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effectiveness as +1 and we think its effects will be evident in the short term.

### Proposal 14.5.8: Use Federal and State Funds to Encourage Experimental Use of New Mitigation Technologies

The issue of how to mitigate undesired environmental impacts is often a major bone of contention in geothermal hearings. Occasionally, new or still experimental techniques are available to reduce certain impacts, but power plant or steam field operators are justifiably reluctant to bear the full risk of using new technologies.

This proposal argues that the willingness of power plant builders or field operators to use unproven mitigation technologies could be substantially increased if the federal and state governments would provide funds for such applications. The proposal also argues that the development of improved mitigation technologies will go a long way toward decreasing state and local agency resistance to geothermal development.

We think the cost of implementing this proposal would be low in time and money and medium in trouble. The primary cause of the trouble would be the reallocation of funds from plants and basic research to this specific applied purpose. We think the benefits of this proposal would be a low reduction of the time, money, and trouble involved in the geothermal development process. We rate the proposal's effectiveness as +1 and think its cumulative effects will

occur in the long term, although the effects of any successful mitigation technologies are apt to be short term.

## 14.6 Transmission Issues

An installation needs to have a minimum generating capacity of roughly 200 MWe before the construction of new transmission lines can be justified. However, most of the presently envisioned generating units will have capacities of 50 to 100 MWe, and will therefore be too small to justify construction of their own transmission lines. Although some geothermal fields are near existing lines that have the needed capacity availab e, others are not. Consequently, many questions have arisen concerning access to transmission facilities.

The major controversies center on the rights of smaller companies to access to existing lines and the role of the government in insuring that reasonable access opportunities exist. Proposals offered range from policies that would force transmission line owners to wheel power for any producer, to those that would require government ownership and operation of transmission facilities.

### Proposal 14.6.1: Supervise Transmission Negotiations between Privately Owned Utilities and Others Who Want to Transmit Electricity

This proposal argues that even though the Otter Tail case requires privately owned utilities to negotiate in good

faith with others who want to use their power lines, such negotiations still need supervision. There are two reasons for this situation: (1) the vastly unequal bargaining power of the parties, and (2) the fact that the public interest would be served best by a swift conclusion of negotiations.

Before beginning to assess this proposal (or any of the others that deal with transmission problems), we should note that the whole relationship between electricity transmission and newer and more dispersed power sources needs a great deal of study. The issues raised are not likely to be resolved quickly, but until some resolution occurs, these questions are likely to cause problems for both industry and the public.

We think the costs of adopting this particular proposal would be medium in time, low in money, and high in trouble. We suspect that the utilities would put up strong resistance to such supervision on the grounds that it would favor those that want to transmit power over those that have built and operated the transmission facilities. With respect to changes that the proposal would bring about in the geothermal development process, we think that it could produce a low reduction in the time involved, a low to medium reduction in money, and a medium reduction in trouble, since geothermal development in outlying areas would depend on the ability of power producers to transmit that power back to load centers. We rate the overall effectiveness of this

proposal as +1 to +2 and think its effects will occur in the long term.

Proposal 14.6.2: Have Privately Owned Utilities Transmit Power for Other Entities

This proposal goes beyond Proposal 14.6.1: instead of merely calling for supervision of negotiations, it would have the government require that negotiations reach a favorable outcome. Therefore, we expect the adoption costs for this proposal to be higher than those for the previous one. We estimate these costs as being high in time, low in money, and high in trouble. We think the changes that the proposal would bring about in the development process would be a low reduction in the time involved, a low to medium reduction in money, and a low reduction in trouble. We estimate trouble reduction as less in this case than in the case of the previous proposal because this proposal could be expected to cause greater utility resistance. We estimate the overall effectiveness of this proposal as +1 and think its effects would occur in the long term.

Proposal 14.6.3: Conduct Antitrust Actions Against Privately Owned Utilities That Refuse to Wheel Others' Power

This proposal is one of the methods for enforcing the two previous proposals; however, it involves antitrust litigation. Such litigation, as we have noted before, is costly in time and effort and is not a particularly effective policy instrument. We estimate the adoption costs of

this proposal to be high in time, money, and trouble. We think any changes it would bring about in the geothermal development process are apt to be low. Consequently, its overall effectiveness is rated as near 0, and its effects, if any, are seen as occurring in the long term.

Proposal 14.6.4: Place Existing Electric Transmission Lines in "Common Carrier" Status

This proposal represents another way to have transmission line owners wheel small producers' power output. We think the costs of adopting this proposal, like those of using antitrust actions, would be high in time, money, and trouble. It appears that the overall effectiveness of this proposal would be -1, since it is likely to cause more problems than it would solve. Its effects would occur in the long term.

Proposal 14.6.5: Have the State and Federal Power Producers Guarantee the Power of Others Who Want to Transmit over Privately Owned Lines

One of the objections that transmission line owners have to transmitting the power of others is that such power is unreliable, and that they, as the owners, are the ones held responsible for the reliability of the system. One way of dealing with this problem might be for governmental power producers to act as power insurers for the other power sources.

Although this proposal shows a fairly good understanding of some of the reasons for the utilities' reluctance to

transmit power from other sources, it probably is not the best form for dealing with those problems.

We estimate the costs of adopting such a proposal to be high in time, medium in money, and high in trouble, since the arrangement would be very difficult to work out, both technically and administratively. We estimate the changes that it would bring about in the geothermal development process to be a low reduction in time, a low reduction in money, and perhaps a low increase in the amount of trouble involved. Consequently, we rate its overall effectiveness near 0. We think that its effects, if any, would occur in the long term.

### Proposal 14.6.6: Build New Publicly Owned Lines to Connect Geothermal Areas to Load Centers

Since a geothermal power plant can be fairly small and still be economically efficient, many small public utilities are very interested in geothermal development. However, such publicly owned utilities tend to be located at some distance from geothermal resource fields, and consequently would need transmission lines. Some (but certainly not all) of these utilities are quite leery of having to use privately owned transmission lines and would prefer to wheel their power over publicly owned lines. This proposal argues that the way to connect such publicly owned utilities to geothermal fields is for the state or federal government to build more transmission lines into those fields so that

the public utilities could use publicly owned lines to get power from the geothermal fields to their service areas.

We estimate that the cost of adopting this proposal would be medium in time, medium in money, and high in trouble. Quite often the public line would simply duplicate a privately owned line; furthermore, it would have all the right-of-way problems that the private line had already gone through. We think that the changes that could occur in the development process would be medium reductions in time, money, and trouble. Nevertheless, we give this proposal a favorable rating because at present several public utilities are willing to look only at geothermal fields that are near publicly owned transmission lines. We rate the proposal's overall effectiveness at +1 and we think that its effects will occur in the long term.

### Proposal 14.6.7: Require that Lines Built to New Nongeothermal Plants Make Provisions to Carry Geothermal Power Where Appropriate

This proposal is addressed to the complaint of many utilities that existing lines sometimes lack the capacity to carry geothermal plant output. The proposal argues that all transmission line extensions should plan for future geothermal development when they are to be routed near geothermal fields. The primary virtue of this proposal is that geothermal development would not have to pay an independent price for the time, money, and trouble of assembling a right-of-way and building a transmission line.

We estimate that the cost of adopting this proposal would be medium in time, low in money, and medium in trouble. We think the changes it could bring about in geothermal development processes are a medium reduction in time, money, and trouble. We rate its overall effectiveness as +1 and think that its effects will occur in the long term. Of course, many participants in the geothermal system plan to transmit goethermal power over transmission lines that will also carry power from planned nuclear plants in nearby (also remote) sites. The opposition to nuclear plants in California, even with the failure of Proposition 15, may well succeed in delaying or preventing the construction of both the plants and their associated transmission lines. Without the economies of scale available through "piggybacking" transmission from geothermal plants onto lines designed to handle much larger loads, bringing power from remote geothermal resource locations may pose economic problems. Therefore, if such lines are not going to be built, the geothermal participants will have to make other plans.

### Proposal 14.6.8: Have the State Designate Transmission Corridors and Assemble the "Rights-of-Way" Across Them

This proposal would require that the state government, rather than the utilities that are going to transmit the power, bear the time, money, and trouble costs of choosing the transmission corridors and assembling the rights-of-way.

We estimate that the cost of adopting this proposal would be high in time, money, and trouble. Part of the problem is that the transmission corridor selected by the state government may be in the wrong place and may be assembled at the wrong time to be of optimum use to the entities that want to transmit power to that corridor. Nevertheless, if the state government does assemble such corridors and the attendant rights-of-way, we think the proposal would produce a medium reduction in the time, money, and trouble involved in geothermal development. We therefore rate the proposal as +1 and think that its effects would occur in the long term.

## 14.7 Taxation and Finance Issues

As in any industry, taxation issues in geothermal development can serve as either powerful inducements or deterrents to expansion. Several tax-related issues have been mentioned under other headings. In this section, we address the major tax change proposals that have been put forth in the past few years.

### Proposal 14.7.1: Allow Intangible Costs of Drilling Geothermal Wells to be Deducted as a Current Expense for Tax Purposes

Normally, the Internal Revenue Code requires that taxpayers include all expenses associated with the obtaining of capital goods in the "basis" of the capital and then allows them to deduct a portion of the basis from their current

income over the life of the capital goods. In the case of oil or gas wells, however, a special provision allows the taxpayer to deduct all the wells' intangible expenses (such as those for the labor of exploring the area and drilling the hole) from current income immediately. This provision makes investment in oil and gas drilling an attractive prospect for companies and individuals seeking deductions to "shelter" income from other sources, and it frees income from one set of wells for use in drilling the next set. Court cases in California have applied this provision to geothermal steam wells, but its application to geothermal hot water wells remains in doubt. This proposal calls for application of the provision to all geothermal wells.

We estimate that the cost of adopting this proposal would be medium in time, medium in money, and medium in trouble. It does require congressional legislation, and it does favor resource extraction industries; however, because the legislation has already come close to passage in Congress and the bill is currently in the legislative process, its adoption costs are less than they might otherwise be.

In terms of the changes that the proposal could bring about in the geothermal development process, we estimate that it could produce a low reduction in the time and money involved, and a medium to high reduction in trouble. Its main advantage is that it would make outside money for geothermal investment less costly and easier to raise, since high-income individuals would be attracted to the shelter

aspects of geothermal investment despite its inherent risks. We rate its overall effectiveness as +1 to +2 and think that its effects would occur in the short term.

### Proposal 14.7.2: Allow the Deduction of Intangible Expenses as Current Expenses, but Only if the Tax Savings Go Directly into Geothermal Expenditures

This proposal imposes the limits on the deduction of intangible expenses as a current expense in order to make the procedure more palatable to Congress and the public. However, we think that the restriction on the use of the tax savings would hamper their ability to attract outside investment. Consequently, we think the proposal would be slightly harder to implement than Proposal 14.7.1 and would have slightly less positive impact (0 to +1) on geothermal development.

### Proposal 14.7.3: Allow Revenue from Geothermal Wells to be Subject to a 22 Percent Depletion Allowance Instead of Cost Depletion

Normally, taxpayers are allowed to take cost depletion allowances, in which they may deduct no more than a fixed portion of the original cost of each resource over the predicted life of the resource. In the case of minerals, however, a taxpayer may deduct a certain percentage of the income from the mineral as long as he has income from it, regardless of the original cost of the mineral source. This proposal calls for the application of this depletion allowance to all geothermal resources. Once again, a court case

in California has applied the provision to geothermal steam, but not to geothermal hot water.

The primary virtue of this proposal would be to free the internal funds of geothermal development companies for further investment in geothermal development. The assessment of the proposal in terms of adoption costs--medium in all three categories--is very similar to that of Proposal 14.7.1, since this provision is part of the same bill as the provision involved in Proposal 14.7.1.

With respect to the changes it would produce in the geothermal development process, we think it would bring about a low reduction in the time involved, a medium reduction in money, and a medium reduction in trouble. We rate its overall effectiveness as +1 to +2 and think that its positive effects would be seen over the long term.

### Proposal 14.7.4: Allow Percentage Depletion Only to the Extent that Tax Savings are Invested in Geothermal Development

This proposal suggests a restriction on the use of tax savings from an income depletion allowance to lower the adoption costs of such an allowance. We estimate these costs as low to medium in all three categories. The restriction on the tax savings would not detract markedly from their attractiveness; therefore, the proposal would make more money available for geothermal development. Its effect on the development process will be a low reduction in the time involved, a medium reduction in money, and a medium

reduction in trouble. We rate its overall effectiveness as +1 to +2, and think that its effects will be long term.

Proposal 14.7.5: Allow Geothermal Developers to Deduct as Current Expenses 300 Percent of the Costs Associated with Dry Holes

This proposal, like others above, is designed to increase the attractiveness of geothermal investment for those in high tax brackets. The premise is that if one in three geothermal wells is successful, writing off 300 percent of the costs associated with dry holes would make geothermal investment almost a no-lose proposition.

