



COMMENTS OF
THE ENVIRONMENTAL DEFENSE FUND, INC.

ON THE

DRAFT ENVIRONMENTAL STATEMENT
RELATED TO CONSTRUCTION OF
PALO VERDE NUCLEAR GENERATING STATION
UNITS 4 AND 5
ARIZONA PUBLIC SERVICE COMPANY, ET AL

Docket Nos. STN 50-592
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Submitted by:

Daniel Kirshner
Economic Analyst

Dr. W.R.Z. Willey
Staff Scientist

David B. Roe
Staff Attorney

David Mastbaum
Staff Attorney

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INTRODUCTION

The Environmental Defense Fund, Inc. (EDF)^{1/} has been concerned for some time about the failure of energy decision-makers to consider alternatives to the construction of large central station electric generating plants.^{2/} It is beyond dispute that conservation and alternative energy potentials which are safer, cleaner, more reliable and cheaper than conventional large power plants must be exhausted, and the energy problem reduced as much as possible, before the public is forced to cope with the problems of whatever is next best (nuclear-, coal-, or oil-fired generation). The Nuclear Regulatory Commission's (NRC) Draft Environmental Statement on Palo Verde Nuclear Generating Station Units 4 and 5^{3/} strongly

^{1/} EDF is a not-for-profit environmental organization with more than 43,000 members nationwide. EDF is dedicated to the protection and rational use of natural resources and to the preservation and enhancement of the human environment. Its staff of scientists, economists, lawyers and others pursue these goals through scientific research and monitoring, and administrative, judicial and political action.

^{2/} See, e.g., Dr. W.R.Z. Willey, Testimony Before the California Public Utilities Commission--Alternative Energy Systems for Pacific Gas & Electric Company: An Economic Analysis (1978); Dr. W.R.Z. Willey, Testimony Before the Arkansas Public Service Commission on Behalf of Attorney General Bill Clinton (1978); . Mastbaum, Testimony of the Environmental Defense Fund, Inc. . . the Office of Technology Assessment's Report on the Direct Use of Coal Before the Subcommittee on Energy Development and Applications of the U.S. House Committee on Science and Technology (1979).

^{3/} U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Draft Environmental Statement Related to the Construction of Palo Verde Nuclear Generating Station Units 4 and 5, Arizona Public Service Company, ET AL (April 1979) (DES).

suggests that the existence of such alternatives has been ignored, and demonstrates conclusively that they have not been analyzed in the context of the proposed units.

Based on extensive research on the extent to which energy conservation and alternative energy sources can meet future energy needs,^{4/} EDF believes that there are feasible, presently available alternatives to the construction of Palo Verde Nuclear Generating Station Units 4 and 5 which will provide the same energy yield in the same time period, at lower cost to all concerned. These alternatives--which the DES has either ignored or dismissed without serious analysis--include, inter alia: (1) on-site solar space and water heating (direct use of heat from the sun by customers); (2) increased end-use efficiency (often called "conservation"); (3) co-generation; (4) load management; (5) geothermal; (6) and wind.

The accident at the Three Mile Island nuclear plant, the serious potential risks to human health and the environment from coal-fired generation^{5/} and the uncertain status of continuing oil supplies from the Middle East have increased the importance of a comprehensive effort to capture the benefits of these alternative energy sources to the maximum extent feasible. The conventional energy wisdom--to which the DES subscribes--says

^{4/} See note 2, supra.

^{5/} See, e.g., Congress of the United States, Office of Technology Assessment, The Direct Use of Coal: Prospects and Problems of Production and Combustion (1979); SRI International, The Long Term Impact of Atmospheric Carbon Dioxide on Climate (7 9) (prepared for the U.S. Department of Energy).

that nuclear, coal and oil are our only options to meet the demand for electricity. Succumbing to that false dilemma will lead to severe environmental and financial consequences,^{6/} which do not need to be incurred, and which in fact can be avoided at no sacrifice or increase in cost.

