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STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
AUTH.NAME AUTHOR AFFILIATION
PARKER,G.A.. Affiliation Unknown
RECIP.NAME RECIPIENT AFFILIATION
Commission

SUBJECT: Objects to proposed facility site.

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Miller

4231 E. Stanford Dr.
Phoenix, AZ. 85018
June 7, 1979

RETURN TO REACTOR DOCKET FILES

Director, Div. of Site Planning & Safety
Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Draft Environmental Statement, PALO VERDE NUCLEAR GENERATING STATION

Dear Sir:

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David A. Lewis
5708 East 1st Street
Tuscon, Arizona 85711

Dear Mr. Lewis:

Your letter to Ms. Kari dated January 21, 1978 raised several significant questions regarding the earthquake hazard at the Palo Verde site. These questions were considered by the NRC staff and our advisors, the U. S. Geological Survey during our safety review of the site. Based on our review of the seismicity and geological characteristics of the region, we determined that the Palo Verde site is suitable for construction of a nuclear power plant with appropriate earthquake design considerations. Our assessment of the earthquake hazard is contained in the Safety Evaluation Report for the site. Your questions have been addressed in that report. However, we are providing in the following paragraphs some additional specific considerations of the questions raised in your letter.

The Palo Verde site is in west-Central Arizona about 50 miles west of Phoenix. The area is recognized as being in the Basin and Range tectonic province. This tectonic province extends from the Sierra Nevada Mountains on the west to the Wasatch Front and Colorado Plateau on the east, and from the vicinity of the Snake River Valley on the north into northern Mexico on the south. Earthquake activity within the Basin and Range province generally occurs in association with the faults at the margins of basins. Within the Basin and Range province the historic record of seismicity indicates significant spatial variation in the level of activity. In the northern part of the province the activity is concentrated mainly along the eastern and western margins of the province, though zones of relatively higher activity extend into the province interior in western Nevada and also across southern Nevada. The southern part of the province including the Palo Verde site has been relatively quiet seismically.

Among the earthquakes known to have occurred within the province was the Sonora desert earthquake of 1887 cited in your letter. During our review of the Palo Verde site, we considered several reports dealing with this earthquake. The reports appearing in the Bulletin of the Seismological Society of America (Aguilera, 1920; Sumner, 1977) indicate an association

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With regard to the second item in your letter, it is somewhat unclear what in the Preliminary Safety Analysis Report you are referring to as the earthquake "expected at the site vicinity". The applicant is required by Appendix A to 10 CFR Part 100, "Seismic and Geologic Siting Criteria for Nuclear Power Plants" to follow certain procedures in assessing the earthquake hazard to a site being considered for a nuclear power plant. Our requirement is that earthquakes identified with the same tectonic province as the site and which cannot be correlated with tectonic structure should be assumed to occur in the vicinity of the site. Thus, even though no earthquakes may have occurred in the vicinity of a site, and even though geologic mapping may not have identified any faults which would localize earthquake activity there, Appendix A conservatively requires that structures be designed to resist earthquakes as large as those which have occurred historically in the site's tectonic province that are not correlated with tectonic structure.

The accuracy of any prediction of earthquake size and frequency is dependent on the completeness of the data base. An important factor in our consideration of the earthquake hazard to the Palo Verde site was that earthquakes occurring in the Basin and Range tectonic province show a good correlation with tectonic structure. Though data on earthquake occurrence is rather sparse in southern Arizona, the fact that the semi-arid environment acts to preserve the geologic record of prehistoric earthquakes (as noted earlier for the Sonora region) coupled with the lack of such

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The seismic zones referred to in item 3 of your letter appear to be the zones described in the Preliminary Safety Analysis Report prepared by Arizona Power and Light Company. These zones are supported in varying degrees by the existing data. The tectonics of southern and western California are mainly controlled by the presence of the lithospheric plate boundary which passes through the state and is marked by the San Andreas fault. This region is characterized tectonically by transcurrent or strike-slip faulting and compressional stresses. These characteristics clearly distinguish this area from the Basin and Range province which is dominated by extensional stresses and block faulting. To the northeast of the Basin and Range province, the Colorado Plateau is a relatively stable region with only scattered earthquake activity. In their Preliminary Safety Analysis Report, Arizona Power and Light Company provided arguments that the Basin and Range province could be divided into several distinct zones. The southern and much of the north-central portion of the Basin and Range province have been relatively quiet seismically compared to the margins of the province in central Utah and western Nevada. Also, within the Basin and Range province there exist differences in geological structure and geomorphological features which reflect differences in the tectonic development of the region. The applicant's purpose in identifying these zones was to recognize areas within which there exists a consistency of earthquake hazard. As we have noted, most earthquakes in the Basin and Range province can reasonably be assocated with faults. In particular, in western Nevada the large earthquakes have produced surface displacements. This is also the case with the Sonoran earthquake of 1887 which produced surface displacements on a known fault.

The purpose of determining tectonic provinces and correlation of earthquakes with tectonic structure is to provide a basis for assessing the seismic design for a site. The seismic and geologic siting criteria for nuclear power plants require that the historical earthquakes in the site

region either be correlated with tectonic structure or identified with tectonic provinces. For the Palo Verde site, the Arizona Power and Light Company found that historic earthquakes larger than magnitude 5 could be associated with tectonic structure. An earthquake of magnitude 5 was taken to be the largest earthquake in the Basin and Range tectonic province which could not be correlated with tectonic structure. In establishing the seismic design basis, or design acceleration, for the Palo Verde site, according to the Seismic and Geologic Siting Criteria, the occurrence of an earthquake of magnitude 5 was assumed to be possible anywhere within the Basin and Range tectonic province. This assumption places little reliance on the zonation proposed by Arizona Power and Light Company and is viewed as conservative considering the information noted earlier which supports more restrictive zonation.

It is unclear what United States Geological Survey Report you are referring to in item 4 of your letter. The final report submitted to the NRC by the U. S. Geological Survey on April 1, 1976, and the Safety Evaluation Report prepared by the NRC Staff set forth our evaluation of the earthquake hazard at the Palo Verde site. We have not been able to identify the discrepancies that you suggest may exist between the Preliminary Safety Analysis Report prepared by the Arizona Power and Light Company and a report prepared by the United States Geological Survey. It commonly occurs that reviewers comment that specific conclusion reached by the applicant for a license have not been conservatively demonstrated. However, we are unaware of any discrepancies in the Preliminary Safety Analysis Report which might have caused us to alter our conclusions as addressed in the Safety Evaluation Report.

Item 5 of your letter concerns the effect of a Sonoran-type earthquake under the Palo Verde site. As we have noted above, the 1887 Sonoran earthquake clearly occurred on a known fault and produced surface displacement on this fault. In assessing the seismic design of the Palo Verde site, we have assumed that this earthquake could occur no nearer to the site than the northern extension of the structure with which it was associated. The assumption that an earthquake of this size could occur under the Palo Verde site is not warranted considering the low seismicity and lack of geological evidence for recent fault movement in the site vicinity.

The seismic design basis for the Palo Verde site was reviewed by geologists and seismologists of the Nuclear Regulatory Commission staff and geologists and seismologists with the U. S. Geological Survey. We

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I believe that this responds to the questions raised in your letter. I appreciate your concern about safe siting and design of nuclear power plants.

Sincerely,

Original Signed By
E. G. Case

Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation

Enclosure:

NUREG-75/098

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either be correlated with tectonic structure or identified with tectonic provinces. For the Palo Verde site, the Arizona Power and Light Company found that historic earthquakes larger than magnitude 5 could be associated with tectonic structure. An earthquake of magnitude 5 was taken to be the largest earthquake in the Basin and Range tectonic province which could not be correlated with tectonic structure. In establishing the seismic design basis, or design acceleration, for the Palo Verde site, according to the Seismic and Geologic Siting Criteria, the occurrence of an earthquake of magnitude 5 was assumed to be possible anywhere within the Basin and Range tectonic province. This assumption places little reliance on the zonation proposed by Arizona Power and Light Comapny and is viewed as conservative considering the information noted earlier which supports more restrictive zonation.

It is unclear what United States Geological Survey Report you are referring to in item 4 of your letter. The final report submitted to the NRC by the U. S. Geological Survey on April 1, 1976, and the Safety Evaluation Report prepared by the NRC Staff set forth our evaluation of the earthquake hazard at the Palo Verde site. We have not been able to identify the descrepancies that you suggest may exist between the Preliminary Safety Analysis Report prepared by the Arizona Power and Light Company and a report prepared by the United States Geological Survey. It commonly occurs that reviewers comment that specific conclusions reached by the applicant for a license have not been conservatively demonstrated. However, we are unaware of any discrepancies in the Preliminary Safety Analysis Report which might have caused us to alter our conclusions as addressed in the Safety Evaluation Report.

