

PAIUTE PIPELINE COMPANY

Description of Company Operations

Paiute Pipeline Company (Paiute) is a corporation duly organized and validly existing under the laws of the State of Nevada and has its principal place of business in Las Vegas, Nevada. Paiute is a wholly-owned subsidiary of Southwest Gas Corporation (Southwest), which is a corporation duly organized and validly existing under the laws of the State of California. Southwest's principal place of business is also located in Las Vegas, Nevada. Paiute is a "natural gas company" as defined by the Natural Gas Act. Paiute is primarily engaged in the transportation and storage of natural gas in interstate commerce for ultimate public consumption.

By order issued May 17, 1988, in Docket No. CP87-309-000, 43 FERC ¶ 61,257, the Federal Energy Regulatory Commission (Commission) granted a certificate of public convenience and necessity to Paiute authorizing it to: (1) acquire and operate the certificated interstate natural gas facilities previously owned and operated by Southwest; (2) render interstate sales services in accordance with outstanding certificates of public convenience and necessity previously issued to Southwest; and (3) make sales of natural gas in interstate commerce to Southwest-Northern Nevada and Southwest-Northern California for resale. The Commission also granted permission and approval for Southwest to abandon its interstate natural gas facilities and the jurisdictional services performed through those facilities. On June 16, 1988, Paiute filed its notice of acceptance of the certificate of public convenience and necessity as issued by the Commission's May 17, 1988 order. Paiute commenced operations on August 1, 1988.

Paiute's interstate pipeline system extends from a point of interconnection with the facilities of Northwest Pipeline Corporation (Northwest) on the Idaho-Nevada border at the Owyhee River to: (1) a point of termination on the Nevada-California state line immediately south of Lake Tahoe, where Paiute delivers natural gas to Southwest-Northern California for local distribution in El Dorado County, California; and (2) a point of termination on the Nevada-California state line immediately north of Lake Tahoe, where Paiute delivers natural gas to Southwest-Northern California for local distribution in Placer and El Dorado Counties, California.

From the interconnection with Northwest, Paiute's mainline extends approximately 225 miles to the Wadsworth Junction near Wadsworth, Nevada. Along the mainline, Paiute delivers gas into its Elko and Lovelock Laterals. Paiute can also receive gas into its mainline from its LNG storage facility, which is located near Lovelock, Nevada, approximately 61 miles upstream of the Wadsworth Junction. At the Wadsworth Junction, Paiute's mainline divides into two mainline extensions, the Reno Lateral and the Carson Lateral. The Reno Lateral extends to the cities of Sparks and Reno, Nevada. The Carson Lateral extends to the Carson City, Nevada area, where the lateral further divides into Paiute's North Tahoe and South Tahoe Laterals. Along the Carson Lateral, Paiute delivers gas at various delivery points and into several other lateral pipelines. On

December 1, 2002, Paiute established, at the Wadsworth Junction, an interconnection with a second upstream pipeline, Tuscarora Gas Transmission Company (Tuscarora).

On August 1, 1988, the date of Paiute's commencement of operations, Paiute began rendering wholesale natural gas sales service to four distributor customers: (1) Sierra Pacific Power Company (Sierra Pacific), which serves the cities of Reno and Sparks, Nevada, and surrounding areas in Washoe County, Nevada; (2) Southwest-Northern Nevada, which serves various communities in northern Nevada other than those areas served by Sierra Pacific; (3) CP National Corporation, the predecessor of Avista Corporation (Avista), which served the city of South Lake Tahoe, California, and surrounding areas in El Dorado County, California; and (4) Southwest-Northern California, which serves various communities around the north shore of Lake Tahoe in Placer and El Dorado Counties, California.

By orders issued September 20, 1990 (52 FERC ¶ 61,311) and March 26, 1991 (54 FERC ¶ 61,338), the Commission approved a settlement offer in Docket No. RP88-227-000 with modifications. Pursuant to the settlement and the Commission's orders, on June 1, 1991, Paiute converted to a transportation only pipeline and began rendering firm transportation service and contract liquefied natural gas storage service to the preceding distributor customers. Traditionally on Paiute's system, flowing supplies of customer-owned gas have been delivered to the Paiute system through the facilities of Northwest. At the request of its storage customers, Paiute will withdraw vaporized LNG from its LNG storage facility, which has the capability of providing peaking supplies as the need exists. With the addition of the Tuscarora interconnection in December 2002, customers have since had available a second receipt point for having flowing supplies of natural gas delivered into the Paiute system, as discussed further below.