Specifically, EDF believes that the DES fails to analyze adequately: 1) the full costs and benefits of Palo Verde Units 4 and 5 because the NRC has chosen to ignore all information and data concerning the serious accident at the Three Mile Island nuclear plant near Middletown, Pennsylvania; and, 2) presently available superior alternatives to the construction of Palo Verde Units 4 and 5 which could provide the same or an even greater yield in the same time period. Therefore, EDF has concluded that the DES does not comply with the National Environmental Policy Act of 1969 (NEPA);^{7/} Executive Order 11514^{8/} as amended by Executive Order 11991;^{9/} the Guidelines of the President's Council on Environmental Quality (CEQ);^{10/} and the NRC's own regulations implementing NEPA.^{11/}

EDF submits these comments in response to the NRC's and

^{6/} See, e.g., California Public Utilities Commission, Decision No. 89316 at 6 (Sept. 6, 1978) ("It is well settled in our minds that continued growth of new generating capacity is too financially and environmentally expensive for California").

^{7/} 42 U.S.C. §4321 et seq. (Supp. V, 1975).

^{8/} 35 Fed. Reg. 4242 (1970).

^{9/} 42 Fed. Reg. 26967 (1977).

^{10/} 40 C.F.R. Part 1500.

^{11/} 10 C.F.R. Part 51.

U.S. Environmental Protection Agency's announcements^{12/} of the availability of the DES. Our comments will focus on the two issues identified above. They are not intended to be an all-inclusive analysis of the DES.

THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

NEPA was enacted in direct response to growing dissatisfaction with decisionmaking by federal agencies, which had permitted "[i]mportant decisions concerning the use and the shape of man's future environment . . . to be made in small but steady increments which perpetuate rather than avoid the recognized mistakes of previous decades."^{13/} It recognizes the "profound impact of man's activity on the interrelations of all components of the natural environment . . ." and declares a national policy "to use all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony. . . ."^{14/}

To implement this objective, NEPA establishes certain procedural obligations, including the preparation of a detailed environmental statement for "major federal actions significantly affecting the quality of the human environment."^{15/} These

^{12/} 44 Fed. Reg. 23951-52 (1979); 44 Fed. Reg. 27735-39 (1979).

^{13/} S. Rep. No. 91-296, 91st. Cong., 1st Sess. 5 (1969).

^{14/} §101(a), 42 U.S.C. §4331(a).

^{15/} §102(2)(c), 42 U.S.C. §4332(2)(c).

procedural obligations must be met "to the fullest extent possible,"^{16/}

An environmental statement must be sufficient to "permit a decisionmaker to fully consider (sic) and balance environmental factors,"^{17/} to "enable those who did not have a part in its compilation to understand and consider meaningfully the factors involved,"^{18/} and to permit an "informed choice."^{19/}

Pursuant to the authority granted by §103 of NEPA,^{20/} to review agency procedure and regulations and establish means by which agencies are to discharge their responsibilities under the Act, the President issued Executive Order 11514.^{21/} This Executive Order, issued pursuant to statutory authority, binds all federal agencies and becomes part of the statute.^{22/} Accordingly, whether an agency's actions comply with NEPA must be judged in light of the affirmative duties imposed by the Executive Order.

Pursuant to the authority of Executive Order 11514, CEQ has issued guidelines defining NEPA's requirements for the preparation

^{16/} §102(2), 42 U.S.C. §4332(2).

^{17/} Concerned About Trident v. Rumsfeld, 555 F.2d 817, 827 (D.C. Cir. 1976); Natural Resources Defense Council v. Hughes, 437 F. Supp. 981, 988 (D.D.C. 1977).

^{18/} Environmental Defense Fund v. Corps of Engineers, 492 F.2d 1123, 1136 (5th Cir. 1974).

^{19/} Committee for Nuclear Responsibility v. Seaborg, 463 F.2d 783, 787 (D.C. Cir. 1971).

^{20/} 42 U.S.C. §4333.

^{21/} 35 Fed. Reg. 4247 (1970).