Item 5 of your letter concerns the effect of a Sonoran-type earthquake under the Palo Verde site. As we have noted above, the 1887 Sonoran earthquake clearly occurred on a known fault and produced surface displacement on this fault. In assessing the seismic design of the Palo Verde site, we have assumed that this earthquake could occur no nearer to the site than the northern extension of the structure with which it was associated. The assumption that an earthquake of this size could occur under the Palo Verde site is not warranted considering the low seismicity and lack of geological evidence for recent fault movement in the site vicinity.

The seismic design basis for the Palo Verde site was reviewed by Geologists and Seismologists of the Nuclear Regulatory Commission staff and Geologists and Seismologists with the U. S. Geological Survey. We believe that the

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seismic potential of southern Arizona has been properly considered in this review. A more detailed description of the staff review of the site is available in the Safety Evaluation Report published by the Nuclear Regulatory Commission in October 1975 (NUREG-75/098).

I believe that this responds to the questions raised in your letter. I appreciate your concern about safe siting and design of nuclear power plants.

Sincerely,

Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation

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Req info re the earthquake potential of southern Arizona and the safety design of the Palo Verde Nuclear Project

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Req info re the earthquake potential of southern Arizona and the Safety design of the Palo Verde Nuclear Project

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# PRINCIPAL CORRESPONDENCE CONTROL

January 21, 1978

Recd 1/25/78 A.K.

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn: Sybil Kari
5415 MNB

Ms. Kari:

The awesome power produced by splitting an atom has great potential for both good and evil. Yet, even the beneficial uses of nuclear power must be carefully scrutinized to prevent an unintentional catastrophe. In this regard I have written you for information about a possible safety hazard with the Palo Verde Nuclear Project.

The information I am requesting concerns the seismic (earthquake) potential of southern Arizona and its impact upon the design of the Palo Verde Nuclear Project.

I first became interested in this subject while I was a law student attending a class on energy law at the law college at Arizona State University. In that class I had the opportunity to question an attorney for the Palo Verde Project about many aspects of the nuclear plant. He answered most questions to my satisfaction, except this one---"On the richter scale what size earthquake can the Palo Verde Project withstand?"

My dissatisfaction with his response to the above question interested me enough to research the answer myself. I discoveredthat this seeming simple question is very difficult, if not impossible to answer accurately. All of the various facets involved in this question are beyond my expertise and I have prepared a few basic questions which I would like you to respond to.

For the sake of brevity I have narrowed the questions down to those which concern the earthquake potential of southern Arizona. The main hypothesis which I would like you to research is:

> Whether southern Arizona is part of the same seismic area as the area in which the Sonoran Earthquake of 1887 occured.

If this hypothesis is correct, then an earthquake of eight point five (8.5) on the richter scale could occur randomly at any place in southern Arizona. Therefore, I have prepared the following five (5) questions, which when answered, will resolve my doubts about the safety hazards of Palo Verde Nuclear Project.

1. Broadly stated, what evidence supports and negates the above hypothesis that southern Arizona is part of the same seismic area in which the Sonoran Earthquake occured.

2. The writers of the preliminary safety analysis stated that since an earthquake had occured near the present site and was not due to a known tectonic structure, that an earthquake could be expected at the site vicinity.
   a. What was the probable cause of this earthquake?
   b. How accurate can we predict the size and frequency of occurance of such earthquakes when they are not due to known tectonic structures?
   c. What efforts have been made to predict the occurance of earthquakes in Arizona?

3. In a seperate report by the United States Geological Survey, the writers did not discover enough evidence to warrant the existance of one of seismic zones surrounding the Palo Verde Nuclear Project.
   a. What evidence supports and negates the existance of the remaining zones?
   b. What evidence supports and negates the description of these zones as circular rather than a different shape?
   c. What is the purpose and importance of these zones on the the gravitational force caused by an earthquake?

4. In the above report the writers for the United States Geological Survey concluded that the preliminary safety analysis had underestimated the probable size of an earthquake occuring within one of the zones by one (1) richter point.

a. What is the probable explanation for this discrepency?
b. How accurate is the United States Geological Survey report as compared to present seismic prediction methods?
c. Did the preliminary safety analysis underestimate the magnitude of possible earthquakes in any other zones?

5. What would be the effect of a Sonoran-type earthquake on the buried faults located under the Palo Verde site?

The seismic potential of Arizona, which the above questions deal with, may constitute an un-resolved safety hazard. I frankly do not know if any such hazard exists, however by asking these questions, I only want to learn the truth about my fears. Thankyou in advance for your attention to this matter.

Please respond to: David A. Lewis
5708 E. 1st Street
Tucson, AZ. 85711

Sincerely,

David A. Lewis

David A. Lewis

c.c. Congressman Morris K. Udall, 235 Cannon House Office Building
Washington, D.C. 20515

U.S. Nuclear Regulatory Commission, Washington, D.C. 20555
Attn. Sybil Kari, 5415 MNB

Docket #3 STN-50-528
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| DVassallo | Pacific Gas &Electric Co. |
| JStolz | |

Major M. R. Massis, USMC
106 King Richard Court
Jacksonville, N. C. 28540

Dear Major Massis,

I am pleased to respond to your letter of February 17, 1977 to Mr. Dennis Allison requesting information on certain aspects on nuclear power. The material provided is discussed below.

The environmental considerations with respect to nuclear power plant consideration are well illustrated in the Final Environmental Statement for the Palo Verde Nuclear Generating Station (Enclosure 1).

The principal NRC regulations on environmental considerations for nuclear power plants are contained in 10 CFR Part 51 (Enclosure 2). Individual states have their own environmental requirements and procedures. You should contact the appropriate state government(s) if you need further information about this requirements.

Sources and cost data for uranium fuel are summarized on pages 39-49 of the NRC staff's Proposed Findings which were submitted following recent environmental hearings for the Diablo Canyon Nuclear Power Plant (Enclosure 3).

A number of fast breeder reactors have been built and operated in the U. S. and elsewhere. A readily available summary of the worldwide experience is contained in the current issue of Scientific American (March 1977) in an article about the French demonstration plants. The U. S. Energy Research and Development Administration had been planning to build, in a joint venture with the electric utility industry, a large scale demonstration plant suitable for commercial electric power generation at the Clinch River site in Tennessee. However, this program is being reconsidered by Congress in light of the President's recommended energy policies. Fusion research is outlined in Enclosure 4.

Two studies on waste disposal systems are enclosed (Enclosures 4 and 5).

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In addition, an order form to obtain publications from the Energy Research and Development Administration is included (Enclosure 6). More extensive information is available from the ERDA Technical Information center as discussed in the order form.

I trust this information will be useful to you in your work.

Sincerely,

Original Signed by
John F. Stolz

John F. Stolz, Chief
Light Water Reactors Branch No. 1
Division of Project Management

Enclosures:
1. Final Environmental Statement Palo Verde Nuclear Generating Station Units 1, 2 & 3
2. 10 CFR Part 51
3. NRC Staff's Proposed Findings of Fact and Conclusions of Law in the Form of a Proposed Decision
4. Worlds Within Worlds: The Story of Nuclear Energy Volume 3
5. Alternative Processes for Managing Existing Commercial High-Level Radioactive Wastes
6. NRC Task Force Report on Review of the Federal/State Program for Regulation of Commercial Low Level Radioactive Waste Burial Grounds
7. Order Form for Publications from the Energy Research and Development Administration

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MAY 12 1977

Original Signed by
John F. Stolz

(6)

Major Malcolm R. Massie, USMC
106 King Richard Court,
Jacksonville, N. C. 28540
17 February 1977

Mr. Dennis Allison,
U. S. Nuclear Regulatory Commission,
Germantown, Md. 20767

Dear Sir:

I am, concurrent with a military career, pursuing a Master of Science degree in Systems Analysis and Management with the University of Southern California. As part of the requirements for completion of one sub-course in organization theory, I am preparing a paper dealing with a major problem facing our country - energy depletion.

Your recent letter to the editor in the Washington Post prompted me to write you for information. Specifically, I would appreciate any details you can provide in the following areas;

a. Environmental considerations with respect to nuclear power plant construction

b. Federal and state regulations concerning (a) above

c. Sources and cost data for nuclear fuels

d. Present and future status of "breeder" reactors and fusion power

e. Nuclear waste disposal systems, including container dimensions and weights - I am attempting to develop the feasibility of an innovative disposal system, one that may not have the adverse environmental impact of present systems, utilizing the Space Shuttle or some similar device, and discarding canisters into extraterrestrial orbit.

Any information on the above or related subjects will be treated with strict confidentiality. A compilation of the results will be made available, if you so desire, upon completion of the project.

