27:53 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused?
6:27:58 PM	Chairman Schmitt	
	Note: Sacre, Candace	May be excused.
6:28:00 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter, another witness?
6:28:06 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	Joint witness, turn over to Ms. Goad.
6:28:14 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
6:28:24 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Lane Kollen.
6:28:36 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness is sworn.
6:28:45 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
6:28:50 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Direct Examination. Name?
6:28:54 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Business address?
6:29:07 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Occupation?
6:29:17 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Direct testimony?

6:29:22 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	AG/City of Clinton ask file testimony operating ratio versus return on equity issue, nothing else?
6:29:33 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Additions/corrections?
6:29:39 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Asked same questions, same answers?
6:29:44 PM	Asst Atty General Goad - witness Kollen	
	Note: Sacre, Candace	Adopt testimony?
6:29:50 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Available for cross.
6:29:53 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloah, Mr. Gardner?
6:29:57 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	No.
6:29:59 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig?
6:30:01 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Yes.
6:30:03 PM	Staff Atty Koenig PSC - witness Kollen	
	Note: Sacre, Candace	Cross Examination. ROE models increased or decreased, why?
6:30:37 PM	Staff Atty Koenig PSC - witness Kollen	
	Note: Sacre, Candace	Think ROE awards are -
6:30:41 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Interject, Kollen testified not related what ROE should be, limited to ROE or operating ratio methodology.
6:31:03 PM	Chairman Schmitt	
	Note: Sacre, Candace	Discussed on direct, cross may continue. Objection overruled.
6:31:26 PM	Staff Atty Koenig PSC - witness Kollen	
	Note: Sacre, Candace	Water companies versus gas/electric companies, ROE awards typicall less for water?
6:32:20 PM	Staff Atty Koenig PSC - witness Kollen	
	Note: Sacre, Candace	Recall policy/directive whether 88 percent used operating ratio?
6:34:06 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Nothing further.
6:34:38 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Osterloh?
6:34:52 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Not have cross.
6:34:56 PM	Chairman Schmitt	
	Note: Sacre, Candace	Vice Chairman Chandler?
6:35:04 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Couple.
6:35:17 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Examination. Reduction in risk, pg 4, reading. (Click on link for further comments.) Not detail basis. Mentioned reduction in variability expenses, basis water less risk?
6:37:30 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Recognition of risk, 50 basis points, basis that amount?
6:39:27 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	No firm specific information 50 basis point?
6:39:51 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Case any other jurisdictions utility uses other than ROE, such as debt service coverage or operating ratio?

6:41:46 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Debt service and tier unreasonable type and size of WSCK?
6:44:25 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Size premium correlates inherent risk proxy group in calculating rate of return, ROE?
6:45:26 PM	Vice Chairman Chandler - witness Kollen	
	Note: Sacre, Candace	Opinion size premium apply only small companies not part of larger companies?
6:45:53 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	All have.
6:45:56 PM	Chairman Schmitt	
	Note: Sacre, Candace	Dr. Mathews?
6:46:02 PM	Commissioner Mathews	
	Note: Sacre, Candace	Not have any.
6:46:04 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Goad?
6:46:06 PM	Asst Atty General Goad	
	Note: Sacre, Candace	No.
6:46:07 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Potter?
6:46:09 PM	Atty Potter City of Clinton	
	Note: Sacre, Candace	No.
6:46:12 PM	Chairman Schmitt	
	Note: Sacre, Candace	Witness be excused, anything else?
6:46:23 PM	Chairman Schmitt	
	Note: Sacre, Candace	Excused.
6:46:28 PM	Chairman Schmitt	
	Note: Sacre, Candace	Case for all parties?
6:46:33 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Correct.
6:46:35 PM	Chairman Schmitt	
	Note: Sacre, Candace	Anything else?
6:46:57 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	No further.
6:46:59 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Nothing.
6:47:01 PM	Chairman Schmitt	
	Note: Sacre, Candace	Data requests, briefs?
6:47:12 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Yes.
6:47:13 PM	Chairman Schmitt	
	Note: Sacre, Candace	Deadline December 8, data requests filed tomorrow?
6:47:30 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	Should be able.
6:47:41 PM	Chairman Schmitt	
	Note: Sacre, Candace	Data requests end of day November 13.
6:48:01 PM	Chairman Schmitt	
	Note: Sacre, Candace	Mr. Garner, Mr. Osterloh, responses on/before November 20?
6:48:18 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Doable.
6:48:23 PM	Chairman Schmitt	
	Note: Sacre, Candace	If problem, file something.

6:48:30 PM	Chairman Schmitt	
	Note: Sacre, Candace	Briefs/responsive brief, simultaneous by end of day November 23. Responsive brief by December 1. Dates okay?
6:49:46 PM	Asst Atty General Goad	
	Note: Sacre, Candace	Good with dates.
6:50:03 PM	Vice Chairman Chandler	
	Note: Sacre, Candace	Confirm, Staff and petitioners effective date proposed rates December 8?
6:50:16 PM	Chairman Schmitt	
	Note: Sacre, Candace	Is the 8th.
6:50:19 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Thought it was 7th.
6:50:46 PM	Chairman Schmitt	
	Note: Sacre, Candace	If you would, yes, defer to 8th. Otherwise, just have three days.
6:51:13 PM	Chairman Schmitt	
	Note: Sacre, Candace	Ms. Koenig, problem?
6:51:16 PM	Staff Atty Koenig PSC	
	Note: Sacre, Candace	In record as December 8, 2020.
6:51:39 PM	Chairman Schmitt	
	Note: Sacre, Candace	Everybody okay with data requests, responses, brief schedule?
6:51:45 PM	Atty Osterloh Water Service Kentucky	
	Note: Sacre, Candace	Yes.
6:51:48 PM	Chairman Schmitt	
	Note: Sacre, Candace	Anything before close?
6:52:15 PM	Chairman Schmitt	
	Note: Sacre, Candace	Hearing adjourned.
6:52:23 PM	Session Ended	

Exhibit List Report

2020-00160 12Nov2020

Water Service Corporation of Kentucky (Water Service Kentucky)

Name:	Description:
PSC Exhibit 01	Periodic Water Inspection Water Service Corp (Clinton) Water System
PSC Exhibit 02	Periodic Water Inspection Water Service Corp of Kentucky Water System Bell County KY
PSC Exhibit 03	Kentucky American 2018-00358 Final Order
PSC Exhibit 04 (IDENTIFICATION ONLY)	Macro Trends Treasury Bond Yield Chart
PSC Exhibit 05	Federal Reserve Press Release November 5, 2020
PSC Exhibit 06	SC Docket No. 2000-0210-W/S Direct Testimony Steven M. Lubertozzi
PSC Exhibit 07	NRRI Cost Allocation and Rate Design for Water Utilities December 1990
PSC Exhibit 08	2020-00160 WSCK Comparative Analysis Requested ROEs - Staff Summary

PSC EXHIBIT 1

Matthew G. Bevin
Governor

Charles G. Snavely
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Public Service Commission
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615
Telephone: (502) 564-3940
Fax: (502) 564-3460
psc.ky.gov

Michael J. Schmitt
Chairman

Robert Cicero
Vice Chairman

Talina R. Mathews
Commissioner

August 28, 2019

Stephen R. Vaughn
Water Service Corp (Clinton)
P.O. Box 818
Middlesboro, KY 40965

Re: Periodic Water Inspection
Water Service Corp (Clinton) Water System
Hickman County, KY

Dear Mr. Vaughn:

Public Service Commission staff performed a periodic inspection of the Water Service Corp (Clinton) water system on August 20, 2019, reviewing utility operations and management practices pursuant to Commission regulations. The report of this inspection is enclosed with this letter.

Based on the inspector's observations, the following deficiency was identified:

1. Water Service Corporation (Clinton) is not in compliance with the Divison of Water as required in 807 KAR 5:066, Section 3(1). (No Certified Operator)

For the one deficiency listed above, please submit a plan of action with documentation supporting the plan. As discussed at the inspection, please include the new operator's name and the approval of an alternate staffing plan from the Division of Water. This shall be submitted by September 20, 2019.

Please review the enclosed inspection report in its entirety as you will find further information noted in regard to the inspection. If you have any questions regarding this inspection, feel free to contact Erin Donges at 502-782-2627 or via email at erin.donges@ky.gov.

Sincerely,

Erin Donges
Utility Regulatory & Safety Investigator

Public Service Commission

Enclosure(s)

Copy: Stephen Lubertozzi, President

PSC EXHIBIT 2

Matthew G. Bevin
Governor

Charles G. Snavely
Secretary
Energy and Environment Cabinet

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Michael J. Schmitt
Chairman

Robert Cicero
Vice Chairman

Talina R. Mathews
Commissioner

July 22, 2019

Stephen Vaughn
Water Service Corp of Kentucky(Middlesboro)
P.O. Box 818
Middlesboro, KY 40965

Re: Periodic Water Inspection
Water Service Corp of Kentucky Water System
Bell County, KY

Dear Mr. Vaughn:

Public Service Commission staff performed a periodic inspection of the Water Service Corp of Kentucky water system on June 19, 2019, reviewing utility operations and management practices pursuant to Commission regulations. The report of this inspection is enclosed with this letter.

Based on the inspector's observations, the following deficiencies were identified:

1. Utility did not have annual written inspection records as required by 807 KAR 5:006, Section 26(6)(b). (All valves are not inspected on a yearly basis)

2. Utility has 5/8" x 3/4" meters that have been in service in 10 years without being tested contrary to the table in 807 KAR 5:066, Section 16(1). (300 meters over 10 years without being tested)

For the two deficiencies listed above, an explanation of why these deficiencies occurred and how these deficiencies will be remedied and prevented in the future needs to be provided. A letter addressing the organization's actions regarding these deficiencies shall be submitted by August 22, 2019.

Please review the enclosed inspection report in its entirety as you will find further information noted in regard to the inspection. If you have any questions regarding this inspection, feel free to contact Erin Donges at 502-782-2627 or via email at erin.donges@ky.gov.

Sincerely,

Erin Donges
Utility Regulatory & Safety Investigator
Public Service Commission

Enclosure(s)

Copy: Stephen Lubertozzi, President

PSC EXHIBIT 3

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF KENTUCKY-AMERICAN WATER COMPANY FOR AN ADJUSTMENT OF RATES	)))	CASE NO. 2018-00358

ORDER

On November 28, 2019, Kentucky-American Water Company (Kentucky-American), pursuant to KRS 278.180, KRS 278.190, and 807 KAR 5:001, Section 16(1)(b)(1), filed an application requesting to increase its rates and establish a Qualified Infrastructure Program (QIP) tariff to replace aging infrastructure. Kentucky-American also requested approval of a utility plant acquisition adjustment in connection with the purchase of the city of North Middletown's (North Middletown) water system assets.

BACKGROUND

Kentucky-American, a wholly owned subsidiary of American Water Works Company, Inc. (American Water), is a jurisdictional utility that distributes and sells water to approximately 130,000 customers in its Central Division, which consists of Bourbon, Clark, Fayette, Franklin, Harrison, Jessamine, Nicholas, Scott, and Woodford counties; its Northern Division, which consists of Gallatin, Owen, and Grant counties; and its Southern Division, which consists of Rockcastle and Jackson counties.[1]

In its application, Kentucky-American requested an increase in water revenues of $19,865,003 million, or 22.6 percent per year for the forecasted test period, compared to

[1] Application at paragraph 2; Direct Testimony of Ann E. Bulkley (Bulkley Direct Testimony) at 37.

the operating revenues for the forecasted test period under existing water rates. On April 15, 2019, Kentucky-American filed a base period update (Base Period Update) that reduced the requested revenue requirements by $1,382,884, to $18,482,119, or 21.01 percent per year for the forecasted test period.

There are two intervenors in this matter: The Attorney General of the Commonwealth of Kentucky, by and through the Office of Rate Intervention (Attorney General), and Lexington-Fayette Urban County Government (LFUCG) (jointly, Attorney General/LFUCG).[2] The Attorney General and LFUCG entered into a joint participation agreement and co-sponsored two witnesses. By Order entered December 5, 2018, the Commission suspended the proposed rates up to and including June 27, 2019. Following discovery, the Commission held an evidentiary hearing on May 13–14, 2019, in Frankfort, Kentucky. The Commission conducted a public meeting in Lexington, Kentucky, on May 6, 2019. All parties submitted written briefs. This matter now stands submitted to the Commission for a decision.

TEST PERIOD

Kentucky-American used as its forecasted test period the 12-month period ending June 30, 2020.[3] Its base period is the 12-month period ending February 28, 2019.[4]

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[2] The Community Action Council for Lexington-Fayette, Bourbon, Harrison, and Nicholas Counties, Inc. withdrew its request to intervene on January 8, 2019.

[3] Application at paragraph 6.

[4] *Id.* at paragraph 7.

VALUATION

Rate Base

Kentucky-American proposed a forecasted net investment rate base of $441,122,362 based on a 13-month average for that period.[5] In its Base Period Update, Kentucky-American increased the proposed rate base to $446,698,296.[6] The Attorney General/LFUCG proposed to reduce Kentucky-American's rate base to $426,623,063.[7] The Attorney General/LFUCG proposed to (1) reduce cash working capital to reflect the Attorney General/LFUCG's adjustments to Kentucky-American's lead-lag study and removal of non-cash expense; and (2) apply a slippage factor.

Cash Working Capital

Working capital is an element of rate base that recognizes the amount of investor-supplied capital used to fund the utility's day-to-day operations and to compensate shareholders for the delay in recovery of certain expenses from ratepayers. Kentucky-American's proposed $3,754,000[8] for working capital, which was increased to $3,961,000 in the Base Period Update, is based upon a lead/lag study performed on the historical data for the 12-month period ending August 31, 2018.[9]

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[5] Application, Exhibit 37, Schedule B-1 at 2.

[6] Base Period Update (filed Apr. 15, 2019), Exhibit 37, Schedule B-1 at 2.

[7] Direct Testimony of Lane Kollen (Kollen Testimony), Revenue Requirement Model, Kollen_KAW_Revenue_Requirement_Model_Recommendation_03.15.19.xlsx, Rate Base Tab, Line 19, Column I.

[8] Application, Exhibit 37, Schedule B-1, Page 2 of 2, and Schedule B-5.

[9] Base Period Update at 1; Direct Testimony of Melissa L. Schwarzell (Schwarzell Direct Testimony) at 23.

The Attorney General/LFUCG proposed to reduce cash working capital by $10,435,000 to reflect three proposed adjustments to Kentucky-American's lead/lag study. These adjustments have a net impact of lowering the revenue requirement by $1,051,237 million.[10]

(1) Service Company Charges

American Water Works Service Company (Service Company) has a prepayment provision under which the Service Company bills for estimated charges for its services to Kentucky-American for the current month, and then subsequently trues up the estimated and actual charges. The Attorney General/LFUCG contended that the prepayment provision is unreasonable because it allows American Water recovery at Kentucky-American's grossed-up allowed return instead of at American Water's actual and lower cost of short-term debt.[11] The Attorney General/LFUCG argued that this prepayment practice is unusual and results in negative expense lead days and artificially increases the cash working capital included in the Kentucky-American's rate base.[12] The Attorney General/LFUCG recommended that the Commission modify the expense lag days from the negative 3.50 days to 45.63 days. The Attorney General/LFUCG's modification results in a reduction in rate base of $1,309,000 and a reduction in revenue requirement of $131,871.

Kentucky-American countered that the Service Company exists to provide services to American Water affiliates at cost and that it does not make a profit from the

[10] Direct Testimony of Lane Kollen (Kollen Testimony), Revenue Requirement Model, Kollen_KAW_Revenue_Requirement_Model_Recommendation_03.15.19.xlsx, Summ Rev Req Tab.

[11] *Id.* at 8.

[12] *Id.* at 8.

provision of those services.[13] Kentucky-American maintained that the Service Company's billing terms are meant to match expenses with the receipt of payments from affiliates, which are the beneficiaries of the services.[14] According to Kentucky-American, prepayment of the at-cost Service Company bill is a reasonable provision to support cash expenses and payroll incurred on behalf of Kentucky-American.[15] Kentucky-American further noted that the data used to illustrate the differences between invoice and payment amounts looked only at the monthly impact and not the annual impact and is exaggerated, and the Attorney General/LFUCG failed to make a corresponding increase for the short-term debt costs.[16]

In his post-hearing brief, the Attorney General argued that the prepayment arrangement benefits shareholders, but not ratepayers, because the carrying cost on the capital employed is at Kentucky-American's grossed-up return instead of American Water's lower short-term debt costs.[17] The Attorney General stated that this form of arbitrage is not reasonable and the excessive cost incurred through cash working capital should be disallowed.[18]

In response, Kentucky-American argued that prepayments are a reasonable provision to support cash expenses and payroll incurred on behalf of Kentucky-

[13] Rebuttal Testimony of Melissa L. Schwarzell (Schwarzell Rebuttal Testimony) at 11.

[14] *Id.* at 11.

[15] *Id.* at 13.

[16] *Id.* at 12.

[17] Attorney General Post-Hearing Reply Brief (Attorney General Brief) (filed June 11, 2019) at 8.

[18] *Id.* at 9.

American.[19] Kentucky-American claimed that the Service Company does not make a profit from these services and that any interest income attributable to Kentucky-American's prepayments flow back to Kentucky-American.[20]

(2) Cash Dividend Expense

The Attorney General/LFUCG contended that Kentucky-American's dividend is a cash expense paid quarterly through a disbursement of cash by Kentucky-American to its parent, American Water.[21] Thus, according to the Attorney General/LFUCG, the cash dividend should be separated from the non-cash non-dividend components of the net income "expense" in the lead/lag study.[22] The Attorney General/LFUCG recommended a 75/25 percent allocation between the cash and non-cash components and, because dividends are paid both quarterly and in arrears, the Attorney General/LFUCG suggested that the Commission apply 134.9 days, as opposed to 0 days, to the cash component.[23] The Attorney General/LFUCG's proposal would reduce the rate base by $6,418,000 and reduce revenue requirement by $646,559.[24]

Kentucky-American countered that the Attorney General/LFUCG's position conflicts with Commission precedent, is unreasonable, and should be rejected.[25]

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[19] Kentucky-American Post-Hearing Brief (Kentucky-American Brief) (filed May 31, 2019) at 29.

[20] *Id.* at 29.

[21] Kollen Testimony at 10.

[22] *Id.* at 10; Attorney General Brief at 9.

[23] Kollen Testimony at 12; Attorney General Brief at 9.

[24] Kollen Testimony, Revenue Requirement Model, Kollen_KAW_Revenue_Requirement_Model_Recommendation_03.15.19.xlsx, Summ Rev Req Tab.

[25] Schwarzell Rebuttal Testimony at 10; Kentucky-American Brief at 29.

Kentucky-American argued that, in prior decisions, the Commission found that investors are entitled to a return when service is rendered and are entitled to daily reinvestment of the earnings.[26] Kentucky-American asserted that how it finances its ongoing operations, relative to dividend payment, is purely a financing decision that has no effect on whether a cash return is expected at the time that service is rendered.[27]

(3) Non-cash Items

The Attorney General/LFUCG argued that a cash working capital study should not include non-cash expenses.[28] The Attorney General/LFUCG asserted that depreciation and amortization expense, deferred income tax expense, and a non-cash, non-dividend component of net income expense should be excluded because such expenses do not require a cash disbursement.[29] The Attorney General/LFUCG claimed that applying zero expense lag days to these expenses assumes that they will actually be paid in cash when they are incurred and have no expense lag days.[30] Because these expenses are never paid in cash, the Attorney General/LFUCG contended that "the correct expense lag days for never is infinity, which essentially removes the non-cash items from cash working capital."[31] In his post-hearing brief, the Attorney General noted that at the hearing, Kentucky-American's expert witness, Ms. Melissa L. Schwarzell, confirmed that not only

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[26] *Id.*

[27] *Id.*

[28] Kollen Testimony at 13.

[29] *Id.* at 13–14.

[30] *Id.* at 14.

[31] *Id.* at 15.

does depreciation never get paid in cash, but is not paid at all.[32] The Attorney General/LFUCG recommended removing the non-cash items, which results in a decrease in rate base of $2,708,000 and revenue requirement of $272,808.[33]

Kentucky-American argued that the Attorney General made similar recommendations to exclude non-cash items from Kentucky-American's lead/lag study in past cases and that the Commission has repeatedly rejected the Attorney General's recommendations.[34] Kentucky-American stated that the same working capital methodology used in this case has been used for numerous prior rates cases.[35] Kentucky-American argued that the Commission has consistently found that deferred taxes and depreciation should be included in the cash working capital calculation in order for investors to be made whole.[36]

The Commission notes that Kentucky-American's lead/lag study uses the same methodology that we have accepted since 1983.[37] We agree with Kentucky-American that the Attorney General has consistently presented, and the Commission has consistently refused to adopt, the arguments raised here regarding the inclusion of non-

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[32] Attorney General Brief at 10.

[33] Kollen Testimony, Revenue Requirement Model, Kollen_KAW_Revenue_Requirement_Model_Recommendation_03.15.19.xlsx, Summ Rev Req Tab.

[34] Schwarzell Rebuttal Testimony at 7.

[35] *Id.*

[36] *Id.* at 9.

[37] Case No. 8314, *Notice of Adjustment of Rates of Kentucky-American Water Company* (Ky. PSC Feb. 8, 1982) at 6.

cash items in the calculation of working capital.[38] The Attorney General/LFUCG offered no new evidence or arguments in the current proceeding to disturb our previous findings or to support a change in our position on this matter. Therefore, consistent with precedent and based upon the evidence in the record, we find the Attorney General/LFUCG's proposal regarding cash working capital should be denied.

Slippage

Kentucky-American segregates its construction budgets into three categories: (1) normal recurring construction; (2) construction projects funded by others; and (3) major investment projects. In response to a data request, Kentucky-American provided a cumulative slippage factor of 101.89 percent based upon its calculation of a ten-year average slippage factor of 110.46 percent for all recurring projects and 91.08 percent for all investment projects.[39] Also, in response to a data request, Kentucky-American revised its rate base calculation from $441,122,362 to $441,111,572, which increased the revenue requirement in its application from $19,865,003 to $20,001,661, or $136,657.[40]

The Attorney General/LFUCG argued that Kentucky-American historically spends less than its annual capital budget, and therefore the Commission should apply a slippage

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[38] *See* Case No. 10069, *Notice of Adjustment of the Rates of Kentucky-American Water Company* (Ky. PSC July 31, 1996) at 6–8; Case No. 92-452, *Notice of Adjustment of the Rates of Kentucky-American Water Company* (Ky. PSC Nov. 19, 1993) at 17–21; Case No. 95-554, *Notice of Adjustment of the Rates of Kentucky-American Water Company* (Ky. PSC Sept. 11, 1996) at 21–24; Case No. 97-034, *Notice of Adjustment of the Rates of Kentucky-American Water Company* (Ky. PSC Sept. 30, 1997) at 25–28; Case No. 2004-00103, *Adjustment of the Rates of Kentucky-American Water Company* (Ky. PSC Feb. 28, 2005) at 17.

[39] Kentucky-American Response to Commission Staff's Second Request for Information (Staff's Second Request), Items 2–3; Kentucky-American Brief at 30. Kentucky-American applied a ten-year historical slippage factor, which is consistent with Commission previous decisions in Kentucky-American rate case.

[40] Kentucky-American's Response to Commission Staff's Fourth Request for Information, Item 5; Base Period Update at Exhibit 37.

factor of 91.968 percent based on a comparison between the annual actual construction expenditures and the annual original construction budget for 2008 through 2017.[41] The Attorney General/LFUCG's proposed adjustment, based on a slippage factor of 91.968 percent, reduced rate base by $4,064,299 and expenses by $554,000, which included the impact on the grossed-up return on the reduction in the rate base and the reduction in depreciation and property tax expenses.[42]

Kentucky-American countered that the Attorney General/LFUCG's use of the 91.968 percent slippage factor is inaccurate because it omits much of Kentucky-American's actual spend.[43] Kentucky-American maintained that the Attorney General/LFUCG based the information on a response to a data request that Kentucky-American asserted does not appropriately compare budgeted and actual spend because it omits $21 million of infrastructure investment.[44] Kentucky-American asserted that the slippage percent of 101.89 percent as set forth in Item 3 of Commission Staff's Second Request for Information is consistent with Commission precedent and should be applied.[45]

In his post-hearing brief, the Attorney General argued that this is the first time that Kentucky-American proposed a slippage factor as part of its Base Period Update that

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[41] Kollen Testimony at 16, 18; Attorney General Brief at 10.

[42] Kollen Testimony at 18–19; Attorney General Post-Hearing Reply Brief at 11.

Slippage Plant Additions	$(409,443)
Depreciation and Property Tax	$(145,028)
Total	$(554,471)

[43] Rebuttal Testimony of Brent E. O'Neill (O'Neill Rebuttal Testimony) at 2; Kentucky-American Brief at 30–32.

[44] O'Neill Rebuttal Testimony at 2–4.

[45] *Id.* at 5; Kentucky-American Brief at 30.

increased the revenue requirement.[46] The Attorney General questioned why Kentucky-American did not initially apply a slippage factor in its application, given that historically the Commission has applied it, and it is beneficial to the shareholders.[47] The Attorney General recommended that the Commission follow the established precedent and apply the adjustment proposed by Attorney General/LFUCG.[48]

In its reply brief, Kentucky-American reiterated that the Attorney General/LFUCG's proposed slippage adjustment is unreasonable but noted that all parties agree that a slippage factor should be applied based upon Kentucky-American's budget.[49] Kentucky-American also reiterated that the Attorney General/LFUCG's recommendation ignores the $21 million of actual capital spent and is not a reasonable representation of budgeted and actual amount spent.[50] Kentucky-American argued that it followed Commission methodology, which is consistent with precedent, and therefore Kentucky-American's proposed slippage adjustment should be approved.[51]

The Commission agrees that the Attorney General/LFUCG's recommended slippage factor is incorrect because it excludes projects actually constructed and that were included in Kentucky-American's capital plan. Additionally, the Attorney General/LFUCG did not include the impact the slippage factor has on other components

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[46] Attorney General Brief at 11.

[47] *Id.*

[48] *Id.*

[49] Kentucky-American Post-Hearing Reply Brief (Kentucky-American Reply Brief) (filed June 14, 2019) at 25.

[50] *Id.* at 26.

[51] *Id.*

of revenue requirement, including construction work in progress (CWIP), contributions in aid of construction (CIAC), deferred income taxes, and short-term debt. For the above reasons, the Commission does not accept the Attorney General/LFUCG's proposed adjustment.

The Commission notes that Kentucky-American's 91.08 percent slippage factor for investment projects correctly included construction projects approved by its capital investment management committee (CIMC) but not included in the capital plan. However, the 91.08 slippage factor for investment projects did not reflect the estimated costs that were approved by the CIMC. Because the estimated costs approved by the CIMC were not included, Kentucky-American's slippage calculation includes the total capital spent for each year, but not the overall budgeted capital investment plan. As a result, Kentucky-American overstated the slippage factor for investment projects because it included only the actual costs expended to construct the CIMC-approved projects and did not include the offsetting estimates. Including the cost estimates approved by the CIMC in the calculation of the slippage factors for the investment projects, the Commission has determined that the ten-year average slippage factor for investment projects should be decreased from 91.08 percent to 81.45 percent.[52]

Regarding the slippage factor for recurring projects, the Commission finds that the evidence in the record supports Kentucky-American's slippage factor of 110.46 percent.

For the above reasons and based on the evidence in the record, the Commission finds that applying a ten-year average slippage factor of 81.45 percent should be applied

[52] Kentucky-American's Responses to Commission Staff's Fourth Request for Information (Staff's Fourth Request), Item 4(a).

to investment projects, and a ten-year average slippage factor of 110.46 percent should be applied to recurring projects.

Rate Base Adjustments

(1) Utility Plant in Service (UPIS):[53]

For the reasons discussed above, the Commission finds that applying a slippage factor of 81.45 percent for investment projects and a slippage factor of 110.46 percent for recurring projects to UPIS results in adjustments that reduce the forecasted UPIS by $1,016,411 and revenue requirement by $112,996.

(2) Accumulated Depreciation

Kentucky-American forecasted the accumulated depreciation to be $197,770,499 based on a 13-month average of its accumulated depreciation balances from June 1, 2019, through June 30, 2020.[54] Because the Tax Cuts and Jobs Act (TCJA) made CIAC and customer advances taxable income for water and sewer utilities, Kentucky-American included the impact that the federal income tax gross-up on CIAC and customer advances would have on accumulated depreciation.[55] Once Kentucky-American became aware that the Commission does not permit water utilities such as Kentucky-American to gross-up CIAC and customer advances,[56] Kentucky-American informed the Commission that it

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[53] To calculate UPIS, Kentucky-American used capital construction budgets, which are separated into three categories: normal recurring construction, major investment projects, and construction projects funded by others (CIAC). Of the three categories, normal recurring construction and major investment projects are relevant to the calculation of UPIS in regard to slippage factors.

[54] Application, Exhibit 37, Schedule B-1, at page 2.

[55] Schwarzell Rebuttal Testimony at 2–4.

[56] *See* Administrative Case No. 313, *The Effects of the Tax Reform Act Of 1986 on Contributions In Aid Of Construction and Customer Advances* (Ky. PSC July 8, 1988).

had ceased collecting tax gross-ups for new contributions and had refunded the tax gross-up on contributions that had already been collected.[57]

In its Base Period Update, Kentucky-American increased its accumulated depreciation by $41,484 to reflect the elimination of the impact of CIAC and customer advances tax gross-up and the construction slippage factors that it used in adjusting UPIS.

The Commission finds that the forecasted accumulated depreciation should be adjusted to reflect the effect of construction slippage discussed above and to reflect the elimination of the CIAC and Customer Advances tax gross-up. This results in a decrease in rate base of $19,206 and decrease in revenue requirement of $2,134.[58]

(3) <u>Construction Work in Progress (CWIP)</u>

Kentucky-American included $7,859,210 in forecasted CWIP based upon its capital construction budgets for the period from June 1, 2019, through June 30, 2020.[59] In its Base Period Update, Kentucky-American increased its accumulated depreciation by $87,868 to reflect the impact of the construction slippage factors it used to adjust UPIS. Using the Commission approved slippage, the CWIP balance decreases by $203,005 and revenue requirement decreases $22,568.

(4) <u>Cash Working Capital</u>

Using the lead-lag study that it presented, Kentucky-American calculated a base working capital requirement of $3,754,000.[60] In its Base Period Update, Kentucky-

[57] Schwarzell Rebuttal Testimony at 4.

[58] Slippage adjustment of $(29,220) + FIT Gross-Up Elimination of $10,014.

[59] Application, Exhibit 37, Schedule B-4.1 at 2.

[60] Application, Exhibit 37, Schedule B-1, page 2 of 2 and Schedule B-5.

American increased cash working capital by $207,000. By applying its adjustments to the forecasted revenues and expenses to Kentucky-American's lead-lag study, the Commission calculated a revised cash working capital requirement of $3,553,000, a rate base reduction of $201,000. The cash working capital adjustment decreases revenue requirement by $22,346.

(5) <u>Contributions in Aid of Construction (CIAC)</u>.

In its application, Kentucky-American included CIAC of $73,319,577 as a reduction to rate base.[61] To reflect the elimination of the impact of CIAC and Customer Advances, tax gross-up, and the construction slippage factors it used in adjusting UPIS, Kentucky-American decreased forecasted CIAC by $ 1,108,255 to $72,211,322 in its Base Period Update.

The Commission rejects this adjustment and instead adjusts CIAC for the Commission-approved slippage. The resulting slippage and FIT Gross-Up impact results in an increase in rate base of $1,108,225 and an increase in the revenue requirement of $123,203.[62]

(6) <u>Customer Advances</u>

In its application, Kentucky-American included $(13,508,680) in forecasted customer advances.[63] Subsequently, in its Base Period update, Kentucky-American decreased forecasted customer advances by $1,042,381 to reflect the elimination of the

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[61] *Id.*

[62] Slippage adjustment of $(678,712) + FIT Gross-Up Elimination of $1,786,967.

[63] Application, Exhibit 37, Schedule B-1.

impact of CIAC and customer advances tax gross-up and the construction slippage factors it used in adjusting UPIS.

Adjusting Consumer Advances for the Commission approved slippage and eliminating the FIT Gross-Up results in an increase in the rate base of $1,042,381 and an increase in the revenue requirement of $115,880.[64]

(7) Accumulated Deferred Income Taxes (ADIT)

In its application, Kentucky-American deducted $90,721,671 of ADIT from its forecasted rate base.[65] In calculating its forecasted ADIT, Kentucky-American followed the requirements of the Accounting Standards Committee (ASC) 740.[66] Kentucky-American described ASC 740 as a balance sheet approach to deferred income taxes that requires the deferred income tax provision be shown in total, and recognized the regulatory assets and liabilities that will be recovered in rates in future years.[67] According to Kentucky-American, the largest portion of excess forecasted ADIT is associated with the TCJA.[68] Kentucky-American was unable to calculate the impact the TCJA would have on its excess ADIT or the amortization of the excess ADIT, therefore, the full amount of the TCJA liability was originally deducted from rate base.[69]

Kentucky-American included a negative amortization expense amount, and the corresponding increase in rate base, in the forecast year revisions filed with its Base

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[64] Slippage adjustment of $(218,411) + FIT Gross-Up Elimination of $1,260,792.

[65] Application at Exhibit 37, Schedule B-1, page 2.

[66] Direct Testimony of John R. Wilde (Wilde Direct Testimony) at 5.

[67] *Id.* at 5.

[68] Schwarzell Direct Testimony at 24.

[69] *Id.*

Period Update.[70] Kentucky-American increased rate base ADIT by $455,188 to remove the 13-month average of the amortization of the excess federal ADIT and state ADIT.

In the below Revenue Requirement section titled Deferred Income Tax Expense, the Commission discusses the impact of the TCJA and, among other things, modifies the amortization period for the unprotected federal excess ADIT and state excess ADIT to a 10-year amortization period. This adjustment increases rate base ADIT by $545,796. When adjusting the ADIT for slippage and the deferred maintenance revision, rate base increases by $234,092 and the revenue requirement increases by $26,024.[71]

(8) Unamortized Deferred Maintenance

Based upon actual expenditures and the forecasted expenditures for 2019 through June 2020, as adjusted for amortizations, Kentucky-American included deferred maintenance totaling $9,539,974 in its application, based upon a 13-month average of actual and forecasted deferred maintenance projects.[72] Subsequently, in the Base Period Update, Kentucky-American added two new tank-painting projects to deferred maintenance.[73]

According to Kentucky-American, one scheduled project was delayed while Kentucky-American determined whether it would adversely affect the service to customers.[74] Kentucky-American revised its deferred maintenance schedule to include the rehabilitation and painting of Kentucky River Station Hydrotreators 9 and

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[70] Wilde Rebuttal Testimony at 4.

[71] Slippage $75,070 + Deferred Maintenance $(395,774) + ADIT $554,796

[72] Schwarzell Direct Testimony at 21.

[73] O'Neill Rebuttal Testimony at 19.

[74] O'Neill Rebuttal Testimony at 9 and 20.

Hydrotreators 10, which were scheduled to be painted after the forecasted period. Kentucky-American explained that it rescheduled the hydrotreator tank project to take advantage of contractor availability and to complete the project ahead of peak demands period during 2019.[75] Kentucky-American further notes that work has begun on the hydrotreator projects.[76]

In his post-hearing reply brief, the Attorney General argued that Kentucky-American improperly updated its forecasted test year to include the hydrotreator projects because 807 KAR 5:001, Section 16(6)(d), prohibits updating forecasted test years in rate cases within 30 days of a scheduled hearing. The Attorney General recommended that the Commission reject the $109,119 increase to deferred maintenance because it was made within 30 days of the scheduled hearing. LFUCG did not address this issue in its post-hearing reply brief.

We note that Kentucky-American filed the Base Period Update on April 15, 2019, which was 29 days prior to the original hearing date of May 14, 2019.[77] We also note that while the Attorney General objects to the increase in deferred maintenance, he has not objected to the $1,382,884 reduction in the revenue requirement reflected in the Base Period Update. According to 807 KAR 5:001, Section 22, the Commission is permitted to deviate from the provisions of 807 KAR 5:001, Section 16(6)(d), for good cause. Here, evaluating the totality of the facts, we find that good cause exists to permit Kentucky-American to deviate from the requirement by filing the Base Period Update within 29 days

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[75] *Id.* at 19.

[76] Base Period Update at 1.

[77] By Order entered April 26, 2019, the Commission revised the hearing dates to begin on May 13, 2019, and continue on May 14, 2019.

of the scheduled hearing. First, the update was filed within one day of the regulatory deadline. Second, the Attorney General has taken an inconsistent position, objecting to one line item in the Base Period Update while tacitly accepting all other line items in the Base Period Update. Finally, by rescheduling the projects, Kentucky-American was able to avoid demobilizing contractors, which ultimately benefits ratepayers by advancing with necessary maintenance while contractors are available.

The Commission further finds that Kentucky-American's deferred maintenance, including the incremental increase from the Base Period Update, is reasonable, and therefore should be allowed for ratemaking purposes an increase in rate base of $1,586,270 and an increase to revenue requirement of $176,343.

Summary of Rate Base Adjustments

Based on the adjustments discussed above, the Commission has determined that Kentucky-American's net investment rate base is $443,653,707.

Rate Base Component	Application 13-Month Average Forecasted Rate Base	Commission Adjustments	Commission 13-Month Average Forecasted Rate Base
Utility Plant at Original Cost	$ 790,806,081	(1,016,441)	$ 789,789,640
Utility Plant Acquisition Adjustment	225,195	0	225,195
Deduct:			
Accumulated Depreciation	(197,770,499)	(19,206)	(197,789,705)
Net Utility Plant in Service	$ 593,260,777	$ (1,035,647)	$ 592,225,130
Construction Work In Progress	7,859,210	(203,005)	7,656,205
Working Capital Allowance	3,754,000	(201,000)	3,553,000
Other Working Capital	807,789	0	807,789
Contribution In Aid of Construction	(73,319,577)	1,108,255	(72,211,322)
Customer Advances	(13,508,680)	1,042,381	(12,466,299)
Deferred Income Taxes	(90,721,671)	234,092	(90,487,579)
Deferred Investment Tax Credits	(10,001)	0	(10,001)
Deferred Maintenance	11,816,493	1,586,270	13,402,763
Deferred Debits	1,198,681	0	1,198,681
Other Rate Base Elements	(14,660)	0	(14,660)
Net Original Cost Rate Base	$ 441,122,361	$ 2,531,346	$ 443,653,707

REVENUE REQUIREMENT

For the base period, Kentucky-American reports operating revenues and expenses of $91,907,987 and $63,263,822, respectively.[78] In its Base Period Update, Kentucky-American updated these to $90,802,120 in revenue and $62,787,006 in expenses.[79] Kentucky-American proposed several adjustments to revenues and expenses to reflect the anticipated operating conditions during the forecasted period, resulting in forecasted operating revenues and expenses for the Base Period Update of $88,512,827 and $65,547,123, respectively.[80] The Attorney General/LFUCG proposed adjustments to Kentucky-American's revenue requirement totaling $7,217,411.[81] The Commission accepts Kentucky-American's forecasted operating revenues with the following exceptions:[82]

Trane

The Attorney General/LFUCG proposed to reduce test-year revenues to reflect the announced plant closure of Trane Lexington by the end of 2019.[83] Specifically, the Attorney General/LFUCG recommend that Kentucky-American defer these revenues as a regulatory liability and amortize them over two years for a revenue impact of $7,934.[84] Kentucky-American disagreed with Attorney General/LFUCG, arguing that revenues from

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[78] Application, Exhibit 37, Schedule C-1.

[79] Base Period Update, Exhibit 37, Schedule C-2.

[80] Base Period Update, Exhibit 37, Schedule C-1.

[81] Kollen Testimony, Revenue Requirement Model, Kollen_KAW_Revenue_Requirement_Model_Recommendation_03.15.19.xlsx, Summ Rev Req Tab.

[82] See Appendix A.

[83] Kollen Testimony at 19–20.

[84] Kollen Testimony at 19. Grossed-Up Expense.

the plant closure are uncertain and that a deferral would be difficult to estimate, but due to the relatively minor impact, conceded to the adjustment.[85] Accordingly, the Commission will make an adjustment to reduce revenues by $7,845.

Allowance for Funds Used During Construction (AFUDC)

In its application, Kentucky-American proposed to increase forecasted operating revenues by $554,026 to include AFUDC.[86] In calculating this forecast, Kentucky-American used an 8.25 percent weighted cost of capital.[87] Subsequently, in the Base Period Update, Kentucky-American decreased AFUDC by $ $6,023 for a revised level of $548,003, which reflects the effect of slippage on CWIP and Kentucky-American's reduction of the weighted cost of capital to 8.21 percent.

The Commission finds that AFDUC should be reduced by $79,324 to reflect our adjustments to CWIP for slippage and the overall rate of return of 7.69 percent, which is discussed below.

Fuel and Power Expense

Kentucky-American's purchased power expense for the forecasted test period was impacted by four adjustments: (1) power usage of the new I-75 Booster Station; (2) an expected rate increase resulting from Kentucky Utilities' (KU) general rate case; [88] (3) installation of high-efficiency pumps; and (4) the installation of variable frequency drives.[89]

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[85] Schwarzell Rebuttal Testimony at 13.

[86] Application, Exhibit 37, Schedule C-1 page 2 of 9.

[87] *Id.*, Schedule J-1.1/J-2.1.

[88] Case No. 2018-00294, *Electronic Application of Kentucky Utilities Company for an Adjustment of Its Electric Rates* (Ky. PSC Apr. 30, 2019). Kentucky-American receives electric service from KU.

[89] Direct Testimony of Kevin Rogers (Rogers Direct Testimony) at 29.

The Attorney General/LFUCG raised two issues related to Kentucky-American's fuel and power expenses: the impact on Kentucky-American's purchased power expense from the KU rate case; and Kentucky-American's proposal to apply a different rate for unaccounted-for water loss than permitted by Commission regulation.

(1) Purchased Power Expense Correction

Kentucky-American included a purchased power expense of $4,470,870 in forecasted operations.[90] Because Kentucky-American's figures were based on proposed rates in the pending KU rate case, the actual adjustment was in flux until that case was decided.

Based on a proposed stipulated settlement in the KU rate case, the Attorney General/LFUCG proposed a $97,027 reduction to fuel and power expense.[91] Subsequently, Kentucky-American accepted the recommendation and reduced its fuel and power expense by $97,027 for a total purchased power expense of $4,373,843.

In his post-hearing brief, the Attorney General agreed with Kentucky-American's adjustment and recommended that the Commission accept it.[92] However, in its post-hearing brief, LFUCG argued that the final order in the KU rate case reduced KU's revenue requirement 4.233 percent lower than the proposed stipulation, and, therefore, Kentucky-American's purchased power expense should be lowered by 4.233 percent.[93]

The Commission finds that an adjustment is warranted but that it should be based upon the final rates approved by the Commission in the KU rate case, which reflects the

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[90] Application, Exhibit 37 Schedule C-1 page 2.

[91] Kollen Testimony at 30–31. Grossed-up expense.

[92] Attorney General Brief at 40.

[93] LFUCG Post-Hearing Brief (LFUCG Brief) (filed June 11, 2019) at 20.

actual rates that apply to Kentucky-American. As LFUCG discussed, the rates approved by the Commission are lower than the rates contained in the proposed stipulation. Based on the evidence in the record and the final Order issued in Case No. 2018-00294, the Commission finds that Kentucky-American's purchased power expense should be reduced by $100,320 for ratemaking purposes as calculated in the table below.

As Filed Power Expense Increase Related to Increase in KU Rates (Based on a 7.8% Increase in Rates)			$	199,399
KU Original Overall Rate Increase Ask	$	112.460		
Divided by: Granted Overall Increase	$	55.880		
KU Rate Increase Settlement As Percentage of Request		49.7%		
Power Expense Related Granted Rate Increase			$	99,079
Commission Adjustment			$	(100,320)

(2) Unaccounted-for Water Loss

Kentucky-American did not make an adjustment for its unaccounted-for water loss above 15 percent, as required by 807 KAR 5:066, Section 6(3), nor did Kentucky-American request a deviation from that regulation. Instead, Kentucky-American asserted that the Commission should approve Kentucky-American's proposed alternative unaccounted-for water loss of 20 percent because, according to Kentucky-American, it is taking reasonable, cost-effective steps to control unaccounted-for water.[94] Kentucky-American further asserted that it remained below the 15 percent threshold between 2009

[94] O'Neill Rebuttal Testimony at 16; Kentucky-American Brief at 43.

and 2015 and that its unaccounted-for water loss had only recently exceeded 15 percent.[95]

The Attorney General/LFUCG argued that because Kentucky-American did not propose an adjustment or propose an alternative method for measuring water loss in its initial application, its request should be denied.[96] The Attorney General/LFUCG further argued that Kentucky-American's unaccounted-for water has been steadily rising and support for this increase is lacking.[97]

Pursuant to 807 KAR 5:066, Section 6(3), Kentucky-American has the burden of proof to establish that an alternative threshold for unaccounted-for water loss is more reasonable than the regulatory standard of 15 percent. The Commission agrees with the Attorney General/LFUCG that Kentucky-American failed to meet its burden of proof, and therefore its proposed alternative 20 percent threshold is denied. In reviewing Kentucky-American's water-loss history it appears that unaccounted-for line loss has steadily increased and that the proposed alternate level is simply the current unaccounted-for water loss. Although Kentucky-American identifies cost-effective steps, it has recently taken to control unaccounted-for water, it has neither produced an analysis or study to quantify the impact these programs will have on water loss; nor has it presented a quantifiable plan as to how it will maintain its target water loss into the future.

Because the Commission denied the alternative threshold, we must make adjustments related to the unaccounted-for water loss above 15 percent. Limiting

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[95] O'Neill Rebuttal Testimony at 17; Kentucky-American Brief at 44.

[96] Attorney General Brief at 57; LFUCG Brief at 8–13.

[97] *Id.*

Kentucky-American's water loss to 15 percent results in a decrease to forecasted fuel and power expense of expense for the water division of $190,993. When combined with the reduction from the purchased power expense discussed above, the Commission's total reduction to the forecasted fuel and power expense is $291,313.

Chemical Expense

Kentucky-American included the chemical expense of $2,887,866 in forecasted operations.[98] Through discovery, the Attorney General/LFUCG found that Kentucky-American had overstated certain of its forecast chemical expenses due to calculation errors that double counted these expenses.[99] In its Base Period Update, Kentucky-American corrected the errors, resulting in a decrease to the forecasted chemical expense of $102,886.[100]

In addition to the reduction to account for Kentucky-American's calculation error, the Commission finds that it is reasonable to make an additional adjustment to remove chemical expense related to unaccounted-for water loss above the 15 percent regulatory threshold, discussed in the above section. Therefore, The Commission finds that the chemical expense should be reduced by $121,704[101] to eliminate the chemical cost incurred for line loss over 15 percent. The total Commission adjustment to the forecasted chemical expense is a reduction of $224,590.

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[98] Application, Exhibit 37 Schedule C-1 page 2 of 9.

[99] Kollen Testimony at 29

[100] Base Period Update, Exhibit 37 at 1.

[101] $2,887,866 (Kentucky-American's Forecast) - $102,866 (Error Correction) = $2,785,866 x (4.37)% (Line Loss in Excess of 15%) = ($121,704).

Uncollectible Expense

According to Kentucky-American, it developed its forecasted uncollectible percentage of revenue by utilizing historical uncollectible dollars to revenue ratio from 2015, 2016, and 2017.[102] By applying this percentage to pro forma revenue for the fully forecasted test period, Kentucky-American calculated its forecasted level of uncollectible expense to be $804,093.[103]

The Commission finds that it is reasonable to reduce the uncollectible expense due to the loss of revenue from the closure of the Trane plant, which was discussed above. Applying the uncollectible percentage to the approximately $8,000 in revenue to reflect the loss of Trane, the Commission finds that uncollectible expense should be reduced by $72.

Depreciation Expense

Kentucky-American includes a depreciation expense of $18,604,103 in its forecasted operations.[104] Based on the Commission's treatment of forecasted rate base with regard to slippage, an adjustment has been made to increase forecasted depreciation expense by $17,404.

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[102] Direct Testimony of James L. Pellock (Pellock Testimony) at page 16.

[103] *Id.*

[104] Application, Exhibit 37, Schedule C-1; Kentucky-American's Response to Commission Staff's First Request for Information (Staff's First Request), Item 3(a), W/P-4-1 and W/P-4-3. $18,316,098 (Depreciation) + $24,567 (Amortization UPAA) + $263,438 (Amortization) = $18,604,103.

General Tax Expense

Kentucky-American included a forecast of general tax expense of $57,814,766, which includes property taxes of $7,032,232, payroll taxes of $596,020, Commission assessment of $175,930, and taxes and licenses of $10,594.[105]

Based on our treatment of forecasted rate base with regard to slippage, the Commission finds that it is reasonable to reduce forecasted property tax expense by $3,379. The Commission further finds that it is reasonable to reduce the Commission assessment by $16 to reflect the $8,000 decrease in revenues from water sales resulting from the closure of the Trane plant. Finally, The Commission finds that it is reasonable to decrease payroll tax expense by $23,303 to reflect the reduction to incentive compensation as discussed below. The Commission's total adjustment to Kentucky-American's forecasted general tax expense is a reduction of $26,698.

Interest Synchronization Expense

Kentucky-American proposed a forecasted interest expense of $13,233,671 based on the forecasted capital structure, the weighted cost of debt and the weighted dividend rate on the preferred stock.[106] As shown in the table below, the Commission has recalculated this expense to be $13,315,311 based on the rate base and weighted cost rates found reasonable herein resulting in an adjustment of $75,940.

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[105] Application, Exhibit 37, Schedule C-2.

[106] Application, Exhibit 37, Schedule E-1.3.

	Weighted Cost of Debt	Rate Base	Interest Synchronization
Short-Term Debt	0.05%	443,843,707	$ 221,922
Long-Term Debt	2.91%	443,843,707	12,915,852
Preferred Dividend	0.04%	443,843,707	177,537
Interest Synchronization			$ 13,315,311

Deferred Income Tax Expense

In its application, Kentucky-American included a forecast of deferred income tax expense of $1,549,140.[107] In the Base Period Update, Kentucky-American decreased deferred income tax expense to $1,212,844, which represents a $385,857 expense for the stub period, a $109,930 expense for state excess ADIT, and a $717,057 expense for federal excess ADIT.[108]

The excess ADIT arose from the TCJA, which reduced the federal income tax rate from 35 percent to 21 percent effective January 1, 2018, and the reduction of the Kentucky income tax rate from 6 percent to 5 percent, also effective January 1, 2018. The reduction in the federal and state income tax rate resulted in excess ADIT balances that must be returned to the ratepayers. An additional issue is that federal excess ADIT is separated into two categories, protected and unprotected. The TCJA normalization rules only apply to protected ADIT, which is defined as public utility property subject to accelerated

[107] Application, Exhibit 37, Schedules C-2 and D-1.

[108] Base Period Update at 1; Kentucky-American's response to the Commission Staff's Post Hearing Request for Information, Item 8, Kentucky-American_R_PSCPHDR_NUM008_052419_ Attachment.xlsx, Line 24, Column D. We note that there is a $3.00 difference in the amount of state excess ADIT between the Base Period Update and Kentucky-American's response to the Post-Hearing Request for Information.

depreciation under 26 U.S.C.A §§ 167 and 168.[109] The TCJA normalization rules require utilities to use the Average Rate Assumption Method (ARAM) or the Reverse South Georgia Method (RSGM) if the utility does not have sufficient financial records to comply with the requirements of the ARAM. Unlike the federal excess ADIT, the state excess ADIT is not deemed protected.

The issues to be decided regarding Kentucky-American's deferred state and federal income taxes are: (1) the amortization period for excess state and federal tax between January 1, 2018, and June 30, 2019 (stub period); (2) the amount of federal excess ADIT; (3) treatment of repair-related federal excess ADIT; (4) the amortization period for unprotected federal excess ADIT; and (5) the amortization period for the state excess ADIT.

First, regarding the amortization of excess state and federal ADIT deferring during in the stub period, Kentucky-American proposed to amortize over a three-year period beginning June 30, 2019.[110]

Second, as noted above, Kentucky-American provided an estimate of the aggregate of federal excess ADIT but was unable to separate it into protected and unprotected excess ADIT or amortize the excess ADIT to be returned to the customers because the estimates were uncertain and subject to revision.[111] Kentucky-American explained that, prior to the TCJA enactment, it was not required to use the ARAM and had to build a database in tax software, which included formatting and aligning vintage

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[109] Tax News Update, *Power and Utility concerns under the TCJA*, January 25, 2018, 2018-0186 https://taxnews.ey.com/news/2018-0186-power-and-utility-concerns-under-the-tcja.

[110] Wilde Rebuttal Testimony at 4; Kentucky-American Brief at 17.

[111] Direct Testimony of John R. Wilde (Wilde Direct Testimony) at 8.

records.[112] Kentucky-American further explained that the process would be completed by the first or second quarter of 2019.[113]

Third, Kentucky-American proposed that its repair-related federal excess ADIT be treated as protected, consistent with its consent agreement (Consent Agreement) with the Internal Revenue Service (IRS). The Consent Agreement between Kentucky-American and the IRS directs Kentucky-American to use normalization rules for repairs costs.[114] In other words, the Consent Agreement requires Kentucky-American to treat repair costs, which otherwise would be unprotected, as protected for ADIT purposes. Kentucky-American argued that if it returned the excess ADIT associated with its repair deductions more rapidly than the ARAM, then it would be a normalization violation and a violation of the Consent Agreement, which would subject Kentucky-American to a fine and retroactive loss of the use of accelerated depreciation.[115] Kentucky-American requested that the following categories of repair deductions be treated as protected: Fed-Repair M/L, which has a net total of $1,357,034; Fed-Repair 481(a), which has a net total of $2,827,732; and Fed-Tax Repairs, which has a net total of $3,095,042.[116]

Fourth, Kentucky-American requested approval to amortize the unprotected excess ADIT over a 20-year period.[117] Kentucky-American argued that a 20-year period

[112] *Id.* at 12.

[113] *Id.* at 13.

[114] *Id.* at 10–11, and Exhibit JRW-2.

[115] Wilde Rebuttal Testimony at 18; Kentucky-American Brief at 20; Kentucky-American Reply Brief at 12–13.

[116] Wilde Rebuttal Testimony, Exhibit JRW-4R.

[117] Wilde Rebuttal Testimony at 11–12; Kentucky-American Brief at 21; Kentucky-American Reply Brief at 14.

was consistent with the life of the underlying assets, would minimize rate shock to customers, would reduce the impact on Kentucky-American's cost of capital from negative cash flow, and was consistent with unprotected excess ADIT amortization periods approved in other proceedings.[118]

Fifth, Kentucky-American requested to treat the state excess ADIT the same as federal excess ADIT.[119]

The Attorney General/LFUCG disagreed with Kentucky-American on the majority of the excess ADIT issues but did not address the amortization period for the stub period excess state and federal excess ADIT.

Regarding the amount of federal excess ADIT, the Attorney General/LFUCG argued that Kentucky-American should separate estimated excess ADIT into protected and unprotected amounts, calculate an amortization expense for the protected excess ADIT, and use a short amortization period for the unprotected excess ADIT.[120] The Attorney General/LFUCG argued that the differences between the temporary excess ADIT returned to customers and the actual amounts could be trued up through a TCJA rider in a separate proceeding, Case No. 2018-00042 once Kentucky-American determined the actual excess ADIT amounts.[121]

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[118] Wilde Rebuttal Testimony at 12; Kentucky-American Brief at 21–22; Kentucky-American Reply Brief at 14.

[119] Wilde Direct Testimony at 8.

[120] Kollen Testimony at 34–35.

[121] Case No. 2018-00042, *Electronic Investigation of the Impact of the Tax Cuts and Job Act on the Rates of Kentucky-American Water Company* (Ky. PSC Dec. 21, 2018). We note that Case No. 2018-00042 was consolidated into this proceeding and closed as a separate proceeding.

Regarding the repair-related federal excess ADIT, the Attorney General/LFUCG argued that Kentucky-American incorrectly characterized the repair-related excess ADIT as protected.[122] The Attorney General/LFUCG disagreed that the Consent Agreement was applicable to the repair-related excess ADIT in the categories of Fed-Repair M/L, Fed-Repair 481(a), and Fed-Tax Repairs.[123] The Attorney General/LFUCG argued that the Consent Agreement includes a provision that subsequent changes in the law that are inconsistent with the Consent Agreement will nullify the Consent Agreement, and that the TCJA was a change in the law that nullified the Consent Agreement.[124] Although the Attorney General/LFUCG disagreed that the Fed-Repair M/L category should be treated as protected, they explained that the amount is relatively minor, and thus did not dispute the characterization of that category as protected.[125] The Attorney General/LFUCG further explained that that the Fed-Repair 481(a) and Fed-Tax Repair categories were significant and should be treated as unprotected.[126]

Regarding the amortization period for the federal unprotected excess ADIT, the Attorney General/LFUCG recommended that it be amortized over a three-year period.[127] The Attorney General/LFUCG argued that extending the amortization period delays the return of excess ADIT to ratepayers, and therefore proposed a three-year period because

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[122] Kollen Testimony at 35–37; Attorney General Brief at 43–45.

[123] May 14, 2019 HVT at 11:22:57.

[124] Kollen Testimony at 36–37; Attorney General Brief at 43–44.

[125] May 14, 2019 HVT at 11:23:18.

[126] *Id.* at 11:28:15.

[127] Kollen Testimony at 39; Attorney General Post-Hearing Reply Brief at 41–43.

it matched the amortization period that Kentucky-American proposed for rate case expenses.[128]

Regarding the state excess ADIT, the Attorney General/LFUCG noted that the normalization requirement does not apply to the amortization of the state excess ADIT. The Attorney General/LFUCG proposed that the Commission approve a three-year amortization period, which would match their recommendation for unprotected federal excess ADIT.[129]

Beginning with the amortization period for the stub period, the Commission finds that it is reasonable for Kentucky-American to amortize the state and federal excess ADIT that was deferred during the stub period for the same length of time as the stub period, 18 months.

Regarding the amount of the excess federal ADIT, including the repair-related federal excess ADIT, we are not persuaded by the Attorney General/LFUCG's arguments. First, Case No. 2018-00042 was consolidated into this case and closed, so we must address the issue in the proceeding. Second, we disagree with the Attorney General/LFUCG's conclusions regarding the applicability of the Consent Agreement to the repair-related federal excess ADIT. In relevant part, the Consent Agreement stated:[130]

> If any item of property subject to the taxpayer's Form 3115 is public utility property within the meaning of § 168(i)(10) or former § 167(l)(3)(A):

[128] *Id.*

[129] Kollen Testimony at 41.

[130] Wilde Direct Testimony, Exhibit JRW-2.

> (A) A normalization method of accounting (within the meaning of § 168(i)(9), former § 168(e)(3)(B), or former § 167(l)(3)(G), as applicable) must be used for such public utility property;
>
> (B) As of the beginning of the year of change, the taxpayer must adjust its deferred tax reserve account or similar reserve account in the taxpayer's regulatory books of account by the amount of the deferral of federal income tax liability associated with the § 481(a) adjustment applicable to such public utility property[.]

The Commission disagrees that the Consent Agreement is no longer applicable because the TCJA required a change in the law. When the Consent Agreement referred to a "normalization method of accounting" as defined in Section 168(i)(9), it was referring to 26 U.S.C.A. § 168(i)(9), which defines a normalization method of accounting in the tax code. Important here, the TCJA did not amend the definition of a normalization method of accounting in the tax code. In fact, despite several amendments to 26 U.S.C.A. § 168 since Kentucky-American entered into the Consent Agreement in 2010, the codified language defining a "normalization method of accounting" in Section 169(i)(9) has not been changed.

The TCJA did add to the definition of a normalization method of accounting as used in 26 U.S.C.A § 168 by including a "note," stating:

> A normalization method of accounting shall not be treated as being used with respect to any public utility property for purposes of section 167 or 168 of the Internal Revenue Code of 1986 if the taxpayer, in computing its cost of service for ratemaking purposes and reflecting operating results in its regulated books of account, reduces the excess tax reserve more rapidly or to a greater extent than such reserve would be reduced under the average rate assumption method [ARAM].

This note, which has the force of law, essentially creates the requirement at issue in this case: that a utility use ARAM to reduce excess ADIT created by the reduced tax rate and arising from certain book-tax timing differences for public utility property. However, there is no indication that this "change" modified the requirement in the Consent Agreement that Kentucky-American use a normalization method of accounting for public utility property. The Commission notes that the 1986 Tax Act contained a nearly identical note for excess ADIT generated by the reduction in tax rates.

Absent a direct conflict between the Consent Agreement and the change in the law, of which there is none here, the Commission is unpersuaded that Kentucky-American does not remain subject to the Consent Agreement. In fact, the Consent Agreement appears to have been written in a manner that accounts for potential changes in the definition of a "normalization method of accounting" without affecting the requirement that Kentucky-American use that method.

As noted above, the Consent Agreement states in relevant part that a "normalization method of accounting (within the meaning of § 168(i)(9) . . .)" must be used for public utility property. Section 168(i)(9)(A) first defines a "normalization method of accounting" by stating what a utility must do to use a normalization method of accounting. Section 168(i)(9)(B) then defines a normalization method of accounting by identifying things that are prohibited and, if done, will require the IRS to find that a utility is not using a normalization method of accounting. The TCJA simply adds to that definition, with language similar to 1986 Tax Act, by stating that "[a] normalization method of accounting shall not be treated as being used with respect to any public utility property for purposes of section 167 or 168" if the ARAM is not used to reflect the amortization of excess ADIT.

These requirements do not conflict and may all be applied pursuant to their plain language. Reading them together, they indicate that Kentucky-American must, among other things, apply the ARAM (or the RSGM if they cannot apply the ARAM) when determining the extent to which the excess ADIT arising from repair costs for public utility property subject to the 2010 Consent Agreement may be amortized to reduce rates.

Regarding the amortization period for unprotected federal excess ADIT, we are not persuaded that Kentucky-American's request to use a 20-year amortization period is reasonable. The Commission agrees with the Attorney General, who noted in his brief that the Commission has not granted a 20-year amortization period for the unprotected federal excess ADIT resulting from the TCJA and that the facts of this proceeding more closely match the case where we approved a 10-year amortization period.[131] However, we do not find the 3-year amortization period proposed by the Attorney General/LFUCG to be reasonable. The Commission finds that a 10-year amortization is reasonable because it will balance the impact to cash flow and will provide ratepayers the full benefit of the reduction in the federal corporate income tax in a timely manner.

Similarly, the Commission finds it reasonable to apply an amortization period of 10 years for the state excess ADIT. The Attorney General/LFUCG are correct that the normalization requirement does not apply to state excess ADIT, and therefore the Commission further finds it reasonable to apply the 10-year amortization period to the entirely of Kentucky-American's state excess ADIT.

The Commission must adjust Kentucky-American's deferred income tax expense for slippage and the deferred maintenance increase, along with the TCJA impact from the

[131] Attorney General Brief at 41–43.

stub period, and the state and federal excess ADIT. Based on the evidence of record and as discussed above, the Commission finds that it is reasonable to decrease Kentucky-American's deferred income tax expense by $1,226,898, for ratemaking purposes.[132]

Middletown Employee Allocation Expense

In its Base Period Update, Kentucky-American reduced labor costs by $27,538 to reduce the allocation of the city of North Middletown's employee from a 100 percent allocation to the water division to a 60 percent allocation. Based upon the Commission's findings regarding the North Middletown acquisition, which are discussed below, the Commission finds that the allocation revision is reasonable and therefore should be accepted.