^{22/} See United States v. Messer Oil Corp., 391 F.Supp. 557, 561-62 (W.D.Pa. 1975).

of environmental impact statements.^{23/} As the agency "entrusted with the responsibility of developing and recommending national policies to foster and promote the improvement of the environmental quality,"^{24/} CEQ's guidelines are, at a minimum, entitled to significant weight,^{25/} and may not be disregarded "except for the strongest of reasons."^{26/}

NRC has adopted regulations to implement NEPA.^{27/} These regulations are as binding as law on agency action.^{28/}

THE DES IGNORES RELEVANT DATA AND INFORMATION FROM
THE THREE MILE ISLAND NUCLEAR REACTOR ACCIDENT

An environmental impact statement must contain adequate information to permit a "rather finely tuned and systematic

^{23/} 40 C.F.R. Part 1500. Executive Order 11514 was amended by Executive Order 11991, 42 Fed. Reg. 26967 (1977), directing CEQ to prepare regulations binding on all federal agencies. The final regulations appear in 43 Fed. Reg. 55978-56007 (1978). Although these new regulations, effective July 29, 1979, have no present legal force, their underlying policies deserve consideration. See Get Oil Out, Inc. v. Andrus, ___ F.Supp. ___, ___ (C.D.Cal. 1979).

^{24/} Green County Planning Board v. Federal Power Commission, 455 F.2d 412,421 (2d Cir. 1972).

^{25/} Environmental Defense Fund v. Tennessee Valley Authority, 468 F.2d 1164,1178 (6th Cir. 1972).

^{26/} Environmental Defense Fund v. Tennessee Valley Authority, 339 F.Supp. 806,811 (E.D.Tenn. 1972).

^{27/} 10 C.F.R. Part 51.

^{28/} Scherr v. Volpe, 466 F.2d 1027,1032 (7th Cir. 1972).

balancing"^{29/} "of the benefits of the proposed project in light of its environmental risks, and . . . comparison of the net balance for the proposed project with the environmental risks presented by alternative courses of action."^{30/}

The DES does not contain or analyze any information and data from the Three Mile Island nuclear reactor accident which may bear on the safety, reliability and cost of Palo Verde Units 4 and 5.^{31/} In order to evaluate adequately the costs and benefits of Palo Verde Units 4 and 5 and analyze those costs and benefits in comparison with alternative energy potentials, it is essential that all relevant information and data from the Three Mile Island accident be considered in the DES.^{32/} One NRC official recently conceded that "we've learned a great deal from the accident that will make reactors safer."^{33/} The DES should discuss what steps will be required to make reactors safer, and how much it will cost. Indeed, the DES implies that data from the Three Mile Island accident is relevant to an analysis of Palo Verde Units 4 and 5, but candidly admits that

^{29/} Calvert Cliffs' Coordinating Committee v. Atomic Energy Commission, 449 F.2d 1109, 1113 (D.C. Cir. 1971).

^{30/} Natural Resources Defense Council v. Morton, 458 F.2d 827, 833 (D.C. Cir. 1972). See Executive Order 11514 §2(b); 40 C.F.R. §1500.8 (CEQ Guidelines); CEQ Regulations §1502.22, 43 Fed. Reg. 55978 (1978); 10 C.F.R. §51.23(c) (NRC Regulations).

^{31/} See, e.g., Wall Street Journal (Western Edition), April 24, 1979, at 1, col. 6.

^{32/} See 10 C.F.R. §51.23(c)

^{33/} Los Angeles Times, June 2, 1979, part 1 at 11, col. 1 (statement of Dr. Milton S. Plesset, Vice Chairman, NRC Advisory Committee on Reactor Safeguards).

the NRC did "not take into consideration the experience gained from the accident at the Three Mile Island site" ^{34/}

Therefore, EDF believes that the NRC must prepare a supplemental draft EIS re-evaluating Palo Verde Units 4 and 5 in light of the Three Mile Island accident. As the new CEQ regulations command:

(c) Agencies:

- (1) Shall prepare supplements to either draft or final environmental statements if:

* * *

- (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. ^{35/}

EDF believes the DES supplement should include, inter alia, the following:

- (1) Revised probabilities of postulated accidents and occurrences in light of the Three Mile Island accident;
- (2) Environmental consequences of the revised postulated accidents and occurrences;
- (3) New operating procedures and additional reactor safeguards that may be needed;

^{34/} DES at 7-4, Table 7.2 n. e.

