Exhibit No.:
Issues: Purchased Power
Witness: Tom Y. Lin
Sponsoring Party: MoPSC Staff
Case Nos.: EO-97-144 and EC-97-362

MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

UTILICORP UNITED, INC.

d/b/a/ MISSOURI PUBLIC SERVICE

CASE NOS. EO-97-144 and EC-97-362

DIRECT TESTIMONY

OF

TOM Y. LIN

Jefferson City, Missouri
March, 1997

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UTILICORP UNITED, INC.

d/b/a/ MISSOURI PUBLIC SERVICE

CASE NOS. EO-97-144 and EC-97-362

Q. Please state your name and business address.

A. My name is Tom Y. Lin and my business address is 301 West High Street, Jefferson City, Missouri, 65101.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Public Service Commission (MPSC or Commission), as a staff engineer in the Engineering Section of the Utility Operations Division's Energy Department.

Q. Please describe your educational and professional background.

A. I hold a Bachelor of Engineering degree in Mechanical Engineering from Nanjing Institute of Technology (now Southeast University), China, in July 1983. After graduation in 1983, I worked for seven years as a mechanical engineer at the Fujian Testing and Research Institute for Electric Power, a division of Fujian Provincial Electric Power Industry Bureau. During that time, I was responsible for developing, designing, modifying, testing, and performing computer simulation programs, boiler efficiency and heat rate tests, and various projects in Fujian Power Plants. In January 1991, I pursued an advanced degree in the United States and graduated from the University of Oklahoma with a Master of Science degree in Mechanical Engineering in 1993. I began my employment with the Commission in 1994. I am a registered Professional Engineer (PE) under the laws of the State of Missouri and am a member of the National and Missouri Society of Professional Engineers.

Q. Have you filed testimony previously before this Commission?

A. Yes, I have filed testimony in Case Nos. ER-95-279 (The Empire District Electric Company's (EDE's) 1995 - 1996 rate increase case), EM-96-149 (UE - CIPSCO Inc. merger case) and ER-97-81 (EDE's 1996 - 1997 rate increase case).

Q. What is the purpose of your direct testimony in the Staff's earnings complaint case against Missouri Public Service (MPS or Company), a division of UtiliCorp United Inc. (UCU), Case Nos. EO-97-144 and EC-97-362?

A. The purpose of my direct testimony is to determine and support the proper purchased power prices, and associated energy, to be used by Staff Witness Leon C. Bender as input into the production cost model.

Q. What was the test year that you used?

A. The test year was from January 1995 to December 1995, updated through June 30, 1996.

Q. What is purchased power?

A. It is the hourly energy which is purchased in the market place from another electric company and which is required to meet the native load of the electric utility company.

Q. How did you calculate purchased power prices?

A. I used the Staff's standard procedure to calculate the purchased power prices; specifically, I performed a statistical calculation based on the use of a truncated normal distribution curve to represent the hourly purchased power prices in the spot market.

Q. What kinds of raw data did you use in the calculations to determine proper purchased power prices?

A. Historical capacity and spot market purchase prices were (1) obtained from the Company in response to Staff Data Request (DR) #2903 and #2904, and (2) submitted to the Staff in response to Commission Rule 4 CSR 240-20.080 (20.080 data).

Q. Were different kinds of purchased power considered by you?

A. Yes. I considered three different kinds of purchased power; capacity, peaking and spot purchased power.

Q. Please explain what is a capacity purchase.

A. Capacity purchases are contracts for the purchase of power where the purchaser pays (1) a fixed cost for the ability to receive a maximum number of MWs per hour of generation and (2) a variable cost for MW hours of the energy associated with that generating capacity that is being purchased. The purchasing company can obtain a quantity of hourly energy up to the maximum amount shown in the capacity contract and the corresponding energy cost is typically based on the selling utility's energy or incremental cost plus some mark up, typically ten percent, more or less.

Q. How many capacity purchase contracts does the Company have?

A. There are two capacity purchase contracts in the Company's portfolio, based on the Company's response to Staff DR #2903. One is a contract with Union Electric Company (UE); the other is a contract with Associated Electric Cooperative, Inc. (AEC).

Q. What types of AEC and UE transactions, as reflected by the 20.080 data, were considered as capacity purchases?

A. In the response to Staff DR #2903, the capacity purchases were identified by the Company as those transactions in the 20.080 data which were tagged as system participation (SP) and operating reserves (OR) transactions. All other types of transactions with AEC and UE, including other companies' transactions with the Company, were identified as spot purchased power.

