

**REPORT OF THE
COAL AND ENERGY COMMISSION
TO
THE GOVERNOR
AND
THE GENERAL ASSEMBLY OF VIRGINIA**



SENATE DOCUMENT NO. 28

**COMMONWEALTH OF VIRGINIA
DIVISION OF PURCHASES AND SUPPLY
RICHMOND
1979**

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**Final Report of the
Coal and Energy Commission**

To

The Governor and the General Assembly of Virginia

Richmond, Virginia

December, 1978

To: Honorable John N. Dalton, Governor of Virginia

and

The General Assembly of Virginia

I. INTRODUCTION

The Coal and Energy Commission has been in existence since the passage of Senate Joint Resolution No. 109 during the 1975 Session of the General Assembly. Senator J. Harry Michael introduced this resolution to give formal status to an ad hoc group of concerned individuals who were investigating the potential for coal liquefaction and gasification in the Commonwealth and served as Chairman during the last three years.

As of July 1, 1979, the Coal and Energy Commission plans to merge with the Energy Study Commission created in 1973 by Senate Joint Resolution No. 128 to formulate a joint effort in making effective legislative recommendations for increasing utilization of Virginia's coal resources and assisting the Commonwealth in utilizing energy in all forms as efficiently and effectively as possible.

The new Commission (See Appendix I of this report) has an arduous task ahead. At the final meeting of the Commission in September, 1978, Dr. Hibbard reported dire predictions for the Commonwealth and indeed this country regarding energy supply and demand during the next decade. A summary of Dr. Hibbard's remarks is as follows:

There are adequate supplies to meet the United States energy demands with the following qualifications:

* *Natural Gas* : Due to declining reserves and lead times required to develop and deliver new sources, there will be a gap between supply and demand in the 1980's which will result in a 10-20% shortage.

* *Oil* : Although domestic production will increase to over 10 million barrels/day, imports will increase to 14 million barrels/day, half of which may be refined products. U.S. refinery capacity is inadequate to process this large volume of imports. As a result, the annual costs of imports will increase to \$65 billion/year in 1975 dollars.

* *Coal* : Domestic production will increase to 1.8 million tons/year by 1996, requiring a large expansion of western resources. The use of western sub-bituminous coal which requires scrubbers will be reduced.

* *Nuclear* : Nearly 230 gigawatts of new nuclear electric power will be required.

* *New Technologies* : Synfuels, solar electric, wind and shale oil will not be available in significant quantities by 1988.

These projections are consistent with actual experience for 1975-78 as follows:

- * Gas - production on target
- * Oil production and imports - on target
- * Coal production - behind because of strikes
- * Construction of coal and nuclear plants - behind the projection due to long time requirements for building these facilities which suggests electricity gap in the 1980's resulting in brown outs.
- * Newly proposed sulphur dioxide regulations which require scrubbers on new coal-fired plants will swing the competitive balance for new electric power plants from coal and dictate that all new electric power plants be nuclear because of scrubbers costs.
- * Unless nuclear siting and permit procedures are accelerated, serious electric shortages will result.

Summary: model studies of U.S. long-range energy supplies suggest that sufficient fuel supplies with imports are available to meet modest U.S. demands until 1988; provided, however, that the facilities are built to produce and utilize them.

Present trends suggest that these facilities are not being installed on time, which may result in gas shortages, brown outs and oil import payments of much more than \$65 billion per year.

The Commission members requested that the above mentioned summary be included in this report of the Commission as evidence of the severity of the energy problem ahead, that the energy crisis is still with us and will continue to be a critical concern not only to Virginia. The implications are far greater.

II. MEMBERSHIP.

During the last year Senator J. Harry Michael, Jr., Charlottesville, continued to serve as Chairman; Delegate C. Don Dunford, Tazewell, as Vice Chairman. The membership was as follows: Senator Peter K. Babalas, Norfolk; Mr. Edmond M. Boggs, Richmond; Mr. Blaine Carter, Richmond; Mr. Charles A. Christophersen, Richmond; Mr. B. V. Cooper, Big Stone Gap; Delegate J. Paul Council, Jr., Franklin; Delegate Walter H. Emroch, Richmond; Mr. Ernst W. Farley, Jr., Richmond; Mr. Jerry L. Fraley, Big Stone Gap; Mr. Herbert O. Funsten, Williamsburg; Delegate Joseph A. Johnson, Abingdon; Mr. Mark R. Kilduff, Richmond; Mr. Harden Lacy, Williamsburg; Mr. Louis Lawson, Richmond; Mr. Fred W. Walker, Richmond; Delegate W. Ward Teel, Christiansburg; Mr. George F. Walker, Tazewell; and Mr. W. Luke Witt, Richmond. Ms. Susan T. Gill of the Division of Legislative Services served as staff to the Commission and drafted the final report to the Governor and General Assembly.

III. WORK OF THE COMMISSION.

In the Spring of 1978 the Coal and Energy Commission divided into subcommittees with the intent of covering the entire Commission in the fall of this year to make policy decisions and any necessary legislative recommendations.

The subcommittees and their respective membership are as follows:

- A. Geothermal Development in Virginia:
 - Herbert O. Funsten, Chairman
 - Edmond M. Boggs

James L. Calver
Harden Lacy

B. Constitutional Question of Tax Exemption for Conversion Equipment for Those Converting from Oil or Natural Gas to Coal:

W. Ward Teel, Chairman
Harden Lacy
Fred Walker
Mark R. Kilduff
W. Luke Witt
Peter K. Babalas

C. Contributions from Coal Industry to Virginia Polytechnic Institute and State University (hereafter referred to as VPI and SU) Center for Coal and Energy Research. ARC funding for coal and energy research; and work with VPI and SU Center for Coal and Energy Research:

C. Don Dunford, Chairman
J. Harry Michael, Jr., Chairman
Blaine Carter
Jerry L. Fraley
B. V. Cooper
George F. Walker

D. Future of Virginia Energy Office: Should it be created by legislative statute?

Fred W. Walker, Chairman
W. Ward Teel
Walter H. Emroch
Charles A. Christophersen

E. Coal Marketing, Purchases and Utilization:

C. Don Dunford, Chairman
B. V. Cooper
Jerry L. Fraley
W. Ward Teel
Fred W. Walker
J. Paul Councill, Jr.
Blaine Carter
George F. Walker

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GEOTHERMAL ENERGY

The Subcommittee has worked with the National Council for State Legislatures in the first year of a two year program when Virginia was chosen as a project State for geothermal policy fomulation and resource development. The goal of this project is recommended legislation to aid the development of geothermal energy in Virginia.

Virginia's geothermal energy is probably in the form of hydrothermal systems with low to medium temperatures in the coastal plains. Preliminary drilling indicates potential at Wallops Island and Portsmouth. At present no geothermal energy is being utilized in Virginia. However, possibilities for utilization include:

1. residential and commercial space conditioning via water-referenced heat pumps;
2. residential/commercial hot water, e.g. spas;
3. industrial process heat;
4. agriculture, e.g. corp drying, tobacco curing, poultry raising, green housing; and

5. aquaculture.

The food industry is the most likely target for geothermal development because of its large demands for process water. Also, the siting of new industrial/agricultural parks near geothermal fields such as a Wallops Island is a possibility.

Tobacco production is located predominantly in the coastal plains area (90%) and utilizes 60 degrees centigrade temperatures which would be ideal for the geothermal energy. Virginia has suffered persistent natural gas and fuel oil shortages during recent winters. Utilization of geothermal resources for home heating offers an alternative which would free oil and gas to keep industries operating during cold weather which has in the past necessitated plant closings.

Virginia at this time has no specific geothermal policies and hopes to formulate them in order to avoid future conflicts regarding ownership. The Department of Geology, Virginia Polytechnic Institute and State University (hereafter referred to as VPI and SU), is currently studying geothermal potential in the Atlantic Coast Plain from New Jersey to Florida for the federal Department of Energy.