^{35/} §1502.9(c), 43 Fed. Reg. 55978 (1978) (CEQ Regulations); Accord, 40 C.F.R. §1500.11 (CEQ Guidelines). See Executive Order 11514 §2(c), 10 C.F.R. §51.23; Aluli v. Brown 437 F.Supp. 602 (D. Hawaii 1977); Environmental Defense Fund v. Costle, 439 F.Supp. 980 (E.D. N.Y. 1977); Essex County Preservation Ass'n v. Campbell, 399 F.Supp. 208 (D.Mass. 1975) aff'd, 536 F.2d 956 (1st Cir. 1976).

- (4) An up-to-date analysis of reactor reliability and availability;
- (5) Revised cost estimates for reactor construction and operation; and,
- (6) A revised cost-benefit analysis which considers and balances the environmental and other effects of Palo Verde Units 4 and 5 and the alternatives.

In conclusion, the importance of considering information and data from the Three Mile Island accident during the Palo Verde review process was well stated in a recent Los Angeles Times editorial:

. . . [T]he Three Mile Island accident has raised a real question as to whether government regulators will be able to insure the safe operation of nuclear-power plants. If the answer turns out to be no, the implications--in terms of the development of alternative energy sources--should be faced sooner rather than later, not ^{36/} just in this country but all over the world.

THE DES FAILS TO ANALYZE ADEQUATELY ALTERNATIVES
TO PALO VERDE UNITS 4 AND 5

Introduction

Analysis of alternatives "is the heart"^{37/} and the "linchpin of the entire impact statement."^{38/} "[I]t is the essence and

^{36/} Los Angeles Times, May 22, 1979, part 11 at 6, col. 1.

^{37/} CEQ Regulations §1502.14, 43 Fed. Reg. 55996 (1978).

^{38/} Monroe County Conservation Council v. Volpe, 472 F.2d 693, 697-98 (2d Cir. 1972).

thrust of NEPA that the pertinent Statement serve to gather in one place a discussion of the relative environmental impact of alternatives."^{39/} The CEQ guidelines provide that:

A rigorous exploration and objective evaluation of the environmental impacts of reasonable alternative actions . . . is essential. . . . In each case, the analysis should be sufficiently detailed to reveal the agency's comparative evaluation of the environmental benefits, costs and risks of the proposed action and each reasonable alternative. ^{40/}

NRC has recognized that a "hard look" for a superior alternative is a condition precedent to determining that an applicant's proposal is acceptable under NEPA.^{41/} EDF finds that the NRC has not taken the required "hard look" because the DES's analysis of alternatives is seriously inadequate.

For example, the DES gives no consideration to either direct solar space heating or co-generation as an alternative method of meeting all or part of the energy demand or "need," which Palo Verde Units 4 and 5 are intended to satisfy. Geothermal and wind generation receive cursory discussions, of less than one-half page each, which conclude that "significant amounts" of either source of electricity are not expected within the 1990 time frame of Units 4 and 5.^{42/} At least for the California applicants,

^{39/} Natural Resources Defense Council v. Morton, 458 F.2d 827, 834 (D.C. Cir. 1972).

^{40/} 40 C.F.R. §1500.8(a)(4). See also Executive Order 11514 §2(b); 10 C.F.R. §§51.20(a)(3), 51.23.

^{41/} Public Service Company of New Hampshire (Seabrook Station Units 1 and 2) ALAB-471, 7 NRC 477 (April 1978).

^{42/} DES at 9-5-9-6 §§9.1.2.2 and 9.1.2.3.

these conclusions are contradicted by the draft 1979 official California energy report, which projects at least 2700 megawatts of geothermal development in California by the year 1991 in all of its five major demand scenarios, and projects between 1300 and 2700 megawatts of co-generation in the same time period in all major scenarios.^{43/} The same document recognizes the significance of the type of comparisons which EDF believes are essential, by creating a full separate scenario explicitly based on comparative methodology developed for this purpose by EDF.^{44/}

While the DES contains a fair discussion of various potential conservation scenarios in Chapter 8, these potential energy savings are virtually ignored in the DES's cost-benefit analysis of alternatives, which is limited to the conservation already being projected by the applicants and reflects only voluntary and limited regulatory measures. The analysis does not account in any way for the conservation potentials which could result from comprehensive and systematic conservation programs including direct utility investment in various forms of increased end-use efficiency.