Employee Vacancies/Labor Expenses

In the application, Kentucky-American identified the appropriate staffing level as 152 full-time positions, which is an increase of 9 new employees and 5 temporary employees.[133] Kentucky-American stated that the increase in staffing level is needed in order to establish and sustain a more cost-effective level of service, and that the proposed staffing level is consistent with meeting regulatory requirements, tariff requirements, industry standards, service requests, and customer needs.[134]

The Attorney General/LFUCG questioned this increase to the full-time employee estimate and noted that historically Kentucky-American has had fewer actual full-time

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[132] State $(160,979) + Federal $(680,062) + Stub $(385,857).

[133] Rogers Direct Testimony at 19.

[134] *Id.* at 19–20.

employees than it has forecasted.[135] The Attorney General/LFUCG asserted that the impact of fewer forecasted employees would reduce revenue requirement by $492,027.[136]

Kentucky-American countered that, with the use of a forecasted test period, two methods are available to address employee vacancies. First, assume no vacancies and reduce overtime, temporary and contractor expenses accordingly. Second, assume a vacancy rate and include increased expenses for overtime, temporary, and contractor expenses to complete the work.[137] Kentucky-American employed the first option in developing its forecasted labor expense.[138] Kentucky-American argued that the Attorney General/LFUCG incorrectly used only a portion of the second methodology because there is no corresponding adjustment for increased overtime, temporary, or contract labor costs that would be necessary at the proposed full-time employee level.[139]

In his post-hearing brief, the Attorney General argued that Kentucky-American will not achieve the 152 forecasted full-time employee count by July 1, 2019, and that as of May 15, 2019, the full-time employee count was 138.[140] For this reason, the Attorney General asserted that the Commission should accept the Attorney General/LFUCG's

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[135] Kollen Testimony at 22; Attorney General Brief at 31.

[136] Kollen Testimony at 23. Grossed-up expense.

[137] Rebuttal Testimony of James S. Pellock (Pellock Rebuttal Testimony) at 2; Kentucky-American Brief at 37–38.

[138] Pellock Rebuttal Testimony at 2; Kentucky-American Brief at 38.

[139] *Id.*

[140] Attorney General Brief at 32.

proposed adjustment as a more accurate barometer of Kentucky-American's expenses.[141]

We are not persuaded by the Attorney General/LFUCG's arguments. They are similar to arguments from the Attorney General that we have rejected in prior Kentucky-American rate proceedings in which we noted that the Attorney General considered only the impact of employee vacancies on Kentucky-American's labor forecast and did not consider the impact of the vacancies on Kentucky-American's overtime and temporary/contract forecasts.[142] We continue to adhere to this position. If vacant employee positions exist, work will either be shifted to other employees and thus result in an increase in overtime costs, or Kentucky-American will hire additional temporary/contract labor. Kentucky-American has shown that its forecasts for overtime and temporary/contract labor have been reduced from an average of 27,500 hours to 16,034 hours to reflect the full employee complement proposed.[143] The Attorney General/LFUCG has not considered that the decreased direct labor costs from vacant employee positions will be offset by increases in overtime or temporary labor costs.[144] However, the overall impact of these vacancies on Kentucky-American's operating expenses and ultimately its revenue requirement is unknown. Based on the evidence of record and the reasons discussed above, the Commission finds that the Attorney

[141] *Id.* at 32.

[142] Case No. 2004-00103, *Adjustment of the Rates of Kentucky-American Water* Company (Ky. PSC Feb. 28, 2005) Order at 44. *See* Case No. 95-554, *Application of Kentucky-American Water Company to Increase Its Rates* (Ky. PSC Sept. 11, 1996); Case No. 2010-00036, *Application of Kentucky-American Water Company for an Adjustment of Rates Supported by a Fully Forecasted Test Year* (Ky. PSC Dec. 14, 2010).

[143] Pellock Rebuttal Testimony at 3.

[144] *Id.* at 2.

General/LFUCG's proposed adjustment to labor expense for employee vacancies should be denied.

Support Services Expense

In its forecasted Service Company costs, Kentucky-American included business development costs of $93,013 and external affairs and public policy costs of $262,641 that the Service Company had allocated to Kentucky-American.[145] Of these amounts, the Commission has deducted $9,184 and $23,166 to reflect the elimination of costs related to the Annual Performance Plan (APP) and Long-Term Performance Plan (LTPP), respectively, which is discussed below.

The Commission previously placed Kentucky-American on notice that business development expenses allocated to the utility from the Service Company would be considered reasonable and appropriate for rate recovery only in those instances in which the utility was able to "appropriately document and separate forecasted management fees between those that are directly assignable and those that are allocated."[146]

In this proceeding, Kentucky-American was unable to provide the Commission with a detailed listing and description of business development costs or external affairs and public policy costs included in forecasted management fees that would support allowing recovery for those costs. As with the Commission's previous decisions concerning business development costs, it is the Commission's belief that external affairs and public

[145] Kentucky-American's Response to Staff's Second Request, Item 70.

[146] Case No. 2004-00103, *Adjustment of Rates of Kentucky-American Water Company* (Ky. PSC Feb. 28, 2005) at 53. Placing this burden upon Kentucky-American is consistent with Kentucky-American's statutory duty as an applicant to demonstrate that its proposed rates are reasonable. *See* KRS 278.190(2).

policy costs enhance shareholder value but do not benefit ratepayers, and therefore should not be costs borne by ratepayers.

In light of its failure to identify or describe the business development as well as external affairs and public policy services that the Service Company provides, the Commission finds that Kentucky-American has failed to meet its burden to demonstrate the reasonableness of the costs. Therefore, we will reduce forecasted service company costs by $323,304.[147]

Incentive Compensation Expense

In its forecasted labor expense, Kentucky-American included $1,273,663[148] for its APP and $496,223[149] for its LTPP, which are performance pay incentive compensation plans for Kentucky-American employees and Service Company employees. One hundred percent of the funding measures for the APP are based on earnings per share (EPS), which means that no APP payments are made if EPS targets have not been met.[150] Once the funding measures have been met, the APP performance measures are weighted based on 50 percent financial measures and 50 percent non-financial operational measures, which include safety, drinking water quality, and customer

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[147] Business & Development $(83,829) + External Affairs & Public Policy $(239,475).

[148] Kentucky-American's Response to the Attorney General's First Request for Information (Attorney General's First Request), Item 22.

[149] *Id.*

[150] Kentucky-American response to Staff's Second Request, Item 31.

satisfaction goals.[151] Under the LTPP, 100 percent of the performance measures are based on earnings measures that consist of EPS and relative total shareholder return.[152]

The Attorney General/LFUCG recommended that the Commission exclude the entirety of APP and LTPP incentive compensation expense from rate recovery. As support for the recommendation, the Attorney General/LFUCG explained that 100 percent of Kentucky-American's performance measures for the APP and LTPP are tied to financial measures, which the Commission has historically disallowed. The Attorney General/LFUCG argued that incentive compensation tied to financial measures incentivize achievement of shareholder goals for maximizing return on their investment, rather than ratepayer goals of improved service and safety, and reduced rates. The Attorney General/LFUCG argued that ratepayers should not pay for expenses that primarily benefit shareholders. Additionally, the Attorney General/LFUCG argued that incentive compensation tied to financial measures incentivizes Kentucky-American to request greater and more frequent rate increases in order to improve EPS and total shareholder return, which creates a conflict between achieving lower rates for customers or achieving greater financial performance for shareholders. The Attorney General/LFUCG recommended that Kentucky-American's revenue requirement be reduced by $1,927,000, consisting of a reduction of $1,770,000 in incentive compensation expense, and the related reduction of $135,000 in payroll tax expense and $22,000 in

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[151] *Id.*

[152] Kentucky-American response to Staff's First Request, Item 33.

bad debt and Commission assessment expenses related to the incentive compensation plans.[153]

In response, Kentucky-American asserted that because 50 percent of the APP is weighted on operational measures and 50 percent on financial measures, if the Commission were to deny recovery of incentive compensation expense related to financial measures, Kentucky-American should be allowed to recover in rates at least 50 percent of its APP expense related to non-financial measures.[154]

The Commission agrees in part and disagrees in part with the Attorney General/LFUCG. The Commission has consistently disallowed recovery of the cost of employee incentive compensation plans that are tied to financial measures because such plans benefit shareholders while ratepayers receive little benefit.[155] However, the Commission has also held that the amount removed for ratemaking purposes should be based on the performance measures and not the funding measures.[156] This distinction is important because, while 100 percent of Kentucky-American's LTPP performance measures are tied to earnings measures, the APP performance measures are based 50 percent on financial measures and 50 percent on non-financial measures. The Attorney General/LFUCG's recommendation is inconsistent with Commission precedent in regards

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[153] Kollen Testimony at 27.

[154] Rebuttal Testimony of Kurt M. Kogler at 7–8.

[155] *See* Case No. 2014-00396, *Application of Kentucky Power Company for: (1) A General Adjustment of its Rates for Electric Service; (2) An Order Approving its 2014 Environmental Compliance Plan; (3) An Order Approving its Tariffs and Riders; and (4) An Order Granting All Other Required Approvals and Relief* (Ky. PSC June 22, 2015).

[156] *Id.* at 25–26.

to the APP because the Attorney General/LFUCG's recommendation is based on the percentage of funding measures and not performance measures.

The Commission finds that it is reasonable to remove 50 percent, or $636,832, of the $1,273,663 cost for the APP that is tied to financial measures, and 100 percent, or $496,746 of the cost for the LTPP that is tied to financial measures for ratemaking purposes.[157]

401(k) Contribution Expense

Kentucky American included $38,433 for its employees and $31,550 allocated from the service company in retirement plan expense related to matching contributions made to employees' 401(k) retirement plans who are also participants in a defined benefit pension retirement plan.[158]

The Attorney General recommended reducing Kentucky-American's retirement plan expense by $70,000 based on recent decisions in which the Commission denied recovery of retirement expenses in which a utility made contributions to both a defined benefit pension plan and a 401(k) plan.[159]

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[157] Support Services

	APP	$696,641	50 percent	$348,321
	LTPP	$480,641	100 percent	$480,641
		TOTAL		$828,962
Kentucky-American				
	APP	$577,022	50 percent	$288,511
	LTPP	$ 16,105	100 percent	$ 16,105
		TOTAL		$304,616

[158] Kentucky-American Response to Attorney General's First request, Item 10.

[159] Kollen Testimony at 28–29.

Kentucky-American asserted that the Commission addressed this issue in Case No. 2017-00321,[160] and rejected a disallowance of such a retirement plan expense because the utility provided evidence of the steps it undertook to manage retirement benefits.[161] Kentucky-American contended that it has taken similar significant steps to manage and offering a lump-sum distribution to no longer active but vested plan participants in lieu of receiving their retirement annuity under the defined benefit plan to reduce Kentucky-American's plan expenses and risk.[162] Kentucky-American also asserted that it has taken additional steps to reduce employee benefit costs beyond retirement benefits.[163]

Kentucky-American misreads the Commission's finding in Case No. 2017-00321. The Commission clearly stated that we will make adjustments to retirement plan expenses for duplicative retirement plans, such as when defined benefit plans are not locked and frozen, and participants continue to earn benefits under a defined benefit plan and a defined contribution plan.[164] When a defined benefit plan is frozen, participants stop earning benefits from the date the plan is frozen. When a defined benefit plan is locked, then eligibility for the plan is closed. When a defined benefit plan is locked, but

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[160] Case No. 2017-00321, *Electronic Application of Duke Energy Kentucky, Inc. for: 1) An Adjustment of the Electric Rates; 2) Approval of an Environmental Compliance Plan and Surcharge Mechanism; 3) Approval of New Tariffs; 4) Approval of Accounting Practices to Establish Regulatory Assets and Liabilities; and 5) All Other Required Approvals and Relief* (Ky. PSC Apr. 13, 2018) at *22-23.*

[161] Rebuttal Testimony of Kurt M. Kogler (Kogler Rebuttal Testimony) at 2–3.

[162] Kentucky-American Brief at 39.

[163] *Id.* at 39–41.

[164] Vice Chair Cicero's Comments, Kentucky Chamber Energy Management Conference (Jan. 18, 2018), https://psc.ky.gov/agencies/psc/speeches/cicero/VC_Cicero_KYChamber_Energy_Conference_1-18-18.pdf.

not frozen, then those employees who participated in the now-closed plan continue to accrue benefits. Managing duplicative retirement plans to lessen costs is not the equivalent of locking and freezing a plan to avoid duplicative benefits.

Here, Kentucky-American locked the defined benefit plan as of January 1, 2006. However, the locked defined benefit plan was frozen for a small group of employees consisting of union employees hired between January 1, 2001, and December 31, 2005.[165] Union employees hired before January 1, 2001, and non-union employees hired before January 1, 2006, continue to accrue benefits under the defined benefit plan because it was locked but not frozen for these employees.[166]

We conclude that Kentucky-American's retirement plan expenses for matching 401(k) contributions are reasonable only for union employees hired between January 1, 2001, and December 31, 2005, whose defined benefit plan was locked and frozen, and thus are not duplicative. The retirement plan expenses for matching 401(k) contributions for union employees hired prior to January 1, 2001, and for non-union employees hired before January 1, 2006, should be disallowed because the defined benefit plan for these employees was locked, but not frozen, and thus are duplicative, with these employees accruing retirement benefits from both plans. Permitting utility employees to participate in multiple pension plans simultaneously while many ratepayers have no pension plan at all, is not fair, just, or reasonable.

For the reasons set forth above, the Commission finds that the retirement contribution expense should be reduced by $65,058 to reflect 401(k) matching

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[165] Kentucky-American response to Staff's Post-Hearing Request, Item 10.

[166] *Id.*

contributions made by Kentucky-American to union employees hired prior to January 1, 2001, and to non-union employee hired prior to January 1, 2006, who are also eligible for the defined benefit program.[167]

Deferred Maintenance Expense

The Commission made an adjustment for the operations and maintenance (O&M) impact of the amortization for the Base Period Update for deferred maintenance of $107,578.

Rate Case Expense Amortization

Kentucky-American's forecasted rate case expense of $1,230,559 included $312,141 for internal labor services.[168]

The Attorney General/LFUCG recommended that the internal labor costs be excluded from the rate case expense for the following reasons: (1) the significant increase in estimated expenses compared to Kentucky-American's prior rate case; (2) a comparison of the size of the rate case cost estimate to the size of the requested increase; and (3) internal labor costs are generally not requested by other utilities in rate case expense recovery because the costs are not incremental.[169] The Attorney General/LFUCG recommended reducing forecasted rate case costs by $312,000 to remove internal labor support services expense.[170]

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[167] Support Services $(26,625) + Kentucky-American $(38,433)

[168] Application, Exhibit 37, Schedule F-6.

[169] Kollen Testimony at 42.

[170] *Id.* at 43.

Kentucky-American countered that higher rate case cost than past cases is not a sufficient basis to disallow recovery of prudently incurred cost.[171] Kentucky-American explained that the internal labor costs resulted from compensation and Service Company cost studies that Kentucky-American commissioned to support its position and to provide the Commission with a complete record.[172] In addition, Kentucky American asserted that the Attorney General/LFUCG has not shown that there is a correlation between the requested revenue increase and the estimated cost to submit a rate case application.[173]

In additional support of the internal labor costs, Kentucky-American explained that it uses the resources of the Service Company to support the preparation, filing, and litigation of a rate case as an alternative to Kentucky-American staffing and maintaining its own in-house expertise for the full scope of rate case filings 100 percent of the time.[174] According to Kentucky-American, the cost of providing these services is directly charged to Kentucky-American and not otherwise included in the allocated Service Company costs recovered as an expense in Kentucky-American's revenue requirement, therefore, these costs are incremental.[175]

In his post-hearing brief, the Attorney General reiterated the increased costs since the last rate case, noting that it is a 39.25 percent increase.[176] The Attorney General

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[171] Pellock Rebuttal Testimony at 3.

[172] *Id.* at 4.

[173] *Id.* at 5.

[174] *Id.*

[175] *Id.*

[176] Attorney General Brief at 45.

maintained that the additional studies commissioned by Kentucky-American were not required or requested by the Commission.[177]

In its post-hearing brief, LFUCG argued that only actual, reasonable rate case expenses should be recovered in rates.[178] LFUCG recommended that the Commission disallow the legal fees and internal labor costs, asserting that Kentucky-American failed to provide sufficient support for the fees.[179]

In response to LFUCG's arguments, Kentucky-American filed unredacted time entries for its legal fees, arguing that LFUCG failed to raise this issue prior to raising it in its post-hearing brief.[180]

Based on the evidence of the case, the Commission finds that Kentucky-American demonstrated that the allocated Service Company costs are reduced by all forecasted directly billed costs (rate case costs for all subsidiaries) and, therefore, there is no double recovery. In fact, Kentucky-American's allocation of Service Company costs is reduced by the hours directly billed.[181] Kentucky-American has also shown that the cost of using the Service Company is a financially sound decision as expenses are directly charged to Kentucky-American and are treated as incremental. Accordingly, the Commission finds that the Attorney General/LFUCG's proposed adjustment to rate case amortization be denied. However, the Commission's review of the unredacted invoices for legal services

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[177] *Id.* at 45–46.

[178] LFUCG Brief at 20.

[179] *Id.* at 22.

[180] Kentucky-American Reply Brief at 20–21.

[181] *See* Kentucky-American Brief at 43.

as filed by Kentucky-American on June 14, 2019, reveal a number of charges totaling $40,950 for consulting fees charged by Edward J. Grubb. Kentucky-American's data responses provide no details regarding this consultant, such as the work he performed, the number of hours he worked, or his hourly rate. Consequently, the rate case expenses should be reduced by $40,950 to reflect the exclusion of these unsupported fees. Based upon the updated estimated rate case costs of $1,296,794, the Commission increased Kentucky-American's revenue requirement by $22,079 based on a three-year amortization.

Other

Due to the Commission approved slippage adjustment, the Commission made a reconciling adjustment for other table income. The net impact of these adjustments is a reduction in the revenue requirement of $470,157.[182]

Income Tax Expense

Kentucky-American included a forecast of current income tax expense of $4,271,756, which includes state income tax of $738,871 and federal income tax of $3,532,885.[183]

The Commission finds that it is reasonable to make an adjustment to Kentucky-American's state income tax expense of $112,608 for an adjusted current state income tax expense amount of $851,479. The Commission further finds an adjustment to Kentucky-American's federal income tax expense of $449,302 to an adjusted level of

[182] See Appendix A.

[183] Application, Exhibit 37, Schedule C-1.

$3,982,187 is reasonable. The calculations of the Commission's adjustments to current state and federal income taxes is contained in Appendix A which is attached hereto.

Chemical Complex Expense

In its post-hearing reply brief, LFUCG raised, for the first time, an argument that expenses related to the construction of a chemical complex at one of Kentucky-American's treatment stations should be disallowed because Kentucky-American did not request a Certificate of Public Convenience and Necessity (CPCN) prior to constructing the facility.[184] LFUCG asserted that, because Kentucky-American did not request a CPCN, the Commission has not determined the reasonableness of the expense, and therefore it should be disallowed.

The Commission notes that the Attorney General and LFUCG submitted data requests to Kentucky-American regarding the chemical complex but offered no evidence or testimony regarding the ratemaking treatment of the chemical complex. The Commission's findings must be supported by sufficient evidence. Here, with no evidentiary support in the record regarding the proposed adjustment, the Commission is without any basis, much less sufficient evidence, to justify an adjustment, and therefore we deny LFUCG's proposed adjustment to remove expenses related to constructing the chemical complex.

To the extent that LFUCG based its argument on our findings in Case No. 2018-00281, LFUCG misreads those findings.[185] We did not apply a 2 percent bright-line test

[184] LFUCG Brief at 17–19.

[185] Case No. 2018-00281, *Electronic Application of Atmos Energy Corporation for an Adjustment of Rates* (Ky. PSC May 7, 2019).

in that Order to determine whether a utility should apply for a CPCN. We explained that the utility in that case alleged that its estimated project cost was less than 2 percent of net utility plant, and thus did not request a CPCN. As we pointed out in that case, the estimated cost for the proposed construction was over 2 percent of net utility plant, and thus, the utility's alleged reason for not requesting a CPCN was not supported by the facts. While we have, on occasion, considered the percentage of the utility's net utility plant in CPCN determinations, each determination is fact specific, takes into account all of the facts, and does not rely on a single bright-line test.

RATE OF RETURN

Capital Structure

Kentucky-American's proposed capital structure based on the projected 13-month average balances for the forecasted test period and the costs assigned to each capital component is shown in the table below.[186]

Class of Capital	Application 13-Month Avg Net Caryng Amount	Ratios	Job Develop Credit	Adjusted Capitalization	Requested Returns
Short-Term Debt	$ 6,777,501	1.519%	$ 3,110	$ 6,780,611	3.2740%
Long-Term Debt	220,061,621	49.324%	100,990	220,162,611	5.9000%
Preferred Stock	2,243,433	0.503%	1,030	2,244,463	8.5100%
Common Equity	217,071,552	48.654%	99,618	217,171,170	10.8000%
Total Capitalization	$ 446,154,107	100.000%	$ 204,748	$ 446,358,855	
JDITC		$ 204,748			

When submitting its Base Period Updates Kentucky-American proposed the following revisions to its forecasted capital structure to reflect (1) an update to the short-

[186] Application, Exhibit 37, Schedule J-1.

term debt balance to reflect the North Middletown acquisition that closed in April 2019 as opposed to February 2019; (2) an increase in the equity infusion from $6,000,000 to $9,300,000; (3) a reduction in the long-term interest rate for the $16,000,000 issuance from 4.55 percent to 4.16 percent; and (4) a reduction in the cost of short-term debt from 3.274 percent to 2.585 percent.[187] Kentucky-American's revised forecasted capital structure and assigned cost rates are shown in the table below.

Class of Capital	Update 13-Month Avg Net Caryng Amount	Ratios	Job Develop Credit	Adjusted Capitalization	Updated Requested Returns
Short-Term Debt	$ 10,308,270	2.274%	$ 4,656	$ 10,312,926	2.5850%
Long-Term Debt	220,061,621	48.546%	99,397	220,161,018	5.8700%
Preferred Stock	2,246,465	0.496%	1,016	2,247,481	8.5100%
Common Equity	220,689,002	48.684%	99,680	220,788,682	10.8000%
Total Capitalization	$ 453,305,358	100.000%	$ 204,749	$ 453,510,107	
JDITC		$ 204,748			

The Attorney General/LFUCG objected to Kentucky-American's proposed cost of short-term debt, arguing that the forecasted cost is overstated and inconsistent with present rates.[188] The Attorney General/LFUCG asserted that the forecast assumes an increase in short-term rates throughout the test year and that such an assumption cannot be determined with any level of certainty. The Attorney General/LFUCG recommended a short-term cost rate of 2.68 percent, the present one-month LIBOR rate of 2.49 percent plus 0.19 percent credit spread.[189] Regarding long-term interest rates, the Attorney

[187] Scott W. Rungren Rebuttal Testimony (Rungren Rebuttal Testimony) at 3–6. In addition, a correction to the base period balance of preferred stock was updated in the filing.

[188] Kollen Testimony at 46. One-month LIBOR rate as of March 11, 2019.

[189] *Id.* at 46–47.

General/LFUCG argued that the long-term debt rate proposed by Kentucky-American for its May 2019 financing is overstated and recommended a cost rate of 4.22 percent for the debt issuance based on the present 3.10 percent yield on the 30-year Treasury debt plus a credit spread of 1.12 percent.[190]

Kentucky-American responded stating that it has revised its short-term interest rate forecast downward based on more current LIBOR rate projections in its Base Period Update filing.[191] Regarding the long-debt rate for the May 2019 issuances, Kentucky-American also updated this interest rate projection to 4.16 percent in its Base Period Update filing.[192] The Attorney General agreed with these revised cost rates.[193]

Upon review of the record, the Commission finds that Kentucky-American's revised capital structure accurately projects the test-year capitalization requirements with the exception of short-term debt. The Commission is reducing short-term debt by $2,023,097 to reflect the construction slippage approved herein. The Commission's forecasted capital structure and assigned cost rates are shown in the table below.

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[190] *Id.* at 48.

[191] Rungren Rebuttal Testimony at 7; Kentucky-American Brief at 45.

[192] Rungren Rebuttal Testimony at 8; Kentucky-American Brief at 45.

[193] Attorney General Brief at 28.

Class of Capital	Commission 13-Month Avg Net Caryng Amount	Ratios	Job Develop Credit	Adjusted Capitalization	Authorized Returns
Short-Term Debt	$ 8,285,173	1.836%	$ 3,759	$ 8,288,932	2.4320%
Long-Term Debt	220,061,621	48.764%	99,843	220,161,464	5.8600%
Preferred Stock	2,246,465	0.498%	1,020	2,247,485	8.5100%
Common Equity	220,689,002	48.903%	100,128	220,789,130	9.7000%
Total Capitalization	$ 451,282,261	100.001%	$ 204,750	$ 451,487,011	
JDITC		$ 204,748			

Return on Equity

Kentucky-American developed its proposed ROE using versions of the constant growth discounted cash flow (DCF) model and the forward-looking capital asset pricing model (CAPM). The modeling includes two proxy groups, a Water Proxy Group, composed of water utilities only, and a Combined Utility Proxy Group,[194] composed of water and natural gas distribution utilities. Both proxy group model results include and exclude American Water. Kentucky American also considered Value Line's projected ROEs. The results ranged from 8.00 percent to.13.03 percent.[195] Based upon these models, Kentucky-American proposed an ROE range of 10.00 percent to 10.80 percent, with a recommended ROE of 10.80 percent.[196]

Kentucky-American stated that its recommendation takes into consideration business and financial risk factors of Kentucky-American, including its capital expenditure

[194] Kentucky-American included the Combined Utility Proxy Group due to the small size of the Water Utility Group, which included only five companies.

[195] Bulkley Direct Testimony, AEB-1 – AEB-5 and AEB-9 – AEB-10.

[196] *Id.* at 8.

requirements and adjustment mechanisms, as compared with the Combined Utility Proxy Group.[197] Kentucky-American supported a forward-looking estimate and, as such, relied on forward-looking inputs and assumptions, and expectations for higher interest rates.[198]

The Attorney General/LFUCG urged the Commission to reject Kentucky-American's proposed 10.80 percent ROE, asserting that it grossly overstated a fair rate of return.[199] The Attorney General/LFUCG provided an ROE analysis that employed the DCF and two CAPMs but based their recommendation on the results of the DCF model.[200] The Attorney General/LFUCG's DCF model results indicated equity cost rates ranging from 7.92 percent to 10.95 percent for the Water Proxy Group, and from 8.38 percent to 11.49 percent for the Combined Utility Proxy group. Based on the DCF model results, the Attorney General/LFUCG proposed a range of 9.02 percent to 9.27 percent, with a recommended ROE of 9.15 percent.[201]

For the DCF model, the Attorney General/LFUCG employed the same two proxy groups as Kentucky-American and the average and medium value for the expected growth rates.[202] The Attorney General/LFUCG noted that the median DCF results for the Combined Utility Proxy Group were within the allowed ROEs for American Water subsidiaries, which average 9.66 percent, yet Kentucky-American excluded these median

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[197] *Id.* at 4–5, 8.

[198] *Id.* at 8–9.

[199] Direct Testimony and Exhibits of Richard A. Baudino (Baudino Testimony) at 3.

[200] *Id.*

[201] *Id.* at 33–36.

[202] *Id.* at 23.

values in favor of the high range values.[203] The Attorney General/LFUCG argued that Kentucky-American's DCF model results were asymmetric and biased because Kentucky-American excluded only the low-end DCF results, and did not examine and exclude excessively high DCF estimates.[204] The Attorney General/LFUCG further argued that the Commission should not consider Kentucky-American's projected stock price DCF results when determining the ROE because investors cannot purchase the proxy company stock at this projected price and because the use of these projected prices is speculative and inaccurate.[205] The Attorney General/LFUCG advised the Commission to reject the Value Line projected Water Proxy Group ROEs because recently allowed ROEs for American Water's subsidiaries and DCF estimates using current stock prices are much lower.[206] Finally, the Attorney General/LFUCG recommended that the Commission apply Kentucky-American's DCF model results in totality for guidance in determining a fair ROE.[207]

For the CAPM analysis, the Attorney General/LFUCG presented models based on the expected return for the stock market and on a risk premium using historical market returns.[208] The CAPM analysis also used the average yields on 30-year and 5-year Treasuries from September 2018 through February 2019.[209] The results of the Attorney

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[203] *Id.* at 38, 40, and Table 4 at 39.

[204] *Id.* at 44.

[205] *Id.* at 46.

[206] *Id.* at 46.

[207] *Id.* at 40.

[208] *Id.* at 3 and Table 3 at 35.

[209] *Id.* at 34.

General/LFUCG's CAPM analysis ranged from 6.74 percent to 9.35 percent.[210] However, the Attorney General/LFUCG argued that the CAPM analysis should be rejected outright because the results were exceedingly high and, even at the lower end of the range, the CAPM analysis far exceeds recently allowed returns that average 9.66 percent for operating companies within American Water.[211]

The Attorney General/LFUCG asserted that, instead of forward-looking assumptions used by Kentucky-American, the Commission should rely on current interest rates and data in determining a fair ROE.[212] The Attorney General/LFUCG emphasized that, given the recent hold in increases in federal funds rates, the current interest rates are indicative of investor expectations and are efficient.[213] The Attorney General/LFUCG maintained that with low inflation, slowing growth, and tightening financial conditions, the case for increased interest rates in 2019 has weakened considerably.[214]

Similarly, the Attorney General/LFUCG asserted that it was inappropriate to use forecasted or projected bond yields, because bond yield forecasts are speculative, while current rates are tangible and verifiable.[215] For this reason, the Attorney General/LFUCG rejected Kentucky-American's use of forecasted 30-year Treasury bond yields and recommended using shorter-term Treasury yields, arguing that shorter securities have

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[210] *Id.* at 35, Table.

[211] *Id.* at 38.

[212] *Id.* at 40–41.

[213] *Id.* at 10.

[214] *Id.* at 9.

[215] *Id.* at 47.

less risk and are, therefore, more indicative of the risk-free rate.[216] Further, the Attorney General/LFUCG claimed that the market return estimate of 15.19 percent is extraordinarily high when compared to historical norms, as well as in comparison to the Attorney General/LFUCG's models, and therefore should be given little weight in this proceeding.[217]

The Attorney General/LFUCG also disagreed with Kentucky-American's assertion that risks arising from the use of a future test year, revenue decoupling, the impact of the proposed QIP, and its capital expenditure program should be taken into account when determining the ROE.[218] First, regarding the future test year, the Attorney General/LFUCG disputed Kentucky-American's assertion that it has a comparable risk to the proxy groups if rates are set using a future test year.[219] The Attorney General/LFUCG countered that Kentucky-American actually has less risk because 58 percent of the operating subsidiaries of the Water Proxy Group and 50 percent of the operating subsidiaries of the Combined Utility Proxy Group use future test years.[220] Second, the Attorney General/LFUCG argued that Kentucky-American did not request a decoupling mechanism and questioned the appropriateness of awarding Kentucky-American a higher ROE due to a factor that is not applicable.[221] Third, the Attorney General/LFUCG

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[216] *Id.* at 48.

[217] *Id.* at 49.

[218] Bulkley Direct Testimony at 70–75.

[219] Bulkley Direct Testimony at 75.

[220] Baudino at 42.

[221] *Id.*

claimed that Kentucky-American has not suffered any adverse financial consequences from not having a QIP because it earned robust returns without a QIP, and, due to the use of a future test year, will recover infrastructure investments through June 30, 2020.[222] Finally, with respect to Kentucky-American's capital expenditure program, the Attorney General/LFUCG asserted that it is Kentucky-American's responsibly to prudently manage its expenditures and timing of its rate cases to ensure a balance of expenses and a competitive return on its investments.[223]

In response, Kentucky-American argued that the Attorney General/LFUCG's recommended ROE of 9.15 percent abandons standards for financial integrity, capital attraction, and comparable returns.[224] Kentucky-American asserted that a 9.15 percent ROE fails to offer equity investors a return that is comparable to alternative investments with similar risk, may not allow Kentucky-American the opportunity to raise equity capital, and falls outside the range of authorized ROE from 2012–2018, which averaged 9.68 percent.[225] Kentucky-American claimed that a 9.15 percent ROE combined with Kentucky-American's equity ratio of 48.65 percent resulted in a weighted equity ratio (WROE) of 4.45 percent, which is well below the average equity rate established for the operating subsidiaries of American Water and would impact American Water's allocation of discretionary capital.[226] Kentucky-American further claimed that a WROE of 4.45

[222] *Id.*

[223] *Id.* at 42–43.

[224] Bulkley Rebuttal Testimony at 2 and 7.

[225] *Id.* at 2, 8–10, and Figure 1 at 12.

[226] *Id.* at 8.

percent would be well below the industry average of 4.88 percent and could be viewed as a credit negative by the rating agencies.[227]

Kentucky-American noted that Attorney General/LFUCG's recommended ROE is on the low end of their analytical results, which ranged from 8.38 percent to 11.49 percent for the Combined Utility Proxy group.[228] Kentucky-American argued that, in the current low interest rate environment, DCF models have been consistently underestimating and recommended that other ROE models be recognized.[229] Kentucky-American further argued that the Attorney General/LFUCG failed to consider the risk related to the TCJA for utilities and Moody's recent downgrade of American Water over concerns about increased leverage and cash flow leakage resulting from tax reform.[230]

Kentucky-American disagreed with the Attorney General/LFUCG's arguments regarding interest rate forecasts, noting that while the Federal Reserve recently indicated that it will be patient in determining future adjustments, other economic officials see higher rates as appropriate later this year.[231] Kentucky-American contended that, even with a wait-and-see policy, the lagged effect of past increases in the federal funds rate suggests a continued increase over the near-term yield on long-term government bonds.[232]

Kentucky-American questioned the Attorney General/LFUCG's DCF analysis; specifically, the reliance on projected dividend growth rates as investment analysts

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[227] *Id.* at 13–14 and Figure 2 at 15.

[228] *Id.* at 3.

[229] *Id.* at 3 and 14.

[230] Bulkley Rebuttal at 5 and 14–16.

[231] *Id.* at 17.
[232] *Id.* at 18.

predominantly report earnings per share growth projections. Kentucky-American maintained that using median as opposed to mean results is appropriate because outliers on both the high and low end have a lesser impact on the median as on the mean.[233] Upon revising the Attorney General's models, Kentucky-American not only determined that the DCF results increase from 9.15 percent to 9.55 percent, but also emphasized that the DCF results should be considered in conjunction with other ROE models.[234]

Regarding the Attorney General/LFUCG's CAPM analysis, Kentucky-American argued that the model results of 6.74 percent to 8.05 percent using the historical market risk premium are too low and are inconsistent with required returns because they are well below the average authorized ROE for water utilities of 9.48 percent for 2017–2018.[235] Kentucky-American contended that the Attorney General/LFUCG agreed that the results are too low because they rejected these results in favor of the DCF results.[236] Kentucky-American underscored the need to use forward-looking inputs in the CAPM for both the market risk premium and the risk-free rate.[237] Additionally, Kentucky-American noted the Attorney General/LFUCG's reliance on Value Line's annual return projections of 3 to 5 years are inconsistent with their opinion that the Commission should not consider Value Line's projected returns.[238] Kentucky-American updated the Attorney General/LFUCG's

[233] *Id.* at 29–30.

[234] *Id.* at 35–36 and 38.

[235] *Id.* at 39.

[236] *Id.* at 40.

[237] *Id.*

[238] *Id.* at 47–48.

models using only Value Line's median growth rates and the Attorney General/LFUCG's risk-free rate and estimated an ROE of 9.98 percent.[239]

Kentucky-American presented additional ROE analyses, including Value Line's ROE projections for 10.50 percent in 2019 and a Risk Premium Analysis estimate of 9.80 percent at the Attorney General/LFUCG's risk-free rate.[240] Kentucky-American asserted that averaging and equally weighing the updated results to the Attorney General/LFUCG's DCF and CAPM models, as well as including the expected earnings and risk premium methodologies, results in an ROE in the range of 9.96 percent to 10.29 percent.[241]

Kentucky-American concluded that its proposed cost of equity is reasonable and should be approved.[242] Kentucky-American asserted that its proposed ROE is supported by multiple analytical techniques, adjusted for incremental costs and risks, and relies on market-based data to quantify investor expectations. Kentucky-American cautioned against accepting the Attorney General/LFUCG's lower ROE recommendation, emphasizing that utility regulators recognized that the DCF model is producing low return estimates and, as a result, utility regulators have considered the results of other equity models in addition to the DCF model.[243]

In his post-hearing reply brief, the Attorney General emphasized the need to balance the rates so that they are non-confiscatory, argued that Kentucky-American's

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[239] *Id.* at 49 and 53, Figure 7.

[240] *Id.* at 56 and 61.

[241] *Id.* at 62, Figure 8.

[242] Kentucky-American Brief at 46.

[243] *Id.* at 46, 50. LFUCG filed a post-hearing reply brief, but did not specifically discuss Kentucky-American's proposed ROE.

proposed ROE tests the upper bounds in ROE determination, and is 30 basis points higher than the highest authorized water ROE since 2012.[244] The Attorney General claimed that Kentucky-American's WROE argument is novel and goes beyond the ordinary consideration of financial risk.[245]

In evaluating the ROE for Kentucky-American, the Commission must evaluate and review each model and all parties' positions, and balance the financial integrity of the utility with the interests of the consumer and the statutory obligation that rates be fair, just, and reasonable. Kentucky-American supported a forward-looking model with forecasted interest rates, whereas the Attorney General claimed that current rates are more appropriate. This Commission previously held that forecasted interest rates are not reliable and that the best estimates are produced using the most current interest rates.[246] Rates have been forecasted to increase for several years, and, at one point, forecasted to increase two times in 2019.[247] However, the Federal Reserve Board changed its stance, decided to adopt a wait and see approach, and revised policies that were set just a short time prior.[248] Therefore, the Commission continues to view forecasted interest rates as unreliable and frequently inaccurate and supports models that utilize current interest rates and data.

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[244] Attorney General Brief at 12–13.

[245] *Id.* at 30.

[246] *See* Case No. 2018-00281, *Electronic Application of Atmos Energy Corporation for an Adjustment of Rates* (Ky. PSC May 7, 2019) at 43.

[247] *See* https://www.bbc.com/news/business-47644267

[248] *Id.*

The Commission is not persuaded by Kentucky-American's argument that a 10.80 percent ROE is reasonable because it addresses the unique business and financial risks arising from capital investments, impacts of the TCJA and the QIP, and the lack of a revenue decoupling mechanism. Many of these risks are mitigated through the use of a forecasted test year and the QIP, which is approved in this Order. Both mechanisms lower regulatory lag and allow for a timelier recovery of capital investments.[249] The Commission agrees with the Attorney General/LFUCG that additional adjustments for risk arising from the impact of the TCJA are unwarranted because Kentucky-American does not have credit ratings of its own, but falls under the umbrella of American Water's credit ratings and because American Water's credit ratings fall within the range of credit ratings for the Combined Proxy Group.[250] The Commission is also unpersuaded by Kentucky-American's WROE argument. The approved ROE and Kentucky-American's equity ratio result in a WROE of 4.744 percent that is within the range of American Water subsidiaries, which range from 3.44 percent to 6.29 percent and should not significantly affect credit agency evaluations.[251]

Kentucky-American's proposed ROE of 10.80 percent is above both the industry average of 9.68 percent and American Water's average of 9.66 percent. Additionally, it is far greater than recent returns awarded by this Commission and not in line with the Commission's objective to balance the needs of the utility and the customer. Conversely, the Commission believes that the Attorney General/LFUCG's recommended 9.15 percent

[249] Bulkley Direct Testimony at 70–76. Even though Kentucky-American did not propose a decoupling mechanism, it justified a higher ROE as compensation for the higher risk.

[250] Baudino Testimony at 43.

[251] Kentucky-American's Response to Staff's Post Hearing Request, Item 22.

ROE is not compatible with the industry average and would not allow for the appropriate level of industry investment even when coupled with a timelier recovery of capital investment.

For the reasons set forth above, the Commission awards Kentucky-American an ROE of 9.70 percent. This award appropriately balances the needs of Kentucky-American and its customers, is within the range of recent awards to comparable companies,[252] and is compatible, if not slightly larger than, the industry average and American Water average. Furthermore, this award is within the mean and median results of Kentucky-American's DCF models and supports the revised DCF and CAPM of the Attorney General as presented by Kentucky-American and within the range of the DCF models presented by the Attorney General.[253] The impact on the revenue recruitment is a decrease of $3,347,811.

Weighted Cost of Capital

Applying the cost rates of 2.43 percent for short-term debt, 5.86 percent for long-term debt, 0.040 for preferred stock, and 9.70 percent for common equity to the Commission's capital structure percentages consisting of 1.84 percent, 48.76 percent, 0.50 percent, and 48.90 percent, respectively, produces an overall cost of capital of 7.69 percent.

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[252] *See* Case No. 2018-00281, *Electronic Application of Atmos Energy Corporation for an Adjustment of Rates* (Ky. PSC May 7, 2019); Case No. 2018-00261 *Electronic Application of Duke Energy Kentucky, Inc. for Authority to 1) Adjust Natural Gas Rates 2) Approval of a Decoupling Mechanism 3) Approval of New Tariffs 4) and for All Other Required Approvals, Waivers, and Relief* (Ky. PSC Mar 27, 2019); and Case No. 2018-00295, *Electronic Application of Louisville Gas and Electric Company for an Adjustment of Its Electric and Gas Rates* (Ky. PSC Apr. 30, 2019).

[253] The Commission agrees with the Attorney General that Kentucky-American's proposed CAPM market return estimate of 15.19 percent is excessive and used Kentucky-American's revised CAPM models.

Authorized Increase

The Commission finds that Kentucky-American's net operating income for rate-making purposes is $ 34,116,970. We further find that this level of net operating income requires an increase in forecasted present rate revenues of $13,399,178. A schedule with the revenue requirement impact of each of the Commission's adjustments is contained in Appendix A.[254]

Net Investment Rate Base	$	443,653,707
Multiplied by: Rate of Return		7.6900%
Operating Income Requirement		34,116,970
Less: Operating Income - Present Rates		24,172,918
Operating Income Deficiency		9,944,052
Multiplied by: Revenue Conversion Factor		1.3475
Increase in Revenue Requirement		13,399,178
Increase in Revenue Requirement - Water Sales		13,399,178
Forecasted Operating Revenues - Water Sales		85,473,766
Total Revenue Water Sales - Required Rates	$	98,872,944
Percentage Increase		15.676%

COST-OF-SERVICE STUDY/RATE DESIGN

Kentucky-American filed a cost-of-service study (COSS) using the base-extra capacity method.[255] This methodology is widely recognized within the water industry as an acceptable methodology for allocating costs.[256] This Commission has previously

[254] There is $9 immaterial difference between Appendix A and the increase in the revenue requirement calculated here.

[255] Application, Exhibit 36.

[256] American Water Works Association, *Principles of Water Rates, Fees and Charges* (5th Ed. 2000) at 50.

accepted the use of this methodology for cost allocation and development of water service rates.[257] The Commission finds the COSS to be acceptable for use as a guide in allocating the revenue increase granted herein.

Rate Design

For general water service, Kentucky-American currently charges a monthly service charge and a flat volumetric fee. Kentucky-American separates the service charges by meter size, and between residential users, and all other customers. Kentucky-American proposed to unify the monthly service charge to all classes of customers by meter size. The service charge is intended to recover the cost of customer facilities such as meters and services, and the cost of customer accounting, including billing and collecting and meter reading.[258] The volumetric fee is intended to recover the cost of producing, transporting, and distributing the water.[259]

In developing its proposed rates, Kentucky-American used the COSS as the basis to move the customer charge towards the true cost to serve.[260] As seen in the table below, the COSS supports the proposed rates.

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[257] *See, e.g.* Case No. 2002-00040, *An Investigation Into Butler County Water System, Inc.'s Rate Schedule for Services with Private Fire Protection Facilities* (Ky. PSC Mar. 29, 2005) at 12 ("While several different methods of allocating costs exist, the base-extra capacity method is one of the most widely used methods of allocating costs. It recognizes that the cost of serving customers depends not only on the total volume of water used but also on the rate of use. We have used this methodology in several rate proceedings and have found it an effective methodology.").

[258] Direct Testimony of Constance E. Heppenstall (Heppenstall Direct Testimony) at 9.

[259] *Id.* at 9.

[260] *Id.* at 8.

Meter Size	Current Customer Charge Residential	Current Customer Charge All Other Customers	Proposed Customer Charge All Customers	COSS Customer Charge All Customers
5/8"	$12.49	$13.63	$15.00	$19.67
3/4"	18.74	20.46	22.40	29.51
1"	31.23	34.07	37.30	49.18
1-1/2"	62.45	68.17	74.70	98.35
2"	99.92	109.04	119.50	157.36
3"	187.35	204.47	224.00	314.72
4"	312.25	340.77	373.40	491.75
6"	624.50	681.50	746.70	983.50
8"	999.20	1,090.40	1,194.70	1,573.60

The Attorney General is against a higher customer charge and argued that a higher charge will impair the ability of Kentucky-American customers to conserve through reduced water usage and thus hinder their ability to lower bill costs.[261] The Attorney General stated his concern over Kentucky-American testimony that stated a guideline in the rate design was to increase customer charges to allow for a greater recovery of customer costs including ready-to-serve costs.[262] The Attorney General requested that the Commission consider a more measured approach concerning the customer charge increase and, should the Commission increase the monthly service charge, consider this reduction in volumetric risk when determining Kentucky-American's ROE.[263]

The Commission notes that the Attorney General offered no evidence or testimony regarding an increase in the customer charge. The Commission's findings must be supported by sufficient evidence, and therefore the Commission finds that the proposed customer charges are within the cost to serve. Thus, the proposed customer charges

[261] Attorney General Brief at 47.

[262] *Id.*

[263] *Id.* at 48.

should be approved, with the difference between the proposed and awarded revenue requirement applied to the volumetric charge. As a result, the average bill for a residential customer using 3,869 gallons per month will increase by $5.21, from $32.06 to $37.27, or 16.25 percent.

Rate Unification

Kentucky-American recently acquired two utilities: Eastern Rockcastle Water Association (Eastern Rockcastle) and North Middletown. Since their acquisition, Kentucky-American has maintained the service rates charged to those customers at the time they were acquired. Kentucky-American proposed that the customers in Eastern Rockcastle and North Middletown be charged the same rates as those charged to the rest of Kentucky-American's customers.

In opposition to the proposed unification of rates, the Attorney General argued that since Kentucky-American did not direct their COSS expert, Ms. Constance Heppenstall, to consider a separate cost of service for the acquired systems, there is no justification for a unified tariff.[264] The Attorney General stated that such actions fail to follow the Commission's previous orders, which directed Kentucky-American to perform a separate COSS when acquiring other water systems.[265]

LFUCG also opposed this proposed unification of the rates.[266] Specifically, LFUCG argued that Kentucky-American fails to adhere to a previous Commission

[264] Attorney General Brief at 46.

[265] *Id.* at 46.

[266] LFUCG Brief at 28.

directive in Case No. 2012-00520[267] in which the Commission stated that the consolidation of an acquired system's rates with Kentucky-American's rates should not be presumed.[268]

In support of the consolidation, Kentucky-American asserted that the decrease to the acquired utilities' rates will have a minimal effect on other customers. LFUCG stated that this impact is misleading as Kentucky-American is basing it on the deficiency between the present rate revenue to the proposed revenue and does not include the full cost to serve these new acquisitions.[269] LFUCG acknowledged that the impact on other customers is relatively small due to the scale of the systems, but stated that as more acquisitions occur the cost can grow exponentially resulting in a large impact to legacy customers.[270] In place of the unification of rates, LFUCG proposed to increase present rates based on a uniform percentage within each customer class and allow Kentucky-American, in its next base rate case, to present better information supporting the unification of rates.[271]

In Case No. 2005-00206, Kentucky-American acquired the city of Owenton's water and wastewater-related assets.[272] In that Order, we stated that "the Commission places

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[267] Case No. 2012-00520, *Application of Kentucky-American Water Company for an Adjustment of Rates Supported by a Fully Forecasted Test Year*, (Ky. PSC Oct. 25, 2013).

[268] LFUCG Brief at 28.

[269] *Id.* at 29.

[270] *Id.* at 30.

[271] *Id.* at 31

[272] Case No. 2005-00206, *The Verified Joint Application of the City of Owenton and Kentucky-American Water Company for Approval of the Transfer of Ownership of the Assets of the City of Owenton to Kentucky-American Water Company*, (Ky. PSC July 25, 2005).

KAWC on notice that KAWC's next application for a general rate adjustment should contain a proposal for a single rate schedule applicable to all KAWC customers."[273] In Kentucky-American's following rate case, Case No. 2007-00143, a single tariff rate structure was proposed and approved.[274] Further, in the final Order for Case No. 2012-00520, the Commission not only stated that rate unification should not be presumed, but also stated that such language was added merely to affirm the position and found that the unified rate structure should remain in place stating that "[T]he Commission has consistently supported the concept of a unified rate structure to encourage consolidation of water systems and to improve the quality of water service in the Commonwealth. Reversal of this policy would discourage further water system consolidation."[275]

Consistent with Commission precedent and based on the evidence in this case, the Commission now reaffirms those findings and, therefore, further finds that the proposed unified tariff is reasonable and should be approved.

Tap Fees

Kentucky-American proposed to decrease its tap fees based upon a three-year average of the actual cost of meter installation. Kentucky-American explained that the decrease is due to lower material costs as Kentucky-American transitions to polyethylene service lines rather than copper tubing.[276]

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[273] *Id.* at 6.

[274] Case No. 2007-00143, *Adjustment of Rates of Kentucky-American Water Company* (Ky. PSC Nov. 29, 2007).

[275] Case No. 2012-00520, *Application of Kentucky-American Water Company for an Adjustment of Rates Supported by a Fully Forecasted Test Year*, (Ky. PSC Oct. 25, 2013) at 70.

[276] O'Neill Direct Testimony at 47.

The Commission finds that the proposed tap fees will yield enough revenue to pay the expenses incurred in rendering the service and, therefore, are reasonable and should be approved.

Weather Normalization

Kentucky-American requested to adjust the normalized usage for residential and commercial customers. To develop its requested adjustment Kentucky-American analyzed weather data, time progression, customer usage patterns, and other predictor variables to develop a normalized usage for the forecasted test year.[277]

The Commission accepts the Weather Normalization as proposed by Kentucky-American for residential and commercial customers.

INFRASTRUCTURE REPLACEMENT TARIFF

Kentucky-American's Proposed QIP

Kentucky-American proposed to establish a tariff rate adjustment mechanism, the QIP tariff, to make capital improvements to replace its aging water system infrastructure. Kentucky-American's existing distribution system contains approximately 2,038 miles of water main,[278] including:

- 85 miles, or 4 percent, of lined and unlined cast iron and asbestos cement mains installed between 1885 and 1950;
- 515 miles, or 25 percent, of lined and unlined cast iron, galvanized steel, asbestos cement pipe, PVC pipe, ductile iron pipe, and other mains installed between 1950 and 1970;
- 1,356 miles, or 67 percent, of asbestos cement pipe, ductile iron pipe, galvanized steel, lined and unlined cast iron, PVC pipe and other mains installed between 1970 and 2010; and

[277] Schwarzell Direct Testimony at 10.

[278] O'Neill Direct Testimony at 24 and Exhibit 2 at 3–4.

- 82 miles, or 4 percent, of ductile iron and PVC pipe mains installed since 2010.

Although Kentucky-American accelerated the replacement of aging infrastructure in the last few years, its infrastructure is deteriorating at a faster rate than the current replacement rate. Kentucky-American projected that, at the current replacement rate, it will take 57.4 years to replace the rest of the cast iron main in the distribution system and approximately 377 years to replace the entire main in the system.[279] Because the infrastructure has a life expectancy of 60 to 100 years, Kentucky-American must further accelerate the rate of replacement of aging distribution and water treatment infrastructure to keep pace with the useful life of the assets in order to maintain safe and reliable water service. If the QIP is approved, Kentucky-American committed to investing between $6,000,000 and $10,000,000 in annual incremental capital spending.[280]

Kentucky-American asserted that the QIP would have substantial financial benefits for customers. Kentucky-American explained that alternative regulatory mechanisms, such as the QIP, provide financial benefits to customers by reducing regulatory costs, increasing rates on a more gradual basis than a general rate case, and providing regulatory certainty that attracts debt and equity capital at reasonable costs, all of which lower the rate impact on customers. Additionally, Kentucky-American claimed that the QIP would result in lower costs to customers over time as compared with the costs from deferred replacement because unscheduled pipe replacements are approximately ten

[279] O'Neill Direct Testimony at 28.

[280] O'Neill Testimony at 36; May 13, 2019 H.V.T. at 9:24:15.

times more expensive than scheduled pipe replacements.[281] Last, Kentucky-American provided evidence that other American Water subsidiaries filed less frequent rate cases after the implementation of a similar infrastructure replacement mechanism, which results in savings to ratepayers from avoided rate case expenses.[282]

Kentucky-American also asserted that the QIP would allow it to timely recover the fixed costs of infrastructure replacement, which provides an incentive for increased capital investment in replacing infrastructure, which, in turn, ensures safe, adequate, and reliable water service. Kentucky-American argued that it experiences an adverse revenue impact from regulatory lag because it carries the significant investment expense without an opportunity to recover costs until the next rate case. According to Kentucky-American, the QIP would mitigate the adverse revenue impact of regulatory lag by allowing Kentucky-American to recover its investment costs on a more current basis than under traditional ratemaking. Kentucky-American explained that, while Kentucky-American and its parent, American Water, always strive to provide safe, adequate, and reliable service, American Water competes with other companies for capital, and Kentucky-American competes with other American Water subsidiaries for investment funding. Kentucky-American claimed that the QIP would result in more predictable cost recovery, which would attract investors and the capital necessary for infrastructure replacement, both for American Water as it competes for capital in the marketplace and for Kentucky-American as it competes for discretionary funds within American Water.

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[281] O'Neill Direct Testimony at 32; Kentucky-American response to Staff's Second Request, Item 50; Kentucky-American Brief at 7–8.

[282] Kentucky-American's response to Staff's Second Request, Item 57; Kentucky-American Brief at 8.

Kentucky-American stated that the only plant eligible for the QIP would be existing distribution and water treatment infrastructure that was non-revenue producing and non-expense reducing.[283] Kentucky-American said that it would prioritize the replacement of cast iron and galvanized steel mains, which represent 15 percent of the distribution system but account for 64.2 percent of main breaks per year.[284]

Kentucky-American proposed that the QIP surcharge be established with an annual filing based on the forecasted test-period expense with an annual reconciliation of projected costs and actual costs. Under Kentucky-American's proposed plan, the first QIP test period would be July 2020 through June 2021, which are the 12 months following the forecasted test year in this case. Kentucky-American would make its first annual QIP filing, with a detailed schedule of qualifying projects, no later than April 2, 2020, which is 90 days before the start of the first test period. Kentucky-American provided a proposed schedule for processing annual QIP filings within the 90-day review period that included a timeline for requests to intervene, discovery, intervenor testimony, and a hearing. Kentucky-American further proposed that the annual balancing adjustment be filed at least 90 days before the end of each 12-month QIP period to true up projected costs and revenues with actual costs and revenues. The balancing adjustment filing also had a proposed timeline for intervention, discovery, intervenor testimony, and a hearing.

In calculating the QIP surcharge, Kentucky-American proposed that the total revenue requirement equal the pre-tax return for qualified additions and removal

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[283] Application, Exhibit 2 at 50; Schwarzell Direct Testimony at 31; Schwarzell Rebuttal Testimony at 21. Non-revenue producing and non-expense reducing plant is plant that is not constructed for the purpose of serving new customers.

[284] O'Neill Direct Testimony at 33, and Exhibit 2 at 18.

expenditures plus the depreciation and property tax for the proposed projects in the forecasted test year.[285] Kentucky-American suggested that the QIP surcharge be calculated as a percentage that would apply to all water charges, excluding other surcharges or add-on taxes; be displayed as a separate line item on customer bills; and be applied to all retail customer classes.[286] The QIP would be reset to zero as of the effective date of rates approved in each base rate case.[287]

Attorney General/LFUCG Position

The Attorney General/LFUCG recommended that the QIP be denied, or, in the event that the Commission approved the QIP, limited to a pilot program with defined constraints. The Attorney General/LFUCG addressed the QIP mechanism within the context of regulatory principles but declined to address the reasonableness or prudence of the proposed QIP.[288]

As a basis for the recommendation to deny the QIP, the Attorney General/LFUCG raised four arguments. First, they claimed that Kentucky-American failed to demonstrate a financial or infrastructure need for the QIP because Kentucky-American earned a "robust" ROE in 2017 and 2018 while investing in its system and providing reliable service and because Kentucky-American failed to demonstrate an increase in main breaks and leaks due to aging infrastructure.[289] The Attorney General/LFUCG argued that Kentucky-

[285] Application, Exhibit 2 at 51; Schwarzell Direct Testimony at 32.

[286] Application, Exhibit 2 at 51; Schwarzell Direct Testimony at 32–33.

[287] Schwarzell Direct Testimony at 33.

[288] Baudino Testimony at 49.

[289] *Id.* at 52; LFUCG Brief at 5–8; Attorney General Brief at 48–54.

American will make the necessary infrastructure investments and that American Water will provide the necessary investment funds with or without the QIP.[290] Second, the Attorney General/LFUCG asserted that the categories of plant subject to the QIP were overly broad as compared to similar requests filed in Kentucky-American's previous rate cases.[291] Third, they declared that the proposed 90-day review period was too brief to allow for sufficient review by the Commission and intervening parties, and therefore allowed Kentucky-American to pass through capital costs without sufficient regulatory scrutiny to ensure that the capital costs were prudently incurred.[292] Fourth, they maintained that the QIP would not provide adequate procedural processes to protect customers from unreasonable costs and unnecessary rate increases because it was an automatic adjustment.[293]

The Attorney General/LFUCG recommended that, if the Commission approved the QIP, certain limitations be imposed, including: (1) the QIP be a two-year pilot to allow the Commission and intervenors to evaluate the feasibility of the QIP; (2) the eligible plant be limited to non-revenue producing distribution mains that replace existing mains to accelerate the replacement rate and limit annual rate increases; (3) that an annual and cumulative cap be imposed to protect ratepayers from excessive future rates; (4) that the ROE for the QIP be reduced by one percent from the ROE authorized in this case to mitigate rate impact on customers and balance the interests of shareholders and

[290] LFUCG Brief at 4–5; Attorney General Brief at 49–51, 55.

[291] Baudino Testimony at 54–55; Attorney General Brief at 55.

[292] Baudino Testimony at 55–56.

[293] *Id.* at 56–57.

ratepayers; (5) that Kentucky-American be required to file a base rate case within two years of implementing the QIP in order to evaluate cost recovery under the QIP; (6) the use of a historical, rather than a forecasted cost basis, which would remove the need for an annual reconciliation of projected and actual costs; and (7) that the Commission allow for sufficient time for Commission Staff and intervenors to review costs, engage in discovery, and file testimony.[294]

Kentucky-American Response to Attorney General/LFUCG

In response, Kentucky-American argued that the Attorney General/LFUCG failed to provide any evidence that contradicted the financial and infrastructure need for the QIP, the reasonableness of the proposed categories of eligible plant, and the reasonableness of the proposed 90-day period to provide adequate opportunity to review the QIP filing. Kentucky-American reiterated that, while it accelerated the replacement rate and reduced the period to replace all of its mains from 500 years to 377 years, the current replacement rate is not sustainable without more timely cost recovery through the QIP.[295] Kentucky-American argued that, without the QIP, it would have to file a new rate case as soon as the prior rate case was decided in order to mitigate the regulatory lag for capital improvements associated with accelerated infrastructure replacement.

Kentucky-American also disputed the Attorney General/LFUCG's proposed modifications to the QIP, arguing that the Attorney General/LFUCG's recommendations were counterproductive, unnecessary, and artificial limitations not supported by evidence. Kentucky-American countered that aging infrastructure replacement programs have been

[294] Baudino at 57–61; Attorney General Brief at 55–56.

[295] Kentucky-American Brief at 11.

successfully implemented in other jurisdictions and have been recognized as a best practice by the National Association of Regulatory Utility Commissioners (NARUC).[296]

Analysis and Findings

It is well established that KRS 278.030 and KRS 278.040 expressly grant the Commission plenary ratemaking authority to regulate and investigate utilities and to establish fair, just, and reasonable rates.[297] In the absence of any statute that requires a particular procedure to determine whether rates are fair, just, and reasonable, the Commission has the authority to consider and decide ratemaking issues such as the infrastructure replacement surcharge proposed by Kentucky-American.[298]

As documented in the case record, aging water system infrastructure is a national issue, with an estimated 1,000,000 miles of pipe nearing the end of its useful life at an estimated replacement cost between $335 billion to $1 trillion over the next 25 years.[299] This Commission is cognizant of the need to prudently and timely replace aging infrastructure in order to provide safe, adequate, and reliable water to customers.

Before we address the Attorney General/LFUCG recommendations, we again note that they expressly stated that the recommendations were developed in the context of regulatory principles, and that they declined to address the reasonableness or prudence of the proposed QIP.[300]

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[296] Kentucky-American Brief at 16.

[297] *Public Serv. Comm'n v. Commonwealth ex. Rel. Jack Conway*, 324 S.W.3d 373, 383 (Ky. 2010).

[298] *Id.*

[299] Direct Testimony of Nick O. Rowe (Rowe Direct Testimony), Exhibit NOR-1; Kentucky-American Response to Staff's Second Request, Item 47 at 53.

[300] Baudino Testimony at 49.

Regarding the Attorney General/LFUCG's recommendation to deny the QIP, the Commission finds the Attorney General/LFUCG's arguments unpersuasive. First, despite the Attorney General/LFUCG's assertions to the contrary, the case record contains substantial evidence regarding the need for the QIP. The Attorney General/LFUCG's argument that the status quo is acceptable ignores the hard fact that, if Kentucky-American continues with the current replacement rate and investment level, it would take 377 years for Kentucky-American to replace infrastructure with 60 to 100 years of remaining useful life. Unlike infrastructure investment that extends service to new customers, and thus produces new revenue, investment in existing infrastructure nearing the end of its useful life is inherently a non-revenue producing investment, with the costs borne by the existing customer base. Another hard fact is that there will be a significant increase in capital costs to replace aging infrastructure, with a subsequent rate increase to recover those capital costs. The Commission must balance Kentucky-American's need to make a prudent infrastructure replacement investment to ensure that ratepayers receive safe, adequate, and reliable water, and the mandate that rates be fair, just, and reasonable. The Commission finds it reasonable to approve an alternative cost recovery based on smaller, more gradual rate increases. The alternative is to wait until Kentucky-American files its next general rate case, with the result that customers experience rate shock from large increases due to rate recovery for several years of capital investment to replace aging infrastructure.

Second, the Attorney General/LFUCG failed to provide evidence in support of their allegation that the plant Kentucky-American proposed to include in the QIP is overly broad. Further, the Attorney General/LFUCG's assertion that the Commission should deny the QIP based on differing criteria in this case and previous requests for an infrastructure replacement tariff mechanism ignores that this is a factual determination that we make on a case-by-case basis.