The National Conference of State Legislatures in its September report the Commission noted the following policy concerns relative to Virginia:

- A. Resource characterization: define the resource, clarify its legal status particularly in conjunction with existing water rights procedures; and assign ownership rights.
- B. Resource access: 1) land use planning and identification of appropriate areas for geothermal development; 2) entry rights for resource exploration on private and State lands; 3) development rights and 4) streamlined access procedure
- C. Field Development: necessary drilling controls; reservoir management procedures; resource allocation among competing interests; facility siting procedures; appropriate environmental regulation and streamline regulatory process.
- D. Marketing: clarification of utility issues and consideration of direct use market structures.
- E. Incentives: consideration of appropriate tax benefits, stimulation of investments and market expansion.

VPI and SU will sponsor a conference on geothermal energy in the Spring of 1979 to consider the problems and possibilities of this resource in the Commonwealth. The Subcommittee will continue to work with NCSL throughout 1979 with recommendation to the full Commission prior to the 1980 General Assembly. (See comments from Harden Lacy as Appendix II. for additional information.)

FUTURE OF VIRGINIA ENERGY OFFICE

The Subcommittee on the Future of the Virginia Energy Office met with Mr. George Jones and Mr. Boyd Johnson of that office to review the situation since the Virginia Energy Office was absorbed by the Office of Emergency Services. The merger was still new and it was difficult for the Subcommittee to evaluate the situation.

The Emergency Services and Disaster Law serves as the basis for the operation of the office with the Governor as director and Mr. Jones as coordinator. In the merger of the energy and emergency services functions in one office within State government there was a cost savings to the Commonwealth; no new personnel were added.

Mr. Jones noted that amendments to the current legislation were needed to clarify the role of Office of Emergency Services in terms of energy-related work. A separate energy act was at this time not advisable. The Commission concurred that at present this arrangement was acceptable and asked the staff to work with the Office of Emergency Services on amendments to Title 44 of the Code to clarify the location of energy-related matters within State government. Mr. Dunford will introduce this legislation in the 1979 Session of the General Assembly (see Appendix III).

CONSTITUTIONAL QUESTION ON TAX EXEMPTION

ON CERTAIN CONVERSION EQUIPMENT

Delegate Ward Teel chaired a subcommittee which investigated the possibility of a tax exemption for certain federally mandated conversion equipment at manufacturing sites or plants. The Assistant Attorney General assigned to the Department of Taxation stated that there was a constitutional question involved. The subcommittee also considered legislation to separate from the classification of machinery and tools equipment designated for energy conversion at industrial sites. A copy of Mr. McConnell's comments on this proposal are included as Appendices IV and V of this report, but they should not be construed as an Attorney General's opinion on the subject.

Mr. Teel will introduce legislation of the separate classification of energy conversion equipment as well as a resolution calling for a constitutional amendment to allow a locality at its option on exemption for the entire conversion costs at manufacturing plants or sites. Delegate Teel's proposed legislation is included in Appendices VI and VII.

COAL MARKETING, PURCHASES AND UTILIZATION

Delegate Dunford's Subcommittee's formulated a resolution encouraging the President of the United States, Congress and the Governor of the Commonwealth to assist in the resolution of the Norfolk and Western Railway strike which has had serious effects upon the marketability of Virginia's coal. A copy of this resolution is attached as Appendix VIII of this report.

Respectfully submitted,

J. Harry Michael, Jr., Chairman

C. Don Dunford, Vice Chairman

Peter K. Babalas

Edmond M. Boggs

Blaine Carter

Charles A. Christophersen

B. V. Cooper

J. Paul Councill, Jr.

Walter H. Emroch

Ernst W. Farley, Jr.

Jerry L. Fraley

Herbert O. Funsten

Joseph A. Johnson

Mark R. Kilduff

Harden Lacy

Louis Lawson

Fred W. Walker

W. Ward Teel

George F. Walker

W. Luke Witt

APPENDIX I

A BILL to amend the Code of Virginia by adding in Title 9 a chapter numbered 22.1, consisting of sections numbered 9-145.1 through 9-145.4, establishing the Virginia Coal and Energy Commission; allocation of funds.

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding in Title 9 a chapter numbered 22.1, consisting of sections numbered 9-145.1 through 9-145.4, as follows:

CHAPTER 22.1.

VIRGINIA COAL AND ENERGY COMMISSION.

§ 9-145.1. Commission established; agency assistance; powers and duties.—The Virginia Coal and Energy Commission is hereby established as a permanent agency of the Commonwealth and is hereafter referred to in this chapter as “Commission.” The Commission shall generally study all aspects of coal as an energy resource and shall study ways in which the Commonwealth can take action on energy related problems. All agencies of the State shall assist the Commission in its work. In addition to the aforementioned general powers, the Commission shall also perform the following functions:

A. Act in an advisory capacity to the Governor and executive branch agencies upon energy related matters;

B. Investigate and consider such questions and problems relating to the field of coal and energy utilization and alternative energy sources as may be submitted;

C. Make recommendations to the Governor and General Assembly on its own initiative;

D. Consult with applicable State agencies on all matters regarding energy conservation, including the promotion and implementation of initiatives for the public-at-large to conserve energy;

E. Endeavor to encourage research designed to further new and more extensive use of the coal and energy resources of the Commonwealth;

F. Effectively disseminate any such proposals to groups and organizations, both State and local, so as to stimulate local governing bodies and private business initiative in the field of energy related matters; and

G. Coordinate its efforts with those of the Virginia Solar Energy Center established pursuant to § 10-214 and the Virginia Center for Coal and Energy Research established pursuant to Article 2.01 of Chapter 11 of Title 23 (§ 23-135.7:1 et seq.) of the Code of Virginia.

§ 9-145.2. Membership; compensation.—A. The Commission shall consist of seventeen members, of whom five shall be appointed by the Committee on Privileges and Elections of the Senate from the membership of the Senate, five shall be appointed by the Speaker of the House of Delegates from the membership thereof and seven shall be appointed from the State at large by the Governor. The at-large appointees shall include representatives of industry, government and groups or organizations identified with coal and energy production and conservation.

B. The terms of office of the legislative members shall be coincident with their service in the house from which appointed; the appointees of the Governor shall serve for terms of four years and their successors shall be appointed for like terms, but vacancies occurring other than by expiration of term shall be filled for the unexpired term. Any member may be reappointed for successive terms.

C. The members of the Commission shall elect its own chairman annually.

D. Legislative members of the Commission shall receive such compensation as is set forth in § 14.1-18 and all members shall be reimbursed for their actual expenses incurred by them in the performance of their duties in the work of the Commission.

§ 9-145.3. Clerical and secretarial facilities; supplies; printing.—The Division of Legislative Services shall serve the Commission as its secretariat and central administrative office and shall furnish the Commission with such services as the Commission shall deem necessary.

§ 9-145.4. Annual report.—The Commission shall report its findings and recommendations to the Governor and the General Assembly on an annual basis.

2. That all unexpended funds remaining in the accounts of the Virginia Energy Study Commission and the Coal and Energy Commission are hereby transferred and allocated to the Virginia Coal and Energy Commission established pursuant to this act in order to effectuate the purposes contained herein.

APPENDIX II

Comments from Mr. Harden Lacy

Preface

Over the next year the Virginia Coal and Energy Commission will be engaged in a comprehensive review of Virginia's policy regarding the development of geothermal energy. This report is designed to give each Commission member a brief overview of geothermal energy, its potential as a practical energy resource, and some of the problems hampering its utilization. It is not an original work, but rather a compilation of extracts from recent sources touching on a variety of issues raised by the growing interest in the exploration of geothermal energy.

