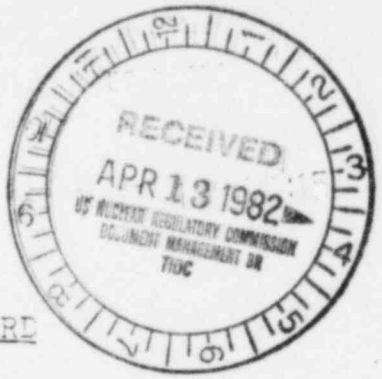
RELATED CORRESPONDENCE



UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of ARIZONA PUBLIC SERVICE COMPANY, et al.	)	Docket Nos. STN 50-528 STN 50-529 STN 50-530
(Palo Verde Nuclear Generating Station, Units 1, 2 and 3)	)	

MOTION FOR ORDER REQUIRING ADMISSION AND PRODUCTION OF DOCUMENTS WITHIN TEN DAYS

The Intervenor moves for an order requiring the Applicant to admit the genuiness of a document and to produce documents at its offices in Phoenix within ten days after service on the Applicant of this motion or on April 16, 1982.

Attached to this motion is an APS report dated November 17, 1977 entitled "Use of Effluent at Palo Verde". The Intervenor needs to be able to identify this report and requests that APS be required to admit that it is genuine.

On page 7 of this report it says that the effluent requirements during peak summer months are about 2,600 A-F/unit. We wish to examine and copy the engineering report on which this statement is based and to examine and copy all other reports on water requirements that APS has.

Intevenor has just obtained a copy of this report from a person who refuses to be identified. This report is contrary to the testimony of the Staff expert so obviously the Staff does not know about it.

D503
S.1

Respectfully submitted this 7th day of April, 1982,

By Patricia Lee Hourihan

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11/17/77

ARIZONA NUCLEAR POWER PROJECT

PALO VERDE NUCLEAR GENERATING STATION

USE OF EFFLUENT AT PALO VERDE

We at Arizona Public Service, along with every responsible utility executive in Arizona, fully appreciate the need for prudent, comprehensive management of our limited water resources. Without water we simply cannot generate the electric power that the public needs. We also recognize that other sectors of our economy and the public at large have demands on our water resources that are just as legitimate as ours. We understand that if these other demands for water are not met, there won't be much need for electric power because there won't be any public around to use it.

Consequently, we are anxious to assist and cooperate with MAG and every other organization that is concerned with the use and management of water in Arizona. We offer our assistance not because we want to establish a claim for priority status though we hope everyone recognizes that reasonably priced electric power is an important ingredient in irrigation, commerce and industry and the pleasant amenities of life such as swimming pools.

Therefore, we offer assistance and cooperation not to get a leg up on somebody else, but to assure that informed judgments are made on the use and management of water -- judgments that are founded upon correct information with goals that are achievable in the real world.

Today, we are concerned more with the information required to make those informed judgements rather than with the establishment of specific goals, such as water for recreation. As we see it, in order to make sound judgments in this very complex subject, you must have sound information. What they say about computer programs -- "Garbage in, garbage out" -- is equally applicable to water use and management studies.

Unfortunately, several misconceptions have surfaced that need correction if we are to avoid confusion and uninformed judgments that could lead to serious consequences not only for Palo Verde and other generating projects, but for other elements of our society as well.

Before addressing Palo Verde directly, let me explain briefly how water considerations enter into a utility's planning and operations. It all starts with siting -- where do we put our new generating resources? Immediately, we are faced with a choice -- Will it be coal or nuclear? Each alternative has its own special considerations, but both require water.

In selecting a site for a coal electric generating plant, the prime parameters are (1) the source of the coal and (2) the availability of water. In mountainous Arizona with almost non-existent north-south rail connections it is far more economical to move energy by wire than by rail. Consequently, today Arizonans rely for the bulk of their electric requirements on long transmission lines to coal plants generally situated near or in the northeast corner of the State, some 200-400 miles away from the major load centers where the electric power is needed.

