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STATE GOVERNMENT WORKSHOP ON
BARRIERS AND INCENTIVES OF
GEOTHERMAL ENERGY RESOURCES

MASTER

Quarterly Report
For Period May 1, 1979 - July 31, 1979

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I. INTRODUCTION

With funds from the United States Department of Energy, Division of Geothermal Energy, the National Conference of State Legislatures has undertaken a project to stimulate and assist the review of state policies that affect geothermal development.

The NCSL Geothermal Policy Project has the following work tasks:

- Prepare background material for state geothermal policy review;
- Develop specific geothermal profiles for target states;
- Stimulate state decisions to review geothermal policies;
- Assist states in their analysis of geothermal issues;
- Formally review the project's methods and results.

State assistance will be in the form of:

A. Reference Materials

1. "Packet of Background Materials" -- a comprehensive gathering of information on the nature of geothermal resources and the various development opportunities available including important state legislation and research studies;
2. "Geothermal Pamphlet" -- an introduction to the nature of geothermal resources, their beneficial uses, the role of state policies, and the NCSL Geothermal Policy Project;
3. "State Profile" -- a concise description of a state's leading policy concerns and potential benefits from geothermal development, including an outline of the location and character of the state's geothermal resources and their potential applications;
4. "Summary of State Actions" -- a summary of state study results and legislative actions taken during the year.

B. State Presentations and Technical Assistance

As part of the policy review process, the project will provide individual assistance at the request of the state. In the form of workshops or through more informal contacts, project staff will assist in such areas as analyzing policy alternatives, describing legislative action taken in other states, and identifying important studies, expert witnesses and concerned parties available for assistance.

C. Assistance from Experts

To insure that the policy reviews conducted are thorough and complete, the project is designed so that the states receive the expertise of all parties concerned with geothermal development.

Participating in the multifaceted effort will be:

1. State legislators;
2. State legislative staff;
3. State and local officials;
4. Geothermal developers, investors, utilities and other concerned private groups;
5. Consultants from public and private research institutions; and
6. Representatives of the Division of Geothermal Energy, U.S. Department of Energy.

II. SUMMARY

During the second quarter of the project's second year, the NCSL Geothermal Policy Project continued with initiation of geothermal studies in new project states and furthering of policy development in existing project states.

Initial contact was made with the Alaska legislature to ascertain its interest in conducting a geothermal policy study, and Alaska, Delaware, Hawaii, New Mexico and Utah have now requested the NCSL project to begin study efforts for their states.

Doug Sacarto of the project staff has been asked to chair the Geothermal Resources Council organizing committee concerned with pending law and regulations.

A major development for the project was the hiring of a Project Director and a Special Assistant. Dwight Connor, formerly chairman of the North Dakota Natural Resources Council and director of the state Energy and Conservation agency, was hired for the position of Project Director, and Lee Ivy, formerly a staff person for energy, science and natural resources with the Oklahoma Legislative Council, was hired for the position of Special Assistant.

III. PROJECT ACTIVITIES

A. State Activities

In the second quarter of the project's second year, efforts were continued to initiate geothermal study activities in newly selected project states and to carry forward policy development in existing project states.

Initial contact was made with the Alaska legislature to ascertain its interest in conducting a geothermal policy study with the NCSL project. A resolution was passed by the Alaska legislature requesting NCSL project participation in the state (Appendix 1).

Initial contact was also made with Sen. Peter Bozick, Chairman of the Maryland Joint Committee on Energy, regarding the possibility of conducting a geothermal project policy review during the 1979 interim period. A summary of geothermal issues in Maryland was prepared at his request (See B. Project Materials).

Follow-up contacts were made with Arizona, Delaware, Hawaii, Maryland, Nevada, New Mexico, Oregon, Utah, Virginia and Washington to arrange for geothermal project involvement in each of these states. Summaries of past activities and a prospectus for follow-up efforts were outlined for Hawaii and New Mexico (See B. Project Materials). A list of important issues concerning geothermal development in the state of Washington was also prepared (Appendix 2).

Follow-up contacts were made with Alaska, Arizona, Colorado, Delaware, Hawaii, Maryland, Nevada, New Mexico, Oregon, Utah, Virginia and Washington to discuss geothermal legislative review in those states.

Project staff held discussions with Senator Harris McDowell of Delaware, who requested that the NCSL geothermal project prepare a

summary of policy issues regarding geothermal development (See B. Project Materials).

A list of important issues relating to taxation and leasing of geothermal resources was prepared for the Utah Interim Committee on Energy and Natural Resources (See B. Project Materials).

Alaska, Delaware, Hawaii, New Mexico and Utah have requested the NCSL project to begin study efforts for their states, while the Virginia Coal and Energy Commission has stated its intention to address geothermal issues later in the fall. Arizona, Colorado, Maryland, Nevada and Washington, however, still have not committed themselves to a geothermal policy study, expressing a concern with allocation of limited committee and staff resources to geothermal issues.

NCSL staff met with legislators and legislative staff from Alaska to begin formulating a workplan for that state, and it was agreed that NCSL staff would meet with the legislature's special joint committee on hydropower and geothermal energy in August.

Project staff met with Sen. Ted Bottiger of Washington, Sen. Lawrence Jacobson of Nevada, Rep. Geraldine McCormick of Washington, and Norris Nordvold, research staff director of the Arizona Senate, regarding possible geothermal policy reviews in their respective states.

B. Project Materials

Six summary documents were prepared:

- "Summary of 1978 Hawaii Geothermal Policy Review" (Appendix 3)
- "Summary of 1978 New Mexico Interim Study of Geothermal Policies" (Appendix 4)
- "Geothermal Legislation Considered in 1979 State Legislative Session" -- This update includes the states of Alaska, Arizona, Colorado, Delaware, Hawaii Maryland, Nevada, New Mexico, Oregon, Utah and Washington. (Appendix 5)
- Summaries of geothermal issues in Alaska, Maryland and Virginia (Appendices 6, 7 and 8)

A list of important issues relating to taxation and leasing of geothermal resources was prepared for the Utah Interim Committee on Energy and Natural Resources (Appendix 9); Sen. Harris McDowell of Delaware was sent a policy report on legislative issues concerning geothermal energy in his state (Appendix 10).

A paper, "District Heating: Legal and Institutional Parameters" (Appendix 11), and the research and outline for a policy report for the state of Washington were prepared.

C. Information Requests

Project staff responded to numerous requests for information regarding the geothermal project and specific issues. These requests came from legislators and staff, state and federal officials, government contractors and private parties. Responses were given verbally, in a letter or by sending materials prepared during the project.

D. General Meetings and Conferences

Staff attended or participated in a variety of meetings and conferences.

1. Southwestern Regional Geothermal Operations Advisory Council Meeting

Staff attended the meeting in Tucson, Arizona, May 14-16, at which time ways were outlined in which the NCSL geothermal project and the state operations research efforts could be coordinated to complement each other.

2. Geothermal Resources Council

Staff participated in the June 21 planning meeting for a three-day seminar on regulatory concerns, to be held November 28-30, 1979.

Staff also participated in the June 28 Geothermal Resources Council (Rocky Mountain section) luncheon and discussion of water rights.

E. Liaison Activities

Several contacts were made with Randall Stephens of the DOE geothermal office regarding management of the geothermal project; with Bob Grant with regard to leasing policies throughout the western U.S.; and with Leonard Bronder with regard to taxation policies in Utah. Grant and Bronder are associated with DOE-sponsored studies by EG&G.

Contacts were made at the June 21 planning meeting of the Geothermal Resources Council, at which time, Doug Sacarto of the project staff was asked to chair the organizing committee concerned with pending law and regulations.

Contact was also made with the United Indian Planners Association regarding the status of its geothermal project; with Kevin Johnson of Geo-Products regarding Nevada geothermal issues; with Greg Cherim of Johns Hopkins University regarding Maryland geothermal issues; with Ernie Rebuck of Maryland Water Resources Administration regarding that state's geothermal/groundwater issues; and with Fletcher Paddison, Johns Hopkins University Applied Physics Laboratory (APL), regarding the APL geothermal study.

Proposed Federal Energy Regulatory Commission regulations implementing §§ 201 and 210 of PURPA were reviewed, and the recommendation was made that minimum conversion efficiency standards for qualifying geothermal facilities be eliminated or lowered from the proposed 40 percent of ideal Carnot efficiency to 25 percent.

Project staff also attended meetings of the NCSL Energy Committee (July 23-24) and briefed the committee's chairman, Sen. Paul Hess, on activities of the geothermal project.

F. Personnel

1. Special Assistant

Lee Ivy was hired for the position of Special Assistant for the project, beginning June 4. Lee Ivy previously was a staff person for energy, science and natural resources with the Oklahoma Legislative Council.

2. Project Director

Dwight Connor was hired for the position of Project Director, beginning July 9. Dr. Connor previously was chairman of the North Dakota Natural Resources Council and director of the state Energy Management and Conservation agency.

G. Miscellaneous

A tour of The Geysers was arranged for state legislators on July 28, following the NCSL Annual Meeting. Participants in this tour included 21 legislators, 4 legislative staff, 12 guests, 2 U.S. Department of Energy officials and 5 NCSL staff, for a total of 44 participants.

IV. VARIANCE OR PROBLEMS

None

V. PLANS FOR FUTURE REPORTING PERIODS

In August, travel to Alaska, New Mexico and Utah is anticipated. State visits will be made to meet with regulatory officials, legislative committees and staff to analyze and develop specific policy options.

Discussions in August with Arizona, Colorado, Maryland, Nevada and Washington should result in final decisions on whether geothermal policy studies will be conducted this interim period in those states.

VI. APPENDICES

1. House Resolution No. 7 in the Legislature of the State of Alaska
2. Correspondence with Jim Bricker, Senate Research Center, state of Washington re: geothermal development in that state
3. "Summary of 1978 Hawaii Geothermal Policy Review"
4. "Summary of 1978 New Mexico Interim Study of Geothermal Policies"
5. "Geothermal Legislation Considered in 1979 State Legislative Session"
6. "Geothermal Policy Report" prepared for the Alaska Legislature
7. Memorandum to Sen. Peter Bozick re: legislative issues regarding geothermal development in Maryland
8. Memorandum to Virginia Coal and Energy Commission re: geothermal legislation
9. Memorandum to Sen. Fred Finlinson re: geothermal taxation and leasing policies for Utah
10. "Geothermal Policy Report" prepared for the Delaware Legislature
11. "District Heating: Legal & Institutional Paramaters"

Appendix 1

Introduced: 4/26/79
Referred: Resources

BY THE SPECIAL
AGRICULTURE COMMITTEE

1 IN THE HOUSE

2 HOUSE RESOLUTION NO. 7

3 IN THE LEGISLATURE OF THE STATE OF ALASKA

4 ELEVENTH LEGISLATURE - FIRST SESSION

5 Relating to geothermal resources.

6 BE IT RESOLVED BY HOUSE OF REPRESENTATIVES:

7 WHEREAS Alaska has vast geothermal resources indicated by numerous
8 volcanoes and hot springs; and

9 WHEREAS the legislature has appropriated money to construct a demonstra-
10 tion project using geothermal energy at Pilgrim Hot Springs; and

11 WHEREAS the state will one day own more land than any other state in the
12 Union; and

13 WHEREAS the state has not yet written geothermal leasing regulations;
14 and

15 WHEREAS the National Conference of State Legislatures has professional
16 experience in legal and institutional matters relating to geothermal energy;

17 BE IT RESOLVED that the Alaska House of Representatives respectfully
18 requests the Governor to direct a review of the statutes relating to geother-
19 mal energy resources to determine what corrective amendments, if any, need to
20 be made; and be it

21 FURTHER RESOLVED that the Governor is also requested to direct a review
22 of present administrative policy and procedure and new policies and proce-
23 dures be developed so as to facilitate leasing of geothermal energy resources
24 on state land; and be it

25 FURTHER RESOLVED that the Alaska House of Representatives requests the
26 National Council of State Legislatures to assist in this undertaking.

27 A COPY of this resolution shall be sent to the National Conference on
28 State Legislatures.

29

Appendix 2

May 31, 1979

Mr. Jim Bricker
Staff Director, Senate Research Center
Room 101, Senate Office Building
Olympia, Washington 98504

Dear Jim:

I've enclosed a first-year summary of the NCSL geothermal project, as you requested. On page 5, there is a table which outlines the issue areas we have addressed in specific states.

We have prepared a variety of materials that would be drawn on in a geothermal study for Washington. These include the summary "State Policies for Geoheating" and the longer State Policies for Geothermal Development. Other general reference materials we've compiled are described on pp. 6-8 of the Annual Report.

Our workplan carries us from general materials to state-specific analyses, first in a geothermal State Profile and ultimately in a description of legislative policy options. If desired, we also will draft legislation. State-specific materials developed by the project are described on pp. 9-14.

Regarding the need for a geothermal policy review and legislation in Washington, there are several areas that have not been addressed but really should be. The most important are:

- o Leasing procedures and lease provisions --
this session the legislature enacted SB2191, placing ownership of geothermal resources with the surface owner and authorizing the Department of Natural Resources to lease geothermal resources on state lands. The bill, however, did not prescribe leasing procedures or stipulations for geothermal leases. Should all geothermal resources be leased competitively or non-competitively? Or should a mixed system of competitive and non-competitive leasing be established? If a mixed system is preferred, when should competitive leasing be required? What bid factor is best for competitive geothermal leasing -- cash bonus, deferred cash bonus, royalties, net profits, work commitments? Lease provisions, including lease term, renewal, renegotiation,

acreage limits, rentals and royalties, also remain to be addressed.

Leasing procedures and lease provisions are legitimately the concern of the legislature, and virtually every other western state has by statute established requirements and guidelines for state geothermal leasing.

- o Development of low-temperature resources --
geothermal resources are defined in Washington as "that natural heat energy of the earth from which it is technologically practical to produce electricity commercially and the medium by which such heat energy is extracted from the earth." Geothermal laws and regulations in the state apply to such resources, while the production and use of other naturally heated fluids (including secondary uses of geothermal fluids from powerplants) must be authorized through the state's water appropriation procedures.

The largest contribution of "geothermal" resources generally will be through non-electric uses. The adequacy of state water law in Washington to efficiently regulate non-electric geothermal development therefore should be examined.

- o District heating authorization --
a major application of geothermal resources is in district-wide heating systems. Privately owned and public systems are possible, but both require legislative authorization encompassing the kinds of service provided, financing mechanisms, eminent domain authority, joint action authority, rate regulation and other particulars. This is an important area for early legislative action. The city of North Bonneville is now investigating geothermal district heating.
- o Taxation and Incentives --
the applicability of excise taxes, sales taxes, property taxes and severance taxes to geothermal operations and properties should be clearly declared by the legislature. In addition, new energy resources deserve consideration for various incentives to help make them competitive with established energy sources, like oil or nuclear, that have themselves been heavily subsidized. In 1977, a property tax exemption was instituted in Washington for solar energy systems. For geothermal systems, property tax breaks, income tax incentives and state loan programs

should be evaluated for their relative costs and benefits as means for encouraging reliance on an indigenous energy supply.

The use of geothermal resources in buildings owned by the state or its political subdivisions also is valuable in establishing a market for geothermal resources and educating the public about the resource's value. A special feasibility study could be mandated for this purpose. Alternatively, the life-cycle cost analysis required by law for new or renovated public buildings (SB 2016, 1975) could be directed to include consideration of geothermal heating systems when siting the building or evaluating alternative heating systems.

o Fluid Disposal --

geothermal power production and heating systems both involve the production, handling and disposal of very large volumes of fluid. Surface disposal often may be undesirable. Underground injection of the fluids, however, often is seriously constrained by state law. This issue should be examined to ensure that Washington law and associated regulations can deal effectively with geothermal fluid disposal.

In closing, I should note that the U.S. Department of Energy, in support of the NCSL geothermal project, has issued two contracts -- one to examine geothermal leasing and the other to evaluate the effects of state taxes and incentives on geothermal development. These projects clearly are germane to geothermal policy concerns in Washington.

I hope this summary of geothermal issues in Washington makes clearer the value of legislative action during this interim period. To give you more information, I've also asked Steve Craig of the Washington Energy Office to outline geothermal issues in the state that the legislature should be addressing. Steve is chairman of the Washington State Interagency Geothermal Development Council.

I look forward to talking with you in Denver, June 6-7. If you have any questions before then, give me a call.