Sincerely,

Malcolm R. Massie

[illegible]

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Encl ltr fm Russell J. Lowes encl cy report to the Arizona Corporation Commission re costs of the Palo Verde Nuclear plant versus the use of coal

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Rep. John Rhodes

REF-pmh - LOWES

Congress of the United States

House of Representatives

Washington, D.C.

May 3 1977

Office of Congressional Affairs
US Nuclear Regulatory Commission
Washington, D.C. 20555

Sir:

The attached communication is sent for your consideration. Please investigate the statements contained therein and forward me necessary information for re- the enclosed corre- answer.

April 16, 1977

Representative John Rhodes
House of Representatives
Washington, DC 20515

Dear Mr. Rhodes:

Enclosed is a report that I prepared to submit to the Arizona Corporation Commission. It was submitted April 4, 1977 on Consumers' Night, representing Arizonans for Safe Energy.

It has been mentioned that Arizona may have several more nuclear reactors built within its boundaries. In consideration of this possibility, I decided to make a study of the present reactors now being built at the Palo Verde site.

In concluding this study I have found that by observing strictly the economics of nuclear versus coal energy, it would actually cost the rate-payers less to assume costs and have the Palo Verde Nuclear plant totally abandoned, and to replace the planned generating capacity with coal-fired plants, than to proceed with construction as planned.

You will find that my summary of pages seventeen and eighteen make clear the economic impact of nuclear energy in Arizona.

Sincerely,

Russell J. Lowes

Russell J. Lowes
7501 E. Hubbell
Scottsdale, AZ 85257

945-2400

# PALO VERDE ECONOMICS --

# APS PROJECTIONS VERSUS NATIONAL AVERAGES

Submitted to the Arizona Corporation Commission
April 4 ~~March 5~~, 1977

Russell J. Lowes
for
Arizonans for Safe Energy
618 N. Central Ave.
Phoenix, Arizona 85003

Chapter I

# APS' ECONOMIC PROJECTIONS FOR THE PALO VERDE PLANT

The following report will deal with Arizona Public Service (APS) economic projections for the Palo Verde Nuclear Generating Station, in contrast with national averages and trends for reactors already in operation.

Up to this time APS has never released to the public a thorough comparative report on the costs of nuclear vs. coal energy. For the Palo Verde, APS has made an estimation on the economics based on studies done elsewhere in the nation. The company projects that electricity from the Palo Verde plant will be 38 per cent cheaper than coal-fired electricity. They project nuclear at 40 mills* per kilowatt hour, and therefore coal at 64.52 mills per kilowatt hour.[1]

APS' prediction for nuclear generated electricity is based on false assumptions to such a degree that nuclear is made to look economically better than coal, when in actuality coal energy is more economical in Arizona.

It should be assumed that the cost for coal-fired electricity as projected by APS is fairly accurate. The company has been building coal-fired plants for years, and is presently involved in construction of such plants.

In order to conduct a comparative economic study on nuclear energy, there must be a breakdown of the costs, and a computation of the energy output. The utilities' major cost categories directly concerning electrical production from the Palo Verde plant are

---

*1 mill equals 1/10th of one cent.

[1] Arizona Corporation Commission, Arizona Public Service Rate Hearing Transcript, (Phoenix, Arizona: Hardy W. Scott & Associates, March 1977), p. 1222.

capital investment, fuel costs, operation and maintenance, and decommissioning (see Table I). Then there are hidden costs such as waste storage; police protection of the wastes, fuel in transport, and the plant; and research and development--of which the utility pays only a small part.

The electrical output must then be figured. This output is expressed in terms of kilowatt or megawatt hours of electricity (kWhe or MWhe). Although APS owns only a portion of the Palo Verde plant, this report will deal with the economics of the entire plant. Interest charges will be neglected, as will taxes. The plant life will be assumed at 35 years. (The Final Environmental Statement by the Nuclear Regulatory Commission states the plant life at both 30 and 40 years.)

Table I

APS PROJECTIONS FOR PALO VERDE
GENERATED ELECTRICITY
(over a 35-year lifetime)

| Cost Category | Mills per kWhe | Total Cost (billions $) |
|---|---|---|
| Capital investment[a] | 3.17 | 2.78 |
| Operation & maintenance[b] | 4.0 | 3.5 |
| Fuel[c] | 5.89* | 5.16 |
| Decommissioning | (not figured) | ---- |

SOURCES:

[a]Final Environmental Statement--Palo Verde Nuclear Generating Station, Units 1, 2, and 3, NUREG-75/078 (Washington, D. C.: Government Printing Office, September 1975);

[b]Arizona Corporation Commission, Arizona Public Service Rate Hearing Transcript (Phoenix, Arizona: Hardy W. Scott & Associates, March 1977, p. 1222).

[c]Ted Dando, Nuclear Information Representative for Arizona Nuclear Power Project; personal letter, March 18, 1977.

*5.89 mills is the estimated average for the year 1990. Estimations after 1990 are unavailable.

Costs for operation and maintenance (O&M) and the hidden costs will not be discussed in detail in this report. O&M figures are unavailable on a nationwide basis; however the "19th Steam Station Cost Survey" showed that O&M costs of nuclear power are slightly higher than coal.[1]

---

[1]Leonard M. Olmsted, ed., "19th Steam Station Cost Survey", Electrical World, 15 November 1975, p. 47.

## Chapter II

## PROJECTIONS FOR CAPITAL INVESTMENT

Capital investment for power plants is the amount of money required to build them. The capital costs for a nuclear plant are higher than those for a coal plant.[1]

Arizona Public Service projects that Palo Verde will cost $2.8 billion; or $730 per kW (installed). Construction of the nuclear plant probably could not have been finished at that cost today.

The average construction cost per kW in 1976 was $773 for plants completed that year.[2] The Palo Verde should cost more than the average plant because cooling towers are being installed. Cooling towers add an additional $85 per kW as compared to the average cooling system.[3]

Nuclear plant capital investment has increased on an average of fifteen percent per year since 1965, while in the same time the cost of building a coal plant has gone up less than ten percent per year. Even the Atomic Energy Commission (which usually underestimated the costs of nuclear energy, compared to the national averages) increased nuclear capital projections 500 percent from 1968.[4]

---

[1]Leonard M. Olmsted, ed., "19th Steam Station Cost Survey," Electrical World, 15 November 1975, p. 47.

[2]Edward Cowan, "Economics of Nuclear Power Are No Longer Optimistic," New York Times, 18 July 1976, sec. 4, p. 6.

[3]James J. O'Connor, "Why Industrials Must Favor Coal," Power, September 1976, p. 7.

[4]Marvin Cooke and Mike A. Males, "Analysis of Public Service Company's Projections for the Black Fox Nuclear Stations", presented to the Oklahoma Public Service Commission, Tulsa, Oklahoma, 22 August 1976, p. 2.

If the average escalation rate continues throughout the building period of the nuclear station, assuming there are no schedule delays, the cost per kW would total $2365; the plant cost would total $9 billion--3.2 times APS' estimate of $2.8 billion.

The fifteen percent escalation figure may decrease substantially in the future, but the costs are definitely expected to soar. Edward Cowan of the New York Times writes,

> The unwillingness of nuclear engineering companies to promise delivery of a $1 billion to $1.5 billion plant six or seven years in advance for a fixed price is symptomatic of the run-away economics --an unanticipated surge of capital, labor, and uranium costs--and other shocks that have buffeted the nuclear power industry in the last few years.[1]

The Bank of America predicts that kW costs for nuclear plants will range from $1620 to $1907 in 1985.[2]

---

[1] "Economics of Nuclear Power Are No Longer So Optimistic", New York Times, 18 July 1976, sec. 4, p. 6.

[2] John Berger, "Nuclear Power--No Solution to Energy Crisis", San Francisco, 1976, p. 8. (Mimeographed).

Chapter III

# FUEL COSTS

## Fuel Performance

In obtaining an accurate picture of uranium costs for a nuclear plant, a net energy gain per unit of uranium must be projected. Then the cost of the fuel must be projected.

The energy gain for nuclear fuel is expressed as millions of kWhe per ton of milled uranium, known as yellowcake. There has been no official governmental wide-scale survey of this energy gain, but there have been estimates and small-scale surveys.

APS is projecting a lifetime use of 4819.62 tons (based on the assumed 35-year lifetime of the plant) of uranium dioxide ($UO_2$).[1] There is a conversion ratio of 1:7.3, of $UO_2$ (which is the finished product) to yellowcake, with a margin of error. In other words, for every pound of $UO_2$ used for fuel in a reactor, it takes 7.3 pounds of yellowcake (approximately).[2] (NOTE: The reason that this step was used, instead of just using APS' figures on yellowcake, was because the author has been unable to obtain such figures from the Public Service Company.) Multiplying 4819.62 tons by 7.3 yields 35,183.226 tons of yellowcake.

Dividing the total APS estimation of energy output by the amount of uranium to be used gives a projected 25 million kWhe per ton of yellowcake.

