

## **NOTICE CONCERNING COPYRIGHT RESTRICTIONS**

This document may contain copyrighted materials. These materials have been made available for use in research, teaching, and private study, but may not be used for any commercial purpose. Users may not otherwise copy, reproduce, retransmit, distribute, publish, commercially exploit or otherwise transfer any material.

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specific conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

## DIRECT APPLICATIONS DEMONSTRATION PROJECTS

E. G. DiBello

EG&G Idaho, Inc.

The early commercialization of geothermal energy is being aided by the implementation of demonstration projects that are funded on a cost sharing basis by the Department of Energy. A total of twenty-two projects designed to demonstrate the technical and economic feasibility of the direct application of geothermal fluids are presently underway in the United States. The types and locations of these projects are shown on the attached viewgraphs.

A typical project scenario will be presented. In addition, the various environmental, institutional, engineering and economic factors that should be considered in the development of direct applications projects will be discussed. These factors will be related to actual project experience.

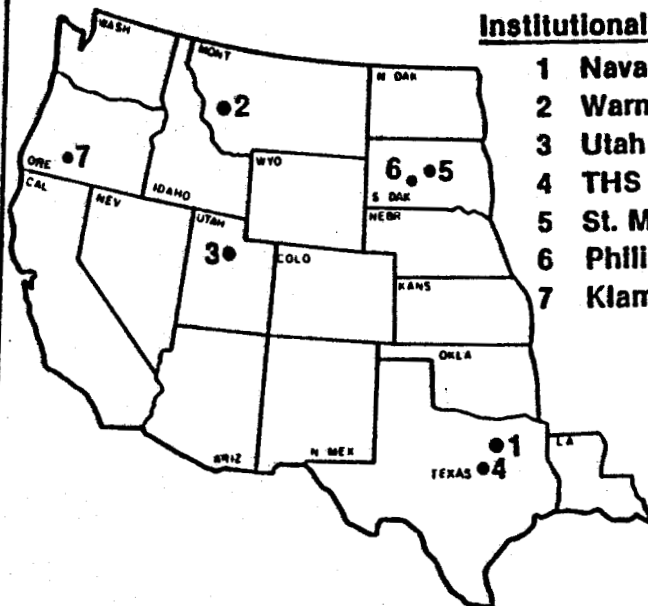
As a result of these demonstration projects, private firms and organizations are gaining experience, and public awareness of geothermal energy is being increased. Concurrently, valuable environmental, technical, operational, and economic information is being generated that will assist in the future commercial development of geothermal energy.

# DEMONSTRATIONS

## WHAT DO THEY ACCOMPLISH?

- FEASIBILITY OF CONCEPTS
- TECHNOLOGY TRANSFER
- OPTIMIZATION OF DESIGNS
- VISIBILITY
- ACCEPTANCE BY PUBLIC
- DEMONSTRATE GOVERNMENTAL DETERMINATION
- DEVELOPMENT OF HARDWARE

NEL-6-7259

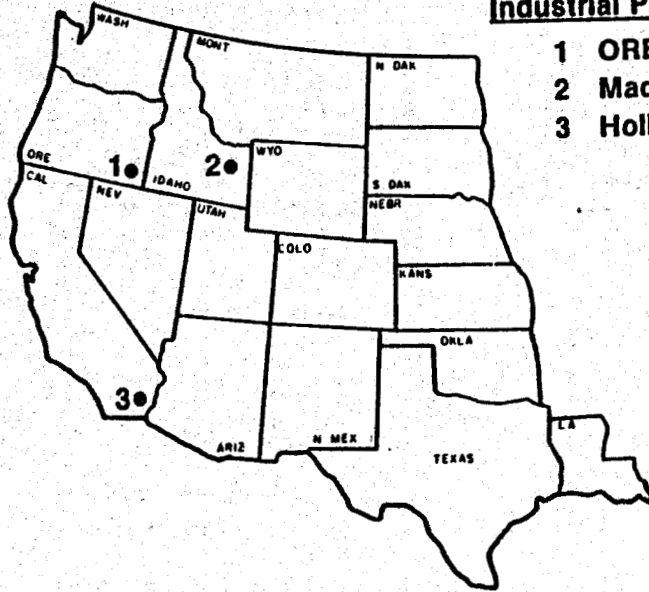


### Institutional Heating Systems

- 1 Navarro College & Hospital Corsicana, Texas
- 2 Warm Springs Hospital, Montana
- 3 Utah State Prison, Utah
- 4 THS Hospital, Marlin, Texas
- 5 St. Mary's Hospital, Pierre, South Dakota
- 6 Phillip School, South Dakota
- 7 Klamath Falls, Oregon, YMCA

