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)	)	

JOINT APPLICANTS' REPLY TO INTERVENOR PATRICIA LEE HOURIHAN'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

Pursuant to the schedule adopted by the Licensing Board at the hearing on June 25, 1982, Joint Applicants hereby reply to Intervenor Patricia Lee Hourihan's Proposed Findings of Fact and Conclusions of Law, dated August 13, 1982 (hereinafter referred to as the "Intervenor's Proposed Findings" or "IPF").

1. THE CONTENTION

At the outset it is evident that there is disagreement among the parties as to the nature and scope of the contention at issue in this proceeding. Without discussion or justification of any kind, Intervenor has attempted to resuscitate her motion to add new contentions or, alternatively, amend her original contention, which was submitted to the Board and the other parties on April 26, 1982 -- one day before the start of the evidentiary hearing. By such

motion Intervenor attempted to raise the issue of the capability to safely shut down the Palo Verde units.

Argument on the motion was heard on April 27, 1982, and it was denied by the Board on the grounds that it was untimely and that the criteria established by 10 CFR 2.714 for the acceptance of contentions untimely filed had not been satisfied.[1/] (Tr. 347). Intervenor's Proposed Findings[2/] do not justify, explain or discuss in any way why at this late date her motion should be granted or why the contention on which this proceeding was actually tried should be modified. Accordingly, it should not be incumbent upon the Applicants to address such issue.

Suffice it to say as to Intervenor's attempt to resurrect the safe shutdown issue in her Proposed Findings, that Intervenor's argument on her motion revealed her concern to be that effluent in the reservoir would be required

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1/ During the course of argument on Intervenor's motion, the Chairman twice asked Intervenor's counsel to address the matter of timeliness (Tr. 322-23; 343-44). Counsel's responses can be summarized as follows: (i) She had been engaged only recently; (ii) Intervenor had recently hired an expert who could testify as to water quality aspects; and (iii) information had been recently received respecting the Salt River Indian Community litigation. Only the latter of the three responses comes close to addressing the criteria of 10 CFR 2.714 for late filed contentions, but the Board has ruled that the Indian litigation is not a justiciable issue. (Tr. 337-38). Thus, the Board properly denied Intervenor's motion.

2/ The proposed findings of fact and conclusions of law submitted by the Joint Applicants and Staff will be referred to as "Applicants' Proposed Findings" and "Staff's Proposed Findings", respectively.

to provide a source of water to the ultimate heat sink required to shutdown the Palo Verde units and maintain them in a safe shutdown condition. (Tr. 320-21, 340-42). Accordingly, the Board ruled that inquiry would be permitted as to the connection between the ultimate heat sink and the reservoir. (Tr. 330, 353, 355). Such ruling, however, never in any way placed in issue the adequacy of the ultimate heat sink itself.

With respect to the issue of the supply of effluent, Intervenor's Proposed Findings would modify the original contention in a manner beyond the broadened interpretation given to it by the Board, i.e., to include all three units instead of only Unit 3, and to encompass impacts of effluent quality on the quantity of effluent required. (Tr. 329-31, 333-34, 337, 345-50). First, the effluent supply contention as restated in Intervenor's Proposed Findings eliminates the restriction of the issue to "the first five years of operation". Second, such restated contention eliminates the restriction of the issue to the supply of effluent during months of peak requirements.

There is nothing in the record which supports Intervenor's change of the contention from the first five years of operation to an indefinite period. However, any argument over such change has been rendered moot by the clear, uncontroverted evidence in the record. Every projection by whomever or whenever made shows that the avail-

ability of effluent will continue to grow over time. (Staff Ex. 1, p. 5-2; JA Ex. LL, Tables IV-1 and IV-2). As Intervenor's witness McCain acknowledged, as the population in the Phoenix area grows over the next 40-50 years, so will the amount of wastewater effluent grow. (McCain, Tr. 2393). Similarly, it is not disputable that the capacity of the 91st Avenue Plant, currently 90 MGD, with an expansion to 120 MGD almost complete, will be further expanded by 1985-87 to 150 MGD to meet expected demands during the 1985-2005 time span. Indeed, the most current projections (i.e., 1982 MAG projections, JA Ex. LL, Table IV-2) show that from 1985 to 2010 the quantity of effluent produced at the 91st and 23rd Avenue plants will increase from 138.6 MGD to 210.0 MGD, or 118.7 MGD (133,000 acre-feet/year) in excess of that required for Palo Verde and all prior commitments. Such projected flows for such plants exclude the additional effluent expected to be produced at the regional or satellite plants which have been discussed (i.e., Northeast, East Mesa, Arrowhead and CAP plants) and, collectively, are projected to produce additional effluent at the rate of 26.8 MGD, or 30,000 acre-feet/year by 2010. (JA Ex. LL, Table IV-2, Table VI-17, Table VII-3).