Sincerely,

Douglas M. Sacarto
Acting Director
Geothermal Policy Project

Enclosure

DMS:sc

STATE OF
WASHINGTON

Dixy Lee Ray
Governor

WASHINGTON STATE ENERGY OFFICE

400 E. Union-1st floor, Olympia, Washington 98504 206 754-1350

June 1, 1979

Mr. Douglas M. Sacarto
National Conference of State Legislatures
1405 Curtis St. 23 Floor
Denver, CO 80202

Dear Mr. Sacarto:

SUBJECT: Resolution of Institutional Factors Affecting Geothermal
Development in Washington State

As a follow up to our May 30 phone conversation, I have listed below those geothermal related issues which the National Conference of State Legislators (NCSL) could assist our legislature in addressing:

1. Establishment of a procedure for forming direct use heating districts.
2. Consideration of royalty and/or tax revenues from geothermal developments and associated rates.
3. Establishment of a geothermal leasing procedure for state lands.
4. Consideration of state tax incentives for geothermal development and operation.
5. A review of state water law as it pertains to utilization of low temperature geothermal fluids and to cascading uses of high temperature geothermal resources.
6. Establishment of approved means of disposal of geothermal fluids after use.
7. Establishment of a procedure for allocating and utilizing revenue from federal geothermal leases and royalties made available to the state.

Because of the deteriorating petroleum fuel and electrical supply situation in our state and nation, it is with a heightened sense of urgency that we should accelerate our efforts toward realizing whatever geothermal potential may exist in our state. NCSL's assistance in dealing with institutional factors which need to be addressed in Washington could greatly facilitate the possibility of realizing this potential in a timely manner.

Mr. Sacarto

2

June 1, 1979

Our office looks forward to NCSL's involvement in furthering geothermal progress in Washington State and will cooperate fully in providing whatever assistance is deemed appropriate by our legislature and NCSL.

Sincerely,

A handwritten signature in cursive script, reading "Steven J. Craig".

Steven J. Craig
Chairman, Washington State
Interagency Geothermal Development
Council

SJC/jm

cc Jim Bricker
Fred Adair
Ken Madsen

**National
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of State
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Summary of 1978 Hawaii Geothermal
Policy Review

During 1978, the National Conference of State Legislatures Geothermal Policy Project worked with the Hawaii Legislature in reviewing state policies regarding geothermal resources. The activities and products of that study are summarized below:

August 1, 1978

A briefing was held for key legislative contact persons in Hawaii at the State Capitol. Discussions were held in the following areas:

- o Current and future federal geothermal programs affecting Hawaii
- o Geothermal activities at the state level
- o A proposed work plan for the Hawaii Legislature's participation in the project

August 2, 1978

A workshop on "State Legislative Issues in Geothermal Development" was held at the State Capitol. The workshop began project activities in the state, and its goal was to set an agenda for the policy study -- to determine the parameters for the study and also to prioritize the issues that need to be addressed. Representatives from the following groups attended the all-day meeting:

- o Private officials, including developers and utility representatives
- o Hawaii Geothermal Energy Project and other university officials

- o Federal agencies
- o State agencies (legislative and executive), and
- o County officials

The major discussion areas during the workshop were:

- o The Hawaii Legislature's role in geothermal energy
- o Geothermal development opportunities and problems in Hawaii
- o Hawaii in the U.S. Department of Energy Geothermal Program
- o Federal environmental standards applied to geothermal development
- o State geothermal policies and the needs of industry
- o Concerns of county government
- o Regulations on leasing of geothermal resources and drilling for geothermal resources in Hawaii

A summary of workshop proceedings was distributed and comments were solicited. Subsequently, the NCSL Geothermal Policy Project produced and distributed a Background Report on Geothermal Policy: Legislative Options and Recommendations. The following issue areas were covered in the report:

- o Ownership
 - State claims to geothermal resources underlying private lands
 - Native Hawaiian claims
 - Relationship to water resources
- o Incentives
 - Stimulating utilization
 - Stimulating production
- o Intra-governmental coordination
- o Regulatory delays
 - Facilitating the regulatory process
- o Direct Use
 - Authorization for heating district formation

- o Land use planning
 - Changes in land use law
- o Lease stipulations

Comments on the report were solicited and reviewed and subsequently distributed to the Hawaii Legislature.

A number of geothermal-related bills were introduced during the 1979 legislative session. Most were carried over to the 1980 session.

A summary follows:

HB 368 - to fund research, development and demonstration activities for alternative energy sources	Carried over to 1980 session
HB 369 - to establish an alternate energy commercialization fund	Carried over to 1980 session
HB 372 - relating to the Hawaii Natural Energy Institute	Carried over to 1980 session
HB 376 - to limit speculation in geothermal energy development	Carried over to 1980 session
HB 393 - relating to state leases on lands with geothermal resources	Carried over to 1980 session
HB 394 - to establish a Hawaii Geothermal Application Center	Carried over to 1980 session
HB 395 - to establish tax incentives for geothermal energy development	Carried over to 1980 session
HB 396 - relating to geothermal rights and state ownership	Carried over to 1980 session
HB 502 - relating to appropriations for geothermal energy projects	Carried over to 1980 session
HB 1680- to establish the Energy Laboratory of Hawaii and make appropriations	Passed House/ passed first reading in Sena
HR 165 - to review the state's alternate energy development program	Referred to House Energy Committee
HR 166 - to review leasing of geothermal resources	Referred to House Energy and Water, Land Use Development and Hawaiian Affairs Comm
SB 111 - to establish the Hawaii Geothermal Application Center	Carried over to 1980 session

SB 116 - to limit speculation in geothermal energy development	Carried over to 1980 session
SB 974 - to appropriate for research and development of geothermal fluids in combination with biomass energy projects	Carried over to 1980 session
SB 1077- to establish a tax credit for non-fossil fuel energy producing utilities	Carried over to 1980 session
SB 1766- to include geothermal resources in state leases of public lands	Carried over to 1980 session
SB 1781 - to reserve mineral rights for the state with the exception of geothermal resources on private lands	Carried over to 1980 session

Interim Geothermal Study
Prospectus for 1979

Issues to be Reviewed

The NCSL Geothermal Policy Project recommends two topics for detailed review during the 1979 interim session, in addition to assessing selected key legislation carried over to the 1980 session.

- o geothermal-water law interface: the 1978 Constitutional Convention resulted in a directive to the state to review the water resource regime in Hawaii. This policy review should include a consideration of geothermal resource rights in relation to water rights, especially with regard to ownership implications and conflict situations.
- o marketing and distribution of geothermal resources: several of the respondents to the project's Background Report on Geothermal Policy indicated that a major concern was a mechanism to establish energy corridors (similar to heating districts) for integrated thermal utilization and transmission. This review would necessarily involve an examination of Hawaii's land use policies with regard to geothermal development.

Geothermal legislation in three key areas was carried over to the 1980 session. The Geothermal Policy Project is prepared to assist the State in assessing selected legislation.

- o geothermal resources ownership: HB 396; SB 1781
- o geothermal leasing: HB 376; HB 393; HR 166; SB 116; SB 1766
- o geothermal tax incentives: HB 395; SB 1077

Please refer to the project's Background Report on Geothermal Policy for additional discussion of the above topics.

Proposed Workplan

A general workplan for the 1979 interim geothermal policy study is proposed as follows:

<u>Task</u>	<u>Lead Responsibility</u>
1. Assign topics to appropriate interim committee(s)	HI

<u>Task</u>	<u>Lead Responsibility</u>
2. Prepare briefing papers and background materials on geothermal issues in Hawaii	NCSL
3. Review list of study topics for possible modifications (Committee hearing or workshop, with NCSL staff support)	HI
4. Conduct policy study, involving state agencies, the Geothermal Advisory Committee and other concerned parties	HI/NCSL (joint)
5. Draft appropriate legislation (NCSL staff support)	HI
6. Review legislation for introduction (Committee hearing or workshop with NCSL staff support)	HI

**National
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of State
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Appendix '4

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Summary of 1978 New Mexico Interim
Study of Geothermal Policies

During the 1978 Interim Session, the National Conference of State Legislatures Geothermal Policy Project worked with the New Mexico Legislature in reviewing and formulating state policies regarding geothermal resources. The activities and products of that study are summarized below.

July 13, 1978

Project activities were initiated in New Mexico with a presentation before the Interim Committee on Natural Resources at the State Capitol. The presentation, by project staff and Dr. Robert San Martin of the New Mexico Energy Institute of New Mexico State University, centered on three areas:

- o An overview of geothermal resources in the state (the resource, research and development programs, leasing and exploration status and commercialization potential);
- o A tentative list of problem areas in geothermal development to be used in developing an agenda for the policy study; and
- o A proposed work plan for New Mexico's participation in the project.

The committee approved the project's work plan and schedule for activities during the interim period with the ultimate goal of developing legislative recommendations for submittal to the Legislative Council.

September 15, 1978

A workshop on "Problems in Geothermal Energy Development in New Mexico" was held for the Interim Legislative Committee on Natural

Resources in Grants, New Mexico. The purpose of the meeting was to present testimony to the committee on problem areas impeding the efficient development of geothermal energy in the state. The following persons made presentations before the committee on actions they felt the legislature should take to encourage geothermal development:

- o Representative Robert Grant, Albuquerque, New Mexico
- o Thomas McCants, Private Rancher, Animas, New Mexico
- o Harry Olson, AMAX Exploration, Inc., Denver, Colorado
- o Edward Kaufman, Los Alamos Scientific Laboratory, Santa Fe, New Mexico

October 13, 1978

Project staff made a presentation before the New Mexico Interim Legislative Committee on Natural Resources at Carlsbad, New Mexico. The objective of the presentation, based on a "Background Report on Geothermal Policy" prepared for the committee's consideration, was to outline the problem areas that had been identified previously as hindering geothermal development and present options the committee could take in making legislative recommendations.

Options the committee might wish to consider, either in changing existing laws or programs or in implementing new programs, were presented in five areas:

- o Legal Status of Geothermal Resources
- o Direct Use (Non-Electrical Applications) of Geothermal Energy
- o Known Geothermal Resources Field
- o Geothermal Leases

Committee members requested that project staff develop specific recommendations for consideration in the five policy areas under review.

November 9, 1978

Project staff presented a report "Legislative Recommendations on Geothermal Energy" to the New Mexico Interim Legislative Committee on Natural Resources at the State Capitol. The presentation outlined specific legislative proposals for the committee's consideration.

Recommendations for legislative action were made in six areas:

- o Policy area: Legal status of geothermal resources
 - Issue: Regulating the relationship of geothermal resources to other resources
 - Proposal: Resolution to continue study of the legal status of geothermal resources
- o Policy area: Direct use of geothermal resources
 - Issue: Incentives
 - Proposal: (No action taken)
 - Issue: Heating districts
 - Proposal: District Heating Authorization Amendments
 - Issue: Initial market for geothermal heating
 - Proposal: Joint memorial on life-cycle cost analysis
 - Issue: Initial market for geothermal heating
 - Proposal: Joint memorial on education programs for public awareness
- o Policy area: Energy research and development
 - Issue: Aggressive research and development fund
 - Proposal: Joint memorial on aggressive geothermal research and development fund
 - Issue: Seeking assistance from national laboratories
 - Proposal: Joint memorial on national laboratories
- o Policy area: State leasing system
 - Issue: Changes in lease terms
 - Proposal: Bill to extend lease term and make other changes
 - Issue: Further modification of leasing system
 - Proposal: Resolution to continue studying leasing modifications
 - Issue: Competitive only leasing
 - Proposal: Joint memorial to study current leasing system

- o Policy area: Coordinated state program for geothermal development
--Issue: Interagency cooperation in regulating geothermal development
Proposal: Resolution to study establishing an inter-agency coordinating committee
- o Policy area: Continued study of geothermal development in New Mexico
Proposal: Joint memorial to support further study of geothermal energy issues

Following the presentations and a discussion session, the committee unanimously adopted the report for inclusion in the committee's report to the New Mexico Legislative Council. In addition to the legislation and memorials approved in the report, the committee also passed a motion accepting project staff's recommendation to continue study in three areas ("Legal Status of Geothermal Resources," "Further Modification of Lease System" and "Interagency Cooperation in Regulating Geothermal Development") with the intention of developing legislation to be considered during the 1979 legislative session. In addition to the legislative committee meeting, project staff also met with the officials of the New Mexico Oil Conservation Division to discuss proposed changes in geothermal regulations.

January 24, 1979

Project staff met with legislative and executive officials concerning proposed legislation for introduction in the 1979 legislative session. Meetings were held with:

- o Senator Joseph Gant, Chairman, Senate Conservation Committee
- o Charles Young, Legislative Council
- o Daniel Nutter, Chief Supervisor, Oil Conservation Division; Department of Energy and Minerals
- o Lynn Teschendorf, General Counsel, Oil Conservation Division; Department of Energy and Minerals

- o Gene Gray, Director, Bureau of Water Rights, State Engineer's Office
- o Jack Kennedy, Director, State Lands Office
- o Oscar Jordan, General Counsel, State Lands Office
- o Charles Wood, Legislative Liaison, Department of Energy and Minerals

As a result of the various meetings, agreement was reached that legislative recommendations approved by the Interim Committee on Natural Resources would be introduced in the 1979 legislative session. Project staff agreed to develop bill analyses for these proposals, including arguments for and against proposed legislation.

In terms of the areas designated for further study and development -- the legal status of geothermal resources, further modifications of the leasing system and developing an interagency geothermal coordinating committee -- contact was made with the executive agencies with jurisdiction over these areas. Their comments on the proposed legislation in these areas were solicited.

Geothermal Legislation

As a result of the geothermal policy study, several pieces of legislation were introduced by Senator Gant during the 1979 session.

- o SJM 9 Directed the Legislative Council to include geothermal policy study in the work of at least one interim legislative study committee. Approved
- o SJM 10 Directed Commissioner of Public Lands in consultation with the Energy and Minerals Department and the Energy Institute of NMSU to examine existing state geothermal leasing policies and report to the legislature by July 31, 1979, with recommendations. Approved

- o S.B. 476 Enlarged state geothermal acreage limitation from 25,600 acres to 51,200 acres; extended the initial state geothermal lease term from 5 years to 10 years. Died in Senate Conservation Committee in favor of H.B. 446.

Other geothermal legislation considered during the 1979 session included:

- o H.B. 446 Enlarged acreage limitation on state geothermal leases from 25,600 acres to 51,200 acres; extended geothermal lease term limitation from 5 years to 10 years. Approved
- o H.B. 447 Clarified procedures and powers regarding the administration of the Geothermal Resources Conservation Act. Approved

Interim Geothermal Study
Prospectus for 1979

Background

The New Mexico Interim Legislative Committee on Natural Resources recommended on November 9, 1978, that further study be conducted in three policy areas for possible legislative action during 1979.

These areas are:

- Legal status of geothermal resources
- State geothermal leasing provisions
- Interagency cooperation in regulating geothermal development

Work was begun on these topics, although no substantive legislation was introduced. Draft legislation was proposed only regarding the legal status of geothermal resources. That legislation was submitted for comment to the Energy and Minerals Department and to the State Engineer with follow-up discussions still to be scheduled.

Issues to be Reviewed

Geothermal policy issues recommended for detailed review during the 1979 interim session include:

- Legal status of geothermal resources - work already begun would be continued. This includes additional meetings with the State Engineer and representatives of the Energy and Minerals Department.
- State geothermal leasing provisions - state leasing procedures and stipulations would be examined in conjunction with the review being conducted by the Commissioner of Public Lands pursuant to SJM 10.

- Interagency cooperation - state regulatory agencies concerned with geothermal development would be contacted. Existing methods of coordination would be examined, with any potential for additional coordination identified and evaluated.
- District heating authorization - draft legislation prepared for the 1979 legislative session would be reviewed for any possible refinements.
- Financial incentives - the value of possible financial incentives in encouraging development and use of geothermal energy would be evaluated and compared to their costs. Such incentives include income tax credits, loan programs, and property tax deferrals.