We estimate that the adoption costs of this proposal would be high in time, money, and trouble. It is extremely favorable to individuals in high tax brackets, and is favorable in a form that neither Congress nor the public seems in any mood to support; therefore, it is apt to face very stiff resistance. We estimate that it could produce a medium reduction in the time, money, and trouble involved in geothermal development because it would vastly increase the number of both people and dollars going into geothermal development. However, counties and state agencies would still want to proceed fairly cautiously with permit-granting and other procedures. We rate the effectiveness of the proposal as +1, but think that its most notable effects would occur in the short term.

## Proposal 14.7.6: Use a Biddable Factor Other than a Cash Bonus in Competitive Lease Sales

At present, the federal government grants leases in KGRAs to the potential lessee willing to pay the highest bonus (cash value per acre) for the lease. The California SLC is currently trying a lease bidding procedure in which the potential lessees offer to set aside a percentage of net profits for the state. This proposal argues that the bonus bidding procedure rewards those with immediate cash, thus favoring the bigger resource companies. The net profits bidding procedure, however, has some difficulties. First, it involves substantial administrative expenses to check the accounting by which the leaseholder determines net profits. Second, it poses a problem for public agencies, which have difficulty defining "net profits." Therefore, this proposal calls for BLM and SLC to experiment with royalty bidding as a compromise. This method of bidding would also allow money that would have gone into bonuses to be used for exploratory and development drilling instead.

We estimate that the costs of adopting this proposal would be low in time and money but medium in trouble, since it would face resistance from those who feel the federal and state governments should get as much as they can for leases immediately. We estimate the effects it could exert on the geothermal development process as a medium reduction in the time involved, a low reduction in money (the lessee would pay with later dollars rather than earlier ones), and a

low increase in the trouble involved (instead of a simple, one-time cash bonus, the developer now has to worry about calculating either increased royalties or net profits in the future). We rate the overall effectiveness of this proposal as +1, and think that its effects will occur in the long term.

Proposal 14.7.7: Replace the Local Property Tax with a Severance Tax

This proposal would do away with the property tax on geothermal resources and would tax only the value of resources removed from the ground.

Because it would require a legislative and perhaps even a state constitutional change, its adoption costs are high in time, money, and trouble. Resistance can be expected from two sources: from developers, who would fear greater tax increases (it is easier to change the severance tax than the property tax); and from the counties, which would oppose erosion of their property tax base, elimination of their control in taxing what they view as a local resource, and the loss of revenue to compensate for the risks associated with power plants.

We estimate the changes that this proposal would produce in geothermal development as virtually zero reduction in the time involved, a low reduction in money (presumably, the severance tax would not start until the developers started delivering the geothermal resource), and a low

increase in trouble (it is apt to increase the counties' resistance to geothermal development for the same reasons that made it hard to adopt). We rate the effectiveness of this proposal as -1 to 0 and think that its effects, if any, would occur in the short term.

Proposal 14.7.8: Eliminate the Capital Gains Tax on Sales of Geothermal Assets

This proposal is another unusual tax break to encourage geothermal development. It argues that increasing the ease with which lands containing geothermal resources could be transferred from one owner to another would lead to their ownership by those most eager to develop them. Since this proposal requires a legislative change that is both favorable to a resource extraction industry and unusual, we feel that adoption costs will be high in time, money, and trouble. (For some reason, propositions that favor resource extraction industries in unusual ways appear to fare even worse than those that favor them in normal ways.) We estimate that the changes this proposal would produce in the geothermal development process would be a zero reduction in the time involved, a low reduction in money, and perhaps a low reduction in trouble. We rate its effectiveness as near 0 and think that its effects, if any, would occur in the long term.

Proposal 14.7.9: Relax California Restrictions on Selling Risky Securities

The argument for this proposal is that geothermal investments are so risky that they cannot be offered through the normal security sales process. We estimate that this proposal would have adoption costs high in time (if the securities restrictions were to be relaxed, a new set of securities restrictions would have to be developed); low in money; and high in trouble (such a move would be very controversial and would be hard to justify for geothermal development alone--as opposed to other risky developments). We estimate the changes this proposal could produce in the geothermal development process would be low reductions in time, money, and trouble. We rate its overall effectiveness as -1, because the side effects on securities markets, together with the political pressure exerted by annoyed investors who lost money as a result, would more than cancel out any gain in ease of marketing geothermal securities. We estimate that the effects, if any, would occur in the long term.

Proposal 14.7.10: Promote More Limited Partnership Agreements

The limited partnership agreement provides a device for raising money from those outside the geothermal field without incurring many of the restrictions involved in selling securities. Some companies have already begun using this technique to raise money for geothermal development. We

estimate that its adoption costs will be low in time, low in money, but high in trouble (geothermal development is a very risky investment with an uncertain tax status, so that attracting more money is going to continue to be difficult no matter what mechanisms are used).

With respect to changes in the geothermal development process, we estimate that the proposal could produce low reductions in the time and money involved and a medium reduction in trouble, since limited partnership agreements place the developer under fewer obligations than do loans. We rate the overall effectiveness of the proposal as 0 to +1. We think that its effects, if any, would occur in the long term.

Proposal 14.7.11: Have California Change Its Tax Laws as a Model for the Suggested I.R.S. Changes

This proposal would allow both the deduction of intangible expenses as a current expense and income depletion to be incorporated into the California income tax law as a model for the way the federal statute might read. We estimate the adoption costs of this proposal to be roughly medium in time, money, and trouble (not much money is at stake, but the proposal does require a legislative change). We think that the proposal's effect on the development process would be a low reduction in time, money, and trouble. The action itself cannot be expected to have much of an effect, since the California income tax rate is fairly low.

Furthermore, at the present time this arrangement is not apt to serve as a model for the I.R.S.: first, because the I.R.S. has already announced a position against such legislation; and second, because similar models of such legislation have already been introduced in Congress. Therefore we rate the proposal's overall effectiveness as 0 to -1. We think that its effects, if any, would occur in the long term.

Proposal 14.7.12: Enact Provisions Similar to Those Surrounding KEOGH Plants to Encourage Institutional Investment in Geothermal Development

In geothermal development, there appears to be a long time between the initial investment and the return. Consequently, the investment is not attractive for those seeking more than a tax shelter. Some middle-class investors who are willing to take large risks and wait many years for the chance of a return that would vault them into another income class may find geothermal investment attractive, but they do not represent enough money to sustain a high rate of investment in geothermal development. Therefore, this proposal calls for tax and trust provisions that would attract the large investors who can and will wait for a long time: institutions such as universities and pension funds. These provisions could include deferment of taxation on income invested in geothermal development; changes in the trust laws allowing geothermal resources to qualify as "prudent investments" (on the grounds that these investments

serve a particularly valuable public purpose); and lower rates of taxation on geothermal income that returns to the investing institutions.

Because many of these provisions are statutory changes, the adoption costs are going to be medium to high in time, money, and trouble. The proposal also faces the danger that if these provisions were enacted for geothermal development the government might be besieged with requests that other investments receive similar dispensation. The proposal would then become a general tax preference package and would face increasing political resistance.

Even if such provisions were enacted, however, we doubt that that much money would be forthcoming. We therefore think that the proposal would exert low effects on the time, money, and trouble involved in geothermal development. In addition, the proposal could have many unfavorable side effects, such as the pressures it creates to give special treatment to other investments. Consequently, we rate its effectiveness as 0. We think that its effects, if any, would occur in the long term.

### Proposal 14.7.13: Establish a Time Period for Cost Depletion Purposes

This proposal, like Proposal 14.7.8, represents a change in the tax treatment of geothermal resources in order to make it easier to transfer them from one owner to another. If the I.R.S. would set a definite time period for cost depletion of the geothermal resource, negotiations between

buyers and sellers of land with geothermal potential would be much easier.

We think that this proposal could probably be accomplished by regulation, which would make its adoption costs low in time and money, and medium in trouble (the trouble arising over arguments as to the exact time period to be allowed for cost depletion). We think the effects of the proposal on the process would be a zero reduction in the time involved, a zero reduction in money, and a low reduction in trouble (it would be slightly easier to transfer land with geothermal potential). We rate its overall effectiveness as between 0 and +1. We think that its effects would occur in the long term, since the process of transferring land from one owner to another is apt to take a long time.

## 14.8 Environmental Reporting

Environmental reporting is one area that has been the source of numerous and continuing complaints. This is also an area where institutional learning and administrative changes can produce some desired improvements in a relatively short time.

### Proposal 14.8.1: Do a Leasehold EIR and Then Require No More than Addenda for Subsequent Wells on that Leasehold

This proposal addresses the issue of how much data and analysis--as well as how large a geographic area--should be

included in the initial EIR. It argues that the total permitting process would be faster if the applicant and the county followed the procedures now usually used in Sonoma County, where the first application includes a relatively large land area, and subsequent applications are merely added to that first EIR.

We estimate the adoption cost of this proposal to be low in time, low in money, and medium in trouble. The trouble is likely to arise from resistance by the developers, who appear to take the position that EIRs on the first wells in an area should be quite small. Since the discovery of a dry hole will mean that the developer will pull out entirely, developers argue that a more extensive EIR should wait until the area gives evidence of having a fairly high geothermal potential.

The effects of this proposal on the geothermal process will depend on whether early exploratory wells do discover geothermal resources. If one of the first exploratory wells were to discover a geothermal resource, then the effects on the process would be a low reduction in the time, money, and trouble involved. If none of the initial wells were to find a geothermal resource, then the effect of the proposal would be to create a low increase in time, money, and trouble. Perhaps a useful modification to the proposal would be to apply it only in areas with very high geothermal potential.

We rate the overall effectiveness of the proposal as 0 to +1 in high potential areas and -1 to 0 in low potential areas. In any case, we think its effects will show up in the short term.

Proposal 14.8.2: Allow Geothermal Activities to Receive a Negative Declaration

At least theoretically, counties do have the power now to declare that the drilling of geothermal wells exerts little significant impact on the environment. Indeed, one argument for this proposal is that exploratory drilling itself provides data essential to an adequate EIR. Such a "negative declaration" would mean that less extensive documentation would be required for permit granting. Therefore, we estimate the adoption costs of this proposal to be low in time, low in money, and medium in trouble. The trouble is likely to arise because of the controversial nature of giving a negative declaration for what is still a fairly new kind of activity. A compromise that might lessen the controversy would be to prepare EIRs to cover only the disturbance of vegetation.

We estimate that the effects of this proposal on the geothermal process would be a low reduction in the time, money, and trouble involved. If a county's negative declaration decision would be upheld by the courts, the proposal would exert a positive effect on the system. However, such an effect would be small at best, because the time, money, and trouble involved in a negative declaration process are only somewhat less than those required by a full EIR process.

Therefore, we rate the proposal's overall effectiveness as 0 to +1. We think that its effects would occur in the short term.

Proposal 14.8.3: Grant the Drilling of Geothermal Wells a Categorical Exemption from Some of the Environmental Procedures

This proposal, like the previous one, would also reduce the reporting requirement surrounding the permitting of geothermal wells. However, it would go even further than the previous proposal, arguing that if the drilling of geothermal wells follows certain specified procedures, the activity should exert no environmental impacts that need analysis in an environmental impact report. Many petroleum wells receive such a categorical exemption now and thus escape the requirements of the environmental reporting process. However, there is some discussion to the effect that petroleum wells may be losing their categorical exemption in the future. Therefore, we estimate the adoption costs of this proposal as low in time, low in money, but high in trouble: even though the counties have the power to implement the proposal, any attempt to let geothermal wells escape the environmental reporting process is apt to be very controversial, and may be prevented by litigation.

Our basic reservation about the proposal is that the reduction in the time, money, and trouble involved in the environmental reporting process will be somewhat cancelled

out by the increased trouble in dealing with the resistance that is likely to arise. We estimate that the effects of this proposal would be to bring about a low reduction of the time, money, and trouble involved in geothermal development; that its overall effectiveness will rate somewhere between 0 and +1; and that its effects will occur in the short term.

Proposal 14.8.4: Make the Drilling of Geothermal Wells an Allowable Land Use in KGRAs and Other Areas of High Geothermal Potential

This proposal argues that decisions about where geothermal development should and should not occur need to be set forth in a comprehensive planning decision. Proponents of this proposal expect that it would produce one of two results: (1) a county might balance zones of exclusion with zones of inclusion, so that development could proceed faster in included zones; and (2) even if zones of inclusion are not specified, the protection of the most sensitive zones from geothermal development would reduce the opposition to such development in the county as a whole.

We think that the counties have the power to institute this proposal now. If they were to do so, drilling geothermal wells would not require a separate conditional-use permit, but could simply proceed under rules previously set up to govern drilling in each area. However, the counties are very much against any process that would eliminate their well-by-well control of geothermal development. Therefore, we estimate that the adoption costs would be low in time, low in money, but very high in trouble.