With respect to the Intervenor's elimination of the restriction of the adequacy of the effluent supply "during months of peak operation," the change works to Intervenor's disadvantage. The record is clear that due to

atmospheric conditions effluent requirements are highest during the summer months and lowest in the winter months. (JA Ex. X, Table 3.4-2). Thus, the estimate of annual effluent requirements would be reduced if it were assumed that refueling would occur in June (i.e., the peak month), rather than December (i.e., the lowest month), which was used in developing the estimate of 21,350 acre-feet/year. (Bingham, Tr. 926-27; JA Ex. T, WGB-3).

Such a change in assumptions could be made without violating the Staff's cost-benefit analysis, since such analysis was performed on the basis of an assumed average annual capacity factor of 60% over a term of 30 years without regard to schedules for operation. (Staff Ex. 1, pp. 2-2, 6-4; see also PVNGS Draft Environmental Impact Statement, p. A-91). Nonetheless, the evidence indicates that the adjustment for summer refueling would be far less significant than the adjustment for using a 60% annual capacity factor which is all that is required to meet the Staff's cost-benefit analysis.[3/]

2. APPLICABLE LEGAL STANDARD

Because the Staff's discussion of the applicable legal standard (Staff's Proposed Findings, pp. 16-20) pro-

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3/ It can be calculated from the data shown in Table 3.4-2 of the Environmental Report-Operating License Stage ("ER-OL") that refueling in June, rather than December, would reduce effluent requirements about 470 acre-feet per unit.

vides a full and complete response to Intervenor's argumentative discourse on this subject, we will not burden this reply with a repetitive answer. Further elucidation is not required to conclude that the Board is bound by the "reasonable probability" test propounded by the Appeal Board in Northern States Power Company (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41 (1978) and the Appeal Board's subsequent decision in Public Service Company of Oklahoma (Black Fox Station, Units 1 and 2), ALAB-573, 8 NRC 102 (1979).

Intervenor's reliance on Philadelphia Electric Company (Limerick Generating Station, Units 1 and 2), LBP-74-44, RAI-74-6 1098 (1974), where the licensing board imposed a lengthy condition on the issuance of construction permits requiring the applicant to assure the availability of compensating water storage at the time of initial power operation, is misplaced. In that case, the licensing board concluded that without such water storage, the applicant might not be able to achieve year round full power operation. (Id. at 1128, 1152). Upon exceptions to the licensing board's initial decision, the Appeal Board practically eliminated the condition. Philadelphia Electric Company (Limerick Generating Station, Units 1 and 2), ALAB-262, NRCI-75/3 163, 205-06 (1975). Finding that the cost-benefit analysis for the Limerick plant tipped in favor of granting the construction permits without the need for a water stor-

age reservoir, the Appeal Board deleted the requirement that compensating water storage be available at the time of initial power operation. Noting, however, that a condition similar to the one requiring compensating water storage had been proposed by the applicant and that the applicant had already taken the procedural steps to obtain approval of such storage, the Appeal Board revised the condition to provide that the applicant was to take the necessary steps to provide compensatory water storage at the "earliest practicable time." (Id. at 206).

In addition, one point made by the Staff and ignored by the Intervenor requires amplification. The point is that "the cooling water availability in Black Fox was much more tenuous than here because the City of Tulsa had the right to terminate its water supply contract for the reactor at will." (Staff's Proposed Findings at 18). The facts in this case are that the Multi-Cities do not have the right to terminate Agreement No. 13904 under any circumstances. The most that the contract permits them to do is to "interrupt" effluent deliveries only if four conditions are met.

The first condition is that there exist a "critical need for water for domestic purposes." Ignoring the interpretive questions imbedded in this phrase, the existence of a "critical need" is not sufficient by itself to permit interruption of deliveries. Rather, the cities must

have also exhausted "all reasonable sources, including the use of excess wastewater effluent." (Emphasis added.) It is this condition which the Intervenor has glossed over without full and fair consideration.