Proposed Workplan

A general workplan for the 1979 interim geothermal policy study, pursuant to SJM 9, is proposed as follows:

<u>Task</u>	<u>Lead Responsibility</u>
1. Assign geothermal topics to appropriate interim committee(s)	New Mexico
2. Prepare briefing papers and background material on geothermal issues in New Mexico	NCSL
3. Review list of study topics for possible modifications. (Committee hearing or workshop, with NCSL staff support)	New Mexico
4. Conduct policy study, involving state agencies, NMSU and other concerned parties	New Mexico/NCSL (joint)
5. Draft appropriate legislation (NCSL staff support)	New Mexico
6. Review legislation for introduction (committee hearing or workshop, with NCSL staff support)	New Mexico

TABLE III

GEOTHERMAL LEGISLATION CONSIDERED IN 1979 STATE LEGISLATIVE SESSION

STATE	LEGISLATION	STATUS
Alaska	SR 8 - directs the administration to review current state law relating to geothermal resources and to develop omnibus legislation dealing with that subject; also directs a review of state rules and regulations	Held over until 1980
Arizona	HB 2078- expands activities of Arizona Solar Energy Research Commission to include other renewable energy sources, including geothermal	Passed
Colorado	SB 316 - to exclude alternative energy devices from valuation of property for property tax assessment	Passed and Signed
	SB 321 - to include geothermal system in alternative energy devices for income tax deduction	Passed and Signed
	SB 324 - to require an annual appropriation from the severance tax trust fund to support the development and utilization of alternative energy sources in the state	In Senate Appropriations and Budget Committee
	SB 498 - to establish an Energy Coordinating Council to inventory state energy programs, study and analyze energy policies, etc.	Passed; to Governor
	HB 1495- to exempt alternative energy devices (including heating and cooling systems using geothermal) from sales tax	Postponed Indefinitely
	HB 1540- to exclude an alternative energy device from valuation of property for property tax assessment	Failed
Delaware	(Draft)- Geothermal Resource Conservation Act	Being drafted
Hawaii	HB 368 - to fund research, development and demonstration activities for alternative energy sources	Carried over to 1980 session
	HB 369 - to establish an alternate energy commercialization fund	Carried over to 1980 session
	HB 372 - relating to the Hawaii Natural Energy Institute	Carried over to 1980 session
	HB 376 - to limit speculation in geothermal energy development	Carried over to 1980 session
	HB 393 - relating to state leases on lands with geothermal resources	Carried over to 1980 session
	HB 394 - to establish a Hawaii Geothermal Application Center	Carried over to 1980 session
	HB 395 - to establish tax incentives for geothermal energy development	Carried over to 1980 session
	HB 396 - relating to geothermal rights and state ownership	Carried over to 1980 session
	HB 502 - relating to appropriations for geothermal energy projects	Carried over to 1980 session
	HB 1680- to establish the Energy Laboratory of Hawaii and make appropriations	Passed and Signed
	HR 165 - to review the state's alternate energy development program	Failed
	HR 166 - to review leasing of geothermal resources	Failed
	SB 111 - to establish the Hawaii Geothermal Applications Center	Carried over to 1980 session
	SB 116 - to limit speculation in geothermal energy development	Carried over to 1980 session
	SB 974 - to appropriate for research and development of geothermal fluids in combination with biomass energy projects	Carried over to 1980 session
	SB 1077- to establish a tax credit for non-fossil fuel energy producing utilities	Carried over to 1980 session
	SB 1766- to include geothermal resources in state leases of public lands	Carried over to 1980 session
	SB 1781- to reserve mineral rights for the state with the exception of	Carried over to 1980 session

STATE

LEGISLATION

STATUS

Oregon	SB 337 - to exempt property equipped with geothermal heating or cooling systems from ad valorem taxation	Passed Senate; in House Revenue Committee
	SB 427 - to exclude from the assessment of real property any consideration of a geothermal well located on the property or furnishing an alternative source of heat to the property	Favorable recommendation from Senate Revenue and School Finance Committee
	SB 439 - to limit to five years leases and contracts by the Division of State Lands for exploration and development of geothermal resources upon certain lands	Tabled
	SB 502 - to permit joint participation in geothermal activities of cities and people's utility districts in Oregon with cities, utility districts, electric cooperatives and privately owned electric utility companies in Nevada and California	Passed
	SB 515 - to authorize energy conservation facility tax credit against personal income tax or corporation excise tax to trade or business which conserves energy by use of renewable energy source	Referred to Senate Committee on Revenue and School Finance
	SB 517 - to authorize corporation excise tax credit for commercial lending institutions making low-interest loans for installation, construction and operation of certified alternative energy devices	Passed Senate; in House Revenue Committee
	SB 611 - to establish a small scale local energy project loan program	Passed Senate; in House Energy and Environment Committee
	SB 723 - establishes income tax credit for residents connecting to a geothermal central district heating system	Passed Senate; in House Energy and Environment Committee then to House Revenue Committee
	SB 750 - to create Oregon Natural Energy Commission	Tabled
	SB 862 - to establish the Oregon Power Commission	Favorable recommendation by Senate Ways and Means Committee
	SB 927 - creates Alternative Energy Development Commission which will prepare plans for development of alternative energy	Passed Senate; in House Energy and Environment Committee
	SJR 24 - to amend the Oregon Constitution, upon voter approval, to authorize issuance of general obligation bonds to provide funds to finance development of small scale local energy projects	Passed Senate; on Speakers desk
Utah	SB 290 - to authorize private and municipal heating and cooling districts to utilize hot water or geothermal resources	Not considered (not placed on calendar)
	SB 314 - to appropriate supplementary funds for the Beaver County geothermal project	Failed
	SJR 9 - to include geothermal study as part of the 1979 interim legislative committee work	Killed; geothermal study included in legislature's master resolution for interim studies
	SB 279 - to enact a Geothermal Resource Conservation Act which defines the resource and provides for its regulation	Passed Senate/Killed in House
Washington	HB 674 - to place ownership of geothermal resources in the public domain	Killed in House
	SB 2191 - to place ownership of geothermal resources with the surface owner (private)	Enacted

STATE	LEGISLATION	STATUS
Maryland	HB 1064- to establish a tax credit for installation of certain energy conserving items or renewable energy sources in an individual's principal residence	Failed
	SB 42 - to exempt from retail sales tax certain energy conservation materials including devices using geothermal resources	Failed
Nevada	AB 144 - to exempt nonproducing geothermal leases from property tax	Passed and Signed
	(Draft)- to authorize general improvement districts to establish heating	Under consideration
	(Draft)- to declare geothermal "sui generis" and to direct the State Water Engineer to formulate rules and regulations	Under consideration
New Mexico	HB 366 - to appropriate \$2.5 million for energy research and development	Passed
	HB 446 - to extend the acreage limitation on state geothermal leases from 25,000 to 51,200 acres and to provide for a second 5-year lease term without production upon payment of increased rental	Passed
	HB 447 - to clarify procedures and powers regarding the administration of The Geothermal Resources Conservation Act	Passed
	SJM 9 - to direct the Legislative Council to include geothermal policy study in the work of the interim legislative study committees	Passed
	SJM 10 - to direct the Commissioner of Public Lands to examine the existing policy of leasing of state lands for geothermal purposes and to make recommendations for changes	Passed
	(Draft)- amendments to NM Geothermal Resources Conservation Act to eliminate regulatory overlap and to remove high-temperature geothermal resources from the appropriative rights system while establishing a permit procedure for geothermal production to protect water rights	Under consideration
Oregon	HB 2134- to establish procedures for reinjecting geothermal fluids and to permit DOGAMI to adopt regulations on reinjection and to require DEQ water pollution control facilities permit for reinjecting contaminated fluid	Passed
	HB 2715- to require persons submitting designs for construction of state-owned buildings to consider the feasibility of alternative energy systems	Passed House; in Senate Energy and Environment Committee
	HB 2786- to exempt from definition of "public utility" those corporations and other associations furnishing heat, light or power to less than 20 customers	Passed House; to Senate
	HB 2843- authorizes energy conservation facility tax credit of 5% per year for 10 years to trades, business and industry using solid waste, renewable energy and cogeneration, also 20 year property tax exemption for nonprofit corporations based on certification from Oregon DOE	In House Revenue Committee
	HB 2919- amends alternative energy device program to include multifamily and nonresidential buildings	Tabled
	HB 3128- authorizes tax credit of 5% for 5 years to trade or business (other than utility) for cost of "energy equipment", defines "energy equipment"	In House Energy and Environment Committee; then to House Revenue Committee

Appendix 6

GEOHERMAL POLICY REPORT

Prepared for the Alaska Legislature

July, 1979

National Conference of State Legislatures

1405 Curtis Street

Denver, Colorado 80202

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INTRODUCTION

The Alaska House of Representatives passed a Resolution (No. 7, 4/26/79) requesting the Governor to direct a review of statutes relating to geothermal energy and soliciting the assistance of the National Conference of State Legislatures Geothermal Policy Project. This report responds to the Resolution by outlining policy areas relevant to geothermal development, raising issues of concern and suggesting legislative responses.

The following policy areas are reviewed in this report:

- I Resource Ownership:
- II Resource Leasing
- III Resource Allocation
- IV Water Law Interface
- V Taxation
- VI District Heating
- VII Environmental Protection

In each policy area, recommendations are made for legislative initiatives. The National Conference of State Legislatures geothermal project is prepared to assist the Alaska Legislature and executive agencies in a geothermal policy review. Background materials, as well as direct technical assistance, can be provided by the project.

I. RESOURCE OWNERSHIP

Alaska has not specifically determined the ownership of geothermal resources. By implication, however, property rights to the resource derive from the subsurface estate: the statute provides for limited surface use separate from a state geothermal lease [38.05.181(n)] and also provides for private surface owner preferential rights to reserved (subsurface) geothermal resources [38.05.181(n)]. The statute also provides for the conversion of mining claims or mineral leases to geothermal leases [38.05.181(i)] and vice versa [38.05.181(l)(s)].

Recommendation: In order to clarify geothermal ownership, the legislature may, consistent with statutory implications, declare geothermal property rights to be in the mineral (subsurface) estate.

II. RESOURCE LEASING

Generally, leasing of state lands and resources is carried out under the Division of Lands of the Alaska Department of Natural Resources. Statutorily, "deposits of . . . geothermal resources and state lands containing these deposits are subject to disposition under rules and regulations, recommended by the director and adopted by the commissioner . . ." (38.05.145).

However, certain leasing parameters are provided in the statutes. These relate to bidding, acreage limitations, royalty, rental, lease terms and renewal. In most of these areas, adequate direction is given to the Division of Lands.

Recommendations: Alaska House Resolution No. 7 (1979) calls for a review of geothermal leasing statutes and regulations, and requests the assistance of the National Conference of State Legislatures in this review. It is suggested that at least two areas be specifically addressed. The first regards the minimum acreage limitation of 640 acres except in certain cases. Because of the special nature of small-scale direct use of geothermal for heating, the legislature may wish to consider specifically exempting this type of use from the 640 acre minimum.

The second area concerns uncertainty in the statutes with regard to access and surface use on a lease in which the resource is reserved to the state and the lessee is someone other than the surface owner. Again, the legislature may wish to examine this issue as part of the larger review.

III. RESOURCE ALLOCATION

The state has declared its interest in the "maximum economic recovery" of geothermal resources [38.05.181(a)(2)(A)] and has provided for voluntary unitization [38.05.181(e)(3)]. However, no mechanism exists for apportioning production to prevent waste in the absence of a cooperative agreement.

Recommendation: The legislature may authorize the Department of Natural Resources to allocate production in the absence of voluntary unitization. The doctrine of "correlative rights" (equitable apportionment) is suggested as the most appropriate method of geothermal allocation. The "rule of capture" (with upper production limits) and appropriation (quantified priorities) are alternative possibilities.

IV. WATER LAW INTERFACE

The relationship of geothermal resources to water resources is unclear. Provision is made for the Department of Natural Resources to compel the production of "demineralized water" as a geothermal byproduct, subject to beneficial uses according to state water law [38.05.181(e)(2)]. It is uncertain whether the geothermal producer would have an automatic or preferential right to appropriate such byproduct water.

More significantly, the application of the appropriation doctrine generally to geothermal development has not been determined. Geothermal

production -- especially of lower-temperature and, hence, shallower resources -- may cause interference with existing water rights. A mechanism to resolve such conflicts is needed. Alternatives include: requiring appropriative water rights for total production or consumptive use; requiring offset water rights for interference situations; adopting a temperature threshold to distinguish "hot groundwater" from "geothermal fluids." The implication of appropriative geothermal rights for resource allocation also must be considered.

Recommendation: It is suggested that the legislature and the Department of Natural Resources undertake a comprehensive review of the relationship of geothermal resources to water. The NCSL geothermal project has had extensive experience in this regard and is prepared to assist in such a policy review.

V. TAXATION

Probably the most significant taxes with respect to geothermal development are the income tax and the property tax. The income tax is important in that it represents a potentially substantial reduction in the earnings of the geothermal developer. The tax is levied on individuals and corporations. The tax rate for the individual is graduated, while that for the corporation is set at 5.4% of taxable income plus a 4% surtax (43.20.010) . The Federal Internal Revenue Code is followed.

The property tax is of major importance because of its potentially large size and because it is virtually independent of cash flow. While Alaska allows its municipalities to administer the property tax, the Constitution (Art. IX, Sections 3 and 4) gives to the state the power to set standards for appraisal and provide exemptions.

Recommendations: Because of the potential for high rates of property taxation while income is low, the legislature may wish to consider specifically basing the geothermal property tax on yield or production rather than on in-place value of the resource. Alaska may also wish to consider the possibility of exempting the geothermal producer from property tax during exploration, development and early production, or deferring that tax until a later time.

VI. DISTRICT HEATING

Private Systems: Both privately and publicly owned utilities are possible district heating vehicles. However, authorization to provide such services must be found. With regard to investor-owned utilities, the provision of "water (and) steam" is labelled a public utility service [42.05.701(2)(B)]. Whether district heating via geothermal resources would fall into this category is unclear.

Recommendation: It is suggested that the legislature specifically authorize geothermal district heating. While the existing statute might be liberally construed to include such services, specific authorization would remove any uncertainty and constitute a stimulus to district heating implementation.

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Public Systems: Alaska has expressed a strong constitutional (Art. X, Sec. 5) and statutory [29.63.090(d)] preference against the creation of new political entities to provide services which might be provided by existing ones. Municipalities (boroughs/cities) are already authorized to provide "heat, light, power (and) water" services (29.48.030). This seems adequate to cover district heating services. Borough service areas (29.63.090), public corporations or other municipal instrumentalities (29.59.010) may be organized as a specific district heating vehicle. Municipal bonding, taxing, property, franchise, regulatory and other powers also are adequate for implementing district heating.

Recommendation: No action seems necessary with regard to district heating authorization or powers.

Geothermal Parks: Alaska has a statute regarding Area Redevelopment (41.30) which is administered by the Board of the State Development Corporation. The statute authorizes cooperation with political subdivisions and industry to promote business expansion in redevelopment areas, including loans to aid financing.

Recommendation: It is suggested that the legislature direct the Board to consider the organization of heating districts for industrial/commercial parks utilizing geothermal resources in its administration of the redevelopment program.

Public Utility Commission: A geothermal heating district, whether public or private, would need to obtain a "certificate of public convenience and necessity" (42.05.221) from the Public Utility Commission in order to be organized. The Commission may deny such certification if competition between utilities not in the public interest would result.

Recommendation: It is suggested that the legislature declare district heating with geothermal and other alternate energy sources to be in the public interest, despite potential competition with existing utilities. A preference for public or private systems may be incorporated in such a declaration.

Investor-owned utilities are under the rate jurisdiction of the Public Utility Commission. Municipal utilities are exempt from such control unless they elect to be subject or are in competition with another certified utility. In such cases, Commission control over municipal utility rates does not extend to rates necessary to meet bond covenants. In addition, the Commission may exempt utilities from its jurisdiction in the public interest.

Recommendation: The legislature may, as a financial incentive, direct the Public Utility Commission to exempt geothermal or alternate energy source district heating from its rate jurisdiction. This would be especially appropriate for public systems, the majority of which will be financed through bond issues.

VII. ENVIRONMENTAL PROTECTION

Alaska has statutes with regard to protecting its air, water and coastal zone resources (see Title 46). Other possible environmental concerns associated with geothermal development include noise generation, subsidence due to production and induced seismicity from reinjection. The noise problem is not likely to be serious with the use of noise reduction technology developed in recent years. In addition, severe noise generation is primarily associated with high-pressure steam wells, found only at the geyser (CA) to date. Potential subsidence/seismicity problems are highly dependent on the particular geologic regime being developed.