Q. How did you calculate the hourly energy prices for each capacity contract?

A. Based on 20.080 data, the historical price data for each capacity contract was used to calculate hourly weighted average prices by month, for hours 0100 to 2400, for each capacity contract.

Q. If for some hours there was not any purchased energy and price for that month, how did you determine those hourly prices?

A. A monthly weighted average price was used for these hours in that month.

Q. Do you think this was a reasonable method to calculate the capacity purchased energy prices?

A. Yes. Because the capacity purchased power was provided by specific electric utility companies (UE and AEC), the prices are based on those companies' energy or incremental costs plus approximately ten percent.

Q. Is there a maximum quantity of hourly energy the Company can purchase under each capacity contract?

A. Yes. In response to Staff DR #2903, the Company provided the maximum amount of hourly energy shown in each capacity contract.

Q. Please explain the method you used to determine the peaking purchased prices.

A. I chose the method historically used by the Staff for production cost model runs to determine the peaking purchased prices.

Q. How did you determine the amount of peaking purchased energy?

A. Peaking purchased energy (excluding the summer months of June through August) was approximately equal to ten percent of total generation capacity of the Company's system. For the summer months, the amount of peaking purchased energy required to meet load went as high as approximately fifteen percent of the total Company's generation capacity.

Q. What are spot market purchases?

A. For purposes of this case, spot market purchases are near term transactions for energy on an hourly basis for a short period. These transactions are related to the purchasing company's native load, generating units, production costs and economic dispatch. The energy is regarded as surplus capacity by the selling companies.

The purchasing company can buy energy from one or more utility companies based on its own economic decisions. Since the spot market purchases depend on power markets, they are more volatile than capacity purchases. Spot market purchases are generally made to meet unanticipated energy needs, or to take advantage of "low" energy prices.

Q. Did you use the same methodology to develop the spot market purchased energy prices as the capacity purchased prices?

A. No.

Q. What methodology did you use to determine the spot market energy prices?

A. I used a procedure developed by the Commission's Energy Department-Engineering Section described in the document entitled <u>A Methodology to Calculate Representative Prices for Purchased Energy in the Spot Market</u>. Based on the Company's actual hourly spot transaction prices obtained from the Company's 20.080 data, I calculated the spot market energy prices using the above methodology.

Q. How did you determine spot purchased energy?

A. In terms of the Company's 20.080 data, I calculated the approximate amount of hourly spot purchased energy (MWH) as ranging from the actual hourly maximum amount to the actual hourly maximum amount minus the amount of peaking purchased energy for hours 0100 to 2400 by month. This hourly amount of energy was considered as the maximum hourly quantity of spot purchased energy for that month available in spot power markets.

Q. How were these purchased energy prices and the associated energy including capacity, spot and peaking purchased power used?

A. As I stated earlier, the purchased energy prices and the associated energy including capacity, spot and peaking purchased power were a part of the input data which was used by Staff Witness Leon C. Bender for production cost model simulations.

Q. Did you encounter any difficulty receiving the necessary information from the Company?

A. Yes. I initially issued 9 DRs in Case No. EM-97-248 during the period May to August, 1996. Those DRs that I sent to the Company in July and August, 1996 in most part were not responded to by the Company. I sent DR #2902, #2903, #2904, and #2905 to the Company on October 29, 1996 in this case. These were among the 9 DRs that I had submitted to the Company in May, July and August, 1996 in the merger case. I received the Company's response to my DR #2902 on December 9, 1996, DRs #2903 and #2905 on February 4, 1997 and DR #2904 on February 10, 1997.

Q. Does this conclude your direct testimony?

A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of the Earnings Review of UtiliCorp United, Inc., d/b/a Missouri Public Service	))	**Case No. EO-97-144**

and

The Staff of the Missouri Public Service Commission, Complainant, v. UtiliCorp United Inc., d/b/a Missouri Public Service, Respondent.	))))))))	**Case No. EC-97-362**

AFFIDAVIT OF TOM Y. LIN

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Tom Y. Lin, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form consisting of 7 pages to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

Tom Yidong Lin

TOM Y. LIN

Subscribed and sworn to before me this 28th day of March, 1997.

Joyce C. Neuner

Notary Public

My Commission Expires: JOYCE C NEUNER
NOTARY PUBLIC STATE OF MISSOURI
OSAGE COUNTY
MY COMMISSION EXP JUNE 18,1997