The record shows that within the Salt River Project boundaries there is no potential of a critical need for water in the foreseeable future. (Juetten, Tr. 677; Steiner, Tr. 754-55; McCain, Tr. 2216). Outside the Salt River Project, each of the Multi-Cities has the unrestricted right to drill new wells within its service area and pump as much groundwater as may be required to meet its needs. In addition, CAP water will be available as an additional source after 1985. Collectively, these sources are expected to meet the area's needs, including those resulting from projected population growth, for the next 50 years, provided a meaningful conservation program is adopted. (Steiner, Tr. 758-9; JA Ex. Q, pp. 88, C-18). If a water shortage on the Colorado River more severe than any experienced in the past were to occur, other sources are available. (Steiner, Tr. 758-59; JA Ex. Q, pp. 88, C-18).

Beyond all of these sources, Agreement No. 13904 requires the Multi-Cities to exhaust the use of all excess wastewater effluent before interruption of effluent deliveries to Palo Verde. As of today, all of the effluent produced at the 23rd Avenue Plant would fall into this category and the quantity will continue to grow over time.

Thus, examination of the 1982 MAG projections (JA Ex. LL) reveals that excess effluent will be available as follows:

	91st & 23rd Ave. Plants Excess Effluent over PVNGS Actual Requirements and All Prior Commitments*/	Effluent from Northeast, East Mesa and Other Plants**/	Total
	(mgd)	(mgd)	(mgd)
1985	66.6	9.7	76.3
1990	58.4	12.4	70.8
1995	71.5	14.3	85.8
2000	86.6	20.3	106.9
2010	118.7	26.8	145.5
2020	171.8	33.1	204.9

*/ Source: JA Ex LL, Table IV-2.

**/ Source: JA Ex LL, Tables VI-17 and VII-3.

To place this quantity of excess effluent in perspective, 204.9 MGD projected to be available in 2020 is equivalent to about 229,000 acre-feet/year. In comparison, the total proposed allocations of CAP water for all six of the Multi-Cities (which is not expected to be needed until 2034) is 174,848 acre-feet/year. (JA Ex Q, pp. 34-35). In other words, in 2020, before interruption of delivery of effluent to Palo Verde would be permissible, the Multi-Cities would have to exhaust the use of a quantity of excess wastewater effluent equal to 130% of their total CAP allotment. It is also 229% of the amount of effluent which is required for exchange with Indians under the proposed CAP allocations.

It makes little difference in this reasoning whether or not the expansion of the 91st Avenue Plant con-

tinues beyond that already in progress. The effluent processed in 1981 with a design capacity of 90 MGD was sufficient to meet Palo Verde requirements. The almost-completed expansion to 120 MGD, and the expansion planned for 1985-87, assures that the excess amount available at the 91st Avenue Plant will increase even more. But even assuming that the 91st Avenue Plant is not expanded to 150 MGD, the Multi-Cities will have to provide facilities somewhere to process effluent of equal amounts and that effluent also will be excess effluent.

The point is that whatever amount of excess effluent that can be exchanged for Indian CAP water or for non-Indian agricultural water will constitute additional water sources and will reduce the risk of a critical need for water. The result is the same even if such exchanges or substitute uses are achieved by construction of regional or satellite plants. In all cases, such exchange or reuse of effluent serves to enhance available water sources and reduce the risk of critical water shortages. And if excess effluent cannot be used to provide added water sources, then certainly the Palo Verde effluent cannot be so used and the interruption of deliveries to Palo Verde could not be justified.

The only instance to which this reasoning would not apply is one where the Multi-Cities diverted enough sewage from the 91st Avenue Plant for treatment at some

other plant or plants to reduce the effluent produced at the 91st Avenue below that produced in 1981. The likelihood of such instance arising is remote indeed for three reasons. First, Agreement No. 13904 prohibits such action by the Multi-Cities. (JA Ex. H, p. 17). Second, as acknowledged by Intervenor's own witness McCain, it would be uneconomic to develop new sewage treatment capacity elsewhere when capacity up to 150 MGD will exist at the 91st Avenue Plant. (McCain, Tr. 2427). Third, there are currently no plans to develop any additional plants (McCain, Tr. 2192). The point is that recycling future growth in wastewater effluent through exchanges, substitute uses, or tertiary treatment, if necessary, would virtually assure the absence of any critical water need in the foreseeable future.