---

[1]U.S. Nuclear Regulatory Commission, Final Environmental Statement - Palo Verde Nuclear Generating Station, Units 1, 2 and 3, NUREG-75/078 (Washington, D.C.: Government Printing Office, September 1975), sec. 3, p. 4.

[2]Phone interview, Jim Harding, Special Advisor, California Resources Agency, Sacramento, Calif., 9 March 1977.

According to M. C. Day, professor of chemistry at Louisiana State University, 14 million kWhe per ton of yellowcake is about the average ratio.[1] In a report to the Bulletin of the Atomic Scientists, civil engineer Ralph G. Kazmann and Joel Selbin, professor of chemistry, apparently agree. They state that omitting such plants as the Yankee Rowe and the Dresden 2 (which have poor performances), the average output is about 18 million kWhe per short ton of yellowcake.[2]

## Fuel Costs and Availability

To accurately project costs for uranium, the supply must be determined. The supply is nearing depletion on a worldwide as well as a nationwide basis; ie., the supply that is reasonably obtainable.

When the amount of uranium reaches a certain dilution, the energy required to process the ore outweighs the amount of energy obtainable. Before this dilution occurs, the volume of earth to be mined becomes economically and environmentally unfeasible.

Tennessee Shale is such an example. It has been considered mineable by the U.S. Government. Yet this shale has a very low energy gain. To obtain the equivalent gross amount of electrical energy, it would be necessary to move about 2.3 times as large a volume of uranium ore as coal. The energy per short ton mined would be 980 kWhe for uranium, and 2,250 kWhe from bituminous coal.[3] Uranium is running short in the United States, and this is the type of reserves the suppliers will have to turn to.

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[1] M. C. Day, "Nuclear Energy: A Second Round of Questions", Bulletin of the Atomic Scientists, December 1975, pp. 53-54.

[2] Ralph G. Kazmann and Joel Selbin, "Letters", Scientific American, April 1976, P.8.

[3] M. C. Day, "Nuclear Energy: A Second Round of Questions", Bulletin of the Atomic Scientists, December 1975, p. 58.

But what about finding more uranium? There have been no major uranium deposits identified in this country in the last seventeen years, according to Robert Ninninger of the U. S. Geological Survey Uranium Branch.[1] William C. Carley of the Wall Street Journal writes, "Geologists are especially concerned because they think most of the easy-to-find uranium deposits near the surface have already been discovered."[2]

M. A. Lieberman, associate professor of electrical engineering and computer sciences and a member of the Energy and Resources Group at the University of California at Berkeley, estimates that the total amount of uranium that can be assumed to exist in the United States is 1,134,000 short tons. He concludes: "It will be shown that, if the expansion of nuclear power proceeds as planned, a serious shortfall in uranium will develop during the late 1980's."[3]

Most of the uranium in the U.S. comes from two geological formations known as the Colorado Plateau and the Wyoming Basins. We will need to discover new uranium supplies equal to nine Colorado Plateaus or twenty Wyoming Basins. Hans Adler, Geologist for the Energy Research and Development Administration Nuclear Fuel Cycle and Production Division, states: "The major question confronting exploration geologists, is where in the U.S. will facsimiles of these two regions be found once, much less 9 or 20 times."[4]

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[1]Ralph E. Lapp, "We May Find Ourselves Short of Uranium, Too", Fortune, October 1975, p. 151.

[2]William C. Carley, "Uranium Drain. Fuel Shortage Forecast for U.S. Nuclear Plants Within Decade or Two", Wall Street Journal, 7 June 1976, sec. 1, pp. 1, 10.

[3]M. A. Lieberman, "United States Uranium Resources--an Analysis of Historical Data", Science, 30 April 1976, p. 435.

[4]David Dinsmore Comey, "The Uneconomics of Nuclear Energy", Skeptic, July 1976, p. 21.

Utility companies are unsure of their future sources. The suppliers are not consenting to long-term contracts, unless there is allowance for them to increase costs in the event their costs go up. Such is the case in APS' contract.[1]

Commonwealth Edison of Chicago, the nation's largest nuclear utility, admitted it had no idea where its uranium would come from after 1980; its fuel manager could only say, "We must believe the resources will be there to keep those monsters running."[2]

There have been large companies defaulting on contract prices already. Westinghouse, the nation's leading uranium supplier, found itself unable to provide 50 million pounds of natural uranium to utilities at the contracted prices and defaulted, prompting lawsuits.[3] APS has contracted with Westinghouse for its uranium, even though the supplier will find it hard to meet other contracts through the 1990's. Other companies have also announced deficits, such as General Electric, the second largest supplier in the U. S.

To top it all off, there is now an OPEC-like uranium cartel that is expected to purposely jack prices up.[4]

## What about the Breeder--or Recycling?

It has been rumored that the breeder reactor will relieve resources requirements for uranium. That would be partially true if the breeder program is okayed. Many conserva

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[1] Ariz. Corporation Commission, APS Management Study (Phoenix, Arizona: Peat, Marwick & Mitchell, Inc., 1976), sec. 4.6, p. II-14.

[2] William J. Lanouette, "Nuclear Fuel: Will It Run Out?", National Observer, 24 April 1976, p. 1.

[3] "Westinghouse: the Waiting Period", Forbes, 1 December 1975, pp. 24-36.

[4] "It Worked for the Arabs", Forbes, 15 January 1975, pp. 19-21.

tive political leaders who support the current nuclear program are opposed to the breeder. If the program survives, the cost is expected to be tremendous. A General Accounting Office report, revealed by columnists Jack Anderson and Les Whitten, states that if the program comes on line, it would cost $153 billion to build the same energy capacity that could be constructed for $128 billion with conventional reactors and $95 billion with coal-fired power plants.[1]

If the nation turns to the breeder, it would have no significant effect on uranium requirements in the year 2000, according to Dr. Ralph Lapp, a breeder proponent. The program would possibly depress uranium prices later on.[2]

The situation on recycling is similar; it just may never be gotten around to. In this case too, there are dangers involved. But, if recycling becomes a reality, the most that the uranium supply could be boosted would be 50 percent, but probably less than 25 percent, according to M. C. Day.[3]

Because of the shaky grounds on which the breeder and the recycling program stand, because of the complications in implementing either, and due to the lengthy lead time in constructing either type of plant, it is evident that even both together will not relieve our uranium shortage.

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[1] Jack Anderson and Les Whitten, "Secret GAO Report gives Nuclear Energy Dim Look", Scottsdale (Az.) Daily Progress, 3 November 1976, p. 4.

[2] Ralph E. Lapp, "We May Find Ourselves Short of Uranium, Too", p. 199.

[3] M. C. Day, "Nuclear Energy: a Second Round of Questions", pp. 53-54.

## Chapter IV

## CAPACITY FACTORS

In figuring the costs of power from any plant, a comparison must be made between how much money is put into producing the electricity and how much electricity is delivered. What is actually produced from a plant is referred to as electrical output, and is expressed as a percentage of the amount of electricity that could have been produced, had the plant been in perfect running order at all times. This percentage is called the "capacity factor" of the plant.

To be more specific, the capacity factor of a power plant refers to the number of kWhe a plant produces in a given amount of time, divided by the number of kWhe that the plant could have produced, if the plant had been operating 100 percent of the time at full performance.

If two plants require the same cost for building, operating, maintaining, and fueling, but one has an average capacity factor of 80 percent over the life of the plant, while the other has an average of 40 percent, the first plant generates electricity for one-half the cost required by the second plant.

Palo Verde will have three separate reactors, each producing 1270 MWe at full performance. APS has predicted an average capacity factor of 75 percent over the life of the three reactors.

This projection is totally unrealistic. There has never been a reactor over 1000 MWe in size to operate at this high percentage for a full year. The larger the reactor, the lower the average capacity factor will be. The Palo Verde reactors are to be the largest reactors in the United States.

In the U.S., the average nuclear plant size is between 700 and 800 MWe. Two Swedish engineers calculate an average capacity factor of 42.7 percent for the average size reactor.[1]

Evidence of the lower capacity for larger plants exists in the record of actual performance of nuclear reactors. Jim Harding, Special Advisor to the Energy Resources Conservation and Development Commission of California, has calculated the total lifetime commercial reactor capacity factor to be 53.7 percent.[2] The average capacity factor for plants over 1000 MWe is about 44.5 percent.[3]

It is not likely that capacity factors will improve for plants over 1000 MWe. In fact, the cumulative-to-date capacity factor average for plants over 1000 MWe went down from 46 percent in 1974 to 44.5 percent in 1975.[4] There has been no significant improvement--or learning curve--for nuclear performance since 1973, the first year that the U. S. Government started releasing reactor performance records. Furthermore, a retrogression of capacity factors is expected. All plants over 1000 MWe in the U.S. are less than eight years old, and after the eighth year of operation, capacity factors decline throughout the rest of the reactors' lifetimes.