GEOTHERMAL ENERGY: AN OVERVIEW

I. RELEVANCE TO VIRGINIA

Both the U.S. Department of Energy (DOE) and the National Conference of State Legislatures (NCSL) have selected Virginia as a project state for geothermal policy formulation and resource development. The Virginia General Assembly and the NCSL will be working together through 1979 in a comprehensive review of state law and regulation affecting geothermal development in the state. The goal of this review is to "establish a legal and regulatory climate in Virginia that encourages development of geothermal resources while at the same time protects the state's interest in its natural resources."¹

Dr. John K. Costain, Dr. Lynn Glover and Dr. A. K. Sinha of the Department of Geological Science at Virginia Polytechnic Institute and State University (VPI and SU) will be conducting a study of geothermal potential in the Atlantic Coastal Plain from New Jersey to Florida for the DOE. A workshop on geothermal energy will be held at Virginia Tech in March 1979. Test drilling is scheduled to begin in June.

II. NATURE OF GEOTHERMAL ENERGY²

Geothermal energy, as the name implies, is the natural, internal heat of the earth. Transported to the surface, this heat may be economically applied for a variety of uses, including electric generation, heating and cooling of buildings, commercial heat-processing and in agricultural cropdrying, greenhouses and soil heating.

The source of geothermal energy is the earth's molten core where temperatures in excess of 1,000 degrees centigrade (1,832 degrees Fahrenheit) are reached as the result of:

- 1) natural decay of radioactive core materials
- 2) frictional forces resulting from
 - a) solar and lunar tides and
 - b) relative motion of crustal "plates" which form the bases of the continents.

Most of this energy is located too far below the earth's surface to be extracted economically with present technology. In some locations, however, special geological conditions have created pressures and heat much higher than ordinarily found at that depth. These "hot spots," known as geothermal reservoirs are usually found in regions of recent (on the geological time scale) volcanic and mountain-building activity.

The reservoirs are formed when magma, a mixture of molten rock and gases, penetrates into the Earth's crust from the underlying mantle. When the magma penetrates to the surface, it erupts in a volcano. But when the penetration stops short of the surface, the trapped magma heats rocks near the surface and local hot spots or geothermal reservoirs are created. In these areas of concentrated geothermal energy, temperatures of 65 degrees - 343 degrees Centigrade (150 degrees -

650 degrees Fahrenheit) occur at depths of less than two miles and can feasibly be tapped.

Geothermal reservoirs are categorized on the basis of the form in which the energy is found as either:

- 1) Dry steam (vapor dominated) systems
- 2) Wet steam and water (hot water) systems
- 3) Hot, dry rock systems.

A. Dry Steam (Vapor Dominated) Systems

The most desirable, but, unfortunately, the rarest form of geothermal reservoir is the dry steam system. In this system the energy is found in the form of superheated steam that contains minor amounts of boron, carbon dioxide, hydrogen, methane, nitrogen, hydrogen sulfide and ammonia but little or no liquid water. The energy is tapped with relative ease by drilling a well into the reservoir and allowing the superheated and pressurized steam to flow through appropriate pipes to a nearby turbine.

Since the dry steam systems is the easiest to work with, it was the first to be commercialized. The first successful operation began in 1904 at Larderello, Italy, and is still producing electricity (at an output of 365 megawatts in 1975). Exploitation of a dry steam reservoir in the U.S. began in 1960 at The Geysers field in Sonoma County, California, 80 miles north of San Francisco. By 1980, an estimated output of 1180 megawatts will be achieved, enough to supply the electricity demand for a city the size of San Francisco. Other dry steam reservoir fields are under development in Japan and New Zealand.

While the occurrence of the dry steam reservoir is rare, two other categories of geothermal reservoirs are plentiful: wet steams and hot dry rock. Unfortunately neither is so easily extracted or utilized as the dry steam system.

B. Wet Steam and Water (Hot Water) Systems

The energy of the wet steam and water system is in the form of water confined under pressure and heated. When brought to the surface and exposed to normal atmospheric pressure, it boils rapidly (flashes) and a mixture of steam and hot water results. The combination of wet steam and water produced can be utilized as direct heat for various purposes such as space heating or the steam alone can be used to run a turbine to generate electricity.

This type of reservoir generally yields a saline water, and at higher temperatures, a highly concentrated and corrosive brine. The brine can clog up drill holes or eat out machinery in days and poses a substantial disposal problem. In spite of these drawbacks, wet steam and hot water geothermal systems are currently used in New Zealand and Mexico to generate electricity and in Hungary, Iceland and the Soviet Union for direct heat. Most known geothermal reservoirs in the U.S. are of this variety.³

C. Hot Dry Rock Systems

Most geothermal heat deposits located near the earth's surface never come in contact with underground water and therefore do not contain steam or hot water. These thermal deposits, or hot, dry rock systems, are thought to constitute an energy resource at least 10 times larger than the total of all dry steam and wet steam hot water systems.

The most commonly considered method of tapping this form of geothermal energy is by combining drilling and hydrofracturing. By this method, one hole is first drilled into a suitable geothermal deposit having a temperature of at least 300 degrees Centigrade (572 degrees Fahrenheit). Water is pumped through this hole at a pressure of about 7000 lbs. per square inch, causing large cracks in the deposit (hydrofracturing). Once the cracks are formed, a second hole is drilled into the deposit at its uppermost level, thus completing a fluid loop.⁴ Cool water injected through the first hole is heated and returned to the surface via the second hole where the captured heat would be released.

III. Environmental Impact of Geothermal Development⁵

From an environmental standpoint, geothermal development offers a number of positive aspects:

- 1) Unlike fossil-fueled plants, geothermal energy produces no particular air pollution;
- 2) Geothermal energy does not require the mining, transporting, handling or consumption of any fuels;
- 3) Geothermal energy generates no radioactive wastes such as those from fission reactor power plants; and
- 4) No supplemental cooling water is needed to run geothermal plants.

Development is not, however, devoid of potential environmental problems:

1) Water drawn from U. S. geothermal reservoirs contains very high levels of salt and dissolved and suspended minerals. Disposal could present chemical water pollution problems. Potential partial solution to this environmental threat are found in desalination, although the problem of brine disposal from the desalination process still remains. Another possible partial solution is the commercial extraction of minerals from the geothermal fluid. The briny, high-mineral water could also be reinjected into the earth and, in some cases, this may even prove a necessity to prevent the sinking of the earth's surface where large quantities of water are extracted. However, some scientists fear that reinjection could produce earthquakes.

2) Small amounts of noncondensable and sometimes objectionable gases are associated with the steam obtained from geothermal sources. Hydrogen sulfide (H₂S) is the most objectionable component because of its unpleasant odor and its toxicity. The odor can be detected when the gas is in concentrations as low as 0.025 parts per million.

3) The possibility of land subsidence (settling) exists when large amounts of water or other liquids are removed from beneath the ground. This phenomenon has occurred in New Zealand.

4) Nearly all the cooling methods being considered for geothermal plants release waste heat into the atmosphere.

5) There is always the possibility of a well blow out, which has already occurred in the early production wells at Carro Prieto, Mexico.

6) A typical geothermal field and power plant require more land area than an equivalent nuclear or fossil-fueled plant.

7) Aesthetic intrusion on the environment threatens in the possible use of above ground insulated pipes for transporting steam and water.

8) Noise pollution is also a problem. The blast emanating when the steam is periodically vented from the pipes is deafening, even with the installation of gigantic mufflers.

IV. TECHNOLOGICAL AND DEVELOPMENTAL

ASPECTS OF GEOTHERMAL ENERGY⁶

Scientists and technicians, in an effort to hasten the significant exploitation of geothermal energy, are tackling a variety of technological and developmental problems related to:

- 1) locating geothermal resources;
- 2) drilling the wells;
- 3) efficiency; and

4) coping economically with salts and minerals which corrode and gum up equipment and pollute the environment.

A. Locating Geothermal Resources.

Although geothermal energy has been used as a power source since the turn of the century, no one has developed a sure-fire technique to find geothermal reservoirs. The best method has been to look for erupting steam geysers or hot water leaks on the earth's surface. Geothermal explorers have concentrated their search in areas that have dormant volcanoes or lie along geological faults. In these regions, the prospects are good that molten rock has pressed up near the earth's crust. Although expensive, drilling remains the most common way to find geothermal wells. Some researchers consider infra red technology to be a promising new technique. Others think better results can be provided by analyzing water chemistry for its silica content or measuring the electrical conductivity of rock structures.

