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PROPERTY RIGHTS TO GEOTHERMAL RESOURCES IN HAWAII

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RIGHTS TO GEOTHERMAL RESOURCES IN HAWAII*

An historical puzzle obscures the ownership of geothermal rights in Hawaii. In 1846, as the Kingdom of the Kamehamehas was preparing to replace a feudal system of landholding with private ownership of land, the Hawaii legislature enacted a statutory provision which reserved to the royal government "all mineral and metallic mines of whatever description."[1] The meaning of this reservation, asserted in a society with no previous history of mining or metallurgy and with no deposits of minerals in the usual sense of the word, is unclear. Whether geothermal resources fall within the scope of the reservation depends on the interpretation given to "mineral," and the meaning ascribed will largely determine who owns the geothermal reservoirs which have been and may be discovered in this state. Until it has been determined if title to the energy source is in private hands or has been reserved to the government, uncertainty as to ownership will continue to stand as a barrier to the massive investment needed for geothermal development in Hawaii. This paper explores the sources of the ambiguity

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and legal doctrine applicable to its resolution by the courts.

I. Discovery of the problem of resource ownership.

The Hawaii legislature sought to be forehanded in resolving any question as to who owned geothermal resources in the state. In 1974, more than two years before the testing of the first successful well (HGP-A) proved the existence of a geothermal reservoir in Hawaii, the legislature amended the statutory definition of "mineral" to include "geothermal resources," meaning "the natural heat of the earth, the energy... below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat, and all minerals in solution or other productes obtained from naturally heated fluids...."[2] By this amendment, it was intended to place under state ownership all, or virtually all, geothermal resources, for the relevant legislative committees were given to understand that -- with only few exceptions -- the successive Hawaii governments had reserved mineral rights to all lands put into private ownership since the Great Mahele of 1848[3] created a system of holding land in fee simple.

However, two samplings of land grants in the Puna District, Island of Hawaii, in the vicinity of HGP-A subsequently revealed that the mineral reservation was by no means universally included in the instruments by which the government had conveyed land into private ownership. A search of the title records of approximately

14,000 acres, made in 1975-76, showed that only 44 percent of the acreage was in private ownership under grants which explicitly reserved mineral rights to the state. A larger area, comprising 37,700 acres in Puna, was studied in 1977. It indicated that the state unambiguously held mineral rights on approximately 57 percent of the private estates, that 12 percent clearly was not under an express mineral reservation, while the remainder -- about 30 percent -- was held by private owners under instruments of conveyance which lacked an explicit reservation, but derived from estates originally granted subject to the reservation. Since there is no reason to believe that the Puna District is unrepresentative with respect to the prevelance of mineral reservations, it may be reasonably concluded that in the development of geothermal fields, as they may occur throughout the state, the ownership of the new resource will present a problem.

The problem poses two questions. First, can a mineral reservation be implied in the grants which lack the reservation clause? Second, did the mineral reservation include geothermal resources, prior to the 1974 amendment which spelled out that it did? Until these two questions are resolved, both the state and private landowners may under at least the color of title claim to own the same geothermal resources.

II. Origins of the problem in the history of mineral reservations.

The question of geothermal ownership traces back to the very beginning of a system of private landholding in the mid-19th century under Kauikeaouli (Kamehameha III). Land ownership in fee was previously unknown to the Hawaiians. Their concept of land tenure was essentially feudal, possession changing with the shift of political power among the chiefs. All those in possession of land, commoners as well as chiefs, had ancillary rights in the products of the soil, rights generally recognized even if not clearly defined.[4] Additionally, there was a societal right to come upon the land occupied by others, to find such necessities as firewood and building fibres, and to reach the seashore.[5]

The traditional land system was maintained by Kamehameha I, when he brought all the Hawaiian Islands under a centralized control early in the last century. However, by the reign of Kamehameha III (1824-54), the influence of the expanding foreign population, especially the Americans, was sufficient to convert the kingdom into a constitutional monarchy and change the land system into one of ownership in fee. Under the suasion of American advisors in and around the government, in 1845 the Hawaii legislature enacted, and Kamehameha III approved, a statute[6] creating a Board of Commissioners to Quiet Land Titles, commonly called the Land Commission. This five-member body was authorized to receive and pass on the validity of claims to interests in land presented by the government, landlords

(chiefs and konohikis, or lesser chiefs who served as overseers of higher chiefs' estates), and commoner tenants on the land.

The Great Mahele of 1848 made it possible for the Land Commission to separate out what had been, under the traditional land system now being replaced, the undivided interests of king, chiefs and konohikis. The Mahele ("division" or "portioning") was accomplished by a committee created by the Privy Council which, during the first quarter of 1848, made a division of the bulk of the land between the three parties in interest. By what amounted to quitclaim agreements among the parties, these categories of fee simple estates were created: Crown lands retained by the king for his personal benefit;[7] Government lands, to be held by the kingdom for the disposal of each succeeding regime under the constitutional monarch; and Konohiki lands claimed by the high chiefs and konohikis.[8] (An 1850 statute[9] authorized the Land Commission also to grant land titles to "native tenants" who occupied and improved their holdings ((kuleanas)) on Crown, Government, or Konohiki lands. About the same time, resident aliens were made eligible to buy lands in fee simple.[10])

The Mahele in effect identified the lands to which individuals could lay claim. Between 1848 and 1855, the Land Commission considered more than 12,000 claims based on the Mahele and the supplemental legislation of 1850. For claims which were confirmed, the Commission issued a Land Commission award, granting title (usually in fee simple, but sometimes for a leasehold estate), subject to

the payment of commutation by the grantee, either in cash or by his turning back to the government of land having a value equivalent to the cash commutation. The Minister of the Interior then issued a royal patent on the award, quit claiming the government's interest in the land patented. It is from this set of awards and patents that private titles to land in Hawaii derive.

A 1846 statute establishing the authority of the Minister to sell and patent lands prescribed the form and wording of the royal fee simple patents, which included the clause "reserving to the Hawaiian Government all mineral and metallic mines of every description."[11] This statutory prescription was omitted from ensuing codification of the laws, the Civil Code of 1859,[12] but nevertheless the same form of patent or grant, with an identical mineral reservation, continued in use with seemingly few exceptions[13] until after Hawaii was annexed to the United States in 1898.

