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Jack McNamera

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Potentially, geothermal resources are an enormous domestic energy source. However, myriad federal, state and local regulations, which oft-times conflict with one another, have hampered its development. Mr. McNamera analyzes this problem in the context of the nation's present energy situation.

CONSTRAINTS ON GEOTHERMAL DEVELOPMENT: TAX AND BEYOND†

*Jack McNamera**

TAX AND SUBSIDY POLICY

Development of the nation's vast geothermal resource base, now entering its third decade, has been painstakingly slow and arduous. Unfortunately, much of the delay has been man-made. Seemingly every point of contact between the legal system and geothermal resources — and there are many — has provided yet another roadblock and continued frustration.

Access to the vast federal lands, believed to contain nearly fifty-five percent of the potential geothermal production areas, languished in a legislative vacuum throughout the 1960's. Mining, material and mineral leasing laws were all interpreted as inapplicable to geothermal resources. Even after the Geothermal Steam Act of 1970 ended that decade-old stalemate, preparation of leasing and operating regulations delayed the first competitive lease sale until January 1974, more than three years later. A flood of noncompetitive applications then confronted an understaffed BLM and a seemingly recalcitrant Forest Service, and it was not until 1975 that the initial "noncomp" was granted. To date, only nineteen

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*Fellow in Law and Energy, U.S.C. Law Center; Chief Counsel, Geothermal Energy and Law Project, U.S.C. Law Center; B.A., 1968, Canisius College; J.D., 1974, University of Southern California. Member of the California State Bar and the American Bar Association.

percent of these applications have progressed to lease status on BLM land, and a miniscule one and one-tenth percent on Forest Service land. Unlike its historic treatment of mining and mineral leasing within the National Forests, Congress chose, inexplicably, to give the Service veto power over geothermal development therein, rather than entrusting it solely to Interior.

Federal tax policy was similarly ignorant of geothermal's existence throughout the 1960's and congressional reaction to requests for inclusion of geothermal under current expensing and other advantages has consistently been an unending chorus of "it's for the courts to decide." In this crucial area, IRS has emerged as the sole policy maker, and their stance has, quite predictably, been a hostile one. Only the impetus of Jimmy Carter's National Energy Plan seems to have moved Congress to act in this area but the outcome, and its impact, remains in doubt nonetheless.

And while federal tax and mineral disposal policies failed to encourage (or actively discouraged) geothermal development, many other areas of federal and state law were all too inclusive. Western state legislatures, conscious of the long tradition of water rights warfare between themselves and Washington, were loathe to let federal geothermal leaseholders begin what they feared might become a wholesale depletion of already over-committed groundwater reservoirs. They therefore placed geothermal operations under the aegis of their respective water engineers, and multinational oil companies soon found themselves applying for waterdrilling licenses.

County planning departments, particularly in California, felt that they had to grant use permits before any drilling could take place in order to keep a handle on local land use.

Tax assessors, both state and local, saw a possible new source of revenue and spewed forth a multitude of conflicting interpretations.

State and federal wildlife and environmental agencies, unsure of the new resource's impact, rushed in to study, monitor and gauge

State utility commissions and siting councils fought with county and local authorities for the last word on power plant sitings.

Federal, state and private deeds containing “mineral reservations” became a fertile litigational seedbed. Was geothermal a “mineral”, “water” (“animal”, “vegetable”)? — no one seemed to know and each interpretation soon entered the timeless warp of the legal system — apparently (to the hard-pressed developers) never to return. All the while, development of a new, potentially enormous domestic energy source fell farther behind, trapped in the interstices of this legal and institutional maze.

What made this situation all the more lamentable was that, even in the absence of these man-made problems, geothermal still has to overcome some serious natural and technological problems. The faults of the earth seemingly concealed problems rivaling those in the tax code. Of the four basic geothermal resource types — dry steam, hot water, geopressured zones and hot dry rocks — only the first, containing far less than one percent of the total resource base, is presently a technologically proven, economically competitive fuel. Research into the bulk of geothermal’s potential was, of course, being carried on by various government and private entities. But as with all research into alternative energy sources, the low cost of the marginal, competing source (oil) put a damper on most of these activities throughout the 1960’s.