Recommendation: It is suggested that the legislature await further geothermal activity prior to assessing the need for additional environmental regulation.

Alaska has instituted a comprehensive one-stop permitting procedure for energy development (see 46.35). A master application made to the Department of Natural Resources serves as a vehicle to obtain all the required state and local permits, including water appropriation, geothermal prospecting and brine disposal permits. This regulatory streamlining mechanism should prove quite valuable to geothermal developers.

However, local zoning and land use plans constitute an overlay on this process. An applicant to the Department must show certification of compliance with such plans from the political subdivision with jurisdiction. Since few if any political subdivisions are likely to have geothermal zoning elements, a significant delay may result.

Recommendation: The legislature may consider directing local government entities in areas of known geothermal potential to prepare geothermal elements for their zoning or land use plans in anticipation of development.

**National
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of State
Legislatures**

Appendix 7
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President
Jason Boe
President of
The Oregon Senate

Executive Director
Earl S. Mackey

MEMORANDUM

TO: Senator Peter Bozick, Chairman
Maryland Joint Committee on Energy

FROM: NCSL Geothermal Policy Project

DATE: July 5, 1979

RE: Legislative Issues Regarding Geothermal Development in Maryland

This memo summarizes state statutory provisions in Maryland regarding various aspects of geothermal energy development. It is a preliminary survey intended only to identify potential problem areas needing legislative attention. Beyond this brief, the NCSL Geothermal Policy Project is prepared to assist the Maryland legislature in more completely defining legal and regulatory problems and formulating legislative responses.

Resource Characterization

Maryland has defined the geothermal resource by identifying the element of value--the natural heat of the earth--and including the transfer medium and associated by-products. The definition is broad enough to encompass both hydrothermal and hot dry rock systems. The definition also incorporates a temperature threshold (49°C) to distinguish geothermal resources from groundwater. Thus, the relationship of the resource to water is established. Separate, specific geothermal permits are required to explore for and produce the resource, in lieu of standard groundwater permits, with geothermal production effects on standard water supplies taken into account in the permit process.

The nature of the state's overall relationship to the resource is, however, unclear. This includes questions of ownership. The Act makes geothermal resources at least quasi-public in nature as production is subject to state approval and control. Whether such state control implies ownership of the resource, as well, is uncertain. The state should determine whether geothermal resources are to be leased, with attendant financial returns to the state. The presently required permit to appropriate or use the geothermal resources would seem to serve as a regulatory mechanism and not a conveyance of property rights (see Resource Allocation).

To characterize geothermal resources for purposes of ownership, the legislature may wish to assign the resource to the surface or mineral estate, or to the

public domain. Surface use rights are currently required in order to obtain a geothermal permit. The trend of judicial decisions has been to place the geothermal resources in the mineral estate.

Resource Allocation

The Maryland geothermal statute institutes an "appropriation" system for the resource, but statutory guidance is lacking regarding the nature of that system. It might, for instance, be a modified rule of capture (upper limits on production) or analogous to western water law (quantified priorities) or a system based on "correlative rights" to the resource. These three methods differ substantially in their approaches to property rights and their effects on the efficiency of resource development. It would be appropriate for the legislature to examine these differences and determine which method is preferred for geothermal development in Maryland.

Power Plant Siting

The development of hot dry rock resources may eventually make geothermal electrical generation possible in Maryland. The state maintains a power plant site inventory which should, perhaps, include hot dry rock sites as such resources are discovered. In addition, the state has instituted a comprehensive, one-stop permitting process for conventional power plants. That is, an application to the Public Service Commission for a "certificate of public convenience and necessity" simultaneously serves as an application for the necessary water use and air quality permits. A similar system for geothermal power plants would be a useful regulatory streamlining measure.

Environmental Concerns

Maryland has air, water and noise pollution statutes with which geothermal development must comply (as indicated in the geothermal statute). In addition, the state has a wetlands program to protect the special values of these fragile ecosystems. Coastal zone management plans should consider geothermal development impacts as well. However, there are no immediate environmental concerns until prospective geothermal development is better defined.

District Heating

In order for public or private entities to implement geothermal district heating, statutory authorization must be found. A "public service company" is defined to include "steam heating...(and) water" service. It is not clear whether the provision of geothermal fluids would be covered under this mandate.

Numerous public entities (counties, municipalities, water authorities, environmental service) are authorized to supply "water". If liberally construed (as specifically indicated by the Water and/or Sewer Authority Act) such a mandate may extend to provision of district heating services. However, specific authorization would be helpful. This is especially true in the case of "water authorities", which have broad powers appropriate for district heating, but which are prohibited from duplicating the functions of existing utilities.

District heating authorization to an established entity may offer the opportunity to utilize experienced personnel and an existing infrastructure. Alternatively, a new, comprehensive district heating statute may be enacted. This approach has the advantage of authorizing entities with a specific, single mandate.

Taxation

Geothermal resources and production in Maryland are potentially subject to various taxes, among them property tax, gross receipts tax, income tax, use tax, property transfer tax and bonus tax.

The application of these taxes to geothermal properties and development operations in Maryland is uncertain because of the complex and unique nature of the resource. Geothermal resources were not specifically considered when the tax statutes and regulations of the state were established; consequently they are not explicitly dealt with in the tax codes. The proper treatment of geothermal resources under existing tax provisions, for example as water or as a mineral, is questionable because of the diverse characteristics of the resource. Geothermal resources exhibit characteristics of an energy mineral, of water and, in some cases, of gas.

Clarification of Maryland tax provisions with respect to geothermal development is necessary if accurate financial planning is to be achieved. Beyond clarification, the way taxes are applied to geothermal resources has a major influence on development of the resource. Probably the most significant of these state taxes with respect to geothermal development will be the property tax and income tax.

The property tax is of major importance because of its potentially large size and because it is virtually independent of the cash flow of the developer. The questions associated with it include, again, the classification of the resource. Will a geothermal resource be considered as water or a mineral for purposes of property taxation? As was said, the resource exhibits characteristics of both. In order to achieve accurate financial planning, developers must know how the property tax is to be applied.

Furthermore, it is unclear whether property taxation of geothermal resources is to be ad valorem or based on realized value. If based on realized value, the assessment would probably be on production at the wellhead. But if treated as an ad valorem tax on the in-place resource, the property tax may be especially burdensome to the geothermal developer during exploration and early production. This is true because of the relatively high valuation of the resource and a relatively low income during these times. The developer may simply not have the funds to pay this tax at the time it is due. If the ad valorem tax is applied, the legislature may wish to consider an exemption for geothermal resources or a deferral until income is produced from the property.

The income tax is of importance because it represents a potentially substantial reduction in the net earnings of the geothermal developer. With respect to calculation of corporate and individual income tax, the legislature may wish to examine two leading issues. The first is the depletion allowance. Will there be a depletion allowance for geothermal resources? If so, what will be the rate? The depletion allowance can provide a powerful incentive or, conversely, disincentive to geothermal development, depending on its provisions.

The second issue concerns expensing intangible drilling costs, which allows certain drilling investments to be deducted from taxable income. Allowing intangible drilling expenses to be deducted is an incentive for investment in geothermal exploration and development drilling.

Finally, consideration may be given to providing property or income tax credits for geothermal equipment or use. This is currently allowed on some local property taxes for solar energy equipment. Such credits would promote the utilization of geothermal energy.

Other taxes previously mentioned, such as the gross receipts tax, use tax, property transfer tax and bonus tax, are potentially applicable to geothermal development in one form or another, but do not seem to raise the uncertainties associated with the property and income taxes. This, coupled with the fact that levies are generally lower than those associated with the property and income taxes, make them of less immediate concern.

Leasing

The Maryland Geothermal Resources Act deals with the appropriation and use of geothermal resources. The statute does not specify, however, whether the geothermal resource is to be leased (see Resource Characterization). The legislature may wish to address this issue specifically. One option which might be considered would be requiring, or prohibiting, the leasing of all geothermal resources. On the other hand, the legislature may wish to

Senator Peter Bozick, Chairman
July 5, 1979
Page 5

tie leasing to resource characterization (hydrothermal resources versus hot dry rock resources).

If it is decided that all or some geothermal resources are subject to leasing, leasing procedures for state lands will be necessary. By statute, the authority to lease or otherwise convey state property is vested in the Board of Public Works. Leasing procedures, lease terms, royalties and other provisions are implicitly left to the discretion of the Board. The legislature may choose to continue this practice with respect to leasing of state lands for geothermal development. If so, the Board should be specifically designated by statute as the agency with authority to lease state lands for geothermal development.

Alternatively, the legislature may choose to specify by statute provisions for geothermal leasing. If this is done, certain issues should be addressed in the formulation of those provisions: competitive versus non-competitive leasing; rates for royalty and rental; acreage limitations; and terms of leases. The NCSL Geothermal Policy Project has worked with other states in these areas and is prepared to assist the Maryland Legislature in reviewing and formulating its policies.

Appendix 8

MEMORANDUM ON GEOTHERMAL POLICY

TO: Virginia Coal and Energy Commission
FROM: NCSL Geothermal Policy Project
DATE: July 19, 1979
RE: Geothermal Legislation

Introduction

Virginia's geothermal resources are likely to be low to medium-temperature hydrothermal systems (aquifers) best suited to space heating and other direct applications. At some future date, hot dry rock (radiogenic plutons) at depth may be tapped for electrical generation and other high-temperature uses. Geothermal legislation in Virginia should take into account the physical nature of the resource and its potential utilization.

At present, Virginia has no statutes specifically relating to geothermal resources. However, existing laws pertaining to the powers of political subdivisions, the environment, utilities, water and taxation are likely to affect geothermal development. This memo will outline the parameters of a comprehensive geothermal resources act, as well as raising issues of concern presented by established legislation. The following policy areas will be examined.

- A. Geothermal Resource Act
 - 1) definition
 - 2) ownership
 - 3) regulatory powers
 - 4) access
 - 5) allocation
 - 6) relationship to water
- B. District Heating
 - 1) political subdivisions
 - 2) utilities
 - 3) State Corporation Commission
- C. Environmental Protection
- D. Taxation
 - 1) property
 - 2) income
 - 3) miscellaneous

A. Geothermal Resource Act

- 1) Definition: The first task of geothermal legislation is to identify the subject resource. The basic elements of geothermal resources are the natural heat of the earth, a transfer medium (natural or artificial) and associated byproducts. A temperature or depth threshold may be incorporated in the definition to distinguish geothermal resources from groundwater. This might also be done by focusing on the thermal use of subsurface fluids; however, even shallow, normal gradient groundwater is susceptible to thermal utilization via heat pumps.
- 2) Ownership: In order to clarify property rights to the geothermal resources, a legislative assignment of ownership may be made. The basic options are ownership by the state (public domain), by the surface owner (surface estate) or by the subsurface owner (mineral estate). Litigation is a possibility whatever assignment is made; however, the courts will be influenced by a rational legislative policy decision.
- 3) Regulatory Powers: In order to avoid agency conflicts and overlapping jurisdictions, a lead agency should be designated to regulate geothermal development. The primary function of such regulation is to control drilling for the resource so as to prevent waste or damage to geothermal and other resources, especially water supplies. Such regulatory jurisdiction may also include a mechanism to allocate production of a common resource among competing producers. The Division of Water or Mineral Resources (Department of Conservation and Economic Development) and the State Water Control Board (Department of Health) are the likely candidates for lead geothermal agency.
- 4) Access: Procedures should be established whereby access to explore for and develop the geothermal resource may be obtained. The most common system applied to geothermal resources is leasing, sometimes with a complementary exploration permit system. If the resource is assigned to other than the surface estate, a separate method for gaining surface access and use must be available. On state lands such surface use would be a concomitant of the resource lease. Private surface owners might be given the first right of access; other lessees might obtain access on private lands through negotiation, easements or eminent domain.

Exploration permits may be made exclusive, and may be made convertible to a lease (preferential rights). Leasing may be by application or by competitive bid. Many states have adopted a "two-tier" leasing system: competitive where the resource potential is known and by application in other areas. Many bid factors - cash bonus, rentals, royalties, work commitments, etc. - are available for competitive system.

Virginia has an existing mineral leasing system (see 10-17. 113 to 116), including competitive bidding for forestry reservation mineral leases and exclusive, convertible exploration permits. Such leases are limited to 5-year primary terms. Geothermal resources would not be presently leasable under this system as "mineral" is defined to in-

clude "petroleum, natural gas, coal, ore, rock and any other solid chemical compound".

- 5) Allocation: The state has two fundamental interests regarding the allocation of geothermal resources. One is to protect the resource from inefficient and wasteful production. The other is to apportion production between competing users of a common supply. The basic allocation options are: the rule of capture (perhaps with upper production limits to protect the resource), appropriation (quantified priorities) and correlative rights (equitable apportionment).

Virginia currently has no allocation mechanism for oil and gas production - hence, the rule of capture apparently applies. The state allocates groundwater (in management areas) via appropriation, except for designated minor uses. In other states, the trend in geothermal resources allocation is to correlative rights, whether instituted by a cooperative unit agreement or assigned by a state agency.

- 6) Relationship to Water: Virginia has defined "water" to include all surface and subsurface waters which affect the public welfare. At face value, this definition is broad enough to include (hydrothermal) geothermal resources. If so, geothermal resources would be a public resource, subject to state jurisdiction and control. As a groundwater, geothermal resources would be administered by the State Water Control Board under the Groundwater Act of 1973 (see 62.1-44. 83 et seq.).

This Act institutes a permit and certification system for groundwater rights - essentially a western appropriative rights regime. Exempt from the permit requirements are agricultural, livestock and domestic uses, as well as any single industrial/commercial use less than 50,000 gallons per day. The system applies only to designated groundwater management areas. Permits are required to initiate a well, with certificates granted upon completion. Such rights are quantified and are prioritized by time of application.

This system may be applied to geothermal development, but would prevent the application of correlative rights to allocate production. By the use of a temperature/depth threshold to separate geothermal resources from groundwater, the correlative rights option would be preserved. In addition, separate access to geothermal resources is desirable since the groundwater regime is burdened with a multitude of vested rights to a different resource.

There should, however, be a conflict resolution mechanism to deal with interference situations between geothermal development and established standard water uses. Limiting production is one approach. Others include requiring the geothermal developer to obtain offset water rights or pay compensation for the damage to the existing use. The legislature may assign the burden of proof in such conflict situations. In the groundwater area, the burden of showing interference is on the complaining party.

B. District Heating

- 1) Political Subdivisions: Counties, cities, towns, special districts and

other political subdivisions possess no inherent governmental powers (aside from "home rule" entities). Thus, specific statutory authorization for such entities to form heating districts may be required. This may be accomplished by enacting a new, comprehensive district heating statute or by amending the charter of existing political subdivisions. The first approach has the advantage of creating entities with a specific, single mandate - district heating - while the second approach has the advantages of ease of drafting and utilization of already established entities.

Whatever approach is chosen, certain basic parameters need to be established. These relate to the method of district formation, the nature of its boundaries, its purposes and its powers, especially financial. Virginia has several possible candidates for district heating implementation. For example, consolidated cities may organize "special service districts" (see 15.1 - 18.2 et seq.) in order to supply "water and heat". Such an authorization might be construed to include district heating. However, special service districts have inadequate financial powers, being limited to special assessment (property tax) revenues.

On the other hand, counties, cities and towns may issue either general obligation (ad valorem supported) bonds or revenue (service charge supported) bonds (see 15.1 - 170 to 208) in order to finance "water-works and other public utilities" (see 15.1-292 et seq.). Whether such an authorization is adequate to cover district heating is uncertain. The specific insertion of such services in the list of authorized utility services (see 15.1- 354 & 875) would be advisable.

Another possible district heating candidate is a "Water and Sewer Authority" (see 15.1 - 1239 to 1270) which may be created by one or more political subdivisions. These may also issue revenue bonds. However, unlike municipal utility revenue bonds, such issues are supported only by project revenues, without the backup support of special assessment power. In addition, specific district heating authorization is lacking.

A promising avenue for geothermal utilization is new, planned, integrated industrial/agricultural parks. Such developments could implement a "cascaded" delivery system whereby successive users could use progressively cooler fluids. Virginia has statutes authorizing "Industrial Development Authorities" (see 15.1 - 1373 et seq.) and "Area Development Authorities" (see 15.1 - 1400 et seq.). Such entities might be directed to consider geothermal utilization in planning new developments

Thus, the avenue for implementing public heating districts in Virginia is uncertain. The legislature should review the possible suitable candidates and amend the relevant charters as necessary. Alternatively, it may enact a comprehensive, new district heating statute.

