

8/12/75

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

ARIZONA PUBLIC SERVICE COMPANY,)
et al.)

(Palo Verde Nuclear Generating)
Station, Units 1, 2 and 3))

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

APPLICANTS' ANSWERS TO
INTERVENOR ACEC'S THIRD
SET OF INTERROGATORIES

SNELL & WILMER

By



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DATED at Phoenix, Arizona
this 12th day of August, 1975

4

1 INTERROGATORY

State fully and in detail what are the economic and environmental effects of the April 1975 statement by the Energy Research and Development Administration (ERDA) that no permanent storage methods have been found for high level nuclear waste products.

ANSWER:

The April, 1975, statement by ERDA has no environmental impact on the ANPP since no permanent disposal of high level wastes are contemplated at the site. It has no economic impact since the fuel cycle cost estimates for the PVNGS already include allowances for permanent waste disposal and these have not been changed by the statement.

2 INTERROGATORY

State fully and in detail if by the time PVNGS is operational there is no permanent storage method, state fully and in detail what specific alternatives are proposed? What will be the economic, land-use, and environmental costs? Where will the temporary storage be?

ANSWER:

The initial unit of PVNGS is currently scheduled to begin commercial operation during the second quarter of 1982. Therefore, the earliest that spent fuel recovery services, with the attendant generation of high level radioactive wastes, would be required, or could take place, is in 1984. Current Federal Government regulations specify that these wastes can be maintained in liquid form at the spent fuel recovery facility site for a period of up to five years, by which time they must be converted to an approved solid form for transfer to a Federal Repository, such transfer of the solidified waste to be accomplished within ten years from the time they were initially generated. In the case of PVNGS, this would be 1994 at the earliest; thus there is almost 20 years to select and demonstrate an acceptable disposal method, which seems quite ample especially since the currently preferred approach will have gone into pilot operation more than 10 years earlier (1982-1983), and other pilot operations are planned in this period.

As a separate but related matter, ANPP is preparing for the contingency that shipment of spent fuel assemblies from PVNGS to a spent fuel recovery facility might be delayed. Thus, as a matter of prudence, ANPP is examining methods by which capability to store such spent fuel can be extended. Highest priority is being given to methods of rearranging the existing on-site storage pool to store a greater number of spent fuel assemblies than originally contemplated; several approaches are currently under engineering study which could more than double such capability without expanding the physical dimensions of the present pool. With this approach, there would therefore be no significant change to the environment costs or any additional land-use; in fact, spent fuel shipping from the site would not be required over the period of storage. Another alternative which is being considered is the shipping of the fuel off-site to some central temporary storage facility, which would most logically be at a planned reprocessing site. If this option is implemented, there would also be no environmental or land-use impact on the PVNGS.

The costs of modified storage racks to accommodate closer spacing in the existing pools and the required expanded cooling and related services is estimated to be on the order of \$2-4 million per unit. If off-site storage is selected, the annual cost of such service is expected to add about 1% to the annual fuel cost, and this would be partly offset by the deferral of payment for reprocessing.

3 INTERROGATORY

State fully and in detail if the Price-Anderson Act provisions for federal insurance assistance are not renewed by Congress, state fully and in detail what will be the impact on this project? Can the participating agencies in this project afford the necessary insurance? How will that coverage be financed and what impact will that have on the economics of the project?

ANSWER:

If the indemnity provisions of the Price-Anderson Act are not renewed by Congress there should be no impact on this project. The cost of insurance, including insurance required under the Price-Anderson Act, has been included in the economic evaluations of the project.

4 INTERROGATORY

State fully and in detail the large work force necessary during construction will have effects both when they move into the Wasco Area and when they leave. State fully and in detail what impact will that large group's leaving have on the Wintersburg Area?

ANSWER:

Applicants would hope, and firmly believe, that there will be no "large work force" moving into and leaving the "Wasco Area." As there will be no large work force moving into the "Wasco Area," there should be no impact on Wintersburg when "that large group" leaves.

5 INTERROGATORY

State fully and in detail how the growth in demand for electricity declined in 1974 from what it was in previous years. If the increases in demand projected in the DES do not materialize, state fully and in detail what is the economic impact on this project?

ANSWER:

Applicants are unable to state fully and in detail "how the growth in demand for electricity declined in 1974 from what it was in previous years" because the growth in demand did not so decline. The second portion of this interrogatory is impossible to answer as phrased. The question lacks reasonable specificity.

6 INTERROGATORY

State fully and in detail what is the basis for projected fuel costs? Are all the costs associated with the reprocessing and permanent storage of waste products included in the fuel costs during the years of operation. If not, the DES should be revised to include all costs.

ANSWER:

Development of fuel cost estimates for the PVNGS units involves projections of a variety of factors over a term extending through the 1990's. Such long-term projections are keyed to a series of assumptions. These assumptions fall into four major categories, as summarized below.

1. The Fuel Design

The fuel design is defined by the suppliers, initially Combustion Engineering, Inc. (CE) and then Westinghouse Electric Corporation (W), in the contracts for fabrication services, as the reference design. The reference design incorporates all current standards for quality of manufacture and for safety and flexibility in operation, as well as reflecting optimum economic performance.

The amount of enriched uranium to be loaded into the fuel core, and relatedly, the number of fuel bundles to be replaced at each refueling outage, are determined by the rated power levels and other design and safety constraints, and by assumptions as to the capacity factor at which the plant will operate, and allowable periods when the electric systems of the applicants can permit the refueling outage to take place.