There is not enough statistical information available to give more than a general estimate on the capacity factor that nuclear reactors will decline to, by the time they are shut down. But they are expected to go down to about 25 percent for the average plant.[6]

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[1] David Dinsmore Comey, "Points Vs. Trends", Bulletin of the Atomic Scientists, Oct.75, p.4

[2] Jim Harding, personal letter, Special Advisor, Calif. Energy Resources Conservation & Development Comm., 8 February 1977.

[3] David Dinsmore Comey, "No Improvement, Capacity Factors Stay Constant in 1975", Not Man Apart, March 1976, p. 11.

[4] Ibid.

[5] Charles Komanoff, Power Plant Performance (New York: Council on Economic Priorities, 1976), p. 4.

[6] Peter Margen and Soren Lindhe, "The Capacity of Nuclear Power Plants", Bulletin of the Atomic Scientists, October 1975, p. 40.

The Council on Economic Priorities, a consulting firm based in New York, did a detailed study on nuclear and coal capacity factors and projected performances for a range of different sizes of reactors for the first ten years of performance (see table 2).

Table 2

LEVELIZED AVERAGE PWR* CAPACITY FACTORS
Ages 1 - 10

| Unit Size | Projected Capacity Factor |
|---|---|
| 500 MWe | 69.5% |
| 600 | 66.2 |
| 700 | 62.8 |
| 800 | 59.4 |
| 900 | 56.1 |
| 1000 | 52.7 |
| 1150 | 47.6 |
| 1300 | 42.6 |

SOURCE: Charles Komanoff, Power Plant Performance (New York: Council on Economic Priorities, 1976), p. 32.

*PWR is the abbreviation for pressurized water reactor, which is the type being built at Palo Verde.

Chapter V

## DECOMMISSIONING

The costs of decommissioning have almost been ignored by APS, and certainly have not been figured into the total cost. There are several figures for decommissioning costs that are circulating. The most common figures are $1 million, plus $100,000 per year indefinitely.

Indefinitely, indeed! "Because of the very long half-life of nickel-59, exposure from gamma rays and X-rays from this source in a commercial reactor would not decline to the permissible level of 0.2 millirems per hour in a 40-hour week for 19.28-80,000 year half-lives, or 1.56 million years," according to the New York Public Interest Research Group at the State University of New York at Buffalo.[1]

Decommissioning has proven to be much more expensive than most utilities estimate. The Elk River reactor, which was 22 MWe as compared to the three 1270 MWe reactors of the Palo Verde, cost $6 million to construct and $6.9 million to dismantle. This ratio should not be casually scaled up to present-day prices, but dismantling is expected to cost much more for commercial sized reactors. The Public Interest Research Group stated that dismantling will certainly amount to tens of millions of dollars per reactor.

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[1] Steven Harwood et al, "The Cost of Turning It Off", Environment (December 1976), p. 18

Jersey Central Power and Light, a New Jersey utility company, is seeking permission from the state's Board of Public Utility Commissioners to boost its rates so it can start building a $100 million fund for the purpose of decommissioning a nuclear power plant. The plan is to raise $1.35 million a year, to be set aside in the form of tax-free government securities. This would raise $100 million by 2033.[1]

The funds that this utility is seeking to obtain may be well under the amount required for decommissioning. In reference to the costs at the Elk River reactor, Chemical and Engineering News reports:

> Similar experience in Europe indicates that the cost of this procedure runs about 45% of the value of the initial investment. In any event, there are no unique technical problems associated with taking a facility out of service.[2]

Because a large reactor has never been decommissioned, it is hard to tell how much the price should be scaled down.

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[1] "In Place Entombment", Stevens Point (Wis.) Daily Journal, 14 January 1977, Sec. 1, p. 4.

[2] "Experts Mull Over Radioactive Waste Disposal", Chemical and Engineering News, 2 August 1976, p. 23.

Chapter VI.

## HIDDEN COSTS

There are many hidden costs of the Palo Verde. The government will eventually carry the burden of storing the high level wastes, and will probably share costs of decommissioning.

There are other government costs that have already indirectly gone into the Palo Verde plant. Committee for Nuclear Responsibility has estimated "For each nuclear plant licensed to operate so far (about sixty plants), taxes provided almost $100 million in government research and development."[1]

For 1977 alone, the Nuclear Regulatory Commission will receive a quarter of a billion dollars in tax money.[2] None of this money is for the military nuclear program. The Energy Research and Development Administration will spend around $5.8 billion for their total nuclear program, some of which is for commercial purposes.

The water requirement for a nuclear plant is much higher than the requirement for a coal plant. The Palo Verde will require 75,000 acre-feet per year. A coal plant of similar size requires 45,000 acre-feet per year. Since Arizona is not getting all of the power from the nuclear plant, much of Arizona's water will be used for out-of-state power. Arizona will lose a tremendous amount of water, without a fight.

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[1] "Nuclear Power -- Bad for the Economy": Committee for Nuclear Responsibility, Inc., Yachats, Ore., Nov. 15, 1976.

[2] Executive Office of the President, The Budget of the United States Government, Fiscal Year 1977: Appendix (Washington, D. C.: Government Printing Office, 1976), Section 2, Page 8.

Chapter VII

# PROJECTIONS BASED ON EXPERIENCE

APS' claims are not supported by the facts documented in this study.

Taking into account the data in Table 2, and the expected decline in capacity factors, it appears that the average capacity factor for reactors the size of Palo Verde's will average about 35 percent over the lifetimes of the reactors. This is 2.14 times lower than the estimate given by APS.

Concerning fuel, it would appear that because of the lowered capacity factor, the amount of fuel purchased should be less than one-half the amount that APS originally projected, thus cutting costs. This, however, is not the case. The apparent saving is nearly cancelled by the fact that the fuel efficiency ratio claimed by APS is 75 percent higher than the actual national average.

It seems obvious that yellowcake will go into the hundreds of dollars per pound, and will cost at least $200 per pound by the 1990's[1] when our mineable domestic reserves near depletion. At this minimum price, the cost for fuel would be 28.57 mills per kilowatt-hour of electricity, instead of the APS claimed figure of 5.89 per kilowatt-hour.

Noting that the costs of construction have gone up drastically and are apparently continuing to climb, this would indicate that the costs of the nuclear plant will finally run between $4.35 billion and $9 billion--assuming that the inflation rate does not increase.

Based on the projected costs of decommissioning the plant in New Jersey, the cost

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[1] M. C. Day, "Nuclear Energy: A Second Round of Questions", Bulletin of the Atomic Scientists (December 1975) p. 54.

of the Palo Verde plant's decommissioning (because Palo Verde is to be the largest plant in the nation) will probably run to over $200 million--the equivalent of 0.49 mills per kilowatt-hour of electricity.

These total costs have been grossly understated by the public service company (see Table 3), as the capacity factor has been overstated.

Table 3

POSTULATIONS VERSUS AVERAGES AND TRENDS
(Over a 35-year Lifetime)

| Cost Category | Mills Per kWhe | | Total Cost (Billions $) | |
|---|---|---|---|---|
| | APS | Probable | APS | Probable |
| Capital investment* | 3.17 | 10.63 - 22.02 | 2.78 | 4.35 - 9.01 |
| Fuel | 5.89 | 28.57 - 71.43 | 5.16 | 11.69 -29.22 |
| Decommissioning | (not figured) | 0.49+ | ---- | 0.2+ |

*disregarding extra cost for cooling towers

Consolidating APS' exaggerated projections on investment input and electrical output boosts the costs per kilowatt hour from both ends. Subtacting APS' estimates on capital investment and fuel cost from the minimum probable estimate yields an increase in cost of 8.3 billion dollars. Dividing APS' projected electrical output into 8.3 billion gives 9.467 mills per kWhe, in additional costs. This gives 49.467 mills per kWhe at the estimated 75 percent capacity factor

The above figures concern only capital investment, fuel, and decommissioning costs--they do not include operation and maintenance, or interest.

Using the 35 percent capacity factor boosts the cost of electricity 2.14 times to 106.0 mills/kWhe. Nuclear energy from the Palo Verde plant will cost at least 165.0% more than APS has been projecting. With coal at 64.52 mills/kWhe, nuclear energy will be at least 64.29 percent more expensive than coal-fired electricity.

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APR 12 1977

Docket Nos. 50-528
50-529
and 50-530

The Honorable Barry M. Goldwater
United States Senate
Washington, D. C. 20510

Dear Senator Goldwater:

We are pleased to respond to your referral of March 7, 1977, regarding a February 11, 1977 communication from Mr. Paul S. Garber, expressing his concern that the government, specifically the U.S. Nuclear Regulatory Commission, has condemned his property to protect the environment by refusing to allow him to sell rock from his property for use in the construction activities at the Palo Verde Nuclear Power Plant (PVNGS).