Third, the Commission finds that a 90-day period is sufficient to review the annual filings. We established a 75-day period for our pilot program for processing electric distribution cooperatives general rate adjustments.[301] KRS 278.190 establishes a six-month suspension for a general rate case based on a forecasted test year. Here, the limited scope of the QIP annual filing should allow for thorough review and evaluation within three months. However, we reserve the right to extend the 90-day review upon good cause. In addition, certain periodic information related to construction under the QIP will be required to promote efficient processing of future filings.

Regarding the Attorney General/LFUCG's recommendations for certain limitations, if the Commission approves the QIP, the Attorney General/LFUCG offered conclusions without evidentiary support for their recommendations. The Attorney General/LFUCG stated that, unless the QIP is limited to a two-year pilot, the Commission effectively approves a rate mechanism with "essentially no cut-off to its operation."[302] However, the same statutory authority that permits the Commission to authorize a QIP also grants us the authority to terminate or limit the QIP. For example, as the Attorney General/LFUCG correctly noted, the Commission placed limits on a gas utility whose forecasted estimates for pipeline replacement were demonstrated to be unreliable.[303] Here, the Attorney

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[301] Case No. 2018-00407, *A Review of the Rate Case Procedure for Electric Distribution Cooperatives* (Ky. PSC Mar. 26, 2019).

[302] Baudino Testimony at 59 and 61.

[303] Case No. 2017-00349, *Electronic Application of Atmos Energy Corporation for an Adjustment of Rates and Tariff Modifications* (Ky. PSC May 28, 2010).

General/LFUCG offered no evidence that the list of projects that Kentucky-American expects to include in the first five years of the QIP is unreliable. Similarly, the Attorney General/LFUCG offered no evidence that annual and cumulative caps were necessary to protect ratepayers from excessive rates or that the ROE should be reduced in order to protect ratepayers' interests. Such a claim implies that the Commission is unable to carry out its statutory duty, which is refuted by the Attorney General/LFUCG's own example of the Commission acting to protect ratepayers that is cited above. Further, the Attorney General/LFUCG offered no evidence that the use of a historical test year would result in a more accurate review of costs than a forecasted year. We note that, as Kentucky-American pointed out, forecasted test years are authorized for gas pipeline replacement tariff mechanisms.

For the reasons discussed above, the Commission finds that Kentucky-American established the need for an infrastructure replacement tariff, and therefore we find it reasonable to authorize the QIP. The Commission directs Kentucky-American to keep track of any O&M savings that result from the QIP investment projects and report these savings in their next base rate case. Additionally, the Commission finds that the following language should be revised in the proposed tariff form as follows:

Remove:

> The monthly QIP Rider charges for all respective water service classifications will be calculated as a percentage and applied to all water charges excluding any other surcharge or add-on taxes.

To:

> The monthly QIP Rider charges for all respective water service classifications will be calculated as a percentage and applied to all water charges including meter fees, volumetric water sales, fire service fees, and

public and private hydrant fees from the Company's most recent base rate case but excluding any other surcharge or add-on taxes.

Kentucky-American should file its first annual QIP filing no later than April 2, 2020, for the first QIP forecasted test period, which should be July 2020 through June 2021. The filing process, information, and deadlines for the QIP are set forth in Appendix B to this Order and should follow Kentucky-American's proposed regulatory process as filed in response to Commission Staff's Post Hearing Request for Information, Item 20. Kentucky-American should include the QIP as a separate line item on its bill. Further, when Kentucky-American makes its annual filing, it should serve the Attorney General with a complete copy.

OTHER ISSUES

North Middletown

Kentucky-American proposed a utility plant acquisition adjustment of $229,290,[304] amortized over ten-years at $24,567 per year, to recover in rates Kentucky-American's purchase of North Middletown's water system assets.[305] Kentucky-American requested that the $1,175,509 purchase price for North Middletown's water assets be recognized as the ratemaking rate base, rather than the $929,841 net book value.[306] Kentucky-American asserted that it was reasonable to base cost recovery on the purchase price

[304] Base Period Update, Exhibit 37, Schedule B-1, page 2 of 2; Kentucky-American Brief at 59. Kentucky-American requested an adjustment of $225,195 in the Application, but filed revised total in the Base Period Update.

[305] Application at paragraph 20; Schwarzell Direct Testimony at page 29, lines 3–6; Base Period Update, Exhibit 37, Schedule D-2. Because North Middletown is a municipal water system and the requirement under KRS 278.020 that the Commission approve acquisitions applies only to utilities, Commission approval is not required for Kentucky-American's purchase of North Middletown's assets.

[306] Application, Exhibit 36, Schedule B-2.4; Schwarzell Direct Testimony at 29–30.

whether the Commission applied the five-step Delta Test, which was first developed and applied by the Commission in Case No. 9059,[307] or under the fair market value approach.[308] Kentucky-American provided evidence that the North Middletown acquisition satisfied the Delta Test criteria because: (1) the purchase was an arms-length transaction, initiated by North Middletown's invitation to bid that was published in a local, general interest newspaper, and with a purchase price that was negotiated without conflict by a willing seller and willing buyer; (2) Existing single tariff customers' bills will be unaffected because the purchase price is funded by the system's present rate revenue, minus a $16,000 deficiency, thus the transaction will not adversely impact the overall rates for new and existing customers; (3) the transaction will achieve operation economies; (4) non-utility property is not part of the transaction, thus the criteria that there be a clear segregation of utility and non-utility purchased property is moot; and (5) the purchase will result in overall benefits in the financial and service aspect of North Middletown's operations by leveraging Kentucky-American's existing financial opportunities and service operations.[309] Kentucky-American further asserted that, while the transaction satisfied each of the elements of the Delta Test, using a fair market value approach would encourage future consolidation and regionalization, which was consistent with the Kentucky Legislature's policy that regionalization and consolidation of water and wastewater systems should be encouraged.[310]

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[307] Case No. 9059, *An Adjustment of Rates of Delta Natural Gas Company, Inc.* (Ky. PSC Sept. 11, 1985).

[308] Schwarzell Direct Testimony at 29–30; Kentucky-American's Response to Staff's Second Request, Items 72 and 74.

[309] Kentucky-American Response to Staff's Second Request, Item 72.

[310] Schwarzell Direct Testimony at 30.

Despite being on notice of this issue,[311] neither the Attorney General nor LFUCG presented testimony or filed any evidence into the record regarding the valuation of the North Middletown transaction for ratemaking purposes. Despite this failure to provide evidence for the Commission to weigh and evaluate, both the Attorney General and LFUCG recommended in their post-hearing briefs that the Commission reject Kentucky-American's request to apply the fair market value to the North Middletown asset purchase.[312] LFUCG further recommended that the Commission reject the adjustment entirely, arguing that Kentucky-American failed to satisfy the Delta Test.[313] The Commission's findings must be supported by sufficient evidence. Here, with no evidentiary support in the record from the Attorney General or LFUCG for their respective positions, the Commission is without any basis, much less sufficient evidence, to evaluate Attorney General's or LFUCG's arguments.

The Commission has previously held that if a utility demonstrates that the acquisition of plant at a cost above book value is in the public interest, then the utility should be allowed to recover its investment.[314] The Commission developed the Delta Test as factors to evaluate whether a utility plant acquisition at a cost above book value is in the public interest. Here, Kentucky-American provided sufficient evidence that each

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[311] We expressly reject the Attorney General's argument raised in his post-hearing reply brief that Kentucky-American raised the argument that both methodologies are reasonable as "unsupported proposals in rebuttal testimony." *See* Attorney General Brief at 61. The record expressly demonstrates that Kentucky-American raised this argument in direct testimony and responded to data requests from Staff regarding this assertion.

[312] Attorney General Brief at 61–62; LFUCG Brief at 24–28.

[313] LFUCG Brief at 25.

[314] Case No. 9059, *An Adjustment of Rates of Delta Natural Gas Company, Inc.* (Ky. PSC Sept. 11, 1985) at 3.

of the five elements of the Delta Test are satisfied. Of particular note, the treatment of the North Middletown asset purchase price does not have a material impact on Kentucky-American's rates. As Kentucky-American explained, the purchase price and the cost of operating the North Middletown system are funded by present rate revenue, with the exception of a $16,000 deficit. Truing up the deficiency would result in a 5.5 percent rate increase to North Middletown customers, if treated as a standalone rate, or, if included in a unified tariff, would impact existing customers by less than one penny per month, and would result in a rate decrease to North Middletown's customers.[315] For the above reasons, the Commission finds that using the purchase price for ratemaking purposes is reasonable. The Commission further finds that, based upon the reasonableness of the purchase price, the amount of the adjustment proposed by Kentucky-American and the ten-year amortization period are reasonable, and should be approved. Finally, the Commission finds that, because we base our decision on Kentucky-American satisfying the Delta Test, the issue of whether to apply the fair market value is moot.

Low-Income Programs

At the Commission's request, Kentucky-American presented a witness at the hearing to discuss programs that assist low-income customers. Kentucky-American provides bill payment assistance to its residential customers through its H2O – Help to Others Program (H2O). Established 19 years ago, H2O is funded by a $62,500 annual commitment from Kentucky-American shareholders and voluntary contributions from customers.[316] Kentucky-American made an additional $5,000 contribution in the program

[315] Kentucky-American Response to Staff's Second Request, Item 72.

[316] May 13, 2019 HVT at 6:11:40.

year ended in September 2018 to replenish funds that were depleted prior to the close of the program year.[317]

The funds are available on a first-come, first-served basis.[318] Eligible customers can receive financial assistance in the form of a bill credit; the maximum amount of financial assistance is $125, and customers can receive H2O assistance only once per year.[319] For the program year ending in September 2018, H2O provided bill payment assistance for 706 eligible customers with an average grant of $114.[320] Kentucky-American publicizes the H2O program through bill inserts and local media, outreach to local officials, public speaking, and on its website.[321] Kentucky-American customer service representatives also make referrals to the H2O program.[322]

H2O is administered by the Dollar Energy Fund (Dollar Energy), a national non-profit organization that acts as the primary agent for gathering, processing, and approving applications, and manages and trains the community agencies that conduct the intake process for H2O applications.[323] Dollar Energy receives an 8.75 percent operating fee; community agencies receive $5.00 for each application that they process.[324] Prior to

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[317] *Id.* at 6:27:36.

[318] *Id.* at 6:21:10.

[319] *Id.* at 6:16:47.

[320] Kentucky-American's Response to Staff's Post-Hearing Request, Item 13; May 13, 2019 HVT at 6:28:50.

[321] May 13, 2019 HVT at 6:26:50.

[322] *Id.* at 6:26:31.

[323] Kentucky-American's Response to Staff's Post-Hearing Request, Item 14; May 13, 2019 HVT at 6:12:54 and 6:16:17.

[324] Kentucky-American's Response to Staff's Post-Hearing Request, Item 14.

2014, another Lexington, Kentucky-based non-profit agency administered the H2O program for an operating fee up to 15 percent.[325]

The Commission commends Kentucky-American for its H2O program, especially for providing an additional $5,000 when program funds were depleted.

SUMMARY

After consideration of the evidence of records and being otherwise sufficiently advised, the Commission finds that:

1. The rates set forth in Appendix C to this Order are fair, just, and reasonable rates for Kentucky-American to charge for service rendered on and after June 28, 2019.

2. The rate of return granted in this Order is fair, just, and reasonable, and will provide sufficient revenue for Kentucky-American to meet its financial obligations with a reasonable amount remaining for equity growth.

3. The rates proposed by Kentucky-American would produce revenue in excess of that found reasonable and should be denied.

4. Kentucky-American is authorized to establish a QIP Rider, as modified in this Order, with its first application filed on or before April 2, 2020, for the first QIP forecasted test period, which should be July 2020 through June 2021. The filing process, information, and deadlines for the QIP are set forth in Appendix B to this Order.

IT IS THEREFORE ORDERED that:

1. The rates and charges proposed by Kentucky-American are denied.

2. The rates and charges, as set forth in Appendix C to this Order are approved.

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[325] May 13, 2019 HVT at 6:25:20.

3. The rates and charges for Kentucky-American, as set forth in Appendix C to this Order, are the fair, just, and reasonable rates for Kentucky-American, and these rates are approved for service rendered on and after June 28, 2019.

4. The QIP Rider requested by Kentucky-American, as modified in this Order, is granted.

5. Kentucky-American shall file its initial QIP Rider application on or before April 2, 2020, for the first QIP forecasted test period of July 2020 through June 2021.

6. Kentucky-American shall comply with the QIP filing process, information, and deadlines set forth in Appendix B to this Order

7. Any documents filed pursuant to ordering paragraph 6 shall reference this case number and be filed in the post-case file.

8. Within 20 days of the date of this Order, Kentucky-American shall, using the Commission's electronic Tariff Filing System, file its revised tariffs setting out the rates authorized in this Order and the revised QIP Rider and reflecting that they were approved pursuant to this Order.

9. This case is now closed and removed from the Commission's docket.

By the Commission

ENTERED

JUN 27 2019

KENTUCKY PUBLIC
SERVICE COMMISSION

ATTEST:

For Executive Director

APPENDIX A

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2018-00358 DATED JUN 27 2019

Line No.	Description	Rate Base & Income Statement Adj.	Income Taxes (Current & Deferred) State 5%	Federal 21%	Operating Income 8.25%	Impact on Revenue Req. 1.3475
1	Income Taxes; Rate Base; & Revenue Req. - App.		503,710	$ 2,140,415	$ 36,392,595	19,865,195
2	Effect of Rate Change					
3	Commission Weighted Cost-of-Capital	7.690%				
4	Less: KAWC Weighted Cost-of-Capital	8.250%				
5	Weighted Cost-of-Cap. Difference	-0.560%				
6	Multiplied by: KAWC Rate Base - Application	443,653,707			(2,484,461)	(3,347,811)
7						
8	Rate Base Adjustments:					
9	Utility Plant at Original Cost	(1,016,441)			(83,856)	(112,996)
10	Accumulated Depreciation	(19,206)			(1,584)	(2,134)
11	Construction Work In Progress	(203,005)			(16,748)	(22,568)
12	Working Capital Allowance	(201,000)			(16,583)	(22,346)
13	CIAC	1,108,255			91,431	123,203
14	Customer Advances	1,042,381			85,996	115,880
15	Deferred Income Taxes	234,092			19,313	26,024
16	Deferred Maintenance	1,586,270			130,867	176,343
17						
18	Required Net Operating Income				$ 34,116,970	
19						
20	Net Operating Income - KAWC Application				$ 21,650,007	
21	Operating Revenue Adjustments:					
22	Trane	(7,845)	(392)	(1,565)	(5,888)	7,934
23	AFUDC	(79,324)	(3,966)	(15,825)	(59,533)	80,221
24	Operation & Maintenance Adjustments:					
25	Fuel & Power - KU	(100,320)	5,016	20,014	75,290	(101,453)
26	Fuel & Power - Unaccounted for Water	(190,993)	9,550	38,103	143,340	(193,151)
27	Chemicals - Error Correction	(102,886)	5,144	20,526	77,216	(104,049)
28	Chemicals - Unaccounted for Water	(121,704)	6,085	24,280	91,339	(123,079)
29	Salaries & Wages - Incentive	(304,616)	15,231	60,771	228,614	(308,057)
30	Salaries & Wages - North Middletown Allocation	(27,538)	1,377	5,494	20,667	(27,849)
31	Support Services - Incentive	(828,962)	41,448	165,378	622,136	(838,328)
32	Support Services - Business Development	(83,829)	4,191	16,724	62,914	(84,777)
33	Support Services - External Affairs & Pub. Policy	(239,475)	11,974	47,775	179,726	(242,181)
34	Support Services - 401(k)	(26,625)	1,331	5,312	19,982	(26,926)
35	Pensions - 401(k)	(38,433)	1,922	7,667	28,844	(38,867)
36	Regulatory Expense	22,079	(1,104)	(4,405)	(16,570)	22,328
37	Uncollectable	(72)	4	14	54	(73)
38	Maintenance Supplies & Services	107,578	(5,379)	(21,462)	(80,737)	108,793
39	Depreciation/Amortization Adjustments:					
40	Depreciation - Slippage	17,404	(870)	(3,472)	(13,062)	17,601
41	Taxes Other Than Income Adjustments:					
43	Payroll, Property, and FICA Taxes	(26,698)	1,335	5,326	20,037	(27,000)
44	Temporary Reconciling ADJ. For Taxable Income:					
45	Interest Synchronization	75,940	(3,797)	(15,150)	18,947	(25,531)
46	Book Depreciation - Slippage	(31,738)	1,587	6,332	(7,919)	10,671
47	Tax Depreciation - Slippage	(52,650)	2,633	10,504	(13,137)	17,702
48	Taxable Customer Advances & CIAC - Slippage	(743,127)	37,156	148,254	(185,410)	249,840
49	Reflect Repairs Deduction - Slippage	356,000	(17,800)	(71,022)	88,822	(119,688)
50	Reverse Book Cost of Removal - Slippage	1,358	(68)	(271)	339	(457)
51	Deferred Income Taxes:					
52	State Def. Income Tax Adj	(160,979)	(160,979)		160,979	(216,919)
53	Federal Def. Income Tax Adj	(680,062)		(680,062)	680,062	(916,384)
54	EADIT Stub Period - State & Federal	(385,857)		(385,857)	385,857	(519,942)
55						
56	Income Tax; Net Operating Income; & Inc. Order		$ 455,339	$ 1,523,798	$ 24,172,916	$ 13,399,169
57						
58	Commission's Increase to Forecasted Current Income Taxes		112,608	449,302		
59	Reported Current Income Taxes		$ 738,871	3,532,885		
60						
61	Commission Adjusted Current Income Taxes		$ 851,479	$ 3,982,187		

APPENDIX B

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2018-00358 DATED JUN 2 7 2019

QIP RIDER
PERIODIC REPORTING AND ANNUAL FILING FORMATS

This Appendix includes the filing formats Kentucky-American shall prepare when submitting its application for the annual adjustment to the QIP Rider. Kentucky-American shall not modify any filing format without the prior written consent of the Commission Staff.

In order for the Commission to properly monitor the capital improvements to Kentucky-American's distribution system, Kentucky-American will need to provide the following information:

1. A list of the names and addresses of the contractors utilized for QIP projects.

2. A copy of the bid document signed with each contractor showing a description and scope of the work, construction specifications, and construction management.

3. Construction schedule for each job.

4. Reasonable size maps for each location.

5. Copies of updated welding certification for each welder kept on site for inspection by the Commission's investigator.

6. Annual progress report for work completed, the amount of progress payment and the costs of removal of the old pipes.

7. All identifying information noted by Kentucky-American in this preceding.

Items 1 through 3 are to be filed as contracts are issued. Items 4 and 6 are to be filed at the beginning of each project. Documents filed pursuant to Items 1 through 6 shall be filed in the post-case file for this proceeding. Item 7 will be filed along with Kentucky-American's application for the annual adjustment of the QIP Rider. Kentucky-American may request a conference with the Commission if clarifications are needed concerning Items 1 through 7.

APPENDIX C

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2018-00358 DATED JUN 27 2019

The following rates and charges are prescribed for the customers in the area served by Kentucky-American Water Company. All other rates and charges not specifically mentioned herein shall remain the same as those in effect under the authority of this Commission prior to the effective date of this Order.

MONTHLY SERVICE CHARGE RATES

Meter Size		
5/8"	$	15.00
3/4"	$	22.40
1"	$	37.30
1 ½"	$	74.70
2"	$	119.50
3"	$	224.00
4"	$	373.40
6"	$	746.70
8"	$	1,194.70

MONTHLY RATES PER 1,000 GALLONS

Service Type		
Residential	$	5.7570
Commercial	$	5.2066
Industrial	$	4.3050
Other Public Authority	$	4.7960
Sales for Resale	$	4.2360

MONTHLY FIRE PROTECTION RATES

Line Size		
2"	$	8.76
4"	$	35.28
6"	$	79.37
8"	$	141.09
10"	$	220.51
12"	$	330.03
14"	$	317.98
16"	$	564.63
Private Hydrant	$	76.57
Public Hydrant	$	48.70

TAPPING FEES

Size of Meter Connected		
5/8-Inch	$	1,223.00
1-Inch	$	2,174.00
2-Inch	$	4,002.00
Larger than 2-Inch		Actual Cost

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PSC EXHIBIT 5

FEDERAL RESERVE press release

For release at 2 p.m. EST

November 5, 2020

The Federal Reserve is committed to using its full range of tools to support the U.S. economy in this challenging time, thereby promoting its maximum employment and price stability goals.

The COVID-19 pandemic is causing tremendous human and economic hardship across the United States and around the world. Economic activity and employment have continued to recover but remain well below their levels at the beginning of the year. Weaker demand and earlier declines in oil prices have been holding down consumer price inflation. Overall financial conditions remain accommodative, in part reflecting policy measures to support the economy and the flow of credit to U.S. households and businesses.

The path of the economy will depend significantly on the course of the virus. The ongoing public health crisis will continue to weigh on economic activity, employment, and inflation in the near term, and poses considerable risks to the economic outlook over the medium term.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. With inflation running persistently below this longer-run goal, the Committee will aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time and longer-term inflation expectations remain well anchored at 2 percent. The Committee expects to maintain an accommodative stance of monetary policy until these outcomes are achieved. The Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and expects it will be appropriate to maintain this target range until labor market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time. In addition, over coming months the Federal Reserve will

(more)

increase its holdings of Treasury securities and agency mortgage-backed securities at least at the current pace to sustain smooth market functioning and help foster accommodative financial conditions, thereby supporting the flow of credit to households and businesses.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Voting for the monetary policy action were Jerome H. Powell, Chair; John C. Williams, Vice Chair; Michelle W. Bowman; Lael Brainard; Richard H. Clarida; Mary C. Daly; Patrick Harker; Robert S. Kaplan; Loretta J. Mester; and Randal K. Quarles. Ms. Daly voted as an alternate member at this meeting.

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For release at 2 p.m. EST November 5, 2020

Decisions Regarding Monetary Policy Implementation

The Federal Reserve has made the following decisions to implement the monetary policy stance announced by the Federal Open Market Committee in its statement on November 5, 2020:

- The Board of Governors of the Federal Reserve System voted unanimously to maintain the interest rate paid on required and excess reserve balances at 0.10 percent, effective November 6, 2020.
- As part of its policy decision, the Federal Open Market Committee voted to authorize and direct the Open Market Desk at the Federal Reserve Bank of New York, until instructed otherwise, to execute transactions in the System Open Market Account in accordance with the following domestic policy directive:

  "Effective November 6, 2020, the Federal Open Market Committee directs the Desk to:
    - Undertake open market operations as necessary to maintain the federal funds rate in a target range of 0 to 1/4 percent.
    - Increase the System Open Market Account holdings of Treasury securities and agency mortgage-backed securities (MBS) at the current pace. Increase holdings of Treasury securities and agency MBS by additional amounts and purchase agency commercial mortgage-backed securities (CMBS) as needed to sustain smooth functioning of markets for these securities.
    - Conduct term and overnight repurchase agreement operations to support effective policy implementation and the smooth functioning of short-term U.S. dollar funding markets.
    - Conduct overnight reverse repurchase agreement operations at an offering rate of 0.00 percent and with a per-counterparty limit of $30 billion per day; the per-counterparty limit can be temporarily increased at the discretion of the Chair.
    - Roll over at auction all principal payments from the Federal Reserve's holdings of Treasury securities and reinvest all principal payments from the Federal Reserve's holdings of agency debt and agency MBS in agency MBS.
    - Allow modest deviations from stated amounts for purchases and reinvestments, if needed for operational reasons.
    - Engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions."

- In a related action, the Board of Governors of the Federal Reserve System voted unanimously to approve the establishment of the primary credit rate at the existing level of 0.25 percent.

(more)

This information will be updated as appropriate to reflect decisions of the Federal Open Market Committee or the Board of Governors regarding details of the Federal Reserve's operational tools and approach used to implement monetary policy.

More information regarding open market operations and reinvestments may be found on **the Federal Reserve Bank of New York's** website.

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https://www.federalreserve.gov/newsevents/pressreleases/monetary20201105a.htm

FEDERAL RESERVE press release

For release at 2 p.m. EST November 5, 2020

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Voting for the monetary policy action were Jerome H. Powell, Chair; John C. Williams, Vice Chair; Michelle W. Bowman; Lael Brainard; Richard H. Clarida; Mary C. Daly; Patrick Harker; Robert S. Kaplan; Loretta J. Mester; and Randal K. Quarles. Ms. Daly voted as an alternate member at this meeting.

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PSC EXHIBIT 6

BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 2000-0210-W/S

IN RE: Application of United Utility Companies, Inc. for adjustment of rates and charges for the provision of water and sewer service.	**DIRECT TESTIMONY OF STEVEN M. LUBERTOZZI**

Q. Please state your name, occupation and business address for the record.

A. My name is Steven M. Lubertozzi. I am employed as the Director of Regulatory Accounting at Utilities, Inc., 2335 Sanders Road, Northbrook, Illinois 60062.

Q. What is your professional background?

A. I have been employed by Utilities, Inc. since June of 2001. Since that time I have been involved in many phases of rate-making in several regulatory jurisdictions. I graduated from Indiana University in 1990, with a bachelors degree and am a Certified Public Accountant. I had four years of public accounting/financial analysis experience prior to joining Utilities, Inc. I am a member of the American Institute of Certified Public Accountants, the Illinois CPA Society, and an Associate member of the Association of Certified Fraud Examiners. I have successfully completed the Eastern Utility Rate School that NARUC and Florida State University co-sponsor and I have testified before the Illinois Commerce Commission.

Q. Would you please explain your job responsibilities at Utilities, Inc.?

A. My responsibilities encompass all aspects of utility commission regulation in fifteen of the states where Utilities, Inc. operates (Georgia does not regulate water and sewer utilities).

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These duties include preparation of rate case applications, coordinating commission audits, developing and delivering testimony before utility commissions and obtaining commission approval of territory expansions.

Q. What is United Utility Companies, Inc.?

A. United Utility Companies, Inc. (UUC or the "Company") is a wholly owned subsidiary of Utilities, Inc. ("UI"). UUC was incorporated in 1975 for the purpose of owning and operating water and wastewater utility systems in two upstate South Carolina. As Mr. Daniel discusses in greater detail in his testimony, many of these smaller systems had experienced regulatory difficulty and, combined with the economies of scale which could be realized from their consolidation, it made regulatory and business sense to create UUC. Since that time, and under the Commission's oversight, UUC has grown to serve approximately 90 water and 1,400 wastewater customers located in six counties across the state. UUC maintains its operations and customer service office in West Columbia, South Carolina and customer payments, meter readings and service orders are processed from this office. Administrative functions such as regulatory services, management, accounting, human resources, and data processing are performed from the Utilities, Inc., office in Northbrook, Illinois.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to sponsor the Application ("Application") of UUC for an increase in its rates for water and sewer services provided to its service area in South Carolina, which was filed with the Commission on September 24, 2001.

Q. Why is UUC requesting rate relief at this time?

A. It has been over eleven years since the Commission last authorized UUC to increase its water and sewer rates, and for the test year ended December 31, 2000, UUC had negative Net Operating Income and a negative return on its rate base. In addition, as time passes, the need for rate relief will increase. The basic cost of living has increased between twenty-five and thirty-five percent in that time period. Environmental compliance costs have likewise increased. Without satisfactory rate relief, UUC's ability to continue to provide safe, reliable and efficient water and sewer utility services to its customers will be placed in jeopardy, and UUC will be unable to meet its financial obligations. In addition, capital will become more costly.

Q. Please describe the Company's application.

A. In addition to the proposed rate schedule, the Application contains financial statements consisting of a balance sheet, income statements, rate base and rate of return schedule, a test year revenue calculation under current rates, a revenue calculation under proposed rates, and a schedule of current and projected Customers. Also included are the most recent approval letters from DHEC and a sample customer bill form.

Q. What are the proposed changes to the Company's Water Rate Schedule?

A. Schedule E under Tab B of the Application contains the Company's Schedule of Proposed Water Rates and Charges. The Company has proposed to increase the water customers' Residential Base Facility Charge from the current charge of $9.00 per month to $11.50 per month and the Usage Charge from $3.50 per 1,000 gallons to $4.50 per 1,000 gallons.

Q. What is the impact of the proposed water rate changes?

A. The impact of the proposed rate changes on UUC's water customers is, on average, an increase of $9.47 per month or 28%.

Q. What changes to the Company's Sewer Rate Schedule are proposed?

A. The Company proposes to increase its monthly charge for sewer to $53.50 per single family equivalent, or SFE, except for mobile homes. Residences have an SFE of one, while commercial SFE's vary. Mobile home monthly sewer rates are proposed to increase to $40. For collection-only customers, the sewer rate is proposed to increase to $27.50.

Q. What is the impact of the proposed sewer rate changes?

A. The impact of the proposed sewer rate changes is an increase of $11.00 to $24.50 depending upon the type of customer, which equates to a 38% to 84% increase.

Q. Mr. Lubertozzi, did you prepare the Financial Statements provided under Tab B of the Application?

A. Yes I did.

Q. Would you please describe the content of the Financial Statements?

A. Yes. The Financial Statements and related schedules submitted with the application consist of a Balance Sheet, Income Statement, Rate Base and Rate of Return, Consumption Analysis under Present rates and Consumption Analysis under Proposed rates. The test year chosen is the year ended December 31, 2000, which was the most recent twelve-month period available at the time of the Company's filing. Schedule A is the Balance Sheet, which shows that at the end of the test year UUC had assets of approximately $2.9 million. This includes approximately $2.8 million of Net Utility Plant. Schedule B is the Income Statement for the test year and is comprised of four pages. Page 1 is the Income Statement for Combined

Operations; page 2 is the Income Statement for Water Operations; page 3 is the Income Statement for Sewer Operations, and; page 4 is a list of brief explanations for the pro forma adjustments made to the various Income Statements. Schedule C is the Rate Base and Rate of Return Statement and is comprised of three pages. Page 1 is the Rate Base and Rate of Return Statement for Combined Operations; page 2 is the Rate Base and Rate of Return Statement for Water Operations, and; page 3 is the Rate Base and Rate of Return Statement for Sewer Operations. Schedule D is the Consumption Analysis under Present rates, and Schedule E is the calculation of revenues under Proposed Rates. Since they were filed, Schedules B and C have been revised to correct an error in the pro forma plant shown in the original schedule C.

Q. **Would you please provide a brief explanation of the proforma adjustments included on Schedule B?**

A. Yes. Operator and Office salaries were annualized as of December 31, 2000. Pension & Other Benefits were annualized to match end of test year salaries and wages. Regulatory Commission Expense was adjusted to reflect the cost of this proceeding amortized over a three-year period. Depreciation Expense was adjusted to reflect the annualized depreciation expense on end of test year plant as well as pro forma additions to plant. Taxes other than income have been adjusted for changes in the payroll taxes based on current tax rates and annualized salary figures as discussed above. In addition, the Regulatory Commission Tax was adjusted to an estimated increase in the assessment by the PSC. Gross Receipts Taxes were annualized on revenues under present and proposed rates. State and Federal Income taxes were calculated at the current rates of 5% and 34%, respectively. AFUDC is eliminated for ratemaking purposes. Interest Expense was synchronized using the capital structure of the consolidated Utilities, Inc. group of companies, consisting of a debt / equity ratio of 50.02% / 49.98% and an embedded cost of debt of 8.62%.

Q. What is set forth in Schedule C?

A. Schedule C is the Rate Base and Rate of Return Statement. As of December 31, 2000, UUC has a rate base of approximately one million dollars. As indicated on page 1 of Schedule C, UUC had a negative return on rate base during the test year.

Q. Would you describe the Pro Forma adjustments to Schedule C?

A. There are two adjustments to the end of test year rate base. Working capital has previously been used in UUC rate cases and is again used in this proceeding. Working capital is calculated at 1/8 of test year's operating expenses. A pro forma adjustment is made to working capital to match the pro forma operating expenses. The other rate base adjustment indicated on Schedule C is to reflect capital projects that were underway but not yet complete as of the end of the test year. These Pro Forma Plant projects are needed to provide customers with safe and reliable sewer service.

Q. Why has the Company requested that the Commission determine the revenue requirement in this proceeding using the rate of return on rate base methodology?

A. Heretofore, UUC's rates were set by the Commission using a variation of the operating ratio approach. In its Order Number 90-651, issued July 16, 1990 in Docket Number 89-602-W/S, the Commission determined that it would use the operating ratio and/or operating margin as guides in determining just and reasonable rates. The Commission described operating ratio as the percentage obtained by dividing total operating expenses by operating revenues and noted that operating margin is the obverse side of this calculation and is determined by dividing the net operating income for return by the total operating revenues of the utility.

Q. Why do you refer to this approach as a variation of the operating ratio approach?

A. First, as the Commission itself noted in Order Number 90-651, its operating margin calculation is the obverse calculation of operating ratio. Secondly, the regulatory, finance, and accounting literature relating to public utilities does not recognize operating margin as a ratemaking approach, but instead discusses operating ratio. Third, as described in the literature, the operating ratio approach is defined as a process in which a utility's revenue requirement is determined by dividing operating expenses by a target operating ratio that the regulatory body deems necessary to permit the utility to generate revenues adequate to cover operating expenses, depreciation, taxes and capital costs.

Q. Would you please identify the literature you are referring to?

A. There are a number of works which refer to operating ratio as a ratemaking approach. One such publication is *Accounting for Public Utilities* by Robert L. Hahne and Gregory E. Aliff, which describes operating ratio methodology as being particularly appropriate for application in the transportation industry because most of the equipment employed in that industry is leased. In discussing application of the operating ratio approach to water and wastewater utilities, at page 3-5 of this publication the authors state:

> Other examples of companies not having the attributes that are conducive to rate base/rate of return measurements are found in the water/wastewater industry. Although water/wastewater companies are capital intensive, many situations exist in which customers provide substantial portions of the capital funds in the form of contributions in aid of construction. These customer-provided funds are normally deducted from the rate base and often result in **nominal**

> **(or even negative) rate base amounts**. If the capital that investors supply is **relatively insignificant** or **even nonexistent**, that capital does not provide an adequate foundation for using the rate base/rate of return measure of service costs, and an alternative measure, such as the operating ratio, is applied.

A copy of the portions of this publication to which I refer are attached in the Appendix to my testimony. Another such publication is the course materials prepared by Dr. Janice A. Beecher, then Director of Regulatory Studies for the Center for Urban Policy and the Environment at Indiana University, for the NARUC Water Committee Eastern Utility Rate School conducted in October of 1997. Dr. Beecher's materials recognize that the operating ratio method is a "[m]odification of [t]raditional [r]egulation" that "is used for smaller systems **with little or no rate base**". A copy of these course materials are also included in the Appendix to my testimony. A third such publication is the Deloitte & Touche *Public Utilities Manual, A Service for Public Utilities*, which simply identifies the operating ratio methodology as one of three ratemaking methods traditionally employed, with cost of service and debt service being the other two. Deloitte & Touche notes that the operating ratio methodology is rarely used except in the transportation industry and do not discuss it further in their publication. A copy of the portion of this publication referencing operating ratio is also included in the Appendix to my testimony.

Q. Is the operating margin or operating ratio approach utilized by any of the other state regulatory bodies with jurisdiction over other subsidiaries of Utilities, Inc?

A. None of the Company's sister subsidiaries are regulated by a state utility commission that employs the operating margin approach used by the Public Service Commission of South Carolina. Only one state utility commission, the North Carolina Utilities Commission, employs the operating ratio methodology to regulate our sister subsidiaries. And, there, the policy is that the operating ratio approach is employed only where it generates **more** revenue than does the rate of return on rate base approach. As I mentioned earlier, the Company's sister subsidiaries operate in fifteen states.

Q. What conclusions do you draw from the literature, Mr. Lubertozzi?

A. It is clear from the literature that the rate of return methodology is the ratemaking approach traditionally employed in the regulation of public utility rates and that the operating ratio methodology is rarely used. Operating margin is not recognized as an alternative. Moreover, in the case of water and sewer utilities, operating ratio is only appropriate for use when there is little or no investor supplied capital. Stated another way, where a water or sewer utility has no significant rate base, the rate of return approach is not appropriate.

Q. What has been the experience of Utilities, Inc. subsidiary in other states?

A. Our experience has been that the only recognized alternative method to rate of return on rate base regulation for water and sewer utilities is operating ratio and that it is employed only in one state, for smaller companies that have little or no rate base, are incapable of having a well-defined capital structure, have a cost of capital which cannot be easily determined and which will benefit on the revenue side when the alternative is employed.

Q. Does the Company fit the profile of a water or wastewater utility for which the operating ratio/ operating margin method is appropriate?

A. Definitely not. The Company has a rate base in excess of $1,000,000 of investor provided capital. This is a substantial and is certainly neither nominal nor insignificant. And, the Company's capital structure is well defined as can be gleaned from the testimony of

Company witness Ahern. Use of our parent's capital structure is in keeping with generally accepted cost of capital analyses among regulatory bodies and has been approved by this Commission in other cases – particularly those involving the telephone industry. And, also as Ms. Ahern's testimony reflects, our cost of capital is easily determined.

Q. Is rate of return on rate base treatment appropriate for the Company?

A. Absolutely. The Company has a substantial rate base and needs to earn a rate of return that is sufficient to obtain the necessary equity and debt capital that a larger utility needs for sound operation.

Q. Does this conclude your testimony at this time?

A. Yes, it does.

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Appendix
of
Steven M. Lubertozzi

ACCOUNTING FOR PUBLIC UTILITIES

ROBERT L. HAHNE
GREGORY E. ALIFF
DELOITTE & TOUCHE LLP

Contributing Authors: The following were the original contributing authors of *Accounting for Public Utilities*. While much of what these individuals originally wrote has been removed or replaced through the annual update process, we wish to continue to recognize their contributions in the creation of this book.

FRANCIS J. ANDREWS, JR.
WILLIAM W. EYERS
JOHN S. FERGUSON
HERNAN GONZALEZ
JOHN D. MCCLELLAN
RICHARD W. MCCULLOUGH
JAMES E. MORRIS
RANDALL A. SNOWLING
JAN A. UMBAUGH

1999

Current Through:
RELEASE NO. 16, NOVEMBER 1999

MATTHEW BENDER

balancing of these two positions is difficult even in stable economic periods. The economic problems of the 1970s, stemming largely from inflation and steep increases in energy costs, resulted in considerable attention being focused on the ratemaking process and have led all interested parties to scrutinize ratemaking methods, their significant components, and their resulting effect on utility prices.

Part II of this book examines the subject of ratemaking. Chapter 3 briefly describes the ratemaking environment and surveys the most important ratemaking styles. Chapter 4 addresses the major factors considered in determining the rate base (the investor-supplied plant facilities and other assets that provide utility services), including the costing method to be used, the time period to be considered, and the components to be included. Chapter 5 focuses specifically on the working capital component of the rate base, with special attention given to cash working capital or those funds needed to cover the lag between required service expenditures and collections received for that service. Chapter 6 deals with depreciation and analyzes the methods used for calculating periodic recovery of capital expenditures. Chapter 7 discusses the selection of the test period used in estimating utility cost of service and the method and timing by which test period data are accumulated.

Chapter 8 describes the phenomenon of attrition, which occurs when revenues consistently fail to keep pace with expenses and a pattern of declining earnings emerges. The causes of, and potential remedies for, this situation are discussed. Chapter 9 covers the principles used in determining what constitutes a fair rate of return as well as the various methods employed in that determination. Chapter 10 addresses the actual pricing of utility services, including rate design with its attendant procedures.

A fundamental aspect of ratemaking considerations is utility taxation, particularly federal income taxes. The complexities of this topic are dealt with in Chapter 17.

§ 3.01 Overview of Ratemaking Approaches

[1] In General

Historically, the rate base/rate of return approach has been the most prominent style of ratemaking in determining revenue requirements. As is developed more fully in § 3.02 below, this approach measures investment in plant plus related support items, such as inventories and cash working capital requirements. Other approaches to measuring the revenue levels required to cover service costs, however, have been employed by regulators on occasion. Among the various approaches that have been used are the following:

(1) *Rate base/rate of return approach*—Under the rate base/rate of return approach, revenue requirements equal the total of:

(a) operation and maintenance expenses;

(b) depreciation;

(c) taxes; and

(d) cost of capital invested in the rate base (i.e., the amount produced by multiplying the rate base by an appropriate rate of return).

The rate base/rate of return approach is widely used in rate proceedings involving investor-owned electric, telephone, and natural gas transmission and distribution companies. These companies are generally capital intensive, and the annual cost of debt interest and equity earnings requirements is a major component of the total cost of providing service.

(2) *Debt service coverage approach*—Under this approach, revenue requirements equal the total of:

(a) operation and maintenance expenses;

(b) taxes; and

(c) debt service requirements (i.e., debt principal and interest payments for the test period plus a specified "coverage" allowance in excess of the actual debt service payments required).

This type of ratemaking approach is most often used in highly leveraged systems (i.e., financed primarily, if not entirely, by debt capital) in which common equity capital is not sufficient to function as primary risk capital in providing an adequate buffer against earnings volatility.

(3) *Operating ratio approach*—Under the operating ratio approach, revenue requirements are determined by dividing operating expenses by a target operating ratio deemed necessary

to produce revenues adequate to cover operating expenses plus depreciation, taxes, and capital costs.

This measure is used primarily in rate proceedings of transportation companies and, in some instances, in establishing water or wastewater company rate levels. It has been used as a substitute for the rate base/rate of return approach in situations in which investor-provided capital and the related capital costs have not been a significant factor in the total cost of providing services.

[2] Considerations Affecting the Ratemaking Approach

The particular ratemaking approach used must fit into a framework of conceptual, practical, and legal considerations.

[a] Conceptual

Conceptually, any of these approaches may be acceptable in the determination of revenue requirements for a regulated utility. The utility incurs costs in providing customer services and is entitled to a reasonable opportunity to recover those costs (presumably incurred at reasonable levels for prudent purposes). Accordingly, the ratemaking process, by whatever means employed, should result in producing rates that, when applied to sales or to services rendered, generate revenues equal to the cost of service incurred. This is fundamental to traditional ratemaking philosophies and procedures, and the structuring of the cost components in a particular format (i.e., the style of ratemaking) should facilitate this objective.

[b] Practical

Practical considerations typically have more effect on the ratemaking style or format than conceptual considerations. Most often, the physical, economic, and financial characteristics of the regulated entity dictate the approach used. Capital intensive companies, such as electric, gas, and telephone utilities, require large fixed investments in plant facilities and are generally financed with substantial amounts of debt and equity capital. In these instances, the rate base has a significant role in measuring service costs. Concurrently, the capital markets provide a ready source of data for assessing the costs of debt and equity capital supporting the rate base. These conditions are ideally suited for application of the rate base/rate or return measure.

Some regulated companies do not have the attributes that are suited for rate base/rate of return applications. Transportation companies, for example, generally are not capital intensive because so many of them lease a large portion of the operating facilities. As a result, operating costs dominate the cost of service, and capital investment (and the related capital cost requirements) are much less significant. In these situations, an alternative measure, such as the operating ratio approach, is more useful in establishing revenue levels required to offset the costs of service.

Other examples of companies not having the attributes that are conducive to rate base/rate of return measurements are found in the water/wastewater industry. Although water/wastewater companies are capital intensive, many situations exist in which customers provide substantial portions of the capital funds in the form of contributions in aid of construction. These customer-provided funds are normally deducted from the rate base and often result in nominal (or even negative) rate base amounts. If the capital that *investors* supply is relatively insignificant or even nonexistent, that capital does not provide an adequate foundation for using the rate base/rate of return measure of service costs, and an alternative measure, such as the operating ratio, is applied.

In addition, a utility may be involved in nonregulated or nonjurisdictional operations or in a variety of classes or types of service. These conditions require practical considerations in choosing the ratemaking approach to cost measurement. An example may be given as follows:

Regulatory and Ratemaking Alternatives

Janice A. Beecher
Indiana University
Fall 1997

Topics

- Alternatives to traditional economic regulation (ratebase/rate-of-return)
- Alternatives to traditional rate design (cost allocation)
- Regulatory reform often involves both
- Rate design choices may affect revenues and earnings

Traditional Regulation

Regulatory review and approval of:
- Revenue requirements
- Ratebase (value)
- Rate of return (ROE and ROR)
- Rate design (cost allocation)

Advantages of the RB/ROR

- A balancing of *competing interests* in the *public interest*
- For capital-intense industries, regulation protects both ratepayers and shareholders
- Reasonable and institutionally valid
- Well-known and familiar (100+ years)
- Produces relatively stable results

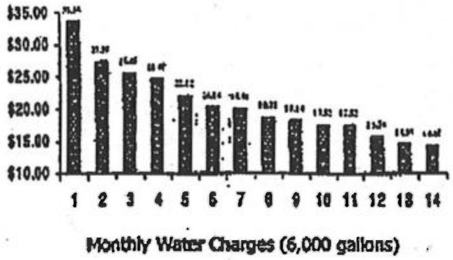
Disadvantages of RB/ROR

- Incentives for overinvestment in capital (ratebase)
- Incentive to cut costs only between rate adjustments (expenses)
- Inadequate incentives for innovation
- Inadequate consideration of social or environmental costs and benefits
- Inflexible, particularly with regard to responsiveness to market changes

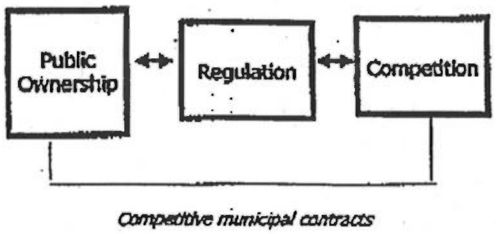
Special Issues for Water

- Rising-cost industry
- Substantial infrastructure needs (20 years = $138 billion)
- Capital intensity and economies of scale
- Monopolistic character
- Industry structure (size, ownership)
- Public health and safety issues
- Environmental and conservation issues

Economies of Scale and Water Pricing



Regulation, Ownership, and Competition



Modifications of Traditional Regulation

- Pass-throughs and cost-adjustment mechanisms (water, energy, taxes)
- Special-purpose surcharges
- Operating ratio
- Cost indexing
- Preapproval for environmental compliance
- Alternative dispute resolution

Revenue Requirements Formula

RR = r(RB-d) + O&M + D + T

Where:

RR	=	revenue requirement
RB - d	=	ratebase less depreciation
O&M	=	operation and maintenance expenses
D	=	depreciation expenses
T	=	taxes

Operating Ratio

- Substitutes O&M for RB:

RR = r(O&M) + O&M + T

- Used for smaller systems with little or no rate base

Alternative Methods of Regulation

- Rate Indexing
- Incentive regulation (price caps)
- Municipal contracts

Rate Indexing

- Uses changes in consumer prices (CPI) or other metrics to adjust prices
- Simplifies ratemaking and reduces ratemaking costs (smaller systems)
- Can be used in conjunction with incentive regulation (larger systems)

Simple Rate Indexing

- Easy to understand, implement
- Rate increases tied to inflation (CPI)
- Example

	Inflation	Increase	$/1,000 gal.
Base year	–	–	.830
Inflation	.03	.249	.849

Incentive Regulation

- Initial price-cap process similar to RB/ROR
- Provides utilities with flexibility and reduces regulatory process
- Provides incentives for performance
- May provide a disincentive for needed expenditures (O&M)
- Criticized for allowing excessive earnings

Types of Incentive Regulation

- Price caps (British model)
- Cost indexing
- Incentive rates of return
- Construction-cost incentives (targets)
- Profit-sharing between ratepayers and shareholders
- Combinations (such as price caps and indexing)

British Price-Cap Model

PC = Price level ± RPI ± K

where K is a composite of :

X	=	expected efficiency in the future
Q	=	expenditure on quality enhancements
Po	=	efficiency gains delivered*
S	=	enhanced service levels expenditure*
V	=	supply/demand balance expenditure*

* = new element

Municipal Contracts

- French model (also uses indexing)
- Public ownership and competitive contracts generally displace independent economic regulation
- Considerable use in wastewater industry, gaining popularity in water
- Competitively bid but very long term
- Concern about long-term commitment and investment

Alternative Methods of Rate Design

- Marginal-cost pricing
- Single-tariff pricing
- Negotiated rates
- Value-of-service pricing

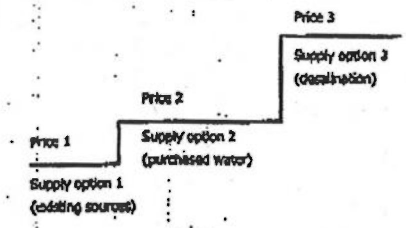
Rate Design Issues

- Science or art?
  - Allocation by customer class, space, time
  - Fixed v. variable charges
- As costs rise, cost allocation becomes more difficult and controversial
- Policy tradeoffs are intensifying
- Role of customer understanding and support
- Increasing experimentation in rate design
- Institutional legitimacy (regulators, courts)

Marginal-Cost Pricing

- Embedded v. marginal or incremental cost
- Promotes efficiency and conservation
- Economic theory v. real world implementation
- Revenue instability when used in determining revenue requirements
- Rate design applications include seasonal and block pricing

Marginal-Cost Pricing Example



Single-Tariff Pricing

- Unique issue for water (utility v. system)
- Spatial differences in cost-of-service
- Costing (economies of scale) v. pricing
- Stand-alone v. district management
- Extends cost averaging and simplifies
- Corporate identity and competitive issues
- Trade-offs among policy objectives
- Role in restructuring (acquisitions)
- Commission policy (majority approve)
- Used in Great Britain (when metered)

Single-Tariff Pricing Example

System A (smaller)	
Stand-alone price	\$3.00/1,000 gallons
District price	\$2.80/1,000 gallons
Single-tariff price	\$2.75/1,000 gallons
System B (larger)	
Stand-alone price	\$2.80/1,000 gallons
District price	\$2.70/1,000 gallons
Single-tariff price	\$2.75/1,000 gallons

Negotiated Rates

- Avoided cost to the *buyer* can be the ceiling
- Marginal cost to the *seller* can be the floor
- Potential applications
  - Wholesale customers
  - Large-volume users
  - Competitive applications
  - Alternative dispute resolution

Value-of-Service Pricing

- Cost-of-service v. value-of-service
- Willingness-to-pay
- Customer preferences
- Equity or fairness issues
- Not widely practiced
- May become more important in competitive environments

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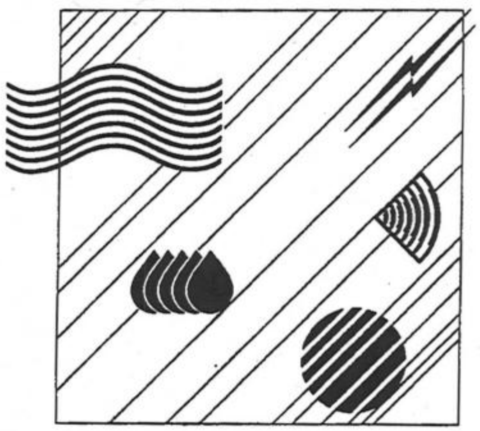
Public Utilities Manual

A Service for Public Utilities



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Public Utilities Manual

A Service for Public Utilities

aspects of the ratemaking process: (1) the investment on which utilities are permitted to derive earnings and (2) the compensation or return to be allowed the investors on their investment. The normal rate formula for determining overall return is a simple one and is developed in some detail in Chapter 2.

Some recent court cases have dealt with regulatory jurisdictional issues. One case addressed the issue of whether local regulators are preempted from disallowing costs of a multistate project where the costs were allocated to separate jurisdictions by the FERC; in the particular case, the courts determined that the local regulator was so preempted. In another case, the courts ruled that the FERC could not impose a market price limitation on charges for fuel supplied by an affiliate where the affiliate charges were based on costs, as required by the SEC under the Holding Company Act.

II. Ratemaking Concepts

Ratemaking Methodologies

The basic objective of utility ratemaking is to determine the total amount of revenues a company must generate from its operations in order to achieve its own objectives and yet, at the same time, meet the needs and objectives of its customers.

Three methods of ratemaking have traditionally been used to achieve this objective: the cost-of-service, the debt-service, and the operating-ratio methods. While each permits the recovery of operating expenses and taxes, they differ in the techniques by which they measure the utility's revenue needs beyond these elements (i.e., their required return on and of capital).

The cost-of-service method is by far the most widely used. The debt-service method is most common in the regulation of cooperatives or government entities that are financed primarily with debt securities. The operating-ratio method is rarely used except in the transportation industry, and will not be further discussed here.

Cost-of-Service Method. This method equates "revenue requirements" or "cost of service" with the total of: operating expenses, depreciation, taxes, and a rate-of-return allowance on the utility's investment in rate base.

The total recorded or estimated amounts for operating expenses, depreciation, and taxes for the period under review, or test period, are deducted from revenues generated during the test period to determine net operating income realizable at current rates. This represents the amount available for return.

The utility's investment in facilities and other assets used in supplying utility service (rate base) is also determined. The required rate of return is determined by analyzing the components of the capital structure to produce the composite rate of return required to adequately meet the utility's capital requirements. Rate base multiplied by this composite rate of return results in the required return, or net operating income.

By comparing the required return with the net operating income realizable at current rates, the net-operating-income surplus or deficiency can be determined. This amount, adjusted for income tax and other factors, is then converted to a gross revenue surplus or deficiency in order to determine the

PSC EXHIBIT 7

NRRI 90-17

COST ALLOCATION AND RATE DESIGN FOR WATER UTILITIES

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This report was prepared by The National Regulatory Research Institute (NRRI) with funding provided by participating member commissions of the National Association of Regulatory Utility Commissioners (NARUC) and a grant from the American Water Works Association Research Foundation (AWWARF). The views and opinions of the authors do not necessarily state or reflect the views, opinions, or policies of the NRRI, the NARUC, the AWWARF, or their contributors.

EXECUTIVE SUMMARY

Cost allocation and rate design are fundamental and closely related parts of the utility ratemaking process. Their many complexities raise a variety of theoretical and practical issues. Though not a practitioner's manual, this report lays a foundation for further exploration of cost allocation and rate design for water utilities at a time when these concerns are increasingly salient. While the report focuses generally on commission-regulated water utilities, it has wider applicability.

The public water supply sector today is operating in an environment of dramatic change. Increasing public concern about economic growth and drinking water quality have complicated the provision of public water service. Per-capita water usage has continued to increase with rising affluence and urbanization. Potential reservoir sites for surface sources and available ground sources have become more scarce. Federal and state legislation and regulations have resulted in more stringent water quality standards. Traditional solutions to supply problems focused on augmenting existing supply sources; however, nontraditional methods including conservation, recycling, and programs designed to improve water system efficiency (for example, least-cost planning and incentive regulation) are now under consideration.

In the current environment of change, water utility issues are attaining a more prominent place on the public and governmental agendas. This growing interest can be attributed to health concerns, occasional droughts, and increased water rates, the latter being a chief concern of public utility regulators. Rising costs in water supply are the result of more stringent drinking water standards and the need to install costly treatment technologies, capacity additions required to accommodate demand growth, and the replacement and upgrading of aging water system infrastructures. The potential for water rates to rival those for energy utilities has increased regulatory concern, particularly with regard to the problem of rate shock and consumers' continued willingness and ability to pay for water service. Water utilities and regulators alike may need to reconsider cost allocation and rate design alternatives when responding to these issues.

Cost allocation is inexact; no single correct approach or method exists. Much depends on the criteria used by analysts. All cost studies involve judgments and should be viewed as a starting point. The choice of a cost allocation approach depends largely on utility management objectives and regulatory policy considerations. In the context of increasing pressure on water rates, a comparison of fully allocated (also known as fully distributed or embedded) cost analysis and marginal-cost analysis is warranted. Fully allocated and marginal-cost calculations both can provide decisionmakers with useful benchmarks for ratemaking as well as planning. These methods can produce divergent results. As a method of compromise, fully allocated costs can be used to determine revenue requirements while marginal costs can be used to design rates. Incremental least-cost analysis is proposed in this report as a marginal-cost ratemaking approach that emphasizes the practical application of least-cost planning criteria to ratemaking.

The theoretical pricing standard is to set rates equal to the cost of service; that is, rate differentials are based on cost differentials. However, to maintain this standard, cost differentials must be sufficiently defined. For example, if there are no marked differences in the cost of providing different volumes of service, it may be more appropriate to adopt a uniform commodity rate than a decreasing-block or increasing-block rate.

Despite the availability of many alternatives, water rate design leaves much discretion to decisionmakers. As in selecting a cost allocation method, the choice of rate design involves tradeoffs among the goals of efficiency, equity, revenue adequacy, and administrative feasibility. Rates that are equitable may not be efficient or perceived as affordable; rates that are perceived as affordable may not be efficient or generate sufficient revenues; rates that are efficient may not be administratively practical. The inclination to promote economic development or conservation policies through rate design must be considered within the context of basic ratemaking objectives and the tradeoffs among them. Decisionmakers may find it increasingly difficult to balance the competing perspectives that are inherent in the ratemaking process.

Finally, it is important to recognize that improved costing and pricing of water utility service, though essential to economic efficiency, is not a panacea for all the problems confronting water utilities and their regulators. Other issues and solutions merit further study as well.

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FOREWORD

A decade ago, Professor Patrick C. Mann of West Virginia University authored *Water Service: Regulation and Rate Reform,* the Institute's first publication on the subject. These issues are revisited and expanded upon in this report, which also is the Institute's first product funded in part by a grant from the American Water Works Association Research Foundation.

Douglas N. Jones
Director
Columbus, Ohio
December 15, 1990

ACKNOWLEDGEMENTS

This project was made possible in part by a grant from the American Water Works Research Foundation. We are grateful to Mr. James Manwaring, AWWARF Executive Director, and Mr. Joel Catlin, AWWARF Project Manager, for making this cooperative effort possible.

The authors acknowledge the careful review and helpful suggestions provided by Dr. Sarah Voll of the NRRI's Research Advisory Committee, Ms. Karlette Fettig and Dr. L. D. McMullen of the AWWARF Research Advisory Council, and Mr. Joel Catlin of AWWARF. In addition, conversations with Dr. Robert Graniere and Mr. William Pollard of the NRRI staff were very useful throughout the project. We especially appreciate David Wagman for expert editing, Wendy Windle for computer graphics, and Linda Schmidt for word processing and production assistance. Any errors, of course, are the responsibility of the authors.

CHAPTER 1

INTRODUCTION

Cost allocation and rate design for water utilities are comparatively new areas of inquiry. Historically, water supply economics has focused on the benefits and costs of large-scale water supply projects, such as reservoirs and dams, while often circumventing issues of cost and price in the public water supply sector.[1] In the public utility realm, the greater attention to other utility services (such as electricity and natural gas) can be attributed to several factors, including the relatively static nature of water industry technology, the relatively small size of the water industry within the United States economy, the dominance of water quality and quantity issues over economic and financial concerns, and the limited debate over issues such as public versus private provision of water service and the appropriate role of competition.[2] A case in point is that geographically localized water shortages tend to heighten awareness of the need to ensure long-term water supplies. However, the predominant response has been to appeal for conservation through voluntary and sometimes mandatory rationing rather than through pricing reform.[3]

One of the more important reasons for the eclipse of water supply by other utility sectors is that in the past, water service has been supplied at a lower cost than other utility services and has generally constituted a relatively small proportion of residential consumer budgets and business expenditures. The relative abundance of inexpensive water supplies has helped keep water prices low. In addition, water rates have generally been increasing at a slower rate than prices for other public utility services. However, low water rates for many publicly owned and privately owned water utilities in the United

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1 These points are made in Patrick C. Mann, *Water Service: Regulation and Rate Reform* (Columbus, OH: The National Regulatory Research Institute, 1981).

2 Jerome W. Milliman, "Policy Horizons for Future Urban Water Supply," *Land Economics* 39 (May 1963): 109-32.

3 According to the economic paradigm, pricing is the preferred rationing and allocation tool.

States can be explained in part by underpricing.[4] The consequences of underpricing include deferring system maintenance and postponing capital replacement of obsolete or aging system facilities.

Underpricing of water service is a function of the need for more refined cost-of-service standards, the use of historical accounting costs (rather than present or near-term future costs) in the ratemaking process, the use of average embedded (rather than incremental) cost as the primary pricing standard in the context of increasing real unit costs of water provision, inadequate provisions for depreciation, maintenance, and other expenses, and consumer pressure to keep rates low. Another explanation for underpricing by some municipal water systems is the political nature of ratemaking at the local level. Although structured differently, many state regulated and privately owned water utilities suffer from many of the same problems. The lack of uniformity in water pricing in general can be partly attributed to the ownership and regulatory dichotomy between public and private water providers.

Forces of change are emerging.[5] In the early 1990s, water issues in general appear to be moving higher on the public and governmental agendas. Issues of economic growth and environmental quality have greatly complicated the provision of water service. Per-capita water usage has continued to increase with rising affluence and urbanization. Potential reservoir sites for surface sources have become more scarce while ground sources have become of limited availability. The traditional solution to supply problems has been to expand or augment supplies; however, nontraditional methods such as conservation, recycling, and programs designed to improve system efficiency (for example, least-cost planning and incentive regulation) are at present under serious consideration. The numerous forces affecting all utilities and their regulation have begun to affect water supply.

Although water quality and quantity issues continue to be prominent, increasing attention is being paid to rising water utility costs, which are primarily related to safe drinking water regulations and the need to install

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[4] On this issues, see James Goldstein, "Full-Cost Water Pricing," *American Water Works Association Journal* 78 no. 2 (February 1986): 52-61.

[5] Patrick C. Mann, "Reform in Costing and Pricing Water," *American Water Works Association Journal* 79 no. 3 (March 1987): 43-45.

costly new treatment technologies, additions to capacity to accommodate growth, and replacement and upgrading of aging infrastructure. Secondary factors include rising energy costs and inflation. Today, the potential for substantial water rate increases and accompanying rate shock looms large, rivaling the past experience of the nation's energy utilities. Changes in pricing policies to encourage conservation and the wise use of water may add to the upward pressure on water rates. As rates rise, so does concern about consumer willingness and ability to pay for water service. All of these issues place demands on water supply managers and regulators as they evaluate cost allocation and rate design alternatives.

Cost allocation and rate design are distinct but intrinsically related processes. The usual purpose of analyzing costs is to provide a basis for setting rates. Likewise, contemporary rate design emphasizes the determination of *cost-based* rates; indeed this objective has become fundamental to utility ratemaking. This report provides essentially a status report on cost allocation and rate design for water utilities. It draws upon theoretical as well as practical knowledge about these topics and provides a basis for evaluating some of the available alternatives. While the focus is mainly on privately owned and state regulated water utilities, the study has broader applicability to other water service providers, all of whom are confronted with cost allocation and rate design issues.

This chapter provides an overview of the issues of value, cost, and price, and a framework for the remainder of the analysis. Chapter 2 provides a description of the water supply industry. Chapter 3 reviews cost allocation, focusing on the embedded cost approach, while chapter 4 reviews conceptual and application issues related to marginal (incremental) cost pricing. Chapter 5 turns to issues of rate design. Chapter 6 offers concluding remarks and is followed by a series of technical appendices, including a glossary of terms and a bibliography. Though not a practitioner's manual, this report lays a foundation for further exploration of cost allocation and rate design for water utilities at a time when these concerns are increasingly salient.

Value, Cost, and Price[6]

Value, cost, and price are intrinsically related and highly interdependent concepts. Although understanding each concept greatly helps in understanding the others, they are distinct in that each evokes a different set of considerations in the water supply field.

