

FACTS AND FIGURES ABOUT THE PUBLIC SERVICE COMPANY STEAM SYSTEM

Steam Business History

The history of the steam heat system in Denver begins with the corporate existence of the Denver Steam Heating Company December 15, 1879. The Denver Steam Heating Company, one of the predecessor companies of Public Service Company of Colorado, originally supplied steam to the Larimer Street area, Denver's original business district. The first commercial steam heating plant was located at 19th and Delgany Streets. Until 1949, this same steam plant provided most of the steam used in downtown buildings. In 1949, most of the steam production was taken over by the Zuni Plant. Steam from Zuni travels 1.8 miles in a 14-inch pipe before reaching the first downtown customers at 14th and Stout. In 1972 the original commercial steam heating plant was replaced with the current Denver Steam Plant, located at 19th and Delgany. The area served by steam comprises an area roughly bounded by Speer Boulevard, Wazee Street, 19th and 20th Streets, Broadway, Lincoln and Grant Streets, and East and West Colfax Avenue. The Auraria Higher Education Complex is also served by Public Service Company steam. Total length of steam mains is about ten miles.

Since its beginning, the steam heat system was generally in a period of growth which peaked with 159 customers in 1978 and 1979. From 1979 to present, the steam business has been in a period of customer and sales decline. The number of customers as of January, 1988 was 122. The all time system peak sales year was 1977 when 1,176,290 Mlbs. of steam were sold. The all time system peak was 510,000 lbs/hour which occurred on December 23, 1983. The average revenue per MLB, including sales tax and franchise fees, peaked at \$10.30/MLB in 1984. In 1987 the average had dropped to \$7.48/MLB, primarily due to decreased natural gas costs.

Uses for Steam:

- Space heating
- Domestic hot water heating
- Building humidification
- Absorption air conditioning - can be used for base load or electric demand peak shaving. High pressure steam (125 psig) would improve marketability of steam for air conditioning.
- Commercial processes - Restaurants, hospitals, hotels, laundries and dry cleaners.

Steam Generation Capacity:

Standard Operating Peak

Zuni Boiler 1	120,000	
Zuni Boiler 2	300,000	
Zuni Total (water treatment limited)		300,000
Denver Steam Plant 1	125,000	
Denver Steam Plant 2	155,000	
Denver Steam Plant Total		280,000

Standby Peak

State Plant (leased until 1994)	80,000	
United Bank (purchase)	40,000	
Radisson Hotel (purchase)	40,000	
Total Standby		<u>155,000</u>

Total Capacity 735,000 lbs/hr.

Total sendout from Zuni is limited to 300,000 lbs/hour due to water storage and treatment limitations. Peak sendout from Zuni has actually been as high as 350,000 lbs/hour for short periods. We do not currently have steam purchase contracts with either the United Bank or Radisson. Negotiations are in progress with United Bank for peaking steam. The Radisson has been unreliable in recent years. Considering this, the actual total capacity is 695,000 lbs/hour.

Fuel:

Natural Gas - Primary
No. 6 Oil - Backup

Incremental Production Costs - Dollars per MLB:

	<u>Fuel</u>	<u>Water, Chemicals Housepower</u>	<u>Total Cost Dollars/MLB</u>
Zuni 1	\$3.07	\$0.25	\$3.32
Zuni 2	2.81	0.25	3.06
DSP 1	2.45	0.25	2.70
DSP 2	2.35	0.25	2.60

Fuel costs are based on December, 1987 average fuel cost of \$2.04/MMBTU for natural gas.

Rates and Tariffs:

Current Rate (10/1/87)

Service Charge	- \$22.20/Month
Commodity Charge	- \$7.551/MLB
Steam Cost Adjustment	- \$(1.010)/MLB
Net Cost	- \$6.541/MLB

Approximate useful energy cost of steam is \$6.54 per MMBTU. For firm natural gas at \$3.30/MCF, the useful energy cost is \$6.63 per MMBTU at a boiler efficiency of 60% and \$4.97 per MMBTU at a boiler efficiency of 80%. Useful energy cost of electricity is about \$17.00 per MMBTU.

Test Year for Last Rate Case - 1983

Steam sales for the test year were not weather adjusted. There were 6,429 heating degree days in 1983. The 10-year rolling average is 5,911 HDD. The 30-year rolling average is 6,014 HDD.

Current Rate Base (9/30/87) - \$4,704,796

Allowed Rate of Return

9.51% on Rate Base
14.4% on Common Equity

Extension Policy

Mains - Free construction allowance equal to one and one half (1.5) times the Company's estimate of the average annual revenue.

Service Connection - No free construction allowance.

Steam Delivery Conditions:

Steam service as defined in the tariffs is the maintenance at the point of delivery of low pressure steam at a pressure of not more than forty or less than two pounds per square inch.

The system controls are designed to maintain a pressure range at the point of delivery of 20 to 25 psig. This is accomplished through telemetering equipment which transmits pressure from three locations. These are the system low pressure point at Lincoln Tower, 19th and Lincoln, the system mid pressure point at the headquarters office building, or the steam delivery pressure at Auraria. Any of these pressure signals can be selected to operate plant controls at Zuni or the Denver Steam Plant to maintain system pressure.

The steam temperature at the point of delivery is at or slightly above the saturation temperature for the delivery pressure. The useful heating value of steam delivered is about one million BTU's per MLB.

Customer and Steam Sales Information:

Number of customers - Currently 122, includes two accounts for Headquarters Office Building.

Primary Use for Steam - Space and domestic hot water heating.

Absorption air conditioning (A/C) customers -

- 14 customers have absorption A/C equipment
- 5 customers use absorption as main A/C source
- 5 customers use absorption as peaking A/C source
- 4 customers have idle absorption A/C equipment

In 1987 the top 10% of all steam customers (12) represented 36.5 percent of steam sales. The top 50% of all customers (60) represented about 90 percent of all steam sales.

The 1987 total annual steam sendout represented a capacity factor (based on Zuni/DSP only) of 19.5% and a load factor of 29.06%. The six month period of January thru April and November-December accounted for 76% of all steam sales in 1987.

Metering:

Total number of meters:	158
Total number of condensate meters:	138
Total number of shunt flow steam meters:	16
Total number of other steam meters (orifice, venturi nozzle, etc.):	4