Because the preparation or amendment of county land-use plans always takes a great deal of time and effort, we estimate the changes that this proposal would bring about in the geothermal development process as a low reduction in time involved, a zero reduction in money, and a medium reduction in trouble. This reduction in trouble, however, will occur only if those opposed to geothermal development are satisfied that it is excluded from the right areas. Otherwise, a county land-use plan is apt to make the situation worse, because it may exclude areas of high potential while granting permission for geothermal development to proceed in areas of very low potential.

In some counties and in some political situations, this tactic may be very effective in reducing opposition to geothermal development. In other counties, it may be ineffective for that purpose and may, in addition, severely harm geothermal prospects. Consequently, we rate the overall effectiveness of this proposal as -1 to +1. In any case, we think its effects will occur in the long term.

### Proposal 14.8.5: Prepare a "Generic" EIR for the Entire Potential Area in the County and Allow All Wells to be Permitted on that Basis Alone

This proposal suggests the preparation of a "generic" EIR that would be county-wide, or perhaps even KGRA-wide. Such an EIR would undoubtedly cost more in time, money, and trouble to produce and would have less detail than EIRs done on a well-by-well basis; nevertheless, the total amount of

time, money, and trouble involved might be less than that required by a whole series of individual EIRs.

We estimate that the adoption costs of this proposal would be high in time, medium in money, and high in trouble, since counties appear to welcome such generic EIRs as a supplement to the individual EIRs but not as a substitute. In addition, such a wide-scale report would undoubtedly be expensive and take a great deal of time. We estimate that the effects of the proposal on the geothermal development process would be a medium reduction to a medium increase in the time involved (whether one large EIR would take less time than many small EIR's is somewhat uncertain), a low reduction in money, and a low increase in trouble, since it is likely to engender the sort of legal challenge that is presently directed against BLM's reliance on its programmatic EIS for leasing.

We rate the overall effectiveness of the proposal as 0 to -1. One of the reasons for this low assessment is that is would interfere with the smooth flow of development proceedings. Geothermal developers would have to wait for the completion of the area-wide EIR (which is apt to take a long time because of its breadth) before they could carry out tests in that area.

Also, an area-wide EIR is most effective in cases where impacts and outcomes are fairly certain. With geothermal development, however, impacts and outcomes are relatively uncertain. In such a case, it is very helpful to be able to

use information from the first well to evaluate the second well, and so forth. This proposal would deprive the counties and others of the valuable information provided by an incremental approach. Therefore, although an area-wide EIR might well be a good supplement to individual EIRs, it is not a good substitute.

Proposal 14.8.6: Allow EIRs for Wells to Exclude Power Plant Impacts if Leasehold Has No Preexisting Producing Wells

This proposal addresses a conflict between developers on the one hand and counties and state agencies on the other. Before allowing an exploratory well in a given area, counties and state agencies want to know what would be the impact of full-scale development in that area. The developers argue that unless the test wells reveal the existence of a geothermal resource, the area will experience no impacts at all. Therefore, this proposal suggests that at least the initial wells should be drilled on the basis of well impacts only and a more comprehensive analysis of impacts should be undertaken only when a resource is discovered.

The counterargument to this proposal is that once a resource is discovered, the political pressure to develop that resource is almost irresistible. Therefore, people who are very concerned about the spread of geothermal development feel that possible impacts need to be analyzed before the resource is discovered.

We estimate that the adoption costs of this proposal would be low in time, low in money, but high in trouble. Although the counties have the power to accept such EIRs now, they are apt to meet very stiff resistance from the public and from some state agencies if they attempt to do so.

We estimate that the proposal's effects on the process would be to produce low reductions in time, money, and trouble. We estimate its overall effectiveness as between 0 and +1, and think its effects, if any, would occur in the short term.

Proposal 14.8.7: Speed up the State Clearinghouse

This proposal addresses the problem of delays in getting environmental reports to the appropriate state agencies and in receiving comments from those agencies. Many people have not been satisfied with the speed with which the State Clearinghouse has been performing this function. Normally, adoption costs for this type of proposal would be high, because it is likely to involve legislative action. However, a bill addressing this subject (Assembly Bill 2649) has already been introduced into the legislative process. Although the bill is not yet in final form, modifying an existing bill is almost always easier than introducing a new one. Therefore, we estimate the adoption costs as low in time, money, and trouble.

Here again, this proposal would reduce system delays by a small amount. Therefore, we estimate that its effect on the geothermal development process would be to produce a low reduction in the time involved and near zero reductions money and trouble. We rate its overall effectiveness as between 0 and +1, and think its effects would occur in the short term.

Proposal 14.8.8: Allow EIRs to be Sent Directly from Counties to the Local Office of the Appropriate State Agencies

Currently, counties must send draft EIRs through the State Clearinghouse before they can go to local offices of state agencies. Some counties feel that the previous procedure, which allowed them to deal with the local agencies themselves, gave them more information relative to the local conditions and gave it to them faster.

We estimate the adoption costs of this proposal to be low in time, low in money, and medium in trouble, since state agencies would probably resist such a move on the grounds that it would interfere with policy coordination between the state and local levels. We estimate the benefits to geothermal development as a low reduction in the time involved and near zero reductions in money and trouble: although the counties would get some immediate local feedback, they would still have to wait for feedback from the state level. The counties might also have to deal with the differences between the state and local offices' view of the

problems involved. We rate the effectiveness of this proposal as between 0 and +1, and think its effects would occur in the short term.

Proposal 14.8.9: Require Each Lead Agency to Draw up a Set of Uniform Requirements for Geothermal EIRs

This proposal addresses the complaint that those who must prepare EIRs have no explicit guidelines on either scope or content required for geothermal activities. Furthermore, the lack of explicit criteria has meant that requirements for EIRs have tended to shift over time. Thus, participants complain they are always trying to hit a "shifting target." This proposal calls for promulgation of explicit criteria to remedy these difficulties.

We think the adoption costs of this proposal would be medium in time, money, and trouble, since setting down such uniform requirements is hard to do. Such criteria have been produced for large portions of the EIS for nuclear plants and geothermal plant and field impacts are extremely simple by comparison. Nevertheless, because uncertainty exists as to some of the effects of geothermal development in individual areas, standard criteria are apt to miss some issues that are important in particular areas, while requiring analysis of other issues that are not always applicable.

We estimate the changes that this proposal would bring about in the process would be a low reduction in the time involved, a low reduction in money, and a medium reduction

in trouble. We rate the proposal's overall effectiveness as 0 to +1 and think its major effects would show up in the short term.

Proposal 14.8.10: Have the Lead Agency, Instead of the Applicant, Hire the Consultant Who Will Prepare the EIR

This proposal argues that the practice of having the lead agency hire the consultant--a practice that already exists in some counties--should be extended to all agencies. The rationale is that in the absence of explicit criteria for the content of EIRs and in light of the unique local problems that are often encountered, the lead agency would be better able to recommend a consultant who is familiar with the particular issues that need to be addressed in a given locale.

We estimate the adoption costs of this proposal to be low in time, money, and trouble. We think its benefits to geothermal development would be a low reduction in time, probably a zero reduction in money, and a low reduction in trouble. We rate its overall effectiveness as 0 to +1 and think its effects would occur in the short term. However, to be most effective, this action should be linked with Proposal 14.8.9 (requiring lead agencies to draw up a uniform set of requirements).

Proposal 14.8.11: Require Uniform, Reasonable Steps for Complying with Laws such as the Antiquities Act and the Endangered Species Act

Several participants have argued that the search for, and protection of, endangered species and/or antiquities

appears to have no inherent limit according to current statutes and regulations. Therefore, this proposal calls for regulations that will set limits on the effort (in terms of time, money, and trouble) that participants must exert to search for or protect antiquities and endangered species.

We estimate the adoption costs on this proposal to be medium in time, low in money, and medium in trouble. The time and trouble would go into determining which steps are reasonable for the protection of antiquities and endangered species.

Because the open-ended nature of the requirements under these acts currently appears to be slowing development in several areas, setting limits on the amount of effort required should enable development in those areas to go ahead. Consequently, we estimate the proposal's benefits to geothermal development as a low to medium reduction in the time involved, a low reduction in money, and a low to medium reduction in trouble. We rate the proposal's overall effectiveness as between 0 and +1, and think its effects would occur in the short term.

### Proposal 14.8.12: Require Those Who Appeal Decisions on the Grounds of EIR Inadequacy to Post Bonds

This proposal argues that those who challenge the adequacy of an environmental impact report should post bonds to pay the costs of demonstrating the adequacy should the claims of inadequacy be declared invalid. This proposal is very controversial, since it opens the door for allowing

applicants to get away with shoddy EIRs. It is very doubtful that any measure of this sort would be politically acceptable. Consequently, we estimate the adoption costs of this proposal to be high in time, low in money, and high in trouble. We estimate the changes that the proposal would bring about in the geothermal development process to be a low to medium reduction in the time involved, a medium to low reduction in money, and a low to medium reduction in trouble.

Presumably, the posting of bonds would prevent people from appealing on the grounds of EIR inadequacy when they really had some other grounds for appeal in mind. However, if the full burden of contesting an EIR's adequacy were placed on individual citizens, then legitimate challenges would be prevented along with fallacious ones. The potential for deterioration in both the quality of EIRs and the political acceptability of the process probably outweighs any advantages that the proposal might have in eliminating frivolous appeals. Therefore, we rate the overall effectiveness of the proposal as -1. We think that the effects would occur in the short term.

Proposal 14.8.13: Establish an Administrative Board to Hear Appeals Based on the Alleged Inadequacy of EIRs

Many people feel that taking EIRs to court is very costly and requires environmental expertise that the courts do not have. This proposal argues that an administrative board established for the purpose of hearing such appeals

would have the necessary expertise and would also be able to deal with such issues more promptly.

We estimate the adoption costs of this proposal to be high in time, low in money, and high in trouble, since the establishment of a board would require legislative change and a budget allocation. The proposal is also apt to be fairly controversial. We estimate the changes it would produce in the geothermal development process to be a low increase in the time, money, and trouble involved. Our reason for giving such a negative assessment is that we think the existence of the board would encourage people to make more EIR appeals. In addition, those making appeals would probably not be satisfied with an unfavorable decision by the administrative board and would take the case to court anyway. Of course, the intensive review of the EIRs could produce better EIRs; on the other hand, it could simply produce bigger ones. At any rate, the net effect would probably be to add much more time to the EIR review process; therefore, we rate the overall effectiveness of this proposal as -1 and think its effects would occur in the short term.

Proposal 14.8.14: Have the Federal and State Government Help Collect Baseline Data in Areas Most Likely to be Sites of Geothermal Development

This proposal argues that much of the baseline information necessary for individual EIRs does not now exist and that the state and federal governments should help gather

those data. Once gathered, the data could then be incorporated into individual EIRs as needed. Some activity of this nature is already in process: the CERCDC study of The Geysers is a good example.

We estimate the adoption costs of this proposal to be medium in time, money, and trouble, since collecting such data would be both time-consuming and expensive, and would involve the reallocation of budgets within agencies. However, the availability of the necessary baseline data could significantly reduce the time, money, and trouble involved in producing individual EIRs. It would also shift the burden of payment of the data collection costs: instead of the applicants paying the costs on a site-by-site basis, the federal or state government would pay the cost on an area-wide basis. Consequently, we estimate the benefits occurring to the geothermal development process to be a low to medium reduction of the time involved, a low reduction in money, and a low to medium reduction of the trouble. We rate the overall effectiveness of this proposal as +1 and think its effects would occur in the long term.

### Proposal 14.8.15: Increase Staff of Lead Agencies to Give Them More Time to Review EIRs Before Public Hearings

This proposal is most concerned with the counties that have very few environmental experts available to review EIRs. We estimate that the adoption costs of this proposal would be medium in time, money, and trouble. Adding staff

to a government agency is always hard because of the budgetary implications involved. In this case, it would also be hard to find people with adequate expertise. We estimate the changes the proposal would produce in the geothermal development process as a low reduction in the time involved in geothermal development, a zero reduction in money involved, and a low increase in the trouble involved. With respect to the proposal's overall effectiveness, there are two viewpoints. Several participants in the process have cited the danger of a Parkinson's Law problem: the more people that are available to review EIRs, the longer the review process would take. On the other hand, the additional staff might be able to spot errors that would otherwise go unnoticed, so that the developers could correct the errors before public hearings were held. From this viewpoint, the proposal could be seen as improving the quality of EIRs. We think that the two sets of effects would tend to balance out; therefore, we rate the overall effectiveness of this proposal as near 0. In any case, the effects would occur in the relatively short term.

## 14.9 The California Energy Resources Conservation and Development Commission (CERCDC)

As discussed in detail in Chapter 10, CERCDC is a new state agency that is in the process of defining its operating procedures and policies. It is hoped that by the time CERCDC

becomes formally involved in the regulation of the geothermal development process, the outcome will have been decided for many of the currently unresolved issues.