Water is a value-added commodity. Its value raises issues of scarcity, competition, and the need for integrated water resource planning. An increasing awareness of water's value has led some to adopt a wise-use approach to its consumption, including--but not limited to--conservation. The cost of supplying water is increasing, especially the expense of complying with safe drinking water regulations. Cost issues also raise questions related to economies of scale and the structural character of the water supply industry. Finally, pricing deals with sending appropriate signals to customers about the value and cost of water. Value-of-service and cost-of-service pricing are contrasting (but not necessarily incompatible) approaches. In the regulatory context, pricing is a part of the process by which revenue requirements are determined, costs allocated, and tariffs designed.

The Value of Water

Of the approximately 340 billion gallons of water withdrawn daily in the United States from surface and ground sources, only about 11 percent is used by public water suppliers. Public suppliers "compete" for water withdrawals mainly against water use in agriculture and electricity generation. The value of water used by public utilities is somewhat dependent on the value society places on other water uses. Over the past several decades, competition for water has intensified greatly, partly because some water sources have reached their carrying capacities or have become impaired either by natural or manmade causes.

Globally, water in its natural state is abundant and renewable, but remains finite and nonrenewable in some respects. For instance, water is nonrenewable when it comes from a severely depleted or contaminated groundwater source. Water

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[6] See Janice A. Beecher, "Value, Cost, and Price: Essay on Emerging Water Utility Issues," *NRRI Quarterly Bulletin* 11 no. 2 (June 1990): 177-181.

withdrawals also require the expenditure of nonrenewable and usually expensive energy resources.

For water users of any type, the cost of water itself (the unprocessed variety) is negligible. All water used by human beings has value principally because its natural characteristics have been altered through withdrawal, transportation, treatment, and/or distribution. Water is a good example of a "value-added" commodity. Indeed, water utilities are in the business of adding value to water, particularly when it comes to safe drinking water.

Several books and articles in recent years have used the terms "scarcity" and "crisis" with respect to water.[7] With globally abundant supplies, it is hard for many to believe that water shortages are a relevant concern. Economists, in fact, prefer the more neutral terminology of supply and demand rather than the concept of scarcity. A "shortage," then, is manifested in higher prices for limited supplies of a good. Higher prices may cause usage to subside, lead to a reallocation of existing supplies in the short term, and stimulate the production of more supplies in the long term.

Because water is vital to human life and because it is not always where we need it when we need it, concerns about scarcity are very real. The North American continental drought of 1988 fueled fears about water shortages in much the same way that the energy crisis of the 1970s dramatized the prospect of energy shortages. In particular, we know more today about the importance of adequate drought planning than before 1988. It may be a well-known truism, but water shortages are not caused by nature but instead are caused by people.

The issue of water scarcity has contributed to an emerging philosophy known as the "wise use of water." Wise use emphasizes, above all else, reducing the wasteful use of water. It is applicable to all types of water (such as treated and untreated water) and all types of water users (such as irrigators, hydroelectric power producers, public suppliers, and consumers). Wise use can take the form of better supply management (such as leak detection and repair) and better demand management (such as pricing reform). Implementing wise-use strategies should be a prerequisite to any large-scale investment in new water supplies, and certainly to any serious consideration of constructing a multi-billion-dollar intercontinental canal

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[7] See Janice A. Beecher and Ann P. Laubach, *Compendium on Water Supply, Drought and Conservation* (Columbus, OH: The National Regulatory Research Institute, 1989).

system, as has been proposed. Pricing, along with integrated resource planning and other policy approaches, is an integral part of most allocation solutions associated with this essential value-added commodity.

The Cost of Water

Perceptions about water's value clearly are enhanced when it costs more. The cost of water is a function both of quality and quantity (that is, availability). Water that is safe to drink tends to cost more. So does water from sources difficult to secure.

Without doubt, the greatest pressure today on the cost of water in the United States is the implementation of the 1986 amendments to the Safe Drinking Water Act (SDWA). Nationally, implementation of the SDWA before the turn of the century may require $30 to $40 billion in capital expenditures alone.[8] Added operation and maintenance costs (including those related to the disposal of contaminants) may substantially increase the total cost of compliance with the act. For individual utilities, the cost of complying with these regulations (both capital and operating) is estimated to be as high as $2,062 per revenue-producing million gallons (RPMG).[9]

SDWA compliance costs for public water suppliers vary across systems as a function of site-specific factors, including system size and, of course, type of treatment required. Smaller systems--and their customers--will be hardest hit by the new regulations. However, because the very smallest systems have a chance for exemption from SDWA requirements (at least in the short term) and because large systems tend to benefit from economies of scale, medium-sized water utilities may be the first to feel the effect of SDWA compliance and thus the first to seek recovery of those costs.

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8 James P. McFarland, John E. Cromwell, Elizabeth L. Tam, and David W. Schnare, "Assessment of the Total National Cost of Implementing the 1986 SDWA Amendments," a paper presented at the NRRI Biennial Regulatory Information Conference in Columbus, Ohio (September 1990).

9 Patrick C. Mann and Janice A. Beecher, *Cost Impact of the Safe Drinking Water Act on Commission Regulated Water Utilities* (Columbus, OH: The National Regulatory Research Institute, 1989).

Because of economies of scale in water supply, there is a growing interest in structural options for water utilities (such as regionalization, mergers, and acquisitions) particularly when very small systems can be absorbed by larger ones that are more financially viable. There is also a growing interest in "nonproliferation" of small systems, that is, in preventing these very small (and often eventually troubled) systems from coming into existence in the first place.

For water utilities that fall under the jurisdiction of regulators, cost recovery is closely related to the issue of management prudence. Regulators will want assurances that least-cost alternatives are being pursued, including improvements both to supply and demand management. Keeping costs down may emerge as the first priority of water suppliers and their regulators. On the other hand, for consumers to value water service accurately, they must realize its true economic costs. This raises the issue of price.

The Price of Water

Prices that accurately reflect costs send correct signals to consumers about the value and cost of water, and thereby encourage wise use and discourage wasteful consumption. Nevertheless, prices in many areas may not adequately reflect the cost of providing water service. Further, the absence of metering, the use of rates unrelated to usage, and subsidization to or from nonutility functions are especially problematic. So is the use of embedded accounting costs in setting rates. Many contemporary pricing strategies are based on the idea of marginal cost, which is the additional cost of producing or selling a single incremental unit.[10] Not everyone agrees with marginal-cost pricing and (not surprisingly) the biggest difficulty in applying it is estimating marginal costs, which depend on assumptions about when the next increment of supply will be added, where it will come from, and how much it will cost. Marginal-cost estimation requires detailed and accurate cost data as well as extra effort on the part of water suppliers and their regulators. For small utilities, it may be a highly impractical approach.

Setting prices also entails assessing the potential effect of a change in price on consumption. The conservation of centrally supplied water through pricing is

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[10] See Patrick C. Mann, and Donald L. Schlenger, "Marginal Cost and Seasonal Pricing of Water Service," *American Water Works Association Journal* 74 no. 1 (January 1982): 6-11.

largely a function of the price elasticity of water demand, which is somewhat variable. Outdoor use, for example, is more price-elastic than indoor use. Some water rate structures--such as increasing block and seasonal rates--are specifically designed for conservation purposes, although disagreement exists over their use. As the cost of water treatment increases, greater attention must be paid to the issue of rate design and alternative rate structures, such as seasonal pricing. It also may be necessary to reconcile value-based and cost-based pricing through less conventional rate structures, such as scarcity pricing or excess-use charges.

Finally, one potential result of higher costs for water treatment is rate shock, especially for consumers served by utilities whose rates are currently very low.[11] Water suppliers and regulators may need to look for ways to mitigate rate shock, including rate phase-in plans similar to those that have been applied to nuclear plants in the electricity sector.[12] For any pricing scheme, however, the effects on utility investors in the regulatory context must be examined.

For a water supplier, generating revenues may be the primary consideration. For the ratepayer, the critical issue is price. As prices rise, some customers will seek substitutes, such as bottled water and reliance on their own wells. Others will seek technological solutions--recycling and low-use devices. Still others simply will change their water use habits. In the worst case, some may be unable to afford water that is safe to drink. Policymakers then will have to deal with the implications of such cases. If higher prices accurately reflect water service cost, however, many customer complaints will be difficult to resolve.

Pricing and resource conservation are inseparable issues because of the relationships of price to quantity demanded. From the viewpoint of economic theory, price is essential to the appropriate valuation, consumption, and conservation of resources. Without correct price signals, consumers may overconsume or underconsume water. Historically, weak price signals characterized by low water prices may be associated with too little conservation. In the future, that situation is likely to change.

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[11] See Mann and Beecher, *Cost Impact.*

[12] Another view is that rate shock is necessary and even desirable for sending accurate pricing signals that lead to changes in consumption behavior. In this view, the effects of rate increases should not be mitigated through phase-in plans or other measures.

The philosopher David Hume once asserted that if all goods were free, as are air and water, anyone could get as much as he wanted without harming others.[13] Today, we know that breathable air and drinkable water are not free. Indeed, they are precious resources that must be protected with diligence, allocated with considerable care, and used wisely. Water has intrinsic value because it is life sustaining. Public water utilities add substantial value by extracting water from its source, carrying it over long distances, and delivering it to our homes ready for safe consumption. The cost of doing so is not insignificant. As the price of water service increases, consumers will appreciate its real cost more than ever before.

The Ratemaking Process

Whether regulated or unregulated, all public utilities charge rates for the services they provide. Rates charged by most publicly owned utilities are determined by governing boards or local authorities. Rates charged by most investor-owned utilities are determined by state regulatory commissions. Water utilities, consumers, and society as a whole have different perspectives on ratemaking, as summarized in table 1-1. These perspectives apply not only to utility rates, but also to the process from which rates emerge.

Three Perspectives on Ratemaking

Utilities expect to be fully compensated for the cost of providing service; that is, revenue requirements must be met. Revenues to the utility must be sufficient to cover capital and operating expenses. Investor-owned utilities also want rates to incorporate a reasonable return on their capital investment. Similarly, publicly owned utilities want to be financially self-sufficient, and not rely on subsidization from other revenue sources. From the utility's perspective, ratemaking is also strategic with regard to the ability to provide its service using existing capacity as well as plan for future additions to capacity. Predictable revenues and flexible rate

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[13] As quoted in William Ophuls, *Ecology and the Politics of Scarcity* (San Francisco: W. H. Freeman and Company, 1977), 8.

TABLE 1-1

THREE PERSPECTIVES ON RATEMAKING

Utility's Perspective

- Does the rate structure fully compensate the utility so that revenue requirements are met?
- Does the rate structure allow the utility to earn a fair return on its investment?
- Is the rate structure strategically sound for load management, competition, and long-term planning?

Consumer's Perspective

- Are both the ratemaking process and the rate structure equitable?
- Are utility rates perceived to be affordable?
- Are both the ratemaking process and the rate structure understandable?

Society's Perspective

- Does the rate structure promote economic efficiency?
- Does the rate structure promote the appropriate valuation and conservation of resources?
- Does the ratemaking process take into account priority uses of water?
- Are both the ratemaking process and the rate structure just and reasonable?

Source: Authors' construct.

structures are strategically advantageous to the public utility, particularly if the utility faces any form of competition, including bypass and self supply.

For consumers, the ratemaking process and resultant rates should be equitable or fair to all types of consumers. This usually means that charges to specific types or classes of customers should be based on the costs of serving those customers, and not on arbitrary or discriminatory criteria. Consumers also prefer rates they perceive to be affordable, which is becoming an increasingly difficult expectation to meet. They also fare better with a rate structure that is understandable, which presumably improves consumption decisions. Consumer understanding and acceptance of utility rates make the job of ratemaking much easier.

Society's perspective differs from that of utilities or consumers. Economic or allocative efficiency is a societal goal having to do with costing and pricing. Rates based on efficiency goals encourage appropriate levels of production and consumption and discourage the misallocation of societal resources. Efficiency also dictates rates that are not unduly discriminatory from an economic standpoint.[14] In the context of efficiency, society has an interest in conserving (that is, not wasting) resources. Conservation emphasizes the correct valuation and allocation of resources. Ratemaking can send signals about priorities. Society may place a priority, for example, on water for human consumption over water for agricultural or industrial uses, and this may be reflected in pricing schemes in the form of subsidization. Finally, society may judge ratemaking in terms of whether it is just and reasonable, a time-honored standard in utility regulation. Good intentions can result in unjust or unreasonable outcomes, as when the cost of regulation itself outweighs its benefits. Many ratemaking practices exist that are accepted as reasonable from the societal standpoint. Creating customer classes and employing averaging to allocate cost among them, for example, may be a form of price discrimination considered reasonable on the basis of regulatory cost savings.

Ratemaking is a continual balancing act among the divergent and often competing perspectives of utilities, consumers, and society. Rates that are perceived by consumers to be affordable do not necessarily meet revenue requirements; rates that are equitable are not necessarily efficient; rates that are

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[14] See J. Stephen Henderson and Robert E. Burns, *An Economic and Legal Analysis of Undue Price Discrimination* (Columbus, OH: The National Regulatory Research Institute, 1989).

economically efficient are not necessarily administratively feasible because of practical application issues.

In balancing perspectives, the key objectives of rate regulation emerge. Although there are many different conceptualizations, the objectives identified tend to be similar. Bonbright, Danielson, and Kamerschen emphasize capital attraction (the utility perspective), fairness to ratepayers (the consumer perspective), and rationing (the societal perspective) as regulation's principal objectives.[15] Their assessment also includes what is referred to as the "ten attributes of a sound rate structure," reported in table 1-2. These attributes can be used to evaluate rate structures as well as the methodologies used to design them. As the authors explain, "Lists of this nature are useful in reminding the ratemaker of considerations that might otherwise be neglected, and also useful in suggesting important reasons why problems of practical rate design do not yield readily to scientific principles of optimum pricing."[16]

Decision Areas in Cost Allocation and Rate Design

Cost allocation and rate design can be dissected into several distinct (though highly interrelated) decision areas, each of which can be further dissected into principal considerations, as identified in table 1-3. The first is the identification of the utility's revenue requirement, which is a function of its capital investment (rate base), allowed rate of return, operation and maintenance expenses, depreciation, and taxes.[17] Costs next can be divided into functional categories of water supply, such as source development, pumping, transmission, treatment, storage, and distribution. Functional cost categories can also be established for nontraditional sources of capacity (such as leak detection and repair, purchased water, or conservation). The next step is to classify costs in terms of customer, capacity (demand), and commodity (operating) costs, distinctions which also are used in rate design. Many methods also emphasize the separate classification of fire protection costs.

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[15] James C. Bonbright, Albert L. Danielsen, and David R. Kamerschen, *Principles of Public Utility Rates* (Arlington, VA: Public Utilities Reports, 1988), 382-84.

[16] Ibid., 384.

[17] See chapter 4.

TABLE 1-2

ATTRIBUTES OF A SOUND RATE STRUCTURE

Revenue-related Attributes

1. Effectiveness in yielding total revenue requirements under the fair-return standard without any socially undesirable expansion of the rate base or socially undesirable level of product quality and safety.
2. Revenue stability and predictability, with a minimum of unexpected changes seriously adverse to utility companies.
3. Stability and predictability of the rates themselves, with a minimum of unexpected changes seriously adverse to ratepayers and with a sense of historical continuity.

Cost-related Attributes

4. Static efficiency of the rate classes and rate blocks in discouraging wasteful use of service while promoting all justified types and amounts of use:
   (a) in the control of the total amounts of service supplied by the company;
   (b) in the control of the relative uses of alternative types of service by ratepayers (on-peak versus off-peak service or higher quality versus lower quality service).
5. Reflection of all of the present and future private and social costs and benefits occasioned by a service's provision (i.e., all internalities and externalities).
6. Fairness of the specific rates in the apportionment of total costs of service among the different ratepayers so as to avoid arbitrariness and capriciousness and to attain equity in three dimensions: (1) *horizontal* (i.e., equals treated equally); (2) *vertical* (i.e., unequals treated unequally); and (3) *anonymous* (i.e., no ratepayer's demands can be diverted away uneconomically from an incumbent by a potential entrant).
7. Avoidance of undue discrimination in rate relationships so as to be, if possible, compensatory (i.e., subsidy free with no intercustomer burdens).
8. Dynamic efficiency in promoting innovation and responding economically to changing demand and supply patterns.

Practical-related Attributes

9. The related, practical attributes of simplicity, certainty, convenience of payment, economy in collection, understand-ability, public acceptability, and feasibility of application.
10. Freedom from controversies as to proper interpretation.

Source: James C. Bonbright, Albert L. Danielsen, and David R. Kamerschen, *Principles of Public Utility Rates* (Arlington, VA: Public Utilities Reports, 1988), 382-84.

TABLE 1-3

COST ALLOCATION AND RATE DESIGN FOR WATER UTILITIES:
DECISION AREAS AND PRINCIPAL CONSIDERATIONS

Decision Areas	Principal Considerations
Identification of Revenue Requirement	Capital investments/rate base Return on rate base Operation and maintenance expenses Depreciation Taxes
Cost Functionalization	Source development Pumping Transmission Treatment Storage Distribution Nontraditional supply
Cost Classification	Customer costs Capacity (demand) costs Commodity (operating) costs
Cost Allocation	Functional cost Commodity demand Base-extra capacity Embedded direct Fully distributed Marginal/incremental
Cost Assignment	Residential Commercial Industrial Wholesale Institutional Public authorities Fire protection

TABLE 1-3 (continued)

Decision Areas	Principal Considerations
Rate Design	Flat fees Fixture rates Uniform rates Decreasing block pricing Increasing block pricing Seasonal rates Excess use charges Indoor/outdoor rates Lifeline rates Sliding scale pricing Scarcity pricing Spatial pricing
Tariff Design	Customer charges Capacity (demand) charges Commodity (operating) charges Dedicated-capacity charges Capital contributions Fire protection charges Ancillary charges

Source: Authors' construct.

The analyst then chooses a cost allocation method for attributing costs to their respectives causes. Some of the methods used are functional cost, commodity demand, base-extra capacity, embedded direct, fully distributed, and marginal (or incremental). Next is the assignment of costs to classes of service. Some typical service classes in water supply are residential, commercial, industrial, wholesale, institutional, public authorities, and fire protection. Finally, rates for each customer class presumably based on the cost of serving them are established. There are many potential water rate structures, some of which appear in table 1-3. The resulting tariff, or authorized list of water service charges, may consist of customer, capacity, and commodity charges as well as special charges for dedicated capacity, capital contributions, fire protection, and ancillary services. Some charges (such as customer charges) are fixed, meaning they do not vary with water usage; others (such as commodity charges) are variable, meaning they do vary with water usage.

The decision areas in cost allocation and rate design are distinct but overlap considerably. Decisions about costs may affect the choice of methodology; decisions about customer classes may affect the choice of a rate structure. The resulting rates should allow the utility to meet its revenue requirements. There are also many subtle and not-so-subtle issues that emerge in the course of ratemaking that require an analyst's judgment. Because there is no such thing as a typical water utility, there may be few precedents or rules of thumb on which to rely. In practice, convenience, expedience, and tradition probably affect ratemaking for water utilities as much as economic analysis.

Generally, the cost-of-service standard has prevailed in setting water rates. This means setting rates that generate revenues from each user group equal to the cost of serving that group. That is, the user class that causes the expense absorbs the cost in rates paid for water service. The cost-of-service concept implies equal treatment for users with equal costs and rate differentials reflecting cost differences. This presumes, however, that water service costs are easily ascertainable for specific user groups. In many cases, cost-of-service analyses ignore the distinction between average (unit) costs and marginal (incremental) costs, between short-run and long-run costs, and between peak and off-peak costs of services. Water rates, as with other public utility rates, are based on averaging (that is, the average users having an average load factor); price discrimination is inherent.

Although cost-based, water utility ratemaking generally has not made use of sophisticated cost allocation methodologies (to identify cost causers) and rate design alternatives (to assign costs to customers).[18] Limited regulatory resources are the leading explanation for why this is so. Moreover, water rates have been affected by other factors, such as political considerations, tradition, value of service, and legal constraints. For example, many water rates have been adopted on the basis of either minimal customer complaint or consistency with the rates of adjacent communities. In brief, setting water rates involves a combination of analysis and expedience as well as a desire to balance competing policy goals. However, in the increasingly complex realm of water utility ratemaking, particularly in light of rising costs and prices, these issues are worth exploring.

18 There are exceptions. Articles appearing in the *American Water Works Association Journal* are a good source on new approaches.

CHAPTER 2

CHARACTERISTICS OF WATER UTILITIES

The water supply industry is both "mature and conservative."[1] Its maturity accounts for a relatively low rate of technological innovation. As a consequence, few radical changes have occurred in the methods of delivering drinking water by central suppliers over the past few decades. The rate of technological change may be stimulated by the stringent drinking water regulations promulgated by the U.S. Environmental Protection Agency under the amended Safe Drinking Water Act and administered by the states through environmental or public health agencies. Increased water prices may also bring about technological, structural, managerial, and regulatory changes. However, there persists a tendency for water supply planners to rely on proven facility designs and standard operating procedures. Thus, the industry's operating characteristics remain relatively constant.

The Water Service Industry

The U.S. Environmental Protection Agency (EPA) estimates that there are more than 50,000 water systems in the United States, as reported in table 2-1. All community water systems must comply with safe drinking water regulations set by the EPA and administered through state agencies. About half of the systems are owned by governmental entities, usually municipalities. The rest are nearly equally divided between privately owned systems and ancillary systems (such as those found in mobile home parks).

Water utilities are somewhat distinct from other types of public utilities in that many small systems serve a relatively small (but not insignificant) portion of the United States' population, as seen in table 2-2. Most of these small systems serve fewer than five hundred persons each. The financial and operating characteristics of water systems vary substantially according to system size. Small water systems are generally defined by the U.S. Environmental Protection Agency as those serving fewer than 3,300 people (approximately 1,000 connections). The

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[1] Wade Miller Associates, *The Nation's Public Works: Report on Water Supply* (Washington, DC: National Council on Public Works Improvement, 1987), 22-24.

TABLE 2-1

WATER SYSTEMS IN THE UNITED STATES, 1986

Ownership Structure*	Number of Utilities	Percent of All Systems
Public		
Local, municipal government	23,248	44.3%
Federal government	528	1.0
On Indian land	127	.2
Subtotal	23,903	45.5
Private		
Investor-owned		
Financially independent	6,716	12.8
Financially dependent on parent company	986	1.9
Homeowners' association or subdivision	6,163	11.7
Other	661	1.3
Not available	178	.3
Subtotal	14,703	28.0
Ancillary		
Mobile home parks	10,150	19.3
Institutions	535	1.0
Schools	458	.9
Hospitals	91	.2
Other	2,638	5.0
Not available	31	.1
Subtotal	13,903	26.5
Total	52,509	100.0%

Source: Frederick W. Immerman, *Financial Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987), table 2-2.

* This table is organized according to ownership, without regard to whether different types of systems are regulated by state public utility commissions.

TABLE 2-2

WATER SYSTEMS IN THE UNITED STATES BY OWNERSHIP STRUCTURE AND POPULATION CATEGORY, 1986

Community Size (persons)	Number of Systems: Public (a)	Private (b)	Ancillary (c)	Total	Average Daily Production: Percent	MGD(d)
25-100	1,525	4,544	8,264	14,333	27.2	.025
101-500	5,416	5,129	4,743	15,288	29.1	.057
501-1,000	3,777	1,655	600	6,032	11.5	.623
1,101-3,300	5,831	1,933	286	8,050	15.3	.714
3,301-10,000	3,950	904	5	4,860	9.2	1.240
10,001-25,000	1,828	237	5	2,070	3.9	4.240
25,001-50,000	897	158	0	1,055	2.0	9.911
50,001-75,000	227	38	0	265	0.5	10.150
75,001-100,000	145	22	0	167	0.3	10.472
100,001-500,000	261	52	0	313	0.6	36.593
500,001-1,000,000	33	29	0	62	0.1	104.422
Over 1,000,000	13	1	0	14	0.03	442.197
Total	23,903	14,703	13,903	52,509	-	-
Percent	45.5%	28.0%	26.5%	100%	-	-

Source: Frederick W. Immerman, *Financial Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987), table 2-2 and 3-1.

(a) Local, municipal government, federal government, and on Indian land.
(b) Investor-owned (both financially independent systems and systems financially dependent on parent companies), homeowners' associations or subdivisions, other, and don't know/refused.
(c) Mobile home parks, institutions, schools, hospitals, other, and information not available.
(d) Millions of gallons daily for 1985.

problems of these systems are well documented.[2] Policymakers at the federal and state levels continue to be greatly concerned about the proliferation of new small, nonviable systems as well as the future of existing nonviable systems.

Water systems have many of the characteristics of monopolies. They typically face little or no competition at the operating level because duplicating service would be costly and inefficient. Their product has no substitute, although there are alternative methods of delivery as well as alternative levels of water quality. Perceptions of market failure--for technological, economic or public health reasons--reinforce the provision of water service mainly by publicly owned or regulated privately owned water utilities.

Forty-six state public utility commissions have the authority to regulate water systems in the United States; nearly 10,000 systems fall under this jurisdiction, and about one-half of these are investor-owned. Fifteen commissions have some jurisdiction over publicly owned water systems. Economic regulation by state commissions is aimed at giving monopolistic utility providers an opportunity to earn a "fair return" on their investment through "just and reasonable" rates. In return, regulated utilities must meet certain obligations to serve, which is to say they cannot discriminate in providing service within their franchised territory and must meet standards of quantity, quality, safety, and reliability. In short, a "regulatory compact" exists between the states and their jurisdictional public utilities. It is an imperfect but essential institutional arrangement.

The economic regulation of water utilities has often been subordinate to the regulation of electric, gas, and telecommunications utilities, mainly because the regulated portion of these other utility sectors consists of much larger firms serving more customers and accounting for a much greater share of economic activity as well as consumers' expenditures on utility services. Even so, many commissions report spending a disproportionate amount of resources on oversight of water utilities.

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[2] See Raymond W. Lawton and Vivian Witkind Davis, *Commission Regulation of Small Water Utilities: Some Issues and Solutions* (Columbus, OH: The National Regulatory Research Institute, 1983), 5-6. A forthcoming NRRI report on the nonproliferation of nonviable water systems also will address these issues.

Although deregulating water utilities is sometimes discussed, an economic rationale for such a policy is not readily apparent.[3] Strategies to improve regulatory efficiency and effectiveness, while reducing costs, are more realistic and urgently needed.

A typical water utility does not exist. The smallest systems are substantially different from the largest in practically all respects. However, some general observations about the cost characteristics, financial characteristics, scale and scope economies, demand characteristics, price elasticity of water demand, and water conservation are appropriate to the later analysis of cost allocation and rate design for water utilities.

Cost Characteristics

Selected operating characteristics of water suppliers according to the size of community served are presented in table 2-3. As would be expected, average net assets and average operating revenues are largely a function of water system size. Using the standard of capital investment per revenue dollar, the water utility industry is possibly the most capital intensive of all utility sectors. Using these data, water systems require $7.80 in assets for every dollar of revenue generated; the ratios range from 5.2 to 19.6. One study found that large water systems required as much $10 to $12 in capital for every dollar of revenue generated and compared this to ratios of 1:1 for the airline industry, 2:1 for railroads, 3:1 for telephone companies, and 3-4:1 for electric utilities.[4] Thus, even in the capital-intense public utility sector, water supply has particularly significant capital requirements.

The high capital intensity in water supply is mostly a function of the capital investment necessary for maintaining production capacity, maintaining a complex distribution network that ties the utility system directly to the consumer, and the necessity of meeting both fire protection and peak demands. The capital intensity

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[3] Janice A. Beecher and Patrick C. Mann, *Deregulation and Regulatory Alternatives for Water Utilities* (Columbus, OH: The National Regulatory Research Institute, 1990).

[4] Science Management Engineering and TBS, Inc., *Urban Water System Characterization* (1979), 15, as reported in Wade Miller Associates, *Report on Water Supply.*

TABLE 2-3

SELECTED CHARACTERISTICS
OF THE WATER SUPPLY INDUSTRY IN THE UNITED STATES

Community Size (persons)	Average Net Assets ($000) (a)	Average Operating Revenues ($000) (b)	Ratios Assets/ Revenues (c)	Assets/ Water Output (d)	Expenses/ Water Output (e)	Revenues/ Water Sold (f)
25-100	$490	$25	19.6	$24.9	$278	$198
101-500	426	45	9.5	16.5	259	243
501-1,000	792	103	7.7	8.4	164	184
1,101-3,300	3,193	475	6.7	7.2	164	204
3,301-10,000	3,471	514	6.8	4.6	141	150
10,001-25,000	13,970	1,999	7.0	4.1	139	180
25,001-50,000	15,185	2,795	5.4	2.4	83	114
50,001-75,000	31,721	3,824	8.3	2.2	83	103
75,001-100,000	53,392	8,461	6.3	3.2	108	109
100,001-500,000	98,311	14,861	6.6	2.2	80	115
500,001-1,000,000	206,616	39,971	5.2	2.0	68	113
Over 1,000,000	659,491	108,318	6.1	1.8	51	82
For all systems	$5,784	$745	7.8	$10.5	$188	$196

Source: Frederick W. Immerman, *Financial Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987), tables 5-1, 4-1, 5-5, 4-9 and 4-5. The data represent publicly-owned and privately-owned water systems.

(a) Current assets, net plant and equipment (gross plant and equipment less accumulated depreciation), and other assets in thousands ($000).
(b) Water operation revenues in thousands ($000).
(c) The ratio of (a) to (b), as calculated by authors.
(d) Gross plant and equipment (before depreciation) divided by average daily production ($/gallons per day).
(e) Operating expenses in cents/1,000 gallons produced.
(f) Water operation revenue (excluding other sources of revenue or municipal fund transfers) in cents/1,000 gallons delivered. Only systems that charge for water are included in the analysis.

is reflected in high capital investment/revenue ratios and low capital turnover rates; that is, low revenue/capital investment ratios.

In examining water utilities, the concepts of variable and fixed costs are relevant. The important classifications are short-term variable costs that change with output supplied (such as treatment chemicals and purchased water), and short-term fixed costs that do not vary with the volume of service (such as depreciation of distribution mains).

The characteristic of high fixed costs relative to variable costs for water utilities has important pricing implications. Conceptually, for reasons of economic efficiency discussed in chapter 3, fixed costs should be incorporated in service or customer charges rather than in commodity (usage) charges. In other words, commodity charges should only include those costs that tend to vary with the volume of services; costs that do not vary with service volume are more appropriately incorporated in service charges, which are at fixed levels. A related costing implication of the high fixed-cost-to-variable-cost ratio for water utilities is that customer load factors can play an important role in rate design. Large users with better load factors can argue that their usage patterns are associated with lower unit costs than lower load factor customers.

Financial Characteristics

The high capital intensity of water supply also has financial implications. Many water utilities have aging capital facilities that need to be replaced during this decade; others must upgrade plant facilities to meet the requirements of the Safe Drinking Water Act. This has forced water utilities to examine options for financing the replacement of aging and/or obsolete facilities. In most cases, the cost of replacement will exceed original costs by a substantial amount.

Investments in water supply tend to be large and indivisible; the "lumpiness" feature that is also typical of other public utility sectors. Many of these investments, including treatment plants and the transmission and distribution infrastructure, may have very long service lives. Because capacity is added in large increments, there may be periods of underutilization (or excess capacity), which can pose significant financial problems in terms of cost recovery. Of course, the utility with plentiful capacity is also in a good financial position to accommodate demand growth.

Because of their small size and weak financial structure, many water systems lack the ability to attract capital through the same mechanisms as larger utilities.[5] Many small water utilities lack a substantial rate base because their original capital costs were recovered through the purchase price of houses in a residential subdivision. Furthermore, the ratemaking process does not consider contributed plant an asset that can placed into rate base (for earning a return) or depreciated (an expense). Without a sufficient rate base, equity, or physical assets to serve as collateral, small water utilities find it difficult and expensive to raise capital. Tales of the very small water utility owner using a home or car for financing collateral are widely circulated. Also, many water systems with ownership of physical plant do not adequately provide for system depreciation, and thus are in a poor position to replace or upgrade infrastructure. The need to make capital improvements to comply with more stringent drinking water standards adds to the financial stress on small water systems.

Some common patterns can be noted in water system financing.[6] Capital investment in reservoirs, transmission, and treatment are generally financed by debt (for both investor-owned and publicly owned systems) and equity borrowing (for investor-owned systems only). Distribution system expansion is generally financed by developer and user hook-up charges with some reliance on borrowing. Operation costs and minor system improvements are generally financed by commodity rates; however, in the case of municipally owned systems, rate revenues are occasionally supplemented by subsidies from the local government.

Scale and Scope Economies

Both economies of scale and economies of scope, though different concepts, have applicability to water supply. A natural monopoly is thought to exist if a service or services can be supplied more efficiently by a single utility than by two or more utilities. Economies of scale should be viewed in the context of a single product or service firm; for example, a water utility providing only general water service. In this case, economies of scale are associated with the concept of natural

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5 Lawton and Davis, *Commission Regulation of Small Water Utilities.*

6 Patrick C. Mann, *Water Service: Regulation and Rate Reform* (Columbus, OH: The National Regulatory Research Institute, 1981), 7.

monopoly, but are not a necessary condition of natural monopoly. Economies of scope should be viewed in the context of a multiproduct or multiservice firm; for example, a water utility providing general water service as well as fire protection. In the multiple product/service case, the concept of natural monopoly requires economies of scope.

Economies of scale are often expected to occur in monopolies and are apparent when the average cost of providing a single product or service decreases as output or volume of service increases.[7] In other words, the unit cost of providing water service is expected to decline as system capacity is expanded. Many analysts contend that water utilities enjoy significant economies of scale.[8] According to recent research, economies of scale exist for treatment cost, but are somewhat less apparent for total system cost.[9] By comparison, some diseconomies of scale are apparent regarding the distribution system.[10]

As noted, table 2-3 reports ratios of assets to revenues generated for water systems according to the size of the community served. For the industry as a whole, economies of scale are indicated. This characteristic is also reflected in the ratios of assets per output of water, operating expenses per output of water, and revenues per sale of water, all of which decline as system size increases. The implication is that larger systems can produce water at a lower cost (in terms of both capital and operating expenses) and sell it at a lower price than smaller systems. More study is needed to determine whether declining ratios are related to the size or density of the population in utility service territories.

Another approach to the issue of scale economies is to examine assets per connection, as displayed in table 2-4. Such assets for production and treatment do not exhibit economies, even though there are scale economies in these areas with regard to water produced. Per-connection economies are not apparent for

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[7] Another measure of economies of scale is the ratio of average total cost to marginal cost (the cost of producing more units of output); economies exist if this value exceeds one.

[8] Robert M. Clark and J. M. Morand, "Package Plants: A Cost-Effective Solution to Small Water System Treatment Needs," *American Water Works Association Journal* 73 (January 1981): 24.

[9] Robert M. Clark, "Applying Economic Principles to Small Water Systems," *American Water Works Association Journal* 79 (May 1989): 57-61.

[10] Ibid.

TABLE 2-4

ASSETS PER CONNECTION
FOR WATER SYSTEMS IN THE UNITED STATES

	Assets($)/Connection					
Community Size (persons)	Production and Treatment	Distribu-tion	Other Plant and Equipment	Total Gross Plant	Total Net Plant	Total Net Assets
25-100	$43	$18,446	$5,934	$13,605	$19,756	$11,711
101-500	308	3,251	451	3,948	3,961	4,053
501-1,000	124	2,019	629	2,626	1,730	1,889
1,101-3,300	285	1,222	239	6,405	4,623	6,710
3,301-10,000	328	926	192	2,159*	1,185	1,583
10,001-25,000	211	750	173	1,879	1,437	1,758
25,001-50,000	212	873	102	1,437	1,083	1,639
50,001-75,000	222	839	95	1,272	925	2,041
75,001-100,000	452	1,140	97	2,186	1,850	2,353
100,001-500,000	206	1,069	213	1,553	1,212	1,766
500,001-1,000,000	171	1,414	472	1,615	1,267	1,662
Over 1,000,000	389	1,194	352	1,857	1,332	1,693
For all systems	$247	$3,409	$829	$7,336	$4,329	$4,660

Source: Frederick W. Immerman, *Financial Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987), table 5-3 .

* Authors' correction/estimation; source reports $21,590.

distribution and other plant and equipment categories as well. For total gross plant, total net plant, and total net assets, the ratio of assets to connections appears to decline somewhat, but not in a conclusive pattern. Thus, scale economies in water supply are more likely to be found in terms of water production than in terms of customer connections.

Although there is little research on this point, water utilities probably also enjoy economies of scope, which exist when the average cost of providing two or more products or services (in combination with one another) are less when provided by a single water utility than when two or more firms provide each of the services separately. An example is a single utility providing both general water service and fire protection service. If economies of scope exist, the unit cost of providing both services is less than if the services were provided by separate water utilities.

The water utility can be viewed as a multiproduct firm providing different types of water service. Kim and Clark found that significant economies of scale do not exist in overall water utility operation.[11] However, the typical water utility experiences substantial economies in providing residential service. The economies of scale achieved in water treatment are offset or negated by the diseconomies in water distribution. In contrast, water utilities in the aggregate experience economies of scope associated with the joint provision of residential and nonresidential service. Since their analysis incorporated a sample of sixty utilities that could be characterized as medium-sized water suppliers, the authors acknowledged that their empirical results did not preclude the possibility of substantial economies of scale for small utilities and moderate diseconomies of scale for large utilities.

Though independent, economies of scale and economies of scope interact to the extent that larger systems may be more capable of keeping unit costs down in their various areas of service. The desire to take advantage of scale and scope economies is central to the issue of water industry restructuring as envisioned by many federal and state policymakers.

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[11] H. Youn Kim and Robert M. Clark, "Economies of Scale and Scope in Water Supply," *Regional Science and Urban Economics* 18 (November 1988): 479-502.

Demand Characteristics

Water systems are designed to meet both peak and off-peak (base) demand. The peak demand (peak load) for a water system is the maximum demand imposed on the system. Water service presents two basic types of peak demands: time-of-day peak demand and maximum-day (or seasonal) peak demand. The time-of-day peak demand is the specific hour or hours within the day that maximum-system demand is experienced. It is not simply a single hour within a day but instead is the hours within a day in which the water system experiences its peak demand. The maximum-day or seasonal peak demand is the specific day or days within the year that maximum-system demand is incurred. For some water systems, a time-of-week peak load may also be important; for example, weekends may produce increased residential use and decreased commercial-industrial use. The resulting compensating effect varies with the mix of commercial-industrial users as well as with residential spatial and usage patterns; therefore, the weekend effect and its impact on system peak loads can be unpredictable.[12]

The load factor for a water system is the ratio of average demand to peak demand. The load factor must be defined with reference to a specific time period or type of peak load, such as maximum-hour or maximum-day. Thus, the load factor is operationalized as the ratio of actual consumption over a period to the maximum (peak) demand multiplied by the length of a period (the period can be hourly, daily, monthly, or annually). The capacity utilization factor for a water system is closely related to the load factor in that it refers to the average system demand as a percentage of designed or rated system capacity. Given relatively high capacity costs, water systems tend to experience declining unit costs with increasing load factors and capacity utilization factors. Since most water systems maintain some reserve capacity beyond that necessary to meet peak demands, the difference between the capacity utilization factor and the load factor for a specific water system is determined by the amount of reserve capacity.

Peak demands are important parameters in the design and construction of water systems. Given that water systems must be capable of servicing peak demands and given the existence of time-of-day, time-of-week, and seasonal

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[12] W. R. Derrick Sewell and Leonard Roueche, "Peak Load Pricing and Urban Water Management: Victoria, B.C., A Case Study," *Natural Resources Journal* 14 (July 1974): 383-400.

consumption patterns, the result is intermittent and varying degrees of unused system capacity. To further complicate matters, water system components are generally designed to meet different types of demands. For example, raw water storage facilities, such as reservoirs, are generally designed to meet average annual demand; transmission and treatment facilities as well as major feeder mains are generally designed to absorb maximum-day demand; and distribution mains, pumping stations, and local storage facilities are designed to meet maximum-hour demand, or maximum-day demand plus fire protection flow requirements, whichever is greatest.[13] Thus water systems with identical average demands are designed differently if their peak demands differ.

The primary contributor to residential peak demands (which cause most system peak demands) is lawn and garden sprinkling. Since sprinkling is used to compensate for deficiencies in rainfall, its occurrence is influenced by temperature, precipitation, and the evapotranspiration rate.[14] Landscaping preferences and even cultural norms also may affect sprinkling demand. During dry periods, sprinkling probably accounts for a large share of residential peak demands. Also, from a load management perspective, there is little possibility that new types of winter water use will emerge to offset summer peak loads created by sprinkling demand.

Price Elasticity of Water Demand

In economics, demand is viewed as the inverse relationship between price and quantity consumed. The price elasticity of demand measures the percentage change in quantity demanded in response to a percentage change in price. That is, price elasticity measures the sensitivity of quantity consumed to price changes. Estimating price elasticity is an important component of demand forecasting and revenue projection. If a rate change is anticipated, its effect on demand and revenues must also be anticipated by utilities and their regulators.

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[13] F. Pierce Linaweaver and John C. Geyer, "Use of Peak Demands in Determination of Residential Rates," *American Water Works Association Journal* 56 (April 1964); and Charles W. Howe and F. Pierce Linaweaver, "The Impact of Price on Residential Water Demand and its Relationship to System Design and Price Structure," *Water Resources Research* 3 (First Quarter 1967): 13-32.

[14] W. Douglas Morgan, "Climatic Indicators in the Estimation of Municipal Water Demand," *Water Resources Bulletin* 12 (June 1976): 511-518.

In a demand model, the price elasticity of demand (n) is calculated as:[15]

$$n = \frac{\text{change in quantity/mean quantity}}{\text{change in price/mean price}}$$

where:

n	= 0.0	Perfectly inelastic demand
0.0	> n > -1.0	Relative inelastic demand
-1.0	> n > -infinity	Relatively elastic demand
n	= -infinity	Perfectly elastic demand

Water, since it is used in a wide variety of ways, is likely to be characterized by a number of different demand curves and each may reflect a different price elasticity. For some types of water use, a change in price is likely to bring about a substantial change in the quantity consumed. Water for swimming pools and landscapes may have price-elastic demands. In contrast, demand for water used for drinking, bathing, laundering, and other more fundamental needs may be more price-inelastic.

The principal research findings about price elasticity of water demand can be summarized as follows:[16]

- Aggregate municipal demand is relatively price-inelastic.
- Price elasticity appears to vary positively with water price levels; that is, there is more usage-price sensitivity with higher rates than with lower rates.
- The price elasticity of residential demand is similar to aggregate municipal demand except when disaggregated into seasonal and nonseasonal components, in which case seasonal demand is more elastic than nonseasonal demand.
- Commercial and industrial demands appear to be more sensitive to price changes than residential demand.

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15 A linear model is appropriately applied to water demand. But it is relevant only in the range for which the analyst has data and results cannot be assumed valid for segments of the demand curve where prices are markedly different.

16 Mann, *Water Service,* iii.

- The price-elasticity coefficients associated with water demand generally indicate that water rates changes can alter usage levels.

- The relatively low coefficients associated with residential demand along with evidence that average sprinkling demand is more sensitive to price than maximum sprinkling demand suggests that time-differentiated rates may be more effective than general rate increases in altering consumption patterns.

Estimates of price elasticities vary widely.[17] According to Baumann, the literature as a whole suggests that a likely range of elasticity for residential demand is between -0.20 and -0.40, which is relatively price-inelastic.[18] Although its statistical significance is questionable, an estimate of elasticity for industrial demand ranges between -0.50 and -0.80, somewhat less price-inelastic than the residential demand. The implication is that industrial users will tend to reduce consumption in response to price increases by a larger quantity than residential users. Presumably, a large enough increase will cause some of these users to seek alternative water supplies.

As part of a comprehensive analysis of water pricing in Tucson, Arizona, William E. Martin and others conducted a longitudinal analysis of changes in prices and quantities of water pumped in order to assess price elasticity.[19] In eleven of sixteen years studied, the researchers found the implied elasticity to be negative, as expected. While people appeared to respond to higher prices by cutting back consumption, the authors concluded that major cutbacks could only be expected when a rate increase was accompanied by enough publicity to increase public awareness. Further, price was only one of several variables, including weather, that

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17 For a summary, see U.S. Army Corps of Engineers as adapted by William O. Maddaus, *Water Conservation* (Denver, CO: American Water Works Association, 1987), 66; reprinted in Janice A. Beecher and Ann P. Laubach, *Compendium on Water Supply, Drought, and Conservation,* (Columbus, OH: The National Regulatory Research Institute, 1989), 242.

18 Duane D. Baumann, "Issues in Water Pricing," in Arizona Corporation Commission, *Water Pricing and Water Demand,* papers presented at a Water Pricing Workshop, Utilities Division, August 21, 1986, 7.

19 William E. Martin, et al., *Saving Water in a Desert City* (Washington, DC: Resources for the Future, 1984).

appeared to affect consumption significantly. In periods of drought, changes in water practices, perhaps induced by public information campaigns, actually may prove to be more influential than the simple price-quantity relationship.

Positive price-elasticity coefficients indicate that water rate changes have some potential for altering water usage levels and patterns. However, given findings that water price changes affect average sprinkling demand substantially more than maximum sprinkling demands, extreme demand patterns may be minimally affected by rate changes. Thus, a seasonal increase in price may provide an incentive to reduce average use during the summer, but not peak use on especially dry days.

The statistical findings regarding the price elasticity of water demand have several implications. The relationship of the quantity demanded of water service and price complicates the task of water system design. Water system design is a function of average and peak demands, which are a function of water price, which is a function of the cost of service, which is a function of system design, and so on, as illustrated in figure 2-1. Therefore, price-elasticity coefficients exceeding zero produce a circularity problem that can be difficult to resolve in the context of traditional public utility regulation.[20]

It has been said that since water is essential to life and no other good can be substituted for it, some small essential amount of water will always have a perfectly inelastic demand; that is, consumers will be willing to pay any price for it. Because water is necessary for human survival, some have argued that price should not be the principal allocation method during a severe water shortage.[21] However, while water itself cannot be substituted, its method of delivery can for most uses. Drinking water, for example, can come from the faucet, be brought home from the supermarket, or delivered in bottles. Some users can substitute publicly supplied water with water from their own wells and thus bypass the water utility. Industrial users may not require treated water at all. Some large users may relocate to areas with water service more suited to their needs. Recycling, as

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20 In the electricity sector, this circularity problem is sometimes referred to as a "death spiral," meaning that rate shock leads to reduced consumption which leads to the need for another rate increase with more rate shock, and so on.

21 David R. Dawdy, L. Douglas James, and J. Anthony Young, "Demand Oriented Measures," in Vujica Yevjevich, Luis da Cunha, and Evan Vlachos, eds., *Coping with Droughts* (Littleton, CO: Water Resources Publications, 1983).

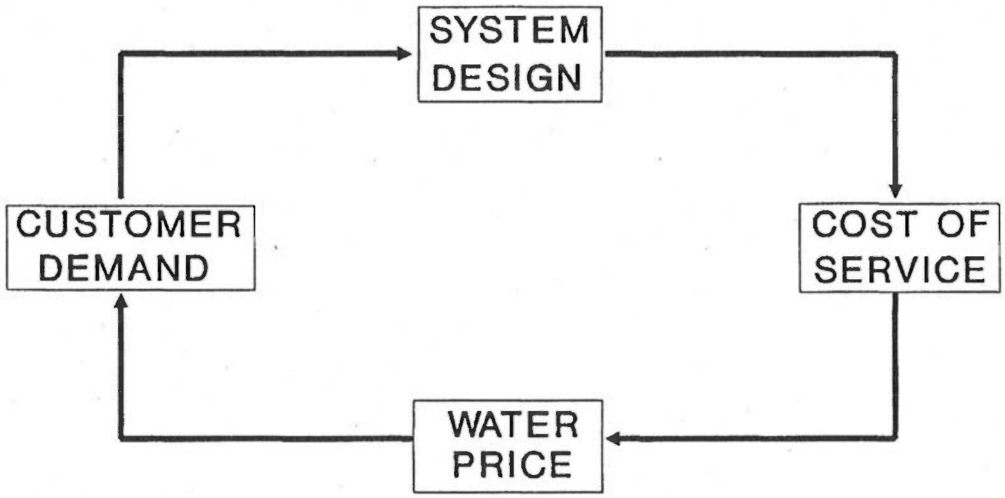

Fig. 2-1. The circularity of system design, cost of service, water price, and customer demand.

another example, substitutes "used" water for new withdrawals. In some instances, conservation in response to drought or other water shortages may have a permanent effect on water consumption habits.[22] These factors should be taken into account when estimating price elasticities of water demand.

Water Conservation

Water demand elasticities determine how much conservation occurs in response to a price change.[23] In some cases, conservation may occur naturally as prices edge upward due to increased costs and as consumers use more water-efficient appliances and change their behavior.[24] In other cases, sharp price increases may induce sudden usage reductions by moving consumers into a more price-elastic part of the demand curve. Any further price increase to remedy the revenue shortfall that results may not be appropriate since it may lead to further revenue losses.

When conservation measures or water use prohibitions are in full force absent an accompanying rate increase, utility revenues will be reduced. Some utilities may have difficulty covering their fixed costs. A rate increase, though unpopular, may mitigate this problem. According to one no-growth model, doubling the price of water results in a 32 percent reduction in demand but a 36 percent increase in revenue for the water utility.[25] Without a price increase, the revenue loss caused by the same level of conservation would be about $585,000 (32 percent). Since

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22 Frank H. Bollman and Melinda A. Merritt, "Community Response and Change in Residential Water Use to Conservation and Rationing Measures: A Case Study--Marin Municipal Water District," in James E. Crews and James Tang, eds., *Selected Works in Water Supply, Water Conservation and Water Quality Planning* (Fort Belvoir, VA: Institute for Water Resources, U.S. Army Corps of Engineers, 1981), 393.

23 These effects depend in part on the time lag inherent in the billing cycle. More frequent bills, received closer to the period of consumption, provide consumers with better information for changing their consumption behavior in response to the price for water service. For conservation purposes, monthly, bimonthly, or quarterly billing are preferable to semiannual or annual billing.

24 Darryll Olsen and Alan L. Highstreet," Socioeconomic Factors Affecting Water Conservation in Southern Texas," *American Water Works Association Journal* 79 no. 3 (March 1987): 68.

25 J. Ernest Flack, "Increasing Efficiency of Non-Agricultural Water Use," in Ernest A. Engelbert and Ann Foley Scheuring, eds., *Water Scarcity: Impacts on Western Agriculture* (Berkeley, CA: University of California Press, 1984), 147.

conservation can have an adverse effect on utility revenues, it may be necessary for a price increase when implementing a nonprice conservation strategy, such as a retrofit program, to meet the water supplier's revenue requirements. Thus a careful consideration of water price (including the billing cycle) is critical to any utility conservation effort, even if price itself is not the principal conservation tool.

Conservation through pricing can be an effective tool for managing demand when the objective is to avoid the need for additional capacity. In 1977, Dallas became one of the first major cities to adopt a pricing policy that imposed a surcharge on peak residential use. Although large peak-time users (more than 20,000 gallons in the summer) experienced a 58 percent rate increase, the overall increase in the revenue requirement was 12 percent. A preliminary assessment attributed a reduction in demand to the new pricing system, with water savings equivalent to the construction of a 50 to 75-million-gallon-a-day treatment plant.[26]

The elasticity of water demand is an important measure, but elasticity estimates do not always encompass all the variables that may affect water consumption behavior and reactions to price changes. As prices escalate, affordability becomes an issue for water service as it does for all public utility services. Price increases also bring about political reactions that may affect ratemaking and other regulatory processes. Further, these variables are dynamic rather than static. Thus estimates of elasticities and their effects cannot be made in a vacuum or without recognizing the effects of time.

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[26] I. M. Rice and L. G. Shaw, "Water Conservation--A Practical Approach," in American Water Works Association, *Water Conservation Strategies* (Denver, CO: American Water Works Association, 1980), 73.

CHAPTER 3

COST ALLOCATION FOR WATER UTILITIES

Cost allocation is an inexact but essential part of ratemaking for public utilities. Put simply, it involves the disaggregation of costs according to functions or services to which they can be attributed. Costs are allocated to the extent the analyst is able to attribute causality. The rate structure, then, is typically used to recover costs from those who cause them. Done well, rate structures mean that utilities are able to meet revenue requirements and consumers are sent appropriate pricing signals.

The application of cost-of-service criteria to water utility ratemaking is not a simple task. One significant problem with the cost approach is the subjectivity in cost measurement for specific services and user groups. The degree of subjectivity is a function of the lack of knowledge regarding the cost of specific water services, the costs of supplying specific consumer groups, and the cost of peak versus off-peak consumption. The cost-of-service principle can also generate a conflict between efficiency and simplicity. A rate structure or level based on costs of service may not be publicly acceptable and may not be easy to administer. Given the many participants (for example, city administrators, utility managers, customer groups, special users, bondholders, stockholders, and regulators) who can influence utility ratemaking, it is easy to understand why water ratemaking incorporates noncost elements. A wide variation in rates across water systems in the United States can generally be observed even within categories of the same size, ownership, and source of supply.[1]

It is readily acknowledged, then, that cost-of-service studies cannot provide definitive results since they unavoidably involve analyst judgment and other considerations. Yet there is an underlying presumption that utility rates should correspond to costs and that even rough methods for accomplishing this goal are better than methods that make no attempt to do so. This chapter describes the steps used in cost allocation, with an emphasis on the fully allocated (also referred

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[1] Patrick C. Mann, "The Water Industry: Economic and Policy Issues," in Charles F. Phillips, ed., *Regulation, Competition and Deregulation--An Economic Grab Bag* (Lexington, VA: Washington and Lee University, 1979), 105-6.

to as fully distributed or embedded) cost approach while the next considers marginal cost pricing. Chapter 5 turns to issues of rate design.

Revenue Requirements

The first step in utility ratemaking is to determine revenue requirements. An example of projected revenue requirements for a publicly owned water utility appears in table 3-1. Alternative methods exist for measuring (or forecasting) revenue requirements. In the regulation of privately owned utilities by state commissions, the utility or rate base/rate of return method prevails. An alternative approach emphasizes the utility's cash needs. The cash and utility bases for determining an identical total revenue requirement are compared in table 3-2. Although for public policy reasons there are differences between these approaches (and the utility and regulatory structures that underlie them), for ratemaking purposes the differences between the utility and cash bases should not be overstated because results may not vary significantly.

Methods

Rate Base/Rate of Return Method

The cost-of-service standard is at the heart of the rate base/rate of return method of determining revenue requirements, which specifies a return on the utility's capital investment and is depicted with the following formula:

$$RR = O\&M + D + T + r(RB)$$

where:

- RR = annual revenue requirement
- O&M = annual operation and maintenance expenses
- D = annual depreciation expense
- T = annual taxes (sales and income)
- r = rate of return
- RB = rate base (adjusted for accumulated depreciation).

Although it is an integral part of traditional public utility regulation and is supported by a broad base of expertise, the limitations of the rate base/rate of return method have been well documented. In sum, rate-of-return regulation may: (1) cause regulated firms to overinvest in capital, sometimes labeled "gold-plating,"

TABLE 3-1

PROJECTED REVENUE REQUIREMENTS FOR A PUBLICLY OWNED UTILITY

Expenditure Component	Expenditures Year 1	Year 2	Year 3
Operation-and-maintenance expense			
Source of Supply	$16,300	$17,700	$17,000
Pumping			
Power	145,500	159,900	152,700
Other	103,800	111,000	107,400
Treatment			
Chemicals	95,200	104,600	99,900
Other	67,300	71,900	69,600
Transmission and distribution			
Distribution reservoirs	13,600	14,400	14,000
Transmission mains	52,300	55,900	54,100
Distribution mains	34,000	36,400	35,200
Meters	92,500	100,700	96,600
Services	33,800	36,800	35,300
Fire hydrants	16,000	17,000	16,500
Other	58,000	62,000	60,000
Customer billing and collecting			
Meter reading	106,000	115,600	110,800
Billing and collecting	196,800	210,600	203,700
Other	11,400	12,200	11,800
Administration and general			
Fringe benefits	79,100	84,500	81,800
Other	293,400	313,800	303,600
Total O&M expense	1,415,000	1,525,000	1,470,000
Debt service requirements	462,000	458,000	460,000
Payment in lieu of taxes	175,000	175,000	175,000
Annual requirements for replacements, extensions, and improvements	189,000	201,000	195,000
Total revenue requirements	2,241,000	2,359,000	2,300,000

Source: American Water Works Association, *Water Rates* (Denver, CO: American Water Works Association, Manual M1, 1983), 6.

TABLE 3-2

COMPARISON OF UTILITY AND CASH BASES FOR EXPRESSING REVENUE REQUIREMENTS

Utility Basis	
Operation and maintenance expense	$259,000
Payment in lieu of taxes	189,000
Capital related costs:	
Depreciation	$126,000
Return	378,000
Total capital related costs	$504,000
Total revenue requirements	$952,000
Cash Basis	
Operation and maintenance expense	$259,000
Payment in lieu of taxes	189,000
Capital related costs:	
Bond debt service	214,000
Major capital improvements	150,000
Recurring improvements, replacements, and extensions	140,000
Total capital related costs	$504,000
Total revenue requirements	$952,000

Source: Robert F. Banker, "Distribution of Costs of Water Service to Customer Classes," in *AWWA Seminar on Developing Water Rates* (Denver, CO: American Water Works Association, 1973), III-17.

in order to inflate the rate base or otherwise use a suboptimal combination of inputs; (2) provide little or no incentive to minimize production costs, be technologically innovative, or respond to changes in consumer preferences; (3) encourage cost shifts (that is, cross subsidies) from unregulated to regulated parts of multifaceted firms; (4) create a real or perceived asymmetric risk to shareholders because of ex-post prudence reviews and other proceedings; and (5) be administratively costly because of extensive hearings, appeals, prudence reviews, oversight, and (in the extreme) micromanagement of the public utility.[2] High administrative or transaction costs often are cited as particularly problematic for small water utilities. Despite these issues, public utility regulation in the United States is a tradition well founded on legal and economic principles. To many, the advantages of regulation in curtailing the potential abuses of monopoly power far outweigh its limitations.

Cash-Needs Methods

Although rate base/rate of return regulation dominates, other methods for determining revenue requirements exist that emphasize the cash needs of the utility.[3] The simplest method may be the use of the utility's balance sheet, perhaps establishing a mechanism for reconciling surpluses and deficits on a year-to-year basis. Rates are used mainly to keep the utility financially viable.

The use of operating ratios has at times been suggested as an alternative method for determining revenue requirements. The operating-ratio technique (which has traditionally been used in motor carrier regulation) is a means of simplifying the regulatory process, particularly in the context of small water utilities having little or no capital investment or rate base. This approach also has appeal because of the chance that an operating margin will not be appropriately designated as a reserve to improve the utility's financial viability. Thus, the purpose of the operating ratio method is not to provide an adequate return on capital invested, but

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[2] Kenneth Rose, "Regulated Utility Pricing Incentives with Price Cap Regulation: Can It Correct Rate of Return Regulation's Limitations?," a paper presented at the Forum on Alternatives to Rate Base/Rate of Return Regulation, sponsored by the Michigan Public Service Commission in East Lansing, Michigan (May 24, 1990).

[3] American Water Works Association, *Revenue Requirements* (Denver, CO: American Water Works Association, Manual M35, 1990), 2-7.

rather to provide an adequate margin of revenues over expenses.[4] Operating ratios have been used by the commissions in North and South Carolina for small water systems.

Using operation and maintenance expenses as a substitute for the rate base, revenue requirements can be expressed by the following formula:

$$RR = O\&M + D + T + r(O\&M+D).$$

Using the operating ratio technique for rate base regulation does not eliminate the need for commission regulation. Regulators must set eligibility requirements for use of the method, determine appropriate operating ratios, and closely monitor the operating data for the utilities to which the method is applied. This method also may provide an incentive to inflate expenses, more so than rate-of-return regulation where expenses are passed through. Finally, as they mature, the investment profile of some water systems will change enough so that the operating ratio method may be an inappropriate tool for determining revenue requirements.

Still another substitute for rate of return regulation based on cash needs is the debt-service method, which shifts attention to the utility's debt. Revenue requirements are based on the sum of operating expenses and the amount necessary to service the utility's debt, both principal and interest. A variation of the debt-service approach is the "times-interest-earned ratio" (TIER), through which revenue requirements equal operating expenses plus a multiple of interest on long-term debt.[5] This method is frequently used by utilities having little equity investment, especially cooperatives and publicly owned utilities. At present, many small utilities have little debt because they have such difficulty securing it.[6] However, compliance with more stringent drinking water standards may increase the reliance on debt financing and thus stimulate interest in debt-service approaches, particularly for small systems.

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[4] Robert M. Clark, "Regulation Through Operating Revenues--An Alternative for Small Water Utilities," *NRRI Quarterly Bulletin,* 9 no. 3 (July 1988), 347.

[5] Deloitte Haskins & Sells, *Public Utilities Manual* (USA: Deloitte Haskins & Sells, 1984).

[6] An unexpected consequence of having little debt is that these small utilities sometime appear "less risky" according to certain debt-based measures of risk.

Factors Affecting Revenues

Water utility revenues--and revenue requirements--can be highly variable. Ratemaking must take this into account. A variety of factors affect revenues, including:[7]

- Number of customers served
- Customer mix
- Customer water use
- Nonrecurring sales
- Weather
- Conservation
- Use restrictions
- Rate changes
- Price elasticity

In addition to these factors, water utility revenue requirements also are affected by:[8]

- Inflation
- Interest rates
- Capital financing needs
- Tax laws and regulations
- Changes in economic conditions
- Changes in utility operations

The cost-of-service analyst must take these influences into account in estimating revenue requirements. Some factors, such as weather, can be accounted for with "normalization" techniques that use long-term historical averages to adjust for extreme cases in the short term. Others, such as conservation and price elasticity, can be analyzed using econometric methods. More difficult to account for because of problems in prediction and quantification are changes in tax laws, economic conditions, and utility operations. The choice of a test year may determine the need to make projections for these variables.

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[7] Adapted from American Water Works Association, *Revenue Requirements* (Denver, CO: American Water Works Association, Manual M35, 1990), 3.

[8] Ibid.

Test Year

Regardless of the method for determining revenue requirements, cost analysis requires the choice of a test year or test period, which is the annualized period for which costs are to be analyzed and rates established.[9] The test year may be an historical year, a future year, or a mixture of the two. The choice of an appropriate test year often is controversial because it involves a tradeoff between the certain nature of historic costs and the speculative nature of future costs. Accounting theory may be more compatible with historic data while economic theory--marginal-cost pricing in particular--is forward looking. Some state commissions may have statutory or regulatory constraints on the test year choice.

As reported in table 3-3, a majority of state regulatory commissions use an historic test year in water utility rate cases. Only a few state commissions use a future test year in water utility rate cases, while somewhat more mix historic and future data. Three states reported using an historic test year with some qualification. In Delaware, utilities may use either an historic test year or a test year with up to nine months of projected data. Illinois and Ohio indicated that an historic test year is allowed, provided the water utility is small. Illinois requires larger systems to use a future test year, while small water systems use an historic test year with an option to forecast. Ohio provides abbreviated filings for very small water systems in which they use an historic test year. All other water systems are required to develop a test year mixing historical data with projections. In a unique response, staff of the Michigan commission indicated that water utilities may choose any method to develop a test year.

Once revenue requirements are established for the test year of choice, the next step in ratemaking is to allocate the costs associated with those requirements to particular functional areas and to customer classes.

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9 Ibid.