Not until the OPEC price escalation and the OAPEC embargo of October 1973 hiked this price skyward was any sense of urgency put into these efforts. Nevertheless, the low cost of coal and nuclear fuel in many areas throughout the West and the proven nature of those technologies continue to dog wide-scale adoption of geothermal-based power by the largest electric systems and industrial users.

In 1974 ERDA sprang, full-blown, from congressional frustration over oil prices, and with it the Division of Geothermal Energy (DGE). DGE was handed the challenging task

of uniting the diverse research programs already in existence and supplementing them in any way necessary to reach an arbitrarily-selected National Geothermal Goal of replacing one million barrels of oil a day by 1985.

DGE found out quickly that, despite a wide range of highly publicized "estimates," no one really knew what the nation's geothermal potential actually was. So, in cooperation with the United States Geological Survey, they began a national Geothermal Resource Assessment Program. In July 1975, the Geological Survey published their initial findings (Circular 726). Though very conservative in approach, the Survey had nonetheless found already identified systems capable of equalling 140 Hoover Dams or nuclear plants. As DGE found out, however, private sector exploratory activity was (as opposed to feverish attempts at lease acquisition) less than optimal for achieving their 1985 "target." As many deep wells had been drilled outside of The Geysers before 1970 as since that date. True, many of the post-1970 tests were far deeper and more expensive than their earlier counterparts, but the exploratory drilling pace was simply too laggard to meet even drastically scaled down (*i.e.*, reasonable) goals for geothermal-based capacity. This situation, coupled with the natural reticence of the utility systems, was making a joke out of any estimates for geothermal potential. "Geothermal development" would become a curious still-life unless a tremendous amount of deephole exploration and testing could be stimulated.

Traditionally, natural resource assessment on federal (as well as state and private lands), has been performed by the private sector. Without entering into the already-lively debate as to the wisdom of this policy, it is an irrefutable fact that this sector's historic level of activity has not been forthcoming in geothermal. Although the vagaries of land access and permitting hang ups have contributed mightily to this state of affairs, the largest single deterrent at present is federal tax treatment of geothermal exploratory expenditures. Geothermal developers have been denied the IRR-boosting tax provisions available to other fuel developers, namely the option to currently expense most costs and a non-cost related deduc-

tion from production income. The current expensing benefits, *e.g.*, have been granted to oil and gas developers since 1917, first by administrative regulation and only belatedly (1953) by statute. Congress has not, as yet, chosen to extend them to geothermal, though it has seen fit to assist those who wish to develop ball clay, bromine, fullers earth, oyster shells, ornamental stone, sand, mica, and flake granite. The seriousness of this implicit policy decision cannot be overstated.

As Chief Counsel for the Geothermal Energy and the Law Project at the University of Southern California Law Center, I have had an opportunity to examine the impact of this curious tax policy decision in a rather detailed fashion. Using data gathered from various industry and governmental sources, I created a model hot-water geothermal project — from preliminary geological and geophysical “weeding out” and leasing through exploratory and developmental drilling to final production. This expenditure data and no less than a dozen possible federal tax treatments were then run through a computer, along with different price, financing and ownership structures, in order to gauge the impact of each of the various tax regimes upon the project’s economic viability. The full study will be published later this year, but I feel at liberty to state that, in the absence of more favorable tax treatments (currently expensing, either alone or in concert with fifteen percent or twenty-two percent percentage depletion) or their equivalent (some form of cost-sharing by government), there is a dramatic downward impact on a geothermal project’s internal rate of return, regardless of the mill price and financial leveraging being utilized. Though this outcome was not surprising, the extent of the shift did come as something of a shock. Plainly, if hot water geothermal systems are to make any contribution to the nation’s energy needs, it will be difficult if not impossible to imagine them doing so in the absence of a more favorable investment climate. In other words, given the present unfavorable federal tax treatment the necessity for enactment of tax incentives or some other sort of geothermal financial subsidy seems clear.

Large policy questions remain, however, as to what form that bolstering should take, as well as its extent, duration,

etc. These issues are also being examined by the USC Law Center Project, under the direction of Professor Christopher D. Stone and myself. I would like at this time to venture some preliminary, personal observations on these points before moving on to what I consider to be larger and more far-reaching policy dilemma confronting geothermal development.