The most serious inadequacy of the DES's analysis of alternatives is its piecemeal approach. The DES dismisses a

^{43/} California Energy Commission, Energy Choices for California . . . Looking Ahead, V-9-18 (Draft Feb. 23, 1979).

^{44/} Id. at V-54-57.

number of alternatives because they cannot alone displace Palo Verde Units 4 and 5. A fair analysis of alternatives must consider whether some combination of feasible alternatives can fully meet end-use energy needs, not whether a single alternative is sufficient.

Finally, no economic and environmental comparison was undertaken in the DES to determine the relative costs and benefits of pursuing any alternatives, or combination of them--other than coal-fired power plants. This violates the NRC's own regulations which require a draft environmental impact statement to

. . . include a preliminary cost-benefit analysis which considers and balances the environmental and other effects of the facility and the alternatives available for reducing or avoiding adverse environmental and other effects. . . .^{45/}

SPECIFIC COMMENTS ON THE DES's ANALYSIS OF ALTERNATIVES

8. The Need for Power

§8.2.3.2 Load Characteristics

The DES assumes that because the applicants' base load facilities are less than 50% of total capability (34%) there is "a need for additional facilities [i.e., large central station power plants such as Palo Verde Units 4 and 5] which will increase base load capability." This conclusion is based simply on an examination of "normal" base load percentages. In order to conclude fairly that a large new base load plant

^{45/} 10 C.F.R. §51.23(c) (emphasis added).

is needed requires a comparative cost analysis of different power sources, i.e., an economic comparison between the cost of the proposed facility and the cost of existing and alternative sources operated in a base load manner. The DES does not make this essential comparative analysis.

9. Benefit-Cost-Analysis of Alternatives

§9.1.1.1 Regional Interties

Northwest-Southwest Intertie

The DES concludes that by the late 1980s "energy will no longer be obtainable from this source on a firm basis." There is no discussion of how much energy will be available (on a non-firm basis) and what the cost would be of using this energy in combination with new and/or existing intermediate and peaking sources (which would provide the required reliability).

9.1.1.3 Curtailment of Power

Voltage Reduction

The inclusion of voltage reduction in the DES's discussion of power curtailment indicates a fundamental misunderstanding of the purpose of voltage regulation programs. Voltage regulation is essentially a conservation not a curtailment scheme. Indeed, the California Public Utilities Commission recently concluded that "[n]o other conservation program has been effective at as

little cost as conservation voltage regulation."^{46/} Moreover, contrary to the DES's conclusion that voltage reduction could cause motors to overheat and run less efficiently, the California Public Utilities Commission's report summarizes test results which show greater efficiency for motors at voltage levels achieved under regulatory programs.^{47/}

9.1.1.6 Miscellaneous Activities

Adjustment of Rates

The DES concludes that the restructuring of rate schedules would not obviate the need for Palo Verde Units 4 and 5 since the applicants "have summer peaks, because of air conditioning loads, which have proved relatively insensitive to conservation efforts of all types." Contrary to this assertion, there are numerous studies which conclusively demonstrate that air conditioning needs can be effectively reduced with conservation measures such as insulation and window shading and screening.^{48/} Indeed, the DES itself flatly contradicts this statement, e.g., "improved insulation conserves energy not only in winter but also reduces the air-conditioning burden in the summer."^{49/}

^{46/} California Public Utilities Commission Energy Conservation Team, Electric Utility Distribution Feeder Voltage Regulation for Effective Energy Conservation ii (1978).

^{47/} Id. at 27.

^{48/} E.g., Hirst and Carney, Effects of Federal Residential Energy Conservation Programs, 199 Science 845 (1978).

