



## GEO THERMAL ENERGY ASSOCIATION

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February 3, 2006

NEPA Draft Report Comments  
c/o NEPA Task Force  
Committee on Resources  
1324 Longworth House Office Building  
Washington, D.C. 20515

Dear NEPA Task Force,

Thank you for preparing an excellent report on the National Environmental Policy Act. In general, we find your findings and recommendations constructive. Before providing some specific comments on your recommendations, let me provide some background for the record on geothermal energy and the impact of delays on our projects.

### **Background on geothermal energy<sup>1</sup>**

Geothermal energy is defined as heat from the Earth. It is a clean, renewable resource that provides energy in the United States and around the world. It is considered a renewable energy resource because the heat emanating from the interior of the Earth is essentially limitless. The heat continuously flowing from the Earth's interior is estimated to be equivalent to 42 million megawatts of power.<sup>2</sup> (One megawatt is equivalent to 1 million watts, and can meet the power needs of about 1,000 people.) The interior of the Earth is expected to remain extremely hot for billions of year to come, ensuring an essentially limitless flow of heat. Geothermal power plants capture this heat and convert it to electricity.

Like all forms of electric generation, both renewable and non-renewable, geothermal power generation has environmental impacts and benefits. By comparison to other forms of electricity generation, choosing geothermal energy has significant benefits. Geothermal energy—whether utilized in a binary, steam, or flash power plant, cooled by air or water systems—is a clean, reliable source of electricity with only minimal environmental impacts, even when compared with other renewable energy sources.

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<sup>1</sup> For more information on geothermal energy and the environment, see *A Guide to Geothermal Energy and the Environment*, at <http://www.geo-energy.org/publications/reports.asp>.

<sup>2</sup>Energy and Geosciences Institute, University of Utah. Prepared by the U.S. Geothermal Industry for the Renewable Energy Task Force (1997), *Briefing on Geothermal Energy*. Washington, D.C.

Geothermal power plants release very few air emissions because they do not burn fuel like fossil fuel plants. Most fossil fuel power plant emissions are either a product of fuel combustion or a waste-product from that process. Geothermal plants avoid both environmental impacts associated with burning fuels as well as those associated with transporting and processing fuel sources. Geothermal plants emit only trace amounts of nitrogen oxides, almost no sulfur dioxide or particulate matter, and small amounts of carbon dioxide. The primary pollutant that some geothermal plants must sometimes abate is hydrogen sulfide, which is naturally present in many subsurface geothermal reservoirs. With the use of advanced abatement equipment, however, emissions of hydrogen sulfide are regularly maintained below even California state standards.

The current average geothermal generation of 15 billion kilowatt hours offsets harmful pollutants and greenhouse gases that would otherwise be generated by coal facilities each year, including 16 million tons of carbon dioxide, 78 thousand tons of sulfur oxides, 32 thousand tons of nitrogen oxides and 17 thousand tons of particulate matter.<sup>3</sup>

One of the most significant environmental benefits of geothermal energy is clean air, which translates into fewer respiratory health problems for the U.S. population. The American Lung Association estimates that power plant emissions, primarily from coal plants, result in over 30,000 deaths each year.<sup>4</sup> Greater use of geothermal power production can lower this number by decreasing air emissions. To illustrate, Lake County, downwind of the world's largest geothermal field known as "The Geysers," is the only air district in California that has been in compliance with all state and federal air quality standards for 17 years.

### **The impact of delays on geothermal projects**

Despite these benefits, geothermal projects can face significant delays many of which can be attributed to federal agencies. Those agencies often cite the need to comply with the National Environmental Policy Act as the cause of delays. Despite the obvious environmental advantages of geothermal power, and the national need for increased domestic energy production, these delays can and do make projects uneconomic. In a recent report, GEA assessed the economic impacts of delays. The following is the pertinent excerpt from that document:

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<sup>3</sup> Based on average EIA estimate of yearly geothermal generation, 1990-2004, available at <http://www.eia.doe.gov/emeu/aer/txt/ptb0802c.html>, and using percentages of each type of generation based on gross capacity listed at GEA website, available at <http://www.geo-energy.org/Existing.htm>.

<sup>4</sup> Garcia, Staci (Aug 2001). *Air Pollution Impacts and Reduction Strategies*  
Retrieved September 24, 2004, from <http://www.nrel.gov/docs/gen/fy01/NN0060.pdf>.