TABLE 3-3

TEST YEAR USED IN WATER UTILITY RATE CASES

State Commission	Test Year Used Historic	Future	Mixed	State Commission	Test Year Used Historic	Future	Mixed
Alabama	X	-	-	New Hampshire	X	-	-
Alaska	X	-	-	New Jersey	-	-	X
Arizona	X	-	-	New Mexico	-	-	X
Arkansas	-	-	X	New York(d)	-	-	X
California	-	X	-	North Carolina	X	-	-
Colorado	X	-	-	Ohio(e)	X	-	X
Connecticut	X	-	-	Oklahoma	X	-	-
Delaware(a)	X	X	-	Oregon	-	-	X
Florida	-	-	X	Pennsylvania(f)	X	-	-
Hawaii	-	-	X	Rhode Island	X	-	-
Idaho	X	-	-	South Carolina	X	-	-
Illinois(b)	X	X	-	Tennessee	-	-	X
Indiana	X	-	-	Texas	X	-	-
Iowa	X	-	-	Utah	-	-	X
Kansas	X	-	-	Vermont	X	-	-
Kentucky	X	-	-	Virginia	X	-	-
Louisiana	X	-	-	Washington	X	-	-
Maine	X	-	-	West Virginia	-	-	X
Maryland	X	-	-	Wisconsin	-	X	-
Massachusetts	X	-	-	Wyoming	X	-	-
Michigan(c)	X	X	X	Virgin Islands	-	-	X
Mississippi	-	-	X				
Missouri	X	-	-				
Montana	X	-	-				
Nevada	X	-	-	**Number of Commissions**	32	5	14

Source: 1990 NRRI Survey on Commission Regulation of Water Systems.

(a) Utilities may use an historic test year or a test year with up to 9 months projected.
(b) Small systems use historical test year with the option of forecasting; large systems use a future test year.
(c) At the utility's option.
(d) Projections for 12 months.
(e) Abbreviated filing for very small systems with historical test year. Other systems use a mixed test year.
(f) Not beyond a 12-month forecast for mixed historical and future test years.

Key Steps in Embedded-Cost Allocation

Embedded-cost allocation depends, first, on the availability of accurate and fairly detailed cost data. This may be facilitated by a uniform system of accounts. Most state regulatory commissions rely on the systems developed by the National Association of Regulatory Utility Commissioners (NARUC) for Class A utilities (revenues exceeding $750,000), Class B utilities (revenues between $150,000 and $750,000) and Class C utilities (revenues less than $150,000). Hawaii and Montana do not use the NARUC system while California, Massachusetts, and New York have developed their own systems of accounts for water utilities.[10] The NARUC accounting system for Class A water utilities appears in appendix A of this report. In addition to accounting information, cost allocation depends on system design and load data as well as any other information required to develop cost allocators.

Assuming that the necessary data are available, the allocation of water utility costs begins with functionalization. For water service, this involves categorizing costs into areas such as source development, pumping, transmission, treatment, storage, and distribution. Since functionalization is essentially based on engineering system design, there is relatively little controversy in this step. However, alternative sources of supply (such as purchased water) and nontraditional sources of capacity (such as leak detection and repair, and conservation programs), may require special attention in the development of functional categories. A more difficult area of cost functionalization is the treatment of joint or common costs, which requires development of allocation criteria. Finally, projections of future costs can be tricky, and care must be taken to place them in the appropriate functional categories.

As mentioned earlier, the next step involves classifying the cost of utility service according to customer, capacity (demand), and commodity (operating) costs. Fire protection costs can be classified separately as well. Customer costs are those associated with metering, billing, collections, and customer service. Capacity costs are those generally associated with the physical plant required to meet peak demands for water service. Because cost allocation is sensitive to how peak

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[10] National Association of Regulatory Utility Commissioners, *NARUC Annual Report on Utility and Carrier Regulation 1988* (Washington, DC: National Association of Regulatory Utility Commissioners, 1989), 746.

demands are defined, care must be taken in their definition. Some of the available methods are:[11]

- Correlation analysis to determine those daily and seasonal periods that most appropriately reflect the margins of cost for the rating periods.

- Judgment to specify when the safe-yield of any capacity element must maintain a certain temporal reliability.

- Statistical and mathematical modeling to determine the intertemporal homogeneity of marginal costs.

- Practical considerations can be used based on rough and ready principles of calculating the probability of exceeding available system capacity, which may vary significantly for different periods.

Commodity costs vary directly with levels of production or consumption, such as those associated with treatment chemicals and energy. Fire protection costs are those associated with the flow requirements needed to fight fires. In classification, all costs must be appropriately accounted for (that is, "fully allocated") and particular attention should be paid to the effects of some costs on others.

Once total costs are functionalized and classified, the final step is to assign costs to service (or customer) classes. Although many water utilities serve only one or two service classes, the possibilities include residential, commercial, industrial, wholesale, institutional, public authorities, and fire protection. Cost assignment to customer classes, for the purpose of generating rates, usually involves assigning customer costs on the basis of service connections, assigning commodity costs on the basis of usage, and the difficult (and sometimes arbitrary) assignment of capacity costs. While some costs, such as fire protection and system development, are directly assignable to customers, most require the use of cost allocators.

A simple example of the allocation of unit costs appears in table 3-4. In this case, revenue requirements are defined for an investor-owned utility and costs are allocated between general water service and fire protection service. Fire protection costs are treated as incremental costs, and they affect virtually all of the other functional cost areas. Other approaches may be taken to allocating fire protection

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[11] Stephen L. Feldman, Robert Obeiter, Michael Abrash, and Martin Holdrich, *An Operational Approach to Estimating the Marginal Costs of Urban Water Supply with Illustrative Applications* (Unpublished report to the Wisconsin Public Service Commission, October 21, 1980), 28.

TABLE 3-4

ALLOCATION OF REVENUE REQUIREMENTS

Expense Function	Total Unit Costs (cents)	Allocation to: General Service (cents)	Allocation to: Fire Service (cents)
Operation and maintenance			
Source of supply	8.9	8.8	0.1
Pumping	7.7	7.6	0.1
Water treatment	3.3	3.3	0.0
Transmission and Distribution	6.7	5.0	1.7
Administration and General	13.0	11.3	1.7
Customer accounts	3.4	3.3	0.1
Taxes			
Federal	11.3	9.1	2.2
Local & state revenue	15.2	13.1	2.1
Real estate	1.1	1.0	0.1
Depreciation	4.9	4.0	0.9
Total operation and maintenance	75.5	66.5	9.0
Interest and carrying charges	10.8	8.6	2.2
Stockholder payments	11.9	9.5	2.4
Balance for capital additions	1.8	1.4	0.4
Total revenue requirement	100.0	86.0	14.0

Source: J. Richard Tompkins, "Fire Protection Charges," in *AWWA Seminar on the Ratemaking Process: Going Beyond the Cost of Service* (Denver, CO: American Water Works Association, 1986), 25.

costs.[12] One is to allocate primary costs to fire service and incremental costs to general service; another is to allocate costs on a proportional basis. However, the allocation of incremental cost to fire service may be a least-cost approach to this issue. The allocation of fire service costs to customer classes can be based on population, service connections, fire hydrants, hydrants per inch-foot, acreage, housing stock, fire-flow factors, or other criteria. For example, fire demand requirements for the different customer classes can yield fire-flow factors as depicted in table 3-5. In this case, the water system serves mainly residential and commercial customers and requires an average fire flow of about 2,400 gallons per minute (gpm). These factors can be used to allocate the cost of transmission facilities among service classes as well as among service territories, such as different municipalities served by one utility.

TABLE 3-5

COST ALLOCATION BASED ON FIRE-FLOW REQUIREMENTS

Customer Classification	Area Acres	Flow Assigned (gpm)	Fire Flow Factor
Residential	11,000	1,000	11,000
Commercial	6,300	3,000	18,900
Industrial	4,700	5,000	23,500
Total	22,000	2,400	53,400

Source: J. Richard Tompkins, "Fire Protection Charges," in *AWWA Seminar on the Ratemaking Process: Going Beyond the Cost of Service* (Denver, CO: American Water Works Association, 1986), 23.

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12 J. Richard Tompkins, "Fire Protection Charges," in *AWWA Seminar on the Ratemaking Process: Going Beyond the Cost of Service* (Denver, CO: American Water Works Association, 1986), 19-28.

Cost allocation is a prerequisite to rate design (addressed in the next chapter). Rates generated from a cost study should be analyzed in terms of revenue implications. Rates that depart significantly from current levels or have unexpected effects on revenues should lead the analyst to verify the parameters of the cost study, including allocation criteria and methods, to check for possible errors. However, the reconciliation of costs and revenues ultimately is the responsbility of decisionmakers who may wish to take into account additional regulatory principles and public policy considerations.

Criteria

Cost allocation is made less arbitrary with the development of appropriate criteria on which cost analysts may rely. Several cost assignment criteria may be appropriate in allocating water utility costs:[13]

- Cost causation
- Traceability
- Variability
- Capacity required
- Beneficiality

The first criterion--and perhaps the most important--is cost causation. This emphasizes that costs should be assigned to the revenue generating customers or services that cause the costs to be incurred. A closely related criterion, traceability, means that costs to be assigned must be identified with a revenue generating unit, that is, a customer class. Traceability (a primary test of cost causation) implies that costs and their causes either are empirically observable or conceptually logical. Variability suggests that costs, although not necessarily traceable, can vary with the usage volume associated with the revenue generating unit. This criterion (a secondary test of cost causation) implies that certain costs exhibit a systematic relationship with specific measures of output. A fourth criterion is capacity required, which means that costs are assigned according to whether the service could have been rendered if the specific costs had not been

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[13] William Pollard, *A Peak-Responsibility Cost-of-Service Manual for Intrastate Telephone Services: A Review Draft* (Columbus, OH: The National Regulatory Research Institute, August 1986).

incurred. (This also may be a secondary criterion that can be applied in cases where both the traceability and variability criteria fail to be instructive in cost allocation.) The criterion of last resort is beneficiality, which suggests that costs are assigned to customers or services that benefit from the costs; that is, incurring the cost is necessary to providing the service. This criterion implies that without the cost being incurred, the service would be provided inefficiently. Perhaps the most prominent application of the beneficiality criterion in water supply is in the allocation of fire protection costs.

Methods

An early approach to water utility cost allocation is known as the functional-cost method.[14] It emphasizes the separation of costs into those associated with: (1) production and transmission, (2) distribution, (3) customer costs, and (4) hydrants and connections. Customer costs could be divided further into (a) meters and services and (b) customer billing and collections. The method has been criticized for its overreliance on analyst judgment and its failure to account fully for those costs driven by capacity or demand.[15] However, the functional-cost approach laid the groundwork for more sophisticated methods that are more responsive to these criticisms. Also, for the very smallest water utilities a functional-cost analysis may be better than no cost analysis at all.

Today, the cost-of service approach is usually associated with what are known as fully allocated or fully distributed methods that involve cost allocation based on variations in demand for utility services. Although there are many variations, two distinct approaches can be found to the full allocation of costs: the peak responsibility method and the noncoincidental-peak responsibility method.[16]

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14 American Water Works Association, *Water Rates,* 21-22.

15 Ibid.

16 National Economic Research Associates, "An Overview of Regulated Rate-Making in the United States" (February 1977); and Robert J. Malko, Darrell Smith, and Robert G. Uhler, "Topic Paper No. 2: Costing for Rate-Making" (August 1981), in *Electric Utility Rate Design Study Report to the National Association of Regulatory Utility Commissioners* (Palo Alto, CA: Electric Utility Rate Design Study Group).

The peak responsibility method is also known as the coincident peak or Wright method. It considers both the magnitude of peak demand and its timing but does not incorporate average demand or volume of usage in the allocation of capacity costs. The allocation basis is the user class contribution to system peak demand. Its conceptual base is that those users who cause peak demand should pay for the capacity required to supply it. Off-peak users are presumed not to affect capacity requirements and capacity costs.

Several criticisms have been leveled at the peak responsibility method. Primarily, it assigns no capacity costs to off-peak users thus producing the criticism that such users should not be relieved entirely of the capacity cost burden. For example, off-peak usage contributes to the incremental capacity required to permit the scheduling of routine system maintenance. Another criticism is that the assignment of all capacity costs to peak services creates the potential for unstable (shifting) peaks. A criticism, however, that has less merit is that users with 100 percent load factors do not contribute to system peak demand and therefore should be assigned no capacity costs. This argument ignores the concept that all users at system peak demand are coresponsible for the peak demand; that is, if the 100 percent load-factor-user shifts consumption from peak to off-peak, less system capacity is required.

The noncoincidental peak method is also known as the class maximum demand or Hopkinson method. In the American Water Works Association's rates manual, the commodity-demand method is an example of this approach.[17] It distinguishes between customer costs, commodity costs, and demand (capacity) costs. An example of this method appears in appendix B.

Noncoincidental methods such as this consider the magnitude of peak demand but do not incorporate either the timing of peak demand or usage (average demand) in the allocation of capacity costs. The allocation basis is the customer class contribution to the sum of the maximum demands for all user classes. By ignoring direct responsibility for system peaks, the method allocates some capacity costs to all user classes. Criticisms of the method include an insufficient adherence to the cost causation standard and inadequate recognition of the benefits of off-peak demand.

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[17] American Water Works Association, *Water Rates* (Denver, Colorado: American Water Works Association, 1983).

Many fully allocated or fully distributed cost methods have capacity cost allocations based on both demand and consumption. Most of these methods are variations of the average-and-excess demand method, also described by the American Water Works Association as the base-extra capacity method.[18] An example appears in appendix C.

The base-extra capacity method, or Greene method, distinguishes between customer costs, base capacity costs, and extra capacity costs, meaning capacity needed to meet hourly, daily, or other peak demands. Thus it considers both peak demand and average demand but does not directly incorporate the timing of demand in the allocation of capacity costs. The approach involves an initial estimation of capacity costs assuming all users are operating at a 100 percent load factor. These estimated base capacity costs are allocated to user classes on the basis of usage. The extra or excess capacity costs then are allocated on the basis of the excess of maximum demand over average demand for each user class. The noncoincident-peak responsibility method is generally used in calculating the class maximum demand. Examples of the determination of allocation bases for facilities designed for maximum-day use and maximum-hour use are depicted in table 3-6.

TABLE 3-6

EXAMPLE OF DETERMINATION OF ALLOCATORS USING BASE-EXTRA CAPACITY METHOD

							Allocation Percentages		
								Extra Capacity	
Type of Use		Quantities		Ratio			Base	Maximum Day	Maximum Hour
Average Day Use	=	10 mgd	=	1.0	=		66.7	-	-
Maximum Day Use		15 mgd		1.5			-	33.3	-
Average Day Use	=	10 mgd	=	1.0	=		40.0	-	-
Maximum Hour Use		25 mgd		2.5			-	-	60.0

Source: Joseph M. Spaulding, "Revenue Requirements and Allocation to Functional Cost Components," in *AWWA Seminar on Developing Water Rates* (Denver, CO: American Water Works Association, 1973), II-19.

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18 Ibid.

The base-extra capacity method makes little distinction between peak and off-peak demand thus violating the cost causation standard. However, it does have validity in apportioning some capacity costs on the basis of usage; that is, higher load-factor customers have higher probabilities of system peak contribution than lower load-factor customers. In brief, base-extra capacity implicitly employs class load factors as a measure of peak responsibility; thus, certain benefits flow to low load-factor classes. The average-and-excess demand method implies that peak demand is only responsible for the incremental costs incurred because of increased demand levels. That is, peak demand is not responsible for all system capacity costs.

In general, fully allocated cost methods suffer from certain deficiencies. All methods other than the peak responsibility method permit user classes to shift usage from off-peak to peak (thus increasing capacity costs) without increasing their class cost allocation. This occurs particularly when class peak demand at system peak is less than class average demand. The application of the various noncoincident peak responsibility methods can result in the inefficient utilization of existing capacity and increased system capacity requirements. There is also a tendency to channel difficult to allocate costs (for example, administrative costs) into the customer category. In these somewhat arbitrary cost assignments, value of service criteria may prevail.

Commission Staff Perspectives on Cost Analysis

As reported in table 3-7, twenty-four of the state commissions require some form of cost analysis in conjunction with water rate proceedings. Eighteen commissions require cost analysis of all water utilities in all rate cases. The New Jersey Commission requires the completion of a cost analysis on a case-by-case basis, while in six states the requirement depends on company size defined either by annual revenues or number of customers. For example, the commissions in Montana and Pennsylvania reported that cost analysis requirements applied only to companies having annual revenues exceeding $50,000 and $700,000, respectively. The other states with size stipulations reported only that larger companies were subject to cost analysis requirements.

TABLE 3-7

WATER UTILITY COST ANALYSIS

State Commission	Are cost studies required?	Who performs the cost analysis?	Characterization of cost analysis used by regulated water systems (a)						
			FC	CD	BX	FA	MI	O	U
Alabama	no	staff	-	-	-	-	-	(b)	-
Alaska	yes	utility	-	-	-	X	-	-	-
Arizona	no	staff	-	-	X	-	-	-	-
Arkansas	yes	both	-	X	-	X	-	-	-
California	yes	both	-	-	-	-	-	(c)	-
Colorado	no	n/a	-	-	-	X	-	-	-
Connecticut	yes	utility	-	X	X	X	-	-	-
Delaware	yes	both	-	-	-	X	-	-	-
Florida	no	staff	-	-	-	-	-	(d)	-
Hawaii	no	n/a	-	-	-	-	-	(e)	-
Idaho	no	n/a	-	-	-	X	-	-	-
Illinois	no	both	-	-	(f)	-	-	-	-
Indiana	no	both	X	X	X	X	X	-	-
Iowa	no	n/a	-	-	-	X	-	-	-
Kansas	yes	utility(g)	-	-	-	X	-	-	-
Kentucky	yes(h)	utility	X	-	-	X	X	-	-
Louisiana	no	n/a	-	-	-	X	-	-	-
Maine	no	utility	-	-	-	-	-	(i)	-
Maryland	no	n/a	-	-	-	-	-	(j)	-
Massachusetts	no	utility	-	-	-	X	X	-	-
Michigan	yes	utility	-	-	-	-	-	(k)	-
Mississippi	yes	staff	X	-	-	-	-	-	-
Missouri	yes	both	X	X	X	X	-	-	-
Montana	yes(l)	utility	-	-	-	X	-	-	-
Nevada	yes(h)	both	X	X	X	X	X	-	-
New Hampshire	no	utility	-	-	X	-	-	-	-
New Jersey	yes(m)	utility	-	X	X	-	X	-	-
New Mexico	yes	both	-	-	-	X	X	-	-
New York	yes	both	-	-	-	X	-	-	-
North Carolina	no	staff	-	-	-	-	-	(n)	-
Ohio	yes(o)	both	-	-	X	-	-	-	-
Oklahoma	no	n/a	-	-	-	X	-	-	-
Oregon	yes	staff	-	X	-	X	-	-	-
Pennsylvania	yes(p)	utility	-	-	X	-	-	-	-
Rhode Island	yes	utility	-	-	-	X	X	-	-

TABLE 3-7 (continued)

State Commission	Are cost studies required?	Who performs the cost analysis?	Characterization of cost analysis used by regulated water systems(a) FC	CD	BX	FA	MI	O	U
South Carolina	no	n/a	-	-	-	-	-	-	X
Tennessee	no	n/a	-	-	-	-	-	-	X
Texas	yes(q)	utility	-	(r)	X	-	-	-	-
Utah	no	n/a	-	-	-	-	-	(b)	-
Vermont	yes	both	-	-	-	X	-	-	-
Virginia	no	n/a	-	-	-	-	-	-	X
Washington	no	utility	-	-	-	X	-	-	-
West Virginia	yes	both	X	X	-	-	-	-	-
Wisconsin	yes	both	-	-	X	-	-	-	-
Wyoming	yes	both	-	-	-	X	-	-	-
Virgin Islands	yes	staff	-	-	-	-	-	-	X
Times mentioned			6	9	12	23	7	9	4

Source: 1990 NRRI Survey on Commission Regulation of Water Systems.

(a) FC = Functional-cost
CD = Commodity demand
BX = Base-extra capacity
ED = Embedded direct
FA = Fully allocated/distributed/embedded
MI = Marginal/incremental
O = Other (as noted)
U = Unknown

(b) Accrual basis.
(c) Fixed cost and commodity cost.
(d) Fixed cost and variable cost.
(e) Original cost.
(f) On an embedded basis.
(g) Commission staff may assist smaller systems.
(h) Requirement for large systems only.
(i) Wisconsin method.
(j) Original cost or fair value.
(k) Actual book cost (accrual method).
(l) Requirement for systems with revenues in excess of $50,000 annually.
(m) On a case-by-case basis.
(n) Rate base method; operating ratios or cost plus.
(o) Requirement for large systems (in excess of 15,000 customers) and medium sized systems (5,000 to 15,000 customers).
(p) Requirement for systems having revenues in excess of $700,000 annually.
(q) Depending on size of system.
(r) Commodity-demand (fixed costs and variable costs).

The survey revealed that cost analysis is performed in its entirety by commission staff in seven jurisdictions and by the utility in fourteen jurisdictions. In the remaining commissions, the responsibility for performing a cost analysis is split between the utility and the commission staff. The Kansas Corporation Commission reported that although water utilities are required to perform cost analyses, the commission staff may assist smaller water utilities in completing cost studies. Interestingly, not all the commissions mandating cost studies shift the entire burden of performing such analysis onto the water utility. In twelve jurisdictions, the commission and the utility share the responsibility. In three of the states that mandate cost analysis, the commission staff performs the cost study. Altogether, commission staffs are involved in developing cost studies in their entirety or on a shared basis in twenty-one of the jurisdictions surveyed.

Regarding methods of cost analysis, also reported in table 3-7, the survey revealed that a variety of approaches are used by regulated water systems for purposes of cost analysis. Many state commission staff members characterize water utility cost studies as fully allocated costing (including fully distributed and embedded cost analysis). Several jurisdictions indicated that regulated water utilities use two or more methods of cost analysis. Indiana, Missouri, and Nevada are noteworthy for the variety of cost studies that come before them.

Results of the survey indicate a rather widespread use of the ratemaking manuals produced by the American Water Works Association, as reported in table 3-8. Over half of the jurisdictions surveyed reported the use of American Water Works manuals; seven jurisdictions indicated they used the manuals primarily as a general reference tool. Additional comments provided on the survey indicated that most found the manuals to be highly useful. However, it was noted that further attention could be paid to specific types of costs and charges, with more detail provided on the different steps in cost analysis. Another comment was that many small water system managers lack the expertise or resources to use the manuals effectively.

Finally, reported in table 3-9, the survey responses expose a variety of concerns about specific cost allocation issues affecting water provision. Commission staff in the jurisdictions under survey detailed twenty-one separate costing issues affecting water utilities. It appears that in terms of costs and their effects on water utilities, commission staff overwhelmingly are concerned with the impact of

TABLE 3-8

USE OF AMERICAN WATER WORKS ASSOCIATION RATEMAKING MANUALS

State Commission	Used by Commission	Used by Utilities	State Commission	Used by Commission	Used by Utilities
Alabama	yes	nk	New Hampshire	yes	yes
Alaska	yes*	nk	New Jersey	yes	nk
Arizona	yes	nk	New Mexico	yes	nk
Arkansas	no	nk	New York	yes	nk
California	yes*	nk	North Carolina	no	nk
Colorado	no	nk	Ohio	yes	yes
Connecticut	yes	yes	Oklahoma	yes*	yes(a)
Delaware	yes	yes(a)	Oregon	yes	yes
Florida	yes*	nk	Pennsylvania	yes	yes
Hawaii	no	nk	Rhode Island	yes	nk
Idaho	no	nk	South Carolina	no	nk
Illinois	yes	nk	Tennessee	no	nk
Indiana	yes	yes	Texas	yes*	nk
Iowa	no	yes	Utah	yes*	no
Kansas	nk	nk	Vermont	no	nk
Kentucky	yes	nk	Virginia	no	nk
Louisiana	no	nk	Washington	yes	nk
Maine	yes	nk	West Virginia	yes	yes
Maryland	no	nk	Wisconsin	yes	nk
Massachusetts	no	yes(b)	Wyoming	no	nk
Michigan	no	nk	Virgin Islands	no	nk
Mississippi	no	nk			
Missouri	yes	nk			
Montana	yes	yes			
Nevada	yes*	nk	**Number of commissions responding yes**	**28**	**12**

Source: 1990 NRRI Survey on Commission Regulation of Water Systems.

* Primarily as a general reference.

nk = not known.
(a) = some systems.
(b) = large systems.

TABLE 3-9

MOST IMPORTANT COST ALLOCATION ISSUES AFFECTING WATER UTILITIES ACCORDING TO STATE COMMISSION STAFF MEMBERS

Issue	Number of Times Mentioned
SDWA compliance/water quality improvements	24
System upgrade/infrastructure improvements	8
Financial viability of small systems	5
Capital costs/debt	4
Supply/water source costs	4
Conservation related steps	4
Labor costs/professional services/salaries	4
Payment and allocation of fire protection costs	3
Resale rates/price discrimination	2
Taxes/federal taxes on contributed plant	2
Appropriate rates of return for subsidiaries	1
Marginal versus embedded cost analysis for new supplies	1
Importance of rate design in cost recovery	1
Obtaining load data	1
Administrative costs	1
Pumping costs (energy)	1
Chemical costs	1
Maintenance costs	1
Metering costs	1
Insurance and liability	1
Water rights	1

Source: 1990 NRRI Survey on Commission Regulation of Water Systems.

safe drinking water requirements on the cost of water provision. The next most frequently mentioned issue of concern related to the cost of system upgrade or infrastructure improvements. Costing issues relating to financial viability of small systems, capital costs and debt, water supplies, conservation, and professional and labor related costs each were mentioned by roughly 10 percent of the responding jurisdictions. Furthermore, a host of costing issues ranging from pumping and chemical costs to rate design and load data concerns were mentioned. The results clearly indicate that a wide range of cost allocation issues affecting water utilities are making their way onto commission agendas.

Conclusion

Costing analysis is not an exact science. Traditional or conventional cost allocation has the potential for arbitrary cost assignments with no definitive scientific, economic, or accounting basis. Much depends on the analyst devising the cost-of-service analysis. Thus, the cost results are, at best, only estimates of actual costs of service. In brief, all cost studies involve judgments and should be viewed as starting points rather than presumptive determinants of rate design. In sum, there is no single "correct" costing method, particularly for the allocation of system capacity cost. In this context, a range of cost studies is desirable (including marginal and incremental cost analyses), since substantially divergent results can be achieved depending on the judgments involved. A range of studies is highly desirable for planning purposes as well.

CHAPTER 4

MARGINAL-COST PRICING APPLIED TO WATER UTILITIES[1]

Central to the issues of cost allocation and rate design is contemporary economic theory, which is used by decisionmakers to understand certain consequences of policy choices. Among other things, theories raise expectations that certain decisions will have certain outcomes. This chapter reviews marginal-cost pricing theory as applied to the case of water supply utilities. Attention is paid to the theoretical and applied aspects of the theory as well as to specific formulations for its use. Also included is a presentation of a method for calculating simple incremental costs based on a least-cost planning perspective and a comparison of the fully allocated and marginal cost approaches.

Marginal Cost in Theory and Practice

Economic theory argues for pricing resources at marginal costs to ensure their efficient allocation, thus maximizing consumer welfare. Marginal cost is among the prevailing standards by which achievement of the competitive ideal is measured, not just by economists but by regulators and judges as well. Prices that accurately reflect marginal or incremental costs send a signal to consumers about consumption, which in turn sends a signal to producers about production.

Marginal cost is defined in economic theory as the derivation of the total cost function with respect to output. Unfortunately, this definition obscures both the conceptual and pragmatic problems that can be experienced in estimating the marginal cost of water service.

Put more simply, marginal cost is the additional cost of producing or selling a single incremental unit.[2] The marginal cost of water service is the cost incurred in providing more water service. In practical terms, the two essential components

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[1] This chapter is based in part on Patrick C. Mann, *Water Service: Regulation and Rate Reform* (Columbus, OH: The National Regulatory Research Institute, 1981).

[2] See Patrick C. Mann and Donald L. Schlenger, "Marginal Cost and Seasonal Pricing of Water Service," *American Water Works Association Journal* 74 no. 1 (January 1982): 6.

of marginal cost are, first, the change in operating costs caused by changing the utilization rate for existing capacity and, second, the cost of expanding capacity, including the operating costs associated with the increased capacity. If the water utility is operating below capacity, marginal cost involves the incremental operating cost of producing more product units within the existing system capacity. In contrast, if a capacity increment is required, marginal cost involves the new capacity costs as well as the operating cost associated with the capacity increment. Calculating marginal costs involves projecting capacity and operating costs for a specified time span given a particular demand forecast. Such projections must take into account certain characteristics of water utilities themselves as well as potential influences on demand, including price.

The welfare principles that underlie marginal-cost pricing theory, as well as the allocative implications of the marginal-cost pricing rule, were set forth by Ruggles.[3] Works by Vickrey and Wiseman are excellent sources for some of the key theoretical objections to marginal-cost pricing.[4] These objections include the theory's limited value in selecting among alternative investments, the distortion effects on income distribution, and the value judgments implicit in applying marginal-cost pricing. Works by Steiner and Hirshleifer provide the early theoretical discussion of peak-load pricing, that is, its marginal-cost aspects and the pricing efficiency implications posed by variations in demand over time.[5]

The arguments for marginal-cost pricing involve economic efficiency and correct price signals. Prices for water service that equal marginal cost generate an efficient allocation of resources. The logic is that consumers are being induced to use water efficiently since the value they place on additional units of water is equal to the value they place on additional units of alternative or sacrificed goods. If water rates are unequal to marginal cost, consumers are receiving incorrect

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[3] Nancy Ruggles, "The Welfare Basis of the Marginal Cost Pricing Principle," and "Recent Developments in the Theory of Marginal Cost Pricing," *Review of Economic Studies* 17(1949-1950): 29 and 107, respectively.

[4] William Vickrey, "Some Objections to Marginal Cost Pricing," *Journal of Political Economy* 56 (June 1948): 218-238; and J. Wiseman, "The Theory of Public Utility Price," *Oxford Economic Papers* 18 (February 1957): 56-74.

[5] Peter O. Steiner, "Peak Loads and Efficient Pricing," *Quarterly Journal of Economics* 71 (November 1957): 585-610; and Jack Hirshleifer, "Peak Loads and Efficient Pricing: Comment," *Quarterly Journal of Economics* 72 (August 1958): 451-62.

signals regarding the resources used in water production; therefore, they will tend to consume either too little or too much water. Conservation is incorporated into the economic efficiency concept but economists generally do not view decreasing consumption in itself as a meaningful goal. That is, conservation is not decreasing usage per se, but instead involves the operation cost and capacity savings from efficient (marginal-cost) pricing.

Water rates based on marginal cost provide the foundation both for attaining an efficient utilization of water system capacity and attaining efficiency in capacity investment. Marginal-cost prices send signals to consumers about the resource cost consequences of their consumption decisions and, conversely, reflect the cost savings if consumers forego the consumption of additional units of water service. The ultimate purpose of marginal-cost pricing is to provide correct price signals for consumption decisions. Thus, when consumers affect water system costs by altering their consumption patterns, their bills change accordingly. In brief, marginal-cost prices reflect the immediate and near-term future cost consequences of usage decisions rather than the historical cost consequences of consumption decisions. Since pricing affects future usage decisions, not past usage decisions, future costs are those relevant for pricing.

In simple terms, economic efficiency is a standard which signals that no further reallocation of resources (either to or from the provision of water service) would enhance consumer satisfaction. The price equal to marginal-cost equation is the best available measure of attaining this standard. For example, price is the best proxy for the value placed on additional units of water service; marginal cost is the best proxy for the value placed on additional units of alternative goods. By water prices reflecting the immediate and near-term future costs of resources used or saved in water consumption, the marginal-cost approach implies a concept of equity in which consumers pay for these costs. In contrast, water prices based on average historical costs create the illusion that resources that can be used or saved at present or in the near-term future cost as much or as little as in the past. The approach implies a concept of equity in which consumers pay for the past costs of consumption decisions.

There are numerous ways of conceptualizing marginal costs: avoidable costs, product-specific costs, single and multiproduct costs, total service incremental costs, and average incremental costs are among the choices.[6] Incremental cost is a concept similar to marginal cost. While theoretical marginal cost refers to one-unit changes in output (such as a gallon of water), incremental cost can refer to larger changes in output (such as a million gallons of water), but also can refer to nonoutput changes (such as a change in water quality or system reliability). In addition, incremental costs can reflect changes in total cost over time. Economic purists prefer to use one gallon rather than a million gallons because it is truer to the theoretical idea of change at the margin. The incrementalist perspective is less rigorous but more practical. Nonetheless, for most purposes the concepts of marginal and incremental cost are virtually interchangeable.

There are also alternative ways of estimating marginal costs.[7] The three basic approaches are engineering process models, econometric models, and optimization or simulation models. Engineering process models emphasize engineering estimates about the cost of alternative supply options. Econometric models use statistical techniques to estimate costs on the basis of the behavior of key cost-causing variables. Such models are frequently used in predicting demand as well. Optimization models combine engineering and economic constraints to achieve an equilibrium, as depicted in figure 4-1. Some alternative ways of measuring marginal costs in water supply are summarized in table 4-1.

Not everyone subscribes to the economist's social welfare paradigm, with its accompanying faith in the competitive ideal. Nor does everyone agree on its application to cost allocation and rate design decisionmaking or the appropriate method for doing so. Yet even if one does not see marginal-cost pricing as a means to economic efficiency, it still can be counted among the most important tools for cost allocation, rate design, and planning. At the very least, an understanding of marginal costs is helpful in evaluating other prospective analytical methods. What other goals the method achieves depends on one's perspective and policy goals.

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6 For an overview, see William Pollard, "Economic Theory Relevant to Marginal and Incremental Cost Estimation," a paper presented at The National Regulatory Research Institute's Telephone Cost-of-Service Symposium in Columbus, Ohio (August 12-17, 1990).

7 Ibid.

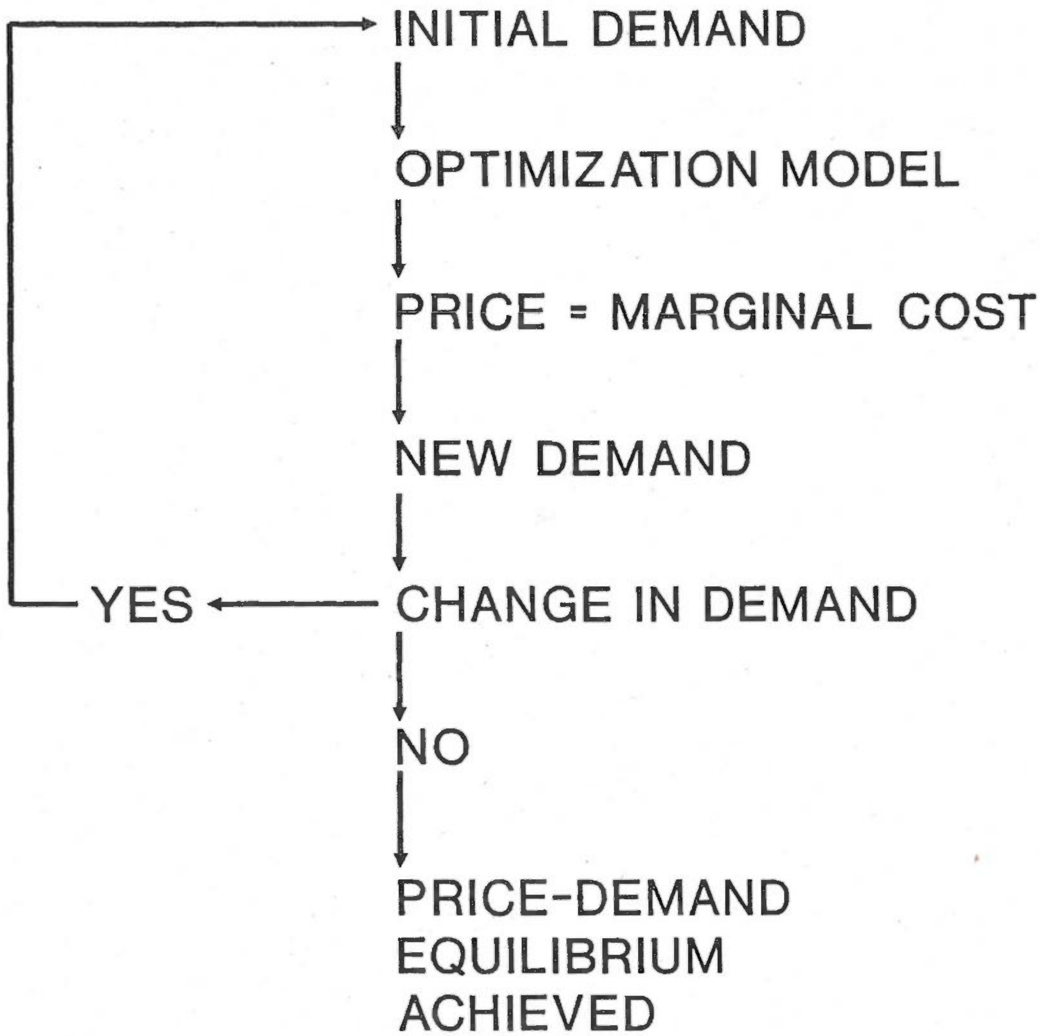

Fig. 4-1. Price-demand equilibrium analysis.

TABLE 4-1

SOME ALTERNATIVE METHODS FOR CALCULATING MARGINAL COSTS

Short-run Costs

- Estimate the average of past observed operating costs for each of the rating (such as, peak and off-peak) periods. These costs are then averaged for each rating period.
- Take some average of hourly operating costs for a given rating period from an economy dispatch model--that is, optimizing the dispatch of pumping stations and water tower discharge.
- Examine short-run operating costs and certain fixed costs with respect to meeting load requirements for any given hour.
- Determine the change on the long-run total cost function with varying load conditions. The change in costs can be calculated using the cost difference from one optimal system design to another as a result of a new load duration curve.
- Derive a set of hourly operating costs from an economy dispatch model. Rating periods can be chosen on the basis of the cost data.
- Derive the operating cost of the peaking plant or a hypothetical plant, simulated with a change in load conditions.
- Derive the operating costs of a rating period subject to a safe yield or reliability constraint.

Source-related Capacity Costs

- Derive the difference between hypothetical expansion plans that are totally peak related and calculate the cost in present value terms. (Some system expansions, such as reservoirs or wells, may be used for peak capacity only).
- Derive the annual incremental cost of any added capacity cost as a result of an expected increase or change in load, allocating these costs to the rating periods on the basis of the ratio of loads between periods.
- Determine the incremental capital costs of all new units and allocate them to the appropriate rating period.
- Calculate the annual capacity cost of any increment of capacity for peak usage and adjust that cost for safe yield or other relevant criteria. These costs can be allocated to rating periods on the basis of comparing the safe yields for different rating periods.

TABLE 4-1 (continued)

Transmission and Distribution Costs

- Treat incremental transmission investment which is related to the incremental peak load growth as a residual to ensure the equality of a revenue requirement to projected revenue collections.
- Use either linear regression or simple division so that additions in transmission and distribution are related to some measure of peak load growth.
- Use regression analysis to relate the levelized transmission and distribution sales and other costs to either off-peak, peak, administrative short-run, or variable costs.
- Use changes in transmission investment cost related to changes in peak demand.
- Relate transmission costs to a price leveled series of cost to peak demand. Distribution costs can be based on a minimum distribution system.
- Use transmission-line losses. Distribution line losses plus average of the incremental connecting charges for new customers can be calculated.
- Use embedded average cost for distribution if it is too difficult to calculate marginal distribution cost.

Source: Adapted from Stephen L. Feldman, Robert Obeiter, Michael Abrash, and Martin Holdrich, *An Operational Approach to Estimating the Marginal Costs of Urban Water Supply With Illustrative Applications* (Unpublished report to the Wisconsin Public Service Commission, October 21, 1980), 24-28.

Estimating the Marginal Cost of Water

Marginal-cost estimation in water service involves forecasting future cost and output streams. These projections require information on several variables, including technology, input price behavior, and price elasticity of water demand. In addition, a planning horizon must be specified as well as appropriate capital recovery and annuitization rates. Marginal-cost estimation is forward looking; that is, marginal operating cost, marginal capacity cost, marginal purchased water cost, and marginal customer cost involve engineering forecasts of costs incurred or avoided if usage, capacity, or the number of customers change. Finally, the marginal cost of water service varies both with time (for example, peak demand as compared with off-peak demand) and with space (for example, locational variations within the utility service area).

Naturally, the biggest difficulty in applying marginal-cost pricing is estimating marginal costs, which depends on assumptions about where the next increment of supply will come from and, of course, its cost. Several different supply options providing different increments of capacity may be available. A new well, for example, adds a much smaller increment of capacity than a new reservoir and probably at a substantially lower overall cost. However, the per-unit incremental cost of the reservoir may be lower than that of the well because of the reservoir's larger capacity. Choosing between the two supply options depends on the forecast of water demand along with hydrological and water quality considerations.

Marginal-cost theory is typically operationalized through the development of time-differentiated rates, an example of which appears in table 4-2. Although time-differentiated pricing logically flows from marginal-cost pricing, seasonal rates can be based on average or embedded cost as well as on marginal cost. In water service, the emphasis on seasonal rather than time-of-day pricing is essentially a function of water system design.[8] Distribution systems are generally designed to meet the maximum instantaneous flows anticipated from fire protection. The hourly peak demands of consumers are therefore not essential in the design of the distribution system. Thus, for most water systems there is minimal variation in

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[8] Steve H. Hanke, "A Method for Integrating Engineering and Economic Planning," *American Water Works Association Journal* 71 (September 1978): 487-91.

TABLE 4-2

EXAMPLE OF MARGINAL-COST FUNCTIONALIZATION
FOR DEVELOPMENT OF SEASONAL RATES

Marginal annual cost of capacity ($/mgd/year)		
Source	19,361	
Treatment	0	
Transmission	27,669	
Distribution	12,912	
Short-run costs ($/1,000 gallons)		
Electricity		0.111
Chemicals		0.010
Maintenance		0.373
Definition of peak periods		
Number of days in peak season	153	
Number of peak hours per day	10	
Number of peak days per week	7	
Number of peak hours in peak season	1,530	
Marginal cost of water ($/1,000 gallons)		
Off-peak season, all hours		
Short-run costs		0.494
Source		0.053
Total		0.558
Peak season, off-peak hours		
Short-run costs		0.494
Source		0.053
Treatment		0.000
Transmission		0.181
Total		0.743
Peak season, peak hours		
Short-run costs		0.494
Source		0.053
Treatment		0.000
Transmission		0.181
Distribution		0.203
Total		0.949
Seasonal rates ($/1,000 gallons)		
Off-peak season		0.558
Peak season		0.829

Source: Stephen L. Feldman, Robert Obeiter, Michael Abrash, and Martin Holdrich, *An Operational Approach to Estimating the Marginal Costs of Urban Water Supply With Illustrative Applications* (Unpublished report to the Wisconsin Public Service Commission, October 21, 1980), 68. Adjusted marginal prices also are reported.

incremental cost associated with daily demand cycles. Similar to the distribution system, storage capacity is determined more by fire protection considerations than by anticipated peak hour demands. Elevated storage can also partially accommodate the daily use cycle (peak and off-peak hours) as well as peak demand for transmission capacity. In contrast, major supply sources and major transmission, pumping, and treatment facilities are generally designed to meet seasonal variations in demand. For many water systems, the capacity costs of these facilities primarily reflect summer peak demands. Thus, for most water systems there is substantial variation in the incremental cost associated with their seasonal demand cycles. Regarding time-differentiated pricing in water service, the emphasis thus should be on long-term (maximum day) demand rather than on short-term (maximum hour) demand. Chapter 5 contains a more detailed discussion of seasonal rates.

Application Issues

Several obstacles can impede the effective application of marginal-cost pricing to water service. For example, Harbeson questioned whether economists actually comprehend the magnitude of divergence between estimated and theoretical marginal cost.[9] Similarly, Turvey asserted that the textbook concept of marginal cost was too simplistic to be useful.[10]

The application of marginal-cost theory in the water sector involves many tradeoffs among competing concerns.[11] The manner in which this complex set of constraints is handled in any particular circumstance depends on how marginal cost is perceived. The conclusions that may be reached will differ to the extent that different conceptions of marginal cost exist. The application of marginal-cost pricing theory to water utilities raises four general issues: (1) allocative efficiency, (2) cost and rate stability, (3) financial viability, and (4) administrative feasibility. As seen in table 4-3, each of the general application issues is associated with some specific application issues.

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[9] Robert Harbeson, "A Critique of Marginal Cost Pricing," *Land Economics* 31 (February 1955): 54-74.

[10] Ralph Turvey, "Marginal Cost," *Economic Journal* 78 (June 1969): 282-94.

[11] Steve H. Hanke and Robert K. Davis, "Potential for Marginal Cost Pricing in Water Resource Management," *Water Resources Research* 9 (August 1973): 808-25.

TABLE 4-3

GENERAL AND SPECIFIC APPLICATION ISSUES ASSOCIATED WITH MARGINAL-COST PRICING

General Issues	Specific Issues
Allocative Efficiency	Income distribution effects Barriers to economic efficiency Ineffectiveness Competing policy goals
Cost and Rate Stability	Needle peaking and shifting peaks Distribution and customer costs Fire protection costs Purchased water costs
Financial Viability	Excess revenues Inadequate revenues Bypass Arbitrary remedies
Administrative Feasibility	Data requirements Predictive accuracy Time lags Public opposition

Source: Authors' construct.

Allocative Efficiency

Externalities pose a limitation to marginal-cost pricing theory in terms of economic efficiency. The observed willingness of consumers to pay incremental costs should not be the sole criterion for supplying them with water service. Externalities are associated with water service. For example, an external benefit that may result from the consumption of potable water is that the health of the consumer may improve with use of improved supplies; as a result, the consumer may not infect another consumer whose future health also will be enhanced. However, since the first consumer does not take the health of the second into consideration in decisions to consume water, willingness to pay incremental costs tends to understate the benefits to the community. In addition, consumers may not sufficiently understand the linkage between water quality and public health. Another example is the provision of water service for fire protection which, when afforded to one resident, also benefits neighbors by stopping the spread of fires and holding down fire insurance rates. Consumers may not understand implicitly the linkage between water service reliability and fire protection.

With respect to output, costs tend to be marginal only intermittently, depending on system utilization. If water system capacity is less than fully utilized, the only costs immediately attributable to additional water usage are certain operating costs (including the cost of purchased water). These costs are referred to as short-run marginal cost (SRMC). Long-run marginal cost (LRMC), in contrast, refers to the sum of SRMC and marginal capacity cost (MCC)--the cost of extending capacity to accommodate additional usage. The two definitions of marginal cost--one applicable in the short run and the other in the long run--must be reconciled since a pricing policy which is associated with the efficient use of existing capacity can result in nonoptimal investment decisions, and vice versa.

Strictly interpreted, the marginal-cost approach requires that price equal SRMC when capacity is not fully utilized, but, as full capacity utilization is attained, price should be increased to ration existing capacity. Once a capacity increment is completed, price should fall again to SRMC, for then the only real incremental costs are operating costs. In brief, prices theoretically should be increased with increasing demand in the period before a capacity increment is necessary; then when the capacity increment becomes available (and excess capacity exists), prices should be decreased, as illustrated in figure 4-2.[12] Water price, therefore, has the twin objectives of (a) attaining an efficient allocation of resources when the system is operating at less than full capacity, and (b) providing signals for when to invest in additional capacity.[13]

Some analysts have addressed the "second best" problem; that is, the issue of marginal-cost pricing not necessarily being optimal for the water sector given significant divergences from optimal pricing and optimal resource allocation in other sectors of the economy.[14] Marginal-cost pricing in one sector may still produce allocative inefficiency if the remaining sectors (through monopoly, taxation, and so on) have prices unequal to marginal cost. Water itself is not priced systematically in each of the major use sectors--agriculture, industry, and public supply. Allocation problems may be particularly apparent during periods of drought or when water supplies are otherwise impaired. Finally, allocative efficiency may not be achievable if other policy goals--such as equity--take precedence.

In addition, some specific application issues related to allocative efficiency include income distribution effects, barriers to economic efficiency, ineffectiveness, and competing policy goals. First, marginal-cost pricing, as with any pricing scheme, has distributive effects on income, a public policy consideration that will generally arise in its implementation. Second, the anticipated economic efficiency gains from marginal-cost pricing may not materialize if, for example, technical or cost efficiencies are not achieved. Moreover, these efficiencies will remain elusive given deviations from efficient pricing in other sectors of the economy, including water use sectors other than public supply. Third, implementation of marginal-cost pricing through seasonal rates or other rate structures may have little or no effect on water consumption patterns which will be a disappointment for those who seek to use the rate structure to induce operational changes, such as load factor improvement. Fourth, policy goals other than allocative efficiency, such as affordability and equity, play a role in cost allocation and rate design.

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[12] William Goolsby, "Optimal Pricing and Investment in Community Water Supply," *American Water Works Association Journal* 67 (May 1975): 220-24.

[13] William Vickrey, "Responsive Pricing of Public Utility Services," *Bell Journal of Economics* 2 (Spring 1971): 337-46.

[14] William Vickrey, "Some Implications of Marginal Cost Pricing for Public Utilities," *American Economic Review* 45 (May 1955): 605-620; and Robert Harbeson, "A Critique of Marginal Cost Pricing," *Land Economics* 31 (February 1955): 54-74.

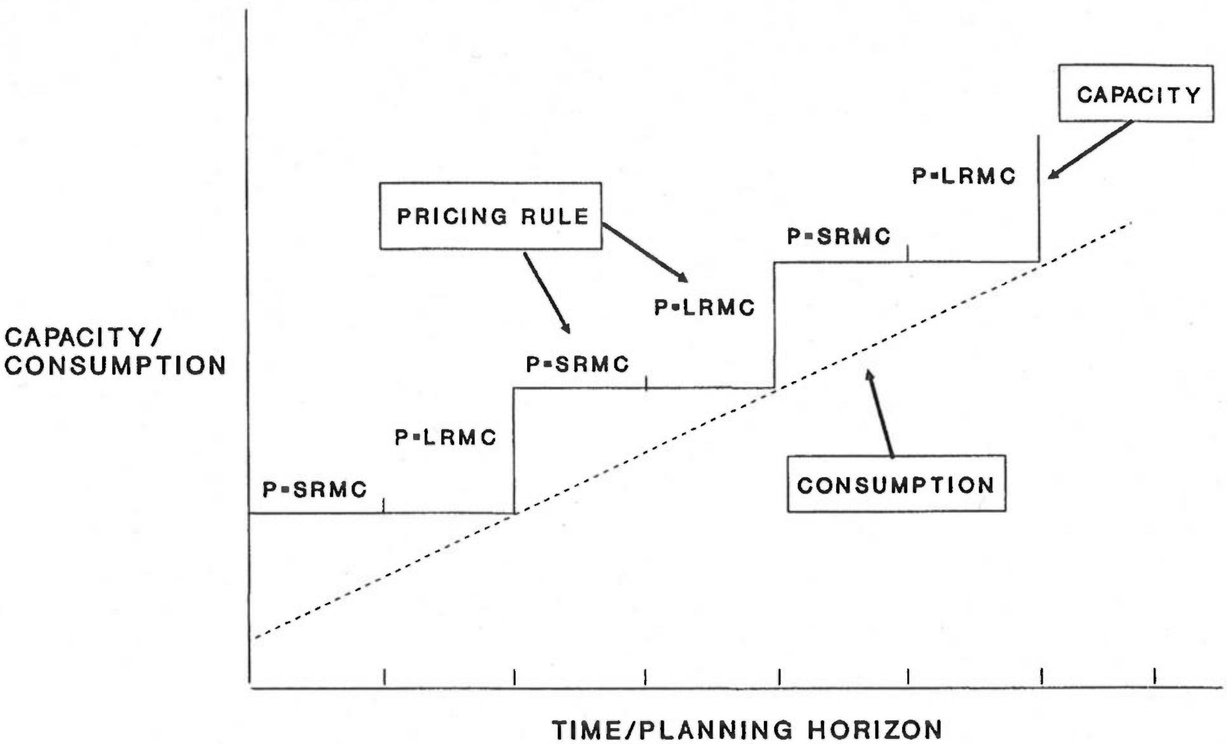

Fig. 4-2. Long-run marginal cost (LRMC) and short-run marginal cost (SRMC) pricing applications for lumpy capacity additions.

Cost and Rate Stability

Cost and rate stability problems associated with strict application of marginal-cost pricing theory are especially apparent in the presence of capital indivisibility (also known as investment "lumpiness"), meaning that capacity is typically added in large increments, some of which have a relatively long service life. By contrast, the rate of capacity utilization changes gradually. In fact, lumpiness is a trait that can apply to operation and maintenance expenses as well, perhaps especially for very small systems.[15] The indivisibility condition is particularly applicable to new water authorities which have a relatively small existing capital stock, and in which large investments are required to place a central system into full operation. Given initial capacity costs which are high relative to operation costs, strict marginal-cost pricing (as well as the strict use of embedded costs) will result in significant fluctuations in price creating a considerable source of uncertainty for consumers and creating problems (including rate shock) both for water utility managements and regulators. Even where it is technologically possible to extend capacity in relatively small increments, fluctuations in financing availability may result in capacity being extended in large increments. The exception is the already established water system with its large existing capital stock; in this case, if demand increments are relatively small and systematic, the indivisibility problem can be minimal.

Another aspect of capital indivisibility is found in the water distribution network. Prior to its construction, distribution costs would be characterized as incremental costs. However, the distribution network is generally designed to meet demands placed upon it for many future years, during which time additional usage causes negligible incremental distribution capacity costs. Economic theory suggests that the price charged for this element of service also should be negligible. This, however, presents a conflict between economic efficiency and the financial viability of the water utility.

Some specific application issues related to cost and rate stability are needle peaking and shifting peaks, distribution and customer costs, fire protection costs,

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[15] Contrast, for example, the addition of another licensed operator to a small one-operator system as compared with a system already employing ten operators (all with comparable salaries, etc). Relative expenses would increase by 100% to the small system and by only 10% to the larger system.

and purchased water costs. First, for a summer-peaking utility (because of lawn sprinkling), peak demand may not be substantially reduced by seasonal pricing, even though average demand declines. Results include the deterioration in annual load factors and revenue erosion. Seasonal rates may induce consumption that shifts the time of peaks but not their overall magnitude. Second, unstable rates can result from inappropriate cost allocation rules. Distribution costs (which vary with main size, number of customers, and location of mains) and customer costs (which are independent of capital expansion) can be handled through service charges. Third, capacity increments may or may not include capacity for meeting fire flow requirements. The joint nature of water service for consumption and fire protection makes it difficult to calculate the marginal cost of fire protection; thus, there has been a tendency to avoid the calculation of marginal fire protection cost. Fourth, the calculation of marginal costs should fully account for wholesale purchases of treated or untreated water.

Financial Viability

The strict application of marginal-cost pricing theory will result in insufficient revenues to the water utility if average cost exceeds marginal cost and excess revenues if average cost is less than marginal cost. In other words, marginal-cost pricing may lead to a mismatch of costs and revenues. This is one of the chief concerns about the marginal-cost pricing approach expressed by the American Water Works Association.[16] Accordingly, "it may be necessary to structure customer charges to achieve a balance of revenues and costs or to diverge from marginal-cost pricing somewhat" in order to align costs and revenues.[17] Of course in doing so, the economic efficiency gains of the marginal-cost pricing method may be lost. There is also concern that high prices will lead to consumption reductions that in turn reduce revenues and threaten the financial viability of the water utility. For these reasons, it may not be possible to achieve the most efficient allocation of water supplies.

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16 American Water Works Association, *Water Rates* (Denver, CO: American Water Works Association, Manual M1, Third Edition, 1983), 57.

17 Mark Day, "A Discussion of Empirical Evidence of the Conservation Impact of Water Rates," in Arizona Corporation Commission, *Water Pricing and Water Demand* (1986): 38.

Some specific financial viability issues that are in the implementation of marginal-cost pricing include excess revenues, inadequate revenues, bypass, and arbitrary remedies. First, water rates set equal to marginal cost may generate revenues in excess of revenue requirements for the water utility, primarily because historical accounting costs tend to underestimate the actual value of resources. Second, if prices based on marginal costs are below prices based on average costs, utility revenues will be inadequate. In particular, utilities with plentiful capacity may have difficulty recovering costs under marginal-cost pricing. Third, confronted with higher water rates, and based on price elasticities for water demand, some large industrial and commercial customers may bypass the local water utility in favor of self supply, which may have adverse effects on the utility's revenue stream. Fourth, methods to treat the problems of excess revenues, inadequate revenues, and bypass can be arbitrary and atheoretical, and many produce ambiguous price signals that undermine the potential for efficiency gains. Subsidization (in either direction) is more likely when revenues do not match costs.

Administrative Feasibility

Sophisticated analyses of utility costs require substantial resources for data collection and cost calculation, affecting both utilities and their regulators. There are measurement difficulties associated with the way cost data are collected and stored in utility accounting systems and with the higher metering and administrative costs required for the collection of certain types of data. Long-run marginal-cost estimations are highly subjective and the use of large data bases and elaborate calculations may not always improve decisionmaking by utilities and their regulators.

There is also the possibility that a well-executed average-cost pricing methodology will result in a close approximation of marginal costs, and do so in a simpler, more understandable way. In fact, some fully distributed cost studies may look much like marginal-cost studies. Decisionmakers may prefer the status quo analysis of historical costs, particularly if it is perceived to be less costly. The problem is in deciding whether the benefits of using marginal-cost analysis--including efficiency gains--outweigh these administrative costs.

Some specific application issues related to administrative feasibility include: data requirements, predictive accuracy, time lags, and public opposition. First, cost analysis requires substantial, accurate cost and demand data. Further, a rate structure can be no more sophisticated than the capability of measuring the water consumption to which the rate structure is applied. Thus water metering is essential and changes in cost accounting and billing practices may be necessary as well. Second, the cost forecasting necessary for marginal-cost estimation is imprecise and alternative calculation techniques yield different results. The approach also requires reliable data on the price elasticity of peak water demand. Without reliable elasticity estimates, price changes will have uncertain effects on revenues, load factors, operation costs, and capacity requirements. Third, billing cycles and time lags between the occurrence of peak demands, meter reading, and the customer's receipt of the water bill increase the uncertainty of consumer response to price. Fourth, the public and regulators may have difficulty accepting a radical change in the establishment of water rates, particularly if consumers perceive that a new rate structure is inequitable, unaffordable, or confusing.

Most of these application problems can be addressed, if not resolved. For example, probably the most problematic issue is the potential for marginal-cost pricing to result in excess revenues for the water utility. Stephen Feldman and his colleagues proposed several alternative tactics for addressing this problem.[18] One could decide not to reconcile the resulting rates with the revenue requirement. Assuming this is not desirable, costs can be adjusted while maintaining peak to off-peak ratios. Alternatively, marginal-cost components (short-run and long-run) can be adjusted proportionately. Overcollections can be rebated or taxed. Intramarginal discounts can be used to lower rates. Rates also could be adjusted by treating distribution cost as a residual. Finally, the inverse elasticity rule can be used in rate design to treat different customer classes differently (Ramsey pricing).

In sum, the application of marginal-cost pricing involves substantial problems, complicating its implementation. Interestingly, however, opponents of marginal-cost pricing stress these conceptual and applicational problems, rather than the possible superiority of conventional average-cost pricing. Many analysts recognize that the problems associated with marginal-cost pricing also apply to average-cost pricing. Of course, analysts' judgment plays a role in any method.

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[18] Stephen L. Feldman, Robert Obeiter, Michael Abrash, and Martin Holdrich, *An Operational Approach to Estimating the Marginal Costs of Urban Water Supply with Illustrative Applications* (Unpublished report to the Wisconsin Public Service Commission, October 21, 1980), 28.

However, conceptual and applicational problems should not stifle ratemaking innovation. Perhaps the most serious difficulty in using marginal-cost pricing lies not in the theory itself or even in the calculation of marginal costs but in the actual translation of cost estimates into water rates. The potential beneficial effects on costs, price stability, and economic efficiency under a marginal-cost or incremental-cost approach would appear to tip the scales in favor of considering including this approach among other tools of the trade.

Four Formulations of Marginal Cost[19]

Most definitions of marginal cost are similar in that they are forward looking; that is, they focus on immediate and near-term-future costs and output. Definitions differ in the extent to which they stress the importance of short-run as opposed to long-run costs, operation as opposed to capacity costs, and changes in consumption in different time periods. Thus, the definitions vary to the extent to which they focus on short-run versus long-run allocative efficiency and by the extent to which they attempt to minimize price fluctuations. Four marginal-cost formulations are discussed below:

- Simple Marginal Cost (SMC)
- Textbook Marginal Cost (TMC)
- Turvey Marginal Cost (TVMC)
- Average Marginal Cost (AMC)

All four formulations are presented for completeness, but while the first two lay the foundation for marginal-cost pricing, severe weaknesses preclude their application in the regulatory context. The other formulations are less true to pure economic theory but more pragmatic.

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[19] See also, Patrick C. Mann, Robert J. Saunders, and Jeremy J. Warford, "A Note on Capital Indivisibility and the Definition of Marginal Cost," *Water Resources Research* 16 no. 3 (June 1980): 602-4.

Simple Marginal Cost

Simple marginal cost (SMC) is defined as:

$$SMC_t = \frac{(R_t - R_{t-1}) + I_t}{(Q_t - Q_{t-1})}$$

where:
- t = the year for which the calculation is being made,
- R = operating and maintenance expenditures,
- I = capital investment becoming operational, and
- Q = water output.

If capacity increments are uneven, SMC generates cost estimations having significant volatility; thus the primary objection to this particular definition of marginal cost is that it precludes any averaging of future capacity increment. In this context, the remaining three formulations of marginal cost incorporate varying degrees of averaging or "smoothing" capital expenditures. It is stressed here that SMC, and similar formulations which focus primarily on short-run marginal cost, cannot be considered as practical cost estimation methods for water service. In brief, SMC, by focusing on the short-run, essentially fails to recognize the averaging of capacity increments, and the desirability of averaging to meet certain regulatory objectives.

Textbook Marginal Cost

Textbook marginal cost (TMC) consists of two components: short-run marginal cost (SRMC), reflecting operating cost increments, and marginal capital cost (MCC), reflecting capital expenditure increments. Similar to SMC, TMC reflects a relatively short planning horizon. TMC is defined as:

$$\begin{aligned} TMC_t &= SRMC_t + MCC_t \\ &= \frac{(R_t - R_{t-1}) + rI_t}{(Q_t - Q_{t-1})} \end{aligned}$$

where: r = the capital recovery factor or the annual payment that would repay a unit loan over the economic life, n years, of the capital expenditure with compound interest of i on the unpaid balance; that is:

$$r = \frac{i\,(1+i)^n}{(1+i)^n - 1}.$$

Given uneven capacity increments, TMC reflects both SRMC and MCC in the years in which capacity becomes operational and reflects only short-run marginal costs in the years in which no capital investment becomes operational. TMC, therefore, generates cost estimations exhibiting substantial fluctuations. However, the application of the annuitization factor (r) to capital expenditures produces some averaging of capacity costs.