NEL-6-17 788

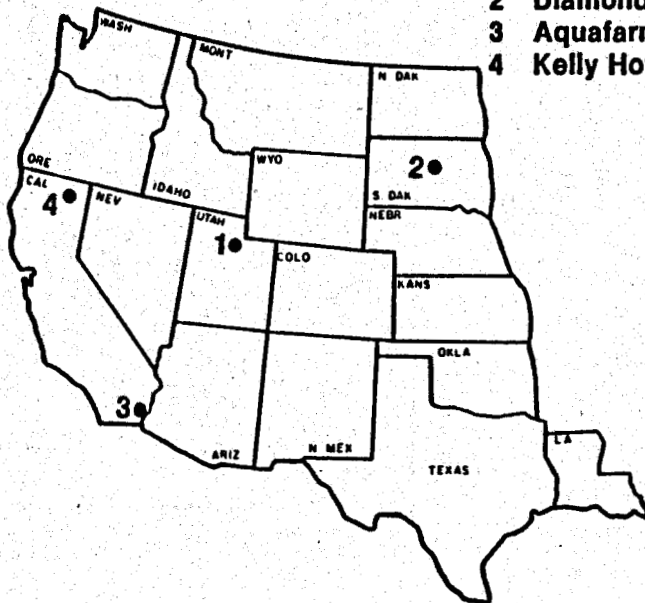
**Industrial Process Sites**



- 1 ORE-IDA — Ontario, Oregon
- 2 Madison County — Rexburg, Idaho
- 3 Holly Sugar — Brawley, California

