

Nuclear Information and Resource Service

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August 12, 2005

California Energy Commission Dockets Unit

Attn: Docket No. 04-IEP-1J

1516 Ninth Street, MS-4

Sacramento, CA 95814-5512

Re: Energy Report: Nuclear Power, 2005 Workshops

We are happy to submit the comments of Nuclear Information and Resource Service (NIRS) to the California Energy Commission's proceeding on its nuclear power Energy Report. NIRS is an international NGO concerned with nuclear power issues and we submit these comments on behalf of our 1150+ members in the state of California.

Sincerely,

Michael Mariotte
Executive Director

GENERAL COMMENTS

We agree with the draft consultant report findings that "...the Energy Commission will not receive a license application for the construction of any new nuclear power plants in California in the near future," and that "...the Energy Commission could not approve a license application for the construction of any new nuclear power plant in California at this time," and agree that the Commission could not approve one in the near future.

We agree with the draft consultant report findings that reprocessing remains too expensive and continues to hold substantial nuclear proliferation concerns.

We agree with the draft consultant report findings that "the Energy Commission cannot conclude that DOE will ever operate the permanent repository at Yucca Mountain," and

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that “California needs a comprehensive assessment of the implications of indefinitely relying on at-reactor interim fuel storage facilities.”

We believe that the State should actively support the efforts of the California Attorney General, Mothers for Peace and others in their challenge to the security concerns over dry cask storage at Diablo Canyon.

We do not agree that California “should evaluate the viability of this option [a centralized interim storage facility] and assess whether California should anticipate that this interim facility will become operational.” Rather, we believe California should explicitly reject this as an option for California utilities. Such a facility would not meet California law prohibiting new nuclear construction until there exists demonstrated means of disposing of high-level radioactive waste. A temporary storage facility is a far cry from disposal. Moreover, the only facility being considered is highly controversial: the proposed Private Fuel Storage facility on Skull Valley Goshute land in Utah has been embroiled in disputed tribal politics and potentially improper Bureau of Indian Affairs approval. Further, it has been vigorously opposed by the State of Utah and residents throughout the state. Utility costs to use this facility would likely not come from the Nuclear Waste Fund, meaning that California residents would be paying twice for radioactive waste storage: once to the Nuclear Waste Fund and again to Private Fuel Storage.

SPECIFIC COMMENTS

Chapter 3: Costs and Benefits of California’s Commercial Nuclear Power Reactors

We find that this chapter is inadequate in two major respects: 1) it does not adequately, but should, discuss the implications of possible applications by PGE and SCE for license extensions for Diablo Canyon and San Onofre; 2) its discussion of carbon and other emissions from nuclear power reactors is inadequate, incomplete and incorrect.

1. The final CEC report should include an examination of the implications of possible license extension for Diablo Canyon and San Onofre.

We make this recommendation because California should begin planning now for the retirements of both Diablo Canyon and San Onofre. Moreover, we believe that California should make clear to both PGE and SCE that the state will oppose any license extension for these facilities.

Although possible license extension applications for these facilities are some years away, planning now for replacement power when these facilities retire is prudent. This is even

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more true given that it is entirely possible that one or both of these facilities will be forced to retire early, due to accident, either at one of these facilities or elsewhere in the world; unanticipated but highly possible capital costs due to deterioration of equipment and/or regulatory action; failure of steam generator replacement—a particular concern at San Onofre given the difficulties in accomplishing this task there, or other reason. No U.S. reactor has ever operated 40 years. The longest-lived was the tiny Big Rock Point unit, which lasted 32 years. While newer reactors may be able to operate for a 40-year period, there is no real-world experience that indicates this would be true, and plans should be made with real-world experience in mind.

Further, there is no experience anywhere in the world that suggests reactors will be able to operate more than 40 years. It is undeniable that the Nuclear Regulatory Commission has given license extensions of several facilities to operate for 20 years beyond their original 40-year licenses and both the NRC and the nuclear industry hope these reactors will be able to operate more than 40 years. However, none of these extensions have yet come into force, and component aging, capital costs, accident, and any number of other factors may—and given the history of the atomic age so far, are likely to—prevent the operation of reactors for much beyond 40 years, if that long.

For example, with both San Onofre and Diablo Canyon being less than 25 years old and already having to replace their supposedly 40-year steam generators at huge costs, it is rational to assume such replacement would be needed again early in a license renewal period. Other large components may also need replacing. Embrittlement of reactor pressure vessels when exposed to another 20-25 years of high heat and radiation levels is a serious concern.