***“Considering that investment is expected to pay-back...”***

An important factor that increases the actual cost of exploration is the tremendous associated risk and possible time delay that may take place before the project begins to pay-back. Private companies active in exploration do not have access to commercial bank loans to finance these activities and are thus required to use their own capital or look for investors willing to share risks and ownership (equity). In finance, high risk means high rates of return. Equity invested in geothermal projects is expected to yield an annual rate of return of about 17% (Owens, 2002). Investments related to particularly risky activities (i.e. initial exploration phases) should thus expect even higher rates of return.

Since it takes a minimum of 3 to 5 years to put a geothermal power plant on line<sup>5</sup>, the initial exploration cost might in fact represent a much higher cost for the project. (e.g. \$150 borrowed during 4 years at 17% corresponds to an actual cost of  $150 \times (1.17)^4 = \$281/\text{kW}$  when the power plant is finally on-line and begins to pay-back). It sometimes takes much more time to bring a power plant on-line. Permitting delays and community reluctance to accept a project may last a very long time. For example, exploration at the Glass Mountain KGRA in Northern California began over 20 years ago.

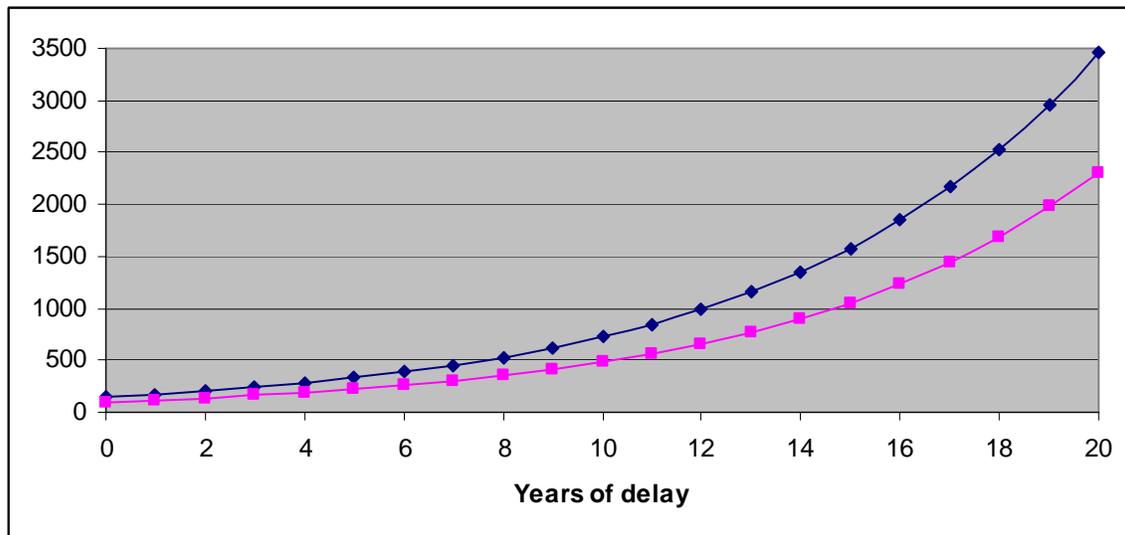
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<sup>5</sup> This assumes that all permits are obtained easily and without lawsuits.

**Figure 1: Financial impact of delay on exploration costs.**

*The following table and chart shows the evolution of the expected value of a \$100 and \$150 capital investment when a 17% rate of return is considered. This illustrates the financial impact delays may have on the project viability.*

Delay (years)	0	1	2	3	4	5	6	7	8	9	10
Exploration Costs	<b>100</b>	<b>117</b>	<b>137</b>	<b>160</b>	<b>187</b>	<b>219</b>	<b>257</b>	<b>300</b>	<b>351</b>	<b>411</b>	<b>481</b>
	<b>150</b>	<b>176</b>	<b>205</b>	<b>240</b>	<b>281</b>	<b>329</b>	<b>385</b>	<b>450</b>	<b>527</b>	<b>616</b>	<b>721</b>



Delay (years)	11	12	13	14	15	16	17	18	19	20
Exploration Costs	<b>562</b>	<b>658</b>	<b>770</b>	<b>901</b>	<b>1054</b>	<b>1233</b>	<b>1443</b>	<b>1688</b>	<b>1975</b>	<b>2311</b>
	<b>844</b>	<b>987</b>	<b>1155</b>	<b>1351</b>	<b>1581</b>	<b>1850</b>	<b>2164</b>	<b>2532</b>	<b>2962</b>	<b>3466</b>

If a rate of return of 17% is applied to a specific exploration cost of 150\$/kW during 20 years, the resulting cost of exploration would be 3466 \$/kW<sup>6</sup>. This cost corresponds to the total capital costs for the most expensive projects currently under development. Figure 1 shows the evolution of exploration cost when long delays take place.”