B. Drilling Dry Wells.

Further research and development of deep-drilling methods is perhaps the most pressing need. Geothermal drilling is anywhere from two to three times more expensive than gas and oil well costs, a difference attributable in part to the relative hardness of the ground above geothermal reservoirs. In addition, drilling technology does not exist for depths much beyond 30,000 feet.

A deep drilling method developed several years ago showed initial promise. In 1972, researchers at the University of California's Los Alamos Laboratory devised a new rock-melting technique to drill a well to reach dry rock areas in California's Imperial Valley. Since then, however, they have decided that conventional oil-well drilling techniques would be just as economical and equally efficient.

C. Efficiency.

Geothermal systems have relatively low efficiency per BTU of waste heat and much of the theoretical power output of geothermal reservoirs is lost between the well and the point of utilization. For example, a great deal of the potential energy in the wet steam and water system is lost as the hot, pressurized liquid flashes into steam at some point down the well. In order to boost power output, researchers are beginning a down-hole pump that would keep the geothermal brine from boiling until it reaches the point of utilization.

Another area of heat loss is the heat exchanger system. This system which is designed to keep the corrosive brine out of contact with machinery, transfers the heat of the geothermal fluid to isobutane which, in turn, drives the machinery. New technology is needed to make the system work efficiently without the present loss of heat in the transfer step.

D. Dealing with Corrosion, Caking and Pollution

Finally the corrosive and caking properties of the brine with its dissolved and suspended minerals must be dealt with either through efficient heat exchanger systems which keep the geothermal fluid and the machinery separated or through the use of caking-and-corrosion-resistant pump and machinery parts.

Technological advancements are also needed to cope with the various threats geothermal development poses to the environment.

V. Policy and Legal Considerations

The fundamental legal and policy problems associated with geothermal development stem primarily from an inability to identify exactly what geothermal resources are. Geothermal energy does not readily fit existing resource categories. It has been described at various times as water, gas and a hard mineral. No precise classification of geothermal resources has as yet been reached.

Two major issues remain unresolved as a result of the failure to cope with the question of exactly what geothermal resources are:

1) Who owns geothermal resources?

2) What rules will govern the exploitation of geothermal resources?

A. Ownership.

Distinct legal traditions surround the ownership of minerals, surface water and ground water on both a federal and State level. So, depending on the existing resource category into which geothermal resources are placed, certain ready-made institutional consequences attach whether they are appropriate or not.

The pitfalls of turning to existing resource categories for guidance regarding the question of ownership can be easily illustrated. Rights to surface water, for example, are generally determined by State law. In the arid states of the west, surface water law is based on appropriative tradition whereas in the eastern states, including Virginia, where water is more abundant, surface water rights are based on riparian ownership. Ground water, on the other hand, which is also dependent of state law, generally is owned by the surface owner subject to certain restrictions such as equitable apportionment which prevents one surface owner from exploiting a groundwater reservoir to the prejudice of neighboring landowners who share the same reservoir. Water, in one form or another, is usually associated with geothermal resources. Should this subject these resources to either surface or ground water law? Or is geothermal energy to be governed by laws applicable to mineral resources?

Congress dodged the question of categorization in passing the Geothermal Steam Act of 1970. The Act established a leasing system whereby individuals, including local and state government units could lease federal lands for the purpose of producing geothermal resources. But Congress failed to declare whether geothermal resources were included in reservations of mineral rights which were attached to patents passing title to public domain lands to individuals.

These illustrations point to a fundamental problem in achieving a rational geothermal resource development policy. Geothermal resources may wind up being governed by a legal regime which has been determined primarily by categorizing the resource rather than by attempting to formulate a regime which is most appropriate to the resource itself. The fact that geothermal resources may contain primarily meteoric or magmatic water should not bear on whether water or mineral law should govern ownership and disposition of geothermal energy. Rather, the relationship of the resource to the surrounding environment and the special requirements of developing the resources should determine what legal regime should govern geothermal resources.

B. Management.

The history of petroleum exploitation is convincing evidence of the need for advance planning of management institutions for geothermal resource development. For a long period the rule of capture characterized petroleum exploitation in the U. S. In its simplest formulation, their rule decrees that an exploiter is entitled to whatever oil he can reduce to his possession regardless of the fact that the reservoir he has tapped may be subject to exploitation by others. Only recently has the concept of coordinated reservoir-wide management tempered the rule of capture.

On the federal level, the regulations proposed by the Department of Interior to implement the Geothermal Steam Act of 1970 constitute an attempt to manage geothermal resource development on federal lands in a comprehensive manner.

State efforts to establish comprehensive development and regulatory schemes for exploitation of geothermal resources have been sparse. With respect to Virginia, the National Conference of State Legislatures and our own committee will be working jointly over the next year in a comprehensive state policy review. The review will be of broad scope, addressing areas such as ownership and appropriation of geothermal resources, field development and pollution control, financing, taxation power of eminent domain and utility franchise authorization. Successful completion of this joint project should lead to the formulation of a legal and policy position specifically suitable to the character of geothermal energy.

FOOTNOTES

- ¹Letter from Rutherford C. Harris, Director, NCSL's Geothermal Policy Project, to Senator J. Harry Michael, Chairman, Virginia Coal and Energy Commission, dated June 15, 1978, regarding Virginia's selection as a project state in the NCSL's Geothermal Policy Project.
- ²Material in this section was extracted from: Wilson Clark, *Energy for Survival* , (1974), pp. 322-326; and H. Stephen Stoker, et al, *Energy* , (1975), pp. 251-258.
- ³Donald R. Allen, "Legal and Policy Aspects of Geothermal Resource Development", *Water Resources Bulletin* , (April 1972), p. 251.
- ⁴Another method of hydrofracturing thought "technically feasible" is the detonation of nuclear explosives at the desired level to provide the necessary channel between the first and second wells. Clark, *supra* at p. 251, indicates the radioactive hazards can be avoided by using a closed recirculation system. He also notes that the depth at which the hot rock is found would permit the nuclear explosion to be contained.
- ⁵Material in this section was extracted from: Clark, *supra* , pp. 327-330 and Stoker, et al, *supra* , pp. 258-260.
- ⁶Material in this section was extracted from: Clark, *supra* , p. 329; John F. Henahan, "Geothermal Energy," *Popular Science* (Nov. 1974), pp. 96-99, 142, 143; and "The Potential for Geothermal Power," *Business Week* , (March 17, 1973), pp. 74, 75.
- ⁷Material in this section was extracted from: Donald R. Allen, "Legal and Policy Aspects of Geothermal Resources Development", *Water Resources Bulletin* , (April 1972), pp. 250-256.

APPENDIX III

A BILL to amend and reenact §§ 2.1-51.24, 44-146.13, 44-146.14, 44-146.16, 44-146.17, 44-146.18, 44-146.19, 44-146.21, 44-146.23, 44-146.24, 44-146.25 and 44-146.26 of the Code of Virginia, relating to powers and duties of the Office of Emergency Services.

Be it enacted by the General Assembly of Virginia:

1. That §§ 2.1-51.24, 44-146.13, 44-146.14, 44-146.16, 44-146.17, 44-146.18, 44-146.19, 44-146.21, 44-146.23, 44-146.24, 44-146.25 and 44-146.26 of the Code of Virginia are amended and reenacted as follows:

§ 2.1-51.24. Agencies for which responsible.—The Secretary of Transportation shall be responsible to the Governor for the following agencies: Department of Highways and Transportation, Virginia Airports Authority, Virginia Port Authority, Division of Motor Vehicles, *the Office of Emergency and Energy Services* and Department of Transportation Safety. The Governor may, by executive order, assign any other State executive agency to the Secretary of Transportation, or reassign any agency listed above to another secretary.