Further, given the continued lack of progress in the nation's radioactive waste program, both Diablo Canyon and San Onofre are likely to face radioactive waste storage issues much more complex and critical than the difficulties they already both now face, if they seek license renewal.

While predicting the lifetime of a reactor and need for major repairs and capital costs is, of course, speculative, it is certainly even more speculative not to predict a shorter-than-expected lifetime and additional repairs and costs, given the history of these facilities. We believe the California Energy Commission should examine the relicensing issue, and we believe if it does so, it will come to the conclusion that relicensing should be disallowed. We believe it is prudent for the California Energy Commission to begin now to plan for the retirement of San Onofre and Diablo Canyon.

Finally, we take exception with this chapter's emphasis on the "indirect benefit of reduced demand for natural gas" as a benefit of continued operation of the state's nuclear facilities, as if natural gas were the only source of electricity available to the state. In fact, continued energy efficiency improvements, distributed generation systems, and renewable power readily available in California could meet much, if not all, of the capacity currently provided by Diablo Canyon and San Onofre. Thus, the indirect benefit of reduced natural gas demand could be 0. In addition, use of such technologies could result even in a net reduction of carbon emissions (see below).

2. The report's discussion of carbon and other emissions from nuclear power reactors is inadequate, incomplete and incorrect.

California is a national leader in its recognition of the threat posed by global warming and its efforts to address the causes of climate change. We applaud the state's awareness in this area and encourage the state to continue and expand its programs to reduce carbon emissions.

Thus, it is surprising that the section of the report on emissions from nuclear power plants is quite poor—not nearly of the same quality as most of the rest of the report.

The report correctly notes that while the operation of reactors themselves is virtually carbon emissions-free, the nuclear fuel chain necessary to support the reactors is not. However, rather than seek independent data, the report uses an analysis from the nuclear industry's Nuclear Energy Institute to quantify the amount of emissions released by nuclear power compared to other technologies. The result is Figure 8 (page 30), which shows that lifecycle nuclear power emissions are similar to clean technologies such as wind and hydro.

Non-industry studies find a greater difference. For example, Germany's Oko Institute found that wind power emits about 20 grams of CO₂ per kilowatt/hour generated, while nuclear power emits about 35 grams per kwh (*Comparing Greenhouse Emissions and Abatement Costs of Nuclear and Alternative Energy Options from a Life-Cycle Perspective*, 1997) or about 75% larger emissions from nuclear power. Other studies, cited in the NIRS publication *Nuclear Power: No Solution for Climate Change* (February 2005) (enclosed as addendum to our comments) have found the difference between nuclear power and clean alternatives to be even higher. Closing San Onofre and Diablo Canyon now would actually result in a reduction of carbon emissions—not an increase.

The emissions caused by the nuclear fuel cycle will increase, rather than decrease. This is because the reserves of rich uranium ore are dwindling. As the richness of the available ore decreases, extraction and processing of the uranium becomes more resource-intensive, leading to higher carbon emissions.

This is less significant for the immediate future in California, but highly significant for nuclear power's overall role as a means of addressing climate change. The National Commission on Energy Policy, the recent MIT report and the International Atomic Energy Agency all agree that for nuclear power to provide any significant role in mitigating greenhouse emissions would require a construction program of unprecedented magnitude. In the U.S. alone, we would need to double or triple the number of operating reactors—or build another 200 to 300 reactors in addition to the 103 now operating. Worldwide, 1,000 to 1,500 new reactors would be needed (there currently are 440 worldwide) to provide even a 20% reduction in emissions.

Such a program would pose numerous issues; perhaps most importantly, even at current nuclear industry cost estimates, the cost would be in the trillions of dollars worldwide and hundreds of billions in the U.S. alone. California is well-aware of the nature of cost overruns in the construction of nuclear reactors. A simple—and generally accurate—formula is to take the industry's cost projections and double them (in California's experience, doubling wouldn't be nearly enough). Use of resources at this level would effectively preclude spending on wind, energy efficiency, solar, distributed generation, green hydrogen, transmission improvements and all of the other technologies that produce even fewer emissions at lower cost.

According to the Oko Institute study cited above, wind power, combined cycle gas turbine cogeneration, and energy efficiency can all provide greenhouse gas emissions reductions at a negative abatement cost, while nuclear power ranges from about \$20-40 per ton of carbon abated. Other studies place annual costs for 1,000 kilograms of carbon emissions avoided at \$68.9 for wind and \$132.5 for nuclear power.

