This document contains the following article:

City of Susanville Geothermal Energy Project

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CITY OF SUSANVILLE
GEOTHERMAL ENERGY PROJECT

BACKGROUND

The use of the geothermal resource within Susanville is historical. In a limited way, since the early 1930s, the resource has been used to prevent winter icing of the mill ponds to heat the municipal swimming pool, space heating of a church, and a small greenhouse operation.

In 1974, with the threatened closure of the Herlong Military Base, the California Department of Commerce and city of Susanville conducted an economic survey of the likely impacts that would occur as a result of this proposed closure. A document "Susanville Area Economic Recovery Project" was produced in June 1974 identifying various ways by which the area could respond to this situation. High on the list of recommendations was the suggestion that the geothermal resource of the area be utilized as a tool for economic development. In the same year, limited private development of Hobo Springs attracted the attention of a developer who erected 30 new greenhouses.

The city, recognizing that the escalating cost of heating was becoming a severe problem to the community and that the high level of unemployment was causing concern, embarked on a vigorous program to initiate the development of the resource.

In September 1974, the Bureau of Reclamation (BuRec), as part of an "in-house" effort, conducted preliminary resource analysis of the geothermal potential of the North Honey Lake Basin.

*Reprinted from "What's A Susanville" prepared for the city of Susanville Geothermal Energy Project System Dedication Ceremony, September 19, 1981.

In June 1975 the National Science Foundation, through the Energy Research and Development Administration (ERDA), approved funding for the city in cooperation with other communities to develop an economic model for geothermal utilization. Because of the interest shown in developing the geothermal resource for the explicit benefit of the community, Congress, at the request of the city, authorized the Bureau of Reclamation to engage in "A Comprehensive Resource Analysis" adequate to determine the feasibility of a geothermal utility system for the city of Susanville (Public Law 94-156). This survey was completed in April 1980. The highly extensive work carried out by the BuRec within the resource area provided the city's reservoir engineering with sufficient information to make final site selections.

In April 1977, the California Division of Oil and Gas and the Energy Resources Conservation and Development Commission completed an "Economic Study of Low Temperature Geothermal Energy in Lassen and Modoc Counties." This document was aimed at providing an overview of possible economic development that could occur as a result of geothermal resource development in these counties. The findings were most exciting and encouraging.

In 1978, under contract to DOE, Aerojet undertook a site specific conceptual study to investigate the feasibility of developing a geothermal program for Susanville.

In July 1978, in response to a Procurement Request for a competitive award to develop a field experiment demonstrating the economic use of geothermal energy in a space heating and industry application, the city filed an application with DOE.

The city was successful in its application and contracted for the Phase I of the proposed

program in February 1979. The Phase I effort was restricted to a design and engineering effort to address the need of retrofitting 17 public buildings to geothermal energy and the defining, evaluation, and site selection of production wells. This Phase I effort was completed July 1980.

Construction of the transmission lines, consisting of some 5,000 feet of insulated line and 5,000 feet of uninsulated return line, commenced in June 1981 and is expected for completion in early September of 1981. Retrofit of 14 school and county buildings was started early July 1981 and is scheduled for completion by mid-September of 1981. It is currently anticipated that the program will be concluded within budget and be listed in early fall of 1981, and 14 public buildings heated by geothermal energy in the winter of 1981-82.

The following is a description of both current and proposed projects for the city of Susanville.

DOE PROGRAM FY 79/80/81—PROJECTED TOTAL COST: $2,039,499

The DOE-funded program is designed to demonstrate the use of geothermal energy for space heating purposes in up to 17 buildings with a system intertie to a Park of Commerce development utilizing the residual heat from these 17 buildings for agri-industry purposes to create job opportunity and diversify the city's tax base.

Programmed within the scope of the construction phase are two production wells, one reinjection facility, an insulated transmission line to carry the geothermal fluids to the candidate buildings, and an uninsulated return line to carry the return fluids to a Park of Commerce development and final injection.

The candidate buildings are:

City Fire Hall
Veterans Memorial Hall
Lassen Union High School Complex
Washington School
County Jail
County Court House
Lassen County Yard
City Yard
Lassen Hospital Complex
Lassen Health Office
Diamond View School
City Hall
U.S. Post Office
U.S. Forest Service Building
Masonic Building

The current funding level will allow 14 buildings to be retrofitted. The engineering studies have been completed for all candidate buildings.

Concurrent with the development of the heating district, the Park of Commerce planning is being developed. This development is anticipated to be principally agri-industry.

In earlier investigations, it was determined that at least 130 communities of a similar composition could benefit from this proposed field demonstration.