There are several possible forms that a geothermal exploration/development incentive (or subsidy if you will) might take. Direct grants, loans, loan guarantees, some mode of price supports, favorable tax treatment — these will not exhaust the creative mind in this area, though surely they would be the major areas studied. Of this group, tax incentives seem to possess several major advantages.

First of all, they would incur virtually no direct additional administrative costs, while the others would all require untold increments of red tape, bureaucracy, and therefore delay. They also have the virtue of open-endedness. A tax break is an offer to perform a certain given activity. It neither mandates nor forbids individual action. If a developer opts for exploration on federal lands, there is also a strong basis in equity since tax incentives amount to a forty-eight percent cost-sharing of exploratory risks by the federal government. Properly framed, they would spur geothermal development at the front end, where it is most needed and has the most dramatic impact.

A strong argument could also be made for enactment of at least some of the proposed geothermal tax incentives as an equalizing factor, rather than any subsidy. They would actually bring treatment of this highly capital-intensive natural resource industry more in line with that of business as a whole. Recent research on my part has found that, at least in oil and gas, both integrated and producer firms pay tax at a higher rate than “manufacturing” entities. The impact of increased investment tax credits and accelerated depreciation schedules on these supposedly “normal” tax-paying firms must not be forgotten.

Or one could point to the necessity of constantly exploring for new productive areas, which are by definition less accessible and higher cost and the wisdom, therefore, of increasing cash flows to further this activity. (Of course certain restrictions on use of tax-driven funds might be necessary to insure such a "plowback").

On the negative side, our preliminary work also shows that tax incentives yield the highest benefits to the most affluent individuals and corporations. The taxes so "forgiven" must be made up by other, less well-off individuals. There is also the plain fact that, once enacted, a tax subsidy calcifies and resists repeal even when it has long outlived the original rationale justifying its creation.

In addition, large companies with funds internally generated from other endeavors will be big beneficiaries of any new tax treatment. Not only integrated oil companies, but mining, gas pipelines, utility, chemical, paper, metal and oil producing firms with large, non-geothermal cash flows will utilize the write-offs particularly in the near term. Small firms trying to put together limited partnership drilling programs with affluent individuals as the limited liability partners face increasing investor scepticism on all public drilling programs. Surely some will survive and even prosper but, as in oil, the bulk of the exploratory investment will be large firm-generated.

Trying to balance these competing arguments is difficult. But at bottom, and aside from its obvious necessity, some form of geothermal subsidy, tax or otherwise, seems justified. Development of an indigenous, non-exportable energy source for electrical generation, space and process heating purposes is clearly in the national interest.

Each 110 megawatts of geothermal-based generating capacity saves \$145 million in imported oil costs annually. Utilization of significant numbers of geothermal systems would therefore have a startlingly positive impact on our balance of payments deficit.

Freeing up domestic oil and natural gas for more efficient end uses — another bonus from geothermal utilization — not only increases their already slipping and decidedly precious supply but “matches” the relatively low quality geothermal fuel with electricity generation or direct applications — processes where most heat is inevitably wasted anyway. This “matching” type of energy conservation (rather than simple demand reduction) is often underestimated by energy planners but offers attractive possibilities.

Given the high concentration of potential geothermal areas in the Western states, utilization of this new fuel could also accelerate the inevitable and necessary creation of a West to East energy delivery system, supplying domestic fuels of all kinds to areas of greatest need — and ones currently exhibiting largest dependence upon foreign oil.

Certainly we should keep in mind, as well, the long history of federal subsidies to other energy fuels when reaching any bottom line on geothermal tax treatment, price supports, etc. No energy fuel has ever been forced to make its way into the marketplace without federal assistance. *E.g.*, oil and gas have had some form of depletion since the first income tax law (1913), and percentage depletion since 1926. Current expensing of the intangible costs of both successful and dry holes has been allowed them (by an administrative Treasury decision initially), since 1917. Coal and other minerals picked up percentage depletion in 1930.

The domestic oil and gas industries have been protected by the federal Connally Hot Oil Act and the federally-approved state prorationing cartel since the early 1930's and by oil import quotas between 1959 and 1973.

State Department aid to United States firms engaged in foreign production (including the institution of foreign tax credits and an embargo of Iran in the early 1950's) must be included here as well. In fact, State's considered acquiescence in OPEC's initial muscle-flexing during the winter of 1970-71 and its passivity in the face of the October 1973 price hikes should also be seen in a same light. While the firms involved

may publicly disagree, their large profit increases (and those of all energy investors) over the past several of OPEC-equivalent prices may have been the largest subsidy of all.