At present, the commission is moving to work out its operating procedures, to develop standards, and to promulgate regulations. However, since CERCDC is not yet directly involved in the licensing process, proposals concerning its actions are based primarily on problems that are anticipated rather than problems that currently exist.

Proposal 14.9.1: Resolve the Ambiguity over the Energy Commission's Possible Mandate to Control the Permitting of All Geothermal Wells

The statute creating the energy commission gave it the power to site power plants and related facilities. Some participants have raised the question as to whether the commission's power to site "related facilities" could make it the permit-granting agency for all geothermal wells. There are at least two possible interpretations of this mandate: (1) CERCDC is to control siting of all wells; and (2) it is to control siting of production wells only. The first interpretation would undoubtedly be challenged in the courts; consequently, we would estimate its adoption costs as high in time, money, and trouble. We estimate that its effect on the geothermal development process would be to create a high increase in the amount of time involved, a low increase in money, and a medium increase in trouble. These cost increases would stem from the political resistance

of the counties to giving up all of their power over geothermal development. We rate the overall effectiveness of this interpretation as -2, and think that its effects would occur in the short term.

If the commission interprets its mandate as covering production wells only, however, the practice is less likely to face a court challenge. Therefore, we would estimate its adoption costs as low in time, low in money, and medium in trouble. We would estimate the changes it would bring about in the geothermal development process as a zero reduction in the time involved, a zero reduction in money, and a low increase in trouble. This increase is due to the greater difficulty of considering production wells at the same time as the power plant--as opposed to the current practice of considering the production wells first and then using this information in power plant decisions.

Unlike the permitting of exploratory wells, the permitting of production wells is very much a part of the permitting of a power plant. We suspect that whether the county or the energy commission does the permitting of production wells will, in the long term, have little effect on the process. As the energy commission gains experience in the geothermal area and the impacts of the power plants are better understood, we think that the counties may be willing to give up what has been a substantial administrative burden, particularly when they still control the placement of the initial exploratory wells. However, such a

transfer will probably have to come about gradually, with the full participation of the counties along the way, and any unilateral action by the energy commission is not likely to be well received. Therefore, we rate the overall effectiveness of the second interpretation at near 0, and think that its effects will show up in the short term.

Proposal 14.9.2: Have CERCDC Conduct Hearings Jointly with State, Regional, and Local Agencies with Which It Shares Power

CERCDC has extensive powers to resolve many issues that currently are being handled by other agencies--(for example, APCDs). One option for accommodating these agencies' concerns and responsibilities would be to conduct hearings jointly on Notices of Intent and Applications for Certification. This proposal argues that such a "panel" or consolidated forum would provide the best method because it would give the other agencies a voice in the proceedings, would reduce potentially volatile political tension, and would give CERCDC a chance to absorb the knowledge of the other agencies. These benefits should help reduce opposition to CERCDC decisions.

The alternative to this practice would be to use a unitary agency procedure in which the other agencies, if they appeared at all, would appear as parties or would be asked to comment on drafts of CERCDC's decisions. Because it is likely that CERCDC will in fact choose the first option, we estimate adoption costs of this proposal as low

in time, money, and trouble. We think the changes that the proposal would bring about in the geothermal development process would be a zero reduction in time and money, but a medium reduction in trouble. We give the proposal an overall assessment of +1 and think its effects will occur in the short term.

Proposal 14.9.3: Raise the Limits on the Minimum Size of Plants whose Site Must be Approved by the Energy Commission

Some participants have suggested that the geothermal development process could be speeded up by exempting most geothermal plants from CERCDC siting control. Currently, all plants producing 50 MWe or more must have their site approved by the energy commission. Most geothermal plants will probably have a capacity of less than 150 MWe. Consequently, if this limit were raised to something like 150 MWe, no geothermal plant would have to be approved by the energy commission. Applicants would then have the option of obtaining approval from either the energy commission or the county and CPUC, according to their preference.

Because this proposal would require a controversial legislative change, its adoption costs would be high in time, low in money, and high in trouble. The changes it would bring about in the geothermal development process are apt to be a low reduction in time involved, a low increase in money, and a low reduction in trouble. The reason that time and trouble are likely to decrease is that presumably

the applicant would choose whichever option was faster. The money, however, would be likely to increase, since the scheme would involve two plant siting procedures--state and local--instead of one. We rate the overall effectiveness of this proposal as 0 to +1 and think that its effects would occur in the long term.

**Proposal 14.9.4: Build Plants Smaller than 50 MWe in Order to Have a Choice of Approval Procedures**

This proposal is a variation on the previous one. In this case, by building a plant smaller than 50 MWe, the applicant would have the option of determining which set of approval procedures he would follow. However, applicants contemplating building larger plants in the future would be well advised not to annoy the energy commission by trying an end run with the first plant of a field.

Aside from this caveat, the adoption costs of the proposal would be low in time, money, and trouble. The value of this proposal to the plant builder is that it gives him the ability to choose the approval process most favorable to his application. The benefits would be roughly the same as those of the previous proposal: a low reduction in the time involved, a low increase in money, and a low reduction in trouble.

However, there are two major drawbacks to this proposal. First, it would require that the state operate two separate approval procedures. Second, if the energy commission were to resent entities that choose to avoid its

procedures, the proposal would only be appropriate to applicants such as government agencies, which would never want to build a power plant over which CERCDC would have jurisdiction. Consequently, we rate the proposal's overall effectiveness as near 0 and think its effects, if any, would occur in the short term.

Proposal 14.9.5: Have CERCDC Provide R&D Support for Geothermal Development

The R&D branch of CERCDC could aid the development of geothermal power in the state by funding research on the most immediate problems surrounding geothermal development. CERCDC could also encourage ERDA to conduct demonstration projects dealing with short-term problems--particularly those related to hot water systems. Although ERDA currently is conducting some projects of this nature, much of its R&D effort is focused on technologies and resources that may become available only in the long term (e.g., geopressurized zones and hot dry rock).

Implementation of this proposal would primarily involve internal policy decisions. Nonetheless, many of these decisions would be of concern to outside parties, such as legislative committees and research firms, some of which have the legal or political power to exert pressure on CERCDC. Therefore, we rate the adoption costs as low to medium in time, medium to high in money (because some long-term projects would lose support), and medium in trouble. Because the demonstration of solutions to problems surrounding

mitigation and technologies for hot water resources are so important, we think the changes that the proposal could bring about in the process would range from medium to high in all categories. The overall effectiveness is +2 and the effects should begin emerging in the short term.

## 14.10 Rules for New Sources of Air Pollution

As noted earlier, permits from local APCDs are required at more than one stage of the geothermal development process. An "authority to construct" and a "permit to operate" are required for both wells and power plants. While local APCDs issue permits and enforce the rules, the ARB establishes the standards. The recently promulgated ARB standards could have significant impact on future geothermal development.

### Proposal 14.10.1: Continue Existing Review Rules for New Air Pollution Sources Rather than Adopting ARB's Proposed Review Rules

ARB's proposed review rules for new air pollution sources were intended to remedy inadequacies in the APCDs' ability to review new sources of air pollution. However, ARB's proposed rules may be unworkable, as the South Coast Regional Air Basin Coordinating Council has stated.[9]

We estimate the adoption costs of this proposal to be low in time, low in money, but medium to high in trouble, since the failure to implement the originally proposed rules is very apt to be challenged by environmental groups. We estimate the changes that the proposal would bring about in

the geothermal development process as a low to medium reduction in time, low to medium reduction in money, and a low to medium reduction in trouble. The reason for this assessment is that the new rules as stated would in fact cause serious problems with granting permits for construction and operation of some geothermal power plants. We rate the effectiveness of this proposal as +1, and we think its effects would occur in the short term.

Proposal 14.10.2: Raise the Maximum Emission Limits That Trigger Review

The maximum limits in the original draft of ARB's proposed rules were five pounds per hour; these were raised to 15 pounds per hour or 150 pounds per day of nitrogen oxides, organic gases, or any air contaminant for which there is a state or national air quality standard (with the exception of carbon monoxide). This change was a compromise with the majority of APCDs that preferred 25 pounds per hour or 250 pounds per day.

We estimate the adoption costs of this proposal as low in time, low in money, and medium in trouble, because it is fairly likely to be opposed by environmental groups. It should be noted that, at least in Lake County, the emission levels were raised to 20 pounds per hour or 200 pounds per day. We estimate the benefits that the proposal could produce for geothermal development as a low reduction in the time, money, and trouble involved, since the proposal concerns only recommended standards for local APCDs. We

give it a rating of 0 to +1, and think its effect would occur in the short term.

Proposal 14.10.3: Change the Limit from a One-Time Hypothetical Maximum Emission to an Average or Limit not to be Exceeded more than X Days Per Year

The ARB's proposed new source review rules use one-time emissions by hour or day as a trigger of requiring review. This proposal calls for either using some kind of average or allowing a new source to exceed the limit a fixed number of times before review is required.

This proposal is already being discussed in the regional air basin coordinating councils. We estimate its adoption costs to be low in time, low in money, and medium in trouble, because setting new standards always generates controversy. We think that its benefits to geothermal development would be a low reduction in time, a low reduction in money, and a low to medium reduction in trouble. Since the procedures would be concerned with an average rather than what might happen once or twice, a shorter monitoring time would be required for approval; however, the dispersion model would still be needed to assess the effects of the emissions. We rate this proposal at 0 to +1 and think its effects would occur in the short term.

Proposal 14.10.4: Make Permitting Easier in Good Air Quality Regions

In areas where ambient air quality standards are being routinely violated, granting variances may be difficult; but

in remote areas, where geothermal resources are generally located, a minimal degradation in the quality of air that is already good could be acceptable.[10] This proposal is rated the same as the previous one: adoption costs would be low in time and money and medium in trouble; its benefits would be a low reduction in time and money and a low to medium reduction in trouble; its overall effectiveness is rated at 0 to +1, and its effects are seen as occurring in the short term.

Proposal 14.10.5: Consider Balancing Benefits of Air Quality Improvement With Other Factors

The ARB's proposed rule allows consideration of only air quality factors in granting or denying permits, and excludes any social or economic hardships that would be created. Furthermore, by law, any appeal of a permit denial cannot consider economic or social factors.

The South Coast Regional Air Basin Coordinating Council has already indicated that it would like the power to consider other types of factors in granting or denying construction and operation permits. Therefore, we rate the adoption costs for this proposal as low in time, low in money, and medium in trouble, since once again, environmental groups would legitimately raise the charge that such considerations could lower the stringency of air pollution control. We rate the proposal's effects on the geothermal development process as a low reduction in time and money and a low to medium reduction in trouble. We give the proposal an

overall rating of +1, and think its effects would occur in the short term.

Proposal 14.10.6: Adjust Maximum Limits According to the Relative Risk Posed by the Pollutant

This proposal calls for the amount of emissions that would trigger review to vary according to the risk of the pollutant. Its adoption would result in a higher limit for some pollutants and a lower one for others.

We estimate the proposal's adoption costs to be medium in time, money, and trouble, due to probable controversy over the specific amounts to be allowed for each pollutant. Both time and money would be required for reaching a satisfactory resolution of the controversy.

Assuming that the results of the proposal would be to raise limits of the geothermal emissions, such as hydrogen sulfide, we estimate the proposal's effects as a low to medium reduction in the time, money, and trouble involved in geothermal development. We give the proposal this rating because control on hydrogen sulfide and some of the other emissions could cause significant problems for the expansion of geothermal development in some areas. We rate the overall effectiveness of the proposal as +1 and think its effects would occur in the short term.

Proposal 14.10.7: Change Rules to Allow Trade-Offs Between Pollutants

The ARB's proposed rules A and B do not allow local agencies to consider reduction of one pollutant as compensation

for an increase of another. This proposal argues that since pollutants differ in how harmful they are to specific air basins, the agency for an air basin should be able to trade a more harmful pollutant for a less harmful one. We rate this proposal the same as Proposal 14.10.5: that is, its adoption costs would be low in time and money and medium in trouble; its benefits would be a low reduction in time and money and a low to medium reduction in trouble; its overall effectiveness is +1; and its effects would occur in the short term.

Proposal 14.10.8: Include Benefits Outside the Basin

Under the ARB's proposed rules, the APCD may balance increased emissions at one point within the basin against the resulting reduction in emissions at another point; however, it may not consider emission reduction in another basin. That is, it may not consider the possibility that hydrogen sulfide emissions at The Geysers could reduce sulfur emissions elsewhere as geothermal plants substitute for oil-burning plants. This proposal would include statewide air quality benefits in the analysis of a new source.

We rate this proposal the same as Proposal 14.10.5: that is, its adoption costs would be low in time and money and medium in trouble; its benefits would be a low reduction in the time and money involved in geothermal development and a low to medium reduction in trouble; its overall effectiveness is +1; and its effects would occur in the short term.