On February 28, 1993, Paiute placed into service a major system capacity expansion project. As a result of the project, Paiute commenced firm transportation service for nine new commercial and industrial end user customers located across Paiute's system. Subsequently a gas marketer customer obtained firm transportation service from Paiute by means of a turnback of capacity to Paiute by another customer and a capacity expansion project described below. In addition, in April 2005 Southwest acquired Avista's service area rights with respect to the city of South Lake Tahoe, California and environs, and merged the area into its northern California operations.

As of March 1, 2009, Paiute provides firm transportation service to three distributor customers (Sierra, Southwest-Northern California, and Southwest-Northern Nevada), one gas marketer, and nine commercial and industrial end users. Paiute also provides firm LNG storage service to its three distributor customers. In addition, Paiute provides interruptible transportation service. Paiute also offers interruptible LNG storage service, although Paiute has not performed any such service since it first became available in August 2005.

No significant changes have been made to Paiute's system since the filing of Paiute's last FERC Form 2-A. Consequently, Paiute has not included a system map herein.

Recent Major Expansions

Since the conclusion of Paiute's previous rate case in Docket No. RP05-163 in 2005, Paiute has constructed two projects which increased the capacity downstream of Paiute's Wadsworth Junction:

(1) 2005 Expansion Project – Pursuant to its blanket certificate authorization under Subpart F of Part 157 of the Commission's regulations, issued March 7, 1985 in Docket No. CP84-739 (30 FERC ¶ 61,250),¹ Paiute constructed its 2005 Expansion Project in the fall of 2005. The project consisted of the modification and/or rebuild of delivery point facilities at seven existing delivery point locations served by the Carson Lateral. No pipeline facilities were constructed or modified. The purpose of the project was to provide additional firm transportation capacity of 4,396 Dth per day on the Carson Lateral and downstream laterals for Southwest-Northern Nevada, and to accommodate Southwest-Northern Nevada's request to increase and decrease its maximum daily delivery entitlements at various delivery points served by the Carson Lateral. Paiute determined that it could accomplish both objectives by means of the shifting of Southwest-Northern Nevada's delivery point entitlements along the Carson Lateral and the modifications at the seven delivery points. The project was placed into service on November 14, 2005. The total cost of the project was \$344,800.

(2) 2007 Expansion Project – Pursuant to its blanket certificate authorization under Subpart F of Part 157, including certain specific authorization obtained by means of a prior notice request for authorization in Docket No. CP07-102, Paiute constructed its 2007 Expansion Project during 2007. The project consisted of the construction of pipeline loop and replacement pipeline facilities along Paiute's Carson and Yerington Laterals and the modification of certain pressure regulating and delivery point facilities downstream of the Wadsworth Junction. The purpose of the project was to provide additional firm transportation capacity of 8,592 Dth per day on the Carson Lateral for three shippers, IGI Resources, Southwest-Northern California, and Southwest-Northern Nevada. The project was placed into service on November 1, 2007. The total cost of the project was \$4,985,373.

All costs from the above projects are transmission function costs.

On December 1, 2002, as part of a capacity expansion project on Tuscarora's system, Tuscarora and Paiute established an interconnection between their systems at the Wadsworth Junction. Southwest-Northern Nevada and Southwest-Northern California obtained firm transportation capacity on Tuscarora's system to have gas delivered by Tuscarora into Paiute's system. As a result of the two Paiute construction projects described above, in addition to earlier projects, Paiute has established a takeaway capacity from its Wadsworth Junction receipt point with Tuscarora of 39,989 Dth per day. All of this capacity is committed to the two Southwest LDCs and a gas marketer under individual firm transportation service agreements.

¹ The blanket certificate was originally issued to Paiute's predecessor, Southwest. Paiute succeeded to Southwest's blanket certificate authorization by virtue of the May 17, 1988 order in Docket No. CP87-309-000 discussed above.

Description of Design and Procedure

Paiute utilizes the widely accepted unsteady-state module (USM[®]) of the SynerGEE software Version 3.36 developed by Advantica Stoner Associates Inc. to model its system and optimize designs. More specifically, within the USM[®], Paiute selected a set of mathematical equations and employed the Method of Characteristics used in one dimensional unsteady state gas dynamics to accurately yield meaningful results and represent the network's interconnection with reasonable reality. These equations model the time varying pressure-flow relationship which exists in high-pressure gas transportation systems, and are found within Appendix A.

The design conditions used in USM[®] were developed using the best available data. For design purposes, allocation of a given customer's demand is based on the maximum historical hourly deliveries for that customer's individual delivery points, the sum of which cannot exceed that customer's daily contract demand. The hourly profile of the total daily demand is developed and periodically updated from SCADA data.

