12 GEOTHERMAL ELEMENT

Given their importance to Calistoga's economy and character, geothermal resources warrant special treatment in the City's General Plan. The Geothermal Element provides the City with direction in the regulation and enhancement of geothermal resources in Calistoga.

A. Background Information

Calistoga is located in a geothermal area that essentially underlies the entire city and much of the surrounding area. The geothermal aquifer in the area has relatively low temperature, on the order of 200 to 210 degrees Fahrenheit. Because the geothermal temperatures are fairly low, the geothermal resource is most suitable for direct-use projects such as heating of buildings, greenhouses, spas and other facilities.

Calistoga's worldwide reputation as a spa/resort community has brought significant development and the creation of an economy based largely on tourism.

Other issues associated with this resource are addressed elsewhere in the General Plan, particularly in the Land Use and Economic Development Elements.

Geothermal Resources

Calistoga has several related geothermal resources that are used in the spa and mineral water industries. A Geothermal Resource Assessment study, was completed in 1986 by the California Energy Commission. This study mapped the geochemical and hydrological characteristics of the geothermal reservoir, and examined the rate of its use by the City, local water bottlers and spas. The report concluded that Calistoga's geothermal resources had an expected life of only 100 years. Monitoring and managing geothermal activities is necessary to prevent over-depletion of these vital resources.

Hot Springs. Two of Calistoga's major industries, the spa/resort industry and mineral water bottling, rely on the City's world-famous mineral water resources. Calistoga's historic roots lie in its development as a spa. Since those early days, the name "Calistoga" has continued to invoke associations with healing waters and rural relaxation, and the City's image as a spa/resort location seems as strong today as ever. The spas, resorts, retail stores and restaurants that cater to visitors attracted by the hot

springs and related facilities comprise the City's largest single source of employment.

Cold Water Aquifer. Calistoga's cold-water aquifer provides water for a number of properties that are not connected to the City's water supply and instead rely on wells. The cold water aquifer also contributes to local mineral waters, as described below. Maintenance of sufficient quantity and quality of the cold-water aquifer water is therefore vital to the use of geothermal resources.

Mineral Water. Mineral waters are derived from the mixing zone between the cold water aquifer and geothermal resource. The local water bottling industry relies on the quality and purity of Calistoga's mineral water resources. Calistoga's two major bottling plants provide the majority of employment in Calistoga's manufacturing sector.

Production of mineral waters is not likely to cause significant depletion of the geothermal resource, which is deeper than the zone from which mineral waters are derived. However, it is critical that the purity of both the geothermal resource and the cold water aquifer be maintained if the mineral water industry is to thrive.

Volcanic Ash. Volcanic ash, deposited millions of years ago from eruptions of nearby Mount St. Helena, is used by the local spa industry for mud baths. Most spas in the City own property where ash is excavated, or they buy ash from local property owners.

While the size of the City's volcanic ash deposits are not known, they are believed to be abundant, with current levels of use depleting them at a relatively slow rate. However, Calistoga's volcanic ash resources, which are non-renewable, have never been comprehensively surveyed. Further studies would be required to establish the likelihood of this resource being exhausted within the City limits in the foreseeable future.

On a regional level, volcanic ash is an abundant constituent within the Sonoma Volcanics, which is a geological formation appearing in many places throughout much of Lake, Napa and Sonoma counties. Therefore, protection of the volcanic ash resource is probably unnecessary from a regional perspective. Disposal of volcanic ash waste from mud bath use is not considered to be problematic, since it is a non-toxic, naturally occurring mineral substance.

Geothermal Resource Uses

As noted above, Calistoga's spa and mineral water industries are based on geothermal resources. Current uses of the geothermal resource are primarily direct use for heating of spas, greenhouses and a few private residences.

At the same time, the geothermal resource beneath Calistoga is relatively little used for energy. Currently, there is no power generation using geothermal resources in the Calistoga area. During the late 1980's and early 1990's studies were conducted by Dames & Moore to assess the feasibility of constructing a heating system for the downtown area. The project was judged to be feasible from an engineering standpoint and the heating system was never constructed.

Geothermal Resource Regulation

In evaluating policies which the City of Calistoga might employ to regulate or encourage geothermal development, it is important to understand that the City regulates only the above ground portion of geothermal projects, even with the city limits. Well permits are issued by Napa County, and overall responsibility for regulation of the geothermal industry lies with the California Department of Conservation Division of Oil, Gas and Geothermal Resources and the California Energy Commission. Although the City may undertake geothermal exploration or development, it does not have regulatory responsibility for permitting or monitoring of geothermal development or maintenance of geothermal

resources. The City does, however, require a Conditional Use Permit for these uses.

B. Key Findings

1. Based on a 1986 study completed by the California Energy Commission, Calistoga's geothermal resource then had an expected life of only 100 years. Geothermal activities need to be monitored and managed to prevent over-rapid depletions of this vital resource.

2. Calistoga's geothermal resources are a significant contributor to the local economy, supporting Calistoga's reputation as a spa destination, the associated hospitality, restaurant and retail sectors, and the local mineral water bottling industry.

3. Volcanic ash resources in the City should be protected since they are non-renewable. However, there are large deposits of volcanic ash throughout the region, so on-going use is appropriate.

4. Geothermal development is already subject to extensive regulation by State and County agencies. Public interests are sufficiently protected through these regulations without establishment of extensive new City regulations. However, the City should monitor geothermal development to determine if and when new City regulations are warranted for protection of local interests.

C. Goals, Objectives, Policies and Actions

Goal G-1 Protect Calistoga's unique geothermal resources.

Objective G-1.1 Protect existing volcanic ash resources within the City in order to allow for this resource's wise use.

Policies

P1. Volcanic ash extraction in Calistoga shall be limited to local mud baths, spas and other employment generators.

P2. Excavation and storage of volcanic ash shall be completed in an environmentally sensitive manner compatible with adjacent land uses.

Actions

A1. Investigate the extent and rate of use of volcanic ash through a quantitative study. Include an analysis of sources of volcanic ash outside the City to determine the relative importance of the local supply. If found necessary through this study, adopt regulations to prevent the overly-rapid depletion of volcanic ash.

Objective G-1.2 Ensure the longevity of geothermal resources.

Policies

P1. The City encourages the study of local geothermal resources as a means to determine status of the reservoir both in terms of quality and quantity.

P2. Support existing geothermal uses as an important contributor to the local economy and Calistoga's reputation as a spa destination, provided these uses are sensitive to the environment and avoid adverse impacts on the City's infrastructure.

P3. New geothermal uses shall be approved only if they will not have an adverse impact on the longevity of the geothermal resource, biotic resources, waterways, the sewage treatment plant, and ability to dispose of the treated effluent.

P4. Bulk exporting of geothermal waters to businesses or individuals located outside the City limits shall be prohibited.

Actions

A1. Conduct a study to consider metering of groundwater dischargers to help determine annual use of the geothermal resources.

A2. Seek funding for studies which monitor the groundwater aquifer quantity and quality in Calistoga and vicinity.

Objective G-1.3 Encourage geothermal energy exploration, recovery, and power production.

Actions

A1. Coordinate with the California Energy Commission to further explore geothermal resources and the creation of a geothermal heating district.