1C.8.1—Voltage Frequency

1. Scope

This document describes the frequency of the steady state voltage that a customer can expect to receive from PacifiCorp.

2. Definition

Frequency is by definition a measure of some steady state periodic wave. In the power system it is equal to the inverse of the period of one complete waveform of the steady state voltage. Its units are hertz (Hz), or cycles per second. Frequency is not defined for transients or other nonperiodic events.

3. Background

Since the mid 1960s the power systems of the entire Western United States have been tied together into one massive integrated power system (Figure 1, Map of Interconnected Western Power System). This helps to stabilize the frequency of individual utilities as well as to aid in the interchange of power. This interconnection of utilities also makes it nearly impossible for any one utility to individually control their frequency independently from the much larger pool of which they are a part.

With such a large power system it is difficult to change its frequency of 60.000 Hz by any significant amount. When a frequency correction must be made, certain utilities are designated to coordinate the change. This can happen right after a major system breakup, which is quite rare (years between events). During such events the frequency could deviate by as much as 0.75 Hz (worse case) for a few seconds. More commonly, temporary frequency deviations occur due to sudden major load or generation changes, and are much smaller. Such events happen every few days somewhere in the Western United States.

4. Frequency Deviation Limits

These are worse-case limits that have been experienced on the power system. These are not guaranteed limits.

Normal:	60.000 ±0.015 Hz	
Sudden Changes:	60.000 ±0.100 Hz	(several times per month)
Major Breakup:	60.000 ±0.750 Hz	(once every few years)

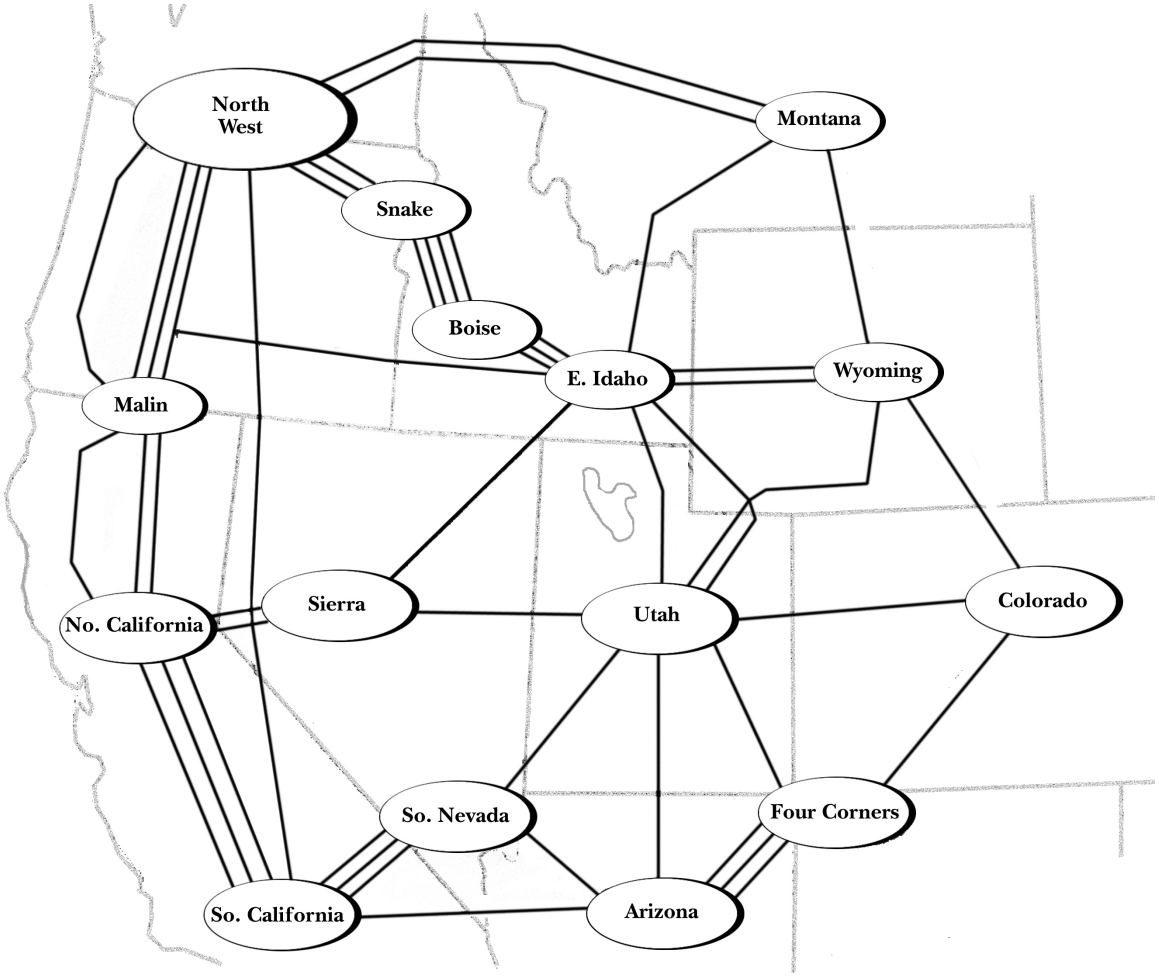

Figure 1—Simplified Map of Interconnected Western Power System