Under such circumstances there is simply no basis for Intervenor's claim that because of Section 21 of Agreement No. 13904, or because Palo Verde is situated in the arid Southwest, that some higher standard than the "reasonable probability" test of the Northern States Power case, supra, should be applied. On the contrary, if there is a real concern about the risk of critical water shortages in Arizona, then it is clear that the recycling of wastewater effluent for any use which otherwise would require the first use of water suitable for potable purposes should be encouraged and developed to the fullest extent. (Steiner, Tr. 759; McCain, Tr. 2379-81, 2193-94).

3. EFFLUENT PROJECTIONS

Intervenor has accepted the use of the 1982 MAG projections (i.e., Ex. LL. Table IV-2) (IPF at 13); thus, it appears that there is no dispute as to the amounts of effluent that will become available in the future. Intervenor also concedes that the construction of the Northeast Plant and the East Mesa Plant, which have been discussed but are not planned (McCain, Tr. 2192-93), would not have a major impact upon the amount of effluent discharged from the 91st Avenue Plant. (IPF at 14). However, Intervenor then goes on to speculate "as the cost of water rises and these trades become more feasible with the arrival of CAP water in the Salt River Valley, the cities may more agressively build subregional plants to effect exchanges." (Id.). However, the speculation only enhances the point we have just made.

First, McCain has stated that the need for such exchanges is unlikely to occur until 2005-2010. (McCain, Tr. 2189-90). This is, in fact, indisputable evidence from Intervenor's own witness that the total water sources (excluding effluent) available to the Multi-Cities will be sufficient to meet their needs until 2005. Second, Intervenor's speculation, if it proves to be true, only goes to establish that effluent will be utilized as a valuable water resource and that such utilization will reduce any risk of a critical water shortage. Third, there will be available somewhere in Phoenix between 125-145 MGD of effluent in

excess of Palo Verde requirements during the 2005-2010 time frame. (See Table at page 9 infra).

Such speculation, however, does not put in question that, as shown by the 1982 MAG projections, the effluent flows from the 91st Avenue Plant will reach about 150 MGD (or 168,000 acre-feet/ year). This quantity is about 69 MGD (or 77,000 acre-feet/year) more than is required to meet Palo Verde requirements and all prior commitments for effluent produced at the 91st Avenue Plant. (JA Ex. LL, Table IV-2). Additionally, the 1982 MAG projections show that there will be an additional 45 MGD (or 50,000 acre-feet/year) of excess effluent available at the 23rd Avenue Plant. Such quantity of effluent from these two plants alone is almost equal to the full allocation of CAP water (116,239 acre-feet/year, JA Ex. Q, p. 35) which is not expected to be needed until 2034. Clearly, if 115,000 acre-feet/year of excess effluent can be reused by exchange or otherwise (which it must be before Section 21 of Agreement No. 13904 can be implemented), the risk of implementation of Section 21 is indeed remote. (Hulse, Tr. 479-80).

4. AGREEMENT NO. 13904

The major uncertainty upon which Intervenor rests her arguments is that under Section 21 of Agreement No. 13904, i.e., in times of critical need for water, effluent deliveries of effluent may be interrupted. We have previously dealt with this argument and pointed out that there is

and will be a large and growing quantity of excess effluent which must be utilized before the conditions permitting implementation of Section 21 can be satisfied.

This response needs no further iteration, but it should be noted the response was limited solely to an analysis of the excess effluent available over Palo Verde requirements. It did not address the potential for implementation of Section 21 with respect to the balance of the amount of effluent committed under Agreement No. 13904. In other words, Agreement No. 13904 provides for the sale of 140,000 acre-feet/year of effluent from both the 91st Avenue and 23rd Avenue Plants. This is about 76,000 acre-feet/year in excess of Palo Verde requirements, which can be used for other electric generating plants as may be built at Palo Verde or elsewhere. (JA Ex. H, p. 11). Obviously, if the excess contracted amount is fully utilized, there will be no effluent available for exchange until 1995. (JA Ex. LL, Table IV-1).[4/] Clearly, a risk of implementation of Section 21 as to some portion of such excess contracted amount will exist until 1995-2000. However, that is a risk which would apply to some future generating plant and has no bearing on

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4/ Table IV-1 of the 1982 MAG projections is used in this case. If Table IV-2 were used, the effluent produced at the 91st and 23rd Avenue Plants would not equal all commitments until 2000. However, under Table IV-2, in the year 2000, exchanges of effluent from the Northeast and East Mesa plants in the amount of 17.4 MGD (or 19,500 acre-feet/year) would be in effect. (JA Ex. LL, Table VI-17).