As this analysis shows, the delays involved in starting-up geothermal projects can make relatively small costs – exploration in this case – exceed the expected cost for the total project! In the case of the project noted above, only one company remains involved in development and all others who had leases or sought to develop in a large, undeveloped,

<sup>6</sup> The actual cost and conditions of venture capital is determined by a contract between the developer and the venture capitalist. This contract specifies the responsibilities and risks taken by each party. In most cases the "cost of delays" will be borne by the venture capital provider and, if the project is build, result in lower return on investment. If the project is abandoned, the venture capitalist loses his investment.

federally designated “Known Geothermal Resource Area” have left due to their inability to develop projects in a timely manner. Nearly thirty years after designation of this area as a KGRA, no power is being produced due almost exclusively to federal agency delays.

It should be noted that this is not the only situation where delay impacts geothermal production. There are substantial areas in the West with pending lease applications waiting for federal agency action. In some cases, lease applications have been pending for over two decades. In California, for example, no new geothermal leases have been issued in over two decades despite industry interest, despite the need for new domestic, energy production, and despite both federal and state priorities for renewable power.

### **NEPA and geothermal energy**

As members of the National Geothermal Collaborative, GEA participated in a workshop on geothermal leasing in November 2004. The agenda and proceedings from that meeting can be found at <http://www.geocollaborative.org/events/sacramento/default.htm>. At that meeting the question of NEPA compliance loomed as a major barrier. While BLM officials from Nevada explained that they were proceeding with leasing since it was given a priority in that state and they were able to lease on the basis of Environmental Assessments, in California a totally different picture emerged.

As the proceedings state: “Rich Estabrook (BLM-CA) presented California’s recent challenges with pending lease applications in Southern California. These included high costs and long time frames associated with completing adequate pre-lease NEPA documentation (conservatively, an EIS may cost \$600,000 and take two years to complete. Most of the lease applications in California are within the California Desert Conservation Area, which raises the visibility of leasing and, therefore, would require an EIS before leasing could occur). It is anticipated that two EIS’s would be needed to cover the high priority lease application areas. Another challenge is a lack of committed staff to process and manage leases (often staff is pulled off for litigation defense activities), lack of geothermal specific funding, and the expectation of litigation.”

Today, fourteen months later, little action has been taken on pending lease applications in California and any new leasing is years away. This occurs despite the fact that California has thousands of megawatts of untapped geothermal resources that could provide environmental, economic and national security benefits to the state and the nation if they were developed.

The National Geothermal Collaborative went further, producing an analysis of recent NEPA documents and noting in particular the issues raised by the public. This report, *Geothermal Outreach Principles and Comment Analysis Report*, can be found at: <http://www.geocollaborative.org/publications/default.htm>. As the report explains: “The National Geothermal Collaborative (NGC) selected MHA Environmental Consulting,

Inc. (MHA) to assist the NGC in conducting a quantitative and qualitative examination of public comments recorded in federal and state environmental and permitting documents for geothermal projects. The primary objectives of this effort are twofold: 1) To analyze what categories of interest and sectors are involved and which issues they raise. 2) To use this analysis to design a set of recommended principles for developing effective outreach programs. The comment analysis represents a compilation and review of 3,787 individual comments on eight proposed geothermal development locations throughout the western United States. The comments span issues raised in 1979 for a geothermal leasing Environmental Impact Statement (EIS) to issues raised in 2003 for a 185 megawatt (MW) geothermal power plant at the Salton Sea (the largest geothermal plant proposed to date). Detailed information regarding the types of comments is found in Appendix A to the report, including tables that summarize frequently occurring comments, quantify the types of comments, and outline topics by commenting entities.”

What this study found was that it didn't matter where a project was located or what type of plant was involved or whether or not there was a demonstrated history of successful mitigation, the same broad range of issues and objections were raised in each and every case. While the vast majority of the comments were negative, the review of these documents also found comments regarding the positive aspects of geothermal development were rare. Positive comments included:

- Diversification of the energy supply for the nation and the state
- Economic benefits of construction labor spending in the community
- Economic benefits of property tax revenue
- Economic benefits of geothermal project and related industry jobs.” (Page A-II)

Rather than speculate about future projects, the analysis of the process followed by a geothermal plant that is now producing is perhaps the best illustration of how the NEPA process works, or doesn't work. The case of the Pacific Energy project in Mono County, California, is such an example and allows comparison of the issues raised during the NEPA process and the ultimate results.