- 2) Utilities: The private sector may organize "Heat, Light, Power (and Water Utilities)" (see 56 - 232 et seq.) in order to provide "heat, chilled air/water, light, power or water". This authorization seems

adequate to cover district heating. Such utilities may also be organized as a municipal franchise under a contract of service. Under this last option, a geothermal developer might be granted a franchise to supply thermal fluids to a municipality for subsequent distribution. Such an arrangement may be advantageous since political subdivisions may be unable to take the risks involved in exploring for and producing geothermal resources.

- 3) State Corporation Commission: In order for an investor-owned utility to be organized, a "certificate of public convenience and necessity" (see 56 - 265) must be obtained. This requirement only applies to companies expressly incorporated as a "public service company". Thus, a private geothermal heating district for an industrial park may be exempt from the certification requirement. Publicly-owned utilities also are exempt. However, a service district organized under the Area Development Act may be prohibited from competing with a certified public utility serving the same territory.

A second aspect of State Corporation Commission utility jurisdiction is control over rates (see 56 - 35 and 12.1 - 12). Investor-owned utilities are subject to such control, while publicly-owned systems are not. In addition, municipalities have concurrent rate jurisdiction over public service company rates for service within the municipality (see 56 - 36, 56 - 232 and Virginia Constitution Article VII-8). There has been litigation in the past over which rate jurisdiction was controlling. It appears that State Corporation Commission rate jurisdiction is superior (see Virginia-Western Power Company v. Clifton Forge 99 SE 723 (1919) cert. den. 251 US 557 (1920), overruled: Victoria v. Victoria Ice, Light & Power Company 114 SE 92 (1922); 15.1-895). Such dual jurisdiction may discourage investors with regard to organizing geothermal utilities. The legislature may, as an incentive to investment, exempt geothermal or alternative energy heating districts from rate control (see Virginia Constitution Article IX-2).

C. Environmental Protection

Virginia has existing statutes regarding air pollution (see 10-17), water pollution (see 62.1 - 44), wetlands (see 62.1 - 13), critical environmental areas, including the coastal zone (see 10 - 187 to 196) and environmental quality, including noise impacts (see 10 - 177 to 186). In addition, mineral developers are required to submit environmental impact reports in order to obtain exploration permits and leases. A similar requirement could be enacted for geothermal development, preserving the distinction between exploration and development impacts that has been recognized for mineral development.

The state also has instituted a "one-stop" permitting mechanism (see 10 - 184.2) whereby a master application serves as a vehicle to obtain a wide range of required state permits. Such a streamlining mechanism is quite useful to developers and would be even more so if local permits were incorporated in the process. Otherwise, no action in the environmental field appears necessary, pending further geothermal activity.

1. Property: Virginia taxes which are potentially applicable to geothermal resources and production are the property tax, income tax, franchise tax and license tax. Regarding the property tax, all taxable real estate, mineral lands, all tangible personal property and the tangible personal property of public service corporation, are subject to local taxation only (58-9), as is machinery used in mining (58-412). Assessment of public service corporations is performed by the State Corporation Commission (58-503.1), but levies are local on corporations engaged in the business of furnishing water or heat, light and power, whether by electricity or gas (58-602).

However, the Constitution provides that

The General Assembly may define as a separate subject of taxation any property... used primarily for the purpose of abating or preventing pollution of the atmosphere or waters of the Commonwealth or for the purpose of transferring or storing solar energy, and by general law may allow the governing body of any county, city, town or regional governmental to exempt or partially exempt such property from taxation, or by general law may directly exempt or partially exempt such property from taxation (Const. Art. X Section 6 (d)).

Furthermore, the statutes state that

Certified solar energy equipment, facilities or devices... are hereby declared to be a separate class of property and shall constitute a classification for local taxation separate from other classifications of real or personal property. The governing body of any county, city or town may, by ordinance, exempt such property from local taxation... (58-16.4 (A), 1979 Supp.).

There is, therefore, precedent for the exemption of (or provisions for the exemption of) alternative energy property from property taxation. This is important with respect to geothermal resources. The ad valorem tax on an in-place resource is especially burdensome to the geothermal developer during exploration and early production because of the relatively high valuation of the resource and a relatively low income at these times. The developer may simply not have the funds to pay these taxes at the time they are due. Moreover, the cities or counties have the option of imposing a severance tax on mineral lands and improvements in lieu of an ad valorem tax (58-774). Because of the complex and unique nature of geothermal resources (they exhibit characteristics of minerals, gas and water), it is unclear whether or not this provision could be applied to them.

2. Income: Individual income tax is graduated (58-151.011), and deductions are based on those allowed by federal income taxation (58-151.031), and it is based on federal taxable income (58-151.032). Federal guidelines for depletion allowance are followed (22% of gross income in 1978 and declining to 15% in 1984 and thereafter, with an upper limit equal to 50% of net income). Intangible drilling expenses are deductible.

- 3) Franchise Tax and License Tax: Public service corporations, while not subject to corporate income taxes, are subject to the license tax on gross receipts or to the franchise tax (58-151.03 (c)). Any city or town may impose a license tax on a public service corporation (58-266.1). Alternatively, they must pay a state franchise tax of 1-1/8% of gross receipts up to \$100,000, and 3-1/2% above that (58-603).
- 4) Recommendations: In order to provide similar property tax benefits and incentives to geothermal developers as are given to solar developers, Article X Section 6(d) of the Virginia Constitution would need to be amended to include geothermal energy. The Legislature could then choose between: (1) amending 58-16.4 (A) of the statutes to include geothermal equipment and thereby allow the cities and counties the option of exempting geothermal; or (2) legislatively exempting or partially exempting geothermal directly by statute. Alternatively, 58-774 could be amended specifically to include geothermal lands and improvements, thereby allowing the cities and counties the option of levying a severance tax in lieu of the ad valorem property tax. This would allow taxation to be more dependent on production. Either of these avenues would help to overcome financial barriers to geothermal development.

Income tax, franchise tax and license tax are all straightforward and present few problems to the geothermal developer as they are presently constituted. There are therefore no recommendations with regard to these taxes at this time.

Appendix 9

MEMORANDUM

TO: Senator Fred W. Finlinson, Co-Chairman
Representative S. Garth Jones, Co-Chairman
Utah Interim Energy and Natural Resources Committee

FROM: NCSL Geothermal Policy Project

RE: Geothermal Taxation Policies

Geothermal energy, a potentially significant contributor to satisfying the current and future energy needs of Utah, is at a crucial point in its development. Uncertainties must be clarified and obstacles overcome if this source of energy is to achieve its full potential. Uncertain tax treatment of geothermal properties and income is one of these hindrances to development. The purpose of this memorandum is to point out some of the problems present in Utah taxation policies and to suggest policy options relating to those problems.

The NCSL Geothermal Policy Project is prepared to assist the Utah Interim Energy and Natural Resources Committee in a comprehensive review of geothermal taxation policies in Utah by providing background materials and technical assistance as requested by the committee.

GENERAL

The geothermal industry, an emerging industry still virtually in its infancy, has as its purpose the development of geothermal resources for heat energy

and power production. However, its success in that development is being hindered by uncertainties concerning which taxes are applicable and how those taxes will be levied. Among the more important taxes potentially applicable to a geothermal resource are: property tax, gross occupation tax, franchise tax and excise tax. (See Appendix)

Moreover, the geothermal resource is extremely complex, with characteristics similar to water, minerals and gas. This prevents a clear application to geothermal resources of existing tax codes for water, energy or minerals. Thus, without clarification of the tax statutes, taxation of geothermal resources will be confused at best. It is therefore highly desirable that the Legislature clarify the status of geothermal resources with respect to taxation.

ISSUES

Property Tax

The property tax is a tax on the value of land, improvements, equipment and resources. Uncertainties, especially with regard to the ad valorem taxation of geothermal resources, can be detrimental to the financial planning efforts of geothermal developers. If the geothermal resource is considered as a mineral or a gas, it is subject to ad valorem property taxation. On the other hand, if considered as groundwater, there would be no such taxation on the resource, as groundwater is not subject to property taxation as a resource. The classification of the geothermal resource is therefore necessary if accurate planning is to be achieved in the area of property tax.

Gross Occupation Tax

Also, the gross occupation tax may apply under certain conditions and

not under others. The gross occupation tax is a severance tax which applies to ores, gas and oil. If classified as a gas, geothermal production would probably be subject to this tax; if classified as a non-metalliferous mineral or as water, the tax would probably not be of concern. Again, the uncertainties can cause significant problems in planning.

Franchise Tax

The franchise tax is a tax on the income of corporations. Two factors included in the calculation of this tax are depletion allowance and intangible drilling costs. The depletion allowance applies to mineral and gas resources, but not to water resources. Likewise, the drilling of gas wells results in a tax deduction for intangible drilling costs, while there is no such deduction allowed for the drilling of water wells. The geothermal developer is once again left in a state of flux with respect to future financial activities.

Excise Tax

The excise tax is essentially a sales tax on certain commodities. Unlike the other taxes mentioned above, the excise tax seems to be relatively straightforward and independent of resource classification, depending rather on end use. Differential rates are used in commercial versus residential sales.

RECOMMENDATIONS

Generally, geothermal resources at higher temperatures have characteristics which in many ways resemble gas or minerals: they have relatively high energy efficiency; they have little potential as strict water resources; and they

are located at greater depths under the earth's surface. On the other hand, geothermal resources at lower temperatures have characteristics which resemble those of groundwater: relatively lower energy efficiency; greater potential as water resources; and relatively shallow location with respect to the earth's surface.

We recommend, then, that the Legislature consider treating the higher-temperature geothermal resources for tax purposes as minerals, and the lower temperature resources as groundwater. Treatment of the high-temperature resources as minerals would seem to fit well within the limits of current legal interpretations of "mines" and "minerals".¹ Furthermore, the nature of the low-temperature resources would probably require that they be considered as groundwater in any case.

This dichotomy would simplify the situation with regard to property tax. The owner or leaseholder of a high-temperature resource would be assessed property tax at the rate set for non-metalliferous minerals. Likewise, lower-temperature resources would be treated as groundwater in the assessment of property tax.

The Legislature should decide whether or not the gross occupation tax will be specifically applicable to geothermal resources, particularly those of the higher temperature variety. It seems likely that the lower-temperature resources would, as groundwater, be unaffected by this tax.

Again, questions surrounding the franchise tax deal primarily with depletion allowance and the expensing of intangible drilling expenses. Currently, two alternative methods of calculating depletion allowances are permitted.

The Legislature may choose to specify one of these methods for use regarding the higher-temperature resources. Depletion allowance would probably not be appropriate for the lower-temperature, or groundwater, resource. (See Incentives, below.)

The developers of the high-temperature resources probably should also be entitled to deduct intangible drilling expenses in the same way as drillers for oil or gas. Geothermal developers compete for the same investment funds as their oil and gas counterparts. (For a discussion of low-temperature drillers, see Incentives.)

Finally, as was discussed earlier, the excise tax is relatively straightforward in its application to geothermal resources, and is therefore the subject of no recommendations at this time.

INCENTIVES

Due to the potential value of geothermal energy in Utah, we suggest consideration of four possible tax incentives for development: expensing of intangible drilling costs for low-temperature resources; examination of the depletion allowance; deferral of certain tax payments; and allowance of tax credits.

Given that the purpose of geothermal development, including low-temperature resources, is the production of energy, we suggest that taxpayers investing in the drilling of low-temperature geothermal wells be allowed to deduct intangible drilling expenses in the same manner as an investor in an oil or gas well, or in a high-temperature geothermal well.

The National Energy Tax Act of 1978 suggests a percentage depletion allowance somewhat different than that currently used in Utah. As one of the two accepted calculation methodologies in Utah, depletion is set at 33 & 1/3 % of net income. The federal act suggests, however, a declining rate of depletion, commencing at 22% of gross income in 1978 and declining to 15% in 1984 and thereafter, with an upper limit equal to 50% of net income. We suggest that the Legislature examine these alternatives.

Certain types of taxes, especially the ad valorem property tax on resources, are especially burdensome to the geothermal developer during exploration and early production. This is true because of the relatively high valuation of the resource and a relatively low income during these times. The developer may simply not have the funds to pay these taxes at the time they are due. An exemption from these taxes at that time or a deferral of their payment until the developer is more able to do so should be considered by the Legislature.

Finally, income tax credits and investment tax credits are included as part of the National Energy Tax Act of 1978. The income tax credits would be available for individuals incurring certain expenditures relating to the installation of residential equipment using geothermal as a source of energy. These credits are set as follows: 30% on an amount up to \$2,000, and 20% on an amount from \$2,000 to \$10,000 (maximum credit: \$2,200). The investment tax credits would be available on property used in the production of energy derived from a geothermal resource, and also property which is installed in an industrial or commercial facility and which utilizes geothermal energy as a source. The amount of the credit is 10%, which is in addition to existing investment tax credits. Similar tax credits in Utah would encourage the development and utilization of geothermal resources.

APPENDIX

Property Tax

Generally, assessment of property for taxation purposes is set at 25% of "reasonable fair cash value," with land and improvements assessed separately.² Specifically, non-metalliferous mines and claims are assessed at 25%, as are machinery and improvements.³ All machinery, improvements, etc., are assessed separately from the mine or claim if they have a value apart from the mine or claim.⁴ If ownership of the mineral rights is severed from ownership of the surface, assessment is separate.⁵

Also, state-owned lands are exempt from property tax, but private improvements on those lands are subject to taxation.⁶ Through judicial interpretation, lessees of state-owned land are assessed ad valorem tax on the lessee's improvements and interest (leasehold) in the land.⁷

Public utilities must be listed and assessed in the county in which they are located.⁸ However, the actual assessment of all public utilities, powerplants, pipelines, power lines, mines and minerals, and machinery and improvements used in mining, shall be performed by the state tax commission.⁹

There are exemptions which can be used in the calculation of property tax. These include total exemption for all water rights, ditches, canals, reservoirs, power plants, pumping plants, transmission lines, pipes and flumes which are used exclusively in the process of irrigation.¹⁰ Furthermore, if power plants, transmission lines, etc., are used to generate or transmit electricity, a portion of which is used in the irrigation process, they are exempt proportionally to the extent of that use.¹¹ Tax monies saved in this

way are to be apportioned to each irrigating user according to the amount of power used in irrigation relative to the total amount used in irrigation by all users.¹²

Occupation Tax

There is a gross occupation tax of 1% for ore and 2% for oil, gas, or other hydrocarbon substances, with the first \$50,000 being exempt.¹³

Franchise Tax

Corporations must pay franchise tax equal to 4% of their net income for the year, but in no case less than \$25.¹⁴ Acceptable computation methodology is described.¹⁵

Depletion allowance is set as a "reasonable allowance...according to the peculiar conditions in each case...made under [the] rules and regulations [of] the tax commission." Alternatively, the taxpayer may choose a percentage depletion allowance of 33 and 1/3% of the net income from the property during the year. In either case, if a lease is involved, the allowance is apportioned between lessor and lessee.¹⁶ Furthermore, mining companies must deduct federal income and excess-profits taxes before computing the depletion allowance.¹⁷

Deductions for exploration and development are applicable when certain conditions are met. By and large, criteria for the determination of allowable deductions versus capitalization of expenditures, are set by rules and regulations. Statutes in this area tend to be general and of an enabling nature.

Excise Tax

There is a 4% excise tax on electricity, gas, heat, fuel, etc., used for commercial consumption, and 1% tax on those commodities when used for residential consumption.¹⁸

FOOTNOTES

1. The terms "mines" and "minerals" are not limited to mere subterranean excavations or workings or to the metals or metalliferous deposits, whether contained in veins that have well-defined walls or in beds or deposits that are irregular and are found at or near the surface or otherwise. *Nephi Plaster & Mfg. Co. v. Juab County*, 33 U.114, 93 P.53, 14 L.R.A. (N.S.) 1043, applying Const. Art. XIII, Section 4.
2. 59-5-1 U.C.A.
3. 59-5-57 U.C.A.
4. 59-5-64 U.C.A. 1953
5. 59-5-57 U.C.A. 1953
6. 59-2-2 U.C.A. 1953
7. *Stowell v. State*, 100 U.420, 115 P2d416
8. 59-4-2 U.C.A. 1953
9. 59-5-3 U.C.A. 1953
10. Const. Art. XIII, Section 2; 59-2-1 U.C.A. 1953
11. Const., loc cit; 59-2-7 U.C.A. 1953
12. Const., loc cit; 59-2-9 U.C.A. 1953
13. 59-5-67 U.C.A. 1953
14. 59-13-3 U.C.A. 1977 Supp.
15. 59-13 passim
16. 59-13-7 U.C.A. 1953
17. *New Park Min. Co. v. State Tax Comm.*, 113U.410, 196 P2d 485
18. 59-15-4 U.C.A. 1977 Supp.