Nuclear may have been the most heavily subsidized fuel of all, from massive research and development efforts and federal enrichment facilities to the Price-Anderson Act. These continue to this day.

The synthetic fuels industry is asking for six to eight billion dollars in assorted federal subsidies and may soon be granted that amount, on top of increased research and development.

Solar heating, cooling and electric technologies will certainly be the recipient of large investment tax credits in the Ninety-Fifth Congress, while that same body has doubled ERDA's requests for solar expenditure several years in a row.

In the face of this litany, geothermal's treatment seems almost incredible. For example, if Treasury's Office of Tax Analysis is opposed, on principle, to current expensing of intangible development well costs and any species of percentage depletion, it should bite the bullet and propose to Congress the complete repeal of Sections 613, 616 and 263 of the IRS Code. No doubt quite a bit of support could be generated for such a move. But to use geothermal as a whipping boy for their half-century of frustrations in this regard disgraces the seriousness of their policy concerns. It is also reminiscent of Interior's behavior in the 1960's, when it tried to impose upon geothermal policies which the oil, gas and mining industries had successfully fought off for years. I must admit quite frankly that I have quite a bit of sympathy for both departments' positions, when viewed in historical context. But their recent actions seem to be motivated by vengeance for past wounds and a conditioned response to the presence of large oil companies in geothermal. Again, if Treasury or Forest Service, etc., believes in horizontal divestiture, let them support the already-strong feeling in Congress and perhaps in the White House for such a measure. To try to achieve a similar result through the "back door" of land or tax policy

only feeds the perversity that has continuously made of our myriad of energy related policies such an irrational jumble.

BEYOND TAX AND SUBSIDY POLICY:
THE "LAND USE" DILEMMA

But let us assume for the moment that Congress enacts some level of percentage depletion and current expensing of intangible exploration and development costs in the current session, as I believe it will. Treasury will have been overridden, as Interior was before it. Certainly there will be a sharp increase in geothermal exploration. But will geothermal development accelerate to the level all believe is desirable? I doubt it.

A less tractable constraint will still remain. It is one which hampers not just geothermal, but all energy fuels and projects to distribute or utilize them, including those with favorable tax treatment. It would be a shame if the brouhaha over geothermal taxes, like that over access to public lands before it, obscured this more basic, all-encompassing problem. And that is this: there is no coordinated, energy-environmental policy decision-making process in the United States. No one seeks to assimilate and integrate the diverse and conflicting values of environmentalists, consumers, energy producers, regions and government agencies. This is seen most clearly when "land-use" decisions must be made in order to allow extraction of a fuel or its utilization.

In this policy vacuum, every entity, whether public or private, from local zoning commissions and tax assessors to multinational oil companies and giant privately-owned utilities, is scrambling for its own personal solution. Each is looking out for its own interests — and nothing else. Despite what Adam Smith and his disciples would predict — the optimal energy future of the United States does not add up to the sum of its individual actor's favorite fantasies. The examples of self-seeking, non-coordinated energy conduct are so numerous as to defy cataloguing, but I would like to note briefly some of the more damaging ones.

In geothermal alone, one could point to the duplicative and unnecessary EIR/EIS procedures which must be suffered

before seemingly any action can take place. Relevant agencies squabble over responsibility for approving geothermal-based utility plants and even single wells.

States and the federal government continue their century-long war over water-rights, and the developer must enter the byzantine state water rights maze to secure sufficient assurance that his geothermal fluid production will not be enjoined by local ranchers.

Some developers refuse to join Phillips Petroleum's Roosevelt Hot Springs unit, hoping for a better deal and a free ride from those who drill. Others evade the acreage limits by the use of individual trusts. The list goes on, nor by any means is this ad hoc irrationality confined to geothermal. Prudhoe Bay has spawned more than one example, with the State of Alaska, the Native Corporations and the multinational oil firms squabbling over each's rights.