When in 1900 the Islands became an incorporated American territory under an Organic Act, the mineral reservation was dropped from the form of the grant, as the document issued by the government conveying land title was now termed. Even when new grants were issued on portions of large estates originally patented subject to the mineral reservation,[14] the territorial Commissioner of Public Lands omitted the reservation clause. Further, the Hawaii Land Court, created in 1903, often omitted a mineral reservation in the decrees and land title certificates it issued,[15] even when the land

had been subject to the reservation under the patent or grant which placed it in private ownership.

It was not until 1955 that the Territory began to include the reservations in grants of public lands to private owners, and then not invariably.[16] Only in 1963, after mineral rights were spotlighted by a brief flurry of interest in mining bauxite deposits, was a Hawaii statute enacted declaring that "all land patents, leases, grants or other conveyance of state land shall be subject to and contain a reservation to the State of all the minerals...."[17] Since then, the mineral reservation has been a standard element in land grants, but between 1900 and 1963 thousands of grants were made without it.[18] Only if the reservation is implicit in these conveyances of public lands, and in other similarly lacking it, can one assume -- as did the 1974 Legislature -- that all private lands in Hawaii are subject to a mineral reservation in favor of the state government.

III. Are there implicit mineral reservations?

The question is a new one in Hawaii. Without any sustained interest in mineral exploitation, there has been little occasion to litigate mineral rights in the state and there is only one recorded case. In re Robinson (49 Haw. 429, 421 P.2d 570), decided in 1966, held that the statutory reservation requirement in effect between 1846 and 1859 was "self-effectuating" and validly included

in the royal patents of that period even though lacking in the Land Commission awards on which the patents were based.[19] However, the rule of the decision is probably limited to lands distributed pursuant to Land Commission awards and the court explicitly left open the question of whether a reservation can be implied in patents or grants issued after the repeal in 1859 of the statute which prescribed the form of the patent.

Arguably, the government of Hawaii, by including a mineral reservation clause in the legislation which implemented the Great Mahele, and by retaining that same clause in the standard land patents and grants issued throughout the regimes of the Kingdom, Provincial Government and Republic, had firmly established a policy of the sovereign to reserve mineral rights on all lands conveyed into private ownership. By this line of reasoning, omission of the clause from some grants, if through inadvertence or the neglect of land office personnel, should not be taken as a waiver of the mineral reservation. As the Robinson court said, if no one contemplated that there would be mining operations when the patents were issued, the land administrators may have had no reason "to focus attention" on mineral rights.[20]

This argument carries force with respect to land conveyed into private ownership before 1900. Several royal grants (categorized above at note 13) were issued without the reservation clause, but they are comparatively rare among the thousands of patents issued

in the 19th century. It is plausible to assert that these exceptional omissions were inadvertent and that mineral reservations should be read into the conveyances.

However, for the stream of grants lacking reservations which issued from the territorial land office after annexation of Hawaii, it is more difficult to maintain that the omission was merely sustained neglect or inadvertence by a succession of public land administrators between 1900 and 1955.[21] Early in the territorial period the question of mineral reservations was raised by the Commissioner of Public Lands, who asked if the reservation formerly contained in grants had been made in compliance with any law which was still in effect. The Attorney General of Hawaii replied that because of the repeal in 1859 of the 1846 statute prescribing the form of royal patents, there was no prohibition on the outright sale of mineral lands by the Territory.

> While I do not find any law which either expressly or by necessary implication permits you to dispose of mineral land in the Territory of Hawaii, yet there being no prohibition of such disposition I think it will be safe to advise you under the circumstances that a sale by you of a tract of land of a mineral character as distinguished from agricultural would probably be held to be valid.[22]

There is no intimation here that the territorial government had a policy of continuing the former practice of reserving mineral rights when public lands were conveyed. On the contrary, the issuance of thousands[23] of reservationless grants during the first half

of this century shows clearly there was a change of policy, a deliberate abandonment of the established practice of reserving mineral rights for the government. The question which then arises is whether the change was valid, or if it represented illegal actions by the officers or functionaries of the Territory.

It can be contended that the 1846 prescription of the mineral reservation remained in effect[24] despite its nominal repeal in 1859 until 1963, when it was replaced by another, more detailed statutory reservation.[25] The argument has three parts. First, the repeal of the statutory form in 1859 did not remove the force of the prescription, as evidenced by continued use of the reservation set forth in the 1846 statute by the successive governments of Hawaii, down to 1900.[26] Second, the reservation was therefore part of that body of "laws of Hawaii relating to the public lands... and the issuance of patents" thereon which was continued in force by the Organic Act in 1900, subject only to amendment by Congress.[27] Third, only Congress was empowered to change the laws of the Territory respecting the public lands, including their patenting. Since Congress did not authorize territorial officials to stop the practice of reserving mineral rights in grants of public lands to private owners, they acted outside of the scope of their authority in doing so.[28] By this line of argument, it may be concluded that mineral reservations are to be implied in the land grants issued after 1900[29] which lack them on the face of the instrument of conveyance.

The absence of an explicit statement as to the intent of Congress regarding mineral reservations in Hawaii leaves ample room, however, for the contrary line of argument. First, the conduct of land officials in placing a reservation in patents issued before 1900 did not provide a standard sufficiently embodied in policy to bind their successors in the territorial government to continue that practice.[30] Rather, in each period of Hawaii history between 1859 and 1963, the inclusion or exclusion of mineral reservation clauses was at the discretion of the successive public lands administrations, since no statute directed them either way.

Second, Congress did address the question of mineral rights when, by a 1910 amendment to § 73 of the Hawaii Organic Act, it explicitly withheld from the territorial Commissioner of Public Lands power to issue mineral leases.[31] Had the Congress also intended to forbid the granting of mineral rights in the conveyance of public lands, the prohibition would have come at that time, or in that manner. Third, the 1906 opinion of the Hawaii Attorney General already quoted,[32] indicated there was "no prohibition" against disposing of mineral lands -- an opinion not reconciliable with a policy of reserving mineral rights to the government. Fourth, in fact thousands of land grants lacking mineral reservations were issued by the Territory, apparently with no protest or admonition from the Congress or any other authority.

The massive fact which confronts any theory of implicit mineral

reservations in Hawaii is that thousands of territorial land grants were made without the language of reservation over a span of more than fifty years. Case law in Hawaii supports the proposition that a uniform construction of a statute over a considerable period of time by an executive department charged with the administration of that statute is entitled to much weight in case of doubt as to the meaning of the law.[33] It is evident that the office of the Commissioner of Public Lands consistently interpreted § 73 of the Organic Act to permit droppping the reservation clause from land grant documents. Legislative acquiescence in this sustained pattern of administrative action infers legislative approval.