As the NGC report states, “Pacific Energy proposed to construct and operate a 10 MW (net) binary power plant and geothermal wellfield development project (PLES I Project). PLES I was originally approved in 1987 under an EA/EIR. The Sierra Club and CDFG then appealed the project to the Interior Board of Land Appeals (IBLA). Following the 9th Circuit Court of Appeal's Methow Valley decision requiring worst-case analysis, the BLM asked the IBLA to remand the decision to do the EIS/Supplemental EIR (which was reviewed in this analysis). The US Supreme Court ultimately rejected the Methow Valley decision. The EIS/EIR was used to approve the project in 1988. Following some litigation and settlement between the applicant and the CDFG, the project was constructed and began operation in 1990.”

And what were the results? From the NGC report: “**Operational Outcomes:**  
After 14 years of operation, none of the major impacts contemplated in the comments on the EIS/EIR have materialized. The PLES I Project (and the adjacent 7 MW (net) MP I Project (which began operation on private land in 1984) and the 10 MW (net) MP II Project (the twin project to PLES I, which also began operation on private land in 1990) continue to operate using the geothermal resources produced from the same geothermal reservoir. Based on a recent third-party analysis of the over 20 years of extensive groundwater and geothermal resource data collected under a cooperative monitoring program, the operation of all of these plants was found to have not had a quantifiable effect on the thermal features in the area. The plants have not had an adverse effect on migrating deer or other wildlife, and are very well hidden from public view. Elected officials, trade associations, and community groups have frequently recognized the plants for their outstanding record on environmental protection and operations excellence.”

It is no exaggeration to say that the developers at this site very nearly walked away from the project. Had it not been for the dedication of several key people to producing clean, geothermal power to meet our energy and environmental needs this project would not have survived a harrowing process. Since the completion and operation of the initial 10MW facility, the project has been expanded to 40MW and the community is also considering expanding its use of geothermal resources for direct use purposes.

It is ironic that while federal and state governments provide incentives to promote the development of more geothermal energy, they create bureaucratic nightmares that can cost as much or more than the incentives through unnecessary and unjustifiable delays.

### **NEPA a leading cause of delay in past and future geothermal projects**

In the Sacramento workshop, the federal agency staff was asked to explain the differences between performing EA's for geothermal leasing in Nevada and requiring EISs in California. They explicitly stated that there would not be much substantive differences in the analysis of geothermal production, its potential impacts, needed mitigation, or other such matters. However, it was considered necessary to do an EIS because, “...Most of the lease applications in California are within the California Desert Conservation Area, which raises the visibility of leasing and, therefore, would require an EIS before leasing could occur.”

The difference in outcomes may be negligible. The difference in protection afforded the environment may be negligible. But, an EA can be done in three months for approximately thirty thousand dollars, while an EIS takes two years or more with cost in the millions! Meanwhile, the agency delays even proceeding with the EIS because it does not have a firm commitment of the funds necessary on a multi-year basis, and with

continued budget deficits it is unlikely that federal agencies will have much certainty about year-to-year funding without special legislative action.<sup>7</sup>

Also, it needs to be recognized that at least in this case the additional delay and costs do not directly address environmental mitigation. Instead, they address the need to deal with the agency's perception of public controversy and litigation. Staff present at the Sacramento meeting made it clear that one consideration was who bears the burden of justification, and if they issue an EA the local staff completing the document would have to be present and justify their conclusions in any subsequent legal challenges while an EIS would transfer that responsibility to other individuals. In other words, it was the fear of litigation and its consequences for the BLM professional staff that drove the decision to take the longer, more expensive route.

It is worthwhile to note that the Task Force concludes that there is in fact little justification for these fears on the part of agency staff. As your report notes on page 11 "of the approximately 50,000 EISs filed each year only 0.2% resulted in litigation." Yet, when this point was made with agency staff, i.e. that the threat of litigation was overblown, they adamantly disagreed stating generalities about how abused the statute has become.

#### **Comments on the Task Force Recommendations:**

As a result of our examination and involvement with the issue of NEPA, it is GEA's view that significant changes and improvements can be accomplished without changing any substantive protections required by the law. The Draft Recommendations proposed by the Task Force would go a long way towards that end, and we wish to highlight a few that we believe are most needed.

Recommendation 1.2: Amend NEPA to add mandatory timelines for the completion of NEPA documents.

Reaching a decision in a timely manner is one of the most critical needs. While it is unfortunate that Congress has to take this step, there does not appear to be any more reasonable approach than establishing statutory requirements for NEPA compliance. Adding mandatory timelines for the completion of NEPA documents would be one of the most beneficial actions that Congress can take to address the problems with agency implementation of NEPA.