The U. S. Nuclear Regulatory Commission issued, in May 1976, a construction permit for the Palo Verde facility. Prior to the issuance of the permit, the staff, as required under the National Environmental Policy Act (NEPA) of 1969, performed an independent assessment of the environmental impact associated with construction and operation of the proposed facility. This assessment led eventually to the preparation of a Final Environmental Statement (FES) for the project which contained conditions which the staff believed were necessary for the protection of the environment. These conditions were incorporated as part of the construction permit.

Condition E(1), page 4, of each Construction Permit reads as follows:

> "The applicant shall take the necessary mitigating actions, including adherence to his commitments summarized in Section 4.5.1, and additional staff requirements summarized in Section 4.5.2 of this Environmental Statement, during construction of the Station and associated transmission lines, to avoid unnecessary adverse environmental impacts from construction activities."

John Mann, Arizona Public Service Company's Environmental Engineer, when he learned of the sale of rock by Mr. Garber to a subcontractor for the project, examined the impact of the removal of the rock from Mr. Garber's

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property and determined that it would violate the spirit of NEPA and be inconsistent with the above condition, in that it would result in an unnecessary visual impact on a relatively heavily traveled road. He then took action appropriate to that determination.

After Mr. Mann had advised Mr. Garber of the company's determination, Mr. Garber contacted us by telephone to inquire whether the company's action had been required by the Nuclear Regulatory Commission. Our Environmental Project Manager for the Palo Verde project advised Mr. Garber that the company action appeared to be consistent with the requirement of its construction permit that it take the necessary mitigating actions to avoid unnecessary adverse environmental impacts from construction activities. It should be understood that our staff has made no independent analysis of the environmental effects of removing rock from Mr. Garber's property; rather, the opinion conveyed to Mr. Garber was premised on the facts reported to us by Mr. Mann. An effective program for mitigating construction impacts necessarily calls for a large measure of licensee initiative and concern for environmental protection. Thus, when a licensee makes the judgment that a particular action is required to mitigate adverse environmental impacts of construction, it is ordinarily neither necessary nor appropriate that the NRC staff make its own independent evaluation of the correctness of that decision.

In the circumstances outlined above, we think there is no real basis for the suggestion that "the Government (NRC) has in essence condemned" Mr. Garber's property. For example, if the company were reasonably to conclude that there were some way in which the rock from Mr. Garber's property could be taken without causing an adverse visual impact in the area of the site, nothing in the license or Commission's regulations would prevent such a sale. Nor does any NRC requirement prevent any other use of the rock from Mr. Garber's property.

As requested in your referral, this response is being sent in duplicate and the enclosure is being returned. It is hoped that the information furnished will be helpful to you in preparing a reply to Mr. Garber.

Sincerely,

(Signed) Lee V. Gossick

Lee V. Gossick
Executive Director
for Operations

SEE PREVIOUS CONCURRENCE*

Enclosure:
Ltr fm Paul S. Garber dtd 2/11/77

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|---|---|---|---|---|---|---|
| | | OELD | | OCA | | |
| | | 4/5/77 | | 4/11/77 | | |
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| SURNAME | RGilbert:aj<br>MDuncan | WRegan<br>WMoore | DMuller<br>HRDenton | ECase<br>BRusche | Gossick | |
| DATE | 4/ /77 | 4/ /77 | 4/5/77 | 4/5/77 | 4/8/77 | |

property and determined that it would violate the spirit of NEPA and be inconsistent with the above condition, in that it would result in an unnecessary visual impact on a relatively heavily traveled road. He then took action appropriate to that determination.

After the fact, when asked by Mr. Garber for our position, we agreed that what Mr. Mann did was consistent with, and in keeping with, our requirement under NEPA for preserving to the extent possible, the natural environment.

Since Mr. Garber's property is neither owned or controlled by Arizona Public Service or by the U. S. Nuclear Regulatory Commission, he is therefore free to negotiate sales of rock from his property for use at any project (other than PVNGS) that might need such material and his charge that "[t]he Government (NRC) has in essence condemned my property ..." is unfounded.

As requested in your referral, this response is being sent in duplicate and the enclosure is being returned. It is hoped that the information furnished will be helpful to you in preparing a reply to Mr. Garber.

Sincerely,

Enclosure:
Ltr fm Paul S.Garber
dtd 2/11/77

OELD

3/ /77

| | | | | | | |
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| OFFICE | DSE:EP | DSE:EP | DSE | NRR | EDO | OCA |
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| DATE | 3/23/77 | 3/24/77 | 3/ /77 | 3/ /77 | 3/ /77 | 3/ /77 |

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

*804
4-6-77

April 6, 1977

NOTE TO: Lee V. Gossick

EDO #1700 - letter to Senator Barry Goldwater was sent to OELD on the 24th of March. OELD had problems with the letter and subsequently met with E. Case on March 31 to resolve problems. Letter retyped in DSE April 5, 1977.

D. R. Muller /for

4/6/77
4130

W. Regan, Chief
Environmental Projects Br. 2
Division of Site Safety and
Environmental Analysis

| FROM: | ACTION CONTROL | DATES | CONTROL NO. |
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| Carlton C. Bomberger | FINAL REPLY | 3/ | PREPARE FOR SIGNATURE OF: ☐ CHAIRMAN ☐ EXECUTIVE DIRECTOR |
| | FILE LOCATION | | OTHER: Dalton |

DESCRIPTION ☑ LETTER ☐ MEMO ☐ REPORT ☐ OTHER

Encl ltr to Paul S. Carter re cancellation of a contract he entered into with V. Q. Contracting Co. for removal of rock from his property for use as rip-rap material at the Palo Verde nuclear power plant

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JCAE NOTIFICATION RECOMMENDED: ☐ YES ☐ NO

NRC FORM 232 (11-75)

EXECUTIVE DIRECTOR FOR OPERATIONS

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DESCRIPTION ☒ LETTER ☐ MEMO ☐ REPORT ☐ OTHER

Encl ltr fm Paul S. Gerber re cancellation of a contract to entered into with V. C. Contracting Co. for removal of rock from his property for use as rip-rap material at the Pale Verde nuclear power plant

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NRC FORM 232 (11-75)

EXECUTIVE DIRECTOR FOR OPERATIONS

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PRINCIPAL CORRESPONDENCE CONTROL

# United States Senate

March 7, 1977

Respectfully referred to:

Mr. Carlton C. Kammerer
Director, Office of Congressional Affairs
Nuclear Regulatory Commission

Because of the desire of this office to be responsive to all inquiries and communications, your consideration of the attached is requested. Your findings and views, in duplicate form, along with return of the enclosure, will be appreciated by

Date 3/17/77
Time 11:20

Senator Barry Goldwater

U.S.S.

Form #2

11 February 1977

Senator Barry M. Goldwater
427 Russell Senate Office Bldg.
Washington, D.C. 20510

Dear Senator Goldwater:

On December 17, 1976 I entered into a contract with V.O. Contracting Company of Phoenix. This contract was for removal of 27,000 cubic yards of rock from my property for use as Rip Rap on a dike on the Palo Verde Nuclear Power Plant being constructed west of Buckeye. On December 30, that contract was ordered canceled by Arizona Public Service Company. The reason given by John Mann (APS's Environmental Engineer) was the removal of rock from my property could be seen from the Nuclear Site and would be environmentally unacceptable to the Nuclear Regulatory Commission. Robert Gilbert, NRC's Program Manager for Palo Verde Nuclear generating station, confirmed removal of rock from my property would be environmentally unacceptable.

Apparently this decision cannot or will not be changed as I've tried for the past month to get it changed. Even if it were changed now, it is too late because the damage is done. V.O. Contracting Company has found a new source for the material.

The Government (NRC) has in essence condemned my property to protect it for the environment's sake. I feel if the Government wants to protect my property, it can do it at the Government's expense, not mine. I would be happy to sell the Government my property so it can protect it. I would even consider trading for other land.

I would appreciate anything you could do to rectify this situation. Thank you.

Very truly yours,

Paul S. Garber

Paul S. Garber
201 E. Loma Linda
Goodyear, Arizona 85338
602/932-1245 (Home)
602/935-8338 (Work)

P.S. For your information:

John Mann (APS) 602/271-7310
Robert Gilbert
NRC - Division of Site Safety & Environmental Analysis
Environmental Projects Branch #3
Bethesda, Md.
301/443-6990

Enclosures (5)

AGREEMENT FOR QUARRYING AND REMOVAL OF RIP RAP MATERIAL

This agreement between V. O. Contracting Company (hereafter referred to as "V. O.") and Paul S. Garber (hereafter referred to as "OWNER") is predicated upon award to V. O. of Bechtel Power Corporations (hereafter referred to as "BECHTEL") Job No.10407, Proposal Invitation No. 10407-13-CF-001, Rip Rap at the Palo Verde Nuclear Generating Station, (hereafter referred to as the "JOB"). This agreement is for the quarrying and removing of the rip rap material required for V. O.'s performance of the JOB, preferably from the North half of the OWNERS property, more particularly described as the East half of the Southeast Quarter of Section 10, Township 1 South, Range 6 West of the Gila and Salt River Base and Meridan, upon the following conditions.