The argument, however, is double-edged. It equally supports the assertion that the actions of the Ministers of the Interior who wrote the mineral clause into the patents issued between 1859 and 1900 were validated by the failure of the Hawaii legislature to repudiate the reservations. Whether the greater weight should be given to administrative practice which protected the public interest in minerals, as against the territorial practice of augmenting private interests, is a question inextricably linked to policy considerations. These will be addressed in parts V and VI below.

IV. Does "mineral" include geothermal?

Irrespective of whether implied mineral reservations are to be found in conveyances of title which lack explicit reservations,

there is the question of whether geothermal resources are covered by any such reservation. Lands granted by the state since 1974 (when the statutory definition of "mineral" was amended[34] to include geothermal resources) are clearly subject to a reservation of underground heat sources. But what is the scope of mineral reservations on lands granted before 1974? Do they too reserve geothermal resources, on the grounds that "mineral" generically includes geothermal reservoirs?

The latter question was ruled on by the Ninth Circuit Court of Appeals in United States v. Union Oil Co. of California,[35] where the court held that the mineral rights in certain California lands which had been reserved by the federal government did include geothermal steam. We must see if this decision is dispositive of the issue in Hawaii, which is also within the Ninth District.

Union Oil was a quiet title action, brought by the United States[36] to ascertain if its reservation of "all coal and other minerals" under lands granted pursuant to the Stock-Raising Homestead Act of 1916[37] encompassed geothermal resources. The court held that it did,[38] predicating its opinion on Congressional intent as evidenced by legislative history. The record showed that prior to 1916 the executive branch had repeatedly called the attention of Congressional committees to abuses and inefficiencies resulting from granting the complete fee to farm lands which overlay fuel deposits and had therefore recommended legislation providing for

the separation of the surface and subsurface estates when federal lands were conveyed. Consequently, from 1909 Congress enacted statutes which reserved minerals in various classes of land to be sold. The 1916 Homestead Act, the court found, was intended to expand agriculture, not mineral production; in fact the Congress was particularly concerned about reserving fuel deposits.[39]

The very language of the statute suggested to the court that Congress intended the reservation to be broadly construed: "All... patents issued under [this Act]... shall be subject to and contain a reservation to the United States of all the coal and other minerals...."[40] Although geothermal energy was not used as a power source in the U.S. in 1916,[41] the court reasoned that the explicit reservation of coal plus the express intent of Congress "to implement the principle urged by the Department of the Interior and retain governmental control of subsurface fuel sources"[42] underlying public lands made it clear that the legislative purpose would be served by holding geothermal fuel sources to be "mineral" and thus subject to the reservation.[43]

By contrast with the extensive legislative record used by the Union Oil court to construe the scope of the federal reservation, the corresponding page in Hawaii's legislative record is virtually blank. Little is known of the origin of the Hawaii mineral reservation beyond the bare facts already stated. In 1846 the legislature enacted a reservation provision as part of a lengthy statute

to organize the government of Kamehameha III.[44] In 1859 the statutory mineral reservation provision was repealed, not to be readopted until 1963.[45]

Why did the Kingdom of Hawaii adopt a reservation of minerals as the Great Mahele was about to begin? Any why did the government delete the reservation from its statutes when the Mahele was largely completed, but nevertheless continue to use the reservation clause as boiler plate in its land patents and grants until Hawaii was annexed to the United States? Neither the sparse legislative record of the period, nor Ralph Kuykendall, the premier researcher into Hawaii's early political history, sheds any light on the mystery. Justice Cassidy in the Robinson opinion expressed understandable puzzlement at the presence of this seemingly exotic element in the first land laws of a jurisdiction which lacked metals and had no inkling that it possessed any metallic mines. He surmised that it must be "some foreigner's idea" to provide the mineral reservation.[46]

However, Mitsuo Uyehara asserts that the "metals" of the reservation clause referred to, or at least included, materials indigenous to Hawaii, including the salt which was traded to foreigners, the broken stone used to surface roads (as in the British usage of calling hard-surfaced thoroughfares "metalled"), and the hard rock from which the Hawaiians fashioned tools before trade brought them iron instruments. He notes the existence in old Hawaii of large "stone mines," or quarries, some of which supplied the clinkstones used to make adzes and grindstones.[47]

Alternatively, the drafters of the 1846 statutory reservation may have intended "metal" in its more familiar form, which excludes salt and stone, drawing upon experience outside Hawaii to provide against the possible discovery in the kingdom of precious metals. The principal drafter was John Ricord,[48] first Attorney General of Hawaii. In 1846 he was only two years off the boat from America and is a logical candidate for the "foreigner" conjectured by Justice Cassidy in Robinson. Ricord came to Honolulu four years before the California gold strike, but 16 years after a sizeable gold rush in Georgia.[49]

All this is highly conjectural. In fact, there is no historical documentation to show the purpose and intended scope of the reservation prior to 1955, when it was partially spelled out to include "clay, mineral substances, oil and natural gases of every sort...."[50] Nor can the scope of the earlier reservation clause be inferred from the purpose of the land distribution scheme to which it was incidental. Indeed, the very attempt to analogize from Union Oil reveals the broad disparity between the circumstances of the federal homesteading act and that of the Mahele. Whereas the federal program had the limited purpose of encouraging ranching and affected only a relatively small part of the public domain, the Great Mahele was an act of primary importance -- the creation of a legal regime for real property in the Anglo-American mode -- which applied to all lands in the kingdom. The purposes of an act as fundamental as the

Mahele were appropriately broad and diffuse. In the Statement of Principles adopted by the Board of Commissioners which administered the Mahele, and in judicial opinions interpreting them, diverse motives were ascribed for the creation of a system of ownership in fee, all stemming from the kingly concerns and enlightened self-interest attributed to Kamehameha III. These include promoting social justice by giving commoners a more secure position through land ownership; encouraging greater efficiency in land use through the incentives of private ownership; gaining the respect of western nations accustomed to the allodial system;[51] and safeguarding the private estate of the King from possible invaders.[52] Since none of these purposes provides a rationale for interpreting the intended scope of the mineral reservation made incident to the Mahele, Union Oil seems clearly distinguishable from, and hence not dispositive of, the "scope" question posed in Hawaii.