Turvey Marginal Cost

Turvey marginal cost (TVMC) is an estimation method advocated by Ralph Turvey for application in water supply.[20] Similar techniques have been advocated for application to electric utilities.[21] TVMC can be defined as the present worth of the cost increment resulting from the same permanent increment in demand starting at the beginning of year t-1 *minus* the present worth of the cost increment resulting from the same permanent increment in demand starting at the beginning in year t. That is, TVMC reflects the difference in the present values of the future cost streams by shifting (for example, postponing or accelerating) a specified capacity increment by one year. The focus is not on the total costs of capacity expansion but on the cost effects of postponement or acceleration of expansion. In this context, marginal cost is the cost saving from postponing a capacity increment and not the cost saving from abandoning the capacity increment entirely.

TVMC considers marginal capacity costs with marginal operating costs defined as annual operating cost divided by the annual amount of water consumption. TVMC differs from the textbook conception of marginal cost in that it varies both

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20 Ralph Turvey, "Analyzing the Marginal Cost of Water Supply," *Land Economics* 52 (May 1976): 158-68.

21 Charles J. Cicchetti, William J. Gillen, and Paul Smolensky," *The Marginal Cost and Pricing of Electricity* (Cambridge, MA: Ballinger Publishing Company, 1977).

upward and downward and is positive only in those years when demand is at or near existing capacity; in between capacity increments, TVMC is generally zero. TVMC is affected when capacity increments are pushed forward or backward in time. Given an increment to projected demand growth, TVMC measures the effect on the present value of total system costs from the acceleration in capacity expansion. Given a decrement to projected demand growth, TVMC measures the effect on the present value of total system costs from the postponement in capacity expansion. In brief, TVMC reflects the difference in total system costs caused by changes in projected permanent demand growth. The TVMC method does not generally look beyond the next capacity increment; thus it ignores the effect of changing unit costs associated with subsequent changes in output. It does, however, incorporate an adjustment for system water loss.

Hanke developed marginal-cost estimates employing a version of TVMC.[22] In his calculation, MCC for a specific year y equals the present worth in y of planned system costs associated with the incremental annual demand starting in year y *minus* the present worth in y of planned system costs with the increment in annual demand starting in year y+1, divided by the annual increment in usage. Thus, marginal capital cost is calculated on the premise of a postponement in capacity expansion. Total marginal cost is the composite for marginal capital costs and marginal operating costs (projected operation costs divided by projected annual water usage). To calculate marginal capital costs for annual use, the relevant capacity investment is aggregated; to calculate costs on a seasonal basis, the relevant planned investment are disaggregated into summer capacity and winter (base) capacity.

Average Marginal Cost

Average marginal cost (AMC) can be viewed as an attempt to reach a compromise between short-run allocative efficiency and the need for correct capacity investment signals by going beyond the traditional definition of the long run by including all future capital expenditures for a specified planning period. Of course, the longer the time frame, the greater the uncertainty of the capital cost

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22 Steve H. Hanke, "On the Marginal Cost of Water Supply," *Water Engineering and Management* 120 (February 1981): 60-63, 69.

estimates. Given its emphasis on a planning horizon, AMC avoids the problem of defining the magnitude of the very next capacity increment, which is invariably difficult to specify, particularly for large water systems in which several different capacity investments may become operational simultaneously.

Mann, Saunders, and Warford presented a relatively sophisticated version of AMC labeled as average incremental cost (AIC).[23] In essence, AIC is calculated by discounting the future incremental costs which will be incurred in providing the incremental water demanded and dividing that by the discounted value of incremental water output over the planning period, as follows:

$$\text{AIC} = \frac{\text{Present worth of the least-cost investment stream}}{\text{Present worth of the incremental output stream resulting from the capacity investment}}$$

Hanke presented a somewhat more pragmatic version of average marginal cost.[24] Capital expenditures are categorized into those capacity increments associated with water volume (such as treatment plants, service reservoirs, trunk mains, and source of supply facilities) and those not associated with water volume (such as distribution mains, meters, and customer services). The latter capital expenditures are primarily related to the number of customers served and should not be included in marginal capital cost calculations to be used as a basis for commodity charges; they are more appropriate for connection and service charges. Since investment increments often change abruptly, the capacity increments are averaged over several years. Therefore, marginal capital cost is formulated as the annuitized value of planned capacity expenditures becoming operational divided by the forecasted increment in total water usage for the planning period (say, five years). Marginal operation and maintenance costs are categorized into those related to volume and those not related to volume and are also averaged over the planning horizon. The resulting average marginal cost, then, consists of averages for both capital costs and the appropriate operation and maintenance costs.

The AMC method recognizes that different increments of capacity have different life spans. It also provides cost estimates that reflect future cost trends

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23 Mann, Saunders, and Warford, "A Note on Capital Indivisibility."

24 Steve H. Hanke, "A Method for Integrating Engineering and Economic Planning," *American Water Works Association Journal* 71 (September 1978): 487-91.

to be incurred as water usage changes. Finally, the method recognizes that with capacity increment lumpiness and the associated abrupt changes in operating costs when capacity increments become operational, it is essential that both capacity and operating costs be averaged over a specified planning period. Given the nature of its averaging process, AMC tends to generate cost estimates that exceed short-run marginal costs but that are less than long-run marginal costs in the TMC formulation. AMC generates cost estimates that smooth out capital expenditures while reflecting the trend of future costs that will be incurred as usage increases.

Hanke also suggested a modified cost categorization in calculating marginal capital costs.[25] He divided capacity costs into those associated with facilities designed to meet maximum-day demand (such as treatment plants), those related to average-day demand (such as reservoirs), and those related to customers and population growth (such as meters). Marginal capital cost in this case consists of separate components for supplying maximum-day demand and average-day demand. In essence, one can calculate peak and off-peak marginal capital costs according to these components. This categorization is important if there is substantial cost variation over the annual demand cycle, which could justify seasonal water rates. If consumers are to receive correct price signals, then the peak period should involve a price reflecting peak and off-peak costs; the off-peak price should reflect only off-peak costs. Hanke and Smart extended marginal-cost analysis to incorporate a demand simulation model.[26] Such models are useful in projecting consumer responses to changes in rate design, such as the implementation of a uniform rate based on marginal cost or seasonal rates based on peak and off-peak marginal costs.

Feldman, Breese, and Obeiter offer another version of average marginal cost.[27] Their version incorporates the calculation of the marginal costs of source capacity, transmission capacity, distribution capacity, treatment capacity, as well as marginal

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[25] Steve H. Hanke, "Water Rates: An Assessment of Current Issues," *American Water Works Association Journal* 67 (May 1975): 215-19.

[26] Steve H. Hanke and A. C. Smart, "Water Pricing as a Conservation Tool: A Practical Management Option," in *Environmental Economics* (Canberra, Australia: Australian Government Publishing Service, 1979).

[27] Stephen L. Feldman, John Breese, and Robert Obeiter, "The Search for Equity and Efficiency in the Pricing of A Public Service: Urban Water," *Economic Geography* 57 (January 1981): 78-92.

operating cost. As with other marginal-cost methods, the data employed in the calculations are engineering's best estimates. Customer costs are excluded from the analysis because they are presumed to be unchanged with system expansion. Finally, in this version, marginal costs are adjusted upward for system water losses.

Evaluating Estimation Techniques

In the abstract, marginal cost is a simple concept. In practice, different definitions of marginal cost exist. The version selected for actual implementation may be determined by factors such as the size of the projected demand increment, the relevant planning horizon, data availability, the preference for short-run allocative efficiency as opposed to long-run resource allocation, the potential impact of technology on production costs, the extent to which price stability is desired, prevailing prices, and the revenue consequences of each particular formulation of marginal cost.

The definitions of marginal cost described above cover the spectrum of tradeoffs among most of these factors. For example, even though TMC is the method that adheres most strictly to theoretical marginal cost, in certain cases both it and SMC can be rejected on technical grounds because they incorporate an insufficient planning horizon (therefore providing inadequate price signals to water consumers regarding the marginal capital cost of water service). The two methods can also be rejected on practical grounds since the potential price volatility associated with each creates regulatory, political, as well as administrative and financial management problems for the water utility. TVMC and AMC are marginal-cost formulations which average the costs of capacity expansion; that is, they incorporate marginal capital cost in price even when capacity increments are not imminent. AMC and TVMC incorporate a longer view of water costs than do SMC and TMC, thus minimizing cost-price fluctuations.

A framework is essential for selecting the most appropriate marginal-cost definition for any particular application. As discussed above, four essential evaluation criteria are:

- Allocative efficiency
- Cost and rate stability
- Revenue adequacy
- Administrative feasibility

The first criterion involves the issue of which marginal-cost definition will satisfy the criterion of minimum divergence from textbook marginal cost (TMC), which represents an approximation of a price that induces short-run allocative efficiency and correctly signals the justification of capacity increments. TMC may not be an absolute representation of marginal cost as defined in economic theory, but it does approximate the theoretical specification of marginal cost. This criterion implies that alternative methods be examined for both absolute differences and ratios between their marginal-cost estimations and comparable TMC estimations. One anticipates that the alternative formulations will tend to converge toward TMC as the capital investment pattern becomes smoother. Even if one does not accept economic efficiency in the broadest sense as a reasonable policy goal, the choice of a marginal-cost pricing method can bring about improvements in price and investment signals as well as the development of a practical cost estimation tool.

The second criterion involves the issue of which marginal-cost definition will best satisfy the criterion of minimizing the volatility of estimations; that is, which technique tends to generate cost estimations having the property of relative stability even under conditions of extreme lumpiness in capacity investment. This criterion implies that marginal-cost estimations be examined for properties of direction (behavior patterns), magnitude, and volatility. This criterion recognizes that marginal-cost pricing has not been feasible in some cases since, under conditions of lumpy investment, prices can be extremely volatile creating both political and financial management problems.

The third criterion concerns the issue of which marginal-cost definition will best satisfy the criterion of providing adequate revenues to cover revenue requirements; that is, which technique minimizes the potential for revenue erosion as well as excess revenues. This criterion indicates that the estimation methods be examined for the property of revenue flows and whether those flows will match incurred costs or revenue requirements.

The fourth criterion is administrative feasibility. The operationalization of marginal costs can be more or less complex. Some of the more sophisticated approaches may be closer to the textbook ideal and yet be very costly to implement. In some cases, the cost of generating data may outweigh the benefits, even the efficiency gains, of the marginal-cost method. A related point is that customer confusion about changes in rate design may create administrative and regulatory problems for the water system. On the other hand, administrative costs are associated with all methods.

The relative importance of the four criteria is essentially a function of judgment. For example, since the typical sale of water is in the nature of a short-term agreement, those who advocate prices based on short-run marginal cost accept price volatility as less important than economic efficiency. That is, the potential exists for continually changing water prices. However, a rational pricing scheme cannot incorporate one criterion such as efficiency and totally ignore price stability and financial considerations. Conversely, a rational pricing scheme cannot incorporate price stability and adequate revenue generation and overlook allocative efficiency as a relevant consideration.

The selection of one definition of marginal cost results in accepting various tradeoffs among allocative efficiency, cost and rate stability, revenue adequacy, and administrative feasibility. The magnitude and nature of these tradeoffs will vary with investment conditions, price horizons, capital recovery factors, economies of scale, and system growth. The ambiguous nature of the marginal-cost concept permits significant latitude in its actual estimation with the outcome being cost estimates diverging from theoretical marginal cost. For example, the averaging process implicit in the average marginal cost and Turvey marginal-cost formulations, even though desirable, can produce cost estimates having little resemblance to the marginal-cost concept portrayed in microeconomic theory. In sum, there are several ways in which marginal cost can be defined for pricing purposes, each having theoretical and practical disadvantages as well as advantages.

Incremental Least-Cost Analysis

The development of a marginal-cost method for application in water is made easier with the use of an appropriate policy framework. Proposed here is a method for calculating average incremental costs that builds substantially on the estimation techniques discussed above while incorporating several practical solutions to some of the more troublesome conceptual and application problems. The general steps in the incremental least-cost (ILC) approach are compared with a marginal-cost pricing approach in table 4-4.

The proposed ILC method defines the next increment of capacity in terms of least-cost planning criteria. The rationale is that cost allocation and rate design

TABLE 4-4

COMPARISON OF MARGINAL-COST ANALYSIS AND INCREMENTAL LEAST-COST ANALYSIS

Key Steps in a Marginal-Cost Analysis

STEP 1:	Identify all potential supply options.
STEP 2:	Choose the most viable supply option.
STEP 3:	Develop cost-allocation assumptions and methodology.
STEP 4:	Perform the cost estimation for the most viable supply option.
STEP 5:	Use the cost estimation in rate design.

Key Steps in an Incremental Least-Cost Analysis

STEP 1:	Identify all potential supply options <u>using planning criteria</u>.
STEP 2:	Develop cost-allocation assumptions and methodology.
STEP 3:	Perform the cost estimation <u>for each supply option</u>.
STEP 4:	Choose <u>the most viable least-cost supply option</u>.
STEP 5:	Use the cost estimation in rate design <u>and planning</u>.

Source: Authors' construct

are an integral part of supply planning and such a methodology helps reinforce these relationships. A planning approach confines the number of capacity increment alternatives to those that meet a priori planning criteria within a specified planning time frame. Planning criteria need not be confined to least-cost principles or even to cost considerations. For example, most water supply plans would require systems to maintain basic engineering and health standards related to system reliability and water quality where cost is a subordinate consideration. The planning framework can span any length of time, and potential capacity increments can be either small or large and have either a short or long service life. One need not assume that the next capacity increment will be added within the next year or even in the next few years. Absent a highly technical analysis, water system engineers essentially can make an educated forecast about a select number of potential capacity sources.

Methodology

The incremental least-cost methodology is summarized in table 4-5. The first step is the identification of appropriate supply alternatives (including changes in output levels using existing capacity as well as nontraditional supply options) consistent with relevant planning criteria. Each supply increment will involve different types of costs in the different functional areas of public water supply: source development (including raw water storage), pumping, transmission, treatment, and storage (for treated water). Some options, such as purchased water, require a separate functional category. Which cost categories are affected by each option depends on the system's existing capacity configuration. Some, for example, may entail additional incremental costs in only select areas without affecting costs in others.

TABLE 4-5

STEPS IN AN INCREMENTAL LEAST-COST ANALYSIS

- Identification of incremental capacity alternatives.
- Feasibility analysis of incremental capacity alternatives.
- Estimation of capital and operation and maintenance costs.
- Cost allocation to functional categories of water supply.
- Cost allocation to off-peak and peak demand.
- Cost allocation to service classes.
- Calculation of total annualized incremental costs (TAIC).
- Calculation of average incremental costs (AIC).
- Identification of incremental least-cost (ILC) alternative.
- Use of estimates in rate design and planning.

Source: Authors' construct.

For purposes of comparison, the incremental capital costs (k) associated with each supply alternative are operationalized as the annual payment over the useful service life of the capital expenditure necessary to pay interest and fully recover capital costs, as follows:[28]

$$k = \frac{Ci(1+i)^n}{(1+i)^n - 1}$$

where:
- k = annualized capital costs,
- C = the total capital expenditure required,
- n = the useful service life of the capital expenditure (a proxy for the consumer payback period), and
- i = the appropriate interest (financing) rate.

For each capacity alternative, the analyst must also estimate operation and maintenance expenses (OM). A pragmatic approach is to use the projected annual OM for the first year that the capacity addition is expected to be operational. Knowing both k and OM for each option allows the calculation of total annualized incremental costs (TAIC) for each capacity option according to the general formula:

$$TAIC = k + OM.$$

Allocating costs to each of the identified functional areas of water supply yields the more detailed formula:

$$TAIC = (k+OM)_d + (k+OM)_p + (k+OM)_r + (k+OM)_t + (k+OM)_s + (k+OM)_o$$

where:
- k = annualized capital costs,
- OM = additional annual operation and maintenance costs,
- d = source development,
- p = pumping,
- r = transmission,
- t = treatment,
- s = storage, and
- o = nontraditional supply.

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28 Jack Hirshleifer, James C. Dehaven, and Jerome W. Milliman, *Water Supply: Economics, Technology, and Policy* (Chicago: University of Chicago Press, 1960).

This calculation of TAIC can be performed for unallocated additions to system capacity, for additions that meet off-peak or peak capacity needs, or for capacity requirements for different customer classes (which also may be divided into off-peak and peak needs). Analysts must develop allocation rules for the assignment of costs. Although in theory all costs can be allocated to a functional area of water supply, some analysts may choose to use a separate category for joint or common costs, such as general office expenses. The customer categories that apply depend on characteristics of the water service area. Cost allocation can be facilitated by the use of an incremental cost allocation matrix, an example of which appears in table 4-6.

The next step in the analysis is the choice of an appropriate denominator for comparing costs on a per-unit basis in terms of what is known as average incremental cost (AIC). Some of the available alternatives are summarized in table 4-7. As always, analyst judgment plays an important role. One approach is to calculate AIC by dividing simple annual costs (TAIC) by the amount of designed capacity added in millions of gallons per annum (mg):

$$AIC_{mg} = \frac{TAIC}{W_{mg}}$$

where: W = additional increment of water capacity, and
mg = million gallons per annum.

The problem with this formulation of AIC is that it does not take into account the difference between designed capacity and utilized capacity or the magnitude of water losses. As a result, AIC_{mg} may tend to underrepresent unit costs. An alternative denominator can be used to reflect the expected utilization of the capacity increment. A utilization factor is the ratio of the maximum demand of a system to the installed capacity of the system. Thus, an alternative AIC calculation can be represented by:

$$AIC_{umg} = \frac{TAIC}{u * W_{mg}}$$

where: u = utilization factor for the capacity increment.

TABLE 4-6

INCREMENTAL COST ALLOCATION MATRIX

Functional Areas		Total Incremental Costs	Allocation of Costs to Demand		Allocation of Costs to Service Classes by Demand													
					Residential		Commercial		Industrial		Wholesale		Institutional		Public Authorities		Fire Protection	
			Base	Peak	Base	Peak	Base	Peak	Base	Peak	Base	Peak	Base	Peak	Base	Peak	Base	Peak
Source Development	k																	
	OM																	
	k+OM																	
Pumping	k																	
	OM																	
	k+OM																	
Transmission	k																	
	OM																	
	k+OM																	
Treatment	k																	
	OM																	
	k+OM																	
Storage	k																	
	OM																	
	k+OM																	
Nontraditional Supply	k																	
	OM																	
	k+OM																	
Total incremental cost*																		

* Assumes allocation of general plant, administration, joint/common, and other costs.

TABLE 4-7

NOTATION USED IN CALCULATING AVERAGE INCREMENTAL COSTS

Notation	Definition
k	Incremental capital costs (annualized).
OM	Incremental operation and maintenance costs (annualized).
$k+OM$	Total annualized incremental cost (TAIC).
$\frac{k+OM}{W_{mg}}$	Average incremental cost (AIC) per system design capacity.
$\frac{k+OM}{u * W_{mg}}$	Average incremental cost (AIC) per utilized capacity, where u = a utilization factor based on system output.
$\frac{k+OM}{W_{rpmg}}$	Average incremental cost (AIC) per revenue producing water.
$\frac{k}{W_{mg}} + \frac{OM}{u * W_{mg}}$	An average incremental cost (AIC) hybrid where unit capital costs are based on added design capacity and unit O&M costs are based on output using a utilization factor.

Source: Authors' construct.

There is another approach for dealing with the issue of water losses, water that is provided free-of-charge, or otherwise unaccounted-for water. Caused by a variety of conditions, "nonaccount water" is not billed and therefore generates no revenues for the utility.[29] The greater the system water loss, the more AIC will underestimate the actual incremental cost of water. Although historical records can be used, care should be taken in estimating revenue producing water because water losses do not necessarily increase linearly with output. Given an estimate of expected annual revenue producing water (rpmg), another calculation of AIC can be made as follows:

$$AIC_{rpmg} = \frac{TAIC}{W_{rpmg}}$$

where: rpmg = revenue producing million gallons per annum.

It follows that the incremental cost of water losses can be estimated by calculating the difference between the incremental cost of the gross additional increment of capacity and the incremental cost of revenue producing capacity. Because mg is always greater than rpmg, this number will always be positive. Water system managers and their regulators will certainly take note of the magnitude of this amount. For some utilities, leak detection and repair may itself be a cost effective (if not least cost) source of additional capacity. Indeed, the incremental least-cost method incorporates a variable (o) to address this potential source of supply. Other supply options, such as purchased water and conservation programs, also can be considered in the nontraditional category, as long as their cost impacts on other functional areas (such as transmission and distribution) also are identified.

Assuming that AIC is calculated for more than one potential source of additional capacity, incremental least cost (ILC) is simply the lowest value that results from the comparative analysis. The option identified should be reanalyzed in terms of feasibility and desirability. If the least-cost alternative is not preferable, it is incumbent on the analyst to explain why. Finally, the least-cost estimate should be compared with cost estimates using other methodologies, including traditional methods used to determine revenue requirements. The divergence

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29 On the issue of water losses, see Lynn P. Wallace, *Water and Revenue Losses: Unaccounted-For Water* (Denver, CO: American Water Works Association, 1987).

between estimates should be evaluated with care, particularly if the analysis is used for pricing decisions.

Assumptions

It is important to clarify the several assumptions underlying the application of the incremental least-cost method described here. These apply to other approaches as well and may present application limitations when certain conditions cannot be assumed. First, it is assumed that operating and cost data on potential supply capacity increments (including changes in existing levels of output) are either readily available or can be easily estimated. Second, operating and cost data on nontraditional supply alternatives, such as wholesale purchases, source-of-supply leasing, leak detection and repair, conservation technology, and so on, can also be estimated. Third, service lives and financing rates associated with alternative capacity increments can be identified with reliability. Fourth, reasonable estimates can be made of the amount of water capacity added to the water system as well as revenue producing water and unaccounted-for water. Fifth, the cost of incremental additions to the distribution system can be directly recovered and therefore are not properly included in a marginal-cost analysis. Sixth, it is assumed that the water utility experiences a positive growth rate in water output and usage along with increased costs of service during the planning period. This assumption precludes the generation of negative marginal-cost values that can occur under this and other cost calculation techniques.

Perhaps most importantly, similar to the average marginal-cost method previously discussed, it is assumed that the use of the incremental least-cost method as described places more importance on the evaluative criteria of cost and rate stability, revenue adequacy, and administrative feasibility than on the criterion of economic efficiency. The method is principally a least-cost planning and general ratemaking tool, and one that should be used in conjunction with others available to the analyst, including historical cost studies.

Discussion

An important part of the ILC method is that incremental capital and operation costs are estimated for each potential capacity increment on an annualized basis. Average incremental costs can be calculated by determining annualized costs and dividing this amount by the amount of capacity added. Capital and operating costs can be estimated separately for each of the principal cost categories (that is, source development, storage, transmission, treatment, and so on) and, at the analyst's discretion, separately for capacity needed to meet off-peak and peak demand. The analysis can be taken a step further by estimating these costs for different customer classes. Still, the method does not require more data than most other cost allocation analyses.

The method, as described, allows analysts to consider alternative measures of average incremental cost based on the denominator of choice. For example, the method recognizes both the incremental cost of added capacity and the incremental cost of revenue-producing water.[30] The difference between the two is a reasonable estimate of the incremental cost of water loss on a per-unit basis. Water suppliers and regulators obviously have an interest in the amount of a system's unaccounted-for or nonaccount water and the incremental cost of these water losses. A reasonable estimate of this cost may induce some water supply managers to implement leak detection and repair programs as essentially a source of additional capacity.

Finally, the method allows for the calculation of more than one average incremental-cost estimate, based on the existence of more than one capacity alternative. These can be used to identify the least-cost alternative for planning purposes as well as ratemaking. If an estimate other than the least-cost amount is selected, the rationale for doing so should be made clear. More complicated analyses can incorporate sensitivity tests using different technology and system growth assumptions. At a minimum, water suppliers (and arguably their regulators)

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[30] The importance of revenue-producing water as the denominator in calculating per-unit costs was emphasized in Patrick C. Mann and Janice A. Beecher, *Cost Impact of Safe Drinking Water Act Compliance for Commission-Regulated Water Utilities* (Columbus, OH: The National Regulatory Research Institute, 1989).

should be able to conduct a rudimentary analysis of future capacity needs within a planning framework.

The key benefits of the incremental least-cost method, then, are that it establishes a principle for choosing the next capacity increment and eliminates many of the concerns related to time frame, simplifies the calculation of annualized costs, provides for the assessment of the incremental costs of revenue-producing water, and sets forth an array of alternatives from which to choose. One of the chief benefits of the least-cost approach is that it encourages the analysis of nontraditional capacity increments, such as purchased water, leasing, water loss reduction, and conservation, within a planning framework.

Incremental least cost has analytical value as a reasonable proxy for marginal costs in a planning framework, even though it departs significantly from the textbook definition with regard to economic efficiency. It offers pragmatic solutions to some of the problems of marginal-cost estimation. Whether or not the value of ILC actually becomes the estimate used for rate design and planning decisions may involve a variety of other considerations.

The choice of any approach depends largely on policy goals and preferences about how to achieve them. Marginal-cost pricing has been advanced by economic theory to make more efficient the allocation of water supply resources. Although marginal-cost or incremental pricing is an imperfect approach to water utility ratemaking, substantial benefits may be gained from its use. At the very least, the results of such an analysis can be used for comparison with more traditional cost allocation and pricing methods in the context of least-cost planning.

Fully Allocated Costs and Marginal Costs Compared

In the regulatory context, an important difference between fully allocated methods and marginal or incremental cost methods is the sequence of procedures. With fully allocated cost methods, revenue requirement determination is followed by cost functionalization (using historic or embedded accounting costs), cost classification, interclass cost allocation, unit cost calculation, and, finally, rate design. One starts with the premise of the equality of revenues and costs followed by an interclass cost allocation that achieves the matching of costs and revenues. Obviously, there can be elements of arbitrariness in the transition from cost allocation to rate design. For example, an allocation method can be selected on the basis of producing allocations that justify a predetermined rate structure rather than on the basis of cost causation principles.

With marginal-cost methods, selection of the planning horizon is followed by the estimation of marginal unit costs (possibly on a functionalized basis), cost classification, rate design, and finally the reconciliation of costs and revenues. One starts with the premise of the equality of price and marginal cost followed by cost adjustments to insure compatibility with revenue requirements. Since unit costs are directly calculated as the bases for rate structure, incremental methods generally do not involve interclass cost allocations.

The differences between fully allocated and marginal-cost methods may be overstated. For example, average cost calculations often are used as approximations of incremental distribution cost and incremental customer cost since incremental cost calculations for these components tend to be less precise than for production (that is, treatment). Both fully allocated and marginal-cost estimations may be adjusted in the rate design process for competition differences across markets. Both methods can be employed to provide a sophisticated rationale for value of service pricing. Both methods do not automatically generate cost-revenue equality. That is, marginal-cost estimations can create rates needing adjustment prior to implementation; fully allocated costs can lead to rates needing adjustment after implementation.

Both fully allocated cost and marginal-cost methods involve value judgments. In fully allocated cost methods, judgments occur in cost assignments, capacity cost allocations, and in the allocation of administrative and general expense. Value judgments also occur in selecting a marginal-cost estimation method, in determining the planning horizon and the timing of new capacity, in defining incremental output, and in reconciling costs and revenues. It is quite possible that the same approximate rate structure can be obtained either by a fully allocated or a marginal-cost method.

Cost concepts have emerged that incorporate elements of both fully allocated cost and marginal-cost methods. For example, the concept of attributable cost is viewed as the direct cost of providing a service plus a portion of other costs which are influenced by the provision of the service, but which would not necessarily be avoidable if the service were not provided. In brief, attributable cost is a melding of embedded and incremental cost. In contrast, the concept of avoidable cost is virtually synonymous with marginal cost. The mixed test year is another concept that, in theory at least, combines the use of embedded and incremental costs. Many commissions prefer this approach to exclusive reliance on either historic or projected data.

Few attempts, however, have been made in the regulatory process to integrate fully allocated cost methods with incremental cost methods. William Melody must be considered a pioneer in assessing the potential for combining these approaches.[31] He suggested that fully allocated cost methods could be employed in allocating revenue requirements to customer classes and specific services. Thus, fully allocated costs would determine the overall revenue requirements attributable to individual customer classes, blocks of use, and other services. Incremental cost estimates could then be employed for designing rates for these classes and services (such as different usage blocks). Thus, incremental cost would assist (along with demand and market factors) in structuring rates. Therefore, fully allocated cost emerges as the revenue requirement standard while incremental cost remains an important factor in rate design.

The Wisconsin Public Service Commission is one of the few commissions that has attempted the actual integration of fully allocated cost and incremental cost methods.[32] The Commission in recent years has employed embedded cost studies to determine the range for cost allocation; embedded cost becomes the primary basis for determining revenue targets for individual classes of service. The Commission then employs incremental cost studies to indicate the point within the range for interclass allocations; incremental cost becomes the primary basis for rate design within classes of service. Further research on the integration of these approaches is probably overdue.[33] However, another issue requiring attention is the criticism

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[31] William H. Melody, "Interservice Subsidy: Regulatory Standards and Applied Economics," in Harry M. Trebing, ed., *Essays on Public Utility Regulation* (East Lansing, MI: Institute of Public Utilities, Michigan State University, 1971), 167-210.

[32] Robert J. Malko and Terrance B. Nicolai, "Using Accounting Cost and Marginal Cost in Electricity Rate Design," Eleventh Annual Rate Symposium on Pricing Electric, Gas, and Telecommunications Services (Columbia, MO: University of Missouri, 1985), 168-82.

[33] Patrick C. Mann, "Costing Method Selection: Rhetoric and Substance," in Patrick C. Mann and Harry M. Trebing, eds., *Public Utility Regulation in an Environment of Change* (East Lansing, MI: Institute of Public Utilities, Michigan State University, 1987), 519-28.

that combining fully allocated and marginal-cost approaches undermines the goals of both methods and produces meaningless results.

In sum, both fully allocated cost and marginal-cost estimations can provide regulators with important benchmarks for rate design. Since these methods can generate divergent results, an option available to regulators is to conduct multiple costing analyses thus producing several pricing benchmarks rather than singular cost values. For example, the results of fully allocated cost studies can be supplemented with incremental cost estimations thus providing both minimum and maximum standards for specific rates. Many of the rate design alternatives available today, and discussed in the following chapter, incorporate elements of fully allocated and marginal-cost analysis.

CHAPTER 5

RATE DESIGN FOR WATER UTILITIES

As already mentioned, the theoretical pricing ideal is to set rates equal to the cost of service; in other words, water prices should track water provision costs. However, a perfect match of water utility costs and water rates is not attainable. Noncost influences on rates include politics, past customs and practices, public (consumer) acceptance, adjacent community rates, and (in the case of publicly owned systems) the existing degree or extent of subsidization, taxation, and free service. An example of multiple objectives in designing water rates is the use of a rate structure combining increasing-block rates for residential service (to promote conservation) and decreasing-block rates for commercial and industrial service (to promote economic development). As water prices are increasingly affected by more stringent drinking water regulations, the policy objective of affordability may emerge, for example, in an increasing interest in lifeline rates.

There is a strong tradition in utility regulation that the fairness of rate differentials depends on differences in costs. However, to maintain this tradition these cost differentials must be defined or specified within reasonable limits. For example, cost differentials must be shown to exist to justify decreasing-block rates. If it cannot be established that there are marked differences in the cost of providing different volumes of water service, it would be appropriate to adopt a uniform rate even if this strategy does not track water supply costs with precision.

A recent survey commissioned by the U. S. Environmental Protection Agency provides a general overview of water rate structures according to utility ownership, as reported in table 5-1.[1] In the aggregate, many systems have rates that vary with the amount of water use. However, a significant proportion of systems use flat fees for water service. According to this source, few systems impose only a uniform rate (where the price per unit is constant as consumption increases) or a nonwater use measure (where charges are tied to something other than direct water use). The data are least specific about rate structures for ancillary systems,

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1 Frederick W. Immerman, *Final Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987).

TABLE 5-1

WATER RATE STRUCTURES BY UTILITY OWNERSHIP

Type of Rate	Publicly Owned(a)	Privately Owned(b)	Ancillary(c)	All Systems
	Percent of Systems			
Variable rate(d)	58.5%	43.1%	16.7%	50.7%
Flat fee(e)	19.5	34.8	25.2	25.4
Uniform rate(f)	5.2	4.3	0.0	4.6
Nonwater use measure(g)	3.1	3.4	6.6	3.4
Other(h)	13.8	14.4	51.5	15.9
Total	100.0%	100.0%	100.0%	100.0%

Source: Frederick W. Immerman, *Final Descriptive Summary: 1986 Survey of Community Water Systems* (Washington, DC: Office of Drinking Water, U.S. Environmental Protection Agency, 1987), tables 5-6 and 5-7.

(a) Based on a sample of 434 utilities.
(b) Based on a sample of 209 utilities.
(c) Based on a sample of 18 utilities.
(d) A rate based on water use, varying with amount of water used.
(e) A fee paid monthly, quarterly, or annually, not based on water use.
(f) A constant rate per unit of water use.
(g) A charge based on something other than direct water use, such as service connection size, lot size, etc.
(h) A rate structure not described by any of the above. Many of these are combinations of fees and rates, or different types of rate structures for different customer classes.

where a combination of charges (reported as "other") may be the norm. Appendix E provides more detailed information on water rates for more than one-hundred United States cities, based on a 1990 survey by Ernst and Young.[2] This chapter explores rates design alternatives for water utilities.

Water Rate Structures

Most water bills consist of a combination of fixed charges (which do not vary with water consumption) and variable charges (which do vary with water consumption). One very basic ratemaking approach, designed specifically for small water systems, results in a fixed charge based on the utility's monthly fixed costs (debt service, reserves, and depreciation) coupled with a variable charge based on the utility's annual operation and maintenance costs, adjusted for inflation and anticipated changes in expenses (such as salary increases).[3]

Fixed charges can take the form of service charges, system development charges, capacity (demand) charges, and access fees. Water systems vary in whether they use fixed or variable charges to cover capacity costs. A fixed charge makes sense if a particular cost of service is associated with a specific customer (that is, if the customer withdraws from the water system the cost can be avoided). In brief, an access or fixed charge makes economic and financial sense if it reflects a connection used exclusively by the consumer, if the cost associated with the connection is independent of the consumer's volume of usage, and if the connection or access cost is essentially independent of production and delivery system design.

Choices about fixed and variable charges must be made in the context of tradeoffs among policy goals, including cost-of-service standards as well as consumer acceptance. For example, it is common in water service to employ a single rate structure for all retail consumers. The singular rate structure is simple to administer, easy to understand, and should recover the costs of service allocated

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[2] *Ernst & Young's 1990 National Water and Wastewater Rate Survey* (Charlotte, NC: National Environmental Consulting Group, Ernst & Young, 1990).

[3] John Regnier, "Case Study: Alabama Rate-Setting Study," presentation at the Annual Meeting of the American Water Works Association in Cincinnati, Ohio (June 1990).

to service classes via proper design of usage blocks. The rate design alternatives discussed herein mainly address the issue of defining usage blocks.

A variety of rate structures are used by water utilities. Illustrated in table 5-2 and summarized below are flat fees, fixture rates, uniform rates, decreasing-block pricing, increasing-block pricing, seasonal rates, excess-use charges, indoor/outdoor rates, lifeline rates, sliding scale pricing, scarcity pricing, and spatial pricing. A subsequent section reviews other water charges.

Flat Fees

The simplest way to bill customers for water service is to use a flat rate or fee with all customers charged the same amount for service regardless of usage levels. No metering is required and fees may be collected according to any desired schedule, even annually. Flat fees can be considered cost-based to a degree because relatively high fixed costs characterize the water supply industry and may be appropriate if all members of the service class can be assumed to have uniform usage. They also insulate utilities from fluctuations in use caused by weather or other factors. However, most analysts reject the idea of flat fees because they send a poor price signal to customers about the cost of water service; nor do they provide an incentive to conserve. Flat fees, in fact, tend to encourage waste.

Fixed charges on the water bill, such as customer charges, also constitute a type of flat fee. These may be used in conjunction with a variable rate based on water consumption. Customer charges are appropriately collected as a flat fee because costs vary with the number of service connections. A variation on this idea is presented in table 5-3, which demonstrates the conversion of customer charges based on meter size. This type of approach presumes that customer costs vary in proportion to meter size and, thus, that customers with large-meter service (such as industrial users) should pay a higher charge than 5/8-inch-meter residential customers. Still, the customer charge is a per-meter charge that is fixed from month to month, as compared to a variable rate based on water usage.

A type of flat fee that does require water metering is the minimum bill, which is sometimes used to establish a basic usage block. This approach establishes a fixed fee linked to a minimal amount of water use; water consumption above this amount is charged at the established per-unit rate. An example of a minimum bill

TABLE 5-2
RATE DESIGN ALTERNATIVES

FLAT FEE*

$/time period

Definition: A periodic fixed charge for water service that is unrelated to the amount of water consumed.

Best used for: Only preferable when metering costs outweigh benefits.

Considerations: Consumers are not sent price signals and may overconsume.

FIXTURE RATE*

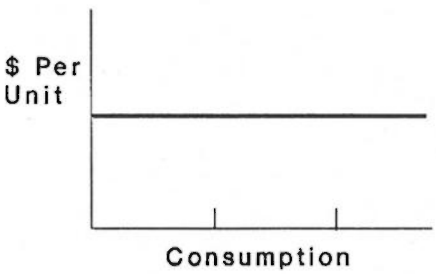
$/fixture

Definition: A periodic fixed charge for water service related to water-using fixtures on the customer's premises.

Best used for: Only preferable when metering costs outweigh benefits.

Considerations: May reflect the cost of service better than a flat fee.

UNIFORM RATE

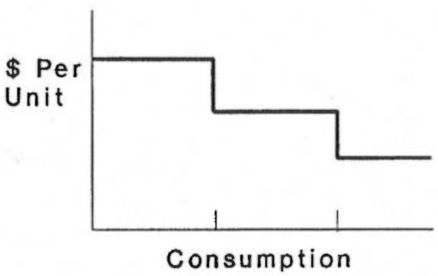


Definition: Price per unit is constant as consumption increases.

Best used for: May be somewhat effective in reducing average use.

Considerations: Large-volume users consider this structure equitable.

DECREASING BLOCK



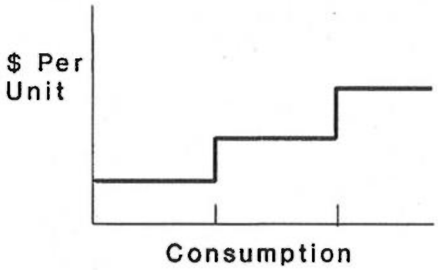
Definition: Price per unit decreases as consumption increases.

Best used for: Retaining large-volume customers.

Considerations: Large-volume users prefer this structure. When there is sufficient supply, the cost of supplying water will probably decrease as consumption increases.

TABLE 5-2 (Continued)

INCREASING BLOCK

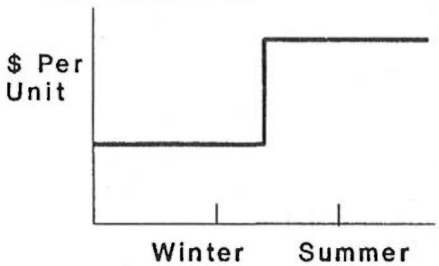


Definition: Price per block increases as consumption increases.

Best used for: Reducing average (and sometimes peak) use.

Considerations: Large-volume users consider this structure inequitable.

SEASONAL

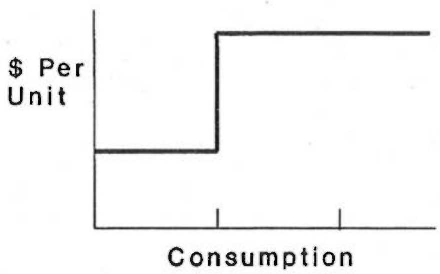


Definition: Price level during season of peak use (summer) is higher than the level during winter.

Best used for: Reducing peak use.

Considerations: Large-volume users consider this structure equitable. Effective for summer tourist community.

EXCESS USE

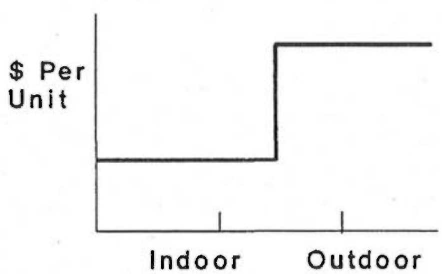


Definition: Price level is significantly higher for all water used above average, usually determined by winter use.

Best used for: Reducing peak use.

Considerations: Large-volume users consider this structure equitable.

INDOOR/OUTDOOR*



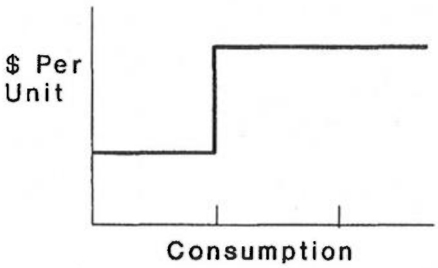
Definition: Price level for indoor use is lower than for outdoor use.

Best used for: Reducing peak use, defined by outdoor use, which is more elastic.

Considerations: Requires either two meters or detailed data and a somewhat sophisticated methodology.

TABLE 5-2 (Continued)

LIFELINE RATE

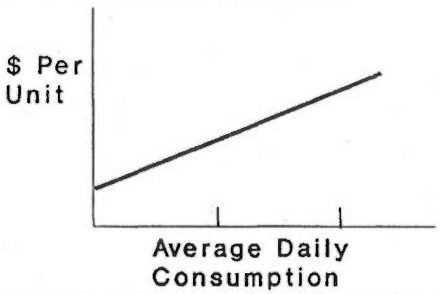


Definition: Price for "necessary" water use is kept low.

Best used for: Reducing average use.

Considerations: Usually used to ensure that low-income users are not unduly burdened by high prices.

SLIDING SCALE

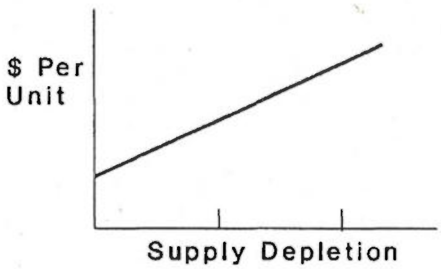


Definition: Price level per unit for all water used increases based on average daily consumption.

Best used for: Reducing average (and sometimes peak) use.

Considerations: Large-volume users consider this structure inequitable.

SCARCITY PRICING

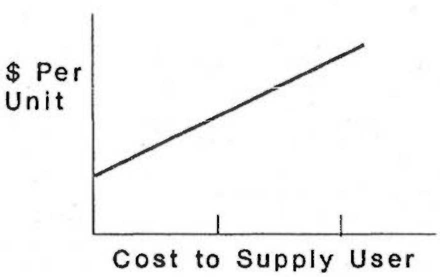


Definition: Cost of developing new supply is attached to existing use.

Best used for: Reducing average use.

Considerations: Used where supplies are diminishing (i.e., a finite supply) so that the costs of developing new supplies are paid for by current users.

SPATIAL PRICING



Definition: User pays for actual cost of supplying water to its establishment.

Best used for: Discouraging new or difficult to serve connections.

Considerations: Used in areas where the distribution system is being expanded rapidly and in difficult to serve areas.

Source: Adapted from American Water Works Association, Before the Well Runs Dry: Volume I--A Handbook for Designing a Local Conservation Plan (Denver, CO: American Water Works Association, 1984), 61-63. •Authors' construct.

TABLE 5-3

DEVELOPMENT OF CUSTOMER COSTS PER METER

Annual Customer Costs

Inside city	= \$145,390/17,025 unit	= \$8.54/unit
Outside city	= \$19,250/1,810 units	= \$10.64/unit

Meter size	Ratios	Annual Cost Per Meter
Inside City		
5/8-inch	1.00	\$ 8.54
3/5-inch	1.25	10.68
1-inch	1.60	13.66
1-1/2-inch	2.60	22.20
2-inch	3.60	30.74
3-inch	7.00	59.78
5-inch	12.50	106.75
6-inch	25.50	217.77
Outside City		
5/8-inch	1.00	10.64
3/5-inch	1.25	13.30
1-inch	1.60	17.02
2-inch	3.60	38.30

Source: Paul J. Hartman, "Development and Design of Water Rate Schedules," in *AWWA Seminar on Developing Water Rates* (Denver, CO: American Water Works Association, 1973), IV-23.

based on the base-extra capacity method of cost allocation appears in table 5-4. In this example, minimum use is defined as 1,000 gallons a month. The fixed monthly charge covers not only customer costs but minimal base and extra capacity costs as well.

Fixture Rates

A rudimentary method for linking water rates to consumption, without metering actual use, is the fixture rate, illustrated in table 5-5. A fixture rate depends on accurate knowledge of water-using fixtures on the premises of each customer served--the number of faucets, toilets, bathtubs, showers, and so on. To the extent that water use varies with the presence of fixtures and the cost of service varies with water use, a fixture rate can be considered cost based. (It is certainly more so than a flat fee.) Fixture rates may be justified in instances when the cost of metering outweighs its benefits. However, fixture rates rely on highly imperfect and imprecise information and provide no incentive to conserve actual water use. For most systems, metering and variable rates are much preferred.

Uniform Rates

The simplest rate structure for metered customers is the uniform rate, under which all customers are charged the same amount for every unit of water consumed, regardless of consumption levels. Because the rate does not provide a volume discount and customers can minimize their total bill by avoiding excessive use, uniform rates provide an incentive to conserve. There is some evidence that metering alone can stimulate conservation, particularly with regard to outdoor water use.[4] Thus metering may lower peak demands.

Obviously, the uniform rate may not track costs with precision. In particular, uniform rates create a form of temporal cross-subsidization between peak and off-peak users. This rate averaging results in prices exceeding the costs of off-peak service and prices less than the costs of peak service; that is, off-peak users subsidize peak users. Uniform rates also create spatial cross-subsidization by

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[4] Brown and Caldwell, *Residential Water Conservation Projects, Summary Report* (Washington, DC: U.S. Department of Housing and Urban Development, 1984), chapter 7.

TABLE 5-4

MINIMUM BILL DESIGN BASED ON THE
BASE-EXTRA CAPACITY COST ALLOCATION METHOD

	Monthly Cost: Inside-City/ 2-inch meter
Customer costs	
Meters and service-related costs ($1.6441/meter) x 2.9 equivalent meter and service ratio	$4.77
Billing and collection costs	2.29
Assume 1.0 thousand gallons monthly allowance, 150% maximum-day extra capacity factor, and 300% maximum-hour extra capacity factor	
Base costs	
$0.2984/thousand gallons x 1.0 thousand gallons	0.30
Extra capacity costs	
Maximum day at $19.0561/year/thousand gallons per day equals $0.0522/thousand gallons $0.0522/thousand gallons x 1.5 extra capacity factor x 1.0 thousand gallons	0.08
Maximum hour at $17.4545/year/thousand gallons per day equals $0.0478/thousand gallons $0.0478/thousand gallons x 3.0 extra capacity factor x 1.0 thousand gallons	0.14
Total minimum charge for 1.0 thousand gallon allowance	$ 7.58

Source: American Water Works Association, *Water Rates* (Denver, CO: American Water Works Association, Manual M1, 1983), 52.

TABLE 5-5

ILLUSTRATION OF A FIXTURE RATE

	Per Annum
Dwelling House, House occupied by one family	
supplied by one faucet	$20.85
Each additional faucet	3.50
One water closet of appropriate kind	6.30
Each additional water closet	3.80
One bath tub	4.85
Each additional bath tub	3.15
One self-closing urinal, none other allowed	4.15
Dishwasher	5.55
One set tub or automatic washer	5.55
Each additional set tub	1.75
Shower separate from tub at bath tub rate	
Outside shower	4.85
Turn on	8.00
Turn off	8.00

Source: Tisbury Water Works, "Rates and Regulations 1979/80," as reported in Charles F. Phillips, Jr., *The Regulation of Public Utilities* (Arlington, VA: Public Utilities Reports, Inc., 1984), 699. Tisbury Water Works is located in Vineyard Haven, Massachusetts.

ignoring geographic differentials in cost. However, the appeal of the uniform rate structure is linked to its simplicity and the deficiencies associated with multiple block rates. A variation of the uniform rate approach is standard tariff pricing in which the same rate structure is applied to a broad geographical area. In sum, the strengths of the uniform rate include relative simplicity, low administration costs, and ease of consumer understanding; compatibility with prevailing notions of fairness and equity; absence of volume discounts that discourage conservation; and conformity with the behavior of certain unit costs of water provision (for example, treatment) given increasing usage. Limitations of the uniform rate include an inability to track unit costs of water provision with precision (that is, some water provision costs, such as administrative and general costs, are fixed in nature and thus automatically decline with increasing water volume); and a lack of recognition that certain price-elastic users (for example, industrial) may resort to self-supply in the absence of a low tail-block rate, thus creating the serious regulatory problem of stranded capital investment.

Decreasing-Block Pricing

Decreasing (or declining) block rates, compared with uniform rates, provide a discount for large-volume use. An illustration based on the commodity-demand cost allocation method is provided in table 5-6. Proponents of decreasing-block rates contend that large users are entitled to lower per-unit prices because of the economies of scale in serving them. Ramsey pricing theory would argue that these customers should get a price break because their demand is more price-elastic, and reasonable substitutes for the method of water delivery may entice them to leave

TABLE 5-6

SIMPLE DECREASING-BLOCK-RATE SCHEDULE BASED ON THE COMMODITY-DEMAND COST ALLOCATION METHOD

	Total	Rate Block First	Rate Block Second
Actual water sales			
Thousand gallons	220,000	170,000	50,000
Percent	100.00	77.3	22.7
Weighted water sales (for demand allocation)			
Thousand gallons	390,000	340,000	50,000
Percent	100.00	87.2	12.8
Allocation of volumetric costs			
Commodity	$25,000	$19,300	$5,700
Demand	131,000	114,200	16,800
Total	$156,000	$133,500	$22,500
Rate per thousand gallons		$0.79	$0.45

Source: American Water Works Association, *Water Rates* (Denver, CO: American Water Works Association, Manual M1, 1983), 68.

the water utility system. Critics argue that decreasing-block rates encourage waste and in some cases subsidize large users. With decreasing-block rates, the incentive to conserve *declines* with greater consumption.[5]

The decreasing-block-rate schedule involves decreasing marginal or incremental rates with higher usage blocks. The decreasing-block-rate form recognizes that:

- Certain costs of water provision are fixed (such as depreciation of distribution mains) and thus automatically decline with increasing water usage.

- Certain users (such as industrial users) with relatively more price-elastic demands require lower rates to induce them to remain on the system. Lower rates can avoid forcing the remaining users to bear a larger portion of system costs.

- Certain large users have better load factors than residential and commercial users lowering the short-term unit capacity cost of supplying these users.

- Noncost objectives such as economic development, past practices, and adjacent community rates can be factors in ratemaking.

The original justification for the decreasing-block-rate structure was the pattern of decreasing unit costs with increasing usage (such as economies of scale with capacity expansion and improved capacity or load factors with existing capacity). The decreasing-block-rate structure passes these cost savings on to the consumer. Moreover, decreasing-block rates can be legitimized by carefully developing customer classes, so that the costs assigned to each class reflect load factors, fixed and variable cost proportions, and other appropriate variables. Arguably, the most important reason that decreasing-block rates have been retained is their revenue stability effect. Price-elastic demands tend to fall in the lower-priced tail blocks while price-inelastic demands tend to fall in the higher-priced initial blocks. The appeal of revenue stability is enhanced by the existence of excess capacity.

Another rationale for choosing decreasing-block schedules over uniform rates involves load factors. Larger users tend to have higher load factors (lower ratios

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[5] Duane Baumann, "Issues in Water Pricing," in Arizona Corporation Commission, *Water Pricing and Water Demand* (Phoenix, AZ: Arizona Corporation Commission, 1986), 9.

of peak demand to average demand) than smaller users, resulting in lower required extra capacities than with lower-load-factor smaller users. However, this rationale overlooks the critical issue of timing of demand (actual contribution to peak demand or peak responsibility), which causes the extra capacity to be built and the incremental capacity costs to be incurred.

Despite the reasoning in favor of decreasing-block-rate structures, significant limitations to this approach exist, including:

- The inability (particularly with the use of many blocks) to track costs with precision, given that some unit costs (such as pumping) tend to increase with increasing volume while other unit costs (treatment) tend to remain constant with increasing volume.

- The possibility that the volume discounts in the schedule exceed any discount defensible on cost-of-service principles; that is, there may be little cost justification for the magnitude of the intrablock rate differentials.

- Justification by costing methods that are questionable in their ability to determine cost causality.

A major criticism of decreasing-block rates is their possible failure to track costs with the result that smaller users subsidize larger users. In addition, block design exercises can be relatively crude with the number of blocks, usage breakpoint, and intrablock rate differentials not being cost justified. Although many argue that decreasing-block schedules for water service are justified by declining unit costs in both the short term and in the long term, substantial confusion continues regarding the circumstances under which decreasing-block rates are cost justified.

In the short term, larger volumes of usage on average tend to involve lower unit costs than smaller volumes, particularly since distribution costs tend to be fixed on a per-customer basis. However, declining unit costs do not necessarily justify declining marginal rates. Furthermore, while high fixed customer costs may provide the rationale for a flat service or customer charge, they do not necessarily provide the rationale for declining marginal commodity charges. In the long term, system expansion may involve some economies of scale. However, simply because incremental costs historically may have been below unit costs does not necessarily justify offering lower marginal rates to higher-volume users than to lower-volume users. That is, long-term incremental costs may be increasing and in the near-term or immediate future may be substantially above long-term unit costs. Also, the decreasing-block schedule tends to ignore the specific peak demands which cause the building of system peak capacity. Lower prices for higher volumes can exacerbate the peaking problem with regard to future capacity needs.

Decreasing-block rates cannot be justified in instances where economies of scale are exhausted. In other words, these rates may be appropriate only when a utility experiences decreasing unit costs with increased usage. Decreasing unit costs are attributable in the short term to improvements in capacity utilization and in the long term to economies of scale. There is reason to believe that many water systems have exhausted these scale economies. A contributing factor is the increase in system expansion costs caused by, among other things, the exhaustion of economies of scale in treatment, the depletion of more accessible sources of supply, and diseconomies in distribution. Therefore, increasing use in the short run may justify declining charges given load factor improvements. If this increased usage triggers an increase in required system capacity with the elevation of unit costs, then the promotion of use in the short run conflicts with increasing use in the long run.[6]

Finally, decreasing-block rates conflict with the policy goal of resource conservation. Because they promote consumption rather than conservation, decreasing-block rates may be particularly undesirable during periods of water scarcity. Low-volume customers may be especially resentful of high-volume price discounts. According to Phillips, "The ultimate effects of both a single rate structure for all users and a declining block rate structure not cost justified are price discrimination among customers and a failure to encourage water conservation."[7]

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6 Patrick C. Mann, "The Water Industry: Economic and Policy Issues," in Charles F. Phillips, Jr., ed., *Regulation, Competition and Deregulation--An Economic Grab Bag* (Lexington, VA: Washington and Lee University, 1979), 104.

7 Charles F. Phillips, *The Regulation of Public Utilities: Theory and Practice* (Arlington, VA: Public Utilities Reports, Inc., 1984), 703.

Increasing-Block Pricing

Under increasing (or inverted or inclining) block rates, the per-unit price increases with consumption. This rate structure is advocated as a method for reducing average and peak water usage. Large users bear the burden of costs associated with providing large quantities of water. With increasing-block rates, the incentive to conserve increases with greater consumption. Thus, increasing-block rates are a method of demand management. Although long-term effects are not certain, raising prices may be one method of inducing water conservation in the short term. What's more, while many alternative rate schedules may induce conservation, some, such as increasing-block rates, have been implemented for this very purpose in several major United States cities.[8]

The increasing-block-rate schedule involves increasing rates with increasing usage levels. This rate structure has been advocated as one form of conservation pricing. Its justification has been based on the existence of increasing incremental costs with capacity expansion and the goal of reducing income inequalities, both of which are debatable rationales. If increasing-block rates do not track costs, the result is that larger users subsidize smaller users. Increasing-block rates can cause decreasing average demand without corresponding decreases in peak demands; that is, the results include decreased load factors, needle peaking, and revenue erosion. Another problem is revenue instability associated with the potential loss of large customers who resort to self-supply.

The cost argument underlying increasing-block rates is that with incremental costs of new capacity increasing, price signals should discourage increasing usage. However, the cost causers are peak demand contributors who are not necessarily large users. One critic generally rejects the use of an increasing-block rate because it "unduly penalizes large customers who may have very favorable annual consumption characteristics."[9] There also may be other factors differentiating costs that are not accounted for by an increasing-block rate.

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[8] *Ernst & Young's 1990 National Water and Wastewater Rate Survey.*

[9] John D. Russell, "Seasonal and Time of Day Pricing," in American Water Works Association, *Water Rates: An Equitability Challenge* (Denver, CO: American Water Works Association, 1983), 96.

Several other potential problems exist with increasing-block rates. First, they are efficient only under unique circumstances. Second, prices that are below incremental costs in the initial blocks and prices that exceed costs in the tail blocks promote neither conservation nor efficient water use. Third, like decreasing-block rates, increasing-block rates pose problems associated with determining the number of blocks, consumption breakpoints, and rate differentials. Finally, a potentially serious problem is their potential impact on utility costs and revenues because of consumer conservation in response to higher water prices.

Nonetheless, a cost-justified increasing-block-rate schedule is feasible. According to the American Water Works Association (AWWA), "It is possible to use some elements of a cost-of-service study as a guide in the design of inverted rates."[10] Accordingly, a peak-use increasing-block-rate structure could be used to alleviate the poor load factor caused by summer residential use. The AWWA cautions, however, that increasing-block rates can be considered cost-of-service related only under special circumstances.

Seasonal Pricing

Time-differentiated, or seasonal, pricing takes notice of the cost differences between peak and off-peak usage and thus mitigates the temporal cross-subsidization between users. Excess-use rates and indoor/outdoor rates, discussed below, are variations of seasonal rates. Also, seasonal pricing may be combined with other rate structures; table 5-7 provides seasonal increasing-block rates adopted in Tucson, Arizona to encourage water conservation.

Most water utilities experience distinct seasonal peaks, due to weather-sensitive demands. The seasonal load pattern indicates that incremental costs may vary substantially over the water utility's annual demand cycle. Over time, given the peak-load problem, uniform pricing results in allocative inefficiency, an involuntary subsidy to peak users by off-peak users, and an inducement to increase system capacity to meet peak demands. Given the premise that water rates should track costs, seasonal rates provide consumers correct price signals that in turn may allow them to change usage patterns.

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10 American Water Works Association, *Water Rates,* 58.

TABLE 5-7

SEASONAL INCREASING-BLOCK WATER RATES FOR TUCSON, ARIZONA

Charges	Winter	Summer
April 1977		
Monthly service charge	$1.40	$1.40
Commodity charge		
First 1,000 cubic feet/month	0.55	0.55
Next 1,000 cubic feet/month	0.55	0.66
Next 3,000 cubic feet/month	0.55	0.77
> 5,000 cubic feet/month	0.55	0.88
May 1986		
Monthly service charge	$3.70	$3.70
Commodity charge*		
First 500 cubic feet/month	0.86	0.86
Next 500 cubic feet/month	0.97	0.97
Next 1,000 cubic feet/month	1.15	1.33
Next 1,000 cubic feet/month	1.31	1.64
Next 2,000 cubic feet/month	1.45	1.85
> 5,000 cubic feet/month	1.61	2.08

Source: Reported in Richard W. Cuthbert, "Effectiveness of Conservation-Oriented Water Rates in Tucson," *American Water Works Association Journal* 81 no. 33 (March 1989): 67 and 69.

Seasonal pricing, as well as daily peak load (or time-of-day) pricing are time-differentiation methods that follow marginal-cost pricing theory. Seasonal rates recognize that the unit operating cost of providing water varies between peak and off-peak days, that capacity requirements essentially are determined by peak demands, and that peak users essentially are responsible for the capacity required to serve the peak demand, while off-peak users bear little responsibility. Therefore, seasonal rate design involves assigning lower costs to usage on off-peak days. Seasonal rates impose higher prices during periods of peak use (in the warm-weather months) to recover costs associated with the higher capacity needs caused by lawn sprinkling and landscaping. Daily peak-load rates are infrequently used by water utilities because, unlike electricity, the ability to store water mitigates the daily peaking problem, the cost of water does not vary significantly on an hourly basis, and the investment required for metering under these rates could outweigh the benefits.[11] Time-of-day pricing may, however, be an appropriate load management tool for regulating water pressures. Better load management may help some water utilities avoid building (and paying for) water supply capacity, a tendency exacerbated by occasional drought conditions when peak demand levels are elevated. Also, maximum-hour peaks are appropriately considered in designing fire protection rates (discussed below).

The prerequisites to effective seasonal pricing are several.[12] First, there must be substantial variation in demand between peak and off-peak periods. Second, installed capacity requirements must be determined primarily by the peak demand confronting the water system. Third, the water utility must have peak demands that occur consistently during the same season. Finally, the utility must be able to estimate the cost differences between meeting peak and off-peak demands. Russell provides some guidelines for utilities contemplating the use of seasonal rates:[13]

- Detailed planning, complete and adequate information programs for customers, and careful administrative and computer procedures are essential for a successful program.

- Any seasonal rate introduced should be relatively modest in price as compared with winter rates at the outset, with later adjustments to increase the differential.

- The summer excess-charge method appears to be the superior method for matching revenues with costs and for discouraging maximum summer demands.

- Any type of summer seasonal rate can cause more variations in revenue than a uniform annual rate.

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11 John D. Russell, "Seasonal and Time of Day Pricing," in American Water Works Association, *Water Rates: An Equitability Challenge,* 91.

12 Mann and Schlenger, "Marginal Cost and Seasonal Pricing," 7.

13 Russell, "Seasonal and Time of Day Pricing," 96.

- A seasonal rate may not be appropriate for all water systems. Where annual supplies are more than adequate and system capacity is adequate or possibly excessive, a seasonal rate may discourage water sales and thus increase the cost of water for the remaining sales, without any substantial benefit to the water system except possibly to better recover costs from summer peaking customers.

The potential benefits of seasonal rates include increased production efficiency (through annual load factor improvements) and reduced peak demands, both of which should enhance the water utility's financial condition. Seasonal rates can be an effective tool for reflecting intertemporal cost differentials without elaborate metering (as required by time-of-day pricing). Reducing peak demands may help extend available water supplies and postpone or eliminate the need for capacity additions.[14] Also, seasonal rates promote conservation while avoiding a problem associated with purely voluntary conservation--that is, declining average usage (but not peak usage) resulting in deteriorating load factors and revenue shortfalls. Finally, for water consumers who are willing and able to modify usage patterns, seasonal rates can result in decreased water bills. In sum, the reasons for considering seasonal pricing--namely conservation and marginal-cost theory--may be compelling for some water systems and their regulators.

Excess-Use Charges

Some analysts prefer the excess-charge form of seasonal pricing (even though the summer/winter form may be easier to administer and easier for customers to understand) because it is more effective for purposes of cost recovery and conservation.[15] The excess-use charge essentially is an increasing-block schedule with two blocks. It requires the determination of "base" and "excess" consumption, with corresponding prices. Excess charges are applied to usage in excess of average winter or base usage. Although some consumers may view this method as arbitrary, the imposition of excess use charges or penalty fees is not uncommon during periods of water shortage, and evidence suggests that the public is supportive of their

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[14] Ibid., 92.

[15] Ibid.

use.[16] However, as a general tool of rate design, this approach is hampered by the difficulty in defining excess use and perceptions that the chosen definition is arbitrary, capricious, or inequitable.