Palo Verde Units 1, 2, and 3 -- the only matter before the Board.

In this connection, the testimony of Applicants' witness Hulse reveals that the timing and planning for use of the committed effluent in excess of Palo Verde requirements which would permit the Multi-Cities to develop exchanges at an early date was one of the major elements of the negotiations concerning possible revisions of Agreement No. 13904. (Hulse, Tr. 485-88).

The Intervenor has attempted to draw a red herring across the path by raising the argument that notice of exercise of the option for effluent for Unit 1 has not been given. (IPF at 14-15). The record is clear, of course, that the option has been exercised as Intervenor's witness McCain testified (McCain, Tr. 2242-43), and construction water is in fact being delivered pursuant to such notice. (Hulse, Tr. 468). However, Intervenor seems to have based her argument on a misconception that Agreement No. 13904 requires the exercise of the option at a point in time that is tied to fuel load or startup. This is not the case. Section 9.1 of the agreement explicitly requires the delivery of Construction Water "<u>whether or not</u>" any of the options is excercised. By definition (Section 5.6 of the agreement) Construction Water is defined as "the water requirements of each ANPP Unit prior to its Date of Firm Operation -- a date, established unilaterally by APS, "on

which each ANPP Unit can be expected to operate reliably at any load up to its rated capacity" (see Section 5.7 of the agreement). Obviously, the Date of Firm Operation cannot be the fuel load date.[5/]

5. CENTRAL ARIZONA PROJECT (CAP)

Intervenor's discussion of the CAP is disingenuous, to say the least. Her opening statement to the discussion is, "CAP was originally scheduled to deliver water beginning in 1985." (IPF at 21). Her corresponding proposed finding 43 is substantially the same: "It was originally anticipated that CAP would begin delivering water to the Phoenix area around 1985." The disingenuity here lies in apparent invitation to draw inferences that there is some evidence in the record of what the "original" schedule was and now that schedule has been delayed. The cited references to Steiner's and McCain's testimony lend no credence to any such inference. Mr. Steiner stated repeatedly that CAP water would be available in the Phoenix area by 1985. (Steiner, Tr. 743, 754, 793, 794). Similar testimony of Mr. McCain was also repetitive. (McCain, Tr. 2179, 2199-

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5/ Intervenor's added comments about the drafting of Agreement No. 13904 are not only gratuitous and unsupported (McCain stated that he did not know who drafted the agreement, Tr. 2194), but contrary to the facts. Agreement No. 13904 represents the culmination of prolonged negotiations which commenced in the summer of 1972. The drafting of the document was an effort in which a number of people actively participated, including corporation counsel of the City of Phoenix and his assistant.

2200, 2201; see also JA Ex. Q, p. 4). There is nothing in the record about "original" schedules. There is nothing in the record suggesting that CAP water will not be available in 1985. What is clear in the record is that the entire CAP project will not be completed to Tucson until 1989-90. (Steiner, Tr. 744; JA Ex. Q, p. 4). But, as Mr. Steiner implied, any delay in completing the project required to serve Pinal and Pima counties (i.e., the Tucson area and agricultural areas between Phoenix and Tucson) only enhances the supply of water to the Phoenix Area. (Steiner, Tr. 778). All portions of the Granite Reef Aqueduct required for delivery of CAP water are completed except three reaches of the aqueduct which are currently under construction and three pumping stations which are also under construction. (Steiner, Tr. 743).

It is also disingenuous of Intervenor to suggest that the funding to complete CAP will require $2 billion, when completion of the project is not necessary to get CAP water to the Phoenix area. This is particularly so since the cost of completion includes several dams and other features which are not necessary to the delivery of water to Phoenix. (JA Ex. Q, pp. 54-55). Similarly, in her discussion concluding that Mr. Steiner's prediction that 1.6 million acre-feet of CAP water will be available in the early years is inflated (IPF at 22), Intervenor is less than candid in not stating that Steiner's prediction was quali-

fied in two important respects. First, it was based in part upon the fact there is currently 65 million acre-feet of water in storage in the reservoirs on the river. (Steiner, Tr. 776-78). Second, Mr. Steiner qualified his prediction that 1.6 million acre-feet would be available only until the Upper Basin states had fully developed their alloted portions of the river water. (Steiner, Tr. 751-52, 765, 780, 793, 795).