Another characteristic of Arizona coal generating plants is that each one involves the first and sole use of water. The sources are the Colorado River or some tributary or a gathering system of wells tapping underground reservoirs. There is no other choice. There are no large sewage treatment plants on the Indian reservations. Nor is there any tailwater or drainage from irrigation farming. So, reuse of water for coal generating plants is out of the question.

When it came to siting our Palo Verde nuclear plant, we were presented with some different problems and also some new opportunities. Transportation of uranium fuel presents no restraints on the location of nuclear plants so we could reduce reliance upon very long transmission lines and locate the plant near our load centers.

We found a new restraint, however. We had to be able to prove for the most questioning minds that the nuclear site was seismically stable. Our geological siting studies, started in the Spring of 1972, told us that there were two areas in the State where we would be most likely to find a site with demonstrable evidence of seismic stability: (i) the Navajo plateau in the northeast corner and (ii) a relatively narrow band lying to the west of Phoenix running in a northwesterly-southeasterly direction. This was precisely what we were looking for -- a site near the Phoenix metropolitan area, the load center where more than half of the power to be generated would be used and where a previously unused water resource - sewage effluent - was available.

The 91st Avenue Sewage plant presented not only a new potential source, but the opportunity to reuse a resource which was then going largely to waste. This is a prime example of good water management undertaken by private industry at substantial expense without any governmental or bureaucratic prodding.

Obviously, if we were going forward with a multi-billion dollar project, it was vital that we do what was necessary to secure a commitment of the needed water supply. Here, we found that we had no alternative but the reuse of effluent. There was and there is now no unappropriated surface water available. There was then and is now no irrigation tailwaters or drainage water available in sufficient dependable quantities to meet our needs. And there was not and is not sufficient groundwater available which, if appropriated for our use, would not severely dislocate agricultural activities over a very large area.

Accordingly, in early 1973 we started negotiations to acquire effluent, and in April, 1973 we signed a contract with the six cities which own the 91st Avenue Sewage Treatment Plant.

Having acquired the right to use such effluent we then had to learn how to use it. There really was not much experience to fall back on with only a few instances where sewage effluent has been used for cooling electric generating plants. But we did know that tertiary treatment -- or what we call a reclamation facility -- would be required. We also knew that this facility would have to be designed to handle the quality of water that would be delivered to Palo Verde.

To determine the kind of tertiary treatment and the functional requirements of our reclamation facility, we built a pilot plant at the 91st Ave. plant in 1973 and operated it for about 15 months at a

cost of $1,100,000. One of the things we learned from this pilot operation was that the tertiary treatment had to be designed to handle water within a certain range of chemical characteristics and total dissolved solids (TDS). We learned that it is more practical to design a facility to process water with a limited range of TDS - say from 500 to 1500 ppm - than a very wide range of 0 to 5,000 ppm. We also learned that it is not feasible to process water with TDS in the range of 3,000 to 4,000 ppm in a facility designed to treat water in the 500 to 1500 ppm range.

Using the criteria established by the pilot operation, we then proceeded with the design of our reclamation facility and it is dependent upon the receipt and processing of water with the quality approximating the effluent from the 91st Avenue plant.

The design is now virtually complete and some purchase orders have been placed. Grading of the water reclamation area is complete and a portion of the on site underground distribution system has been installed. Construction of the water reclamation pipeline from 91st Avenue and construction of the water reclamation plant is scheduled to start April, 1978. Completion of those systems is required in 1980 in order to meet the schedule for operation of Palo Verde Unit 1. In all, the reclamation facility and the transport system represent an investment of about $150,000,000.

Any redesign effort undertaken at this late date in order to process water beyond the design range of TDS or with new characteristics such as pesticides and new organics would not only cause extensive delays bringing about exorbitant increases in cost, they could also seriously

impair our ability to meet the electric energy needs of our customers. Each of the Units at Palo Verde is important in meeting the State's energy needs in the time frame in which they come on line. Any delay in that schedule would raise the prospect of electrical shortages for Arizona.

There is another part of our story that should be of interest to you.

