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GEOTHERMAL RESOURCES OF NEVADA: A NEW MAP

Dennis T. Trexler, Thomas Flynn, and George Ghusn, Jr.

DIVISION OF EARTH SCIENCES, University of Nevada, Las Vegas
255 Bell St., Suite 200
Reno, Nevada 89503

ABSTRACT

A new map showing the geothermal resources of Nevada was recently published by the Division of Earth Sciences, University of Nevada, Las Vegas, in cooperation with the U.S. Department of Energy and National Oceanic and Atmospheric Administration of the Department of Commerce. The new map indicates the location of 910 wells and springs with temperatures greater than 20°C (68°F). Fifty-six areas shown in dark gray indicate water temperatures of 40°C (104°F) or areas where temperatures of 40°C or greater may be encountered at depths less than 500 m (1640 feet). An inset map of the Moana Springs area of Reno shows the location of 114 wells that are used to heat residences, churches and motels.

Geothermal Resources - 1979

In 1979, the first comprehensive map of the geothermal resources of Nevada (Trexler and others, 1979) was published by the Nevada Bureau of Mines and Geology under a contract to the U.S. Department of Energy. The purpose of this 1:500,000 scale map was to indicate areas of potential for direct utilization of geothermal energy. A total of 365 springs and wells with temperatures greater than 20°C are shown. In addition, the symbols for springs and wells indicate the temperature, major chemical constituents, total dissolved solids, flow rate and pH of the water. A numerical scheme was applied to the existing data available at that time to evaluate the potential for non-electric applications of the geothermal resources.

Five parameters were used in evaluating the areas for industrial process heat and residential space heating. Although many other factors could be considered, data for the five parameters selected were available and quantitative. The following parameters, listed in the order of their importance, were chosen to evaluate the potential for industrial process heat: 1) temperature, 2) fluid chemistry, 3) accessibility, 4) population, and 5) depth to resource. For residential space heating, the parameters used are similar, but their order of importance differs: 1) population, 2) depth to resource, 3) temperature, 4) chemistry, and 5) areal extent. Each parameter is assigned a specific coefficient which preserves its order of importance. A second number is chosen for the parameter which is variable and depends upon the quality or quantity of the parameter within the defined region. These two numbers are taken as a product for each of the five parameters and the resultants are summed to arrive at a single number which forms the basis for comparing one area to another.

Geothermal Resources - 1983

In September, 1981, the U.S. Department of Energy contracted with the Division of Earth Sciences, University of Nevada, Las Vegas, to prepare a "Geothermal Resources Map of Nevada." The new map is a comprehensive representation of all geothermal resources in Nevada. A total of 910 springs and wells with temperatures greater than 20°C are shown on the map. Blue symbols represent wells and springs with temperatures between 20°C and 50°C. Springs and wells with temperatures greater than 50°C are shown in red. Each well and spring is designated by a number which is sequential for each county. An accompanying table provides information on the name of the spring or well, a reference number which corresponds to a similar number in Nevada Bureau of Mines and Geology, Bulletin 91 "Thermal Waters of Nevada" (Garside and Schilling, 1979), location by township, range and section, temperature in degrees Celsius, depth of well in meters, flow rate in liters/minute and total dissolved solids in milligrams/liter.

Due to higher ambient temperatures in the southern part of the state, only wells with temperatures greater than 30°C are shown. All information that is available has been used in preparation of the map. Some deep wells are shown which do not have temperature data. This information is currently unavailable due to proprietary restrictions. However, they indicate areas of interest for high-temperature geothermal resources.

Those regions believed to have the highest potential for discovery of geothermal resources have been delineated with dark gray shading. These regions indicate areas where surface water (springs) temperatures are greater than 40°C or where temperatures of 40°C or greater may be encountered at depths less than 500 m (1640 feet).

A lighter gray shading indicates areas favorable for the discovery of thermal water at shallow depth (<1,000 m) of sufficient temperature for direct heat applications. It is probable that only portions of this large region (approximately three-quarters of the state) are underlain by thermal waters.

Thirty-two significant areas are further described in detail on the map with squibs, which provide historical and developmental footnotes. These areas include: Baltazor, Tuscarora, Beowawe, Wells, Elko, Hot Springs Point, Pumpernickel Valley, Golconda, Leach Hot Springs and Gerlach in the north. Important areas in central Nevada include Dixie Valley, Desert Peak, Humboldt House, San Emido Desert, Steamboat Hot Springs, Soda Lake-Upsal Hogback, Stillwater, Fallon, Moana, Hawthorne, Lee Hot Springs, Wabuska and Big Smoky Valley. The southern part of Nevada does not have high-temperature geothermal resources but many areas have resources that are suitable for direct heat application such as the City of Caliente.

The area of greatest utilization of geothermal energy, at the present time, is in the Moana Springs area in south Reno. This area is shown as an inset and indicates the location of 114 wells that are used for space heating residences, churches and motels. It is the site of the largest district space heating development in the state.

This map represents the most current available data on the geothermal resources of Nevada. However, exploration and development of geothermal resources is an ongoing process and this map should only be considered as a representation of the current level of knowledge of geothermal energy in Nevada.

REFERENCES

Garside, L.J., and Schilling, J.H., 1979, Thermal Waters of Nevada: Nevada Bur. Mines and Geol., Bull. 91, 163 p.

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