The most flagrant error made by Intervenor is found in her conclusion that because (a) the dependable, firm supply of CAP water is 630,000 acre-feet per year, and (b) the 800,000 acre-feet of CAP water will be available two out of every three years, first priority users will experience a 20% shortage 36% of the time. (Intervenor's Proposed Findings, p. 23). To achieve such a result, one would have to visualize a river that flows at either 630,000 acre-feet/year or 800,000 acre-feet/year and nothing in between.

Obviously, nature does not work this way, and neither do the statistics from the given premises. If in one out of three years when the CAP water supply is less than 800,000 acre-feet, the actual flow is 790,000 acre-feet, the shortage is far less than 20%. The facts are that there is insufficient data in the record to show what the average shortfall will be during one out of three years, but is clearly less than 20%. In fact, given the facts that, (i) the average CAP flow of 1.3 million acre-feet is based

on historic data over a span of 75 years (Steiner, Tr. 762), (ii) the worst historic runoff was only 630,000 acre-feet (id. at 752), and (iii) existing reservoirs on the main stem of the river system have a capacity of 65 million acre-feet (id. at 793), the frequency of a 20% shortfall would seem to be very low.

In any event, Mr. Steiner's testimony (Tr. 796) is unmistakably clear on several important aspects:

1. The minimum CAP water supply of 630,000 acre-feet/year is not applicable at the beginning of the repayment period (i.e., 1985-2034).

2. At the beginning of the repayment period the minimum supply is more like 1.4 million acre-feet/year.

3. The probability of having 1.6 million acre-feet in each of the first five years from 1985 to 1990 is at least 90%.

Nothing in the testimony of Mr. Lorah or Mr. McCain provides any challenge to any of these three conclusions. Certainly, testimony that at some time in the future the upper basin states will fully utilize their entitlements (a conclusion with which Mr. Steiner concurred, Tr. 751-52) does not challenge any of these conclusions. But most importantly, the fact that there is a 90% probability that 1.6 million acre-feet will be available from 1985 to 1990 virtually rules out any possibility that Section 21 can be implemented during the first five years of operation of the Palo Verde units.

6. WATER REQUIREMENTS

The condenser cooling water requirement for each unit at PVNGS is 21,350 acre-feet/year (19.0 MGD), or 64,050 acre-feet/year (57.2 MGD) for all three units. This requirement is based on the use of average ambient meteorological conditions and the assumptions that (a) each PVNGS unit will operate at a capacity factor of 95% of rated power for 11 months each year and will experience a one month outage each year in December for refueling and maintenance, (b) there will be no treatment of the cooling water blowdown from the circulating water system ("CWS"), (c) cooling water losses will be as defined in Figure 3.3-1 of the ER-OL (JA Ex. X),[6] and (d) concentration of dissolved solids in the influent to the CWS will be permitted to be increased by a factor of 15. (Bingham, ff. Tr. 920, p. 2; see JA Ex. T, p. WGB-3). Although Intervenor takes no issue with assumptions (a), (b), or (c),[7] she does argue that the use of monthly averages of

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[6] The reservoir loss due to evaporation is shown in the ER-OL as 180 GPM. (JA Ex. X, Figure 3.3-1, sheet 2 of 4). The actual evaporation loss for the reservoir is 0.387 MGD, or 269 GPM. (Bingham, Tr. 2591-92).

[7] Intervenor purports to use in her Proposed Findings the rate of evaporation from the reservoir that was used by the Staff in the Final Environmental Impact Statement. (IPF at 10, Finding 23). However, Intervenor provides no citation for the 500 GPM figure which she references. Joint Applicants submit that she would be hard-pressed to provide a citation in view of the fact that the Staff did not use 500 GPM but instead used the figure developed by Joint Applicants. (Staff Ex. 1, p. 4-3).

consumptive use based on average monthly meteorological conditions is not sufficiently conservative. She also challenges assumption (d) and claims that it is unlikely that Joint Applicants will be able to achieve 15 cycles of concentration in the CWS. (IPF at 9-11).