Lacking both clear judicial precedent and any indication of legislative intent, one might construe the mineral reservation in Hawaii by analogyzing the law applicable to petroleum, an energy source which like geothermal occurs in natural reservoirs of fluid and gas, and which has been extensively litigated. The rule in "perhaps a majority of states"[53] is that a reservation of "minerals" includes both oil and gas. However, the applicability by analogy of this purported rule in Hawaii is questionable, given the phrasing of the reservation clause used until 1955, which read "all mineral and metallic mines of every description."[54] Here, "mineral" is not

a noun but an adjective limiting "mines," from which it can be argued, by a narrow construction, that the reservation was not of all minerals but only those which occur in mines, i.e., hard minerals.[55] Since 1957, Hawaii statutes have defined "mining" and "mining operations" broadly, to include the removal of oil and gas as well as of solids,[56] but these latter-day definitions do not resolve the ambiguity of the reservation contained in earlier grants.

Nor does general property law provide a clear answer to the question of what mineral rights the Hawaii government had reserved to itself. The old common law maxim of cujus est solum, ejus est usque ad coelum et ad inferos (to whomever the soil belongs, he owns also to the sky and to the depths)[57] suggests that the fee simple estates created by the Mahele include rights to all subsurface resources not explicitly withheld by the terms of the grant or by the operation of law.[58] However, even in American jurisdictions which adopted the common law in its fullest sweep, there are ample precedents limiting the cujus est solum doctrine, notably with respect to rights to subsurface water claimed by an owner of the surface estate. After reviewing these limitations as they may apply to mineral reservations, Sato and Crocker conclude that the doctrine has been so trimmed back by judicial construction and truncated by legislation that "a state may now proceed to allocate geothermal resource rights with a clean slate,"[59] without concern for the old maxim. A fortiori, that would be true in Hawaii, where the common

law was explicitly adopted subject to "Hawaiian usage" in practice before 1893.[60] Such usage, coupled with certain native rights protected by statute, have placed numerous limitations on the possessory rights of landowners in this jurisdiction. For example, residents of an area may cross private lands to reach the beaches, to take firewood and specified building materials, to use the water supply,[61] and to fish in ocean areas adjacent to private lands.[62] It is by no means evident that a fee simple estate in land, so hedged about with exceptions to its exclusive use by the grantee and his successors, would be construed to include the ownership of geothermal resources, if a mineral reservation exists.

With no clear guidance from Hawaii law, a court might be influenced by the definition of "geothermal" in other states with known geothermal resources. There is, however, no consensus. While Hawaii is the only state to define geothermal resources as "mineral" by statute, California has arrived at the same definition through case law.[63] The statutes of Montana and Wyoming,[64] contrariwise, classify the resource as "water," while in Idaho and Washington[65] it is neither water nor mineral, but a resource sui generis, a category in itself. No guidance is to be found in this even division, and any of these categories may be justified, since geothermal resources do occur as water (or as steam), do carry other minerals in suspension, and are indeed sui generis.[66]

V. Are minerals under a public trust or are private rights constitutionally protected?

Mineral rights are part of a trust held by the government of Hawaii for the benefit of the people of Hawaii; that is the assertion of Ho'ala Kanawai, Inc., an association of Hawaiians. In an amicus-curiae brief presented by the group to the Ninth Circuit Court of Appeals in Robinson v. Ariyoshi[67] (a landmark water case briefly discussed at note 80 below) and in a monograph written by their attorney, Mitsuo Uyehara,[68] it is argued that the Republic of Hawaii had ceded all public lands it held at the time of annexation (August 1898) to the United States, but with the beneficial interest remaining in the people of Hawaii. On this premise of fidiciary responsibility, the argument is developed that by failing to insert the reservation clause in grants made by the territorial Commissioner of Public Lands and in certificates of title issued by the Land Court, the trust was breached, and its beneficiaries deprived of property rights in which they have the beneficial interest. These are the links in the argument:

1. The mineral reservation clause prescribed by the 1846 statute remained in force and effect, despite its nominal repeal in 1859, as evidenced by its continued use throughout the rest of the 19th century.[69]
2. The reservation was therefore included in the body of land laws continued in force by § 73(c) of the Hawaii

Organic Act after annexation, thus retaining the mineral reservation requirement by implication.[70]

3. Public lands, including interests in minerals which were or should have been reserved to the sovereign in Hawaii, were ceded by the Republic to the United States at annexation[71] and then given by the U.S. to the State of Hawaii as a public trust under §5(f) of the Admission Act of 1959.

4. As administrator of public lands, during the period 1900 to approximately 1955 the territorial government acted outside its powers in granting lands without the mineral reservation, to the detriment of the public trust.[72]

The Hawaii Supreme Court has, over the years, generally been receptive to the public trust doctrine, which holds that the sovereign, as trustee for the people over their rights in certain natural resources, such as rivers, coastal waters and tidelands, is closely constrained by its fiduciary duty in granting private rights to these resources.[73] The doctrine was established in Hawaii in 1899, when the Supreme Court used it to deny a corporation the right to develop portions of Honolulu Harbor.[74]

In three recent cases, the Hawaii court has referred to the public trust doctrine in deciding competing claims of the state and of private landowners to rights in natural resources. The first reference came in decisions which had the effect of enlarging state

ownership of beachlands. Whereas previously[75] the court has relied on custom and usage to set the line of vegetation or debris as the upper boundary of public ownership along ocean frontage, in County of Hawaii v. Sotomura[76] and In re Sanborn,[77] it invoked the public trust doctrine to support its decision allowing the state ownership up to the debris or vegetation line. In Sanborn, the majority noted that its decision did not depend on the force of the trust doctrine, but in State v. Zimring[78] the public trust theory was central to a holding that the state owned areas along the ocean newly formed by lava flows.

In light of Sotomura, Sanborn and Zimring, which determined rights in the surface estate, the Hawaii court may also give heed to arguments applying the public trust doctrine to questions of ownership of subsurface rights, as to geothermal resources. In Zimring, the court stated that if private landowners were adjudged to have title to new lava accretions they would be granted a windfall and concluded that "equity and sound public policy" demanded that the windfall should instead "inure to the benefit of all the people of Hawaii."[79] By analogy, it can be argued that the recent discovery of geothermal reservoirs, the existence of which was unknown when virtually all lands were placed into private ownership, should also be treated as a public windfall, to benefit the population at large through the state.