Indoor/Outdoor Rates

A variation on the seasonal rate structure not mentioned in the AWWA discussion of rate schedules is the indoor/outdoor rate schedule.[17] This approach is specifically tailored to household consumption levels, as compared to excess-use charges which are based on averages. This approach is designed to address the problem of inequity occurring when large households with water-efficient landscaping pay more for water than small households with inefficient landscaping, even though the latter contributes "more than its fair share" to the summer peak. Rates for indoor and outdoor use can be charged by installing two meters in each household. This not only is costly, it also could be bypassed by the mischievous homeowner who runs a garden hose from the kitchen sink.

A methodological solution exists to this problem: household consumption during the off-peak season can be used to estimate basic indoor usage during the year. Amounts in excess of this can be billed at the outdoor water rate. Most water suppliers have the data necessary to make this calculation and may use it at present to estimate bills. While the method is slightly inferior to a dual metering system, it may be more equitable among households than simple seasonal rates or excess-use charges.

One potential issue is that treatment costs associated with safe drinking water standards should generally be assigned to indoor water use, or more specifically, to human consumption. However, there are significant economies of scale for water treatment and without a redundant distribution system the differentiation of costs on an indoor/outdoor basis is largely irrelevant. An even more difficult issue is that lower indoor rates provide a disincentive for indoor water conservation. In fact, customers with high outdoor use levels may have an

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16 Edward F. Renshaw, "Conserving Water Through Pricing," *American Water Works Association Journal* 74 no. 1 (January 1982): 5.

17 Gary C. Woodard, "A Summary of Research on Municipal Water Demand and Conservation Methodologies," in Arizona Corporation Commission, *Water Pricing and Water Demand* (Phoenix, AZ: Arizona Corporation Commission, 1986), 43-47.

incentive to use indoor water to excess during the winter inflating their base level. The result could be an increase in average use and only slight reductions in peak (summer) use.

Lifeline Pricing

Lifeline pricing can be viewed as another variation of the increasing-block theme. It provides a lower per-unit price for a specified level of consumption so that low-income consumers can receive water service for basic needs at a reasonable cost. In most formulations, the lowest block is priced below the cost of service. Thus the rate is policy-based, not cost-based.

Other than social and humanitarian benefits, some of the key rationales for lifeline rates are that they make it possible to retain customers on the utility system; that they reduce the frequency and cost of disconnections, collections, and bad debt because of nonpayment; and that by providing an affordable bill, many customers can meet the payments rather than continue to be served without paying anything. One of the key drawbacks is that lifeline rates send inappropriate pricing signals, and thus may not encourage conservation.

Lifeline rates in energy are normally provided only to qualifying individuals according to specified poverty indicators. Such rates have been infrequently considered by water utilities or their regulators, probably in large part due to the relative affordability of water. Also, opponents of lifeline programs generally focus on the problem of cross-subsidization and the belief that lifeline policies essentially provide social welfare benefits that are more appropriately administered by governments and funded by general tax revenues.[18] Many also prefer volunteer contributions by some customers that establish special funds for needy customers, with the utility assisting in the process.[19] One fact that mitigates the need for lifeline rates in water supply is that low-income citizens often live in public housing or apartment buildings that are master-metered. Thus, individuals are not

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18 John F. Guastella, "Lifeline and Social Policy Pricing," in American Water Works Association, *Water Rates: An Equitability Challenge,* AWWA Seminar Proceedings (Denver, CO: American Water Works Association, 1983), 82-87.

19 "Project Water Help Meets with Success," *Water* (Winter 1987), 25.

directly responsible for the water bill. However, higher water prices are paid indirectly through higher rents.

As the cost of drinking water escalates because of more stringent water quality regulations and as the issue of affordability continues to be debated, lifeline rates may receive more attention. The affordability issue is intrinsically related to the issue of water quality and willingness and ability to pay for it. It also is appropriate to consider conservation programs in conjunction with lifeline rates to minimize waste and heighten consumer awareness of water's increasing value.

Sliding-Scale Pricing

Sliding-scale pricing (like increasing-block rates) assigns higher prices to higher consumption levels, but ties prices to average daily consumption rather than total consumption. Therefore, the strengths and limitations of sliding scale rates are similar to those of increasing-block rates. That is, sliding scale pricing may encourage water conservation, but may also cause larger users to bypass the water system in favor of self supply.

Scarcity Pricing

Another variation of increasing-block rates, similar to sliding scale rates, is scarcity pricing. Water supplies are increasingly threatened both by natural and artificial causes.[20] Scarcity pricing stems from marginal-cost theory and assigns higher prices in accordance with the depletion of existing supplies. It may be appropriate for pricing finite water supplies where it is desirable to have current users pay for developing new supplies.

Spatial Pricing

Another pricing innovation is zonal or spatially differentiated rates. Spatial rates complement time-differentiated rates and may be appropriate for utilities with core and satellite areas than for interconnected systems. Requiring satellite systems

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20 Janice A. Beecher and Ann P. Laubach *Compendium on Water Supply, Drought, and Conservation* (Columbus, OH: The National Regulatory Research Institute, 1989).

to pay full development costs may discourage water system expansion, a result which may or may not be consistent with local development and land-use planning considerations. Contributions-in-aid-of-construction for new developments are a form of spatial pricing. In addition, hook-up fees can be assessed to cover the cost of initiating service for new customers. If these fees are high, some prospective customers may be discouraged from connecting to the system. Spatial pricing and hook-up fees are designed to recover the ongoing costs of water service.

Uniform rates over geographic space involve cross-subsidization. The rate averaging results in prices exceeding costs for some users and failing to meet costs for others. It is possible that at current rate levels, design and administrative costs may exceed the efficiency gains from spatial pricing. An example of imperfect spatial rates is the urban/suburban variances associated with publicly owned systems. Some of these differentials are justified by capacity and pumping costs while others are motivated by annexation policies and the objective of taxing nonvoters.

Some rate design proposals would have new customers paying higher rates than existing customers. Little economic justification exists, however, for such a distinction between old and new customers. Both groups are jointly responsible for water system expansion and the development of higher-cost supplies; that is, each group contributes to the total system cost associated with meeting average demand. A rational basis for differential treatment between old and new customers is unequal contributions to peak demands. If new customers impose specific costs upon the system that would not be avoided if existing consumers decreased their usage (such as the cost of extending distribution lines), price variances between old and new customers are justified via service connection charges. Again, it may be necessary to take local development and land-use planning considerations into account.

Other Water Charges

Discussed briefly here (and in detail by the American Water Works Association) are four other types of water service charges: dedicated-capacity charges, capital contributions, fire protection charges, and ancillary charges.[21]

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[21] See American Water Works Association, *Water Rates and Related Charges* (Denver, CO: American Water Works Association, Manual M26, 1986).

Table 5-8 provides a summary of the specific types of charges that fall within these general categories.

Dedicated-Capacity Charges

Dedicated-capacity charges are designed to recover capacity costs from those potential future customers for whom the capacity is being installed. The two principal approaches are availability charges and demand-contract charges, compared in table 5-9. Both methods are cost-based and result in the calculation of fixed charges. Availability charges allow the utility to pay for construction. When facilities are complete, they usually are replaced by regular water rates charged to a group of customers. A demand contract is typically entered into by a large water user and contains specific terms of service. Care must be taken that the demand-contract rate not be unduly price discriminatory.

Capital Contributions

Capital contributions by utility customers are used to support water system improvements such as:[22]

- expanding the quantity of water supply available for normal weather periods, droughts, and emergencies for existing customers;
- providing source-of-supply protection from potential or actual contaminants, and treatment facilities necessary to assure water quality compliance with new or upgraded standards;
- providing additional distribution, storage, or pumping capacity to meet system expansion needs for both fire service and general water service;
- upgrading and replacing older facilities to improve reliability, reduce maintenance and repair costs, increase capacity, and meet current standards; and
- expanding the system to provide service to new customers and developing areas.

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22 Ibid.

TABLE 5-8

SELECTED SPECIAL WATER CHARGES

Dedicated-capacity charges
- Availability charges
- Demand-contract charges

Capital contributions
- Main extension charges
- Participation charges
- System development charges (system buy-in or incremental cost)
- Government grants and low-interest loans

Fire protection charges
- Private fire-protection charges
- Public fire-protection charges

Ancillary charges
- Field-service charges
  - Turn-on/turn-off service
  - Field collections
  - Illegal turn-ons and open meter bypass
  - Special meter readings and final meter readings
  - Meter testing, repairs, resetting, or size change
  - Installation of special or remote meter reading devices
  - Meter boot or stop box clean-out, dig-up, or replacement
  - Special appointments
- Office-service charges
  - New account or transfer charge
  - Collection related charges
  - Administrative, paperwork, and copying fees
  - Wastewater billing fees
- Jobbing and merchandise sales
- Tapping charges
- Application, engineering, and inspection fees
  - Main inspection, filing, and contracts
  - Service-connection and cross-connection inspection
  - Engineering design and water service location
- Construction-water charges
- Miscellaneous work charges
- Unauthorized water use charges
- Unit-cost development charges
- Penalties for water conservation violations
- Special permits (such as irrigation and hydrants)

Source: Derived from American Water Works Association, *Water Rates and Related Charges* (Denver, CO: American Water Works Association, 1986); and Robert M. Wilson, "Special Charges Used by the Denver Water Department," in *AWWA Seminar on the Ratemaking Process: Going Beyond the Cost of Service* (Denver, CO: American Water Works Association, 1986), 11-18.

TABLE 5-9

DEDICATED-CAPACITY CHARGES: A COMPARISON OF METHODS

Availability Charge	
Total investment in plant to be included in availability charge	$450,000
Annual costs	
Debt service	45,000
Payment in lieu of taxes	30,000
Projected annual cost for inspection, billing, and certain (fixed) operation and maintenance expenses	45,000
	$120,000
Monthly charge based on 2,000 equivalent potential customers	$5.00
Demand-Contract Charge	
KYZ Corporation Requirements	
Average daily demand	1.0 mgd
Maximum daily demand	1.5 mgd
Maximum hourly demand	2.0 mgd
Construction of 5,000 feet of 12" water main from treatment plant to site. Estimated cost is $250,000.	
ABC Water Utility	
Annual fixed cost of 2.0 mgd surface supply	$100,000
Annual fixed cost of 4.0 mgd treatment facility	150,000
Annual variable costs (primarily power and chemicals) per million gallons	200.00
Demand charge	
Dedicated construction: $250,000 at 25% (estimated)	62,500
Source of supply ($100,000/2.0 mgd) x 1.0 mgd	50,000
Treatment facility ($150,000/4.0 mgd) x 1.5 mgd	56,250
Total demand charge per year	$168,750
Commodity charge per million gallons	$200.00

Source: Adapted from Vito F. Pennacchio, "Demand and Availability Charges," in AWWA Seminar on The Ratemaking Process: Going Beyond the Cost of Service (Denver, CO: American Water Works Association, 1986), 9-10.

Four types of capital contributions are main extension charges, participation charges, system development charges, and government grants and low-interest loans. The system buy-in and incremental-cost methods for calculating system development charges are compared in table 5-10. System development charges also constitute contributions-in-aid-of-construction, which are increasingly controversial because of taxing and ratemaking implications. The growing capital needs of the water-supply industry brought about by drinking water standards, population growth, and a deteriorating infrastructure may require more attention to the use of capital contributions for system improvements.

Fire Protection Charges

Designing fire protection rates may be the most perplexing task of rate design for water utilities. Fire protection is central to the design of water distribution facilities; yet with good fortune these services can go unused for long periods of time. The cost of private fire protection clearly is assignable while the cost of public fire protection requires some method of allocation. In table 5-11, the equivalent-connection, hydrant/inch-foot, and relative fire-flow requirements methods are compared.

Fixed costs, such as the cost of fire hydrants, are easily translated into fixed charges using some kind of averaging. Capacity costs pose another problem. Cost-based rates, using marginal-cost pricing theory, actually may call for three-tiered pricing, with base costs, seasonal peak costs, and daily (fire protection) peak costs. The costs associated with these peaks can be treated as total service incremental costs.[23] This approach probably results in relatively low fire protection rates. In contrast, a standard of reasonableness for establishing maximum fire protection charges is stand-alone cost or the hypothetical cost associated with a water utility designed to provide fire protection services only, and not general water service. In between lies a price based on the joint provision of general water service and fire

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[23] On the incremental treatment of fire protection costs, see J. Richard Tompkins, "Fire Protection Charges," in *AWWA Seminar on the Ratemaking Process: Going Beyond the Cost of Service* (Denver, CO: American Water Works Association, 1986).

TABLE 5-10

SYSTEM DEVELOPMENT CHARGES:
A COMPARISON OF METHODS

System Buy-in Method	Original Cost ($000)	Accumulated Depreciation ($000)	Net Cost ($000)
Source of supply	5,000	1,000	4,000
Treatment and pumping	8,000	1,200	6,800
Distribution system	12,800	1,800	11,000
Services, meters, and hydrants	4,800	800	4,000
General structures	1,400	200	1,200
	$32,000	$5,000	$27,000
Less net cost of			
Distribution system			11,000
Services, meters, and hydrants			4,000
			12,000
Net investment in backup plant less: Outstanding bonds			8,000
Total equity investment			$4,000
Number of customers			20,000
Average net equity investment per equivalent 5/8-inch-meter customer			$200
System development charge			$200

Incremental-Cost Pricing Method	
Annual revenue under existing rates for typical 5/8-inch customer	$205
Less: Annual operation and maintenance expenses ($115) and annual replacement and improvement costs ($30) to be met from rates	145
Net revenue available to service new debt	$60
Debt that can be serviced (assume 20-year debt amortization at 10% annual interest rate ($60/0.1175)	$510
Estimated total investment in backup facilities required to serve a new 5/8-inch customer	$1,300
System development charge	$790

Source: American Water Works Association, *Water Rates and Related Charges* (Denver, CO: American Water Works Association, 1986), 15 and 16.

TABLE 5-11

FIRE PROTECTION RATES: A COMPARISON OF METHODS

Equivalent-Connection Method

	Total	Public	Private
Prorated demand costs	$110,900	$85,400	$25,500
Direct: hydrants	57,000	57,000	--
Direct: private firelines	9,200	--	9,200
	$177,100	$142,400	$34,700

	Number	Size Factor	Eq. 6-inch Connection	Charge/ Connection	Revenues
Public fire services					
Town A hydrants	388	1.0	388		
Town B hydrants	255	1.0	255		
Town C hydrants	512	1.0	512		
	1,155		1,155(77%)	$123.30	$142,412
Private fire services					
5-inch service lines	100	0.44	44	44.00	$ 4,400
6-inch service lines	200	1.00	200	100.00	20,000
8-inch service lines	60	1.72	103	172.00	10,320
	360		347(23%)		34,700
Total equivalent 6-inch connections			1,502		177,132

Hydrant/Inch-Foot Method (Public Fire Protection)

	Inch-feet	Rate	Amount	Hydrants	Rate	Amount	Total
Town A	3,892,000	$0.0050	$19,910	388	$49.35	$19,148	$ 39,058
Town B	2,613,000	0.0050	13,065	255	49.35	12,585	25,650
Town C	10,485,000	0.0050	52,425	512	49.35	25,267	77,692
Total	17,080,000		$85,400	1,155		$57,000	$142,400

Relative Fire-Flow Requirements Method (Public Fire Protection)

	Service Class	Customers	Fire Flow	Equiv. Cust.	Rate	Revenues
Town A	Residential	5,700	1.0	5,700	$7.62	$ 43,434
Town B	Residential	3,700	1.0	3,700	7.62	28,194
Town C	Residential	6,620	1.0	6,620	7.62	50,444
	Commercial	1,080	2.25	2,430	17.14	18,511
	Industrial	60	4.0	240	30.48	1,829
		17,160		18,690		$142,412

Source: Adapted from American Water Works Association, *Water Rates and Related Charges* (Denver, CO: American Water Works Association, Manual M26, 1986), 9-10.

protection by a single utility, perhaps using the average incremental pricing approach.

More complex pricing schemes for fire protection take into account such factors as property values and insurance rates. While some view fire protection as a discrete service, others believe that it is essentially a public good that should be paid for through tax dollars. Obviously, many policy considerations enter into discussions of these rates. In some jurisdictions, public safety considerations may outweigh those of cost causality.

Ancillary Charges

Ancillary charges or fees are designed to recover, as closely as possible, the actual cost of providing specific services, such as tapping and inspections. A selection of these services appears in table 5-8. Water utilities should take care both to recognize the incidental costs associated with certain services they provide and to develop appropriate fee schedules that reflect them.

Rate Structures Approved by Regulatory Commissions

As reported in table 5-12, the types of water rates imposed by regulated water utilities in the reporting jurisdictions for either residential or commercial and industrial use fall predominantly into three categories: unmetered, uniform, and decreasing-block-rate structures. The results indicate that uniform rates are used in many states for both residential or commercial and industrial water service. Over half of the commissions surveyed indicated that all three types of rates were being used for residential customers, and that uniform and decreasing-block rates are under use for commercial and industrial customers. In all, unmetered charges were mentioned slightly more often than decreasing-block rates for residential water use, while the opposite was true for commercial and industrial rates. Moreover, a sizeable share of the commissions reported the use of increasing-block rates and seasonal rates for all service classes. The responses revealed further that increasing-block rates and seasonal rates were more frequently approved for residential customers than for commercial and industrial customers.

TABLE 5-12

WATER STRUCTURES APPROVED BY STATE REGULATORY COMMISSIONS

State	Residential Rates							Commercial/Industrial Rates						
Commission	FF	FX	UN	DB	IB	SE	O	FF	FX	UN	DB	IB	SE	O
Alabama	X	-	-	X	-	-	-	X	-	-	-	-	-	-
Alaska	X	-	-	-	-	-	-	X	-	-	-	-	-	-
Arizona	-	-	-	X	X	X	-	-	-	-	X	X	X	-
Arkansas	-	-	X	-	-	-	-	-	-	X	-	-	-	-
California	X	-	X	X	X	X	-	X	-	X	X	X	X	-
Colorado	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Connecticut	X	X	X	X	-	X	-	X	-	X	X	-	X	-
Delaware	X	-	X	X	-	-	-	X	-	X	X	-	-	-
Florida	X	-	X	-	-	-	-	X	-	X	-	-	-	-
Hawaii	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Idaho	X	-	X	-	-	(a)	-	X	-	X	-	-	(a)	-
Illinois	-	-	X	X	-	-	-	-	-	-	X	-	-	-
Indiana	X	-	-	X	-	-	-	X	-	-	X	-	-	-
Iowa	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Kansas	-	-	X	-	-	-	-	X	-	-	-	-	-	-
Kentucky	X	-	X	X	-	X	-	X	-	X	X	-	X	-
Louisiana	X	-	X	X	-	-	-	-	-	X	X	-	-	-
Maine	-	X	X	X	-	-	-	-	X	X	X	-	-	-
Maryland	X	-	X	X	X	X	-	X	-	X	X	X	X	-
Massachusetts	X	X	X	X	X	X	-	X	X	X	X	X	X	-
Michigan	X	-	X	X	X	-	-	-	-	X	X	-	-	-
Mississippi	X	-	-	X	-	-	-	X	-	-	X	-	-	-
Missouri	-	-	X	-	-	X	-	-	-	X	-	-	-	-
Montana	X	X	X	-	X	-	-	-	-	X	-	-	-	-
Nevada	X	-	X	X	X	X	-	X	-	X	X	X	X	-
New Hampshire	-	-	X	-	-	-	-	-	-	X	-	-	-	-
New Jersey	X	-	X	X	X	X	-	X	-	X	X	X	X	-
New Mexico	-	-	-	X	-	-	-	-	-	X	-	-	-	-
New York	X	-	-	X	X	X	-	-	-	X	X	-	X	-
North Carolina	-	-	X	-	-	-	-	-	-	X	X	-	-	-
Ohio	X	-	X	X	-	X	-	X	-	X	X	-	X	-
Oklahoma	X	-	X	X	X	-	-	X	-	X	X	X	-	-
Oregon(b)	X	-	X	X	-	-	-	-	-	-	-	-	-	-
Pennsylvania	X	X	X	X	-	-	-	-	-	-	X	-	-	-
Rhode Island	X	-	X	-	-	X	-	X	-	X	-	-	X	-

TABLE 5-12 (continued)

State Commission	Residential Rates FF	FX	UN	DB	IB	SE	O	Commercial/Industrial Rates FF	FX	UN	DB	IB	SE	O
South Carolina	X	-	X	X	X	-	-	-	-	-	X	-	-	-
Tennessee	-	-	X	X	-	-	-	-	-	X	X	-	-	-
Texas	X	-	X	-	X	-	(c)	X	-	X	-	X	-	-
Utah	X	-	X	X	X	-	-	-	-	X	-	-	-	-
Vermont	X	-	X	-	X	-	-	X	-	X	-	X	-	-
Virginia	X	-	X	-	-	-	-	-	-	X	-	-	-	-
Washington	X	-	X	X	X	X	-	X	-	X	X	X	X	-
West Virginia	-	-	X	X	-	-	-	-	-	X	X	-	-	-
Wisconsin	X	-	-	X	-	-	-	X	-	-	X	-	-	(d)
Wyoming	X	X	X	X	-	-	-	-	X	-	-	-	-	-
Virgin Islands	-	-	X	-	-	-	-	-	-	X	-	-	-	-
Number of commissions	31	6	38	29	15	14	1	22	3	34	25	10	13	1

Source: 1990 NRRI Survey on Commission Regulation of Water Systems.

FF = Flat fee
FX = Fixture rate
UN = Uniform rate
DB = Decreasing-block rate
IB = Increasing-block rate
SE = Seasonal rate
O = Other

(a) One system adds a summer surcharge to the uniform rate.
(b) No commercial or industrial customers.
(c) Improvement surcharge.
(d) Decreasing-block with lower blocks increasing.

Conclusion

Whatever rate design is selected, it can be appropriately evaluated by how well it meets the utility's revenue requirement. A variety of methods exist to do this, ranging from sophisticated computer simulation modeling to a basic bill tabulation analysis.[24] In the end, it is not uncommon to make adjustments to the rate structure either to match revenue requirements or meet other policy goals.

Despite the many methodological alternatives, rate design tends to be as much art as science, leaving a considerable degree of discretion to regulators. For publicly owned water utilities, it may be simpler to incorporate policy goals other than cost causation into the ratemaking process. For investor-owned water utilities under the jurisdiction of the state public utility commissions, these goals must be reconciled with traditional principles of regulation. The inclination of the commissions to promote wise use or other policies may depend on legislative mandates, precedents in other utility areas, and whether outcomes are considered consistent with the public interest and other regulatory objectives.

In his critique of lifeline rates, one analyst concludes with the general observation that rate design involves a considerable degree of "informed judgment" and that:

> Specific rate structures have and will continue to incorporate features relating to particular characteristics and objectives. So long as basic cost principles are not significantly compromised, there can be room for "policy" adjustments to effect gradual trends toward such goals as conservation, fuller recognition of economies of scale and even minimizing impact on low-use customers.[25]

The harsh reality is that not every policy goal can be met within the confines of a single--or simple--rate structure.

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[24] American Water Works Association, *Water Rates* (American Water Works Association, Manual M1, 1983), Appendix.

[25] Guastella, "Lifeline and Social Policy Pricing," in American Water Association, *Water Rates: An Equitability Challenge,* 87.

CHAPTER 6

CONCLUSIONS

This report has focused mainly on the costing and pricing of water service. This focus is not intended to imply or indicate that other issues are less important. Economic arguments tend to elevate pricing above other concerns; indeed, more efficient pricing is expected to solve a myriad of production, consumption, and allocation problems. But it is important to recognize that better pricing of water, though essential, is not a panacea for all the issues facing the providers of public water service.

Some Other Issues

Among the important policy issues distinct from price is the concern for water quality both at intake treatment and sewage discharge points. A related issue is the optimal mix of treatment expenditures and water quality. Given surface sources, there is the regulatory policy issue of trading off increased sewage treatment costs upstream for decreased water treatment costs downstream. The focus on water service costing, pricing, and investment decisions for commission-regulated water utilities should not detract from the importance of making similar decisions concurrently for sewage disposal. Water and sewage systems are interrelated (for example, a decrease in household water consumption can result in a decrease in the volume of waste). Separating the decisionmaking for water and sewage pricing can negate efficient pricing and investment policies in water provision. One can argue that sewage cost recovery and pricing is at present less efficient than water service costing and pricing.

Furthermore, the efficient costing and pricing of centrally supplied water service should not be viewed as a complete solution to the efficient use and allocation of water supplies. For example, the historically inefficient pricing of irrigation water in the western United States probably more than offsets any societal gains to be derived from the increased efficiencies in pricing public water supplies. In some states, even in terms of public water service, the proportion of water supplied by commission-regulated water utilities is relatively small. The water utilities regulated by the California Public Utilities Commission, for example, provide an estimated 2 percent of the total public water supply in California. Thus, any attempts by the Commission to attain efficient water pricing and water conservation will have but a small effect on the overall use of public water supplies in that state. Pricing inconsistency among the major water use sectors and between regulated and unregulated sectors will continue to pose a problem.

One of the most difficult unresolved issues is the need to define priority uses for water, which also should be reflected in price. Unfortunately, price and priority in water use are not always consistent. During periods of drought, the burden of use restrictions can be greater for residential users than for irrigation users. Appropriate price signals can redefine priorities and encourage adoption of permanent water conservation measures in some sectors. However, priorities may also be determined by other public policies, specifically those reflected in drought contingency and long-term supply plans. Where water conservation is concerned, commissions should consider water pricing as an important tool but recognize that consumer education about the wise use of water is equally important.[1]

Long-term planning is an emerging issue in water supply. Concerns about water quality and quantity are contributing factors, and there is an increasing need to integrate the many governmental institutions involved in water. Federal, state, and local governments all make policies affecting water, yet often there is limited coordination of their efforts. State public utility commissions need to work more closely with state drinking water and environmental officials responsible for water policy, particularly as to the role of prices in water supply and demand.

There also is a growing concern about whether the structure of the water industry is suited to meet contemporary demands. In particular, the proliferation of numerous small and financially nonviable systems is a problem. In response, there are many proponents of mergers and acquisitions in water supply so that any potential economies of scope (in production or even management) are realized. Restructuring the industry may prove as important as pricing reform to its long-term viability. Included in structural issues are bypass through self supply and the purchase of bottled water.

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[1] Janice A. Beecher and Ann P. Laubach, *Compendium on Water Supply, Drought, and Conservation* (Columbus, OH: The National Regulatory Research Institute, 1989).

Even more important may be technological innovations--especially in water treatment for small systems--that improve the economic situation of individual providers faced with specific supply issues. Portable, affordable treatment systems for small water suppliers may help mitigate the impact of safe drinking water regulations. Interconnecting water systems combines structural and technological solutions that may improve the viability of some systems. However, such solutions are partially dependent on pricing and the assurance of an adequate revenue stream to the water system for adopting these innovations. Management, planning, and cost recovery policies may help promote long-term efficiency through the adoption of innovative technologies.

Regulation by state commissions is imperfect but essential to preventing the abuse of monopoly power. Efficiency and effectiveness of regulation can be improved in a variety of ways.[2] Also, price regulation may not be viewed as necessary for some water utilities. However, one possibility for improving water pricing generally is to expand regulatory authority so that some state or regional oversight is provided to municipalities and other local ratemaking bodies. Such oversight helps remove ratemaking from local political pressures, where incentives to keep prices down may dominate the goals of cost-based ratemaking. State commission regulation has the advantage of being a centralized source of technical regulatory expertise. Thus, the long-term interest in pricing may involve regulatory restructuring as well.

Some Evaluation Criteria

As alternatives in cost allocation and rate design for water utilities are considered, an analytical framework tailored to the particular needs of utilities or regulators can be a useful tool.

A simple framework was introduced in chapter 1. That framework suggested that in considering ratemaking and changes therein, the analyst may seek to compare the perspectives of utilities, consumers, and society as a whole, recognizing that each encompasses different types of goals. Often, conflicts emerge over specific issues because these goals are difficult to reconcile. Incremental-cost

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[2] Janice A. Beecher and Patrick C. Mann, *Deregulation and Regulatory Alternatives for Water Utilities* (Columbus, OH: The National Regulatory Research Institute, 1990).

pricing, for example, may meet society's criterion of economic efficiency (and more than meet utility revenue requirements) while resulting in rates perceived as "unaffordable" by consumers. Only the rarest cost allocation and rate design method will achieve a balanced solution that is actually satisfactory from all three perspectives. It is instead an exercise in optimization, with the explicit knowledge that some goals are partially sacrificed in the interest of achieving others.

On the choice of particular methods, chapter 4 developed an evaluation framework for marginal-cost pricing emphasizing four general issues: allocative efficiency, cost and rate stability, financial viability, and administrative feasibility. Associated with each are several issues related to the practical application of pricing theory. These also may be used in evaluating cost allocation and rate design alternatives. Once again, tradeoffs among competing goals are readily apparent. For example, while the uniform rate structure may be administratively simple, it may be deficient in terms of allocative efficiency or ensuring the long-term viability of the water utility. It is a matter of policy, of course, to determine which criterion is more important than another.

Perhaps most difficult to reconcile are quantitative and qualitative evaluation criteria. In the end, revenue requirements are far easier to estimate than, say, the affordability of water bills. There may be a temptation to use mainly quantifiable indicators of success or failure and avoid the less quantifiable. Yet cost allocation and rate design cannot occur in a vacuum. It may seem necessary at times to relax cost-of-service criteria in the interest of consumer understanding and acceptance, particularly if perceptions of equity are at stake. However, once the door is open to subjective criteria in ratemaking, it is difficult to keep political and other influences out of the process. Subjective criteria, then, must be used with caution.

It may be useful to develop evaluation criteria for cost allocation and rate design in the context of a planning framework. As already noted, pricing is clearly associated with planning. The interest in least-cost planning for all public utilities--water utilities included--continues to rise. The planning process not only serves to identify trends in supply and demand and future capacity options, but to identify the goals and priorities of the water utility. Pricing alternatives can be assessed in these terms. Likewise, long-term planning must take into account the role of price.

Some Research Needs

Public utility regulation clearly has not identified an ideal solution to the cost allocation and rate design puzzle, in part because no single solution exists. Further research will play a role in the evolution of approaches.

In general, the issues of value, cost, and price and their interconnections merit further analysis. Water's global abundance can be deceptive. Growing populations have placed stress on the hydrological system both in terms of quality and quantity. In theory, pricing can improve the allocation of water resources. The economic, operational, and cost characteristics of the public water supply industry could be better understood, particularly its differences and similarities compared to other public utilities. Cost allocation for water utilities requires further refinement. A pressing need exists for the development of cost allocators founded in empirical observation. Engineering process models, econometric models, optimization or simulation models, and other methods can be appropriately applied to the analysis of costs and their causes. Rate design for water utilities is an obvious choice for further research. Attention may be especially needed in understanding how well rate design alternatives meet different policy goals as well as how they satisfy revenue requirements. The issues of financial viability for water providers and affordability for water consumers may emerge as some of the most important research topics. In sum, cost allocation and rate design for water utilities now merit a prominent place on the regulatory research agenda.

APPENDIX A

NARUC UNIFORM SYSTEM OF ACCOUNTS
FOR CLASS A WATER UTILITIES

BALANCE SHEET ACCOUNTS

<u>Assets and Other Debts</u>

Utility Plant

101. Utility Plant in Service
102. Utility Plant Leased to Other
103. Property Held for Future Use
104. Utility Plant Purchased or Sold
105. Construction Work in Progress
106. Completed Construction Work Not Classified
108. Accumulated Depreciation
    - 108.1 Accumulated Depreciation of Utility Plant in Service
    - 108.2 Accumulated Depreciation of Utility Plant Leased to Others
    - 108.3 Accumulated Depreciation of Property Held for Future Use
110. Accumulated Amortization
    - 110.1 Accumulated Amortization of Utility Plant in Service
    - 110.2 Accumulated Amortization of Utility Plant Leased to Others
114. Utility Plant Acquisition Adjustments
115. Accumulated Amortization of Utility Plant Acquisition Adjustments
116. Other Utility Plant Adjustments

Other Property and Investments

121. Nonutility property
122. Accumulated Depreciation and Amortization of Nonutility Property
123. Investment in Associated Companies
124. Utility Investments
125. Other Investments
126. Sinking Funds
127. Other Special Funds

Current and Accrued Assets

131. Cash
    - 131.1 Cash on Hand
    - 131.2 Cash in Bank
132. Special Deposits
133. Other Special Deposits
134. Working Funds
135. Temporary Cash Investments
141. Customer Accounts Receivable
142. Other Accounts Receivable
143. Accumulated Provision for Uncollectible Accounts--Cr.

144. Notes Receivable
145. Accounts Receivable from Associated Companies
146. Notes Receivable from Associated Companies
151. Plant Material and Supplies
152. Merchandise
153. Other Material and Supplies
161. Stores Expense
162. Prepayments
171. Accrued Interest and Dividends Receivable
172. Rents Receivable
173. Accrued Utility Revenues
174. Miscellaneous Current and Accrued Assets

Deferred Debits

181. Unamortized Debt Discount and Expense
182. Extraordinary Property Losses
183. Preliminary Survey and Investigation Charges
184. Clearing Accounts
185. Temporary Facilities
186. Miscellaneous Deferred Debits
    - 186.1 Deferred Rate Case Expense
    - 186.2 Other Deferred Debits
187. Research and Development Expenditures
190. Accumulated Deferred Income Taxes
    - 190.1 Federal
    - 190.2 State
    - 190.3 Local

<u>Equity Capital and Liabilities</u>

Equity Capital

201. Common Stock Issued
202. Common Stock Subscribed
203. Common Stock Liability for Conversion
204. Preferred Stock Issued
205. Preferred Stock Subscribed
206. Preferred Stock Liability for Conversion
207. Premium on Capital Stock
209. Reduction in Par or Stated Value of Capital Stock
210. Gain on Resale or Cancellation of Reacquired Capital Stock
211. Other Paid-In Capital
212. Discount on Capital Stock
213. Capital Stock Expense
214. Appropriated Retained Earnings
215. Unappropriated Retained Earnings
216. Reacquired Capital Stock
218. Proprietary Capital (for proprietorships and partnerships only)

Long-Term Debt

221. Bonds
222. Reacquired Funds
223. Advances from Associated Companies
224. Other Long-Term Debt

Current and Accrued Liabilities

231. Accounts Payable
232. Notes Payable
233. Accounts Payable to Associated Companies
234. Notes Payable to Associated Companies
235. Customer Deposits
236. Accrued Taxes
    - 236.1 Accrued Taxes, Utility Operating Income
        - 236.11 Accrued Taxes, Taxes Other Than Income
        - 236.12 Accrued Taxes, Income Taxes
237. Accrued Interest
    - 237.1 Accrued Interest on Long-Term Debt
    - 237.2 Accrued Interest on Other Liabilities
238. Accrued Dividends
239. Matured Long-Term Debt
240. Matured Interest
241. Miscellaneous Current and Accrued Liabilities

Deferred Credits

251. Unamortized Premium on Debt
252. Advances for Construction
253. Other Deferred Credits
255. Accumulated Deferred Investment Tax Credits
    - 255.1 Accumulated Deferred Investment Tax Credits, Utility Operations
    - 255.2 Accumulated Deferred Investment Tax Credits, Nonutility Operations

Operating Reserves

261. Property Insurance Reserve
262. Injuries and Damages Reserve
263. Pensions and Benefits Reserve
265. Miscellaneous Operating Reserves

Contributions in Aid of Construction

271. Contributions in Aid of Construction
272. Accumulated Amortization of Contributions in Aid of Construction

Accumulated Deferred Income Taxes

281. Accumulated Deferred Income Taxes -- Accelerated Amortization
282. Accumulated Deferred Income Taxes -- Liberalized Depreciation
283. Accumulated Deferred Income Taxes -- Other

WATER UTILITY PLANT ACCOUNTS

301. Organization (301.1)
302. Franchises (302.1)
303. Land and Land Rights (303.2 - 303.5)
304. Structures and Improvements (304.2 - 304.5)
305. Collecting and Impounding Reservoirs (305.2)
306. Lake, River, and Other Intakes (306.2)
307. Wells and Springs (307.2)
308. Infiltration Galleries and Tunnels (308.2)
309. Supply Mains (309.2)
310. Power Generation Equipment (310.2)
311. Pumping Equipment (311.2)
320. Water Treatment Equipment (320.3)
330. Distribution Reservoirs and Standpipes (330.4)
331. Transmission and Distribution Mains (331.4)
333. Services (333.4)
334. Meters and Meter Installation (334.4)
335. Hydrants (335.4)
339. Other Plant and Miscellaneous Equipment (339.1 - 339.4)
340. Office Furniture and Equipment (340.5)
341. Transportation (341.5)
342. Stores Equipment (342.5)
343. Tools, Shop and Garage Equipment (343.5)
344. Laboratory Equipment (344.5)
345. Power Operated Equipment (345.5)
346. Communications Equipment (346.5)
347. Miscellaneous Equipment (347.5)
348. Other Tangible Plant (348.5)

Water Utility Plant Subaccounts (as applicable)

.1 Intangible Plant
.2 Source of Supply and Pumping Plant
.3 Water Treatment Plant
.4 Transmission and Distribution Plant
.5 General Plant

INCOME ACCOUNTS

Utility Operating Income

400. Operating Revenues
401. Operating Expenses
403. Depreciation Expense
406. Amortization of Utility Plant Acquisition Adjustment
407. Amortization Expense
    - 407.1 Amortization of Limited Term Plant
    - 407.2 Amortization of Property Losses
    - 407.3 Amortization of Other Utility Plant
408. Taxes Other Than Income
    - 408.10 Utility Regulatory Assessment Fees
    - 408.11 Property Taxes
    - 408.12 Payroll Taxes
    - 408.13 Other Taxes and Licenses
409. Income Taxes
    - 409.10 Federal Income Taxes, Utility Operating Income
    - 409.11 State Income Taxes, Utility Operating Income
    - 409.12 Local Income Taxes, Utility Operating Income
410. Provision for Deferred Income Taxes -- Credit
    - 411.10 Provision for Deferred Income Taxes -- Credit, Utility Operating Income
412. Investment Tax Credits
    - 412.10 Investment Tax Credits Deferred to Future Periods, Utility Operations
    - 412.11 Investment Tax Credits Restored to Operating Income, Utility Operations
413. Income from Utility Plant Leased to Others
414. Gains (Losses) from Disposition of Utility Property

Other Income and Deductions

415. Revenues from Merchandising, Jobbing and Contract Work
416. Costs and Expenses of Merchandising, Jobbing and Contract Work
419. Interest and Dividend Income
420. Allowance for Funds Used During Construction
421. Nonutility Income
426. Miscellaneous Nonutility Expenses

Taxes Applicable to Other Income and Deductions

408. Taxes Other Than Income
    - 408.20 Taxes Other Than Income, Other Income and Deductions
409. Income Taxes
    - 409.20 Income Taxes, Other Income and Deductions
410. Provision for Deferred Income Taxes
    - 410.20 Provision for Deferred Income Taxes, Other Income Deductions
411. Provision for Deferred Income Taxes -- Credit

411.20 Provisions for Deferred Income Taxes -- Credit, Other Income and Deductions

412. Investment Tax Credits
    - 412.20 Investment Tax Credits -- Net, Nonutility Operations
    - 412.30 Investment Tax Credits Restored to Nonoperating Income, Utility Operations

Interest Expense

427. Interest Expense
    - 427.1 Interest on Debt to Associated Companies
    - 427.2 Interest on Short-Term Debt
    - 427.3 Interest on Long-Term Debt
    - 427.4 Interest on Customer Deposits
    - 427.5 Interest -- Other
428. Amortization of Debt Discount and Expense
429. Amortization of Premium on Debt

Extraordinary Items

433. Extraordinary Income
434. Extraordinary Deductions
409. Income Taxes
    - 409.30 Income Taxes, Extraordinary Items

RETAINED EARNINGS ACCOUNTS

435. Balance Transferred From Income
436. Appropriations of Retained Earnings
437. Dividends Declared -- Preferred Stock
438. Dividends Declared -- Common Stock
439. Adjustments to Retained Earnings

WATER OPERATING REVENUE ACCOUNTS

Water Sales

460. Unmetered Water Revenue
461. Metered Water Revenue
    - 461.1 Metered Sales to Residential Customers
    - 461.2 Metered Sales to Commercial Customers
    - 461.3 Metered Sales to Industrial Customers
    - 461.4 Metered Sales to Public Authorities
    - 461.5 Metered Sales to Multiple Family Dwellings
462. Fire Protection Revenue
    - 462.1 Public Fire Protection
    - 462.2 Private Fire Protection
464. Other Sales to Public Authorities

465. Sales to Irrigation Customers
466. Sales for Resale
467. Interdepartmental Sales

Other Water Revenues

470. Forfeited Discounts
471. Miscellaneous Service Revenues
472. Rents From Water Property
473. Interdepartmental Rents
474. Other Water Revenues

WATER OPERATION AND MAINTENANCE EXPENSE ACCOUNTS

601. Salaries and Wages -- Employees (601.1 - 601.8)
603. Salaries and Wages -- Officers, Directors, and Majority Stockholders (603.1 - 603.8)
604. Employee Pensions and Benefits (604.1 - 604.8)
610. Purchased Water (610.1)
615. Purchased Power (615.1, 615.3, 615.5, 615.7, 615.8)
616. Fuel for Power Production (616.1, 616.3, 616.5, 616.7, 616.8)
618. Chemicals (618.1 - 618.8)
620. Materials and Supplies (620.1 - 620.8)
631. Contractual Services -- Engineering (631.1 - 631.8)
632. Contractual Services -- Accounting (632.1 -632.8)
633. Contractual Services -- Legal (633.1 - 633.8)
634. Contractual Services -- Management Fees (634.1 - 634.8)
635. Contractual Services -- Other (635.1 - 635.8)
641. Rental of Building/Real Property (641.1 - 641.8)
642. Rental of Equipment (642.1 - 642.8)
650. Transportation Expenses (650.1 - 650.8)
656. Insurance -- Vehicle (656.1 - 656.8)
657. Insurance -- General Liability (657.1 - 657.8)
658. Insurance -- Workman's Compensation (658.1 - 658.8)
659. Insurance -- Other (659.1 - 659.8)
660. Advertising Expense (660.8)
666. Regulatory Commission Expenses -- Amortization of Rate Case Expense (666.8)
667. Regulatory Commission Expenses -- Other (667.1 - 667.8)
670. Bad Debt Expense (670.7)
675. Miscellaneous Expenses (675.1 - 675.8)

Water Operation and Maintenance Expense Subaccounts (as applicable)

- .1 Source of Supply and Expenses -- Operations
- .2 Source of Supply and Expenses -- Maintenance
- .3 Water Treatment Expenses -- Operations
- .4 Water Treatment Expenses -- Maintenance
- .5 Transmission and Distribution -- Operations
- .6 Transmission and Distribution -- Maintenance
- .7 Customer Accounts -- Expenses
- .8 Administration and General Expenses

APPENDIX B

AN EXAMPLE OF THE COMMODITY-DEMAND COST ALLOCATION METHOD

TABLE B-1. Allocation of Plant Value
Commodity-Demand Method

Item	Total	Commodity	Demand: Maximum Day	Demand: Maximum Hour	Customer Meters & Services	Direct Fire-Protection Service
Source-of-supply plant:						
Land and land rights	$ 423,000	$ 423,000				
Reservoir	204,000	204,000				
Pumping plant:						
Raw water pumping and transmission lines	114,000		$ 114,000			
Treated-water pumping	425,000		425,000			
Treatment plant	1,048,000		1,048,000			
Transmission and distribution plant:						
Structures and improvements	40,000			$ 30,000	$ 9,000	$ 1,000
Distribution storage	413,000			413,000		
Transmission mains	3,112,000			3,112,000		
Distribution mains	1,830,000			1,830,000		
Meters	472,000				472,000	
Services	1,078,000				1,078,000	
Fire hydrants	248,000					248,000
General plant:						
Office	186,000	12,000	31,000	107,000	31,000	5,000
Vehicles	17,000	1,000	3,000	10,000	3,000	
Other	141,000	9,000	24,000	81,000	23,000	4,000
Total plant value	9,751,000	649,000	1,645,000	5,583,000	1,616,000	258,000
Less: Contributions in aid of construction	750,000				750,000	
Rate base	$9,001,000	$ 649,000	$1,645,000	$5,583,000	$ 866,000	$ 258,000

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 19.

TABLE B-2. Allocation of Depreciation Expense
Commodity-Demand Method

Item	Total	Commodity	Demand: Maximum Day	Demand: Maximum Hour	Customer Meters & Services	Direct Fire-Protection Service
Source-of-supply plant:						
Land and land rights						
Reservoir	$ 3,200	$ 3,200				
Pumping plant:						
Raw water pumping and transmission lines	3,500		$ 3,500			
Treated-water pumping	14,200		14,200			
Treatment plant	28,000		28,000			
Transmission and distribution plant:						
Structures and improvements	1,100			$ 600	$ 400	$ 100
Distribution storage	10,300			10,300		
Transmission mains	37,500			37,500		
Distribution mains	32,500			32,500		
Meters	22,500				22,500	
Services	33,200				33,200	
Fire hydrants	8,300					8,300
General plant:						
Office	4,600	100	1,100	1,900	1,300	200
Vehicles	4,000	100	900	1,600	1,200	200
Other	10,100	200	2,400	4,200	2,900	400
Total depreciation expense	$213,000	$ 3,600	$ 50,100	$ 88,600	$ 61,500	$ 9,200

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 20.

TABLE B-3. Allocation of Operation-and-Maintenance Expense
Commodity-Demand Method

Item	Total	Commodity	Demand: Maximum Day	Demand: Maximum Hour	Customer Costs: Meters & Services	Customer Costs: Billing Collecting	Direct Fire Protection Service
Source-of-supply	$ 17,000	$ 17,000					
Pumping:							
Power	152,700	108,400	$ 44,300				
Other	107,400	____	107,400				
Total	260,100	108,400	151,700				
Treatment:							
Chemicals	99,900	99,900					
Other	69,600	____	69,600				
Total	169,500	99,900	69,600				
Transmission and distribution:							
Distribution storage	14,000			$ 14,000			
Transmission mains	54,100			54,100			
Distribution mains	35,200			35,200			
Meters	96,600				$ 96,600		
Services	35,300				35,300		
Fire hydrants	16,500						$ 16,500
Other	60,000			24,600	31,500		3,900
Total	311,700			127,900	163,400		20,400
General billing and collecting:							
Meter reading	110,800					$ 110,800	
Billing and collecting	203,700					203,700	
Other	11,800					11,800	
Total	326,300					326,300	
Administration and general:							
Fringe benefits	81,800	2,300	25,000	13,200	16,000	22,600	2,700
Other	303,600	6,400	67,100	46,900	59,600	115,900	7,700
Total	385,400	8,700	92,100	60,100	75,600	138,500	10,400
Total operation-and-maintenance expense	$1,470,000	$ 234,000	$ 313,400	$ 188,000	$ 239,000	$ 464,800	$ 30,800

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 21.

TABLE B-4. Unit Costs of Service
Commodity-Demand Method

Item	Total Cost	Commodity	Demand: Maximum Day	Demand: Maximum Hour	Customer Costs: Meters & Services	Customer Costs: Billing Collecting	Direct Fire Service
Total system units of service:							
Number		2,877,000	16,563	29,632	18,159	203,136	
Units		thou. gal	thou. gpd	thou. gpd	equiv. meters	bills	
Operation-and-maintenance expense:							
Total	$1,470,000	$234,00	$313,400	$188,000	$239,000	$464,800	$30,800
Unit cost ($ unit)		0.0813	18.9217	6.3445	13.1615	2.2881	
Depreciation expense:							
Total	$213,000	$3,600	$50,100	$88,600	$61,500		$9,200
Unit cost ($ unit)		0.0013	3.0248	2.9900	3.3868		
Rate Base:							
Total rate base	$9,001,000	$649,000	$1,645,000	$5,583,000	$866,000		$258,000
Unit rate base ($ unit)		0.2256	99.3178	188.4112	47.6899		
Payment in lieu of taxes:							
Total	$175,000	$12,600	$32,000	$108,600	$16,800		$5,000
Unit cost ($ unit)		0.0044	1.9320	3.6650	0.9252		
Unit return on rate base:							
Inside-city ($ unit) *		0.0107	4.6977	8.9118	2.2557		$12,000
Outside-city ($ unit) **		0.0169	7.4488	14.1308	3.5767		
Total unit costs of service:							
Inside-city ($ unit)		0.0977	28.5762	21.9113	19.7292	2.2881	
Outside-city ($ unit)		0.1039	31.3273	27.1303	21.0502	2.2881	

* At 4.73 percent return on $8,420,000 rate base.

** At 7.5 percent return on $583,000 rate base.

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 34.

TABLE B-5. Cost Distribution to Customer Classes
Commodity-Demand Method

Item	Commodity	Demand		Customer Costs		Direct Fire-Protection Service	Total Cost of Service
		Maximum Day	Maximum Hour	Meters & Services	Billing & Collecting		
Inside-city:							
Unit cost of service ($ unit)	0.0977 per thou. gal	28.5762 per thou. gpd	21.9113 per thou. gpd	19.7292 per equiv. meter	2.2881 per bill		
Retail service:							
Residential:							
Units of service	928,000	6,355	10,168	16,019	190,452		
Allocated cost of service	$ 90,700	$ 181,600	$ 222,800	$ 316,100	$ 435,800		$1,247,000
Commercial:							
Units of service	590,000	3,232	5,252	1,951	12,528		
Allocated cost of service	$ 57,600	$ 92,400	$ 115,100	$ 38,500	$ 28,700		$ 332,300
Industrial:							
Units of service	1,149,000	4,722	6,296	169	120		
Allocated cost of service	$ 112,300	$ 134,900	$ 138,000	$ 3,300	$ 300		$ 388,800
Fire-protection service:							
Units of service		960	5,760				
Allocated cost of service		$ 27,400	$ 126,200			$ 57,000	$ 210,600
Total inside-city allocated cost of service							$2,178,700
Outside-city:							
Unit costs of service ($ unit)	0.1039	31.32773	27.1303	21.0502	2.2881		
Wholesale:							
Units of service	210,000	1,294	2,156	20	36		
Allocated cost of service	$ 21,800	$ 40,500	$ 58,500	$ 400	$ 100		$ 121,300
Total system allocated cost of service	$ 282,400	$ 476,800	$ 660,600	$ 358,300	$ 464,900	$ 57,000	$2,300,000

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 36.

APPENDIX C

AN EXAMPLE OF THE BASE-EXTRA CAPACITY COST ALLOCATION METHOD

TABLE C-1. Allocation of Plant Value
Base-Extra Capacity Method

Item	Total	Base	Extra Capacity: Maximum Day	Extra Capacity: Maximum Hour	Customer Meters & Services	Direct Fire Service
Source-of-supply plant:						
Land and land rights	$ 423,000	$ 423,000				
Reservoir	204,000	204,000				
Pumping plant:						
Raw water pumping and transmission lines	114,000	74,000	$ 40,000			
Treated-water pumping	425,000	276,000	149,000			
Treatment plant	1,048,000	681,000	367,000			
Transmission and distribution plant:						
Structures and improvements	40,000	13,000		$ 17,000	$ 9,000	$1,000
Distribution storage	413,000	41,000		372,000		
Transmission mains	3,112,000	1,400,000		1,712,000		
Distribution mains	1,830,000	824,000		1,006,000		
Meters	472,000				472,000	
Services	1,078,000				1,078,000	
Fire hydrants	248,000					248,000
General plant:						
Office	186,000	78,000	11,000	61,000	31,000	5,000
Vehicles	17,000	7,000	1,000	6,000	3,000	
Other	141,000	59,000	8,000	47,000	23,000	4,000
Total plant value	9,751,000	4,080,000	576,000	3,221,000	1,616,000	258,000
Less: Contributions in aid of construction	750,000				750,000	
Rate base	$9,001,000	$4,080,000	$ 576,000	$3,221,000	$ 866,000	$ 258,000

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 14.

TABLE C-2. Allocation of Depreciation Expense
Base-Extra Capacity Method

Item	Total	Base	Extra Capacity Maximum Day	 Maximum Hour	Customer Meters & Services	Direct Fire Service
Source-of-supply plant:						
Land and land rights						
Reservoir	$ 3,200	$ 3,200				
Pumping plant:						
Raw water pumping and transmission lines	3,500	2,300	$ 1,200			
Treated-water pumping	14,200	9,200	5,000			
Treatment plant	28,000	18,200	9,800			
Transmission and distribution plant:						
Structures and improvements	1,100	200		$ 400	$ 400	$ 100
Distribution storage	10,300	1,000		9,300		
Transmission mains	37,500	16,900		20,600		
Distribution mains	32,500	14,600		17,900		
Meters	22,500				22,500	
Services	33,200				33,200	
Fire hydrants	8,300					8,300
General plant:						
Office	4,600	1,600	400	1,100	1,300	200
Vehicles	4,000	1,400	300	1,000	1,100	200
Other	10,100	3,400	800	2,500	3,000	400
Total depreciation expense	$213,000	$ 72,000	$ 17,500	$ 52,800	$ 61,500	$ 9,200

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 16.

TABLE C-3. Allocation of Operation-and-Maintenance Expense
Base-Extra Capacity Method

Item	Total	Base	Extra Capacity: Maximum Day	Extra Capacity: Maximum Hour	Customer Costs: Meters & Services	Customer Costs: Billing & Collecting	Direct Fire Service
Source-of-supply	$ 17,000	$ 17,000					
Pumping:	152,700	137,400	$ 15,300				
Other	107,400	69,800	37,600				
Total	260,100	207,200	52,900				
Treatment:							
Chemicals	99,900	99,900					
Other	69,600	45,200	24,400				
Total	169,500	145,100	24,400				
Transmission and distribution:							
Distribution storage	14,000	1,400		$ 12,600			
Transmission mains	54,100	24,300		29,800			
Distribution mains	35,200	15,800		19,400			
Meters	96,600				$ 96,600		
Services	35,300				35,300		
Fire hydrants	16,500						$ 16,500
Other	60,000	9,900		14,700	31,500		3,900
Total	311,700	51,400		76,500	163,400		20,400
General billing and collecting:							
Meter reading	110,800					$110,800	
Billing and collecting	203,700					203,700	
Other	11,800					11,800	
Total	326,300					326,300	
Administration and general:							
Fringe benefits	81,800	24,400	8,700	7,400	16,000	22,600	2,700
Other	303,600	69,000	23,500	27,900	59,600	115,900	7,700
Total	385,400	93,400	32,200	35,300	75,600	138,500	10,400
Total operation-and-maintenance expense	$1,470,000	$ 514,100	$ 109,500	$ 111,800	$ 239,000	$ 464,800	$ 30,800

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 17.

TABLE C-4. Units of Service
Base-Extra Capacity Method

	Base		Maximum-Day			Maximum-Hour				
Customer Class	Annual Use thou. gal	Average Rate thou. gpd	Capacity Factor %	Total Capacity thou. gpd	Extra Capacity thou. gpd	Capacity Factor %	Total Capacity thou. gpd	Extra Capacity thou. gpd	Equivalent Meters and Services	Bills
Inside-city:										
Retail service										
Residential	928,000	2,542	250	6,355	3,813	400	10,168	7,626	16,019	190,452
Commercial	590,000	1,616	200	3,232	1,616	325	5,252	3,636	1,951	12,528
Industrial	1,149,000	3,148	150	4,722	1,574	200	6,296	3,148	169	120
Fire-protection service				960	960		5,760	5,760		
Total inside-city	2,667,000	7,306		15,269	7,963		27,476	20,170	18,139	203,100
Outside-city:										
Wholesale service	210,000	575	225	1,294	719	375	2,156	1,581	20	36
Total system	2,877,000	7,881		16,563	8,682		29,632	21,751	18,159	203,136

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 29.

TABLE C-5. Cost Distribution to Customer Classes
Base-Extra Capacity Method

Item	Base	Extra Capacity: Maximum Day	Extra Capacity: Maximum Hour	Customer Costs: Meters & Services	Customer Costs: Billing Collecting	Direct Fire-Protection Service	Total Cost of Service
Inside-city:							
Unit costs of service ($/unit)	0.2984 per thou. gal	19.0561 per thou. gpd	17.4545 per thou. gpd	19.7292 per equiv. meter	2.2881 per bill		
Retail service:							
Residential:							
Units of service	928,000	3,813	7,626	16,019	190,452		
Allocated cost of service	$ 276,900	$ 72,700	$ 133,100	$ 316,100	$ 435,800		$1,234,600
Commercial:							
Units of service	590,000	1,616	3,636	1,951	12,528		
Allocated cost of service	$ 176,100	$ 30,800	$ 63,500	$ 38,500	$ 28,700		$ 337,600
Industrial:							
Units of service	1,149,000	1,574	3,148	169	120		
Allocated cost of service	$ 342,900	$ 30,000	$ 54,900	$ 3,300	$ 300		$ 431,400
Fire-protection service:							
Units of service		960	5,760				
Allocated cost of service		$ 18,300	$ 100,600			$ 57,000	$ 175,900
Total inside-city allocated cost of service							$2,179,500
Outside-city:							
Unit cost of service ($/unit)	0.3377	20.8938	21.5565	21.0502	2.2881		
Wholesale:							
Units of service	210,000	719	1,581	20	36		
Allocated cost of service	$ 70,900	$ 15,000	$ 34,100	$ 400	$ 100		$ 120,500
Total system allocated cost of service	$ 866,800	$ 166,800	$ 386,200	$ 358,300	$ 464,900	$ 57,000	$2,300,000

Source: American Water Works Association; Water Rates (Denver, CO: American Water Works Association, Manual M1, 1983), 35.

APPENDIX D

AN EXAMPLE OF MARGINAL-COST ANALYSIS

TABLE D-1

UNIT MARGINAL COST BY CUSTOMER CLASSIFICATION

	Annual Marginal Cost	Effective Sales (TG's)	Unit Marginal Cost
Residential:			
A. Supply	$106,129	118,443	$0.90
B. Pumping	50,134	118,443	0.42
C. Treatment	22,143	118,443	0.19
D. Storage	48,079	84,607	0.57
TOTAL	$226,486		$2.08
Commercial:			
A. Supply	$106,129	148,081	$0.72
B. Pumping	50,134	148,081	0.34
C. Treatment	22,143	148,081	0.15
D. Storage	48,079	105,777	0.45
TOTAL	$226,486		$1.66
Other Industrial:			
A. Supply	$106,129	169,214	$0.63
B. Pumping	50,134	169,214	0.30
C. Treatment	22,143	169,214	0.13
D. Storage	48,079	131,619	0.37
TOTAL	$226,486		$1.43
Large Industrial:			
A. Supply	$106,129	211,518	$0.50
B. Pumping	50,134	211,518	0.24
C. Treatment	22,143	211,518	0.10
D. Storage	48,079	164,506	0.29
TOTAL	$226,486		$1.13
Public Authorities:			
A. Supply	$106,129	148,081	$0.72
B. Pumping	50,134	148,081	0.34
C. Treatment	22,143	148,081	0.15
D. Storage	48,079	105,777	0.45
TOTAL	$226,486		$1.66

Source: Massachusetts-American Water Company Exhibit SBA-4 in a rate hearing before the Massachusetts Department of Public Utilities (June 1990).

TABLE D-2

EFFECTIVE SALES AND PRODUCTION DATA FOR MARGINAL-COST STUDY

Effective Sales By Class	Demand Ratio	Sales Ratio	Annual Sales Per MGD of Capacity
Residential			
Max Day	2.50	0.3245	118,443
Peak Hour	3.50	0.2318	84,607
Commercial			
Max Day	2.00	0.4057	148,081
Peak Hour	2.80	0.2898	105,777
Other Industrial			
Max Day	1.75	0.4636	169,214
Peak Hour	2.25	0.3606	131,619
Large Industrial			
Max Day	1.40	0.5795	211,518
Peak Hour	1.80	0.4507	164,506
Public Authorities			
Max Day	2.00	0.4057	148,081
Peak Hour	2.80	0.2898	105,777

TOTAL PRODUCTION:	Average Day	5.51 mgd
	Annual Volume	2,011,150 TGs
Company Use & Unaccounted For		<u>379,483</u> TGs
Effective Total System Sales		1,631,667 TGs

Calculation of System Sales per 1.0 MGD of Additional Capacity

Ratio of Total System Sales to Total Production:		0.8113
System Demand Ratio	2.00	
System Sales Ratio	0.4057	
Annual System Sales per MGD of Capacity (TGs per year)		148,081

Source: Massachusetts-American Water Company Exhibit SBA-4 in a rate hearing before the Massachusetts Department of Public Utilities (June 1990).

TABLE D-3

ESTIMATED COST OF FACILITIES REQUIRED TO PROVIDE 1 MGD OF NEW CAPACITY

Facilities Required			Capital Costs
1.	Well:	Exploration & Development	$150,000
		Mass. DEP Permitting	25,000
		Structures & Appurtenances	25,000
			$200,000
2.	Pumping:	Structure	$100,000
		Equipment	50,000
			$150,000
3.	Treatment:	Equipment	$50,000
4.	Storage:	250,000 gallons (1)	$250,000
5.	Transmission Mains Required to connect new well and storage facilities to existing distribution network (2):		
		a. Well	$250,000
		b. Storage Tank (3)	$60,000
6.	Land for well site		$250,000
7.	Land for tank site (4)		$12,500

Notes:

(1) Based on 1 MG Structure costing $1,000,000. Volume required to equalize 1 MGD of maximum day demand is assumed to be 250,000 gallons or 25 percent of the total.

(2) Based on 2,500 ft. of 12" main at $100 per foot.

(3) Based on 25% of $250,000 for transmission main.

(4) Based on 25% of $50,000 for land.

Source: Massachusetts-American Water Company Exhibit SBA-4 in a rate hearing before the Massachusetts Department of Public Utilities (June 1990).

TABLE D-4

CALCULATION OF ANNUAL MARGINAL COST FOR FACILITIES REQUIRED TO PROVIDE ADDITIONAL CAPACITY

A.	Supply	Capital Cost	Life Cycle	Present Value	Equal Periodic Payment
	Well	$200,000	40	$264,449	$29,569
	Transmission Main	250,000	100	343,418	37,811
	Land	250,000	-	351,931	38,749
	Total Fixed Costs	$700,000		$959,799	
	Annual Marginal Cost - Supply				$106,129

B.	Pumping	Capital Cost	Life Cycle	Present Value	Equal Periodic Payment
	Structure	$100,000	50	$133,939	$14,827
	Equipment	50,000	25	63,305	7,522
	Total Fixed Costs	$150,000		$197,244	$22,349
	Variable Costs:				
	Power Purchased		$	282,249	
	Maintenance of Equipment			23,906	
	Total System			$306,155	
	Effective Total System Sales (TG/YR)			1,631,667	
	Unit Variable Cost				27,785
	Annual Marginal Cost - Pumping				$50,134

TABLE D-4 (continued)

C. Treatment	Capital Cost	Life Cycle	Present Value	Equal Periodic Payment
Equipment	$50,000			
Total Fixed Costs	$50,000	20	$62,276	$7,825
Variable Costs:				
Chemicals			$147,649	
Maintenance of Equipment			10,116	
Total System			$157,765	
Effective Total System Sales (TG/YR)			1,631,667	
Unit Variable Cost			$0.10	
System Sales for IMGD Capacity			148,081	
Annual Variable Cost				14,318
Annual Marginal Cost - Treatment				$22,143

D. Storage	Capital Cost	Life Cycle	Present Value	Equal Periodic Payment
Storage Tank	$250,000	50	$334,847	$37,067
Transmission Main	60,000	100	82,420	9,075
Land	12,500	-	17,597	1,937
Total Fixed Costs	$322,500		$434,864	
Annual Marginal Cost - Storage				$48,079

TABLE D-4 (continued)

Supporting calculations:

Land cost required for increased well capacity:	$250,000
Return at 11.01%	$27,525
Property Taxes at 1.147%	2,868
Income Taxes at 30.36%	8,356
Total Annual Cost (Equal Periodic Payment)	$38,749
Land cost required for increased storage capacity:	$12,500
Return at 11.01%	$1,376
Property Taxes at 1.147%	143
Income Taxes at 30.36%	418
Total Annual Cost (Equal Periodic Payment)	$1,937

Source: Massachusetts-American Water Company Exhibit SBA-4 in a rate hearing before the Massachusetts Department of Public Utilities (June 1990).