This agreement is subject to payment of royalty and other conditions and considerations outlined below.

1. V. O. shall have the right to remove the rip rap material from OWNERS property above described upon the payment to OWNER of a royalty of twenty-five cents per cubic yard so removed, payable $6,750.00 upon Bechtel's awarding the JOB to V. O., such payment to be made by ~~cashier~~ Jam's check as an advance royalty. The actual cubic yardage of the rip rap material shall be determined by Bechtel upon completion of the JOB and a cash adjustment of the royalty shall be made by V. O. to OWNER, if the actual yardage exceeds 27,000 yards or by OWNER to V. O. in the event the actual yardage of the material as so determined is less than 27,000 yards, such adjustment to be made in cash within thirty days after final payment to V. O. by BECHTEL.

2. Such removal shall be completed by ~~January~~ February 15, 1977 unless the JOB completion date is extended due to forces beyond the control of V. O., in which event the OWNER shall be notified by V. O. of the revised estimated completion date.

3. V. O. shall indemnify and hold OWNER harmless from any loss, cost or expense arising because of V. O.'s performance of the JOB and removal of the rip rap material from OWNERS property and will furnish OWNER with a certificate of its public liability and property damage insurance carrier naming OWNER as an insured, and with a provision that it cannot be cancelled without thirty days prior written notice to OWNER.

4. V. O. shall obtain any and all required permits from governmental bodies and pay the fees therefor.

5. V. O shall comply with any and all applicable laws, rules and regulations of governmental bodies with respect to the removal of the material from OWNERS property.

6. Other considerations shall include and be limited to the following.

(a) Upon completion of the JOB, V. O. will leave a haul road to the quarry site.

(b) V. O. shall provide to the OWNER sixteen (16) hours of D9 Caterpillar bulldozer or equivalent of other equipment time, with operator, to be utilized for pit cleanup at the OWNERS direction. Such equipment time shall be supplied and utilized within 30 days of completion of the JOB. Jam

7. Upon being awarded the JOB by Bechtel, we will furnish a $2,000.00 Bond to be returned to V. O. if the foregoing conditions have been met or paid to OWNER to the extent necessary to complete the agreement. Jam

8. The agreements of V. O. hereunder are subject to the JOB being awarded to it by Bechtel and a contract executed between V. O. and Bechtel.

My Commission Expires Sept. 23, 1979
Joyce Demarbeck

ACCEPTED AND AGREED TO

Paul S. Garber
(OWNER)

11/3/76
Date

ACCEPTED AND AGREED TO

J C Mason
V.O. Contracting Company
(V.O.)

Dec 17, 1976
Date

Post Office Box 21666 Phoenix, Arizona 85036

ANPP-SCM-579
December 30, 1976

Mr. J. A. Packard
Field Construction Manager
Bechtel Power Corporation
P. O. Box 49
Palo Verde, Arizona, 85343

Subject: Environmental Considerations

Dear Mr. Packard:

Due to environmental considerations, do not use The Garber Hillside S. E. of the PVNGS Site as a source of Rip-Rap material. Please consider alternate sources. Further, the road to this source must be restored to the natural state.

In the future please prohibit construction activities east of The Dike/East Wash area.

Please respond by January 20, 1977.

Very truly yours,

W. M. Petro,
Site Construction Manager

WMP/LWP/paw

cc: E. E. Van Brunt, Jr.
R. L. Robb
J. A. Roedel
W. H. Wilson
J. R. Mann

RECEIVED
DEC 30 1976
Construction
PVNGS

MASON
DEC 31 1976

Bechtel Power Corporation
Engineers — Constructors

Palo Verde Nuclear Generating Station
P.O. Box 49
Palo Verde, Arizona 85343

December 30, 1976
B/VOC-K-0474-C

V. O. Contracting Company
P. O. Box 16114
Phoenix, Arizona 85011

Attention: Mr. J. A. Mason

Subject: Palo Verde Nuclear Generating Station
Bechtel Job 10407
Subcontract No. 10407-FSC-32
Disapproval Of Riprap Source
Letter No. 5, File: FSC-32

Dear Mr. Mason:

Please refer to your transmittal dated December 20, 1976, regarding the riprap pit agreement dated December 17, 1976 with Paul S. Garber for quarrying and removing riprap material from his property adjacent to and southeast of the project property. We hereby advise you that the client has informed us that this source of riprap is not approved because of environmental considerations.

We hereby direct you to locate another source within the 7 mile radius of the project as stated in your bid proposal for our approval. When you have selected an alternate source please advise us and we will arrange an inspection of this source with you and with the environmental personnel from the client and Bechtel to approve or disapprove this alternate source on the basis of environmental considerations.

Your prompt action in locating an alternate riprap source will be appreciated.

Very truly yours,

BECHTEL POWER CORPORATION

J. A. Packard
Field Construction Manager

RWH/jak

MASON
DEC 31 1976

V. O. Contracting Co.

PHONE 258-0909
252-8482

P. O. BOX 16114
PHOENIX, ARIZONA 85011

January 19, 1977

Mr. Paul S. Garber
201 E. Loma Linda Blvd.
Goodyear, Arizona 85338

Dear Mr. Garber:

The attached copies of letters from the Arizona Nuclear Power Project and Bechtel Power Corporation are self explanatory.

Under the terms outlined in Section 1 of our agreement for Quarrying and Removal of Rip Rap Material, no material will be removed from your property.

We, therefore, request the $6,750.00 in advance royalty be returned.

Yours truly,

V. O. CONTRACTING CO.

J. A. MASON,
President

JAM:jed

CC: J. A. Packard,
Field Construction Manager

Encls.(2)

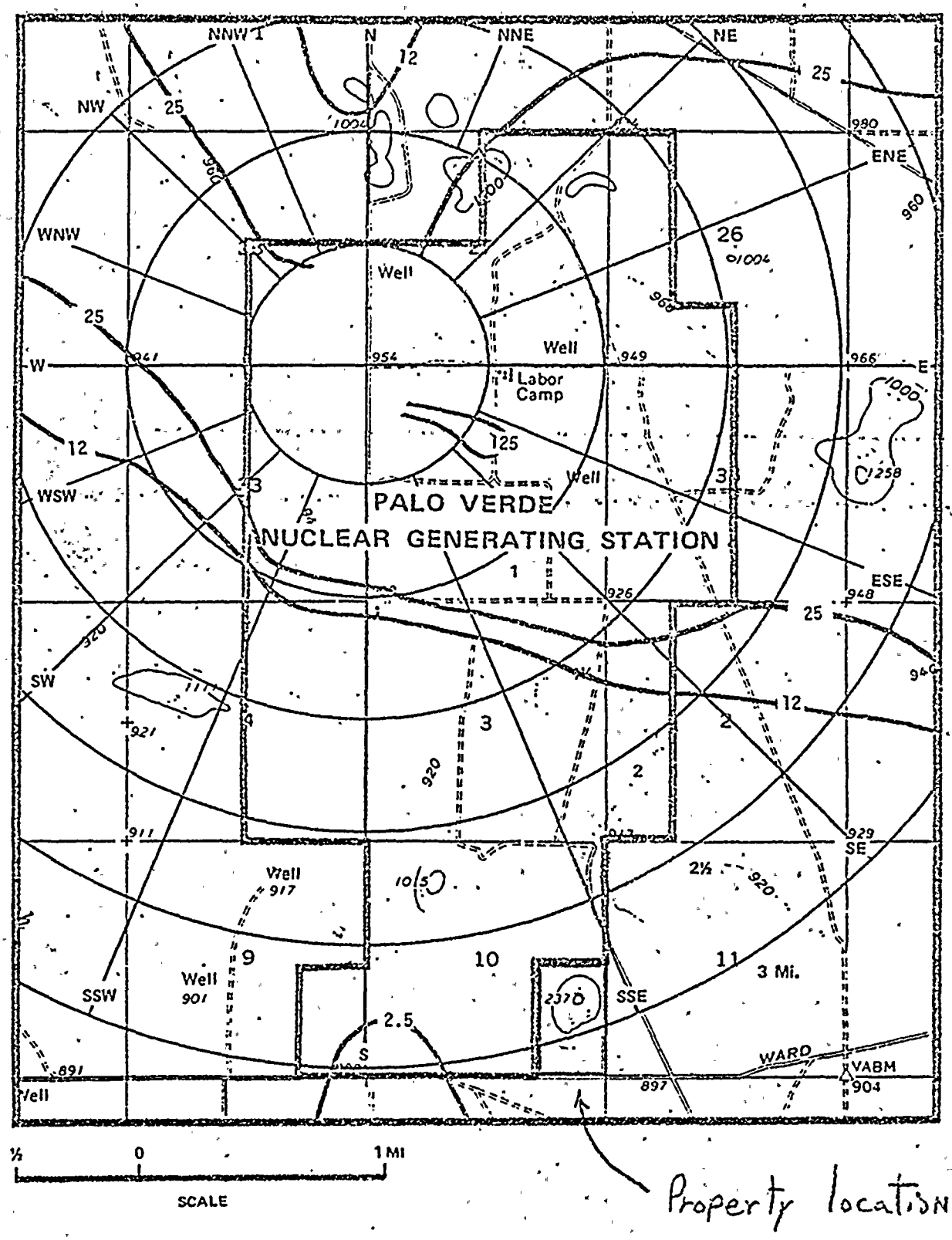


Fig. 3.6. Onsite Solids Ground Deposition Total, lb/acre/yr. From ER, Fig. 5.1-18, Corrected to design drift rate of 0.01 per cent.