California is contributing to the Alaskan oil irrationality as well. Standard Oil of Ohio, owner of half the Prudhoe Bay reserves, wants to refine and sell their share in the Midwestern United States. They have chosen a Long Beach, California to Midland, Texas pipeline route, utilizing a converted natural gas line for most of that distance and constructing extensions at both ends and a tanker terminal in Long Beach Harbor. The California Energy Commission and Air Resources Board are steadfastly opposed to the terminal siting, predicting a potentially "immense" adverse impact on Southern California's already poor air quality. Though their claims are strong ones, their "alternative" is the same as the oil producers — sell it to the Japanese. California doesn't need Alaskan oil, they reason, so let the rest of the country fend for itself, paying a higher price for ever greater imports.

These instances are merely the tip of the iceberg. The list goes on and on. Despite all the ink being spilled over "Energy Policy", and the tidal wave of reports, analyses and position papers, the present United States energy area most closely resembles the law of the jungle or the cave, rather than a rational and conscious balancing of local, regional and national values.

As with the more notorious policy problems that have beset geothermal, the mind of man has succeeded only in institutionally balkanizing a situation which nature itself had rendered difficult. Natural resources are not distributed on a uniform per capita basis either, nationally or internationally. Desert-like Saudi Arabia and Kuwait have the most oil but few people, as do the Arctic and deepest parts of our great oceans. By constructing a world-wide distribution system and rationalizing this disparate dispersal of supply and demand, a few large private oil companies, assisted by the United States and British state departments, managed for years to mask this problem. They made all the "land use" decisions and "value trade-offs" in a few New York and London boardrooms. But they are no longer in charge.

Nor is it just Venezuelans, Saudis and Libyans who have short-circuited their arrangements. Britain, Norway, Canada and even the United States have been rocked by demands for greater public control over energy decision making. The strongest and most irresistible historical force now at large in the world is democracy and its most graphic current manifestation is the struggle for popular local control over the use of the energy resources of the earth. No one, from the most affluent leaders of OPEC or OAPEC to the lowest city or county Planning Department, wants to have decisions which so abruptly and thoroughly affect their lives made by "outside" entities over whom they have no control. The "enemy" is thus easy to spot — anyone who tries to impose their will unilaterally, whether it be from the White House or the Exxon boardroom, an international bank or state capital. The powerful forces which rationalized and integrated energy supply and demand worldwide for half a century have been brought to a halt by what must appear to them to be surprisingly minimal opposition.

Nor is the opposition without weapons. Federal and state environmental legislation and other forms of legal challenge now exist, and planning is no longer the private preserve of industry and its "regulators." The energy companies and the federal bureaucracy have not yet fully comprehended the intellectual and political basis for the constant round of chal-

lenges they face. This lack of understanding is as responsible for the oft-furious opposition to energy proposals in Lake County, as it was for the formation of OPEC seventeen years ago.

Many of the past decade's delayed or cancelled energy projects would no doubt have been saved had their proponents actively sought out local opinion, however contrary, at the earliest planning stages and incorporated local values into their proposals. Quite frankly, some facilities would have clearly been quashed by such consultations. And perhaps that is the way it should be, since no one value is supreme. In a democratic society some consensus must be reached as to the desirability of heavily impacting projects. Failure to recognize this will mean that energy activities of every description will continue to be disrupted, delayed, blunted and strangled in "red tape."

From the standpoint of geothermal development this situation is even more ominous, for this new resource is in a vulnerable, formative stage. What can be done to break the stalemate? Is it possible to reconcile the divergent energy interests within the localities, states and regions of the United States?

It could well be that the most helpful and perhaps least expensive subsidy that the federal government could give to geothermal developers would be the reconciliation and re-ordering of the complex knot of conflicting values and attendant procedures which perpetually harass them.

The State of California is currently attempting to perform this function within its jurisdiction. A State Task Force on Geothermal Resources, of which the author is a public member, has prepared a draft of its approach to untangling, or at least partially leveling, the "paper mountain." Perhaps its efforts will be duplicated at the federal level, where the Inter-agency Geothermal Coordinating Council has formed a Task Force on Permitting.

Doubtless some areas will opt to prevent geothermal development. But many more will choose to accept it and delin-

enate clear procedures to be followed. That will truly be a victory for all of us. But if it is not done, passage of favorable tax legislation, like the creation of DGE and the enactment of federal geothermal leasing and loan guarantee programs, will be a hollow victory indeed.