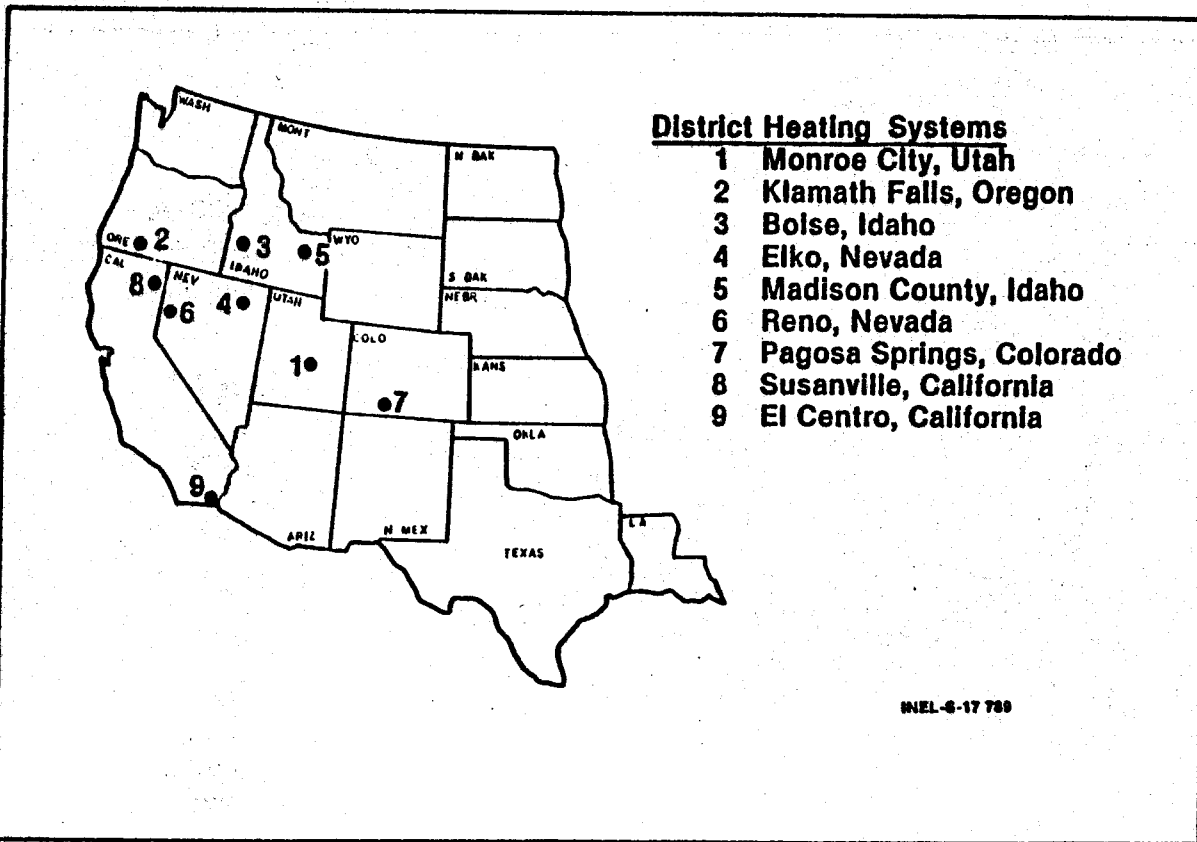
MEL-6-17 787

**Agribusiness**



- 1 Utah Roses — Sandy, Utah
- 2 Diamond Ring Ranch — South Dakota
- 3 Aquafarms International — Mecca, Calif.
- 4 Kelly Hot Springs — Novato, California

MEL-6-17 788



## DOE Hydrothermal Applications Projects Annual Energy Savings

Category	No. Projects	BTU/Year
District Heating	9	$3,478 \times 10^9$
Unit Space Heating	7	$238 \times 10^9$
Agriculture/Aquaculture	4	$490 \times 10^9$
Industrial Process Heating	2	$1,635 \times 10^9$
		<b><math>5,841 \times 10^9</math>*</b>

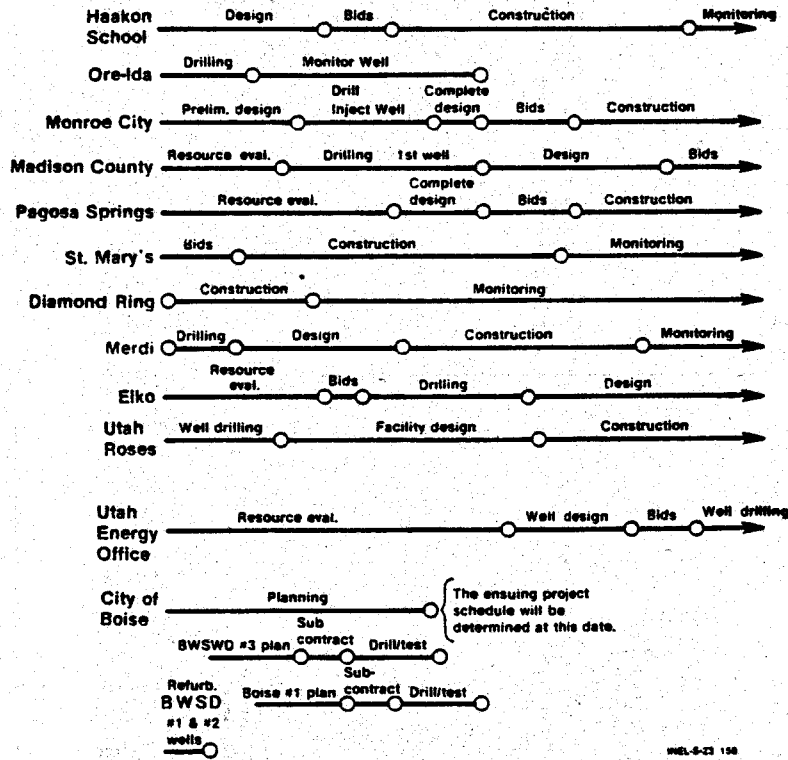
\*Equivalent to  $\approx$  1 million barrels of crude oil/year