Because the total cost of the reclaimed effluent will be great and because there are limits on the availability of effluent, we were compelled to design our cooling system to maximize the use of the available effluent. The result is that we have been able to design our system to operate at TDS concentrations up to 14-15 times the original levels.

In contrast, four other electric generating plants that use effluent for cooling, two in Las Vegas, one in Amarillo, and one in Lubbock only achieve a level of 4-5 concentrations.

A more dramatic way of getting this point across is to cite the progress we have made since we started. When we started, we estimated we would consume about 35,000 A-F/yr. for each of the Palo Verde Units. When we had completed our preliminary design, we were able to reduce this estimate to about 25,000 A-F/yr. Now with our design substantially complete our best estimate is that our effluent requirements will only be 21,000 A-F/yr/unit.

Accordingly, for the first three units at Palo Verde, total effluent requirements would be about 63,000 A-F/yr. This annual amount will not be required until 1987, the first full year, when all three units are operating. This would

amount to about one-third of all of the effluent discharged from the 23rd and 91st Avenue plants in 1987.

If Units 4 & 5 are built then our needs will be about 105,000 A-F/yr. in the year 1991 and beyond. This would be 51% of all the effluent expected to be discharged in 1991 and a smaller percentage each year as the amount of effluent grows. (4,400 A-F/yr. is the projected growth rate in the 90's).

We think it is very important that you get these numbers clearly in mind --- 63,000 A-F/yr for three units in 1987 and 105,000 A-F/yr. for five units in 1991. We consider them to be conservative, but realistic estimates.

We also want to make clear to you the distinction between the amounts of effluent we expect to consume annually and the amount that must be contracted for on an annual basis.

The average monthly usage will be about 1,750 A-F per unit. But Mother Nature does not permit us to use averages. Evaporation rates increase with rises in temperatures. Consequently, in the average adverse summer months we expect our effluent requirements to peak at about 2,600 A-F/unit. These months also coincide with the period when the public needs electric power the most. Therefore, it is prudent, and necessary to avoid cutting back electric generation when it is needed most, to contract for effluent, which is done on an annual basis, in sufficient quantities to cover our peak month requirements with a sufficient allowance to account for expected variations from average atmospheric conditions.

Thus, we see a need to secure commitments for about 93,600 A-F/yr. for three units at Palo Verde and 156,000 A-F/yr. for five units. But, I want to stress that irrespective of the

contract amounts, actual consumption annually will be approximately 63,000 A-F for three units and 105,000 A-F for five units. The difference between the contracted amount of effluent and the actual amount used will be available for other uses.

With these facts in mind, you will recognize that the statement in the Corps of Engineers' September 28, 1977 report that "the current plans call for PVNGS to consume some 75,000 acre-feet per year of sewage effluent in 1982 and about 1990 increase their consumption to 140,000 acre-feet' is absolutely erroneous.

There are several other misconceptions contained in this report which must be clarified. First, it is reported that we feel we "have no mandate or authority to investigate groundwater use any further". We categorically deny this statement. In our studies for Units 1, 2, & 3 which are described in the Palo Verde Environmental Report and the Final Environmental Statement, we considered several alternative water sources and concluded that the use of sewage effluent was the best choice for Palo Verde Units 1, 2, &3. In our present activities relating to Palo Verde Units 4 & 5, we are continuing to investigate the quantities and qualities of groundwater available, the feasibility of its use at Palo Verde and the impact of such use. In this context we do maintain that changing our reclamation facility design for units 1, 2 and 3 at this late date to handle saline water would be disastrous to the utilities and the public who will need the Palo Verde power.

The report goes on to state that "Mr. Weigold mentioned that about 150,000 acre feet of water per year are pumped out of the ground in the Buckeye area through their combined irrigation and dewatering programs". We deny that Mr. Weigold ever said any

such thing, and we add that the facts are substantially different.

The records show that in 1974 groundwater pumped for irrigation was 53,600 acre-feet and pumped drainage water amounted 11,500 acre-feet, or a total of about 65,000 acre-feet. It has been reported to us that in 1976 drainage pumping had increased from 11,500 acre-feet to about 20,000 acre-feet. Thus, it is clear that all of the irrigation and drainage water in the Buckeye Irrigation District (BID) is not sufficient to meet our requirements.