On behalf of recognizing the private ownership of geothermal

resources not subject to an explicit reservation, it can be argued that the recognition of an implied reservation in grants made before 1974 would be a taking of private property without due process, in violation of the 14th Amendment. The Federal District Court for the District of Hawaii in recent cases has applied the 14th Amendment to reach decisions on natural resource ownership contrary to holdings of the Hawaii Supreme Court. In Robinson v. Ariyoshi,[80] the District Court ruled that private landowners had rights to surface waters earlier awarded to the state by the Hawaii court in McBryde Sugar Co. v. Robinson.[81] Acknowledging that it is "axiomatic that the law of real property is left to the states to develop and administer," the District Court nevertheless contradicted the Hawaii court, justifying its intervention on the grounds that the decision in favor of the state amounted to a judicial "taking" without due process, since the Supreme Court had itself raised the theory of state ownership in reviewing a lower court opinion which did not address that general issue.[82]

Again, in Sotomura v County of Hawaii,[83] the District Court held contrary to the Hawaii Supreme Court in the action cited in note 76 above, ruling that state ownership of beachland reaches only to the line of seaweed, and not to the higher line of vegetation. The court declared "The [state] decision in Sotomura was... intended to implement the court's conclusion that public policy favors extension of public use and ownership of the shoreline. A desire to

promote public policy, however, does not constitute justification for a state taking private property without compensation."[84]

In a recent federal action on the Zimring suit over lava accretions cited in note 78 above, a visiting U.S. District Court judge held that the federal court lacked jurisdiction to review the decision of the Hawaii Supreme Court on this property question. However, he distinguished Sotomura and Robinson on the ground that in those actions the Hawaii court, by raising questions of resource ownership suo sponte and deciding them without an adequate hearing on the merits, had denied due process to the landowners.[85] The decision of the visiting jurist tends to limit the constitutional constraints on assertion of state ownership of contested natural resources as previously enunciated by the regular members of the U.S. District Court for the District of Hawaii, but still leaves "taking" as an issue which predictably will be raised when ownership of geothermal rights is litigated in this jurisdiction.

VI. Consequences of the determination of ownership of geothermal rights.

How the courts decide the two legal questions identified by this analysis -- Is a mineral reservation to be implied in grants which lack one? Are geothermal resources included in mineral reservations made prior to 1974? -- may influence the pace and extent of geothermal development in Hawaii. A decision in favor of private

ownership of the new resource may, in the first instance, help induce owners of small parcels to make their property available for drilling, and stimulate owners of large estates themselves to initiate exploration and development.[86] The short-range effects of a judicial holding which minimizes the scope of the mineral reservation, arguably, would speed resource development.

However, in the long run a finding that the state owns geothermal resources may be conducive to a fuller utilization of the reservoirs. Large-scale exploration for new reservoirs may continue to require financial assistance from the state, either in direct funding or in tax subsidies. Politically, it is much easier to provide that support when the state owns the resource than if private owners were to be the immediate beneficiaries.

The pattern of extraction of geothermal resources and their pricing may well differ, between private and public ownership. Because geothermal fluids, like oil and gas, occur in large reservoirs which may underlie several adjacent parcels, under private ownership a pattern of beggar-thy-neighbor may emerge, as competing exploiters each seek to maximize their take from the common pool. The experience of the petroleum industry has documented the wastefulness of the mode of competitive drilling, which results in a smaller total recovery of the resource available than does a "unitized" exploitation of each reservoir. Unitization can be required by the state even if the resource is judged to be privately owned, but experience

in the oil and gas fields shows that it may be difficult to impose if competition among competing firms is strong.[87] Presently, Hawaii law provides for unitization in the exploitation of geothermal fields but do not require it.[88]

The example of The Geysers, sole producing geothermal field in the United States, suggests that government intervention in pricing may be necessary to distribute the economic benefits of geothermal energy development more broadly than merely among the owners, extractors and appliers of the heat. At The Geysers, the steam is sold to the Pacific Gas & Electric Company at a price calculated by a formula essentially based on the costs of alternative fuels -- coal, crude oil and atomic power.[89] Steep rises in the price of fossil fuels have increased geothermal steam prices far above the costs of production, with much profit to the geothermal producers, but with little benefit to the consumers of electric power. Arguably, the Public Utilities Commission could use its regulatory authority to control any geothermal energy contracts in Hawaii,[90] but as resource owner the state could more readily ensure that long-term benefits are passed on to consumers, should geothermal power be less costly to the utility companies than the oil it displaces.

The uses of geothermal resources may also be affected by the decision on private or public ownership. In the United States generally, and thus far in Hawaii, commercial developmental plans for

geothermal have centered almost exclusively on using the resource to generate electricity. Alternative uses, as direct application of the heat for industrial and agricultural processing, have not been much discussed, though non-electrical applications of geothermal resources are commonplace abroad.[91] They would be more in the forefront if direct uses were readily seen as profitable, but it will take research and development to identify and demonstrate how the new resource can be directly used in the Hawaii economy without first converting it to electricity. As resource owner, the State of Hawaii is more likely to finance and encourage multiple uses of geothermal than if the resource is owned privately.

VI. Summary

A sharp discontinuity in the administration of Hawaii's unique land laws has created uncertainty as to the ownership of geothermal resources in the state. Until Hawaii was annexed to the United States and governed under the Organic Act of 1900, mineral rights had with rare exception been reserved to the government, even though the statutory requirement for making the reservation had been repealed in 1859. Beginning in 1900 and through 1955, the practice was reversed and lands were patented without mineral reservations -- even some lands which had originally been granted subject to a reservation. Further, the Land Court created by the Territory issued certificates of titles to lands registered under the Torrens system,

omitting mineral reservations made at the time of original conveyance by the government. It is unclear whether reservations are to be implied in some or all of the titles issued without express reservation clauses.

The uncertainty is compounded by contradictory arguments which can be readily made as to whether "mineral" reservations in Hawaii encompassed geothermal resources in grants made prior to a 1974 statute which states that they do. The cryptic history of mineral reservations in a jurisdiction lacking minerals in the usual sense of the term is uninformative as to the intent of the Kingdom, Provisional Government and Republic which made the reservation. Case law in Hawaii is limited to a single relevant decision which is not dispositive of the question, nor are rulings in other portions of the Ninth Circuit regarding geothermal rights.

In the absence of a clear statutory rationale or authoritative case law, a court may well be influenced by considerations of social policy, notably whether Hawaii common law has adopted a public interest doctrine which applies to geothermal resources, and whether these resources come under a public lands trust in favor of the Hawaiian people, as asserted by an advocate for one association of Hawaiians. In this context, the Hawaii Supreme Court has recently shown a receptivity to social policy arguments, while in parallel cases regarding ownership of natural resources, the federal District Court in Hawaii has been the more protective of private property rights under the 14th amendment.