MEMORANDUM

TO: Senator Fred W. Finlinson, Co-Chairman
Representative S. Garth Jones, Co-Chairman
Utah Interim Energy & Natural Resources Committee

FROM: NCSL Geothermal Policy Project

RE: GEOHERMAL LEASING PARAMETERS

Geothermal resources are currently leased in Utah via a Geothermal Steam Lease and Agreement issued by the Board of State Lands. Such leases may be obtained through application to the Board, without the necessity for competitive bidding.¹ Provision is made in the lease agreement for multiple use, lease term, rentals, royalties (primary production and byproducts), diligence, pollution control, protection of the leasehold from drainage by offset wells, bonding, surface use, abandonment, surrender, drilling permits, resource conservation, well logging, insurance, unitization, default and assignment. While the Committee may wish to examine and revise the method of granting leases and lease provisions, a more pressing issue is clarification of the legal basis for geothermal leasing. This memo will analyze the existing legal foundation with regard to geothermal leasing in Utah, raise issues of concern and suggest policy options.

The NCSL Geothermal Policy Project is prepared to assist the Utah Interim Energy and Natural Resources Committee in a comprehensive geothermal leasing policy review by providing background materials and direct technical assistance.

The Legal Basis for Geothermal Leasing

There currently exists no explicit statutory authorization to lease geothermal resources in Utah. The only statutory treatment of the resource is contained in code provisions relating to water², whereby:

The division of water rights is given jurisdiction and authority to require that all wells for the discovery and production of water to be used for geothermal energy production in the state of Utah, be drilled, operated, maintained, and abandoned in such manner as to safeguard life, health, property, the public welfare, and to encourage maximum economic recovery.

Thus, geothermal resources are neither defined nor explicitly classified as to resource type. By inference, however, the resource is water (to be used for geothermal energy production) and, hence, available through appropriation.

Nevertheless, the Board of State Lands (the Board) has asserted in its "Rules and Regulations Governing the Issuance of Mineral Leases" that "Geothermal Steam Resources³ contained in or under lands of the State of Utah are reserved to the State and shall be sold only upon a lease and royalty basis." The Geothermal Steam Lease and Agreement is labelled a "mineral lease". By inference, then, the resource is a mineral and, hence, available through leasing.

The code provisions and the mineral leasing rules thus produce an inconsistency of treatment with regard to geothermal resources. If, as the code implies, the geothermal resource is water, it is subject to appropriation. Appropriation creates quantified priorities and is not subject to the financial obligations (rentals, royalties, taxes) applied to leasing. On the other hand, if as the

leasing rules assert, the geothermal resource is a mineral, it is subject to leasing with its attendant financial liabilities. In addition, mineral leases are subject to unitization⁴, a system of assigning equitable shares to a common resource. This method of allocation is incompatible with the quantified priorities inherent in appropriative water rights.

Thus, the uncertainty regarding allocation and financial treatment of the resource needs clarification. Even more serious, however, is the possibility of disputes over ownership due to the lack of a clear definition of the resource. If geothermal resources are deemed to be (ground) water, they would be a quasi-public resource, appurtenant to the surface estate. On the other hand, if geothermal resources are deemed to be a mineral, they would be part of the sub-surface estate.

The problem arises where the mineral estate (sub-surface) has been separated from the surface estate through severance (to another party) or reservation (to the state or federal government). In such a situation, both the surface and mineral estate owners may claim ownership of the geothermal resources. Disputes of this nature have, in fact, occurred⁵. Should the surface owners prevail in any potential litigation on this point, existing state geothermal leases may well be invalidated.

Although the Board is the policy-making body of the executive branch⁶ and has the power to make rules and regulations consistent with its "organic" act⁷, its decisions with regard to mineral leasing of geothermal resources probably do not have the force of law. This is especially so since its treatment of geothermal resources seems inconsistent with the legislative mandate to the Division of Water Rights to regulate the production of geothermal energy under its jurisdiction over water.

Thus, the present uncertainty in Utah with regard to the legal basis for geothermal leasing may give rise to serious conflicts over allocation of production, financial treatment and ownership. A legislative authorization of geothermal leasing, including a definition and classification of the resource, would ameliorate the situation.

ISSUES

- (1) Clarification of the nature of and jurisdiction over geothermal resources.
- (2) Examination of the use of a temperature threshold in a geothermal definition.

RECOMMENDATIONS

- (1) Geothermal resources may be defined as a mineral, thereby confirming the authority of the Board to issue mineral leases for geothermal resources. Alternatively, the Board may be separately authorized to grant specific geothermal leases. In that case, assignment of ownership (surface/mineral estate, public domain) would be necessary to resolve disputes. Litigation may result whatever assignment of ownership is made; however, the courts will be influenced by a rational legislative policy declaration.

If the legislature does mandate a leasing system for geothermal resources, it should consider the application of the doctrine of appropriation (of water rights) to resource production. Should standard appropriative rights be required, quantified priorities in geothermal systems will be created. This will hinder or prevent the application of the more efficient method of allocation known as correlative rights⁸, whether implemented through cooperative unitization or assigned by a state agency. This would

violate the statutory mandate to maximize economic recovery of the resource.

The NCSL Geothermal Policy Project, in draft legislation prepared for the 1979 legislative session, recommended an approach to this problem whereby required appropriative rights would be ancillary to the geothermal resources lease and be subject to unitization/correlative rights.

- (2) The adoption of a temperature threshold in a geothermal resources definition, also suggested in the previously mentioned legislation, would be a method to fine-tune the access and allocation methods applied to hydrothermal⁹ resources. Low-enthalpy fluids, under the temperature threshold, would be treated as hot groundwater and incorporated into the existing groundwater regime -- the rationale being that such fluids are likely to grade into conventional water supply aquifers. Such low-enthalpy fluids would be subject to appropriation, acquire a quantified priority of production, and be exempt from the financial burdens applied to leased substances.

High-enthalpy fluids, above the temperature threshold, would be treated as a leasable substance, with attendant financial returns to the state. Production would be allocated via the doctrine of correlative rights, either by unitization or by assignment by the state agency given jurisdiction. Ancillary appropriative rights would be required only as a mechanism to protect existing conventional water uses and would not constitute an allocation of production.

FOOTNOTES

1. "Newly acquired" lands (generally a terminated or surrendered leasehold) are leased competitively through sealed bids. All bids filed within 15 days of the offering are considered to be filed simultaneously (see Rule 7 of the Board of State Lands' "Rules and Regulations Governing the Issuance of Mineral Leases").
2. 73-1-20 UCA (77 supp.)
3. This terminology -- geothermal steam resources -- is inappropriate. Utah's geothermal resources are apparently liquid, not vapor, dominated. This is recognized in the lease agreement, itself, wherein production of "not only geothermal steam, but also hot water, steam, by-products thereof, steam condensates, as well as minerals and chemicals and/or electrical and other energy..." is allowed.
4. 65-1-76 UCA (1953); Rule 18 (Board of State Lands); Term 20 (Geothermal Steam Lease).
5. In one case, a state agency controlling the surface estate on state lands has contested the issuance of a mineral lease for geothermal resources on the same parcel by the Board. Under 65-7-10, mineral leases are the exclusive province of the Board of State Lands; however, the consent of the state agency using state lands must be obtained. If geothermal resources should be deemed a part of the surface estate, the state agency controlling the surface would be the leasing agent (with the governor's approval) under 65-7-9.

In a second and potentially more serious dispute, a private surface owner has objected to the issuance of a geothermal resources lease for state-owned mineral rights under her parcel. In three California cases the courts held geothermal resources to be included in mineral reservations; however, those courts considered statutes which specifically

FOOTNOTES (continued)

defined the geothermal resource and did not treat it as water.

6. 65-1-1 UCA (1953)

7. 65-1-97 UCA (1953)

8. While the earth's internal thermal energy may be virtually inexhaustible, it takes time for that heat to build up locally into a useful concentration. In addition, the geothermal fluids containing and transmitting that enthalpy are limited and usually slow to recharge. Therefore, the geothermal resource often is a "wasting" resource, with limited useful life. Further, reservoir dynamics may produce drawdowns in some areas as production occurs in others. Thus, the geothermal resource is a "fugitive" resource.

Resources of this type -- oil and gas for instance -- are generally allocated by one of two methods: the rule of capture or correlative rights. The rule of capture implies that whatever is reduced to possession becomes the property of the producer. However, it is difficult to reduce enthalpy to possession; it can be neither stored nor transported for a long distance. In addition, the rule of capture may lead to a wasteful "race to capture" the resource, with overdrilling and possible reservoir damage. Efficient production of geothermal resources requires more coordinated development than occurs under a rule of capture.

The trend in geothermal resource allocation has been to a system of correlative rights. That is, each producer obtains a pro rata share (based on acreage, productivity, etc.) and the reservoir as a whole is managed for optimal utilization. Correlative shares in a geothermal reservoir may be assigned by a state agency or implemented through

FOOTNOTES (continued)

cooperative development -- unitization. Unitization usually requires a specified percentage of operators to agree to the unit operation.

9. Hydrothermal systems are geothermal resources associated with fluids or vapors capable of transmitting the thermal energy (enthalpy) to the surface.

Appendix 10

GEOTHERMAL POLICY REPORT:
Legislative Issues and Recommendations

Prepared for the Delaware Legislature
1979 Geothermal Policy Review

Geothermal Policy Project
National Conference of State Legislatures
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CONTENTS

- I. Introduction
- II. Resource Characterization
- III. Ownership
- IV. Access & Allocation
- V. Regulatory Procedures
- VI. District Heating

I. INTRODUCTION

Geothermal activity in Delaware is in initial stages. Thus, the state may establish a comprehensive legal foundation to guide the course of future development. For geothermal resources to supply their full potential, policies must be established providing prompt access and secure rights to the resource, efficient regulatory procedures, equitable financial treatment and a substantial market. Developers favor such legislative action as it reduces uncertainty regarding rights to the resource, methods of development and obligations to competitors and the public interest.

This report examines relevant policy concerns regarding rights and access to the resource, regulatory procedures and marketing mechanisms. In each policy area, existing legal parameters are analyzed, important issues are raised and policy options are suggested. A brief summary, highlighting the most important issues, follows.

A. Resource Characterization

The basic task is defining the subject resource and determining its relationship to existing resource categories. This is a complex task due to the unique nature of geothermal resources which resemble in some respects water, minerals and gas. Resource characterization may carry implications regarding ownership.

- (1) What are geothermal resources?
- (2) How do geothermal resources relate to other water and mineral resources?

B. Resource Ownership

Secure rights to the geothermal resource are a fundamental requirement for successful development. Geothermal entrepreneurs should not be forced to negotiate with multiple potential lessors in order to obtain development rights. A resource definition as water or mineral may determine ownership. Litigation is a lively possibility whatever assignment of ownership is made; however, a rational legislative policy decision will carry much weight with the courts.

- (1) What party controls the property rights to geothermal resources?

C. Resource Access and Allocation

Some system of leasing, selling, franchising or licensing development rights to geothermal resources must be established. Such a system should not constitute a time-consuming burden on development and must allow developers to secure their investment. In addition, a method of allocating production among competing developers of a common supply is needed. Such a method should ensure adequate returns on investment while preventing waste of the resource.

- (1) How may geothermal developers obtain access to the resource on state and private lands?
- (2) How should a common supply be allocated among competing producers?

D. Regulatory Procedures

The state has a valid interest in ensuring that geothermal development takes place in a manner which protects public health and welfare,

the environment and other resources, and is fiscally responsible. Drilling controls, pollution, waste disposal and land use issues need to be examined. Delaware's coastal and wetland resources represent a special concern. It also is vital that the regulatory burden on geothermal development not be excessive.

- (1) Is there adequate authority (statutory and regulatory) to control geothermal developmental impact?
- (2) How may regulatory procedures be streamlined?

E. District Heating

District heating represents the most promising and likely vehicle for the marketing of Delaware's geothermal resources. Adequate authorization for private and public corporations to form and operate such heating utilities is required. Integrated, multiple uses such as industrial parks and residential and commercial heating districts should be encouraged.

- (1) What type of private corporation may form a heating utility?
- (2) How may municipalities and other political subdivisions form and operate a heating district?
- (3) What is the role of the Public Service Commission in regulating geothermal district heating?

The NCSL Geothermal Policy Project has assisted state legislatures in formulating and reviewing policies in all of the above areas.

Various project documents and materials are available to assist state policy reviews, as well as direct technical assistance.

The project is prepared to respond to Delaware's needs as the state develops a comprehensive framework to encourage and control geothermal development.

II. RESOURCE CHARACTERIZATION

Geothermal resources possess distinctive characteristics which should be recognized in a definition. In addition, geothermal resources in Delaware occur in a variety of geologic settings including hydrothermal reservoirs (hot fluids) and hot dry rock. The basic element of value is the heat energy (enthalpy); however, some transfer medium, usually water, is a necessary component. The transfer medium, itself, may be valuable for its dissolved minerals and gases (byproducts). All these elements should be contained in the definition to avoid conflicting ownership claims to different constituents of the resource.

Geothermal resources have generally been classified as water, mineral or sui generis (unique). Delaware has defined "groundwater" as "any water naturally found under the surface of the earth."¹ This seems broad enough to include hydrothermal resources with their attendant enthalpy. Hot dry rock resources would not fall within the definition.

On the other hand, Delaware has defined a "mineral" as "any natural inorganic substance with definite chemical and physical properties which is present in, or at the bottom of a body of water, or anywhere within the earth's crust."² This also seems broad enough to include hydrothermal resources as well as hot dry rock.

Neither definition focuses on the unique element of geothermal resources -- enthalpy. As a result, simply declaring the resource to be water or mineral

would not adequately characterize it. An accurate definition of geothermal resources should include all its physical features and constituents. Beyond physical characterization, the legislature may wish to classify geothermal resources as water or mineral for ownership purposes. In any case, production of the resource via its transfer medium (water) may give rise to conflicts with existing water uses, necessitating some resolution mechanism.

A recent approach given consideration by some states (NM, UT) and adopted to a degree by others (MD, OR, ID) utilizes a temperature cutoff to distinguish between deep, hot geothermal resources (hot dry rock, high-temperature hydrothermal systems) and shallow, warm geothermal resources (medium-temperature aquifers) likely to grade into conventional water supply strata. In the West, this has been considered, in part, as a means to remove high-temperature resources from the system of appropriative water rights. This is not a consideration in Delaware since all water is allocated on an equitable apportionment basis.³

There are, however, other considerations which may still indicate a temperature cutoff approach in Delaware. Separating low-enthalpy "hot groundwater" from other geothermal resources could facilitate development of the lower temperature resource through:

- (1) simplified access -- a drilling permit rather than a resource lease;
- (2) reduced regulatory burden -- neither drilling controls nor environmental impact assessments would need to be as stringent as required for high temperature geothermal development;
- (3) inapplicability of royalties and severance taxes;
- (4) incorporation ("grandfathering") of existing thermal uses of groundwater into the access and allocation regime;

- (5) minimizing potential legal challenges from mineral estate owners on the basis of the Union Oil⁴ case, which held the dry steam geothermal resource at the Geysers (CA) to be a mineral reserved to the United States under the Stock-Raising Homestead Act. The challenge would likely arise if all hydrothermal resources, regardless of temperature, were placed in the groundwater regime.

Enactment of the temperature cutoff, then, would divide the resource with regard to regulatory purposes, method of access, financial treatment, status of existing thermal uses and, perhaps, ownership. Leasing procedures, royalties and stringent development regulations would be applied to the deep, high temperature geothermal resources, while low temperature fluids would be developed as water.

Issues

- (1) How should geothermal resources be defined?
- (2) How should geothermal resources be related to other resources?