The major objective of DOE programs is to stimulate the private and public sector to develop alternative renewable energy resources by demonstrating the feasibility of the use of these resources.

In recognition of the above, the city, in conjunction with the county and college, has embarked on a vigorous program to investigate other potential sources/uses of renewable energy resources available within Lassen County.

The following programs, developed as a direct result of the expertise developed through the DOE-funded program, are currently in planning or have been funded:

UNDER THE HUD 701 PLANNING PROGRAM

The city was awarded $20,000 to conduct a long-term development strategy for the proposed economic development activities anticipated to occur as a result of cascading geothermal energy into planned agri-industry Parks of Commerce. The city is to provide a $10,000 match. This program is currently being conducted by the city and professional planners and programmed for completion by August 31, 1981.

HUD "INNOVATIVE GRANT FOR COMMUNITY ENERGY CONSERVATION PROGRAM" FmHA INDUSTRIAL DEVELOPMENT GRANT

The city of Susanville was awarded $800,000 by HUD with a share of $100,000 from FmHA for a field demonstration to heat 126 homes utilizing geothermal energy in a low-to-moderate income area in an existing block grant area, and to create job opportunity by agri-industry use of cascaded energy from the heating district.

Payback of $300,000 of the grant money allocated for retrofit packages will be to a revolving fund allowing the program to be expanded into further low-to-moderate income neighborhoods.

This program is currently in an engineering phase with procurement and construction anticipated to commence in early September 1981 and completion scheduled for July 1982.

CALIFORNIA CORRECTIONAL CENTER—LITCHFIELD

As a part of the field work conducted by the BuRec, a geothermal reservoir was defined at the Johnston Ranch in Litchfield some 1 1/2 miles from the correctional center and 8 miles from the city of Susanville. It is presently anticipated that some 2,500 gallons/minute @ 180°F could be available.

The correctional facility currently utilizes some 750,000 gallons of fossil fuel annually for space heating, laundry, hot water, and for cooling requirements. The city, on behalf of the correctional center, has developed a proposal to retrofit the entire facility to geothermal energy expecting to displace some 500,000 gallons of fossil fuel.

The city of Susanville has undertaken to develop two production wells on the geothermal lease land held by the city and transmit the geothermal fluids to the boundary of the correctional facility at a cost to the city of some $900,000. This effort will be fully funded by the city in conjunction with private investors/developers.

The California Energy Commission has funded the city of Susanville $90,000 to conduct the necessary engineering to retrofit the correctional facility to geothermal energy, and a proposal submitted by the California G.S.A. to the State Legislature was accepted and funded $1,430,000 for the 1981-82 fiscal year for the hardware components. Engineering is scheduled for completion in December of 1981 with construction commencing in the spring of 1982 and first geothermal flow programmed for October of 1982.

Concurrent with the above development, the city intends to cascade the return geothermal fluids from the correctional facility through a Park of Commerce. The city, in cooperation with its developer, has acquired a 400-acre site overlaying the geothermal resource area for commercial development. Candidate industry for this site includes a 1,000,000-sq. foot greenhouse complex planned for construction in 1982-83, a confined swine raising plant incorporating a feed mill complex, and an alcohol plant.

Well drilling is currently underway for this project.

CALIFORNIA STATE ENERGY COMMISSION SCHOOLS AND HOSPITAL PROGRAM

The city was requested to take the lead in developing a program for Lassen Union High School and Washington School. In May 1980, a loan was granted by the state for $14,000 to conduct an energy audit and technical audit of the respective facilities. In February 1981, the school districts were awarded $45,000 to implement the conservation measures recommended.. Fifty percent is repayable to the state from energy savings. Currently, a further in-house evaluation of other schools within Lassen County is being conducted with the intent of upgrading conservation measures in all schools. Savings from the first effort are expected to exceed $20,000 per annum.

LASSEN COMMUNITY COLLEGE

The college, with assistance and support from the city, has embarked on a $45,000 in-house funded program to identify the conservation needs of the college and to investigate the feasibility of developing a cogeneration plant planned to utilize wood waste in a mix with city garbage to provide electricity and space

heating energy to make the college facility totally energy self-sufficient. The cogeneration program will also look to the possibility of including an alcohol plant and to providing a backup to the city's geothermal system.

It is the intent of the college to develop a general energy academic program concurrent with the development of this program to provide students with a "hands-on" experience of alternative energy programs. The ongoing academic program will provide a source of personnel for future energy programs within Lassen County.

