

# THE FIRST LONG DISTANCE TRANSMISSION OF ELECTRICITY IN AMERICA?

WILLAMETTE FALLS-TO-PORTLAND, JUNE 1889

PORTLAND GENERAL ELECTRIC

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Portland General Electric proudly traces its history to some of the earliest industrial developments in the Willamette valley. Among its direct corporate predecessors, PGE can list PEPCO, the Portland Railway Light and Power Company, and, before that, more than thirty individual power providers and transportation concerns that each played an important role in the history of Portland during the 19<sup>th</sup> and early 20<sup>th</sup> centuries.

PGE's predecessors were responsible for many notable achievements. Companies that became part of PGE ran steamships on the Willamette and the Columbia rivers, moving goods and people to Portland. Others built the locks at Willamette Falls, generated the first electricity in the state, and by 1910 had developed an electric-powered trolley and interurban transportation system that was considered among the finest in America. PGE is rightly proud of its long history in Oregon and the numerous "firsts" for which the company may take credit. None, perhaps, is as notable as PGE's connection with the Willamette Falls Electric Company and its transmission of electricity from the powerhouse that became known as "Station A" to downtown Portland, a distance of approximately fourteen miles.



Station A was the result of the vision of several strong-willed and persistent engineers who saw the massive potential of the Willamette Falls and growing need for electricity to power Portland's trolley system, lighting and manufacturing needs. In 1888 Parker Morey, the driving force behind the United States Electric Light and Power Company, which was providing service in Portland, joined forces with Edward L. Eastham, an Oregon City resident who had acquired not only the Willamette Falls Transportation and Locks Company but virtually all the water-rights associated with

the Willamette Falls. As PGE historian Craig Wollner writes "Inevitably the two businessmen were drawn together to form a new company that would harness the power of the falls in the service not only of Oregon City, but of Portland" (Wollner, 1990:24). In November 1888 Morey and Eastham incorporated as the Willamette Falls Electric Company.

Morey hired W. C. Chaney to design a new powerhouse at Oregon City. Chaney was highly regarded nationally, having worked on some of the earliest electrical generation facilities in the United States. Chaney determined that a high voltage system was required to transmit power the fourteen miles and decided upon a series of 125-cycle, 4,000 volt alternating current (AC) dynamos. This was so out of the norm that Westinghouse at first refused to build them, only relenting when H. M. Byellsby, one of the most respected electric engineers of the era, interceded on Chaney's behalf, telling Westinghouse that "If Chaney wants those machines, build them. If any man can make them go, he can" (Wollner, 1990:27). And while Westinghouse did relent and built the AC dynamos to Chaney's design, he did so only with understanding that he would not warranty them to work.

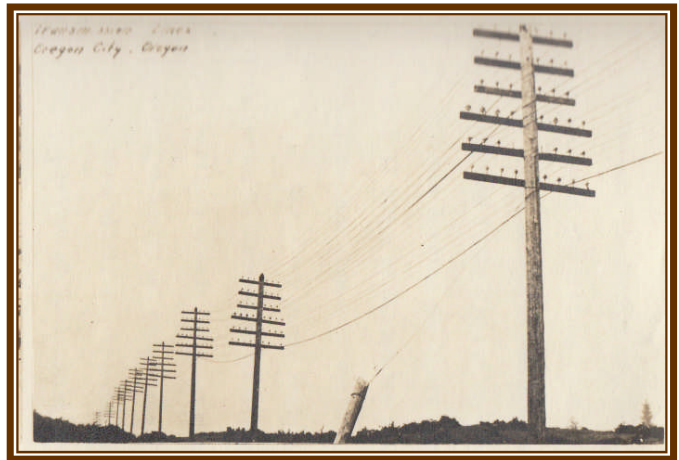
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While Westinghouse was building Cheney's experimental equipment, Morey and Eastham still had a growing Portland market to serve and so they decided to move several Direct Current (DC) brush dynamos at Willamette Falls from an existing plant, and run a new transmission line to serve Portland.<sup>1</sup> R. R. Robley, a longtime PGE employee, wrote a history of the company in 1935, and interviewed many of its earliest employees about these events. "Upon completion of the station building, part of the equipment was moved from the Wielder Mill (in downtown Portland) and installed for use.... The first unit was put into service on the evening of June 3, 1889, to light one of the arc (lighting) circuits in Portland" (Robley, 1935:21). Under the headline "Worked Like a Charm," the *Morning Oregonian* reported the event the following day:

"The Willamette Falls Electric Company started upon one of the Brush arc light dynamos last evening, and the electricity was sent from Oregon City for lighting one of their 10:00 o'clock circuits in this city. It worked magnificently and conclusively demonstrated the fact that our city can be lighted successfully from the falls. The result was a pleasing surprise to the company, the percentage loss of electricity by transmission being much less than their most sanguine expectations" (*Morning Oregonian*, 4-June-1889, 5:1).