2. The Market Factors

a. Where PVNGS has a contract for any commodity or service; e.g., the uranium supply from Anaconda; the ERDA enrichment contract; the CE and W fabrication services contracts, etc.; such contracts would be the basis for the projection over the period they apply. Escalation is computed in accordance with the indices stipulated in the contract.

b. Beyond the point in time where such commitments exist, or in those areas wherein there are no commitments, market models are developed which assume a pattern of growth of the nuclear fuel supply industry, which mandates that new production facilities for fuel cycle commodities and services must be brought into operation on a timely schedule. The cost of these new facilities, in current (escalated) dollars at the time they would be built are estimated;

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the progression of plants takes into account the impact of scale and of learning in each successive facility. The models therefore contemplate that at any given time the U.S. nuclear fuel needs will be met from a combination of facilities of different ages, designs, and sizes, and the cost projections are based upon the average production cost resulting from such a mix, plus reasonable allowances for capital recovery plus a rate of return to the Owner.

The cost of spent fuel recovery, including allowances for shipping of the spent fuel from the PVNGS plant to a reprocessing facility, reprocessing to recover uranium and plutonium for recycle, and the permanent high-level waste disposal, are accounted for.

3. The Financial Factors

a. The calculations use data reflective of Participant circumstances with respect to: (i) the carrying charge to be assigned to fuel commodities and services prior to use in the reactor; (ii) working capital charges on the nuclear fuel inventory; and (iii) discount factors to be used in computing levelized cost using present worthing techniques.

b. Escalation effects are computed separately on each commodity or service which is part of the total fuel cycle, assigning annual rates of escalation for these cost components.

From this matrix of technical and commercial assumptions, actual or levelized nuclear fuel cycle costs over the desired period are computed with the aid of elaborate computer codes.

7 INTERROGATORY

State fully and in detail what have been the increases in fuel costs in the last two years for uranium, natural gas, oil, and coal? What are the known reserves of these fuels? State fully and in detail what effects will the cost trends and depletion of these fuels have on this project?

ANSWER:

The first two portions of this interrogatory are not answerable as phrased. The two questions lack reasonable specificity. The upward cost trends and depletions of natural gas, oil and coal will have a positive effect on this project. Upward cost trends and depletions of uranium will have negative effects. See answer to interrogatory number 8.

8 INTERROGATORY

State fully and in detail what is the projected cost of power from PVNGS in 1975 dollars for the years 1982, 1985, 1990 and 1995? (include calculations)

- (a) What percent (%) of these are fuel costs?
- (b) What will the costs be if projected price increases of the Nuclear Exchange Corp. (See Forbes, Jan. 15, 75, Pg. 19-21) of fuel takes place but the base rate is;
 - (i) \$10/lb.
 - (ii) \$15/lb.
 - (iii) \$20/lb.
 - (iv) \$25/lb.
- (c) Do these cost estimates include;
 - (i) scheduled downtime for refueling
 - (ii) cost of replacement power
- (d) Does the cost include backup power generation capacity? If so, what percent (%) is it of the total cost?

ANSWER:

<u>(A)</u>	<u>(B)</u>	<u>(C)</u>	<u>(D)</u>	<u>(E)</u>
<u>Year</u>	<u>Mills/kwh</u> <u>Power Cost</u>	<u>Power Cost</u> <u>If U308</u> <u>Were \$10/#</u>	<u>Power Cost</u> <u>If U308</u> <u>Were \$25/#</u>	<u>(%) of (B) Which</u> <u>Represent Fuel Cost</u>
1982	22.6	22.8	24.1	12
1985	17.4	17.0	18.4	16
1990	17.9	16.9	18.2	19
1995	17.7	16.9	18.1	18

- (i) All costs in constant 1975 dollars.
- (ii) Computed for Unit #1 of PVNGS.
- (iii) Costs include scheduled refueling downtime.
- (iv) Costs do not include the cost of replacement power.
- (v) Costs do not include backup power generation capacity.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

9 INTERROGATORY

State fully and in detail how often, for what period of time, and for what purpose each unit of PVNGS will have scheduled shutdowns, include shutdown for refueling.

ANSWER:

Each PVNGS unit will be scheduled for one refueling and maintenance outage each year. Only one unit will be scheduled out of service at a time. The refueling and maintenance window is from October 1 through May 31 of each year.

The outage period for each unit is as follows:

- (a) Six weeks during the years 1, 5 and 9.
- (b) Four weeks during the years 2, 3, 4, 6, 7 and 8.
- (c) Eight weeks during the year 10.

The turbine generator inspection and overhaul is expected to be the Critical Path for the six-weeks outage. Reactor refueling and inservice inspection is expected to be the Critical Path for the four weeks outage. Reactor Internals Inspection will be the Critical Path during the tenth year of operation for each unit. The refueling and maintenance outages for each unit for a period of time will continue throughout the life of each unit as indicated in (a), (b) and (c).

The purposes for each scheduled outage will be to:

- 1. Refuel the reactor.
- 2. Maintenance and inspection of plant equipment.

CERTIFICATE OF SERVICE

It is hereby certified that true and correct copies of the foregoing Applicants' Answers to Intervenor ACEC's Third Set of Interrogatories have been placed in the United States mails, postage prepaid, this day of August, 1975, to the following:

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