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<sup>7</sup> The House Resources Committee has provided such special legislative action by adopting provisions in the Geothermal Steam Act Amendments (Subtitle B of the Energy Bill in 2005) that would allow BLM to apply the federal share of royalties to its program for the next five years. These funds would give the agency the resources needed to help address the two-decade long backlog in pending lease applications and other actions needed to implement the new law. Unfortunately, it has been reported the OMB is seeking repeal of this provision which would undermine the Committee's attempt to ensure that this serious problem is addressed.

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**Recommendation 1.3:** Amend NEPA to create unambiguous criteria for the use of Categorical Exclusions (CE), Environmental Assessments (EA) and Environmental Impact Statements (EIS).

Since our experience and analysis indicate that agencies too often perform “defensive management,” it is important that unambiguous criteria be established for the use of CE, EA and EIS. If the agencies are allowed discretion in the choice, too often they will simply defer action towards the more expensive and lengthy alternative and, as has been our continuing experience, end up taking no action arguing that the funds “necessary” to complete that course of action are not available. This puts potential geothermal projects on perpetual hold, and relieves the agency of having to make any hard decisions. The recommendations of the Task Force would help end the NEPA shell game.

We suggest that the Task Force also consider adding direction for CEQ to work with the agencies to support the CE and EA process. If the decision to adopt a CE or undertake an EA is substantively correct, agency staff should have an internal review process in place that will support or correct that decision before reaching litigation. They should not feel that they have to choose an EIS as a self-defense measure.

**Recommendation 3.2:** Direct CEQ to prepare regulations that allow existing state environmental review to satisfy NEPA requirements.

Since many geothermal projects are in California, which has its own extensive environmental review requirements, coordination between federal and state laws so that there does not end up being duplicative, sequential requirements is important. Again, these requirements are often imposed in series rather than in parallel, adding years of delay to projects that end up costing consumers when project costs escalate due to the delays.

**Recommendation 5.3:** Direct CEQ to promulgate regulations to make mitigation proposals mandatory.

Many mitigation measures for geothermal projects are well understood, but federal agencies may or may not have the knowledge necessary to incorporate them into their decision-making. While having CEQ propose regulations making mitigation proposals mandatory is a good step, this need to be coupled with directives to the agencies to develop industry or technology-wide mitigation measures. In addition, the land management agencies will need support and assistance from DOE and other federal agencies to make effective technology and mitigation characterizations. Increasing the priority on identifying and applying mitigation as a standard part of the NEPA process would greatly reduce unnecessary spending and delay.

Recommendation 7.1 Amend NEPA to create a “NEPA Ombudsman” within the Council on Environmental Quality.

Several recent geothermal EIS documents involved multiple federal agencies, particularly the Forest Service and BLM. In these cases, the agencies seemed to be working effectively under an MOU but their adherence to that MOU broke down and decision-making also stopped leaving project developers with no recourse. CEQ should be the key entity to ensure agency coordination and effective implementation of NEPA. Creation of a NEPA Ombudsman would be a step in the right direction and enhance the role of CEQ in achieving effective implementation of the law.

Recommendation 7.2 Direct CEQ to control NEPA related costs.

The issue of “cost-effective” NEPA compliance is central to this entire discussion, from both the governmental and industry perspective. Not only should CEQ be directed to manage NEPA spending responsibly, but the federal agencies should be tasked with reporting on a regular basis on the costs they are incurring for NEPA compliance. To take this a step further, it would be optimal if CEQ also examined the cost-effectiveness of NEPA compliance and reported to Congress every few years with its recommendations for continued improvements.

### **Additional Issues**

Tribal consultation and Section 106 of the National Historic Preservation Act

The Task Force recommendations do not appear to consider the consultation process under Section 106 of the National Historic Preservation Act, which is a primary avenue for tribal consultation on public lands. The federal agencies need to include Section 106 consultation in their regulations and standards for NEPA review, and tribal groups need to be informed about the process. It has been our experience that Section 106 consultation can often come too late in the process, and thus represent a further delay. Also, many issues that are raised and resolved under the NEPA process have been resurrected as part of the Section 106 process and this presents not only a problem of duplication but also one of conflicting authority. The scope of the Section 106 review should be clearly defined by law or regulations, and deference to appropriate federal or state agency decisions should be the standard.

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## **Conclusion**

Thank you for the opportunity to provide input to the Task Force on its recommendations. We commend the Task Force for its work and the constructive spirit of its recommendations. We hope the Task Force will consider our comments and recommendations in producing its final recommendations, and hope Congress and the Administration will take prompt action on measures to improve the administration of the National Environmental Policy Act.

Sincerely,

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