In order to evaluate the reasonableness of Applicants' assumptions, it is essential to establish the legal standard applicable to the determination of water requirements at PVNGS, a fundamental point totally ignored by Intervenor. The determination of effluent requirements for PVNGS was originally made in connection with determining the environmental effects of water diversion. (JA Ex. X, Section 5.6). For purposes of Intervenor's contention that Joint Applicants have not demonstrated an assured water supply, the determination of water requirements is relevant to the cost-benefit analysis for PVNGS. The determination of environmental impacts and the performance of a cost-benefit analysis are requirements imposed under the National Environmental Policy Act ("NEPA"). The nature of assumptions to used under NEPA in Commission proceedings has been addressed by the Appeal Board. In Consolidated Edison Company of New York (Indian Point Station, Unit No. 2), ALAB 188, RAI-74-4 323 (1974), the Appeal Board stated:

> "NEPA does not require the use of the most conservative assumptions in evaluating environmental impacts. In the absence of any such requirement, such assumptions should not be used, for they

> most surely would distort the finely tuned and systematic balancing which is performed." (Id. at 358).

The Appeal Board went on to state that a "rule of reason" is the applicable standard under NEPA. (Id.). Similarly, in Delmarva Power and Light Company (Summit Power Station, Units 1 and 2), LBP-75-43, NRCI 75/8 215 (1975), the licensing board, in addressing the potential impact of entrainment of striped bass by operation of the facility, stated:

> "We find that both the Staff's and Maryland's modeling work have generated what appears to be somewhat conservative, but reasonable, ranges of estimated average potential annual losses to the fishery. . . . (We find that Staff's 'Case C' approach would violate the 'Rule of Reason' approach, i.e., that it would unnecessarily lock us into an evaluation based on the 'most conservative assumption' possible -- an evaluation not required by NEPA. . . .)" (Id. at 238, citation omitted, emphasis in original).

Based on the foregoing, Joint Applicants submit that the use of overly conservative assumptions would be inappropriate for purposes of estimating effluent requirements. The applicable standard is the one that has uniformly been applied by the courts and the Commission's tribunals -- a "rule of reason". (See National Resources Defense Council v. Morton, 458 F.2d 827, 834 (D.C. Cir. 1972); Public Service Company of Oklahoma (Black Fox Station, Units 1 and 2), ALAB-573, 10 NRC 775, 779 (1979); Boston Edison Company (Pilgrim Station, Unit 2), ALAB-479, 7 NRC 774, 779 (1978)).

The assumptions used by Joint Applicants in determining effluent requirements more than satisfy the rule of reason. First, the assumption that each PVNGS unit will operate at a capacity factor of 95% of rated power for 11 months with a one-month outage for refueling and maintenance is a conservative assumption (Hulse, Tr. 408),[8] and was not challenged by Intervenor. (IPF at 9). Second, the use of onsite meteorological data for the years 1974 and 1975 for purposes of determining makeup requirements for the month of June, the month of highest makeup requirements (JA Ex. T, p. WGB-3) overstates consumptive use requirements by approximately 20% when compared to over 60 years of data from Buckeye and Gila Bend, 30 years from Phoenix, and 8 years from the PVNGS site. (Bingham, Tr. 1205, 1212-13).[9] Intervenor's argument that the makeup requirements for June should be applied to the 11 months of operation assumed for each year (IPF at 9) is totally inappropriate under the rule of reason. Third, the assumption that the treated effluent in the CWS will achieve 15 cycles of concentration is reasonable based on the water reclamation studies (JA Ex. BB),

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[8] The Staff's analysis assumed a 60% capacity factor. (Staff Ex. 1, p. 2-2).

[9] The makeup requirement for June based on the 1974-75 data is 2123 acre-feet. (Bingham, Tr. 928; JA Ex. T, p. WGB-4). Intervenor refers to 2114 acre-feet, a less conservative figure, which is derived from onsite data for the years 1976-78. (IPF at 9, see JA Ex. T, p. WGB-4).

which were reviewed independently by the Nalco Chemical Company, the vast operating experience accumulated at other electric generating plants and the flexibility inherent in the CWS, all of which support operation at at least 20 cycles of concentration.[10] (Bingham, ff. Tr. 2585, pp. 13-17; see Staff Ex. 8, p. 1). Fourth, the assumption that there will be no treatment of the cooling water blowdown is conservative in that it increases water requirements that would otherwise be calculated if such blowdown were treated and reused. Fifth, the cooling water losses as defined in the ER-OL are reasonable estimates of such losses.[11] In summary, the assumptions underlying the estimate of water requirements for PVNGS are in all major respects conservative assumptions which tend to increase the amount of the estimate. For this reason, the rule of reason has been satisfied in this case.