Wind, energy efficiency and other clean energy sources also avoid all of the other problems with nuclear power:

*Nuclear power does not work well in warming climates. The summer of 2004's heat wave across Europe not only killed thousands of people, but because of dwindling river levels caused many reactors to reduce power levels and even shut down entirely. Reactors require vast quantities of water to keep the core cool; changes in water levels, and even water temperatures, can greatly affect reactor operations. Reactors in the U.S. have similarly been forced to close during heat waves.

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* Operation of 1500 new reactors would cause known uranium reserves to run out in just a couple of decades—making nuclear power a temporary solution at best or making reprocessing a necessity, even with its proliferation and environmental concerns.

*Operation of 1,500 or more new reactors would create the need for a new Yucca Mountain-sized radioactive waste dump somewhere in the world every 3-4 years. No nation has yet implemented a permanent high-level radioactive waste facility. The odds of identifying so many new scientifically-defensible and publicly-acceptable waste dumps are slim.

*Odds of a major nuclear accident are on the order of 1 in 10,000 reactor-years. Operation of some 2,000 reactors (1500 new plus 440 existing) could result in a Chernobyl-scale nuclear accident as frequently as every five or six years—a price the world is not likely to be willing to pay.

*Operation of 1,500 or more new reactors would require a couple of dozen or more new uranium enrichment plants, and would result in the production of thousands of tons of plutonium (each reactor produces about 500 pounds of plutonium per year), posing untenable nuclear proliferation threats.

*Nuclear power, which can only produce electricity, cannot, of course, even begin to address emissions from automobiles and other components of the transportation sector.

The choice is clear: we can address climate change *or* we can pursue nuclear power. We cannot do both.

For all of these reasons, the report fails in its discussion of nuclear power's role in addressing the climate crisis. We recommend that the California Energy Commission follow the lead of the Kyoto Protocol at its COP 6 and 7 meetings, and explicitly reject nuclear power as a means of addressing greenhouse emissions.

Moreover, the report fails to note that while the reactors themselves do not release any substantial amounts of carbon, they—and the nuclear fuel chain—do release radiation on a routine basis. While radioactive emissions may not cause global warming, they are harmful to all life. As the BEIR VII (Biological Effects of Ionizing Radiation) Committee of the National Academy of Sciences affirmed in June 2005, there are no safe levels of radiation exposure—every radiation exposure, including unavoidable background radiation—contains risk, and every additional exposure increases risk.

While the Nuclear Regulatory Commission and nuclear industry claim these releases are “as low as reasonably achievable,” there is, of course, disagreement about what is “reasonable.” Releases of some radioactive elements, such as tritium and some noble gases like krypton and xenon, are not and often cannot even be monitored. Noble gases are sometimes viewed as harmless by the industry; in fact, some break down into other isotopes. Xenon-135, for example, breaks down into Cesium-135, which has a 2.3 million year half-life. Releases of other radioisotopes may be low, but they are not risk-free.

Given the BEIR VII committee’s findings, it is clear that no radiation releases are “reasonable” and all radiation releases to the environment should be avoided. The best way to do this in California is to begin planning for the retirement of Diablo Canyon and San Onofre, and to seek that retirement at the earliest date possible.

California Reactors and “Low-Level” Radioactive Waste

The California Energy Commission should realize that nuclear power generates so-called “low-level” radioactive wastes, which include long-lasting and biologically active radioactive elements—the very same elements as in high level radioactive waste.

After 2008, there will be nowhere for the hottest of this waste to go, assuming the Barnwell, South Carolina site closes to California as is scheduled. California averted opening a dump in this state, successfully preventing irreversible contamination of the Colorado River and avoiding potentially enormous liability, as has been incurred at the four closed “low-level” nuclear waste dumps in the country.

Your own controller’s office pointed out that opening such a nuclear waste dump is a threat to taxpayers. Congratulations on preventing those unnecessary costs.

By curtailing nuclear power in the state, California would stop the generation of most dangerous and long-lasting nuclear waste and prevent the need for a new nuclear dump.

The nuclear power industry is also working hard to get some of its radioactive waste deregulated so it can go to regular garbage dumps and even be recycled into everyday household items. California’s Department of Health Services attempted to make this legal a few years ago but was stopped by vigilant citizens in court. Unfortunately, the Department could still move to legalize this activity in the state. Stopping the creation of the waste by phasing out the major nuclear waste generators--the nuclear power reactors--would certainly help reduce the motivation to reactivate such environmentally hostile, anti-protection regulations.

Phasing out nuclear power reduces the generation of nuclear waste which will save tax money, the environment and protect our health by preventing nuclear waste from getting into water, environment and everyday household items.

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