FOOTNOTES

1. Laws of Kamehameha III, 1846, p. 99, comprising § 6, Art. 2, Ch. 7, Pt. 1 of An Act to Organize the Executive Departments of the Hawaiian Islands (adopted April 27, 1846) reprinted in II Revised Laws of Hawaii 1925, pp. 2190-93.

2. Act 241, Hawaii Session Laws, 1974, amending Hawaii Revised Statutes, § 182-1. The language of the definition of "geothermal resources" is derived from the California statutes, § 6903, Public Resources Code.

3. Strictly speaking, the Mahele was the division of lands between the sovereign and the chiefs, briefly described below at pp. 4-6, which was completed between January 27 and March 7, 1848. However, as used here and throughout this paper, it is a shorthand term for the entire process of installing a system of land ownership in Hawaii, and so also comprehends the Kuleana Act of 1850 and other legislation under which land was granted in fee during the last half of the 19th century, including extensions given to konohikis to file for patents, all the way until 1895. Laws of Hawaii 1860, p. 27; Laws of Hawaii 1892, republished in II Revised Laws of Hawaii 1925, p. 2151.

4. Jon J. Chinen, The Great Mahele (Honolulu 1978), p. 5.

5. Such rights came to be formally recognized and are now reserved by Hawaii Revised Statutes, 1976, § 7-1 to "the people," a term variously construed as meaning (i) "tenants," Oni v. Meek, 2 Haw. 87 (1858); (ii) those becoming tenants before 1900, Damon v. Tsutsui, 31 Haw. 678 (1930); and (iii) any "lawful occupier" of kuleanas (small holdings) as against the ahupua'a, (basic large land division) Dowsett v. Maukeala, 10 Haw. 166 (1895) and Carter v. Territory, 24 Haw. 47 (1917). Also see Louis Cannelora, The Origin of Hawaiian Land Titles and of the Rights of Native Tenants (Honolulu, 1974) and Sanford Dole, Evolution of Hawaiian Land Tenures, reprinted in Hawaiian Historical Society Papers, No. 3 (1892).

6. Laws of Kamehameha III (1845-46), p. 107 (passed December 10, 1845), incorporated as Art. 4, Ch. 7, Pt. 1 of An Act to Organize the Executive Departments of the Hawaiian Islands, reprinted in II Revised Laws of Hawaii 1925, pp. 2191 ff.

7. Kamehameha III is said to have wanted his private, i.e., Crown, lands clearly distinguished from government lands in case

foreigners invaded his kingdom and seized all lands not privately held. Estate of His Majesty Kamehameha IV, 2 Haw. 715 at 722 (1864).

8. Chinen, cited above at note 4, is the authoritative source for understanding the 1848 land division. As he states at p. 24, "konohiki" (as in "konohiki lands") came to include the superior chiefs as well as to their erstwhile land agents among the lesser chiefs.

9. Enacted August 6, 1850. Laws of Hawaii 1850, p. 202.

10. By an act of July 10, 1850. Laws of Hawaii 1850, p. 146.

11. Section 6 of the statute cited in note 1 above gave the required phrasing of the mineral reservation clause. Patents written in Hawaiian phrased the reservation "ua koa nae i ke aupuni na mine minerala a me na metala a pau." A 19th century Hawaiian dictionary indicated "metala" wa used as both noun and adjective. H.R. Hitchcock, An English-Hawaiian Dictionary (1887), quoted by Mitsuo Uyehara, The Hawaii Ceded Land Trusts: Their Use and Misuse, (1977), p. 30.

12. The omission was explicitly made by § 1491.

13. Warranty (so-called "Kamehameha") deeds, issued up to 1865 to convey title to portions of the monarch's own land which he sold, and some quitclaim deeds, issued by the Minister of the Interior, lacked the reservation clause.

14. E.g., Royal Patent 4497 (on Land Commission Award 8559) was issued to one grantee on June 11, 1861, subject to the reservation. On November 13, 1905, Land Patent 8177 was issued on the same land to a second grantee. The 1861 patent was "by name only," meaning that the tract was identified solely by its Hawaiian placename. A detailed boundary description was supplied for the 1905 patent. Ad adjacent area in Puna, Hawaii was covered by Land Commission Award 8559B, apana (portion) 15. Grant 8088, issued in 1899, contains the mineral reservation, but Grant 8094, issued on the same apana in 1909, does not.

15. Uyehara, op cit., note 11 above, at p. 36.

16. "In 1955, a comprehensive reservation was incorporated in many of the land patents issued by the Territory of Hawaii, and is found in patents presently issued. The reservation usually follows a reservation of water rights and as currently [1957] incorporated is phrased in the following language:

'RESERVING, ALSO to the Territory of Hawaii in perpetuity all rights to clay, minerals, mineral substances, oil and natural gases of every sort and description, that may be upon the surface of or in or under the land.'"
Kenneth Lau, Mineral Rights and Mining Laws (Legislative Reference Bureau, University of Hawaii, 1957), p. 2.

17. Act 11, Hawaii Session Laws 1963; Hawaii Revised Statutes § 182-2(b), (1976).

18. Between 1900 and 1955, the territorial government granted "over 8,000" patents. Lau, op. cit., p. 20.

19. As stated above, the essential steps whereby land titles were created in Hawaii were: (i) apportioning of the land between the sovereign, on one hand, and the chiefs on the other (with later provision for grants to commoners and foreigners); (ii) issuance of Land Commission awards to persons found eligible to receive title to individual estates; and (iii) granting royal patents on the awards, upon payment of the required commutation and furnishing of a boundary description. For a detailed description of the process, with illustration of the documents issued, see Chinen, op. cit., note 4 above.

20. 49 Haw. 429 at 441, 421 P.2d 570 at 577 (1966), citing U.S. v. Cal., 332 U.S. 19, 39-40 (1947).

21. The Organic Act which established the territorial government itself provided a reminder of the potential value of mineral rights in its limitation concerning mining leases on public lands at § 73 (1). The language was relatively conspicuous, since it was added by Congress in a 1910 amendment to the Organic Act and is the only reference to minerals in the Act.

22. Opinion of the Attorney General No. 379 (Hawaii 1906). The court in Robinson (note 20, above) did not comment on the contents or merits of the opinion.