^{49/} DES at 8-12 §8.3.2.4

9.1.1.7 Conservation

The DES's analysis of conservation is limited to the assertion that the applicants' "need for power forecasts" take conservation into account. There is, however, no independent assessment of the method used by the applicants' consultant, National Economic Research Associates (NERA) and relied upon in the DES to assess conservation potential.^{50/} For example, NERA's methodology (setting electricity prices equal to "marginal cost" in the forecast models) cannot evaluate correctly the impact of cost effective efficiency standards, because it relies only on the historical reaction of customers to historical prices.

In sum, the DES does not contain the required independent analysis of potential conservation measures, or of alternative means to achieve these potentials. Instead, it uncritically accepts the methodology of the applicants' consultant.

9.1.2.1 Solar Energy

The DES concludes that the contribution of solar hot water heaters and solar pool heaters will "be very small and has been included in the participant's (sic) load forecast." The accuracy of the DES's analysis of solar penetration is impossible to assess without detailed information on the assumptions (such as future

^{50/} NEPA requires the responsible federal officials to evaluate independently all information and data in an environmental impact statement. See Green County Planning Board v. Federal Power Commission, 455 F.2d 412 (2d Cir. 1972), cert.denied 409 U.S. 849 (1972); Note, Environmental Impact Statements--A Duty of Independent Investigations by Federal Agencies, 44 Colo. L. Rev. 161 1972.

regulatory and tax incentives) that were used in the study relied upon.^{51/} Moreover, EDF finds that NERA's econometric forecasts relied upon in the DES, cannot predict accurately the impact of relatively new technologies, such as solar, which were not generally available when economic equations were estimated.

Finally, the DES concludes that, "[t]he only onsite solar application which could contribute significantly to capacity savings is solar cooling." Thus, the DES assumes that the only way solar can displace base load capacity is to reduce peak (air conditioning) loads. This reflects a confused and simplistic approach to electric-supply planning issues. The issue is not whether solar capacity will be available on-peak (solar hot water, evidently, will in this case) but whether an appropriate combination of solar energy (available, even sporadically) and non-solar backup (used only sporadically) will be cheaper, at the same level of reliability, than a conventional "base load" plant.

9.1.1.2 Wind Energy

The same criticism of the DES's approach to solar energy can be made of the wind energy analysis, e.g., "there will probably be additional future use of wind by U.S. utilities primarily for high cost fuel displacement." Thus, the DES assumes

^{51/} DES at 9-5 §9.1.2.1.

that wind energy will only displace high fuel cost intermediate and peaking plants. However, it cannot be disputed that the variable cost (fuel and operation and maintenance) of wind power is below that of conventional plants. Therefore, when wind-generated power is available it will displace power from any other source.

9.1.2.3 Geothermal Energy

The DES fails to assess the significant contribution of geothermal energy to meet demand in the applicants' service districts. It concludes that even with "active development," "sufficient [geothermal].generation capacity will not be available to replace" Palo Verde Units 4 and 5.

The DES not only fails to analyze geothermal energy as one of a combination of alternatives which could replace Units 4 and 5, but ignores relevant data. For California alone, the California Energy Commission uses a geothermal potential of at least 2700 MW in its energy supply scenarios.^{52/} Even assuming only part of this geothermal potential would be available to the California applicants, there appears to be a serious discrepancy between the DES projection and that of the California Energy Commission.

^{52/} California Energy Commission, Energy Choices for California . . . Looking Ahead V-9-18 (Draft Feb. 23, 1979).

CONCLUSION

The Palo Verde DES is seriously inadequate and does not meet the requirements of the National Environmental Policy Act because it ignores essential information and data from the Three Mile Island nuclear accident about the safety, reliability and cost of nuclear power plants and it fails to analyze fairly conservation and alternative energy potentials which could obviate the need for Palo Verde Units 4 and 5. Therefore, EDF requests that a DES supplement be prepared which considers and analyzes the cost and benefits of Palo Verde Units 4 and 5 in light of the Three Mile Island accident and the combination of available and feasible alternatives which are safer and cheaper and could provide the same energy yield. EDF finds the DES, as written, to be a conscious effort by the NRC "to perpetuate rather than avoid the recognized mistakes of the past."^{53/}

^{53/} See note 13, supra and accompanying text.