Proposal 14.10.9: Shorten or Eliminate ARB Review of APCD Decisions on New Sources

The proposed new source review rules A and B call for a 90-day delay while ARB decides whether to review individual permits. This proposal calls for review on appeal only, and allows less than 90 days to file an appeal. We estimate the adoption costs of this proposal as low in time and money but high in trouble. ARB is caught between EPA on one hand and its local APCDs on the other. EPA wants more time for appeals, and argues that more time is required by the Clean Air Act; local APCDs want their permits to become effective as soon as possible. This proposal suggests that APCDs could include enough time for public comments before granting the permits that EPA would not require extended time for an appeal afterwards.

We estimate the effects of this proposal on the geothermal development process as a low to medium reduction in time, a low reduction in money, and a low reduction in trouble. We rate its overall effectiveness as between 0 and +1, and we think its effects would occur in the short term.

Proposal 14.10.10: Retrofit Emission Controls on Plants in The Geysers Region by Starting with Those with the Highest Emission Levels and Proceeding in Decreasing Order of Emissions

Right now, the schedule for retrofitting plants at The Geysers proceeds in numerical order. This proposal argues that an improvement in air quality could be brought about

easily by retrofitting in the order of emission level. Data from PG&E show that the emissions from units 3, 4, and 5 contribute over 41 percent of the total emissions at The Geysers.

We estimate the adoption costs of this proposal to be low in time and money and low to medium in trouble. Apparently, since the local APCD has already set the schedule for retrofitting, it would have to approve any change in the schedule. We estimate the effects of this proposal on the geothermal process to be a low to medium reduction in time, money, and trouble. The proposal rates a +1 in overall effectiveness and we expect its effects to occur in the short term.

## 14.11 Political Economies of Counties

The social and economic impacts of geothermal development have emerged as one source of political controversy on the local level. The issues lead first of all into questions of whether the local residents want the growth associated with geothermal development. If the residents generally favor the idea of geothermal development, the local issues are related to tax compensation and local management of the growth that does occur.

### Proposal 14.11.1: Have Applicants and Governments Provide More Compensation to Individuals Who are Uniquely or Unusually Affected from Local Impacts of Development

One set of proposals has argued that the resisters should be squeezed out of the approval process. Another set

of proposals has argued that the sources of their resistance, such as emissions, ought to be removed or controlled. This proposal suggests that the local areas ought to be compensated for the causes of their discomfort. Of course, the county already receives compensation in the form of an increased tax base, perhaps more jobs, the attraction of industry, and so forth. This proposal, however, calls for assisting uniquely impacted individuals with measures such as funds for relocation.

We estimate the adoption costs of this proposal to be medium in time, low in money, and medium in trouble. The time and trouble would be involved in finding out which compensations would in fact lessen political opposition to geothermal development activities. The proposal might, unfortunately, create more demands for compensation than could reasonably be met, and resolution of such demands could be quite high in terms of all three cost parameters.

We think the effects of the proposal on the process would be a low to medium reduction in the time involved in geothermal development, a low increase in the money involved, and a low to medium reduction in trouble. The basic idea of the proposal is that by providing this compensatory money, the geothermal developers would reduce the time and trouble involved in getting local governments to accept geothermal development activities. We rate the overall effectiveness of this proposal at between 0 and +1 and think its effect would occur in the short term.

## Proposal 14.11.2: Use "Expediters" from the State and Federal Government to Help Smooth the Process of Local Accommodation to Geothermal Development

We foresee a major problem with this proposal: the possible reluctance of both private developers and local governments to work with such expediters. Developers consistently complain that too much government interference exists already; and local officials, particularly those with experience in dealing with geothermal development, feel fully capable of managing the problems that do arise. Therefore, the presence of yet another government official may actually slow the process of accommodation rather than accelerate it. However, some examples of successful expediters do exist, such as the federal mediators in labor disputes. In those cases, both sides appear to recognize the legitimacy of the expediter's position.

The ability of this proposal to work really depends on two factors: the knowledge and skill of the expediter, and the attitudes of the local officials and developers. Because we think that there is a low probability that both sets of requirements will be met, we estimate the proposal's adoption costs as low in time and money but medium in trouble. Its effects on geothermal development would be near zero in time, money, and trouble. We rate its overall effectiveness as 0 and think any effects would occur in the short term.

## Proposal 14.11.3: Allow Counties Increased Levels of Continuing Control of Geothermal Operations in Return for Faster Initiation of the Process

We rate the adoption costs of this proposal as low in time and money and medium in trouble. The trouble would be involved in determining exactly what kind of continuing control counties would in fact want and could exercise. We estimate the effects of the proposal on the geothermal development process would be a low reduction in time, a zero reduction in money, and a low increase in the trouble involved. The reason for the increase in trouble is that whether the developers would be better off or not is very unclear. They may find it easier to achieve agreement with the counties at the initial stages of geothermal development than to satisfy them on a continuing basis. In addition, the counties may be unwilling to give up much control at the initial stage, even in exchange for substantial levels of increased control at later stages. Although they may well want enforcement of the conditions they write into permits, they may be just as happy to have others enforce those conditions. Therefore, we rate the overall effectiveness of this proposal as 0 and think its effects, if any, would be in the short term.

## Chapter 14

## FOOTNOTES

1. Geothermal Steam Act 1970, Public Law 91-581, Section 7. See also 43 CFR Part 3201.2.

2. Geothermal Steam Act, Section 6(a).

3. Ibid., Section 2(e). See also 43 CFR Part 3200.0-5 (k).

4. Ibid.

5. Litigation is over language of Section 4 of the Geothermal Steam Act which says: ". . . they [KGRA lands] shall be leased to the highest responsible qualified bidder. . . ."

6. 30 CFR 270.17 (6).

7. The NCPA contract, however, gives NCPA the option of either purchasing on the basis of all steam taken (the PG&E model) or on a "take or pay" basis with a minimum of 8000 hours a year of plant operation (NCPA-RFL contract of April 13, 1976).

8. 88 Stat. 1079. Since loans under the program are to be at normal interest rates, the large corporations which can borrow at premium rates are not apt to be drawn to the program.

9. South Coast Regional Air Basin Coordinating Council, The Impact of New Source Review Rules, June 4, 1976.

10. However, continuing uncertainty as to the federal Clean Air Act's "no significant deterioration" provisions results in doubt about this proposal's feasibility.

# BIBLIOGRAPHY

## A. Laws

### 1. United States

#### a. Statutes


Fannin, Paul, U.S. Senate. "A Bill to Amend the Internal Revenue Code of 1954 to Allow a Deduction with Respect to the Exhaustion of Geothermal Steam and Geothermal Resources." S. 2608. Congressional Record 121/162. November 4, 1975.

U.S. Congress. "Basis for Cost Depletion." 26 U.S. Code (USC) 612.

U.S. Congress. "Endangered Species Act of 1973." Public Law 93-205. 87 Statute 884-903. December 28, 1973.

U.S. Congress. "Geothermal Energy Research, Development, and Demonstration." Public Law 93-410 (30 USC 1101-1164). September 3, 1974.

U.S. Congress. "Geothermal Steam Act of 1970." Public Law 91-581. 84 Statute 1566-1574 (30 USC 1001-1025). December 24, 1970.

U.S. Congress. "Intangible Drilling and Development Costs in the Case of Oil and Gas Wells." 26 USC 263(c), including provisions made in the Tax Reduction Act of 1975. Public Law 94-12, passed March 29, 1975.

U.S. Congress. "Partner's Distributive Share: Effect of Partnership Agreement." 26 USC 704(a).

U.S. Congress. "Percentage Depletion." 26 USC 613.

U.S. Congress. "Treatment of Certain Liabilities." 26 USC 752.

b. Regulations

U.S. Department of Agriculture, National Forest Service. Forest Service Manual, Chapter 8410, "Forest Service Environmental Analysis." Washington, D.C. November 1974.

U.S. Department of Interior. "Geothermal Resources Leasing." 43 Code of Federal Regulations (CFR) 3200.0-3244.5. 1973.

U.S. Department of the Interior. "Geothermal Resources Operations on Public, Acquired, and Withdrawn Lands." 30 CFR 270.1-270.90. 1973.

U.S. Department of the Interior, Bureau of Land Management. BLM Manual, Section 1791, "Environmental Analysis." Releases 1-913 and 1-1000. Washington, D.C. June 17, 1974, with revisions September 3, 1975.

U.S. Department of the Interior, Geological Survey, Conservation Division. "Geothermal Resources Operational Orders No. 1, 2, 3, and 4."

No. 1 - Exploratory Operations
No. 2 - Drilling, Completion, and Spacing of Geothermal Wells
No. 3 - Plugging and Abandonment of Wells
No. 4 - General Environmental Protection Requirements

Menlo Park, California. All orders effective February 1, 1975, except No. 4, effective August 1, 1975.

U.S. Department of Interior, Geological Survey, Conservation Division. "Geothermal Resources Operational Order No. 5--Permits, Submittals, Reports, Records, Forms, and Correspondence." Menlo Park, California. Draft prepared December 29, 1975.

U.S. Department of the Navy, Office of the Chief of Naval Operations. "The National Environmental Policy Act and Environmental Impact Statements; Policy Regarding and Assignment of Responsibilities for." OPNAVINST 6240. 2D. Washington, D.C. April 1, 1974.

U.S. Department of the Treasury. "Charges to Capital and to Expense in Case of Oil and Gas Wells." 26 CFR 1.612-4. Revised as of April 1, 1975.

U.S. Department of the Treasury. "Effect of Partnership Agreement" and "Distributive Share Determined by Income or Loss Ratio." 26 CFR 1.704-1(a) and 1.704-1(b).

U.S. Department of the Treasury. "Intangible Drilling and Development Costs in the Case of Oil and Gas Wells." 26 CFR 1.263(c)-1.

U.S. Department of the Treasury. "Partner's Share of Partnership Liability." 26 CFR 1.752-1(e).

U.S. Department of the Treasury. "Percentage Depletion Rates." 26 CFR 1.613(b).

U.S. Office of the President. "Protection and Enhancement of the Cultural Environment." Executive Order No. 11593. 36 Federal Register 8921. May 15, 1971.

U.S. Office of the President, Advisory Council on Historic Preservation. "Procedures for the Protection of Historic and Cultural Properties." 36 CFR 800.1-800.10. January 25, 1974.

U.S. Office of the President, Council on Environmental Quality. "Guidelines for Federal Agencies under the National Environmental Policy Act (issued August 1, 1973)." Environmental Reporter 71:0301-0306.

c. Judicial decisions

U.S. Court of Appeals, Ninth Circuit. "Arthur E. Reich et al. v. Commissioner of Internal Revenue." 454 Federal Reporter, 2d Series 1157-59. January 21, 1972.

U.S. District Court, N.D. California. "United States of America v. Union Oil Company of California." 369 Federal Supplement 1289. 1973.

U.S. Tax Court. "Arthur E. Reich and Carolyn G. Reich, et al. v. Commissioner of Internal Revenue." 52 United States Tax Court Reports 700-717. July 31, 1969.

U.S. Tax Court. "Victory Sand and Concrete, Inc. v. Commissioner of Internal Revenue." 61 United States Tax Court Reports 419-420. January 2, 1974.

2. California

a. Statutes

Dills, Ralph C. California State Senate. "SB 517, An Act to Amend Sections of the Public Resources Code Relating to Geothermal Resources." Introduced February 27, 1975, with amendments through September 2, 1975.

State of California. "Air Pollution Control Districts." California Health and Safety Code, Sections 24198-24302.

State of California. "Certificates of Public Convenience and Necessity." California Public Utilities Code, Sections 1001-1006, as amended by statutes. 1974.

State of California. "Depreciation Account; Rates." California Public Utilities Code, Section 795, as amended by statutes. 1970.

State of California. "Energy Conservation and Development." California Public Resources Code, Section 25000-25903. Addition to code filed with Secretary of State May 21, 1974.

State of California. "Environmental Quality." California Public Resources Code, Sections 21000-21174, as amended by statutes. 1974.

State of California. "Geothermal Resources." California Public Resources Code, Sections 3700-3776.

State of California. "Leasing of Public Lands." California Public Resources Code, Sections 6801-6805, as amended by statutes. 1967.

State of California. "Leasing of Public Lands: Geothermal Resources." California Public Resources Code, Sections 6902-6925.

State of California. "Public Utility." California Public Utilities Code, Section 216.

State of California. "Regional Water Quality Control." California Water Code, Sections 13260-13263.

b. Regulations

State of California. "Guidelines for Implementation of the California Environmental Quality Act of 1970." California Administrative Code, Title 14, Sections 15000-15180 with appendices, as amended by statutes. 1975.

State of California. "Leases and Prospecting Permits for Geothermal Resources." California Administrative Code, Title 2, Sections 2250-2265.

State of California. "Regulations for Preserving and Enhancing the Environment." California Administrative Code, Title 2, Sections 2901-2910.