23. See Lau, op. cit., in note 16 above.

24. This argument is also advanced by Uyehara, op. cit., in note 11 above, at pp. 33-36.

25. See above at note 17.

26. For examples of patents issued by the Kingdom, Provincial Government, and Republic of Hawaii, including mineral

reservations, see Jon J. Chinen, Original Land Titles in Hawaii (Honolulu, 1961).

27. "The laws of Hawaii relating to public lands, the settlement of boundaries, and the issuance of patents on land commission awards, except as changed by this Act, shall continue in force until Congress shall otherwise provide.... In said laws 'land patent' shall be substituted for 'royal patent'; 'commissioner of public lands' for 'minister of the interior', 'agent of public lands', and 'commissioners of public lands', or their equivalents...." Organic Act § 73(c).

28. The power of an administrator is limited by the terms of the authority granted by the legislature and necessary implications of that grant. Extensions of authority beyond those terms can only be conferred by the legislature and cannot be merely assumed by the administrator. Fed. Trade Comm. v. Raladam Co., (283 U.S. 643, 1931). The action of the territorial land commissioners in dropping the mineral reservation so long in use was, arguably, the exercise of a power not lawfully theirs.

29. By the same line of argument, it can be asserted that the relatively few royal patents which were issued without the mineral reservation clause (see note 13, above) also are subject to an implicit reservation.

30. It is the function of the legislature to declare a policy and to fix the primary standards for its administration. Knudsen Creamery Co. of Calif. v. Brock (234 P.2d 26, 37 Cal.2d 485 1951). Arguably, the practice of inserting the reservation clause in the 1859-1900 patents did not rise to a "standard" which the territorial land commissioners were obliged to follow.

31. As amended, § 73(1) of the Organic Act read in part: "... Leases may be made by the commissioner of public lands... for the occupation of lands for general purposes, or for limited special purposes (but not including leases of minerals or leases providing for the mining of minerals), for terms up to but not in excess of sixty-five years...." (Underscoring supplied). This is the only reference to minerals or mineral rights in the Organic Act.

32. At note 22, above.

33. Territory v. Honolulu Rapid Transit & Land Co., 23 Haw. 387 (1916) cited in Keller v. Thompson, 56 Haw. 183, 532 P.2d 664 at 670, (1975).

34. Act 241, Hawaii Session Laws 1974.

35. 549 F.2d 1271 (9th Cir. 1977).

36. The action was brought under the Geothermal Steam Act of 1970, which directed the Secretary of the Interior to bring quiet title actions whenever he found that geothermal development of lands subject to the mineral reservation was imminent [30 U.S.C. § 1020(b)(Supp. 1978)] in order to resolve uncertainty as to resource ownership and thus speed development.

37. 43 U.S.C. § 299 (1964).

38. Reversing the District Court, 369 F. Suppl. 1289 (N.D. Cal. 1973).

39. 549 F.2d 1271 at 1275, 1277-78.

40. 43 U.S.C. § 299 (1964).

41. Italy was then the only nation utilizing geothermal power to generate electricity, a technology it began employing in 1904.

42. 549 F.2d 1271 at 1276.

43. "[T]he mineral reservation is to be read broadly in light of the agricultural purpose of the grant itself, and in light of Congress's equally clear purpose to retain subsurface resources, particularly sources of energy, for separate disposition and development in the public interest." Ibid. at 1279.

44. See note 1 above.

45. By Act 11, Hawaii Session Laws of 1963; Hawaii Revised Statutes, § 182-2(b)(1976).

46. In re Robinson, 49 Haw. 429 at 444 (footnote), 421 P.2d 570, 579 (1966).

47. Uyehara, op cit., at 11 above, pp. 28-31.

48. "Successive parts of two [organic] acts were submitted by Ricord first to his ministerial colleagues for examination and revision, and afterwards to the legislative council for discussion, amendment, and final action. The two houses put the drafts through three readings, debated them section by section with patience and critical care, altering and amending them in numerous essential aspects, and finally passed them.... [However] [w]e have

no data from which to reconstruct the debates in the legislative council...." Ralph Kuykendall, The Hawaiian Kingdom, 1778-1854 (Honolulu, 1957), p. 262.

49. After being trained in the law in New York, Rocord sojourned in Florida, Louisiana, Texas, Arizona and Oregon before coming to Hawaii in 1844. Muir, "John Ricord," 52 Southwest Historical Quarterly 49 (1948).

50. Lau, op. cit. in note 16 above at p. 2.

51. "Ancient practice, according to testimony, seems to have awarded to the tenant less than justice and equity would demand, and to have given to the King more than the permanent good of his subjects would allow." Statement of the Board of Commissioners to Quiet Land Titles, February 9, 1846, reprinted in S. Ballou, The Laws of Hawaii, p. 42 (1898).

"The Hawaiian rulers have learned by experience... that the well-being of their country must essentially depend upon the proper development of their internal resources, of which land is the principal; and that in order to [sic] its proper cultivation and improvement, the holder must have some stake in it.... They perceive by contact with foreign nations that such is their uniform practice.... They are desirous to conform themselves in the main to such a civilized state of things, now that they have come to be a nation in the understanding of older and more enlightened Governments." Id. at 146.

52. Estate of His Majesty Kamehameha IV, 2 Haw. 715, 722, 725 (1864). The language of the court, like that of the Board of Commissioners quoted in the preceding note, implies that Kamehameha III deliberately chose to institute the Great Mahele. However, accounts of the period indicate that, a decade or more before the Mahele began, the youthful monarch had lost a power struggle with the chiefs who had accepted Christianity, and he no longer determined government policy. Real power lay with his advisers and with a faction of the chiefs, notably Kinau, the kuhina nui ("prime minister," in free translation).

> Early in 1835 Kauikeaouli (Kamehameha III) conceded that the chiefs had won.... He approved a new code of laws... and he placed law enforcement in the hands of Kinau. From that time on he virtually abandoned the direction of the affairs of state. He spent most of his time with foreigners, riding, sailing, bowling, or playing billiards....

Gavan Daws, Shoal of Time: A History of the Hawaiian Islands, p. 92 (Honolulu, 1968). See also Ralph Kuykendall, The Hawaiian Kingdom, 1778-1854, p. 136 (Honolulu, 1957).