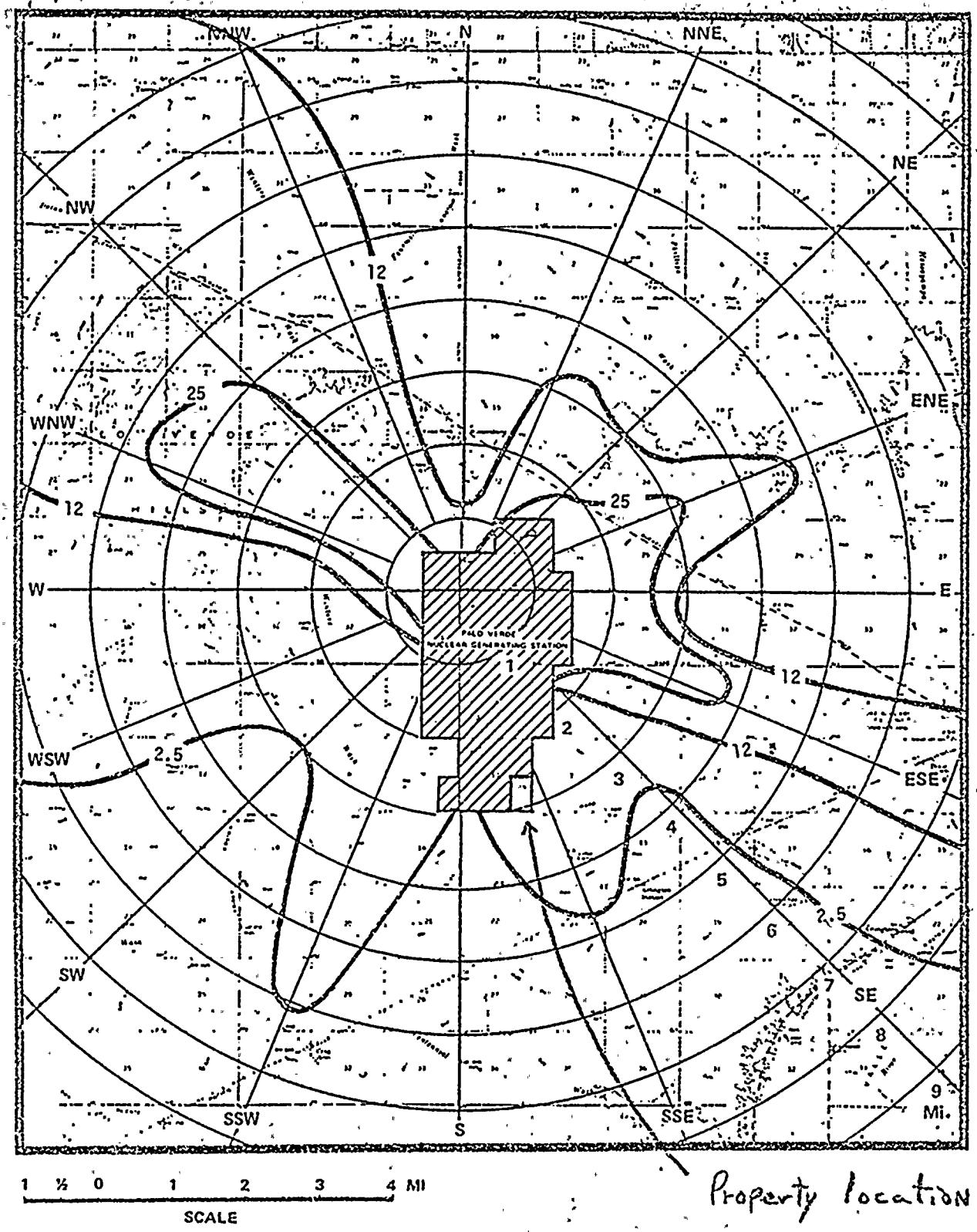


Fig. 3.7. Offsite Solids Ground Deposition Total, lb/acre/yr. From ER, Fig. 5.1-19, Corrected to design drift rate of 0.01 per cent.

APR 12 1977

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JStolz
DAllison
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Docket Nos. 50-528
50-529
and 50-530

The Honorable Barry M. Goldwater
United States Senate
Washington, D. C. 20510

Dear Senator Goldwater:

We are pleased to respond to your referral of March 7, 1977, regarding a February 11, 1977 communication from Mr. Paul S. Garber, expressing his concern that the government, specifically the U.S. Nuclear Regulatory Commission, has condemned his property to protect the environment by refusing to allow him to sell rock from his property for use in the construction activities at the Palo Verde Nuclear Power Plant (PVNGS).

The U. S. Nuclear Regulatory Commission issued, in May 1976, a construction permit for the Palo Verde facility. Prior to the issuance of the permit, the staff, as required under the National Environmental Policy Act (NEPA) of 1969, performed an independent assessment of the environmental impact associated with construction and operation of the proposed facility. This assessment led eventually to the preparation of a Final Environmental Statement (FES) for the project which contained conditions which the staff believed were necessary for the protection of the environment. These conditions were incorporated as part of the construction permit.

Condition E(1), page 4, of each Construction Permit reads as follows:

> "The applicant shall take the necessary mitigating actions, including adherence to his commitments summarized in Section 4.5.1, and additional staff requirements summarized in Section 4.5.2 of this Environmental Statement, during construction of the Station and associated transmission lines, to avoid unnecessary adverse environmental impacts from construction activities."

John Mann, Arizona Public Service Company's Environmental Engineer, when he learned of the sale of rock by Mr. Garber to a subcontractor for the project, examined the impact of the removal of the rock from Mr. Garber's

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property and determined that it would violate the spirit of NEPA and be inconsistent with the above condition, in that it would result in an unnecessary visual impact on a relatively heavily traveled road. He then took action appropriate to that determination.

After Mr. Mann had advised Mr. Garber of the company's determination, Mr. Garber contacted us by telephone to inquire whether the company's action had been required by the Nuclear Regulatory Commission. Our Environmental Project Manager for the Palo Verde project advised Mr. Garber that the company action appeared to be consistent with the requirement of its construction permit that it take the necessary mitigating actions to avoid unnecessary adverse environmental impacts from construction activities. It should be understood that our staff has made no independent analysis of the environmental effects of removing rock from Mr. Garber's property; rather, the opinion conveyed to Mr. Garber was premised on the facts reported to us by Mr. Mann. An effective program for mitigating construction impacts necessarily calls for a large measure of licensee initiative and concern for environmental protection. Thus, when a licensee makes the judgment that a particular action is required to mitigate adverse environmental impacts of construction, it is ordinarily neither necessary nor appropriate that the NRC staff make its own independent evaluation of the correctness of that decision.

In the circumstances outlined above, we think there is no real basis for the suggestion that "the Government (NRC) has in essence condemned" Mr. Garber's property. For example, if the company were reasonably to conclude that there were some way in which the rock from Mr. Garber's property could be taken without causing an adverse visual impact in the area of the site, nothing in the license or Commission's regulations would prevent such a sale. Nor does any NRC requirement prevent any other use of the rock from Mr. Garber's property.

As requested in your referral, this response is being sent in duplicate and the enclosure is being returned. It is hoped that the information furnished will be helpful to you in preparing a reply to Mr. Garber.

Sincerely,

Lee V. Gossick
Executive Director
for Operations

Enclosure:
Ltr fm Paul S. Garber
dtd 2/11/77

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IE (5)
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JStolz
DAllison
WRegan/RGilbert

Docket Nos. 50-528
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and 50-530

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Executive Director
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Enclosure:
Ltr fm Paul S. Garber dtd 2/11/77

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