*The June 3, 1889 transmission of DC power by the Willamette Falls Electric Company from Oregon City to Portland, a distance of between thirteen and fourteen miles, marks the first long distance transmission of electricity in the United States.<sup>2</sup>*

While providing power from the Brush arc DC dynamos, Chaney and the Willamette Falls Electric Company received shipment on the first of the six high-voltage Westinghouse AC dynamos, which according to Westinghouse Company records was shipped via Kalama, Washington on April 30, 1890 (Robley, 1935:20). Two more units were shipped in mid-May, the fourth arrived on October 30, 1890, the fifth on February 8, 1891. Finally, on October 10, 1891, the six and last of the Westinghouse dynamos was in Oregon City (Robley, 1935:21).

It is almost certain that at some time in late summer or early fall of 1890 the first two AC dynamos to arrive at Willamette Falls had been wired and, via the existing transmission line, sent power to downtown Portland. Certainly by February 1891, with five units on site, some of them were in use, augmenting or replacing the earlier DC Brush dynamos at Station A. While the actual start date of AC

<sup>1</sup> The company also ordered additional DC dynamos that would be installed at Station A by 1890.

<sup>2</sup> An earlier demonstration project, in Germany, had demonstrated the theoretical possibility of long-distance DC transmission but no practical long distance line was in operation in the United States until the Oregon City-Portland line went into operation.

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generation at Oregon City, based on the shipping dates of the new dynamos, it appears that the transmission of AC current from Oregon City to Portland occurred sometime late-1890.

Unfortunately, since no particular notice was made in the local press of the substitution of AC power for the earlier DC system at Willamette Falls, the specific date of this second first, being the first long distance transmission of *alternating current* in the United States, has been lost to time. This has created some confusion as to whether Oregon City, or another early transmission at Ames, Colorado, can accurately claim such the honor. That Colorado event, in June 1891, sent AC power 2.6 miles from the powerhouse to Nunn's gold mine.

R. R. Robley, PGE's early historian, confronted the lack of data surrounding this second example of long-distance transmission in the company's history while researching his 1935 study. "[W]ith the delivery and installation of the first of the six new 4,000 volt Westinghouse dynamos in the Summer of 1890, there is no reasonable doubt but that energy from these machines was being transmitted to Portland for commercial use in the late summer or early fall of that year" (Robley, 1935:22). Finally, in an appendix, Robley reprints a paper delivered in June



1892 by Charles F. Scott, of Westinghouse Company, at a meeting of the American Institute of Electrical Engineers. Scott, a prominent engineer who played a major role at Westinghouse, was involved with the design for the Willamette Falls project, as well as the Westinghouse installation that served Nunn's gold mine, in Colorado. Scott differentiates the AC projects, stating "one is for lighting and the other for transmission of power...The plants to be described are the first of their type installed in this country and the apparatus in the power plant is of a kind that has not been heretofore used..." Scott continued:

*The lighting plant was first installed. It is operated by the Willamette Falls Electric Company, Portland, Oregon....when the apparatus was designed, it was not considered practicable (sic) to generate 4,000 volts with the ordinary type of machine.....the work was undertaken with a new type of armature, which is specifically noteworthy, as it rendered high potentials practicable (sic) in a machine of simple construction" (as quoted in Robley, 1935:33, emphasis added)*

Based on Scott's statement, made in 1892 and nearly concurrent with the described events, the long-distance transmission of AC current at Willamette Falls was the first such event in the United States, probably occurring ten months earlier than that at Ames, Colorado and, by Scott's own statement "first." The June 1899 transmission of DC current, by the Willamette Falls Electric Company from Oregon City to Portland, is, without any qualification, firmly documented as the first long distance transmission of electrical energy in the United States. ***As documented by Charles F. Scott, who was personally involved, the Oregon City AC transmission predates the Ames, Colorado event.***