53. Richard Hemingway, The Law of Oil and Gas (St. Paul, 1971), p. 1.

54. See notes 1 and 11, above.

55. The diversity of interpretation given to "mine" is illustrated by the following opinions: "A 'mine' is an excavation in the earth made for the purpose of getting metals, ores or coal." Pruett v. O'Gara Coal Co., 165 Ill. App. 470, 489 (1911); "[Mine] does not comprehend every possible excavation by which mineral matters are brought to the surface. It appears to be definitely settled in most jurisdictions that a gas well or oil well cannot be regarded as a mine." Lambert v. Pritchett, 284 S.W.2d 90, 91 (Ky. 1955); "Oil is a mineral, and... an oil well is a mine." Mid-Northern Oil Co. v. Walker, 65 Mont. 414, 427, 211 P. 353, 356 (1922).

56. A 1957 statute on strip mining and the 1963 statute on state mineral reservations both define mining to include the extraction of all minerals, "whether solid, gaseous, or liquid." Hawaii Revised Statutes, §§ 181-1, 182-1 (1976). The mineral reservation incorporated in patents issued by the Territory beginning in 1955 explicitly includes oil and gas. See note 16 above.

57. 2 Blackstone Commentaries (1902) at 18.

58. Opposed is the doctrine that every land grant by the sovereign is to be construed favorably to the government and "most strongly against the grantee. Nothing passes by intendment or implication, but the grant covers only that which is conveyed in clear language...." 63 American Jurisprudence, 2d. (1972), "Public Lands," § 69.

59. "Property Rights to Geothermal Resources," 6 Ecology Law Quarterly, 250, 486 (1977) at 319. To date, this article is the most comprehensive analysis of law bearing on geothermal rights. Unfortunately, it does not include Hawaii within its purview, nor does the extensive bibliography of statutes, cases and other relevant materials appended to 13 Land and Water Law Review, 349 (1977).

60. "The common law of England, as ascertained by English and American decisions, is declared to be the common law of Hawaii in all cases, except as... established by Hawaiian usage...." Hawaii Revised Statutes (1976) § 1-1, originally enacted in Hawaii Session Laws of 1892, Ch. 27, § 5.

61. Hawaii Revised Statutes (1976), § 7-1 reserves these rights to "the people." See note 5 above.

62. Fishing rights of the public, stemming from those recognized by Art. 5, Ch. 6, Pt. 1, §§ 1-8 of An Act to Organize the Executive Departments, Hawaii Laws 1845-46, pp. 90-92, are now in Hawaii Revised Statutes (1976), §§ 188-1 to 188-5.

63. Geothermal Kinetics, Inc. v. Union Oil Co. of Cal., 75 Cal. App. 3d 56, 141 Cal. Rptr. 879 (1977); Pariani v. State, No. 657-291 (San Francisco County Super. Ct. June 30, 1977).

64. Montana Revised Codes Annotated (Supp. 1977) § 89-867(1); Wyoming Statutes (1977) § 41-3-90.

65. Idaho Code (1977) § 42-4002(c); Washington Revised Code (Supp. 1977) § 79-76.040.

66. See Sato and Crocker, note 59 above at pp. 486-95 for a comprehensive discussion of these statutes.

67. 441 F. Supp. 559 (1977); brief for Ho'ala Kanawai, Inc. (Awakening the Law), U.S. Court of Appeals for 9th Cir., No. 7432, (1979) pp. 8-17.

68. The Hawaii Ceded Land Trusts: Their Use & Misuse (Honolulu, 1977).

69. Brief cited in note 67 above, pp. 9-12.

70. Uyehara, The Hawaii Ceded Land Trusts, p. 34.

71. Brief, at p. 8, referring to the Joint Resolution to Provide for Annexing the Hawaiian Islands to the United States (the Newland Resolution), approved July 7, 1898.

72. Uyehara, op. cit., p. 35.

73. Sax, "The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention," 68 Michigan Law Review 471 (1970).

74. King v. Oahu Ry. & Land Co., 11 Haw. 717 (1899). Tidewater lands were held to be vested in the sovereign "as the representative of the nation and for the public benefit" in Bishop v. Mahiko, 35 Haw. 608, 646 (1940).

75. In re Ashford, 50 Haw. 314, 440 P.2d 76 (1968).

76. 55 Haw. 176, 184, 517 P.2d 57, 63 (1973) cert. denied, 419 U.S. 872 (1974).

77. 57 Haw. 585, 593, 562 P.2d 771, 777 (1977).

78. 58 Haw. 106, 566 P.2d 725 (1977).

79. 58 Haw. 106 at 121, 566 P.2d 725 at 735 (1977).

80. 441 F. Supp. 559 (1977).

81. 54 Haw. 174, 504 P.2d 1330 (1973) and 55 Haw. 260, 517 P.2d 26 (1973), appeal dismissed; 417 U.S. 962 and 976 (1974) cert. denied.

82. The Robinson decision is pending on appeal before the Ninth Circuit Court. The ultimate ruling on this extensively litigated water rights case will certainly influence a judicial determination of the legal regime for geothermal resources in Hawaii.

83. 460 F. Supp. 473 (1978).

84. Id.

85. Zimring v. State, No. 79-0054, ____ Fed. Supp. ____ (D. Haw. ____ 1979).

86. The corporation owning a large subdivision directly across the road from test well HGP-A is said to be preparing to drill on what had originally been intended to be houselots.

87. Sato & Crocker, cited at note 59 above, at 529-32, drawing particularly on the history of oil field exploitation in California.

88. Department of Land & Natural Resources, Regulations on Leasing of Geothermal Resources & Drilling for Geothermal Resources in Hawaii, Rule 3.15 (Honolulu, 1978); Act 135, Session Laws of Hawaii 1978, § 8.

89. Donald F.X. Finn, "Price of Steam at the Geysers," 3 Proceedings, 2d United Nations Symposium on the Development and Use of Geothermal Resources (San Francisco, 1975), pp. 2295-2300.

90. Under Act 132, Session Laws of Hawaii 1978, the rates payable by a public utility to the producers of geothermal steam, or of electricity therefrom, shall be established by agreement between the two parties, subject to approval by the Public Utilities Commission. If the utility and supplier fail to reach an agreement, or if the rate they agree upon is disapproved by the Commission, the P.U.C. shall establish a "just and reasonable rate." By the same act (§ 2b), producers of geothermal steam or electricity generated from the steam are excluded from the "public utilities" regulated by the Commission.

91. Richard Peterson and Nabil El-Ramly, The Worldwide Electric and Nonelectric Geothermal Industry, Hawaii Geothermal Project Program Report (University of Hawaii, Honolulu, 1975).