APPENDIX E

ERNST & YOUNG'S 1990 NATIONAL WATER RATE SURVEY

ERNST & YOUNG'S 1990 NATIONAL WATER RATE SURVEY

State City/ Effective Date	Bill-ing Cycle (a)	Rate Struc-ture (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 / 0	500 / 3.74	1,000 / 7.48	3,000 / 22.44	2 inch 50,000 / 374	4 inch 1 mil / 7,480	8 inch 1.5 mil / 11,220	Connec-tion Charge (c)
ALABAMA										
Birmingham	M	D5	$3.46	$7.71	$11.96	$28.84	$425	$7,887	$11,937	$145
Mobile (1/90)	M	D9	3.78	4.69	9.66	28.86	436	5,776	7,921	281
ARIZONA										
Phoenix (7/89)										
Summer	M	I3	4.70	6.80	8.90	25.30	445	7,264	na	varies
Winter	M	I3	4.70	6.80	8.90	22.20	387	7,264	na	varies
Tuscon (5/89)										
Summer	M	I7	4.10	9.05	15.00	52.15	564	9,533	14,336	400
Winter	M	I7	4.10	9.05	14.70	44.75	564	9,533	14,336	400
ARKANSAS										
Little Rock (2/85)	M	D5	3.60	5.82	9.52	24.32	318	3,168	4,684	120
CALIFORNIA										
Anaheim (9/89)	B,M	U	9.60	11.64	13.68	22.49	237	4,169	6,389	2,500
Bakersfield (1/89)	M	U	4.85	6.88	8.90	17.00	218	4,089	6,170	none
Fresno (12/89)	B	U	3.23	4.43	5.63	10.43	129	2,420	3,649	1,760
Los Angeles (10/88)										
Summer	M,B	U	5.30	7.52	12.65	33.15	525	10,297	15,540	1,455
Winter	M,B	U	5.30	6.85	11.30	29.10	457	8,947	13,515	1,455
Oakland (7/89)	B	U	4.20	7.20	12.20	28.20	424	8,080	12,264	1,480-7,820
Sacremento (1/89)	M	R: U C: D3	5.17	5.17	5.17	10.20	158	2,543	3,793	2,214
San Diego (1/89)	B	R: I2 C: U	3.12	7.64	12.16	31.92	504	9,749	14,846	1,651
San Francisco (7/89)	B,M	U	1.50	4.05	6.60	16.80	257	5,102	7,650	1,600
San Jose (7/89)										
City of San Jose	M	I	4.00	8.09	12.84	31.84	486	9,529	14,320	3,250
San Jose Water Co.	M	I	4.35	8.66	13.62	33.41	507	9,930	14,953	na
Stockton (8/89)	M	D2	5.75	7.35	8.95	15.35	167	2,757	4,165	359
Ventura (6/89)	B	I3	1.36	4.69	8.45	26.11	441	8,830	13,245	699
COLORADO										
Col. Springs (1/86)	M	U	2.74	9.67	16.59	44.30	695	13,856	20,782	3,807
Denver (4/87)	B	D4	2.15	5.25	8.36	19.58	208	3,571	5,358	2,730

APPENDIX E (continued)

State City/ Effective Date	Bill-ing Cycle (a)	Rate Struc-ture (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 / 0	500 / 3.74	1,000 / 7.48	3,000 / 22.44	2 inch 50,000 / 374	4 inch 1 mil / 7,480	8 inch 1.5 mil / 11,220	Connec-tion Charge (c)
CONNECTICUT										
Hartford (3/89)	M,Q	I2	6.16	10.81	15.46	34.06	474	7,257	10,757	2,654
New Haven (11/88)	Q	D3	6.52	13.97	21.42	51.22	653	11,309	16,733	485
Bridgeport (6/89)	M,Q	D3	10.27	14.84	22.45	52.91	507	6,399	9,918	50
DISTRICT OF COLUMBIA										
Washington (10/86)	Q,M	U	0.00	5.02	10.04	30.12	502	10,040	15,060	78
FLORIDA										
Ft.Lauderdale (10/89)	B	U	2.73	6.81	10.88	27.19	425	8,206	12,397	426
Jacksonville (12/81)	M	I2	5.54	5.54	8.20	15.80	212	2,848	4,337	290
Lakeland (10/84)	M	D3	3.10	4.80	7.35	20.10	307	5,880	8,902	530
Miami (10/89)	Q	U	4.29	4.29	7.13	21.38	356	7,125	10,689	315+
Orlando (2/90)	M	D2	2.35	3.93	6.05	13.97	200	3,893	5,854	985
St. Petersburg (9/88)	M	R: I3 C: U	4.38	8.05	11.71	26.37	411	7,510	11,713	505
Tampa (10/89)	M	U	1.50	3.85	7.70	23.10	385	7,700	11,550	1,345
Palm Beach Co.(11/89)	M	R: I3 C: U	3.50	5.90	9.20	20.20	300	4,786	na	1,700
GEORGIA										
Atlanta (3/84)	B,M	D4	3.35	6.75	15.25	49.25	564	7,459	11,059	400+/ 620+
Augusta (1/80)	M	D5	2.88	3.59	7.18	21.54	301	4,195	6,065	425
HAWAII										
Honolulu (7/89)	B,M	U	1.63	5.51	9.95	26.60	418	8,306	12,457	2,325
ILLINOIS										
Chicago (5/89)	B,M,S	U	0.00	3.35	6.69	20.07	335	6,690	10,035	450
Joliet (4/85)	M	D3	2.55	6.96	14.31	41.51	587	11,607	17,407	110
Peoria (3/86)	M,Q	D4	5.00	13.15	21.30	53.90	427	6,412	9,668	0
INDIANA										
Gary (12/89)	B,M	D6	7.08	8.83	17.05	46.22	587	6,190	9,069	varies
Indianapolis (7/88)	M	D5	3.25	8.05	12.85	30.25	395	4,320	6,241	varies
Fort Wayne (8/86)	M	D3	3.59	7.13	10.67	24.83	346	4,427	6,557	412/ 587

APPENDIX E (continued)

State City/ Effective Date	Bill-ing Cycle (a)	Rate Struc-ture (b)	Rates (cubic feet and thousand gallons)							Connec-tion Charge (c)
			5/8 meter				2 inch	4 inch	8 inch	
			0	500	1,000	3,000	50,000	1 mil	1.5 mil	
			0	3.74	7.48	22.44	374	7,480	11,220	
IOWA										
Davenport (7/87)	Q	D4	3.35	7.96	12.57	31.01	368	6,179	8,728	0
Des Moines (1/88)	M	D	5.00	6.32	12.64	37.92	516	7,428	11,051	70+
KANSAS										
Wichita (1/87)	B	D	3.97	5.01	8.60	22.96	220	3,528	4,897	300
KENTUCKY										
Louisville (1/88)	M,B	I6	3.15	6.98	11.36	30.06	478	7,935	11,777	425
LOUISIANA										
Baton Rouge (6/89)	M	D5	7.23	8.98	13.37	30.91	344	4,147	5,867	74
New Orleans (1/87)	M	D3	2.80	9.57	16.53	40.54	628	9,848	14,630	0
Shreveport (1/89)	M	U	2.10	7.22	12.35	26.78	370	7,283	10,963	600
MARYLAND										
Baltimore (5/89)	Q	D3	2.33	3.50	7.00	17.40	175	2,977	4,452	0
MASSACHUSETTS										
Boston (1/90)	Q	I10	0.00	7.55	15.12	45.49	765	15,408	23,118	125
Salem (7/84)	Q	U	10.50	10.50	10.50	31.50	525	10,500	15,750	45+
Springfield (7/89)	Q	U	5.00	5.45	10.90	32.70	545	10,900	16,350	75+ 10/ft.
Lawrence (7/88)	Q	U	3.17	6.75	13.50	40.50	68	13,500	20,250	315
Worchester (7/89)	S	U	1.50	6.85	13.70	41.10	685	13,700	20,550	50
MICHIGAN										
Ann Arbor (7/85)	Q,M	U	2.10	4.10	8.19	24.57	410	8,190	12,285	1,005
Detroit (7/89)	Q,M	D3	0.88	3.02	5.17	13.75	191	3,341	5,039	0
Flint (7/89)	M	D3	3.40	9.35	15.30	45.35	604	9,676	14,401	70
Grand Rapids (1/89)	QM	U	6.05	9.05	12.05	24.05	337	6,145	9,324	3,538+
Lansing (11/86)	Q,M	U	4.15	8.38	12.60	29.50	462	8,616	13,256	1,836
Saginaw (11/89)	Q,M	D3	1.83	3.73	5.64	13.25	210	3,550	5,497	307
MINNESOTA										
Minneapolis (1/84)	Q	U	1.00	4.25	8.50	25.50	425	8,500	12,750	357
St. Paul (1/88)	Q,M	D3	1.07	5.57	10.07	28.07	460	8,757	13,182	1,096

APPENDIX E (continued)

State City/ Effective Date	Bill-ing Cycle (a)	Rate Struc-ture (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 / 0	500 / 3.74	1,000 / 7.48	3,000 / 22.44	2 inch 50,000 / 374	4 inch 1 mil / 7,480	8 inch 1.5 mil / 11,220	Connec-tion Charge (c)
MISSISSIPPI										
Jackson (6/88)	B	U	2.50	10.20	15.40	36.20	543	10,438	15,638	515
MISSOURI										
Kansas City (12/89)	B,M	D3	5.10	9.70	14.30	32.70	381	6,952	9,821	varies
St. Louis (9/89)	Q	D3	3.20	6.75	10.30	24.50	327	5,662	8,537	55
NEBRASKA										
Omaha (5/89)										
Summer	M	D2	2.10	4.71	7.72	20.18	275	4,528	6,713	613
Winter	M	D2	2.10	4.71	7.72	17.76	238	4,528	6,713	613
NEVADA										
Las Vegas (10/87)	M	U	8.66	11.39	14.12	25.04	324	5,614	8,677	400
NEW JERSEY										
Jersey City (1/82)	Q	U	1.00	4.75	8.50	23.50	383	7,530	11,340	190
Newark (2/84)	Q	D5	10.37	10.37	15.56	36.30	484	8,042	11,767	1,750
Trenton (3/84)	Q	D3	4.48	5.49	6.50	10.56	145	2,076	3,597	0
NEW MEXICO										
Albuquerque (9/88)	M	U	5.19	2.79	10.39	22.72	306	5,560	9,237	2,208
NEW YORK										
Albany (6/88)	T	I2	3.75	3.75	10.00	30.00	500	13,514	20,514	175
Buffalo (7/88)	M,Q	na	6.90	6.90	6.90	20.70	207	3,627	5,427	263
New York (1/89)	S,B	U	3.90	4.75	9.50	28.50	475	9,500	14,250	330
Syracuse (12/89)	Q,M	D4	3.59	4.15	8.30	24.90	301	5,260	7,065	235
NORTH CAROLINA										
Charlotte (7/89)	M	U	1.45	4.85	8.25	21.85	341	6,801	10,201	1,001
Greensboro (3/88)	M,Q	D3	1.98	3.30	6.60	19.80	234	2,894	4,294	1,643
Raleigh (8/89)	M	U	1.41	6.61	11.81	32.61	526	10,416	15,651	1,869

APPENDIX E (continued)

State City/ Effective Date	Bill-ing Cycle (a)	Rate Struc-ture (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 0	500 3.74	1,000 7.48	3,000 22.44	2 inch 50,000 374	4 inch 1 mil 7,480	8 inch 1.5 mil 11,220	Connec-tion Charge (c)
OHIO										
Akron (1/90)	M	D3	2.02	9.37	16.72	46.12	610	11,820	18,004	785
Canton (10/88)	Q	D	2.00	4.55	9.10	27.30	313	4,038	5,738	250/ 265
Cincinnati (12/88)	Q,M	D3	3.53	5.11	9.06	23.56	341	5,974	8,978	1,500
Cleveland (2/87)	Q	I2	5.20	5.20	6.23	19.71	336	6,739	10,109	235
Columbus (1/89)	Q,M	D6	2.98	6.42	9.84	30.17	298	4,889	7,034	1,997
Dayton (10/87)	Q,M	D6	3.66	3.66	3.66	8.79	140	2,170	3,157	1,300+/-
Toledo (1/87)	Q,M	D4	4.03	4.03	6.05	18.15	295	4,822	6,703	600
Youngstown (5/88)	Q	D5	1.96	4.96	9.43	30.32	307	4,943	7,383	525
OKLAHOMA										
Oklahoma C. (7/88)	M	U	2.75	4.91	9.23	25.43	406	7,631	11,446	110+
Tulsa (1/90)	M	U	3.74	7.85	11.97	26.63	331	6.394	9,573	110+
OREGON										
Portland (7/89)	Q,M	U	2.80	6.40	10.00	24.40	369	7,221	10,857	610+
PENNSYLVANIA										
Allentown (1/89)	Q	U	2.52	6.04	9.55	23.62	362	7,068	10,648	90
Lancaster (1/89)	Q	D3	1.80	5.24	10.49	31.94	393	4,160	6,142	0
Philadelphia (7/83)	Q	D4	2.08	6.81	11.53	28.28	377	6,478	9,708	50
Pittsburgh (1/89)	Q	U	5.17	10.17	17.96	48.50	730	14,382	21,598	208
Harrisburg (1/83)	Q	U-city D5-suburb	1.28	3.66	5.94	15.56	266	4,901	7,818	107
Scranton (7/89)	Q,M	R: U C: D3	5.33	10.36	19.43	54.33	571	8,264	11,001	0
SOUTH CAROLINA										
Charleston (6/89)	M	D3	3.70	6.64	10.54	23.34	268	5,051	7,638	865
Columbia (8/89)	M	D6	2.55	4.15	8.15	24.15	387	12,610	18,472	125
Greenville (2/81)	Q	D4	2.35	3.29	6.58	18.92	193	3,117	4,613	0
TENNESSEE										
Chattanooga (3/88)	M	D5	6.59	8.35	17.14	52.32	650	7,784	11,499	0
Johnson City (7/88)	M	D8	4619	10.12	17.63	44.30	567	9,258	13,821	225
Knoxville (8/86)	M	D4	6.25	9.53	17.73	50.53	603	7,211	10,373	400

APPENDIX E (continued)

State City/ Effective Date	Billing Cycle (a)	Rate Structure (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 / 0	500 / 3.74	1,000 / 7.48	3,000 / 22.44	2 inch 50,000 / 374	4 inch 1 mil / 7,480	8 inch 1.5 mil / 11,220	Connection Charge (c)
TENNESSEE(cont.)										
Memphis (1/90)	M	R: D3	2.49	3.29	6.58	18.93	264	3,372	5,002	125
		D5-General Power Service								
Nashville (1/90)	M		3.83	11.00	22.95	66.84	996	15,124	22,508	250
TEXAS										
Austin (11/89)	M	U	5.46	9.39	17.84	51.65	856	16,960	25,478	1,627
Beaumont (11/89)	M	U	3.16	6.94	12.10	32.75	520	10,335	15,511	175
Corpus Christi (8/88)	M	R: I6	3.76	6.02	11.13	32.28	415	6,411	9,874	1,739
		C: D6								
Dallas (10/89)										
Summer	M	R: I3	1.29	4.92	9.62	19.89	337	6,690	10,107	225
		C: I2								
Winter	M	R: I2	1.29	4.92	9.62	18.37	290	5,719	8,650	225
		C: U								
El Paso (3/89)	M	I6	3.13	3.59	5.89	15.09	233	4,609	6,942	777
Fort Worth (10/88)										
Summer	M	D3	3.05	9.45	15.85	53.15	849	9,831	14,368	1,610
Winter	M	D3	3.05	9.45	15.85	53.15	605	9,587	14,124	1,610
Houston (8/89)	M	I2	4.47	9.78	18.34	47.68	756	14,982	22,501	135
San Antonio (12/88)	M	R: I	4.72	6.92	9.54	19.01	257	5,011	7,585	varies
		C: D								
		W: U								
UTAH										
Salt Lake (7/89)	M,B	U	6.45	6.45	6.45	15.05	239	4,383	6,722	230/ 290
VIRGINIA										
Norfolk (7/89)	B	D2	2.13	7.76	13.38	37.20	552	10,448	15,749	525
WASHINGTON										
Seattle (1/84)										
Summer	M,B	R: I2	1.40	5.74	10.58	18.39	273	5,353	8,067	0
Winter		C: U	1.40	5.40	9.39	15.21	220	4,293	6,477	0
Tacoma (1/89)	B	R: U	6.35	9.00	11.64	20.75	291	3,914	5,838	2,625
		C: D4								

APPENDIX E (continued)

State City/ Effective Date	Billing Cycle (a)	Rate Structure (b)	Rates (cubic feet and thousand gallons) 5/8 meter 0 / 0	500 / 3.74	1,000 / 7.48	3,000 / 22.44	2 inch 50,000 / 374	4 inch 1 mil / 7,480	8 inch 1.5 mil / 11,220	Connection Charge (c)
WISCONSIN										
Milwaukee (6/88)	Q,M	D4	1.93	5.08	8.23	20.83	316	5,005	7,046	245

Source: *Ernst & Young's 1990 National Water and Wastewater Rate Survey* (Charlotte, NC: National Environmental Consulting Group, Ernst & Young, 1990).

Note: Dates in parentheses following each city name indicate when the rate structure was approved or implemented.

(a) M=Monthly
B =Bimonthly
Q=Quarterly
S =Seminannually
T =Triannually
A =Annually

(b) R =Residential
C =Commercial
W=Wholesale
U=Uniform
D=Decreasing block (with number of blocks)
I =Increasing block (with number of blocks)

(c) Total one-time charges assessed for a new single-family residence to connect to the water system.

GLOSSARY OF COST ALLOCATION AND RATE DESIGN TERMS

abandonment. Retirement of a utility plant on the books without its physical removal from its installed location. NARUC(a)

above the line. Expenses incurred in operating a utility that are charged to the ratepayer. They are written above a line drawn on the income statement separating them from costs paid by investors. See also **below the line.** NARUC(a)

absorption costing. See **full costing.**

accelerated depreciation. Depreciation methods that amortize the cost of an asset at a faster rate than under the **straight-line method.** The three principal methods of accelerated depreciation are sum of the year's digits, double declining balance, and units of production. AWWA(c)

account water. All water for which an account exists, the water is metered, and the account is billed. This concept is preferable to "accounted-for water." See also, **authorized water uses** and **non-account water.** AWWA(e)

accounts. Accounts prescribed in the NARUC(b) Uniform System of Accounts for Water Utilities. NARUC(b)

accrual basis. The basis of accounting under which revenues are recorded when earned and expenditures are recorded when they become liabilities for benefits received, notwithstanding that receipt of the revenue or payments of the expenditures may take place, in whole or in part, in another accounting period. See also **cash basis.** AWWA(c)

accrued depreciation. Monetary difference between the original cost of an article and its remaining value. NARUC(a)

acquisition adjustment. The difference between the price paid to acquire an operating unit or system of a utility and the rate base of the acquired property. See also **plant acquisition adjustment.** NARUC(a)

acquisition adjustment. The difference between the cost of acquiring an **operating unit or system** and the depreciated **original cost** of the acquired property. (Note: any existing **contributions in aid of construction** are also carried through the property transfer and reinstated by the new owner, thus affecting the amount of recorded acquisition adjustment.) See also **plant acquisition adjustment.** DHS

actually issued. As applied to securities issued or assumed by the utility, those which have been sold to bona fide purchasers for a valuable consideration, those issued as dividends on stock, and those which have been issued in accordance with contractual requirements direct to trustees of sinking funds. NARUC(b)

actually outstanding. As applied to securities issued or assumed by the utility, means those which have been actually issued and are neither retired nor held by or for the utility; provided, however, that securities held by trustees shall be considered as actually outstanding. NARUC(b)

ad valorem tax. A state or local tax based on the assessed value of the real or personal property. AWWA(b)

advance for construction. Advance made by or on behalf of customers or others for the purpose of construction, which is to be refunded either wholly or in part. When applicants are refunded the entire amount to which they are entitled according to the agreement or rule under which the advance was made, the balance, if any, remaining in this account shall be credited to **contribution in aid of construction.** AWWA(b)

allowance for funds used during construction (AFUDC). A percentage amount added to **construction work in progress (CWIP)** to compensate the utility for funds used to finance new plant under construction prior to its inclusion in rate base. NARUC(a)

amortization. The gradual extinguishment of an amount in an account by distributing such amount over a fixed period, over the life of the asset or liability to which it applies, or over the period during which it is anticipated the benefit will be realized. NARUC(b)

ancillary charge. A separate charge for ancillary services that is not included in costs for general water service. These ancillary services often must be performed by the utility and benefit only the individual customer using them and have no system-wide benefit. AWWA(b)

associated companies. Companies or persons that, directly or indirectly, through one or more intermediaries, **control,** are controlled by, or are under common control with, the accounting company. NARUC(b)

attributable costing. A cost accounting method in which the cost of providing any service is the costs that could be escaped over time if that service were eliminated and capacity was adjusted accordingly. The assignment of some indirect fixed overhead is required to implement this costing method and it is a longer-run concept than **direct costing.** AUT

audit. See **water audit.**

authorized water uses. All water uses known and approved or authorized by the utility. These uses include all metered uses and reliable estimates of all other approved uses such as public, fire, system, operation, and paid-for uses. AWWA(e)

automatic adjustment clause. Allows a utility to increase or decrease its rates to cover costs of specific items without a formal hearing before a commission. The utility can automatically change its rates only when the price it pays for those specified items goes up or down. Fuel adjustment clauses are an example. NARUC(a)

availability charge. A limited-use **dedicated-capacity** charge made by a water utility to a property owner between the time when water service is made available to the property and the time when the property connects to the utility's facilities and starts using the service. See also **demand-contract charge.** AWWA(b)

average-and-excess method. A method for allocating demand costs by which total demand costs are multiplied by the system's **load factor** to arrive at a cost that can be attributed to average use and allocated to each customer class in proportion to their annual consumption. The remaining costs are generally allocated to each class on the basis of the **noncoincident-demand method.** See also **base-extra capacity method** and **commodity-demand method.** AUT

average demand. The demand on, or output of, a utility system over any interval of time. NARUC(a)

average incremental cost. For a specified time period, the addition to total cost resulting from an increase in capacity divided by the incremental output provided. See also **incremental cost** and **marginal cost.** AUT

average load. The total production for the period divided by the hours in the period. DHS

average service life. Used in determining depreciation, the average expected life of all the units in a group of assets. NARUC(a)

average variable pricing. A pricing structure in which the price per unit varies according to actual expenditures during the billing period. It does not affect use and should be used *only* where costs vary significantly between billing periods. AWWA(d)

base costs. Costs that tend to vary with the total quantity of water used plus those operation and maintenance expenses and capital costs associated with service to customers under average load conditions, without the elements of cost incurred to meet water use variations and resulting peaks in demand. AWWA(a)

base-extra capacity method. An **average-and-excess method** by which **costs of service** are separated into four primary cost components: (1) **base costs,** (2) **extra capacity costs,** (3) **customer costs,** and (4) direct **fire-protection** costs. AWWA(a)

base load. The minimum quantity of utility product delivered over a given period of time. NARUC(a)

base rate. A fixed amount charged each month for any of the classes of utility service provided to a customer. NARUC(a)

base year. The actual or test data year on which a financial model is based. It is the first year of data entry in the model. AWWA(f)

below the line. Expenses incurred in operating a utility that are charged to the investor, not the ratepayers; that is, all income statement items of revenue and expense not included in determining **net operating income.** If the item falls below the net operating income line of the income statement, it is labeled a below-the-line item. Net operating income is the "line" referred to. See also **above the line.** NARUC(a) and DHS

beneficiality. A service is said to benefit from a cost if that cost is necessary to render that service. AUT

benefit-to-cost ratio. The value derived from dividing the sum of all benefits from an activity by the sum of all costs associated with that activity. A benefit-to-cost ratio having a value of 1.0 or greater would indicate that the program is economically worthwhile. AWWA(e)

bill tabulation. A method that shows the number of customer bills rendered at various levels of water usage during a specified period of time for each customer class served by the utility. The tabulation of bills for an historical period provides the basis for identifying typical customer-class usage patterns and aids in the development of rates recognizing such usage patterns. AWWA(a)

book cost. The amount at which property is recorded in these accounts without deduction of related provisions for accrued depreciation, amortization, or for other purposes. NARUC(b)

book value. The accounting value of an asset. The book value of a capital asset equals its original cost minus accumulated depreciation. The book value of a share of common stock equals the net worth of the company divided by the number of shares of stock outstanding. NARUC(a)

budget. An estimate of proposed expenditures for a given period or purpose and a statement of the means of financing them. AWWA(c)

CCF. One-hundred cubic feet.

capacity. The ability of the water utility to have the resources available to meet the water-service needs of its customers. It is the combination of plant- and service-related activities required to provide the amount of service required by the customer. The plant facilities required are a composite of all types of facilities needed to provide service. It represents the ability of the water utility to meet the quantity, quality, peak loads, and other service needs of the various customers or classes of customers served by the utility. See also **dedicated capacity** and **future capacity.** AWWA(b)

capacity (demand) costs. As used in the **commodity-demand method,** costs associated with providing facilities to meet the peak rates of use, or demands, placed on the system by the customers, including capital-related costs on plant designed to meet peak requirements plus the associated operation and maintenance expenses. This cost component may be broken down into costs associated with meeting specific demands, such as maximum-day, maximum-hour, or other periods of time that may be appropriate to the utility. AWWA(a)

capacity required. Reflects the idea that costs or capacity are assigned according to whether they are necessary to the performance of the service. The relevant test is that if these costs were not incurred, the service could not be rendered. AUT

capital intensive. A term used to designate a condition in which a relatively large dollar investment is required to produce a dollar of revenue. DHS

capital program. A plan for capital expenditures to be incurred each year over a fixed period of years to meet capital needs arising from a long-term work program or otherwise. It sets forth each project or other contemplated expenditures in which the entity is to have a part and specifies the full resources estimated to be available to finance the projected expenditures. AWWA(c)

capital structure. The permanent long-term financing of the firm represented by long-term debt, preferred stock, and net worth. NARUC(a)

capitalized costs. Costs are capitalized when they are expected to provide benefits over a period longer than one year. Capitalized costs are considered investments and are included in rate base to be recovered from customers over a number of years. NARUC(a)

cash basis. The basis of accounting under which revenues are recorded when cash is received and expenditures are recorded when cash is disbursed. See also **accrual basis.** AWWA(c)

cash basis for rates. Rates based on cash requirements for operating expenses, capital, and debt service. Most publicly owned utilities use this basis. AWWA(f)

class A utilities. Utilities having annual water operating revenues of $750,000 or more. NARUC(b)

class B utilities. Utilities having annual water operating revenues of $150,000 or more but less than $750,000. NARUC(b)

class C utilities. Utilities having annual water operating revenues of less than $150,000. NARUC(b)

coincident-demand method. A method for allocating demand costs according to the proportion of customer class demand at the time of system peak. See also **noncoincident-demand method.** AUT

coincident peak. Any demand that occurs simultaneously with any other demand on the same utility system. See also **noncoincident peak.** NARUC(a)

collection-related charges. Service fees pertaining principally to the collection and billing functions of the water utility, including delinquency (late) fees and short-check (returned check) charges. AWWA(b)

commodity (operating) costs. Costs that tend to vary with the quantity of water produced, including costs of chemicals, a large part of power costs, and other elements that increase or decrease almost directly with the amount of water supplied. AWWA(a)

commodity-demand method. A **non-coincident demand method** by which **costs of service** are separated into four primary cost components: (1) **commodity costs,** (2) **demand costs,** (3) **customer costs,** and (4) direct **fire-protection** costs. AWWA(a)

composite depreciation rate. A percentage based on the weighted average service life of a number of units of plant, each of which may have a different individual life expectancy. Composite depreciation rates may be determined for (a) a single depreciable plant account, (b) a single rate for several depreciable accounts, or (c) a single composite rate for all depreciable plant of the utility. NARUC(b)

connection charge. The charge made by the utility to recover the cost of connecting the customer's service line to the utility's facilities. This charge is often considered as contribution of capital by the customer or other agency applying for service. AWWA(b)

construction work in progress (CWIP). A subaccount in the utility plant section of the balance sheet representing the costs of utility plant under construction but not yet placed in service. NARUC(a) The utility's investment in facilities under construction but not yet dedicated to service. The inclusion of CWIP in rate base varies from one regulatory agency to another. AWWA(c)

contract demand. Relates to an agreement between the water utility and a large-use customer who requires a significant amount of the total capacity of the utility. The agreement would fix the terms and conditions under which the water utility would provide service to the customer. Such an agreement has been called contract capacity. AWWA(b)

contribution in aid of construction. Any amount of money, services, or property received by a water utility from any person or governmental agency that is provided at no cost to the utility. It represents an addition or transfer to the capital of the utility, and is utilized to offset the acquisition, improvement, or construction costs of the utility's property, facilities, or equipment used to provide utility services to the public. It includes amounts transferred from advances for construction representing any unrefunded balances of expired refund contracts or discounts resulting from termination of refund contracts. Contributions received from governmental agencies and others for relocation of water mains or other plant facilities are also included. See also **allowance for funds used during construction (AFUDC).** AWWA(b)

control. The possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of a company, whether such power is exercised through one or more intermediary companies, or alone, or in conjunction with, or pursuant to an agreement, and whether such power is established through a majority or minority ownership or voting of securities, common directors, officers, or stockholders, voting trusts, holding trusts, **associated companies**, contract, or any other direct or indirect means. NARUC(b)

cost. The amount of money actually paid for property or service. When the consideration given is other than cash, the value of such considerations hall be determined on a cash basis. NARUC(b)

cost causation. Reflects the idea that costs should be assigned to the revenue-producing objects that cause those costs to be incurred. AUT

cost of capital. A utility's cost of capital is the weighted sum of the costs of component parts of the capital structure (that is, debt, preferred equity, and common equity) weighted by their respective proportions in the capital structure. AWWA(c)

cost of removal. The cost of demolishing, dismantling, tearing down, or otherwise removing utility plant, including the cost of transportation and handling incidental thereto. NARUC(b)

cost of service. The total cost of providing utility service to the system or to a group therein (the latter is commonly referred to as an allocated cost of service). The cost components include operating expenses, depreciation, taxes, and **rate of return** adequate to service investment capital. Cost of service is synonymous with the **revenue requirements** of the system (or segment thereof). DHS

cost-of-service pricing. A method of pricing service strictly in accordance with the costs (expenses and allowable profit) that are attributable to it. Customers of services priced below cost are generally subsidized by customers paying above cost for their services. NARUC(a)

curb stop. A shut-off valve attached to a water-service line from a water main to a customer's premises, which may be operated by a valvae key to start or stop flow in the water-supply lines of a building. Also called a curb cock. AWWA(b)

customer advances for construction. A deferred credit account representing cash advances paid to the utility by customers requiring the construction of facilities on their behalf. These advances are refundable; the time or extent of refund depends on revenues from the facilities. Contrast with **contributions in aid of construction (CIAC).** NARUC(a)

customer classification. The homogeneous grouping of customers into classes. Typically, water utility customers may be classified as residential, commercial, and industrial for ratemaking and other purposes. For specific utilities, there may be a breakdown of these general classes into more specific groups. For example, the industrial class may be subdivided into small industry, large industry, and special. Some water systems have individual customers (large users) with individual water-use characteristics, service requirements, or other reasons that set them apart from other general customer classes and who may require a separate class designation. This may include large hospitals, universities, military establishments, and other such categories. AWWA(b)

customer costs. Those costs associated with serving customers, irrespective of the amount or rate of water use, including meter reading, billing, and customer accounting and collecting expense, as well as maintenance and capital costs related to meters and services. AWWA(a)

cycle billing. The process of reading a segment of the system's customers each day of a billing period. By the end of the cycle,, the complete system is read and billed, and a new cycle begins. The customer reading on each day of the cycle will reflect the use for a full period so that the only customers up to date at the end of the accounting period are those read and billed as of the last day of the cycle. All other customers will have unread and unbilled consumptions of from one to thirty days, assuming a one-month cycle. This produces an **unbilled revenue** at the end of each accounting period. DHS

daily peak load pricing. A pricing structure in which the price level is higher during hours of peak use. It can be used for reducing peak use and is expensive to implement since a sophisticated meter reading system would be necessary. AWWA(d)

debt. An obligation resulting from the borrowing of money or from the purchase of goods and services. AWWA(c)

debt expense. All expenses in connection with the issuance and initial sale of evidences of debt, such as fees for drafting mortgages and trust deeds; fees and taxes for issuing or recording evidences of debt; cost of engraving and printing bonds and certificates of indebtedness; fees paid trustees; specified costs of obtaining governmental authority; fees for legal services; fees and commissions paid underwriters, brokers, and salesmen or marketing such evidences of debt; fees and expenses of listing on exchanges; and other like costs. NARUC(b)

debt service. Expenditures for interest and principal repayment on debt instruments. AWWA(f)

debt service coverage. The ratio of net revenues to **debt service** requirements. AWWA(f)

declining block pricing. See **decreasing block pricing.**

decreasing block pricing. A pricing structure, also known as declining block pricing, in which both the average and marginal price per unit decreases as consumption increases. It can be used to retain large-volume customers, who prefer this structure. When there is sufficient supply, the cost of supplying water will probably decrease as consumption increases. AUT and AWWA(d)

dedicated capacity. The portion of the water utility's total capacity that is set aside or "dedicated" for use by an individual large-use customer or group (class) of customers whose total use is a significant part of the utility's total capacity requirement. AWWA(b)

dedicated-capacity charge. A charge to ensure that the utility will recover, from those for whom a significant portion of the total utility plant facilities capacity has been dedicated, the ongoing costs associated with this capacity. Two types of dedicated capacity charges are the **availability charge** and the **demand contract-charge.** AWWA(b)

demand. The maximum rate at which a utility product is delivered to a specific point at any given moment. See also **average demand.** NARUC(a)

demand-contract charge. The use of a **dedicated-capacity charge** incorporated into a contract whereby the water customer agrees to pay the fixed costs associated with a specific share of the utility's capacity and related investment. See also **availability charge.** AWWA(b)

demand costs. See **capacity costs.**

demand factor. The ratio of the maximum demand over a specified time period to the total connected load on any defined system. NARUC(a)

demand rate. A method of pricing under which prices vary according to differences in usage or costs. NARUC(a)

depletion. The loss in service value incurred in connection with the exhaustion of the natural resource in the course of service. NARUC(a)

depreciation. As applied to depreciable utility plant, the loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of utility plant in the course of providing service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand, and requirements of public authorities. NARUC(b)

direct costing. A cost accounting method that assigns only those costs that vary with short-run changes in the rate of output. The costs assigned under this method are not only the direct costs but the indirect variable overhead costs as well. It is sometimes referred to as variable costing. AUT

discount. As applied to the securities issue or assumed by the utility, the excess of the par (stated value of no-par stocks) or face value of the securities plus interest or dividends accrued at the date of the sale over the cash value of the consideration received from their sale. NARUC(b)

discounted cash-flow (DCF) model. The DCF model is often used in ratemaking for estimating the investor required rate of return on common equity. By definition, the DCF model contends that the market price of a common stock is equal to the cumulative present value of all future cash flows to investors produced by said common stock. AWWA(c)

district (or zone) measurement. A measurement of all water flow into an isolated portion (district or zone) of a distribution system to be used to determine the leakage potential for the isolated zone. Annual district measurements can be compared and used to determine changes in the level of water consumption and leakage potential. AWWA(e)

diversity factor. The sum of noncoincident demands of a group divided by the group coincident demand. See also **load factor** and **utilization factor.** DHS

economies of scale. Exist when the unit or average cost of general water service decreases with the expansion of water system capacity. Economies of scale (or size) can be defined either in the context of changes in total system capacity or changes in a single component of the water system (such as treatment). See also **economies of scope.** AUT

economies of scope. Exist when the average cost of combined general water service and fire protection service is less than the cost of providing each service separately; that is, the unit cost of providing multiple services is less than if they were provided by separate utilities. See also **economies of scale.** AUT

embedded costs. Money already spent for investment in plant and in operating expenses. NARUC(a) Those costs that are in existence at any point in time regardless of the date originally incurred and that affect current operations on a continuing basis. DHS

equity. The net worth of a business, consisting of capital stock, capital (or paid in) surplus, earned surplus (or retained earnings), and, occasionally, certain net worth reserves. AWWA(c)

equivalent customer. The means of relating large-use customers to a single family unit or other small-use customer unit, such as a 5/8-inch meter customer. It would represent a composite of all elements of cost differences between the unitary customers and the large-use customers to be served. Normally, it is expressed as a ratio of the small-use customer unit. AWWA(b)

equivalent meters. The number of 5/8-inch meters equivalent in flow to a larger meter. Used to calculate monthly service charges. AWWA(f)

estimated water quantity. The quantity derived from the process of making reliable and pertinent calculations of water volumes using an appropriate method or formula to draw reasonable conclusions about an actual quantity of water. The reliability of the estimate is enhanced whenever actual times of flow, rates of flow, or partial flow volumes are measured and recorded. AWWA(e)

excess-use pricing. A pricing structure in which the price level is significantly higher for all water used above average, usually determined by winter use. It can be used to reduce peak use, and large volume users consider its use equitable. AWWA(d)

expenditures. Amounts paid or incurred for all purposes, including expenses, provisions for retirement of debt, and capital outlays. AWWA(c)

extra capacity costs. As used in the **base-extra capacity** method, those costs associated with meeting rate of use requirements in excess of average, including operation and maintenance expenses and capital costs for system capacity beyond those required for average rate of use. These costs may be subdivided into costs necessary to meet maximum-day extra demand, maximum-hour extra demand, or other extra-demand criteria appropriate to the utility. AWWA(a)

fair market value. Generally the term applies to the amount that a willing buyer will pay a willing seller in an arm's-length transaction. Because of the predominant use of **original cost** in the **rate base** and the constraints that original-cost factors place on the rates that may be charged, the depreciated book cost of utility plant may be a prominent factor in establishing fair market value for a utility system. DHS

fair value. A term normally used in those jurisdictions that, by statute or regulatory precedent, allow the **rate base** to be expressed at a level other than the recorded **original cost** amounts. The most common measure of fair value is reflected in a composite of original cost and **trended original cost** factors. In practice the fair value has often been closer to the original cost level than the trended original cost level. DHS

field-service charges. Charges related to activities including water turn on (or turn off), meter setting or removal, special meter readings, meter testing, and temporary hydrant meter settings. AWWA(b)

fire main. Any main forming part of an integrated system used exclusively for fire protection purposes. NARUC(b)

fire-protection charges. Charges made to recover the cost of providing both public and private fire-protection service to the communities served by the utility. AWWA(b)

fixed charges. Periodic charges to customers that do not vary with water use, unlike **variable charges.** AUT

fixed costs. Business costs that remain unchanged regardless of quantity of output or traffic. See also **variable costs.** NARUC(a)

fixture rate. A pricing structure in which prices for a given time period are set for each water using fixture (that is, faucets, toilets, etc.) at the location where service is provided. Although very imprecise, it is more usage oriented than a **flat fee.** AUT

flat fee. A periodic fixed charge for water service that is unrelated to the amount of water consumed, typically used when customers are unmetered. It is not the same as a **uniform rate** (which is sometimes known as a flat commodity rate). AUT

flat rate. See **flat fee.**

forecast test year. See **future test year.**

fully distributed costing. A cost accounting method in which each job or service absorbs a share of each of the costs of rendering service. It requires the allocation of indirect fixed overhead costs in their entirety, which in turn requires the calculation of predetermined overhead rates. The method uses five cost assignment criteria: (1) **cost causation,** (2) **traceability,** (3) **variability,** (4) **capacity required,** and (5) **beneficiality.** Also known as full costing, fully allocated costing, and absorption costing. AUT

functional-cost method. A method by which **costs of service** are separated into four functions which describe the activities of a water utility: (1) production and transmission, (2) distribution, (3) **customer costs,** and (4) hydrants and connections. This method has not had wide acceptance in recent years because it requires much judgment and fails to recognize that major portions of costs are capacity or demand related. AWWA(a)

future capacity. The capacity for services somewhat in excess of immediate requirements that is built into a utility in anticipation of increased demands for service resulting from higher uses by existing customers or from growth in the service area. AWWA(b)

future test year. Use of future 12-month-period projected utility financial data to evaluate a proposed tariff revision. See also **historic test year** and **test year.** Also known as a forecast test year. NARUC(a)

historic cost. The initial cost to the person who holds the property. **Original cost** and historic cost are the same where property has not changed ownership. When utility property of an **operating unit or system** nature changes ownership, the original cost carries forward and is maintained by the new owner, although the purchase price (that is, historic cost to the new owner) may be something different. DHS

historic test year. Use of a past 12-month period (usually the immediately preceding period) utility financial data to evaluate a proposed tariff revision. See also **future test year** and **test year.** NARUC(a)

hook-up fees. A charge at the time of connection. It can be used to discourage new connections and is usually used to recover connection costs, or, if a system is nearing capacity, to discourage new hook-ups. AWWA(d)

imminence. A test to determine how soon a capital asset will be put into actual use in providing utility service; that is, how soon it will be **used and useful.** NARUC(a)

increasing block pricing. A pricing structure, also known as inverted block pricing, in which the average and marginal price per block of use increases as consumption increases. It can be used for reducing average (and sometimes peak) use, and large volume users consider its use inequitable. AWWA(d)

incremental cost. The change in total cost resulting from a change in capacity, output, or services provided. See also **average incremental cost** and **marginal cost.** AUT

incremental-cost-pricing method (for determining **system-development charges**). A method in which new customers would be responsible for their share of the cost of the last increment of defined **system-development charge facilities** and/or the increment of planned future additions to meet their needs. See also **system buy-in method.** AWWA(b)

interruptible service. Service with special rates for customers who are willing to have their utility service interrupted by the utility when necessary. This is a low-priority service with generally lower unit rates. NARUC(a)

inverted block pricing. See **increasing block pricing.**

investment advances. Advances, represented by notes or by book accounts only, with respect to which it is mutually agreed or intended between the creditor and debtor that they shall be settled by the issuance of securities or shall not be subject to current settlement. NARUC(b)

leakage. See **system leakage, unavoidable leakage,** and **recoverable leakage.**

life expectancy. The time period during which an article is expected to render efficient service. See also **remaining life.** NARUC(a)

lifeline pricing. A pricing structure in which the price for "necessary" use is kept low. It can be used to reduce average use and is usually used to ensure that low-income users are not unduly burdened by high prices. AWWA(d)

load. The amount of utility product delivered at any specified point or points on a system. NARUC(a)

load factor. The ratio of average demand to peak demand, defined with reference to a specific time period or type of peak load, such as maximum-hour or maximum-day. The load factor is operationalized as the ratio of actual consumption over a period, to the maximum (peak) demand multiplied by the length of a period (the period can be hourly, daily, monthly or annual). See also **diversity factor** and **utilization factor.** AUT

load management. Techniques designed to reduce **demand** at peak times. NARUC(a)

losses. See **system water losses** and **meter losses.**

maintenance expenses. Part of **operating expenses,** including labor, materials, and other expenses, incurred for preserving the operating efficiency and/or physical condition of **utility plant.** NARUC(a)

marginal cost. The change in total cost resulting from producing (or not producing) a single incremental unit of a product or service. It is composed of: (1) the change in operating costs caused by changing the rate of utilization of existing capacity, and (2) the cost of expanding capacity, including the operating costs associated with increased capacity. See also **average incremental cost** and **incremental cost.** AUT

master metering. The use of one bulk meter for multiple tenants. NARUC(a)

meter error. That percent of water passing through the meters of a distribution system which is not properly measured by the meter. Master meter error is the meter error for all unmeasured water passing through these source or master meters, and customer meter error is all unmeasured water passing through customer meters. These errors are discovered when meters are calibrated and the quantity of error is derived from the mathematical adjustment of recorded flows to the calibrated corrections. AWWA(e)

meter losses. Water from the total of all losses resulting from meter inaccuracies. Where meters are repaired and recalibrated, meter losses can be calculated from a ratio of meter rates before and after calibration. For meters that are stopped, meter losses can be estimated from previous records from that meter during similar times and seasons. AWWA(e)

metered ratio. The ratio of <u>all</u> corrected water use, whether sold or not, to corrected metered water production. AWWA(e)

metered service. Meters record actual use in order to accurately bill a utility customer. See also **unmetered service.** NARUC(a)

MGD. Million gallons per day.

minor items of property. The associated parts or items of which retirement units are composed. NARUC(b)

mixed test year. A combination of the **historic test year** and **future test year** approaches also know as a partial future test year. See also **test year.** AUT

multiple family dwelling. A residential structure or group of structures which is capable of separately housing more than one family unit. NARUC(b)

net operating income. The amount of revenues from utility operations that remains after the deduction of the operating and maintenance expenses, depreciation expenses, and taxes (income, property, etc.) attributable to the utility operation. The revenues and expenses that are measured to produce net operating revenue are commonly referred to as "above-the-line" items. The revenues and expenses measured apart from net operating income are referred to as "below-the-line" items. The net operating income line on the income statement is the dividing point. See also **below the line.** DHS

net original cost. Original cost less accumulated depreciation. DHS

net salvage value. The value of property retired less the cost of removal. NARUC(b)

nominally issued. As applied to securities issued or assumed by the utility, those which have been signed, certified, or otherwise executed, and placed with the proper officer for sale and delivery, or pledged, or otherwise place in some special fund of the utility, but which have not been sold, or issued direct to trustees of sinking funds in accordance with contractual requirements. NARUC(b)

nominally outstanding. As applied to securities issued or assumed by the utility, those which, after being actually issued, have been reacquired by or for the utility under circumstances which require them to be considered as held alive and not retired; provided, however, that securities held by trustees shall be considered as actually outstanding. NARUC(b)

nonaccount water. The sum of all water produced or purchased by a water utility that is not covered by **account water.** The term is preferable to unaccounted-for water. AWWA(e)

noncoincident-demand method. A method for allocating demand costs to each customer class on the basis of its own peak, regardless of whether it occurs at system peak demand. AUT

noncoincident peak. The sum of peak demands for all customer classes. This peak may or may not coincide with the peak for the total system. AUT

nonfirm service. See **interruptible service.**

nonoperating items. Although sometimes used interchangeably with **nonutility items,** this term may more properly be used to describe items such as construction work in progress which is not currently used in providing utility service. It has also been applied traditionally to financial items (for example, interest expense). DHS

nonutility items. All items of revenue, expense, and investment not associated, either by direct assignment or by allocation, with providing service to the utility customer. DHS

off-peak. A period of relatively low system demands. See also **on-peak.** NARUC(a)

off-peak rates. The use of separate rates or rates lower than average for water delivered during off-peak periods. AWWA(a)

on-peak. A period of relatively high system demands. See also **off-peak.** NARUC(a)

operating expenses. Expenses related to maintaining day-to-day utility functions, including operation and maintenance expenses, taxes and depreciation and amortization costs, but not interest payments or dividends. Operating costs are recovered from customers on a current basis, as opposed to capitalized costs. NARUC(a)

operating ratio. The ratio, generally expressed as a percentage, of operating expenses to operating revenues. NARUC(a)

operating revenues. Amounts collected by the utility for services rendered. NARUC(a)

operating unit or system. Although not clearly defined by the Uniform System of Accounts, this term generally relates to a complete and self-sustaining facility or to a group of facilities acquired and operated intact as a segment of a complete system. DHS

original cost. As applied to utility plant, the cost of such property to the person first devoting it to public service. NARUC(b)

outage. The period during which a generating unit, transmission line, or other facility is out of service. NARUC(a)

peak demand. The maximum level of operating requirements (that is, production) placed upon the system by customer usage during a specified period of time (instantaneous peak, thirty-minute peak, one-hour peak and one-day peak outputs are common points of reference). It may be measured by an operating segment of the company, such as a customer class, or for the entire company, depending on intended use of the data. See also **off-peak** and **on-peak.** DHS

peaking factors. A measure of the additional system capacity needed to deliver peak water volumes. The ratio of peak consumption to average consumption. AWWA(f)

peak-load pricing. A pricing structure in which charges are based on both the quantity of water used and the maximum rate at which it is used. It also recognizes two types of demand (customer's demand that is coincidental with the system peak demand and customer's non-coincidental demands) and prices each separately. AWWA(a)

peak responsibility method. A **cost of service** method proposed for application to telephone utilities that allocates costs according to how and when service is used and how this use contributes to congestion on plant and equipment required to provide service. AUT

plant acquisition adjustment. The difference between the cost to the utility of acquired plant and the original cost of the plant less the amount credited at the time of acquisition for depreciation and amortization and **contributions in aid of construction.** See also **acquisitions adjustment.** NARUC(a)

plant held for future use. Cost of land or other property acquired by a utility but not yet used for generation, transmission, or distribution purposes. See also **utility plant in service.** NARUC(a)

plant in service. See **utility plant in service.**

premium. As applied to the securities issued or assumed by the utility, the excess of the cash value of the consideration received from their sale over the sum of their par (stated value of no-par stocks) or face value and interest or dividends accrued at the date of sale. NARUC(b)

property retired. As applied to utility plant, property which has been removed, sold, abandoned, destroyed, or which for any cause has been permanently withdrawn from service. NARUC(b)

prudence. A consideration of whether investments are dishonest or obviously wasteful. NARUC(a)

rate base. The value of a water utility's property used in computing an authorized return under the applicable laws and/or regulatory policies of the agency setting rates for the utility. AWWA(b)

rate base regulation. A method of regulation in which a public utility is limited in operations to revenue at a level which will recover no more than its expenses plus an allowed **rate of return** on its **rate base.** NARUC(a)

rate of return. The *realized* rate of return is the percentage factor obtained by dividing the **net operating income** from utility operations by the **rate base.** An *adequate* rate of return is the percentage factor that, when multiplied by the rate base, produces earnings that will meet the interest and equity requirements of the capital used to support the rate base. The measure of the adequacy of the rate-of-return factor is usually based upon cost-of-capital measurements. DHS

rate structure. The design and organization of billing charges by customer class to distribute the **revenue requirement** among customer classes and rating periods. NARUC(a)

recoverable leakage. All water from breaks and leaks that are repaired or are considered to be economical to repair. AWWA(e)

reimbursement costing. A cost accounting method used to develop cost-based prices that recover the total cost of production. It employs concepts governing the measurement of costs that are negotiated by customers or their representatives. AUT

remaining life. The expected future service life of an asset at any given age. See also **life expectancy**. NARUC(a)

replacement (or replacing). The construction or installation of utility plant in place of property retired, together with the removal of the property retired. NARUC(b)

replacement cost. An estimate of the cost to replace the existing facilities (either as currently structured or as redesigned to embrace new technology) with facilities that will perform the same functions. This method recognizes the benefits of presently available technology in replacing the system. For example, a number of small generating units may be replaced with a single large unit at lower unit costs and greater efficiency. DHS

reproduction cost. The estimated cost to reproduce existing properties in their current form and capability at current cost levels. The mechanics may involve a trending the original cost dollars to reflect current costs or conducting a property appraisal with cost estimates to for reconstructing the facilities. DHS

research and development. Expenditures incurred by public utilities which represent research and development costs in the experimental or laboratory sense. The term includes generally all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property, and the improvement of already existing property of the type mentioned. NARUC(b)

retained earnings. The accumulated net income of the utility less distributions to stockholders and transfers to other capital accounts, and other adjustments. NARUC(b)

retirement units. Those items of utility plant which, when retired, with or without replacement, are accounted for by crediting the original cost.

revenue requirements. The amount of return (rate base times rate of return) plus operating expenses. NARUC(a) The sum total of the revenues required to pay all operating and capital costs of providing service. DHS

salvage value. The amount received for property retired, less any expenses incurred in connection with the sale or in preparing the property for sale, or, if retained, the amount at which the material recoverable is chargeable to materials and supplies, or other appropriate account. NARUC(b)

scarcity pricing. A pricing structure in which the cost of developing new supplies is attached to existing use. It can be used to reduce average use and where supplies are diminishing (that is, a finite supply) so that costs for developing new supplies are paid for by current users. AWWA(d)

seasonal pricing. A pricing structure in which the price level during the season of peak use (summer) is higher that the level during the winter. It can be used to reduce peak use, and large volume users consider its use equitable. It can be effective for summer tourist communities. AWWA(d)

service connection. That portion of the service line from the utility's water main to and including the curb stop at or adjacent to the street line or the customer's property line. It includes other valves, fittings, and so on, that the utility may require at or between the main and the curb stop, but does not include the curb box. AWWA(b)

service life. The time between the date utility plant can be included in **utility plant in service,** or utility plant leased to others, and the date of its retirement. If depreciation is accounted for on a production basis rather than on a time basis, then service life should be measured in terms of the appropriate unit of production. NARUC(b)

service line. The pipe and all appurtenances that run between the utility's water main and the customer's place of use and includes fire lines. AWWA(b)

service value. The difference between the original cost and the net **salvage value** of utility plant. NARUC(b)

sliding scale pricing. A pricing structure in which the price level per unit for all water used increases based on average daily consumption. It can be used for reducing average (and sometimes peak) use and large volume users consider its use inequitable. AWWA(d)

spatial pricing. A pricing structure, also known as zonal pricing, in which users pay for the actual costs of supplying water to their establishment. Costs (and hence prices) will tend to vary regionally within the service sector. Spatial pricing can be used to discourage new or difficult to serve connections and is used in areas where the distribution system is being expanded rapidly and being expanded in difficult to serve areas (long mains, pumps, and so on). AWWA(d)

straight-line method. As applied to **depreciation** accounting, the plan under which the service value of property is charged to operating expenses (and to clearing accounts if used), and credited to the accumulated depreciation account through equal annual charges during its service life. Estimates of the service life and salvage will be reexamined periodically and depreciation rates will be corrected to reflect any changes in these estimates. NARUC(b)

straight-line remaining life method. As applied to **depreciation** accounting, the plan under which the service value of property is charged to operating expenses (and to clearing accounts if used), and credited to the accumulated depreciation account through equal annual charges during its service life. "Remaining life" implies that estimates of future life and **salvage** will be reexamined periodically and that depreciation rates will be corrected to reflect any changes in these estimates. NARUC(b)

supply main. Any main, pipe, aqueduct or canal, the primary purpose of which is to convey water from one unit to another unit in the source of supply, water treatment or pumping plant and generally providing no service connections with customers. See also **transmission and distribution main.** NARUC(b)

system buy-in method. A method of determining a **system-development charge** from new customers (or developers who represent them) based on the premise that new customers are entitled to water service at the same prices charged to existing customers. The fee to new customers is related to the embedded average-equity investment in the reserve capacity or new capacity used to serve them. See also **incremental-cost pricing method.** AWWA(b)

system-capacity charge. See **system-development** charge.

system-development charge. A contribution of capital toward recently completed or planned future backup plant facilities necessary to meet the service needs of new customers to which such fees apply. Two methods used to determine the amount of these changes are the **system buy-in method** and **incremental-cost pricing method.** Various terms have been used to describe these charges in the industry, but regardless of the term used, these charges have the purpose of providing funds to be used to finance all or part of capital improvements necessary to serve new customers and are raised outside of capital to be served from general water-use rates. Also known as a system-capacity charge. AWWA(b)

system-development charge facilities. Those facilities, or a portion of those facilities, that have been identified as being required for new customer growth. The cost of the facilities will be recovered in total or in part through a **system-development charge.** AWWA(b)

system leakage. All water that is lost from the system through leaks and breaks and includes all **unavoidable leaks,** and all **recoverable leaks** and breaks. AWWA(e)

system water losses. Water from all losses such as theft, illegal connections, unauthorized uses, malfunctioning controls, differences in use quantities caused by meter error and any other loss which is not a result of a leak or a break. AWWA(e)

tariff. The authorized list of charges for a utility's services. AUT

tax incentives. Tax credits or reductions provided to water users who have installed conservation devices. They can be used to reduce either peak or average use and allow for voluntary user choice to use conservation devices. AWWA(d)

test year. The annualized period for which costs are to be analyzed and rates established. AWWA(c) The twelve-month operating period selected to evaluate the **cost of service** and the adequacy of rates in effect or being sought. Frequently, the term "test period" is used, and may refer simply to the test year or expressly to the *adjusted* test year. See also, **historic test year, future test year,** and **mixed test year.** DHS

traceability. An attribute of costs that permits the resources represented by the costs to be identified in their entirety with a revenue-producing unit. AUT

transmission and distribution main. Any main the primary purpose of which is to convey water, requiring no further processing except incidental chlorination or pressure boosting, from a unit in the source of supply, water treatment of pumping plant and generally providing no service connections with customers. See also **supply main.** NARUC(b)

trended original cost. The result of isolating original-cost plant additions by year of placement and factoring the original amounts upward to recognize subsequent changes in the cost of constructing plant facilities. The object is usually to restate installed cost of facilities at current levels. DHS

unaccounted-for water. See **nonaccount water.**

unavoidable leakage. All water from underground leaks which, due to the small amount of actual water lost, would cost more to locate and repair than the value of the water saved over a reasonable amount of time. See also **recoverable leakage** and **system leakage**. AWWA(e)

unbilled revenues. The amount of service rendered but not recorded or billed at the end of an accounting period. Cycle meter reading practices result in unrecorded consumption between the date of last meter reading and the end of the period. If these amounts are not estimated and recorded, they reflect "unbilled" amounts. DHS

uniform rate. A pricing structure in which the price per unit is constant as consumption increases. It may be somewhat effective in reducing average use, and large volume users consider its use equitable. It is also know as a flat rate or a uniform block rate, but is not the same as a **flat fee**. AWWA(d)

uniform system of accounts (USOA). A list of accounts for the purpose of classifying all plant and expenses associated with a utility's operations. The USOA specifies a number for each account, together with a title and a description of content, and prescribes the rules and regulations governing the use of such accounts. Systems of accounts may be prescribed by federal and/or state regulatory authorities. NARUC(a)

unit cost. The cost of producing a unit of a produce or service. An example would be the cost of treating a thousand gallons potable water for use by the water utility's customers. AWWA(b)

unmetered service. Utility service used and billed without being recorded by a meter. See also **metered service**. NARUC(a)

used and useful. A test for determining the admissibility of utility plant as a component of rate base. Plant must be in use (not under construction or standing idle awaiting abandonment) and useful (actively helping the utility provide efficient service). See also **imminence**. NARUC(a)

user charges. The monthly, bimonthly, quarterly, or other periodic charges made to the users of water service through the general water-rate structures of the water utility. AWWA(b)

user fees. Amounts paid by consumers of a service that cover all or part of the cost of providing the service. In contrast, some governmental services are paid for or subsidized by taxes. AUT

utility plant in service. The land, facilities, and equipment used to generate, transmit, and/or distribute utility service. See also **plant held for future use** and **used and useful**. NARUC(a)

utility water use. That water which is removed from the distribution system by the utility for the purpose of maintaining and operating the system. This should include both metered and unmetered water removed with those unmetered uses being reliably estimated. AWWA(e)

utilization factor. The ratio of the maximum demand of a system to the installed capacity of the system. See also **diversity factor** and **load factor**. DHS

value of service. A concept in utility pricing practice whereby the usefulness or necessity of the service to a customer group replaces cost factors as a major influence on the rates charged to the group. DHS

variable charges. Periodic charges to customers that vary with water use, unlike **fixed charges**. AUT

variable costs. Costs which change with the increase or decrease of output. See also **fixed costs**. NARUC(a)

variability. An attribute of costs not traceable to a revenue-producing object based on whether it varies in total with variations in some measure of the volume of activity that is associated with the revenue-producing object. These costs can be assigned to revenue-producing objects according to an estimated rate of variability. AUT

vertical service. The utility company performs all major utility services for its customers, including production, transformation, transmittal, and distribution. This is typical of water utilities. NARUC(a)

vintage rates. A program in which customers are classified and customer rates are based on the date or period in which a customer connects to and first obtains service from the utility system. Such rates and charges can include user rates; customer contributions of capital for system development, main extension, and connection fees; or for ancillary services rendered. The concept has been used during periods of rising average costs to reflect the higher costs associated with serving new customers. AWWA(b)

water audit. A thorough accounting of all water into and out of a utility as well as an in-depth record and field examination of the distribution system that carries the water, with the intent to determine the operational efficiency of the system and identify sources of water loss and revenue loss. AWWA(e)

wheeling charge. The charge made by a utility for transmission of water to another party through its system. AWWA(c)

wholesale service. A situation in which water is sold to a customer at one or more major points of delivery for resale to individual retail customers within the wholesale customer's service area. AWWA(a)

working capital. Used broadly, the term refers to those rate-base allowances other than the utility plant in service and may include material, fuels, supplies, and so on. In the narrower use, commonly referred to as cash working capital, it relates to the investor-supplied funds necessary to meet operating expense or going-concern requirements of the business. There is normally a time lag between the point when service is rendered and the related operating costs are incurred and the point when revenues to recover such costs are received. The operating funds to bridge the lag are usually supplied by the investor and become a fixed commitment to the enterprise. DHS

zonal pricing. See **spatial pricing.**

zone measurement. See **district measurement.**

The **Glossary** was adapted from the following sources:

AUT	Authors.
AWWA(a)	American Water Works Association, *Water Rates* (Denver CO: American Water Works Association, Manual M1, 1983).
AWWA(b)	American Water Works Association, *Water Rates and Related Charges* (Denver, CO: American Water Works Association, Manual M26, 1986).
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PSC EXHIBIT 8

Case No: 2020-00160
Utility: Water Service Corporation of Kentucky
Workpaper: Comparative Analysis Requested ROE's - Summary

Case No.	Requested NOI	Rate Base	Inc/(Dec) Rate Base
2010-00476	$ 442,648	$ 5,820,653	
2013-00237	$ 417,066	$ 4,961,487	$ (859,166)
2015-00382	$ 465,260	$ 5,956,421	$ 994,935
2018-00208	$ 538,299	$ 6,104,405	$ 147,983
2020-00160	$ 601,168	$ 6,323,972	$ 219,568

Case No.	Maintenance	General	Total Operating
2010-00476	$ 866,383	$ 657,286	$ 1,832,663
2013-00237	$ 877,992	$ 623,526	$ 1,867,193
2015-00382	$ 961,364	$ 744,654	$ 2,017,180
2018-00208	$ 1,383,962	$ 813,797	$ 2,568,215
2020-00160	$ 1,706,046	$ 891,405	$ 3,063,291

Return on Rate Base	Long-Term Interest	ROE	
7.60%	6.58%	8.62%	First Case Operating Ratio
8.41%	6.60%	10.41%	
7.81%	6.29%	9.24%	
8.82%	5.87%	11.55%	
9.51%	5.14%	14.13%	

Inc./(Dec.) Total		% Inc./(Dec.) Total	
			First Case Operating Ratio
$	34,530	1.88%	
$	149,987	8.03%	
$	551,034	27.32%	
$	495,076	19.28%	67%

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