§ 44-146.13. Short title.—This chapter may be cited as the “Commonwealth of Virginia Emergency and Energy Services and Disaster Law of 1973.”

§ 44-146.14. Findings of General Assembly.—(a) Because of the ever present possibility of the occurrence of disasters of unprecedented size and destructiveness resulting from enemy attack, sabotage or other hostile action, resource shortage, or from fire, flood, earthquake, or other natural causes, and in order to insure that preparations of the State and its political subdivisions will be adequate to deal with such emergencies, and generally to provide for the common defense and to protect the public peace, health, and safety, and to preserve the lives and property and economic well-being of the people of the State, it is hereby found and declared to be necessary and to be the purpose of this chapter:

(1) To create a State Office of Emergency *and Energy Services*, and to authorize the creation of local organizations for emergency *and energy* services in the political subdivisions of the State;

(2) To confer upon the Governor and upon the executive heads or governing bodies of the political subdivisions of the State emergency powers provided herein;

(3) To provide for rendering of mutual aid among the political subdivisions of the State and with other states and to cooperate with the federal government with respect to the carrying out of emergency *and energy* service functions.

(b) It is further declared to be the purpose of this chapter and the policy of the State that all emergency *and energy* service functions of the State be coordinated to the maximum extent possible with the comparable functions of the federal government, other states, and private agencies of every type, and that the Governor shall be empowered to provide for enforcement by the State of national emergency ~~services~~ *service and energy* programs, to the end that the most effective preparation and use may be made of the nation’s resources and facilities for dealing with any disaster that may occur.

§ 44-146.16. Definitions.—As used in this chapter unless the context requires a different meaning:

(1) “Natural disaster” means any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, earthquake, drought, fire or other natural catastrophe resulting in damage, hardship, suffering or possible loss of life;

(2) “Man-made disaster” means any condition following an attack by any enemy or foreign nation upon the United States resulting in substantial damage of property or injury to persons in the United States and may be by use of bombs, missiles, shell fire, nuclear, radiological, chemical or biological means or other weapons or by overt paramilitary actions; also any industrial, nuclear or transportation accident, explosion, conflagration, power failure, resources shortage or other condition such as sabotage, oil spills and other injurious environmental contaminations, which threaten or cause damage to property, human suffering, hardship or loss of life;

(3) "Emergency services" means the preparation for and the carrying out of functions, other than functions for which military forces are primarily responsible, to prevent, minimize and repair injury and damage resulting from natural or man-made disasters; together with all other activities necessary or incidental to the preparation for and carrying out of the foregoing functions. These functions include, without limitation, fire-fighting services, police services, medical and health services, rescue, engineering, ~~air raid warning services~~, communications, radiological, chemical and other special weapons defense, evacuation of persons from stricken areas, emergency welfare services, emergency transportation, emergency resource management, existing or properly assigned functions of plant protection, temporary restoration of public utility services, *the administration of approved State and federal disaster recovery and assistance programs*, and other functions related to civilian protection;

(4) "Major disaster" means any natural or man-made disaster in any part of the United States, which, in the determination of the President of the United States is, or thereafter determined to be, of sufficient severity and magnitude to warrant disaster assistance above and beyond emergency services by the federal government to supplement the efforts and available resources of the several states, local governments, and relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby and is so declared by him;

(5) "State of emergency" means the condition declared by the Governor when in his judgment, the threat or actual occurrence of a disaster in any part of the State is of sufficient severity and magnitude to warrant disaster assistance by the State to supplement the efforts and available resources of the several localities, and relief organizations in preventing or alleviating the damage, loss, hardship, or suffering threatened or caused thereby and is so declared by him; when it is evident that the resources of the State are adequate to cope with such disasters;

(6) "Local emergency" means the condition declared by the local governing body when in their judgment the threat or actual occurrence of a disaster is or threatens to be of sufficient severity and magnitude to warrant coordinated local government action to prevent or alleviate the damage, loss, hardship or suffering threatened or caused thereby; provided, however, that a local emergency arising wholly or substantially out of a resource shortage may be declared only by the Governor, upon petition of the local governing body, when he deems the threat or actual occurrence of a disaster to be of sufficient severity and magnitude to warrant coordinated local government action to prevent or alleviate the damage, loss, hardship or suffering threatened or caused thereby; provided, however, nothing in this chapter shall be construed as prohibiting a local governing body from the prudent management of its water supply, in the absence of a declared state of emergency, to prevent a water shortage;

(7) "Local emergency organization" means an organization created in accordance with the provisions of this chapter by local authority to perform local emergency service functions;

(8) "Political subdivision" means any city or county in the State and for the purposes of this chapter any town of more than five thousand population which chooses to have an emergency services program separate from that of the county in which such town is located;

(9) "Interjurisdictional agency for emergency services" is any organization established between contiguous political subdivisions to facilitate the cooperation and protection of the subdivisions in the work of disaster prevention, preparedness, response, and recovery;

(10) "Resource shortage" means the absence, unavailability or reduced supply of any raw or processed natural resource, or any commodities, goods or services of any kind which bear a substantial relationship to the health, safety, welfare and economic well-being of the citizens of the Commonwealth.

§ 44-146.17. Powers and duties of Governor.—The Governor shall be Director of Emergency *and Energy Services*. He shall take such action from time to time as is necessary for the adequate promotion and coordination of State and local civilian activities relating to the safety and welfare of the State in time of natural or man-made disasters.

The Governor shall have, in addition to his powers hereinafter or elsewhere prescribed by law, the following powers and duties:

(1) To proclaim and publish such rules and regulations and to issue such orders as may, in his judgment, be necessary to accomplish the purposes of this chapter including, but not limited to such measures as are in his judgment required to control, restrict, allocate or regulate the use, sale, production and distribution of food, fuel, clothing and other commodities, materials, goods, services and resources under any State or federal emergency services programs. Executive orders shall have the force and effect of law and the violation thereof shall be punishable as a misdemeanor in every case where the executive order declares that its violation shall have such force and effect;

(2) To appoint a State Coordinator of Emergency *and Energy* Services and authorize the appointment or employment of other personnel as is necessary to carry out the provisions of this chapter, and to remove, in his discretion, any and all persons serving hereunder;

(3) To procure supplies and equipment, to institute training programs and public information programs, and to take all other preparatory steps including the partial or full mobilization of emergency service organizations in advance of actual disaster, to insure the furnishing of adequately trained and equipped forces in time of need;

(4) To make such studies and surveys of industries, resources, and facilities in the State as may be necessary to ascertain the capabilities of the State and to plan for the most efficient emergency use thereof;

(5) On behalf of the State enter into mutual aid arrangements with other states and to coordinate mutual aid plans between political subdivisions of the State;

(6) To delegate any administrative authority vested in him under this chapter, and to provide for the subdelegation of any such authority;

(7) Whenever, in the opinion of the Governor, the safety and welfare of the people of the State requires the exercise of emergency measures due to a threatened or actual disaster, he may declare a State emergency or state of emergency to exist;

(8) When necessary, to request predisaster federal assistance or the declaration of a major disaster and certify the need for federal disaster assistance and to give assurance of the expenditure of a reasonable amount of funds of the State, its local governments, or other agencies for alleviating the damage, loss, hardship, or suffering resulting from the disaster.

§ 44-146.18. Office of Emergency and Energy Services established; administration and operational control; coordinator and other personnel; powers and duties.—(a) The State Office of Emergency *and Energy* Services is hereby established and shall be the responsibility of the Secretary of Transportation ~~and Public Safety~~ for normal administrative functions. However, during a ~~declared~~ *an* emergency this office shall revert to the operational control of the Governor. The office shall have a coordinator who shall be appointed by and serve at the pleasure of the Governor and also serve as State Emergency Planning Director. The office shall employ the professional, technical, secretarial, and clerical employees necessary for the performance of its functions.