INEL-8-23 693

### FY 80 Demonstration Project Schedule

As of: \_\_\_\_\_

O N D J F M A M J J A S



MEL-6-23 108

## Geothermal Direct Applications Considerations

- Environmental
- Institutional
- Resource
- Well drilling
- Engineering
- Disposal
- Economic

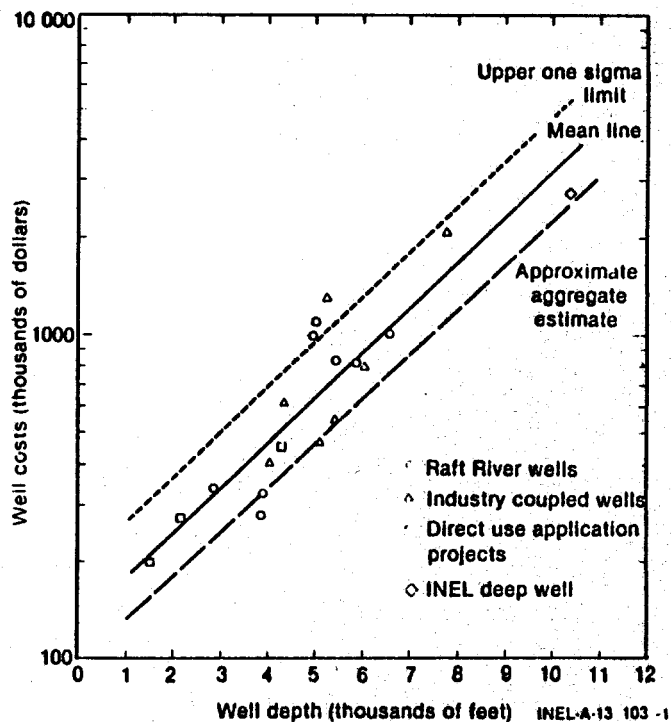
MEL-6-23 592

## Direct Heat Economic Factors

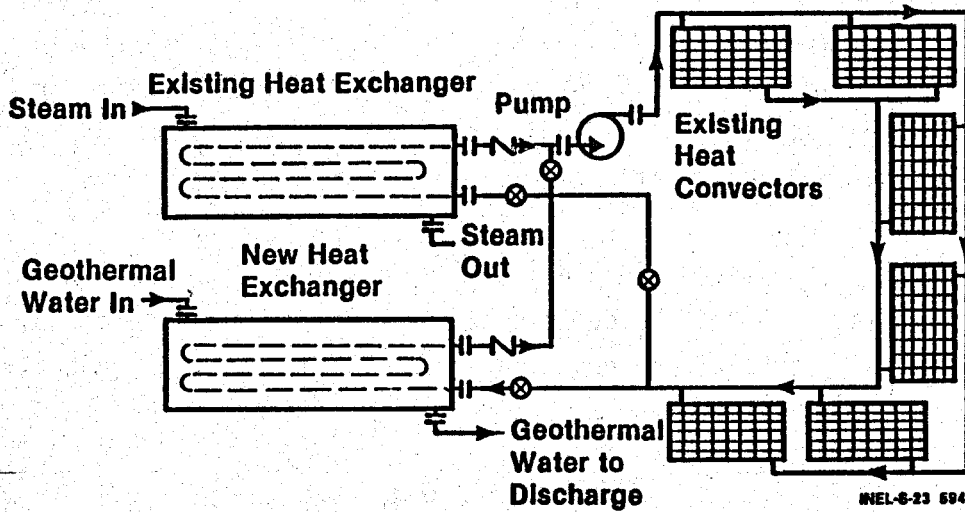
- Resource depth
- Geophysics
- Utilization factor
- $\Delta T$  available
- Pumping costs
- Disposal
- Distance
- Quality
- Heat exchanger
- Investment capital
- Tax position

INEL-S-18 581

## Well Cost vs Depth (1978 Dollars)



## Hot Water Heating



## Force Air Heating