Through the use of USM[®], a wide range of facility reinforcements or alternatives can be investigated to determine the optimum combination of system reinforcements and improvements. When reinforcement/improvement of any segment of the system is required, or if a new system is being designed, numerous combinations of loop pipeline, new pipeline, and/or additional horsepower are analyzed to obtain the optimum facility arrangement for installation. The USM[®] resulting data is transferred to the appropriate flow diagrams for design presentation, which leads to material takeoff for cost estimating.

Paiute designs facilities in accordance with the Federal Safety Standards established by Title 49 of the Federal Code of Regulations, Parts 191 and 192; Transportation of Natural Gas and Other Gas by Pipeline. Facility designs and costs are reviewed and approved by appropriate engineering management.

FLOW DIAGRAM DATA ENGINEERING DESIGN DATA

1. Flow Formula

The Fundamental Equation with variable friction is used in the USM[®] Stoner model for calculating transient flow conditions. The formula is shown below:

$$Q = (n + 1) 77.54 \frac{T_b}{P_b} D^{2.5} e \left[\frac{P_1^2 - P_2^2 - \left(\frac{0.375 G (h_2 - h_1) P_a^2}{Z T_a} \right)}{G T_a L Z f} \right]^{0.5}$$

Where:

- Q = Flowrate (scf/d)
- n = Number of additional pipes in parallel (dimensionless)
- T_b = Base temperature of the standard gas state (°R)
- P_b = Base pressure of the standard gas state (psia)
- D = Inside diameter of pipe (inches)
- e = Pipe efficiency (dimensionless)
- P₁ = Upstream node pressure (psia)
- P₂ = Downstream node pressure (psia)
- G = Gas Gravity relative to air (dimensionless)
- h₁ = Upstream node elevation (feet)
- h₂ = Downstream node elevation (feet)
- P_a = Pipe average pressure (psia)
- Z = Gas compressibility factor (dimensionless)
- T_a = Average gas flowing temperature for a pipe (°R)
- L = Pipe length (miles)
- f = Pipe friction factor (dimensionless)

The method of calculating the supercompressibility (Z) is using a modified Benedict-Webb-Rubin type of equation in terms of reduced temperatures and pressure which approximates the Z factor correlation of Standing-Katz (Trans AIME, Vol. 14b, p. 144, 942).

The friction factor (f) is calculated using the Shacham equation. The formula is shown below:

$$f = \left[-2 \log \left(\frac{\epsilon / d}{3.7} - \frac{5.02}{Re} \log \left(\frac{\epsilon / d}{3.7} + \frac{14.5}{Re} \right) \right) \right]^{-2}$$

Where:

ϵ/d = Relative roughness (dimensionless)

Re = Reynold's number (dimensionless)

2. Horsepower/Flow Formula Compressor

The theoretical compressor is the most basic compressor model used with USM[®] Stoner SynerGEE except where an actual field performance map of each engine-compressor set is used. This equation derivation, shown below, follows the standard theoretical power equation:

$$\frac{HP}{Q} = \left(\frac{3.0303}{e_c} \right) \left(\frac{Z_S P_b T_S}{T_b} \right) \left(\frac{k}{k-1} \right) \left[\left(\frac{P_d}{P_S} \right)^{\frac{k-1}{1}} - 1 \right]$$

Where:

HP = Compressor horsepower

Q = Flow rate through compressor (mmscfd)

e_c = Compressor efficiency (dimensionless)

Z_S = Gas compressibility at suction conditions (dimensionless)

P_b = Base pressure of the standard gas state (psia)

T_S = Gas flowing temperature at suction conditions (°R)

T_b = Base temperature of the standard gas state (°R)

K = Gas coefficient¹ (dimensionless)

P_d = Discharge pressure (psia)

P_S = Suction pressure (psia)

¹Gas coefficient (K) may be molar specific heat capacities (C_p/C_v), if the process is assumed to be adiabatic or isentropic; or the polytropic exponent (n) if the process is assumed to be polytropic. Compressor efficiency (ec) must be determined in a manner consistent with the K selected.

3. Assumptions and Basis

Paiute utilizes the following assumptions and basis:

Energy value = 1,017 Btu/scf
Base Specific Gravity = 0.60
Specific Heat Ratio = 1.3
Flowing Gas Temperature = 50° F (winter)
Base Temperature = 60° F
Base Pressure = 14.73 psia
Pipe Roughness = 600 to 1000 micro-inch
Compressor Station Inlet Losses = 5 to 10 psig
Compressor Station Outlet Losses = 5 to 10 psig

Locations, distances and elevations of modeled facilities were determined from United States Geological Survey quadrangle maps and construction records.