State of California, Air Resources Board. "Suggested New Source Review Rules for Determining Impact on Air Quality. Rule A--Authority to Construct. Rule B--Permits to Operate Sources Subject to Rule A." Sacramento. October 28, 1975.

c. Judicial Decisions and Constitutional Provisions

State of California. Constitution of the State of California.

3. Local Statutes and Regulations

Burbank City Council. "A Resolution of the Council of the City of Burbank Opposing New Regulations of the Air Resources Board with Respect to Commercial and Industrial Plants." Adopted December 16, 1975.

Imperial County Board of Supervisors. "Land Use Zones: Section 83226 G Zone, Geothermal Exploration Zone; Geothermal Exploration Permits." Ord. No. 410. Effective June 1, 1972.

Imperial County Board of Supervisors. "An Ordinance Adding Zone Classifications 'G' and 'L' to Ordinance 249."

Imperial County Department of Public Works. "Terms, Conditions, Standards and Application Procedures for Initial Geothermal Development, Imperial County." May 1971.

Lake County, Board of Supervisors, State of California. "Lake County Environmental Proection Guidelines." Resolution No. 72-246. August 18, 1975.

Los Angeles County Air Pollution Control District, Robert Lunche, APCO. Memorandum to L.A. County Board of Supervisors re: The California Air Resources Board Suggested New Source Review Rules for Determining Impact on Air Quality. Los Angeles. November 28, 1975.

Napa County Conservation, Development, and Planning Commission. "Napa County Oil, Gas, and Geothermal Resource Exploration and Development Ordinance (draft)." Napa. January 7, 1976.

Sonoma County Environmental Protection Committee. Minutes of meeting re: Union Oil Company Request for Authority to Construct One Geothermal Steam Well. January 20, 1976.

## B. Government Publications

### 1. Reports

#### a. United States

Battelle Pacific Northwest Laboratories. The Marysville, Montana, Geothermal Project Final Report. Prepared under ERDA Contract No. 23111-01410. September 1975.

Federal Energy Administration. Project Independence Blueprint, Final Task Force Report: Geothermal Energy. U.S. Government Printing Office. Washington, D.C. November 1974.

Federal Power Commission. Statistics of Privately Owned Electric Utilities in the United States: 1973 (FPC S-247). Washington, D.C. December 1974.

Federal Power Commission. Statistics of Publicly Owned Electric Utilities in the United States: 1973 (FPC S-248). Washington, D.C. December 1974.

Jet Propulsion Laboratory/California Institute of Technology. Conference on Research for the Development of Geothermal Energy, Vols. I, II, and III. Prepared under contract with NASA, ERDA, and NSF. Pasadena, California. August 29, 1975.

Jet Propulsion Laboratory/California Institute of Technology. Status Report: Geothermal Program Definition Project, Parts I and II. Pasadena, California. April 4, 1975.

Lawrence Berkeley Laboratory/University of California, Energy and Environment Division. Proceedings of the Geothermal Power Development Conference: Conduct of AEC's Research and Development Activities in Geothermal Energy. National Technical Information Service. June 18, 1974.

Lawrence Berkeley Laboratory/University of California. Public Opinion Concerning Geothermal Development in Lake County, California. Prepared by Larry Vollintine and Oleh Wares for ERDA under Contract No. W-7405-ENG-48 (BL-4447). March 1976.

Lawrence Livermore Laboratory/University of California. Performance Test of a Lysholm Engine. Prepared for ERDA under Contract No. W-7405-ENG-48 (UCRL-51861). July 3, 1975.

Lawrence Livermore Laboratory/University of California. Present Status of the Polymeric-National Screening Program for the LLL Geothermal Project. Prepared for ERDA under Contract No. W-7405-ENG-48 (UCRL-51843). July 9, 1975.

U.S. Comptroller General. Problems in Identifying, Developing, and Using Geothermal Resources. Report to the Congress, Dept. of the Interior, and ERDA. RED-75-330. Washington, D.C. March 6, 1975.

U.S. Department of the Interior. Final Environmental Statement for the Geothermal Leasing Program Vols. I-IV. U.S. Government Printing Office. Washington, D.C. 1973.

U.S. Department of the Interior, Geological Survey. Assessment of Geothermal Resources of the United States--1975. Circular 725. Arlington, Virginia. 1975.

U.S. Energy Research and Development Administration, Division of Geothermal Energy. "Project Summaries for Contracts of the Division of Geothermal Energy, ERDA" (Draft Issue). Washington, D.C. September 1975.

U.S. Office of Technology Assessment. "Legal and Institutional Constraints in Geothermal Energy" and "Environmental Constraints on Geothermal Energy Development." In An Analysis of ERDA Plan and Program.

University of Alaska. Geothermal Energy: A National Proposal for Geothermal Resources Research. Final report of the Geothermal Resources Research Conference sponsored by the National Sciences Foundation. (NSF-RA-N-73-003). September 1972.

University of Southern California Law Center. Proceedings of the Conference on Geothermal Energy and the Law. National Science Foundation (NSF-RA-S-75-003). February 1975.

b. California

Ball, R. H. and Salter, R. G., et al. California's Electricity Quandary: II. Planning for Power Plant Siting. Prepared for the California State Assembly with support from the Rockefeller Foundation. Rand-Santa Monica, R-1115-RF/CSA. September 1972.

California Coastal Zone Conservation Commission. "California Coastal Plan."

California Energy Resources Conservation and Development Commission. Proposed Energy Research and Development Program; Fiscal Year 1976/77. RD-76-1. Sacramento. February 1976.

Geothermal Resources Council, State of California. Compendium of First Day Papers Presented at the First Conference of the Geothermal Resources Council. Special Report No. 2. Davis, California. February 1972.

Geothermal Resources Council, State of California. Geothermal Overviews of the Western United States. Davis, California. 1972.

Geothermal Resources Council, State of California. Special Study Guide No. 3: Financial Aspects of Geothermal Resources Development. Series of 17 monographs used during Special Short Course No. 3 held October 23-24, 1975. Davis, California.

Jet Propulsion Laboratory/California Institute of Technology. Report on the Status of Development of Geothermal Energy Resources in California. Prepared for California Energy Resources Conservation and Development Commission. JPL Document 5040-25. March 31, 1976.

Lawrence Berkeley Laboratory/University of California, Energy and Environment Division. Geothermal Energy Resource Assessment. Berkeley. July 1975.

Reed, Marshall J. Chemistry of Thermal Water in Selected Geothermal Areas of California. State of California, Division of Oil and Gas. Report No. TR15. Sacramento, August 1975.

Reed, Marshall J. "Comments on Well Corrosion and Scaling in the Salton Sea Geothermal Field" and "The Collection of Geothermal Fluid Samples for Chemical Analysis." Geothermal Professional Papers. State of California, Division of Oil and Gas. Report No. TR14. Sacramento. July 1975.

State of California, Assembly Science and Technology Advisory Council. Geothermal Resources in California: Potentials and Problems. Sacramento. May 1972.

State of California, Department of Conservation, Division of Oil and Gas; and State of Oregon, Department of Geology and Mineral Industries. Proceedings: Workshop on Environmental Aspects of Geothermal Resources Development. Conference held in association with National Science Foundation/Research Applied to National Needs through Grant No. AER 75-06872. November 20-22, 1974.

State of California, Department of Water Resources. Geothermal Wastes and the Water Resources of the Salton Sea Area. Bulletin No. 143-7. Sacramento. February 1970.

State of California, Geothermal Resources Board. The Economic Potential of Geothermal Resources in California. Sacramento. January 1971.

State of California, Joint Legislative Committee on Public Domain, Subcommittee on Geothermal Resources. Geothermal Resources in California: Much Heat and Some Light. Sacramento. November 20, 1974.

State of California, Joint Legislative Committee on Public Domain, Subcommittee on Geothermal Resources. Geothermal Resources in California; The Problems and the Potential. Sacramento. December 28, 1974.

University of California, Riverside. Geothermal Resources Development in California: Imperial Valley Potential, Vols. I and II. Prepared for the Joint Committee on Public Domain, California State Legislature. Sacramento. November 15, 1972.

University of California, Riverside. Patterns of Geothermal Lease Acquisition in the Imperial Valley, 1958-1974. Report prepared for the California State Legislature and Imperial County Board of Supervisors. Sacramento. August 1974.

Vaux, Henry J. and Nakayama, Benjamin. The Economics of Geothermal Resources in the Imperial Valley: A Preliminary analysis. California Water Resources Center Contribution No. 153. University of California, Davis. November 1975.

2. Hearings

State of California, Assembly. "Joint Hearing of the Subcommittee on Geothermal Resources of the Joint Committee on Public Domain and Senate Committee on Governmental Organization." Transcript of hearing held in Los Angeles on September 5, 1974.

State of California, Senate Committee on Governmental Organization. "Hearing on Geothermal Resources (SB 2092)." Transcript of hearing held in Sacramento on October 3, 1974.

U.S. Senate, Committee on Interior and Insular Affairs, Subcommittee on Water and Power Resources. Committee Report: "The Potential for Energy Production from Geothermal Resources." U.S. Government Printing Office. December 1973.

U.S. Senate, Committee on Interior and Insular Affairs, Subcommittee on Water and Power Resources. Hearing on the "Geothermal Energy Act," held November 7, 1973. 93rd Congress, 1st session. U.S. Government Printing Office. 1974.

U.S. Senate, Committee on Interior and Insular Affairs, Subcommittee on Water and Power Resources. Hearings on "Geothermal Resources" held June 13, 1973 and August 10-11, 1973. 93rd Congress, 1st session. U.S. Government Printing Office. 1973 (Part 1) and 1974 (Part 2).

C. Other Publications

Aidlin, Joseph W. "Geothermal Resources--A Program to Accelerate Development and Use of a Promising Supplemental Energy Source." Natural Resources Lawyer VII/4:655-660 (Fall 1974).

Aidlin, Joseph W. "Representing the Geothermal Resources Client." Rocky Mountain Mineral Law Institute, Proceedings of the Nineteenth Annual Institute. New York: Mathew Bender. 1974.

Allen, Donald R. "Legal and Policy Aspects of Geothermal Resource Development." Water Resources Bulletin 8/2: 250-256 (April 1972).

Andrews, Robert, Jr. "After Mammoth: Friends of Mammoth and the Amended California Environmental Quality Act." Ecology Law Quarterly 3:349-389 (1973).

Anonymous. "Finger Points to Forest Service as Big Leasing Bottleneck." Geothermal Report V/1:1-2 (January 1976).

Anonymous. "Friends of Mammoth and the California EQA." University of Pennsylvania Law Review 121:1404-1419 (1973).

Axtmann, Robert C. "Environmental Impact of a Geothermal Power Plant." Science 187/4179-803 (March 1975).

Bjorge, Kenneth R. "The Development of Geothermal Resources and the 1970 Geothermal Steam Act--Law in Search of Definition." University of Colorado Law Review 46/1:1-25 (Fall 1974).

Breyer, Bill. "The CEQA, Requiring an Environmental Impact Report on Projects Having a Significant Effect on the Environment, Applies to Private Construction Projects Requiring a Government Permit as Well as to Public Projects." University of Cincinnatti Law Review 42:563-570 (1973).

Breyer, Stephen G. and MacAvoy, Paul W. Energy Regulation by the Federal Power Commission. Washington, D.C.: Brookings Institution. 1974.

Brooks, John W., Jr. "Legal Problems of Geothermal Industry." Natural Resources Journal 6/4:511-541 (October 1966).

Carter, Luther J. "Solar and Geothermal Energy: New Competition for the Atom." Science 186/4166:811-813 (November 1974).

Castetter, Bruce. "Friends of Mammoth: A Friend to the Environment." California Western Law Review 9:536-546 (Spring 1973).

Chambers, Stephen P. "Private Action Under the Public Trust: An Environmental Bill of Rights for California." Pacific Law Journal 2:620-634 (July 1971).

Cheong, Sid. "The Development of the California and Federal Water Pollution Control Programs." University of California, Davis, Law Review 5:234-271 (1972).

Ecoview Environmental Consultants. A Draft Environmental Impact Report for Shell Oil Company's Federal Leasehold, U.S. Geothermal Wells 3 and 4, Sonoma and Lake Counties, California. October 1, 1975.

Finn, Donald F. X. "Federal Tax Policy and Geothermal Energy Development." Geothermal Energy 2/10:39-42 (October 1973).

Fioravanti, Joseph M. "A Challenge to the California Water Plan." Hastings Law Journal 22:732-758 (February 1971).

Frazer, John E. "The California Environmental Quality Act of 1970." Journal of Beverly Hills Bar Association 7/2:25-31 (March-April 1973).

Furness, John W. "Friends of Mammoth: Vox Populi or Judicial Social Engineering." Pepperdine Law Review 1/1:137-146 (1973).

Geothermal Energy. Selected articles from October, November, and December issues. Vol. 3, Nos. 10, 11, and 12. 1975.

Henahan, John F. "Geothermal Energy . . . The Prospects Get Hotter." Popular Science pp. 96-99ff. (November 1974).