Recommendations

- (1) A geothermal definition should focus on the physical features of the resource and include its constituent elements:
 - a -- thermal energy (perhaps above a threshold temperature)
 - b -- transfer medium (natural geothermal fluids or injected working fluids)
 - c -- attendant byproducts (dissolved minerals or gases)
- (2) It is suggested that a temperature cutoff be considered in order to distinguish between "geothermal resources" and "hot groundwater." Resources below the cutoff would then be integrated into the existing groundwater allocation system. High-temperature resources would receive treatment tailored to their characteristics.

II. RESOURCE CHARACTERIZATION -- FOOTNOTES

1. 7-6002(7) DCA (1974)
2. 7-6102(10) DCA (1974)
3. 7-6010(f) (1) DCA (1974)
4. Union Oil v. U.S. 369 FS 1289 (N.D.-CA 1973) rev'd 549 F 2d 1271
(C.A. 9 1977) cert. den. _____ US _____ (1978)

III. OWNERSHIP

The complex nature of geothermal resources, resembling both water and minerals, has led to litigation and uncertainty for developers. Many states have not assigned ownership, leaving the matter to the judiciary. However, a legislative declaration has several advantages. Unlike courts, legislatures are not precedent-bound, nor are they limited to a particular factual dispute. Rather they may examine a wide range of facts and make decisions on the basis of public policy.

The basic ownership options are: surface estate, mineral (subsurface) estate and public domain. Under the surface estate approach, the landowner (state, federal, private) has title to geothermal resources underlying his parcel. Under the mineral estate approach, landowners would own underlying geothermal resources unless the mineral estate was severed (to another party) or reserved (to the state or federal government). If the estates are separate, provision for surface access and use must be negotiated separately.

Under the public domain approach, the state asserts title to all geothermal resources within its borders as a public trust. It could claim a royalty on all production. Usually, surface owners are given the first right of access to underlying resources. Other lessees would need to negotiate a separate surface use agreement with private surface owners, paying rentals or overriding royalties. On state lands, surface use would be a concomitant of the resource lease.

If a resource split is effected via the adoption of a temperature cutoff in the definition, low-temperature hydrothermal fluids would fall into the existing groundwater property regime. Currently, groundwater is a quasi-public resource which the state controls as a trustee.¹

Issue

- (1) What parties hold the property rights to geothermal resources?

Recommendation

- (1) Although litigation is possible, the state may decide, on an original basis, the ownership of this "new" resource. Enactment of the temperature cutoff would place some "geothermal" resources into a quasi-public trust category. High-temperature hydrothermal and dry rock systems represent a special case whereby the state could adopt any of the options outlined above (surface estate, mineral estate, public domain).

III. OWNERSHIP -- FOOTNOTE

1. Conversation (May 22, 1979) with June MaCartor, Deputy Attorney General attached to the Department of Natural Resources (DNR).
The early, skimpy case law in Delaware on groundwater adopted the "American rule" of "reasonable use": each landowner could make virtually unlimited withdrawals of groundwater to benefit his parcel as long as not used unreasonably - wasted or transported off the parcel. This case law was superseded by the enactment of Title 7, Chapter 60 DCA (1974), which empowered the Secretary of the DNR to allocate water on the basis of equitable apportionment [Section 7-6010(f) (1)] while remaining silent on actual ownership.

IV. ACCESS AND ALLOCATION

A. Access

There are two main avenues for providing access to geothermal resources in Delaware. One is a leasing approach similar to that for oil, gas and other minerals. The other is the allocation approach used for water. Leasing is generally a more burdensome procedure than allocation, and production of leased substances incurs financial liabilities (royalties, rentals, severance taxes) not usually applied to water allocations.

In Delaware, the Governor and the Secretary of the Department of Natural Resources (the Secretary) are authorized to lease public lands,¹ including the "exclusive right of mining, exploring by geophysical and other methods... and... injecting water, brine, and other fluids into the subsurface strata..."² While appropriate for geothermal development, geothermal resource leases would not be available under this statute as only oil and gas are mentioned as producible substances.

"Underwater lands" owned by the state are leasable under a separate chapter³ in order to produce "oil and gas, sulphur and other minerals."⁴ If declared a mineral, then, sub-aqueous geothermal resources would be leasable under this chapter. The underwater lands statute allows for non-exclusive exploration permits to perform "geophysical, geological and seismic surveys, including cores,"⁵ as well as shoreline easements⁶ to transport produced substances.

It contains comprehensive provisions regarding lease terms,⁷ including cooperative development or unitization.⁸ None of this material is contained in the public lands statute.

Neither statute, then, is presently adequate to lease geothermal resources. If declared a mineral, geothermal resources would be leasable via the underwater lands statute, but only those which are sub-aqueous. If these statutes are to be used to lease geothermal resources, specific insertion of the resource into the list of producible substances may be desirable. In addition, statutory guidance as to lease provisions under the public lands act would be advisable.

On the other hand, if geothermal resources, specifically hydrothermal fluids, are designated a water resource, there is an existing access mechanism in Delaware which would be applicable. The Secretary has the authority to allocate all water of the state.⁹ Permits would need to be acquired for a test well and for production of a safe yield. This procedure would not, however, be applicable to provide access to hot dry rock. In addition, placing all hydrothermal resources into the groundwater regime would almost certainly result in a legal challenge on the basis of Union Oil (see the discussion in Section II).

In this regard, use of a temperature threshold to separate "geothermal resources" from "hot groundwater" would be helpful. Hot groundwater would be immediately accessible under the existing allocation system. Existing water uses would receive protection,¹⁰ and a Union Oil challenge would be less likely or forceful with regard to low-enthalpy fluids. Further, the economics of utilizing such low-enthalpy resources are such that imposition of the procedural and financial burdens of a leasing system could be counter-productive.

Issues

- (1) As a mineral, how would access to geothermal resources be obtained?
- (2) As water, how would access to geothermal resources be obtained?
- (3) Should a comprehensive geothermal resources leasing statute be enacted?

Recommendations

- (1) There currently exists no mineral leasing statute applicable to geothermal resources. The simple designation of geothermal resources as a mineral would only enable leases for sub-aqueous systems. The specific insertion of geothermal resources into the list of producible substances would allow geothermal leases on public lands, but guidance for lease provisions is lacking.
- (2) Designation of geothermal resources as water would provide an existing access mechanism for hydrothermal fluids. Hot dry rock would not be included in this mechanism. Moreover, legal considerations and state interests in controlling and receiving a financial return from the development of high-enthalpy fluids indicate that the use of a temperature threshold may be desirable. Hydrothermal fluids under the threshold would then be treated as "hot groundwater", while high-temperature hydrothermal fluids and hot dry rock would receive separate treatment as a leasable resource.
- (3) Since geothermal resources have unique and distinctive features, an individualized leasing statute may be desirable. Many states and the federal government have adopted a "two-tier" system, whereby areas of high or known geothermal potential are leased competitively, while areas of unknown potential are leased by application. Environmental considerations are usually accounted for before leases are offered. Exploration permits also may be available. Many bidding factors are available for competitive leasing: cash bonuses, rentals,

royalties, profit-shares, work commitments, etc. A leasing statute also should give guidance as to lease provisions: duration, renewal and renegotiation, acreage limits, rentals, royalties or other financial liabilities, bonding, stipulations, etc. Provision for joint operations or unitization is desirable as well.

B. Allocation

While the earth's internal thermal energy may be virtually inexhaustible, it takes time for that heat to build up locally into a useful concentration. In addition, the geothermal fluids containing and transmitting that enthalpy are limited and usually slow to recharge. Therefore, the geothermal resource often is a "wasting" resource, with limited useful life. Further, reservoir dynamics may produce drawdowns in some areas as production occurs in others. Thus, the geothermal resource is a "fugitive" resource

Resources of this type -- oil and gas for instance -- are generally allocated by one of two methods: the rule of capture or correlative rights. The rule of capture implies that whatever is reduced to possession becomes the property of the producer. However, it is difficult to reduce enthalpy to possession; it can be neither stored nor transported for a long distance. In addition, the rule of capture may lead to a wasteful "race to capture" the resource, with overdrilling and possible reservoir damage. Efficient production of geothermal resources requires more coordinated development than occurs under a rule of capture.

The trend in geothermal resource allocation has been to a system of correlative rights. That is, each producer obtains a pro rata share (based on acreage, productivity, etc.), and the reservoir as a whole is managed for optimal

utilization. Correlative shares in a geothermal reservoir may be assigned by a state agency or implemented through cooperative development -- unitization. Unitization usually requires a specified percentage of operators to agree to the unit operation.

Delaware has not established adequate authorization for allocating geothermal resources as a mineral. The public lands act contains no provisions for unitization or assignment of correlative shares in a mineral resource. Only the underwater lands act provides for allocation of correlative shares in (underwater) minerals, and only where the resource is produced under a unit agreement between the developers. If designated a mineral, therefore, geothermal resources would lack an allocation procedure except for resources located underwater.

On the other hand, groundwater allocation in Delaware is on the basis of "equitable apportionment"¹¹ qua correlative rights. This method could be applied to hydrothermal fluids, but hot dry rock would not be covered. In addition, there are difficulties associated with placing all hydrothermal fluids, regardless of temperature, into the groundwater regime (see the discussion in Section IV. A).

The equitable apportionment system would, however, be quite appropriate for "hot groundwater" under a temperature threshold. It includes a comprehensive conflict resolution mechanism¹² to protect existing water uses from damage due to subsequent allocations -- although this mechanism may need to be expanded to cover damage to thermal aspects of the use as well as supply reductions. Any planned increase in use by a developer also

would fall under the jurisdiction of the Secretary.¹³ The entire system would be instituted in accordance with a "statewide comprehensive water plan."¹⁴

Issues

- (1) As a mineral, how would geothermal resources be allocated?
- (2) As water, how would geothermal resources be allocated?
- (3) Should a new, comprehensive allocation method be enacted?

Recommendations

- (1) Only the underwater lands act makes provision for the cooperative development of minerals (geothermal resources) if there is a unit agreement. In the absence of a unit agreement, there is no mechanism to assign correlative shares. The public lands act gives no authority for allocating resources placed under its purview. Remedial legislation would be necessary should these statutes be utilized to lease and allocate geothermal resources.
- (2) The "equitable apportionment" system for allocating water in Delaware may appropriately be applied to hydrothermal fluids. The use of a temperature threshold to designate "hot groundwater" is suggested to avoid problems associated with placing all hydrothermal fluids into the groundwater regime. If hot groundwater is to be allocated under this system, protection of the thermal aspects of existing uses should be incorporated into the conflict resolution mechanism. In addition, the Secretary should be directed to take groundwater enthalpy into consideration in the development of the statewide comprehensive water plan.

- (3) As with leasing, a geothermal allocation system may deserve individualized treatment in a specific geothermal statute. Correlative rights is suggested as the most appropriate doctrine to ensure equitable and efficient resource production. Provision should be made for unitization (mandatory or voluntary), as well as for assignment of correlative shares in the absence of cooperative development. Correlative rights to hot dry rock may be difficult to define. A possible approach would be to control the amount of transfer medium injected into the formation.

IV. ACCESS AND ALLOCATION -- FOOTNOTES

1. 7-4510 DCA (1974)
2. 7-4511 DCA (1974)
3. 7-61 DCA (1974)
4. 7-6102(c) DCA (1974)
5. 7-6103 DCA (1974); such permits establish no preferential rights to a subsequent lease, run for two years and are renewable [7-6104 (b)] .
6. 7-6102 (d) DCA (1974)
7. lease duration (7-6111); maximum lease size (7-6109); royalties (7-6112); diligence and production requirements (7-6121); directional drilling (7-6117); drilling records and confidentiality (7-6105).
8. 7-6134 DCA (1974)
9. 7-6010 (f) (1) DCA (1974). It should be noted that the Delaware River Basin Commission also has jurisdiction over major withdrawals from the basin, including groundwater. Authority may be found in Article 10 of the Compact (7-6501).
10. 7-6031 DCA (78 C.S.)
11. supra note 9
12. supra note 10
13. 7-6030 DCA (1974)
14. 7-6010 (b) DCA (1974)

V. REGULATORY PROCEDURES

There are a number of jurisdictions and statutes whose regulations will impact on geothermal development. A summary follows.

A. Division of Environmental Control

The Division of Environmental Control of the Department of Natural Resources has broad, discretionary power in permitting various activities. Although not specifically designed with regard to geothermal development, a number of statutory provisions are likely to be triggered by geothermal activities. Activities requiring a permit¹ include those which would contribute to:

- (1) withdrawal of groundwater (geothermal wells);
- (2) discharge of an air contaminant (well venting, non-condensable gases, cooling tower drift);
- (3) discharge of a water pollutant (subsurface injection or surface disposal of geothermal brines);
- (4) operation of a pipeline system (geothermal distribution);
- (5) construction of any "water facility," including a well².

In some cases, equipment designed to do the above may require a separate or additional permit.³ In addition, all "water well contractors" must be licensed by the Division.⁴

It is likely that geothermal activities in "wetlands" would require a separate, additional permit.⁵ The factors taken into account for a wetlands permit include⁶ environmental impact, aesthetic effect, land use effects, infrastructure needs and impact, and economic

effects (jobs, tax revenues).

The Secretary of the Division is directed to deny or grant the required permits in accord with "duly promulgated regulations."⁷

However, he may, "after a public hearing, publish a list of activities which do not require a permit."⁸

Issues

- (1) Is the statutory authority adequate to cover geothermal activities?
- (2) If so, are there "duly promulgated regulations" to cover geothermal activities?
- (3) Can the regulatory burden on geothermal development be lessened?

Recommendations

(1) There appears to be adequate authority to regulate the drilling for, producing, distributing and disposing of hydrothermal resources. The situation is less clear with respect to the development of hot, dry rock resources. Pipelines associated with such projects would be covered, but stimulation and production wells (although required to be drilled by a licensed contractor) would not appear to require a permit. Only wells designed to "withdraw" groundwater (naturally found under the surface) are covered under 7-6003(a)/(b). Thus, a stimulation well -- as long as it was not injecting a "water pollutant" -- and a production well for injected (non-natural) groundwater would apparently not be covered. The statute may be amended to specifically bring such activities within the scope of Division jurisdiction.

(2) The Secretary may be directed to review the existing regulations governing drilling for and distributing conventional water supplies for their adequacy with regard to geothermal operations -- both hydrothermal and hot dry rock. Consideration should be given to the fact that geothermal wells will probably be deeper than conventional wells and may intersect overlying freshwater aquifers. Abandonment of such wells represents a particular concern. Special attention should be paid to underground injection of spent hydrothermal fluids and transfer mediums for hot dry rock projects, with regard to both pollution of freshwater supplies and thermal degradation of the resource.

(3) Streamlining the permit procedures for geothermal activities would constitute a valuable stimulus to development. One possibility would be to consolidate the various permits into a single geothermal operations permit, granted upon the submission of an approved plan of operations by the developer. The Secretary may designate certain exploratory activities with minimal potential impact as not requiring a permit. Additionally, a geothermal ombudsman to assist with the permit process would be helpful. Finally, an interagency review group may be created to assess the regulatory climate for geothermal operations and make suggestions for improvement.

B. Counties and Municipalities

The zoning power of political subdivisions constitutes an overlay upon the regulatory procedures of the Division of Environmental Control. None of the permits outlined previously "may be granted unless the county or municipality having jurisdiction has first

approved the activity by zoning procedures approved by law."⁹

Local building codes also are likely to impact the utilization of geothermal resources.

Issues

- (1) Are local zoning plans compatible with geothermal development?
- (2) Are local building codes compatible with geothermal utilization?

Recommendations

- (1) Counties and municipalities having a geothermal potential may be directed to include a geothermal element in their zoning ordinances. Consideration should be given to well sites and drilling, distribution corridors, heating districts and surface facilities. Without such an element, geothermal operations would require time-consuming special use permits or variances on a case-by-case basis.
- (2) Building codes should be examined for compatibility with geothermal heating, both in new construction and for retrofits. Consideration may be given to requiring (or giving preferred status to) geothermal district heating for new subdivisions or public buildings, where feasible. Alternatively, heating systems may be required to be compatible with eventual hookup to heating districts. San Diego County (CA) has utilized a similar, innovative approach with regard to solar domestic hot water systems.