The Corps of Engineers report also represents that Mr. Weigold stated that BID would prefer effluent in exchange for groundwater if this were possible. Mr. Weigold said no such thing. The facts are (1) Buckeye has offered its drainage water for use at Palo Verde, and (2) Buckeye has never suggested or proposed to substitute effluent for the groundwater it uses for irrigation. Buckeye must continue to pump this groundwater in order to maintain a proper hydrological balance.

It is also purported that "Mr. Weigold expressed the opinion that the fertilizer value of the effluent is indeed recognized by the farmers of the BID, some of whom farm with no additional fertilizer." Even if it were true, this statement is grossly misleading.

The facts are that the irrigation wells in Buckeye area have generally produced water with a high nitrate content. Indeed, a comparison of samples of the water diverted from the river into the Buckeye Canal (mostly effluent) with samples from the Buckeye irrigation wells shows that the nitrate content of the well water to be the same as in the effluent.

A study is currently being conducted by the University of Arizona to determine whether sewage effluent used in the

Buckeye Valley has had significant or substantial effect on crop yields or farming practices. This study is not complete. However, we can say that, since 1967 when effluent first became available in significant amounts, there has been no report of any dramatic increase in yields.

Finally, we were somewhat concerned by two statements made in the letter of October 26, 1977, inviting us to this meeting. The first of these was to the effect that the quality of the groundwater in the Buckeye area is deteriorating. We were concerned by this statement, because it was directly contradictory to the data which we had reviewed in 1974 and advice we had more recently received from our water consultants whom we consider to be eminently qualified experts.

Since we received your letter, we have done some more checking and this is what we have been told.

1. The groundwater quality in the Buckeye Area has always been bad.
2. From 1935 to 1955 there was a gradual deterioration of quality.
3. From 1955 to the present the quality has improved.

The second statement in the letter which concerned us was to the effect that the only solution to improving the quality of the Buckeye groundwater was to use this low quality water as coolant for the Palo Verde generating units. The letter goes on to state that your engineers do not have sufficient information to conclude whether such a plan would be feasible and requested us to give you such information today.

We have attempted to comply with this request by asking Mr. Leonard Halperny to prepare a report on this subject. He is present with us today and is available to answer any questions you may have.

This gist of his report is (1) continuance of groundwater pumping is and will continue to be necessary to maintain the hydrological balance in the Buckeye Valley, and (2) there would be no significant benefits to the Buckeye farmers in exchanging their irrigation groundwater for effluent.

The second part of the feasibility equation is what would the use of the Buckeye groundwater do to the Palo Verde plant.

One result is that we cannot achieve 14-15 levels of concentrations with highly saline water. Instead, the maximum levels of concentrations would probably be in the range of 4-5 concentrations at best. This would mean that our consumption of water would increase two or three fold. Consequently, our water requirements for Units 4 & 5 would increase from about 42,000 A-F/yr. to about 80,000 to 120,000 A-F/yr -- substantially more than the Buckeye wells can supply.

Other impacts of changing the water source for Units 4 & 5 would be changes in the design and result in increased costs for the following:

1. Evaporation ponds - they would have to be enlarged.
2. Cooling towers - they would have to be redesigned and the size or number may have to be increased.
3. Reservoir - a larger size would be required because of the increase in the cooling water requirements.
4. Reclamation facility - a new pilot operation may have to be conducted and a new design developed.
5. Gathering system - for collecting and transporting groundwater separate from the effluent would have to be developed.

6. Operation would be more difficult and complex, because the cooling water for Units 4 & 5 would have to be controlled separately from the cooling water for Units 1, 2 & 3.

I hope that what I have said and the information I have given or corrected will be useful to the Committee. If you have any questions at this time, either I or Mr. Halpenny will try to be responsive. If there are questions which occur to you later, we will do our best to answer those too. As I said earlier, we share your interests in sound water management. Since our interests are mutual, we want to be helpful and cooperative.