Higginbotham, John Michael. "The Compatibility of Economic and Environmental Objectives in Governmental Decision Making." Pacific Law Journal 5:92-114 (1974).

Johanson, Stephen H. "California's Environmental Quality Act--A Significant Effect or Paper Pollution?" Pacific Law Journal 5:26-54 (1974).

Kane, Kevin P. "Friends of Mammoth: The Expanding Scope of Environmental Law in California." Los Angeles Bar Bulletin 48:81-87ff. (January 1973).

Kruger, Paul and Otte, Carel. Geothermal Energy: Resources, Production, Stimulation. Stanford University Press. 1973.

Lerch, C. S., Jr. "Comments on the California Rule-making Process and the Effects Thereon of the California Environmental Quality Act of 1970." University of California, Davis, Law Review 5:309-329 (1972).

Lewinson, Debra. "California Environmental Quality Act: The Legislative and Judicial response to the Environmental Crisis." University of West Los Angeles, Law Review 5: 21-31 (Fall 1973).

McCloskey, J. Michael and Zierold, John H. "The California Legislature's Response to the Environmental Threat." Pacific Law Journal 2:575-602 (July 1971).

Mendonca. Calvin A. "Does the Environmental Impact Report Requirement of the California Environmental Quality Act of 1970 Apply to Rate Hearings of Public Utilities?" University of San Francisco Law Review 8/3:752-776 (Spring 1974).

Mogulof, Melvin B. Saving the Coast. Lexington Books. 1975.

Phaler, Karl. "Water Quality Control in California: Citizen Participation in the Administrative Process." Ecology Law Quarterly 1:400-425 (Spring 1971).

Robie, Ronald B. "California's Environmental Quality Act: A Substantive Right to a Better Environment?" Los Angeles Bar Bulletin 49/1:17-22ff. (November 1973).

Robson, Geoffrey R. "Geothermal Electricity Production." Science 184/4134:371-375 (April 1974).

Schlauch, Paul J. and Worcester, Theodore E. "Geothermal Resources: A Primer for the Practitioner." Land and Water Law Review IX/2:327-367 (1974).

Seneker, Carl J. II. "The Legislative Response to Friends of Mammoth: Developers Chase the Will-o'the-Wisp." California State Bar Journal 48/2:127-132ff. (March-April 1973).

Stanford Environmental Law Society. "Geothermal Energy: Legal Problems of Resource Development." Stanford Environmental Law Society. 1975.

Wagoner, James P. "Environmental Protection in California: Court Action Powers of State and Local Government Attorneys." Santa Clara Lawyer 14:296-324 (Winter 1974).

Williamson, Oliver E. "The Vertical Integration of Production: Market Failure Considerations." American Economic Review 61/2:112-123 (1971).

Wilson, Howard M. "California Set for Geothermal Surge." Oil and Gas Journal, pp. 32-34, November 3, 1975.

Winters, John M. "Environmentally Sensitive Land Use Regulation in California." San Diego Law Review 10/4;693-756 (June 1973).

Younger, Evelle J. "Environmental Protection in California: Perspective of the Attorney General." Pacific Law Journal 5:19-25 (1974).

D. Unpublished but Written

1. Testimony and Letters to Government Officials

Aidlin, Joseph W. "Testimony of Joseph W. Aidlin, General Counsel of Magma Power Company, before the Subcommittee on State Electrical Energy Policy of the Assembly Committee on Planning and Land Use." Sacramento. February 23, 1973.

Geothermal Energy Institute, Donald Finn, Managing Director. Letter to the California Public Utilities Commission re: the Resources Agency Document "Energy Dilemma--California's 20-Year Power Plant Siting Plan." San Francisco. November 22, 1973.

Geothermal Energy Institute, Donald Finn, Managing Director. Letter to Secretary of the Interior Rogers Morton re: Publication of the Final Regulations for the Federal Geothermal Leasing Program. San Francisco. January 9, 1974.

Geothermal Energy Institute, Donald Finn, Managing Director. Letter to Senator Frank Church, Committee on Interior and Insular Affairs, re: December 1973 report "The Potential for Energy Production from Geothermal Resources." San Francisco. January 8, 1974.

Hyde, Joseph J., representing the accounting firm of Coopers and Lybrand. Letters and testimony submitted to the U.S. House Ways and Means Committee and the U.S. Senate Interior Committee re: tax incentives for geothermal development. San Francisco. April 10, 1974; March 21, 1974; and September 13, 1973.

Northern California Power Agency, Norman Ingraham, Executive Director. Statement Prepared for the Hearings on Geothermal resources, State Lands Commission Subcommittee on Geothermal Resources. San Francisco. September 25, 1975.

Pacific Energy Corporation. Letter to A. Earl Davis, Office of Science and Technology, State of California, re: governmental measures necessary for the accelerated growth of the geothermal resources industry. Natches, Mississippi. November 29, 1973.

Pacific Gas and Electric Company. "Amended Environmental Data Statement Geysers Units 14 and 15." San Francisco. November 1974.

Pacific Gas and Electric Company. "Delays Experienced at the Geysers . . . Possible State Government Action to Minimize Delays." Statement prepared at the request of the California State Assembly Speaker. San Francisco. January 12, 1976.

Pacific Gas and Electric Company. "The Geysers Power Plant Unit 12 Environmental Report." San Francisco. January 1973.

Pacific Gas and Electric Company. "Statement of PG&E with Respect to Proposed New Source Review Regulation (by the California Air Resources Board)." Lakeport. January 26, 1976.

Shell Oil Company. Prepared statement before the California State Lands Commission, Subcommittee on Geothermal Resources, Hearing on the Development of the State's Geothermal Potential. Sacramento. September 25, 1975.

Sonoma County Planning Department, State of California. "A Statement of Environmental Concerns from the Sonoma County Board of Zoning Adjustments to the California Public Utilities Commission." Santa Rosa, California. October 29, 1975.

Southern California Edison Company. Letter to U.S. Secretary of the Interior re: complex leasing procedures as administered by the Bureau of Land Management and other federal agencies. Rosemead, California. June 20, 1975.

Union Oil Company. "Drilling, Production, and Disposal Technologies in Salton Sea Geothermal Area, Imperial County, California." Presented to the Geothermal Resources Board of the State of California during the Imperial Valley Geothermal Hearing. October 22-23, 1970.

Union Oil Company of California. Letter from Vane Suter to Cheryl Kincaid, State Office of Planning and Research, with attachments, re: Department of Fish and Game's position on geothermal development. Santa Rosa. November 24, 1975.

Union Oil Company of California. Letter from Vane Suter to Thomas Cochran, Air Pollution Coordinating Council, Crescent City, re: county Air Pollution Control District response to proposed changes by CARB in "New Source Review Rules." Santa Rosa. January 26, 1976.

Union Oil Company of California. "Suggestions for Resolving the Environmental Impact Report Impasse in California's Geothermal Energy Industry." Statement prepared for State of California resource agencies. Los Angeles. December 16, 1975.

Union Oil Company of California, Vane Suter, District Manager. "Proposed Revisions to the Environmental Resources Element of the Sonoma County General Plan, Concerning the Geothermal Resources." Santa Rosa. January 13, 1976.

Warren, Charles (California Assembly, Chairman, Resources, Land Use, and Energy Committee). Letter to Ronald Robie, Director, Department of Water Resources re: building a DWR-owned geothermal electric plant in the Geysers area to supply power to pumping plants of the State Water Project. Sacramento. December 1, 1975.

## 2. Other

### a. United States

Cahraman, Thomas H. "The Interrelationship between Federal, State, and Local Regulatory Agencies on the Development of the Geothermal Resource in California." A draft paper presented for comment, National Geothermal Conference. University of California, Riverside. April 30, 1973.

U.S. Department of the Interior, Bureau of Land Management. "BLM--Geothermal Notes."

U.S. Department of the Interior, Geological Survey, Conservation Division, Office of the Area Geothermal Supervisor. "Monthly Geothermal Report: November 1975." Menlo Park, California.

U.S. Energy Research and Development Administration. "Energy Technology: Geothermal."

U.S. Energy Research and Development Administration. "Preliminary Fact Sheet: ERDA Geothermal Loan Guaranty Program." Oakland, California.

U.S. Energy Research and Development Administration. "Questions and Answers on ERDA Geothermal Loan Guaranty Program." Oakland, California.

U.S. Energy Research and Development Administration. "Summary of Geothermal Energy Development Problems Addressed by ERDA."

U.S. Energy Research and Development Administration, Working Group on Environmental Controls R&D for Geothermal Energy Systems. "Environmental Control Technology for Energy Systems." Unpublished working paper. April 1975.

### b. California

Green, Phyllis and Farnan, Maureen. "Regulatory Policy, Political Participation, and Social Implications of Geothermal Resource Development in the Imperial Valley." Student paper, University of California, Riverside. January 1975.

Hoffmann, William P. "Notice of Commencement of an Action Pursuant to the California Environmental Quality Act: Friends of Cobb Mountain v. Board of Supervisers, Lake County and Union Oil Company." Complaint for declaratory relief. Filed February 28, 1975.

Jet Propulsion Laboratory, California Institute of Technology. "Proposal to California Energy Resources Conservation and Development Commission for Survey of Status of Geothermal Energy Development in the State of California." Pasadena, California. October 29, 1975.

Imperial County, Geothermal Project Research Administration. "Current Geothermal Research and Development Projects: Imperial County." January 1976.

Imperial County. "Planning for Resource Development: Geothermal Energy in Imperial County, California." Research proposal submitted to the National Science Foundation. Date awarded: June 26, 1975.

Lake County, Planning Commission. "Use Permit: McCulloch Oil Corporation--Francisco." Resolution 75-154. December 11, 1975.

Lake County, Planning Commission. "Use Permit: Union Oil Company-Phelps." Resolution 75-14. January 23, 1975.

Lawrence Berkeley Laboratory/University of California. "A Study of the Socio-Economic Impacts of Geothermal Development in Lake County, California." Draft report prepared by Lenny Kumin, Jayant Sathaye, and Larry Vollintine. March 1976.

Northern California Power Agency. Letter from Norman Ingraham to Professor Christopher Stone, USC Law Center, re: draft report on Geothermal Energy and the Law (Part 1). Lodi. December 31, 1975.

Northrup, William F., State Lands Commission, State of California. "The Role of the State Lands Commission and State Lands Division in Developing Geothermal Resources in California."

Reed, Marshal J. "The Economics of Geothermal Exploration."

San Diego Gas and Electric News Bureau. "Historical and Technical Background of the SDG&E Geothermal Program Leading to the Joint Venture between SDG&E and ERDA"; "Fact Sheet, Geothermal Loop Experimental Facility"; "SDG&E-ERDA Announce Joint Geothermal Project Agreement." News releases. San Diego. August 26, 1975.

Sierra Club. "Resolution Regarding Geothermal Development in Sonoma, Lake, Napa, and Mendocino Counties." Passed by the Northern California Regional Conservation Committee of the Sierra Club. January 10, 1976.

State of California, Air Resources Board. "Consideration of Proposed New Source Review Rules for Determining Impact on Air Quality." Staff Report No. 75-19-4. Sacramento. October 27, 1975.

State of California, Division of Oil and Gas. "Geothermal Fact Sheet."

State of California, Division of Oil and Gas, Geothermal Unit. "EIR Process and Time Requirements for the Drilling of a Geothermal Well." Draft working paper prepared October 8, 1975.

State of California, Division of Oil and Gas, Geothermal Unit. "Minimum Time Requirements for the Development of One Geothermal Power Plant; the Geysers Geothermal Area." Draft working paper prepared October 8, 1975.

State of California, Division of Oil and Gas, Geothermal Unit. "State, Federal and County Agencies that have a Regulatory Responsibility for the Development of Geothermal Resources in California." Draft statement prepared October 14, 1975.

State of California, Division of Oil and Gas, Geothermal Unit. "History of Environmental Legislation and Legal Discussions." Working draft.

State of California, Governor's Office of Planning and Research. "State and Local Permit Study: An Analysis of Administrative Factors affecting Geothermal Development at The Geysers." Draft. Sacramento.

State of California, the Resources Agency. "Cabinet Issue Memo No. R-74-56 re: Recommendations from the Geothermal Resources Board." Submitted to the Governor on November 13, 1974.

State of California, the Resources Agency. Memorandum from E. J. Terhaar, Chief, Energy Division, Department of Water Resources, re: "Meeting to Discuss Geothermal Development in the Geysers Area." December 18, 1975.

State of California, State Lands Commission. "Indenture of Lease" entered into by the State of California and Imperial Thermal Products, Inc. November 21, 1974.

State of California, State Lands Division. "Geothermal Data; State Lands Within Potential Geothermal Areas; Geothermal Resources Leases and Prospecting Permits." Working papers prepared by the State Lands Commission office. Long Beach. December 1975.

State of California, State Lands Division. "State Lands Aspects of Geothermal Resources: Status Report."