C. Coastal Zone Act

The Coastal Zone law prohibits new "heavy industry"¹⁰ in the coastal

zone and requires other "manufacturing uses" to obtain a permit.¹¹

The State Planning Office administers the permit system.¹²

Geothermal drilling and distribution are probably not regulated "manufacturing uses", defined as "the mechanical or chemical transformation of organic or inorganic substances into new products... including establishments engaged in assembling parts of manufactured products..."¹³ Nor, apparently, are geothermal operations likely to be prohibited "heavy industry," examples of which are "oil refineries, basic steel manufacturing plants, basic cellulosic pulppaper mills, and chemical plants such as petro-chemical complexes."¹⁴

Geothermal operations, especially wells and pipelines, might, however, fall into that category of heavy industry "which...although conceivably operable without polluting the environment, has the potential to pollute when equipment malfunctions or human error occurs."¹⁵ Well blowouts, casing failures and pipeline spills are examples of potentially polluting equipment malfunctions associated with geothermal operations. The pollution potential would depend on the characteristics of the geothermal fluids in question.

Issue

(1) Are geothermal operations a prohibited "heavy industry" due to pollution potential or a "manufacturing use" requiring a permit?

Recommendation

(1) A determination should be made as to whether geothermal

development will be allowed or prohibited in the Coastal Zone.

If allowed, a generic "status decision" may be made as to whether geothermal operations are manufacturing uses requiring permits (with attendant environmental and socio-economic impact reviews). Alternatively, status decisions may be made on a case-by-case basis.

D. Noise Control

Delaware has a Noise Control statute¹⁶ which covers both vehicular and other sources. Thus, there is adequate statutory authority to regulate geothermal noise impacts. This problem was of concern in early California operations at the Geysers. However, with modern noise control techniques the problem has been much reduced. In addition, Delaware geothermal wells are unlikely to have the noise potential of the Geysers' high pressure dry steam wells.

Issue

(1) Are existing noise standards for well-drilling and powerplants adequate to control geothermal noise impacts?

Recommendation

(1) It would seem that additional experience with geothermal development should be acquired prior to a review and possible revision of noise standards.

V. REGULATORY PROCEDURES -- FOOTNOTES

1. 7-6003(a) DCA (1974)
2. 7-6002 (24) DCA (1974)
3. 7-6003(b) DCA (1974)
4. 7-6023(a) (1), (2) DCA (1974)
5. 7-6604 DCA (1974)
6. id.
7. 7-6003(c) DCA (1974)
8. 7-6003(e) DCA (1974)
9. 7-6003(c); 7-6604 DCA (1974)
10. 7-7003 DCA (1974)
11. 7-7004(a) DCA (1974)
12. 7-7005 DCA (1974)
13. 7-7002(d) DCA (1974)
14. 7-7002(e) DCA (1974)
15. id.
16. 7-71 DCA (78 C.S.)

VI. DISTRICT HEATING

District heating may be accomplished by private corporations (utilities) or by municipalities and other political subdivisions. However, authorization under law must be found for both approaches.

A. Privately-Owned Heating Utilities

"Steam, Heat and Power Corporations" may be organized to provide "steam...heat...power...(and) water...(by means of a pipeline) service, system, plant or equipment, for public use." A "certificate of public convenience and necessity" from the Public Service Commission (PSC) would be required in order to organize such a public utility. In addition, such corporations would be under general PSC jurisdiction, including rate-making authority.

Steam, Heat and Power Corporations have been granted pipeline easements beneath public byways, providing the local jurisdiction consents.

Issues

- (1) Is the authority to provide "steam, heat, power and water" sufficient to include centralized cooling services?
- (2) Should geothermal heating utilities be under PSC jurisdiction?

Recommendations

- (1) The statutory language may be liberally construed to include such a closely related service as cooling.
- (2) In order to encourage the development of alternate energy sources, geothermal heating utilities may be exempted from PSC

jurisdiction with regard to formation and rate-making. It should be noted that geothermal heating districts would have to compete with existing gas, oil or electric utilities in the provision of heating services.

B. Publicly-Owned Heating Utilities

(1) Delaware counties (New Castle, Kent, Sussex) are individually authorized to construct and operate water systems.⁵ With regard to district heating, authorization may be inferred from the mandate to provide "water". County water systems may be acquired through the use of eminent domain⁶ and be financed through bond issues.⁷ Such bonds are of the general obligation type; that is, although project revenues may be pledged to bond repayment, they are supported by the full faith and credit of the county.⁸ Ad valorem taxes must be levied to make up revenue shortfalls.⁹ Although such bond issues are not subject to county debt limitations¹⁰, political considerations regarding property taxation may operate as a constraint on this financing procedure.

More importantly, county "water systems" are prohibited from encroaching upon municipalities without their consent.¹¹ Since municipalities are the likely load centers for district heating due to urban population density, this limitation could be very significant with regard to the viability of county geothermal heating districts.

County-owned utilities would not be subject to PSC jurisdiction with regard to formation or rates.¹²

(2) Municipalities also are authorized to form "Water and Sewer Authorities"¹³ and operate "water systems...in connection with the supply and distribution of water..."¹⁴ Such systems are created by a referendum¹⁵ of one or more municipalities and possess an impressive list of powers¹⁶ desirable for district heating. Of particular consequence are the following:

- a -- eminent domain may be used to acquire land and water rights;
- b -- easements may be obtained across public and private lands;
- c -- grants-in-aid from a variety of sources may be received;
- d -- joint contracts may be entered into with various entities;
- e -- project financing may be secured through the issuance of revenue bonds (not subject to debt limitations¹⁷ nor supported by property taxes)
- f -- project revenue bonds are accredited for all classes of investors.¹⁸

Municipally-owned utilities are exempt from PSC jurisdiction with regard to formation and rates¹⁹. However, a severe statutory limitation exists for municipal "water systems": they may not duplicate or compete with existing utilities, public or private, serving substantially the same purposes²⁰. This limitation would, on its face, preclude most municipal geothermal heating districts formed under the Water and Sewer Authority Act.

Issues

(1) Are publicly-owned geothermal heating utilities authorized by law?

- (2) If so, are their financial and other powers adequate?
- (3) Should a new, comprehensive District Heating statute be enacted?

Recommendations

- (1) Although the authority to provide "water" may be liberally construed, the addition of "for heating, cooling, domestic or commercial purposes" may be desirable. Such an amendment would clarify the mandate and encourage political subdivisions to utilize existing vehicles for district heating. In either case, municipal heating districts (water systems) using alternate energy sources would need to be exempted from the prohibition against competition with existing utilities.
- (2) Municipal water systems have a more impressive list of powers than do county water systems and a superior project financing mechanism. These powers appear quite adequate for district heating. Taking load factors into account as well, municipal water systems are probably the best candidate for geothermal district heating via an existing vehicle. It should be noted, however, that the problem of competition with existing utilities would need to be resolved.
- (3) Alternatively, a new, comprehensive District Heating statute may be enacted. This approach was utilized in Oregon and offers some advantages to amending an existing statute: high visibility and a specific, single mandate. In addition, the prohibition on competition problem with municipal water systems would be avoided. On the other hand, municipal water systems may already be in existence and offer an infrastructure and experienced personnel.

VI. DISTRICT HEATING -- FOOTNOTES

1. 26-101(2) DCA (78 C.S.)
2. 26-203(a) DCA (78 C.S.)
3. 26-201 DCA (78 C.S.)
4. 26-1101 DCA (1974)
5. 9-28; 9-45; 9-67 DCA (1974)
6. id.
7. id.
8. id.
9. id.
10. 9-1163(a) (8); 9-4506; 9-6706* and 9-6720 DCA (1974)
11. supra note 5
12. 26-202(b) DCA (78 C.S.)
13. 16-14 DCA (1974)
14. 16-1402(12) DCA (1974)
15. 16-1402 DCA (1974)
16. 16-1406(b) DCA (1974)
17. 22-106; 16-408 DCA (1974)
18. 16-1412 DCA (1974)
19. 26-202(a) DCA (78 C.S.)
20. 16-1407 DCA (1974)

* There is an apparent drafting error in this provision: it purports to repeal 9-6111 on debt limits (a section not in existence at the time 9-6706 was codified); the proper exemption should be from 9-6102 (Sussex debt limitation).

DISTRICT HEATING: LEGAL & INSTITUTIONAL PARAMETERS

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ABSTRACT

District heating is a proven vehicle for the direct application of geothermal energy. Successful systems currently exist in Iceland, France and the U.S., with numerous others in planning or construction stages. As geothermal resources come on-line, district heating is likely to be a widespread method of utilization. Such systems will provide centralized space-conditioning, as well as "cascaded" uses where feasible. Legal and institutional factors should be examined to ensure an adequate foundation for implementing geothermal district heating.

INTRODUCTION

District heating basically means the centralized distribution of heat to multiple end-users within a particular service area. Cascaded utilization would involve the successive use of progressively cooler fluid (e.g. industrial process heat, space-conditioning, greenhousing, aquaculture). The heat source may be geothermal, solar or fossil fuel. The use of cogenerated or waste heat would be especially appropriate. If alternate energy sources are used, supplemental fossil fuel capacity may be necessary to meet peak demands or emergencies. Various entities, both private and public, may constitute vehicles to develop and operate a heating district. Such a heating district will be presumed to be a utility.

INVESTOR-OWNED UTILITIES

The private sector may organize a heating district by incorporating an investor-owned utility. Some existing utilities may already have a steam distribution system in place. In other states, specific legislative authorization for utilities to provide district heating services may be required. Such authorization should allow the production and transmission of various heat mediums, including geothermal, for public and private use.

In order to incorporate a new investor-owned utility, or expand the scope of an existing one, certification from the Public Service Commission (PSC) will ordinarily be necessary. Such a "certificate of public convenience and necessity" may be difficult to obtain where the heating district would impinge on an existing heating utility (gas/electric) service area. State legislatures should consider exempting heating districts using alternate fuel sources or waste heat from the certification requirement. Alternatively, they may direct the PSC to grant certification where the public interest would be served, despite competition with an existing utility.

Investor-owned utilities are under the rate-making jurisdiction of Public Service Commissions, although this may not be clear where heating/cooling services are newly authorized. PSC

control of utility rates normally is justified due to the monopoly status accorded a utility in a particular service area. State legislatures may consider, as an incentive to investment, exempting heating districts using alternate or waste heat sources from PSC rate-making jurisdiction.

Thus, legislatures should review at least three aspects of district heating via investor-owned utilities: the authorization to provide district heating services; the requirement of PSC certification; and, the applicability of PSC rate-making jurisdiction.

PUBLICLY-OWNED UTILITIES

Counties, municipalities, special districts and other political subdivisions also are possible vehicles for implementing district heating. However, most political subdivisions possess no inherent powers. Thus, specific enabling legislation often will be necessary to authorize a political subdivision to organize a heating district. In some cases, municipal utility codes or authorizations to provide "water" may be liberally construed to cover district heating services. "Home rule" entities also may be able to implement district heating on their own initiative.

Where new enabling legislation is required, at least two approaches are possible. One is to enact a comprehensive, specific statute such as Oregon's Geothermal Heating Districts Act (ORS Chap. 523, 1977). Such an approach has the advantage of authorizing entities with a specific, single mandate. Alternatively, an existing political subdivision charter may be amended to include district heating, as Idaho has done with

its municipal code (S. 1062, 1979). While the district heating mandate to such entities may be diluted by existing functions, this approach has the advantage of utilizing personnel and infrastructure in place. In addition, where existing bonding and other powers are already adequate, the legislative drafting job is simplified.

Special districts, a species of local government, offer several advantages as district heating vehicles. They may usually cross other political subdivision boundaries and may sometimes include non-contiguous areas, important factors in matching resource and service load centers. Special districts may be able to impose differential taxing coincident with service areas. Their bond issues normally are exempt from constitutional debt limitations applied to cities and counties. And, they are organized and operated to perform a narrow range of similar functions.

Whatever political subdivision is chosen as a district heating vehicle, certain basic parameters need to be established. These relate to the method of heating district formation, the nature of its boundaries, its purposes and its powers, especially financial.

Formation of a heating district will normally involve resolutions of the governing bodies of participating political subdivisions or, perhaps, a local citizen initiative. A referendum on the matter may be required, especially where the district would have property taxation (ad valorem/special assessment) power. State legislative and/or Public Service Commission approval also may be necessary, although this is less common.

A heating district should have flexibility with regard to its boundaries. The crossing of municipal and county lines, and the inclusion of non-contiguous areas, may be necessary to match the heat source with load centers. Annexation capability would be a useful adjunct. The district also may require extra-territorial jurisdiction over sources of supply and facilities.

The purposes of a heating district will generally be to produce, distribute, utilize, sell and dispose of geothermal resources and other heat mediums for domestic, commercial and industrial use. The authority should be broad enough to include geothermal and cogenerated or waste heat sources, as well as the use of fossil fuels for peaking or emergencies such as well shut-downs. While centralized space-conditioning may often be the primary function, integrated development of cascaded uses should be within the purview of the district.

Since political subdivisions are inherently not risk-taking entities, the exploration function may require an innovative approach. Exploration may be an appropriate function for the district where the geothermal resource is demonstrated or where outside (state/federal) capital is available. Otherwise, joint enterprise ability - joint power authorities (with other political subdivisions) and joint ventures (with private industry) - may be necessary to obtain financing. Alternatively, franchises may be granted to private companies to explore for and produce the resource under a contract of sale. Exemption of such production from PSC rate-making jurisdiction would be an appropriate incentive to attract private risk capital. Publicly-owned utilities already are exempt from PSC jurisdiction in most states.

A geothermal heating utility will require the range of powers of a body corporate and political legal status to sue and be sued; ability to con-

tract for services and employ personnel; ability to acquire and dispose of property (within and without the district); ability to fix rates for service; ability to apportion user charges and enforce collection (usually via liens); and, the ability to generate capital.

The most likely avenue for capital financing of a geothermal heating district will be revenue bond issues. Service charges would be designed, and may be statutorily required, to retire revenue bond principal and interest, as well as covering operating expenses. However, the ability to levy special assessments may be a necessary concomitant in order to cover revenue shortfalls. Revenue bond issues are not subject to constitutional debt limits and usually need not be approved in an election.

Where the district has ad valorem taxation power, it may be authorized to issue general obligation bonds. Such bonds also may be retired by project revenues but are supported by the full faith and credit (taxes) of the issuing district. General obligation bonds will usually be subject to debt limits if the issuing authority is a municipality or county. Debt limits for special districts are less common, and if applicable, special district debts are generally not cumulative with other local political subdivision debt. General obligation bond issues may need to be approved in an election.

Whatever the bond option chosen, marketability is subject to legislative initiative. State legislatures should consider declaring heating district bonds a legal investment for all banks, trust funds, school funds and other institutional investors. Such accreditation would expand the capital market for the bonds.

A final consideration regarding the powers of heating districts is the grant of easements and eminent domain. Easements along, across and under public byways and existing transmission

corridors would assist the district in forming its distribution network. The power to condemn easements on certain private property also may be necessary to complete the system. Consideration may be given to extending the eminent domain power to existing geothermal wells and sources of supply, although such a proposal is likely to be controversial.

The problem of condemning existing wells or their forced incorporation into a heating district may be unavoidable where single or multi-family wells are already in use. Geothermal production for a heating district may result in reservoir drawdowns, rendering such wells useless. District monetary liability for such events, as opposed to the issuance of an injunction restraining operations, would result, as a practical matter, in condemnation. A possible method to minimize such liability would be the designation of system-wide economic drilling levels, above which no liability would accrue to the district.

Thus, the legislative agenda for public district heating is manifest. The charters of existing political subdivisions should be examined to identify suitable candidates and amended as necessary. Alternatively, a comprehensive, new district heating statute may be enacted. Formation, boundaries, purposes and powers are the parameters which need to be established for public heating districts.

CONCLUSION

While this paper has focused on the specific legal and institutional parameters of geothermal district heating, there are additional factors subject to legislative initiative which will generally affect the pace of implementing such systems. These include: public funding for demonstration projects; geoheating

public buildings; innovative and compatible building codes and zoning ordinances; public education and technical assistance; loan programs and tax incentives for alternate energy systems; royalties and taxes on resource production; streamlined regulatory and leasing procedures; and, resolution of ownership and water rights issues. While beyond the scope of this paper, the NCSL geothermal project is prepared to assist states to deal with these policy areas.