(b) The State Office of Emergency *and Energy* Services shall in the administration of disaster preparedness programs:

(1) Promulgate plans and programs which are conducive to adequate disaster preparedness;

(2) Prepare and maintain a State Emergency Operations Plan relating to man-made and natural disaster concerns;

(3) Coordinate and administer preparedness plans and programs with the proponent federal, State and local government agencies and relating groups;

(4) Provide guidance and assistance to State agencies and units of local government in designing emergency programs and plans;

(5) Make necessary recommendations to agencies of the federal, State, or local governments on preventive and preparedness measures designed to eliminate or reduce disasters and their impact;

(6) Determine requirements of the State and its political subdivisions for those necessities needed in the event of a declared emergency which are not otherwise readily available;

(7) Assist State agencies and political subdivisions in establishing and operating training programs and programs of public information;

(8) Promulgate, prepare, maintain or coordinate emergency resource management plans and programs with federal, State and local government agencies and related groups, and make such surveys of industries, resources, and facilities within the State, both public and private, as are necessary to carry out the purposes of this chapter;

(9) Coordinate with the federal government and any public or private agency or entity in achieving any purpose of this chapter and in implementing programs for disaster prevention, mitigation, preparation, response, and recovery.

(c) The State Office of Emergency *and Energy* Services shall during a period of declared emergency be responsible for:

(1) The receipt, evaluation, and dissemination of intelligence pertaining to an impending or actual disaster;

(2) Providing adequate facilities for State agencies for conduct of disaster operations;

(3) Providing an adequate communications and warning system capable of notifying all political subdivisions in the State of an impending disaster within a reasonable time;

(4) Establishing and maintaining liaison with affected political subdivisions;

(5) Determining requirements for *recovery* assistance and disaster relief;

(6) Coordinating disaster response actions of federal and State agencies;

(7) Providing guidance and assistance to affected political subdivisions to insure orderly and timely recovery from disaster effects.

(c1) The State Office of Emergency and Energy Services shall in the administration of State energy programs:

(1) Prepare and maintain a comprehensive State Energy Plan;

(2) Administer the State Set-Aside program for petroleum products pursuant to the regulations of the federal Department of Energy;

(3) Manage the State Emergency Fuel Oil Reserve Program and its facilities at Cheatham Annex, Yorktown, Virginia;

(4) Coordinate State activities as required to support federal contingency plans for gasoline rationing;

(5) Operate and maintain the Virginia Solar Energy Center;

(6) Promulgate and coordinate the implementation of State energy conservation programs;

(7) Coordinate energy-related activities between agencies of the federal, State, county, and municipal governments;

(8) Encourage cooperative efforts by and among Virginia businesses, industry, utilities, the academic community, State, local, and federal governments, and private institutions to develop conservation programs and sources of energy; and

(9) Perform such other related functions as the Governor may assign.

(d) The State Office of Emergency *and Energy* Services shall be provided the necessary facilities and equipment needed to perform its normal day to day activities and coordinate disaster related activities of the various federal, State, and other agencies during periods of declared emergency.

§ 44-146.19. Powers and duties of political subdivisions.—(a) Each political subdivision within the State shall be within the jurisdiction of and served by the Office of Emergency *and Energy* Services and be responsible for local disaster preparedness ~~and coordination of response~~, *coordination of disaster response, recovery, and energy-related activities*. Each political subdivision may maintain in accordance with State emergency preparedness *and energy* plans and programs an agency of emergency *and energy* services which, except as otherwise provided under this chapter, has jurisdiction over and services the entire political subdivision.

(b) Each political subdivision shall have a director of emergency *and energy* services who, after the term of the person presently serving in this capacity has expired and in the absence of an executive order by the Governor, shall be the following:

(1) In the case of a city, the mayor or city manager, who shall have the authority to appoint a coordinator of emergency *and energy* services activities with consent of council;

(2) Notwithstanding the provisions of § 15.1-50 of the Code of Virginia, in the case of a county, a member of the board of supervisors selected by the board or the chief administrative officer for the county, who shall have the authority to appoint a coordinator of emergency *and energy* services activities with the consent of the governing body;

(3) A coordinator of emergency services may be appointed by the council of any town to insure integration of its organization into the county emergency *and energy* services organization;

(4) In the case of towns with a population in excess of five thousand having an emergency services organization separate from that of the county, the mayor or town manager shall have the authority to appoint a coordinator of emergency *and energy* services with consent of council.

(c) Whenever the Governor has declared a state of emergency, each political subdivision within the disaster area may, under the supervision and control of the Governor or his designated representative, enter into contracts and incur obligations necessary to combat such threatened or actual disaster, protect the health and safety of persons and property and provide emergency assistance to the victims of such disaster. In exercising the powers vested under this section, under the supervision and control of the Governor, the political subdivision may proceed without regard to time-consuming procedures and formalities prescribed by law (except mandatory constitutional requirements) pertaining to the performance of public work, entering into contracts, incurring of obligations, employment of temporary workers, rental of equipment, purchase of supplies and materials, levying of taxes, and appropriation and expenditure of public funds.

(d) The director of each local organization for emergency *and energy* services may, in collaboration with other public and private agencies within this State, develop or cause to be developed mutual aid arrangements for reciprocal assistance in case of a disaster too great to be dealt with unassisted. Such arrangements shall be consistent with State plans and programs and it shall be the duty of each local organization for emergency services to render assistance in accordance with the provisions of such mutual aid arrangements.

(e) Each local and interjurisdictional agency shall prepare and keep current a local or interjurisdictional emergency operations plan for its area. The plan shall include, but not be limited to, responsibilities of all local agencies and shall establish a chain of command. Each political subdivision having a nuclear power station or other nuclear facility within ten miles of its boundaries shall, if so directed by the Office of Emergency Services, prepare and keep current an appropriate emergency plan for its area for response to nuclear accidents at such station or facility.

§ 44-146.21. Declaration of local emergency.—(a) A local emergency may be declared by the local director of emergency *and energy* services with the consent of the governing body of the political subdivision. In the event the governing body cannot convene due to the disaster, the director or any member of the governing body in the absence of the director may declare the existence of a local disaster, subject to confirmation by the entire governing body at a special

meeting within five days of the declaration. The governing body when in its judgment all emergency actions have been taken, shall take appropriate action to end the declared emergency.

(b) A declaration of a local emergency as defined in § 44-146.16 (6) shall activate the response and recovery programs of all applicable local and interjurisdictional emergency operations plans and authorize the furnishing of aid and assistance thereunder.

(c) [Repealed.]

(c1) Whenever a local emergency has been declared, the director of emergency *and energy* services of each political subdivision or any member of the governing body in the absence of the director, if so authorized by the governing body, may enter into contracts and incur obligations necessary to combat such threatened or actual disaster, protect the health and safety of persons and property and provide emergency assistance to the victims of such disaster. In exercising the powers vested under this section, under the supervision and control of the governing body, such director may proceed without regard to time-consuming procedures and formalities prescribed by law (except mandatory constitutional requirements) pertaining to the performance of public work, entering into contracts, incurring of obligations, employment of temporary workers, rental of equipment, purchase of supplies and materials, and other expenditures of public funds, provided such funds in excess of appropriations in the current approved budget, unobligated, are available. Whenever the Governor has declared a state of emergency, each political subdivision within the disaster area may, under the supervision and control of the Governor or his designated representative, enter into contracts and incur obligations necessary to combat such threatened or actual disaster beyond the capabilities of local government, protect the health and safety of persons and property and provide emergency assistance to the victims of such disaster. In exercising the powers vested under this section, under the supervision and control of the Governor, the political subdivision may proceed without regard to time-consuming procedures and formalities prescribed by law pertaining to public work, entering into contracts, incurring of obligations, employment of temporary workers, rental of equipment, purchase of supplies and materials, levying of taxes, and appropriation and expenditure of public funds.

(d) No interjurisdictional agency or official thereof may declare a local emergency. However, an interjurisdictional agency of emergency services shall provide aid and services to the affected political subdivision authorizing such assistance in accordance with the agreement as a result of a local or State declaration.