### c. Miscellaneous

Battelle Pacific Northwest Laboratories. Recommendations for a U.S. Geothermal Research Plan.

Financial Accounting Standards Board. "Accounting for Income Taxes--Oil and Gas Producing Companies; an Amendment of APB Opinions No. 11 and 23." Stamford, Connecticut. October 1975.

Greider, Robert. "Economic Considerations for Geothermal Exploration in the Western United States." Paper presented at a symposium held by the Colorado Department of Natural Resources on December 6, 1973.

Hendrickson, P.L. "Federal Tax Considerations Related to Geothermal Resources." Internal memo to C.H. Bloomster. Battelle Pacific Northwest Laboratories, Richland, Wash. September 23, 1974.

Walter, R.A. "Identification of Geothermal Research Areas." Internal memo to D.H. Stewart. Battelle Pacific Northwest Laboratories, Richland, Wash. August 16, 1973.

## E. Interviews

### 1. Government Agencies

#### a. United States

Bureau of Land Management, Sacramento Office.

ERDA, Division of Geothermal Energy, Policy Research Branch.

U.S. Forest Service.

U.S. Geological Survey, Area Geothermal Office.

U.S. Senate, Office of Senator Cranston.

U.S. Senate, Office of Senator Tunney.

b. California

Attorney General's Office.

California Energy Resources Conservation and Development Commission. Commissioners, Research and Development Division, Siting Division, Legal Department. Biennial Report.

California Public Utilities Commission. Commissioners, Environmental Impact Branch, Examiner Division, Staff Counsel, General Counsel.

State Lands Commission, Legislative Liaison.

State Lands Commission, State Land Division.

State of California, Air Resources Board.

State of California, Assembly Committee on Resources, Land Use, and Energy, Staff.

State of California, Clearing House.

State of California, Department of Fish and Game.

State of California, Department of Forestry.

State of California, Department of Water Resources.

State of California, Division of Oil and Gas, Geothermal Unit.

State of California, Office of the Lieutenant Governor.

State of California, Office of Planning and Research.

State of California, Water Resources Control Board.

c. Local

City of Burbank, Geothermal Project Manager.

Imperial County Geothermal Project Research Administrator.

Lake County Planning Director and Commission members.

Napa County Planning Department.

Sonoma County, Chief Appraiser's Office.

Sonoma County Planning Department.

2. Developers

Burmah Oil.

Chevron Oil.

Coopers & Lybrand.

Diablo Exploration.

Getty Oil.

Imperial Magma.

Magma Power Company.

Natomas Company.

Pacific Energy.

Republic Geothermal.

Thermal Power Company.

Union Oil Company of California.

3. Utilities

Los Angeles Department of Water and Power.

Northern California Power Agency.

Pacific Gas and Electric.

Sacramento Municipal Utility District.

San Diego Gas and Electric (including New Albion Resources Company).

Southern California Edison (including Mono Power Company).

4. Others

Electric Power Research Institute, Geothermal Research Division.

Energy and Environment Division, Lawrence Berkeley Laboratory.

Geothermal Energy Institute.

Jet Propulsion Laboratory.

Program Officer, Geothermal Program, Battelle Pacific Northwest Laboratories.

Renewable Energy Resources Project, National Conference of State Legislatures.

Senior Research Associate, Division of Humanities and Social Science, California Institute of Technology.

Sierra Club.

William Warne, consultant.

SCOMM

#9:8

CALLAN ASSOCIATES INC.
CAI CONSULTING CORPORATION
SAN FRANCISCO · NEW YORK · CHICAGO · LOS ANGELES

David R. Wood
Senior Vice President

February 28, 1978

Mr. Clark Gruening
State of Alaska
Permanent Fund
528 West 5th Street
Anchorage, Alaska 99501

Dear Mr. Gruening:

You may recall I spoke with you late last year regarding the various investment monitoring services of Callan Associates. You asked for some information to coincide with the legislative session and hopefully my remarks and the enclosed information will bring you up to date on our firm.

Callan Associates was originally started in 1967 as the Investment Measurement and Consulting Department of Mitchum, Jones & Templeton, a major West Coast brokerage firm. Very early in 1973, this department bought itself away from MJT and founded Callan Associates. Our major motive for going out on our own were the considerable conflicts of interest that we were encountering as part of a full service investment house. The disassociation with a brokerage firm has constantly been to our advantage, as well as to our clients. I am a Senior Vice President, Director, and major stockholder of Callan Associates, as well as a joint founder of the department back in 1967. This makes me an "old-timer" in a young industry.

We at Callan Associates look upon ourselves as investment consultants to major pools of capital invested in the various financial market places. For many clients, the first step is to project into the future the growth of a fund and the liabilities corresponding with that growth, if any. This perspective then gives us a feel as to what objectives might properly be set for the fund. This in turn reflects on what style of money managers to hire and what instructions are to be given to them. I would think such a forward planning model for your permanent fund and the future demands upon it would almost be essential.

Once the above information is available, a next logical step would be to screen money managers and alternative investments so as to reach the proper complement of different investment styles and investment alternatives. This might include equity and bond specialists, a good balanced manager, a real estate expert, etc. If appropriate, we could aid you in this type of search because this has been one of our major services since 1969. We know money managers, their history, the personnel, their performance track records, and their styles of management.

Once the fund was properly split between the various management firms, it would then be appropriate to set up a monitoring system to see that each manager was performing satisfactorily, as well as to check on your custodial bank. This monitoring system is separated into two major services: Investment Performance Analysis and a Portfolio Audit Service. Performance measurement reports will concentrate on whether or not each money manager is achieving the results you asked of him. In addition, comparisons are made with the track records of his competitors, i.e., banks, insurance companies, mutual funds, and investment counseling firms. Extensive graphs and colored charts are utilized to make these reports more readable. We tailormake our reports to fit the precise circumstances of each client. Thus, the enclosed sample is included simply to give you an idea of how we present our data.

The audit service is a 100% audit of each penny in each separate management account for every quarter. It checks all purchases and sales as to price, makes sure all dividends and interest payments are correct and are credited to your account on time, and provides a daily cash balance of uninvested monies. This service also contains an internal performance analysis that tells you why the money manager has performed well, average, or poorly.

My associate Doug Dorn is the primary consultant for the Alaska area, as we are already handling the Alyeska Pipeline Plan and may shortly be working with some of your local Taft-Hartley funds with respect to their pension plans.

He may, therefore, next be in Alaska and would very much like to meet with you at your convenience. If our services are of interest to you, I would be more than happy to make a formal presentation at any time to your committee or to any group whatsoever. Please do not hesitate to call me collect if you have any questions of us in the interim period.

Sincerely,

David R. Wood

David R. Wood

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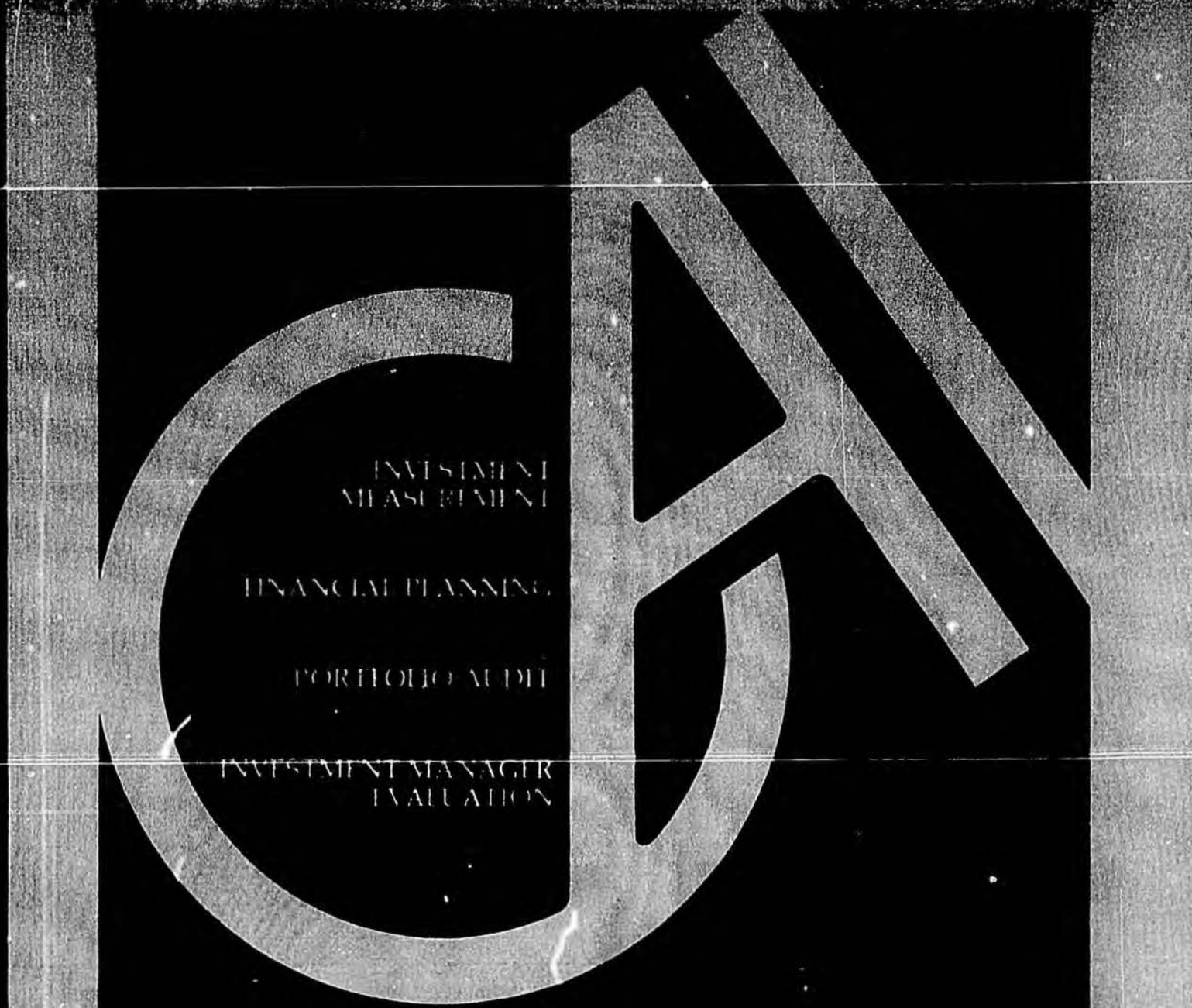
Enc.

cc: Charles J. Fuhrmann, II




# CALLAN ASSOCIATES INC.

## Investment Monitoring and Consulting

## To our clients and friends:

*The officers responsible for employee benefit funds and other large pools of capital face greater pressures than ever. The rapid growth of fund liabilities, the increased volatility of fund assets, and the enactment of the Employees Retirement Income Security Act of 1974 (ERISA) have created new demands for professional monitoring and consulting services.*

*Callan Associates, continuing a measurement and consulting business begun in 1966, offers you the combined experience of 60 professionals committed to careers in financial services. Our clients include major corporate pension and profit-sharing funds, as well as Taft-Hartley, public employee, and eleemosynary funds. We consult with 250 clients nationwide from our offices in New York, Chicago, Los Angeles, and San Francisco, and provide a total monitoring package comprised of the following services:*

- *Investment Measurement Analysis*
- *Financial Planning Service*
- *Portfolio Audit*
- *Investment Manager Evaluation*

*By assisting in monitoring your fund, Callan Associates can help you satisfy the requirements of ERISA and fulfill your fiduciary responsibilities.*

*Sincerely yours,*

Edwin C. Callan

Edwin C. Callan
PRESIDENT

## PORTFOLIO AUDIT

- ~ Verifies the price of each transaction
- ~ Audits the collection of all income
- ~ Examines the balance of uninvested cash
- ~ Analyzes returns for the total portfolio, industry groups, and individual securities
- ~ Maintains cumulative purchase and sale records to evaluate investment decisionmaking
- ~ Summarizes key investment data for your review

CAI provides an analysis and reconciliation of your custodian's statements. All discrepancies are validated by experienced analysts and then itemized for systematic resolution.

Audited numbers form the basis for a detailed investment performance review in a format which facilitates efficient and comprehensive analysis. Special summaries are tailored for your review.

## INVESTMENT MANAGER EVALUATION

- ~ Documents investment objectives and policy
- ~ Profiles present and prospective investment managers
- ~ Provides data on a group of prospective managers
- ~ Assists in formulating the selection and interview format

CAI assists in gathering and analyzing information required for selecting an investment manager.

Consultations include the review of investment objectives and policies as well as the consideration of desirable portfolio manager qualifications. Investment management firms are profiled from the standpoint of organization structure, personnel, performance, and other factors.

This data becomes a valuable reference for the Selection Committee when reaching the final decision.

# AUDITING EVALUATING

# CALLAN ASSOCIATES INC.

INVESTMENT MONITORING AND CONSULTING

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