COUNCIL ON AGING

The city, in cooperation with the Council on Aging, is developing a program for senior citizens. This program is being designed to promote the growing of vegetables by the seniors.

Objectives:

1. By growing vegetables, provide a cheap food source year-round by canning excess production at at central point.

2. Provide a 3,000-sq.-foot greenhouse, geothermally heating, for seedling production that will also include a canning facility.

In the ultimate analysis, the speed of development of the Susanville resource will be attributed to the consistent high level of encouragement that the project office received over the years from the council members of the city of Susanville and to a well-balanced, highly motivated "team" that received unequaled support from former congressman Harold "Bizz" Johnson and State Senator Ray Johnson.

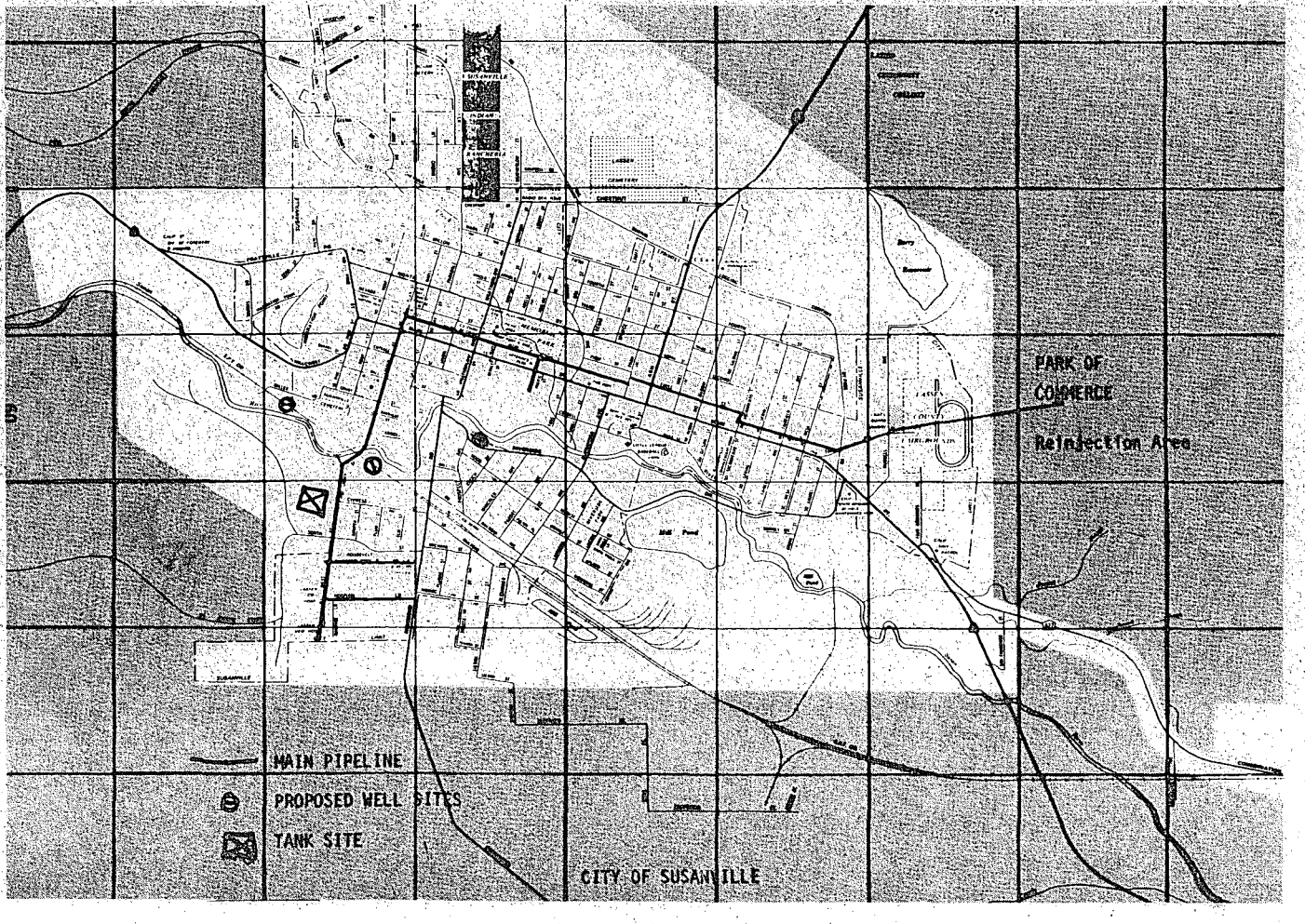

Figure 1. Susanville District Heating Project.