§ 44-146.23. Immunity from liability.—(a) Neither the State, nor any political subdivision thereof, nor federal agencies, nor other public or private agencies, nor, except in cases of willful misconduct, public or private employees, nor representatives of any of them, engaged in any ~~disaster~~ *emergency* services activities, while complying with or attempting to comply with this chapter or any rule, regulation, or executive order promulgated pursuant to the provisions of this chapter, shall be liable for the death of, or any injury to, persons or damage to property as a result of such activities. The provisions of this section shall not affect the right of any person to receive benefits to which he would otherwise be entitled under this chapter, or under the Workmen's Compensation Law, or under any pension law, nor the right of any such person to receive any benefits or compensation under any act of Congress.

(b) Any person owning or controlling real estate or other premises who voluntarily and without compensation grants a license or privilege, or otherwise permits the designation or use of the whole or any part or parts of such real estate or premises for the purpose of sheltering persons, of emergency access or of other uses relating to emergency services shall, together with his successors in interest, if any, not be liable for negligently causing the death of, or injury to any person on or about such real estate or premises or for loss of or damage to the property of any person on or about such real estate or premises during such actual or impending disaster.

(c) If any person holds a license, certificate, or other permit issued by any state, or political subdivision thereof, evidencing the meeting of qualifications for professional, mechanical, or other skills, the person may gratuitously render aid involving that skill in this State during a disaster, and such person shall not be liable for negligently causing the death of, or injury to, any person or for the loss of, or damage to, the property of any person resulting from such gratuitous service.

(d) No person, firm or corporation which gratuitously services or repairs any electronic devices or equipment under the provisions of this section after having been approved for the purposes by

the State Coordinator shall be liable for negligently causing the death of, or injury to, any person or for the loss of, or damage to, the property of any person resulting from any defect or imperfection in any such device or equipment so gratuitously serviced or repaired.

§ 44-146.24. Cooperation of public agencies.—In carrying out the provisions of the chapter, the Governor, the heads of State agencies, the local directors and governing bodies of the political subdivisions of the State are directed to utilize the services, equipment, supplies and facilities of existing departments, offices, and agencies of the State and the political subdivisions thereof to the maximum extent practicable. The officers and personnel of all such departments, offices, and agencies are directed to cooperate with and extend such services and facilities to the Governor and to the State Office of Emergency *and Energy* Services upon request.

§ 44-146.25. Certain persons not to be employed or associated in emergency services organizations; loyalty oath required.—No person shall be employed or associated in any emergency services organization established under this chapter who advocates or has advocated a change by force or violence in the constitutional form of government of the United States or in this State or the overthrow of any government in the United States by force, or violence, or who has been convicted of, or is under indictment or information charging any subversive act against the United States. Each person who is appointed to serve in an organization for emergency *and energy* services shall, before entering upon his duties, take an oath, in writing, before a person authorized to administer oaths in this State, which shall be substantially as follows:

“I..... do solemnly swear (or affirm) that I will support and defend the Constitution of the United States and the Constitution of the Commonwealth of Virginia, against all enemies foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties upon which I am about to enter. “

~~“And I do further swear (or affirm) that I do not advocate, nor am I a member of any political party or organization that advocates the overthrow of the Government of the United States or of this State by force or violence and that during such time as I am a member of the (name of emergency services organization), I will not advocate, nor become a member of any political party or organization that advocates the overthrow of the Government of the United States or of this State by force or violence.”~~

§ 44-146.26. Duties of emergency and energy services organizations.—It shall be the duty of every organization for emergency *and energy* services established pursuant to this chapter and of the officers thereof to execute and enforce such orders, rules and regulations as may be made by the Governor under authority of this chapter. Each organization shall have available for inspection at its office all such orders, rules and regulations.

APPENDIX IV

John G. MacConnell, Assistant Attorney General

Tax Exemptability of Certain Federally Mandated Conversion Equipment

You have asked whether Article X, Section 6, of the Virginia Constitution (1971) would permit the General Assembly to enact legislation exempting certain oil and natural gasburning equipment, which must be converted to coal pursuant to Federal Energy Administration directives, from local taxation.

Any such legislation is affected by three provisions of Article X, Section 6, of the Constitution. First, Section 6(a) states that all property, except as *specifically* provided, shall be taxed. Second, Section 6(f) states that “[e]xemptions of property from taxation as established or authorized hereby shall be strictly construed.” Third, Section 6(d) permits the General Assembly to exempt from taxation “any property, including real or personal property, equipment, facilities, or devices, used primarily for the purpose of abating or preventing pollution of the atmosphere or waters of the Commonwealth.”

The exemption permitted by Section 6(d) must be interpreted in the context of both Section 6(a) and Section 6(f). The words “used primarily for the purpose of abating or preventing pollution” are clearly intended to limit the scope of the exemption to be allowed. The word primarily means “of first importance or principally,” and is construed by the Sales and Use Tax Division of the Department of Taxation to mean more than 50%. Therefore, that a piece of equipment or property has some relationship to the prevention or abatement of air or water pollution is not enough; it must be determined whether such equipment is used primarily for the favored, exempt purpose.

A reading of the *Report of the Virginia Coal and Energy Commission* and of some of the Commission’s minutes indicates that the primary scope of the conversion equipment involved is to run the powerplants of the seven industries subject to the FEA directive. Only secondarily involved is certain equipment incorporated into the powerplants for the purpose of meeting State and federal pollution abatement standards. Section 6(f) cannot be read so broadly as to exempt this kind of property from taxation. At best, legislation could be drafted exempting those portions of the powerplant clearly utilized for pollution control purposes, and required by State and federal regulations, such as mechanical dust collectors, high efficiency electrostatic precipitators, and flue gas desulphurization equipment (“scrubbers”). I do not know what portion of the total conversion costs this equipment represents; however, the exemption that could be provided would not match the relief requested.

Finally, page 7 of the Commission’s Report contains the following recommendations:

“B. That legislation be introduced in the 1978 General Assembly to ease the burden of industry conversion from oil and natural gas to coal *through exemptions on capital value* required for conversion from taxation (with a local option). For example, if it were necessary for an industry to spend \$15,000.00 for conversion from oil or natural gas to coal, than this non income-productive capital should not be subject to assessment for tax purposes.” [Emphasis added.]

The particular relief requested, “exemptions on capital value required for conversion,” is rather amorphous; that is, it is difficult to determine exactly what is being sought and equally difficult to refine the relief to be provided to match the problem posited.

Therefore, I suppose that the overall conclusion I have reached is the same as expressed by Mrs. Warthen and Senator Michael; to provide the relief requested, a constitutional amendment will be necessary.

I have retained the research materials you were kind enough to send over here; if they represent your only copies, I will return them. If you have any questions, please let me know. I must end with the statement that the views I have expressed are my own, and not those of the Attorney General or the Department of Taxation.

APPENDIX V

Statement to Mrs. Sally T. Warthen from John G. MacConnell, Assistant Attorney General

I apologize for bothering you at home, but I have been asked to look at some legislation and it seems 1.) that you may have already researched the area and 2.) that Senator Michael may not trust my conclusions as to its constitutionality without your concurrence. Enclosed are copies of a proposed resolution and proposed legislation dealing with the exemption or partial exemption of "energy conversion" equipment.

I believe that the constitutional amendment is overly broad for the purposes it is intended, that is, it might allow the exemption of equipment not meant to be covered by it. As I see it, the Virginia Coal and Energy Commission was to look at ways to relieve the enormous financial burden placed on certain "manufacturers," which are being compelled to convert from natural gas or oil to coal pursuant to an F.E.A. directive, these same manufacturers having switched away from coal several years ago because of F.E.A. requirements. The language of the amendment is not limited to "manufacturers" and is broad enough to cover the various utilities and even individual homeowners. While normatively speaking that result might be good, the expansion of the exemption beyond its originally intended coverage should be the result of conscious deliberation, and not imprecise draftsmanship. In any event, to cut through my opinion, in a letter to Senator Michael (in which you stated that certain proposed legislation was unconstitutional because it did not constitute equipment used primarily for pollution control or abatement) you indicated that you could prepare a constitutional amendment to provide the same relief. My question breaks down to this:

1. did you ever prepare such an amendment, or
2. did you do enough research such that you would want to comment on the enclosed amendment, which was drafted for Continental Can (now Group) by a Richmond Company attorney.

The same parties drafted the proposed § 58-412.1, which I have suggested would be more properly placed in

58-831.3 or

58-851. Certain words will be omitted so that the applicability of the legislation will be limited to manufacturers, processors, and reproducers. I believe that the separate classification of machinery and tools is constitutionally permissible by the same reasoning applied to the separate classification of tangible personal property with different tax rates applied to the various categories. I have discussed this with Fred Forberg and Raymond Dobyns, and they have not expressed that they have any serious difficulties with it. However, Senator Michael was somewhat skeptical of the proposal, as I believe he had your earlier opinion in mind. I would appreciate your comments on this bill. It exists in draft form, or will shortly, and should be going to either E. M. Miller or John Banks.

APPENDIX VI

A BILL to amend and reenact § 58-831 of the Code of Virginia, and to amend the Code of Virginia by adding a section numbered 58-831.01, relating to taxation of conversion equipment.

Be it enacted by the General Assembly of Virginia:

1. That § 58-831 of the Code of Virginia is amended and reenacted, and that the Code of Virginia is amended by adding a section numbered 58-831.01 as follows:

§ 58-831. Certain machinery and tools segregated for local taxation only.—The machinery and tools segregated for local taxation only under the provisions of § 58-412 *other than energy conversion equipment of manufacturers* shall be taxed as provided by that section.

§ 58-831.01. Energy conversion equipment classified as separate items of taxation.—A. All energy conversion equipment of manufacturers is hereby declared to be a class of property separate from all other tangible personal property. The governing body of any county, city, or town may levy a tax on such property at a different rate than the tax on other personal property. The rate and ratio of assessment on such conversion equipment shall not be greater than the rate and ratio on machinery and tools.

B. For purposes of this section, “energy conversion equipment” shall mean any generating equipment purchased after December thirty-one, nineteen hundred seventy-four, for the purpose of changing the energy source of a manufacturing plant from oil or natural gas to coal, and any co-generation equipment purchased on or after such date to achieve more efficient use of any energy source.

APPENDIX VII

HOUSE JOINT RESOLUTION NO.....

Proposing amendments to Section 6 of Article X of the Constitution of Virginia, relating to property exempt from taxation.

RESOLVED by the House of Delegates, the Senate concurring, a majority of the members elected to each house agreeing, That the following amendments to the Constitution of Virginia be, and the same hereby are, proposed and referred to the General Assembly at its first regular session held after the next general election of members of the House of Delegates for its concurrence in conformity with the provisions of Section 1 of Article XII of the Constitution of Virginia; namely:

Amend Section 6 of Article X of the Constitution of Virginia as follows:

ARTICLE X

§ 6. Exempt property.—(a) Except as otherwise provided in this Constitution, the following property and no other shall be exempt from taxation, State and local, including inheritance taxes:

(1) Property owned directly or indirectly by the Commonwealth or any political subdivision thereof, and obligations of the Commonwealth or any political subdivision thereof exempt by law.

(2) Real estate and personal property owned and exclusively occupied or used by churches or religious bodies for religious worship or for the residences of their ministers.

(3) Private or public burying grounds or cemeteries, provided the same are not operated for profit.

(4) Property owned by public libraries or by institutions of learning not conducted for profit, so long as such property is primarily used for literary, scientific, or educational purposes or purposes incidental thereto. This provision may also apply to leasehold interests in such property as may be provided by general law.

(5) Intangible personal property, or any class or classes thereof, as may be exempted in whole or in part by general law.

(6) Property used by its owner for religious, charitable, patriotic, historical, benevolent, cultural, or public park and playground purposes, as may be provided by classification or designation by a three-fourths vote of the members elected to each house of the General Assembly and subject to such restrictions and conditions as may be prescribed.

(7) Land subject to a perpetual easement permitting inundation by water as may be exempted in whole or in part by general law.

(b) The General Assembly may by general law authorize the governing body of any county, city, town, or regional government to provide for the exemption from local real property taxation, or a portion thereof, within such restrictions and upon such conditions as may be prescribed, of real estate owned by, and occupied as the sole dwelling of, persons not less than sixty-five years of age or persons permanently and totally disabled as established by general law who are deemed by the General Assembly to be bearing an extraordinary tax burden on said real estate in relation to their income and financial worth.

(c) Except as to property of the Commonwealth, the General Assembly by general law may restrict or condition, in whole or in part, but not extend, any or all of the above exemptions.

(d) The General Assembly may define as a separate subject of taxation any property, including real or personal property, equipment, facilities, or devices, 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 government to exempt or partially exempt such property from taxation, or by general law may directly exempt or partially exempt such property from taxation.

(e) The General Assembly may define as a separate subject of taxation household goods, personal effects and tangible farm property and products, and by general law may allow the governing body of any county, city, town, or regional government to exempt or partially exempt such property from taxation, or by general law may directly exempt or partially exempt such property from taxation.

(f) Exemptions of property from taxation as established or authorized hereby shall be strictly construed; provided, however, that all property exempt from taxation on the effective date of this section shall continue to be exempt until otherwise provided by the General Assembly as herein set forth.

(g) The General Assembly may by general law authorize any county, city, town, or regional government to impose a service charge upon the owners of a class or classes of exempt property for services provided by such governments.

(h) The General Assembly may by general law authorize the governing body of any county, city, town, or regional government to provide for a partial exemption from local real property taxation, within such restrictions and upon such conditions as may be prescribed, of real estate whose improvements, by virtue of age and use, have undergone substantial renovation, rehabilitation or replacement.

(i) The General Assembly may by general law allow the governing body of any county, city, or town to exempt or partially exempt from taxation any generating equipment installed after December thirty-one, nineteen hundred seventy-four, for the purpose of converting from oil or natural gas to coal as an energy source for manufacturing, and any co-generation equipment installed since such date for use in manufacturing.

APPENDIX VIII

HOUSE JOINT RESOLUTION NO.....

Memorializing the President of the United States to promote actively an increase in domestic coal consumption and to take immediate action for the cessation of importation of foreign coal.

WHEREAS, coal is the most abundant and potentially the most valuable energy mineral resource in the United States; and

WHEREAS, coal is a vital necessity to many American industries; and

WHEREAS, electric power generation and steel production account for approximately ninety-one per centum of all coal consumed in the United States; and

WHEREAS, many industrial processes can be directly converted to coal, while other industrial uses of coal as a substitute for oil and gas could be accomplished by equipment modifications and chemical or physical alteration of the coal; and

WHEREAS, the United States has only about ten years of proven oil and gas reserves available at the current rate of consumption compared with more than eight hundred years of coal supply; and

WHEREAS, coal's declining role in the national energy structure since nineteen hundred fifty has been accelerated by government actions with emphasis on nuclear electric power, the elimination of import quotas for residual oil, and the implementation of the Clean Air Act; and

WHEREAS, future development and consumption of coal will depend on public policy which is greatly shaped and influenced by actions of the President of the United States; and

WHEREAS, coal is the key to United States energy self-sufficiency; and

WHEREAS, the importation of foreign coal does damage to this Nation's energy self-sufficiency and to the American coal mining industry with which the future of national energy production relies; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the President of the United States is hereby memorialized to promote actively an increase in domestic coal consumption and to take immediate action for the cessation of importation of foreign coal; and, be it

RESOLVED FURTHER, That the Clerk of the House of Delegates is directed to send copies of this Resolution to the President of the United States, the Secretary of the United States Department of Energy and to the members of the Virginia Congressional delegation in order that they may be apprised of the sense of this Body.