7. EFFLUENT QUALITY

In Part B of her Proposed Findings, Intervenor makes several challenges to Joint Applicants' plan to use treated effluent treated in the CWS at 15 cycles of concentration. These challenges relate to (a) the reliability of the Water Reclamation Plant ("WRP"), (b) the adequacy of the

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[10] The reasonableness of the use of treated effluent in the CWS at 15 cycles of concentration is further discussed at pages 24-33, infra.

[11] See discussion at note 6, supra.

water reclamation studies conducted by Joint Applicants, (c) the applicability of industry experience to support operation of PVNGS at 15 cycles of operation, and (d) factors which Joint Applicants allegedly failed to consider. Intervenor argues that if Joint Applicants do not achieve 15 cycles of concentration, their makeup requirements will be "greatly increased." (IPF at 27). Intervenor exaggerates the impact of a decrease in cycles of concentration on water requirements. If one assumes a decrease in cycles of concentration from 15 to 12, or a decrease of 20%, the CWS makeup required would increase from 64,050 to approximately 65,200 acre-feet/year, an increase of less than 2%.[12/] This example bears out what is obvious from page WCB-6 of Joint Applicants' Exhibit U Revised -- significant (20% to 30%) changes from 15 cycles of concentration do not result in the makeup requirements being "greatly" increased.

a. The Reliability of the Water Reclamation Plant.

Intervenor attempts to discredit the reliability of the WRP based on a reliability study performed for the WRP in its original design configuration. As Intervenor recognizes, after the completion and as a result of that reliability study, Joint Applicants modified the design of

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12/ The relationship between CWS makeup requirements and cycles of concentration is set forth in Intervenor's Exhibit IX.

the WRP.[13/] Intervenor makes the argument that since no reliability analysis of the modified WRP was presented, it cannot be determined if the modified design improves the reliability of the WRP. (IPF, Findings 68-69).

Intervenor's argument is without merit. The WRP design shown in Joint Applicants' Exhibit BB and for which the reliability study was performed, consisted of three modules with each module containing two sets of the process elements of filtration, biological nitrification, lime softening, and chlorination. (Bingham, Tr. 1295, 2681). One of the reasons the reliability study was performed was to determine whether changes to the design should be made. Following completion of the reliability study, the module interconnections were changed to a parallel arrangement consisting of six modules with each module containing one set of the essential process elements. (Bingham, Tr. 1295, ff. Tr. 2585, p. 19, Tr. 2681). Based on these changes, Mr. Bingham was able to testify that the reliability of the WRP had been improved. (Bingham, Tr. 2588). Mr. Bingham's

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13/ Contrary to Intervenor,s assertion that the design modification was completed in 1974 (IPF, Finding 67), Mr. Bingham testified that the design change was completed between 1974 to 1976. (Bingham, Tr. 2665). If the design change was not completed until 1976, it is not difficult to understand (except apparently for Intervenor, see IPF at 29 n.16), why the modified WRP was not depicted in the Water Reclamation Studies (JA Ex. BB), which were published in 1975. (Bingham, Tr. 2665).

testimony in this regard was not controverted by any other witness.

Intervenor also asks the Board to conclude that "at least some component of the WRP will not operate properly for a large portion of the time." (IPF, Finding 69). By such statement Intervenor seems to equate component reliability with WRP reliability. These terms are not synonomous. (Bingham, Tr. 1318). Even if one assumes that a component is not operating, this does not compel the conclusion that the WRP is not operating at its design capacity. On the contrary, the WRP can be operated at design capacity with any one of its parallel paths out of service. (Bingham, ff. Tr. 2582, pp. 19-20).

Mr. Bingham also pointed out that the use of the reservoir was not considered in the reliability studies (id. at p. 20) since an avowed purpose of the study was to determine an acceptable size for the reservoir. (Bingham, Tr. 1128-29, 1133-34). In order to develop the relationship between component reliability and WRP reliability (or the overall reliability of supplying treated makeup water), one would have to consider the reservoir since the treated effluent in the reservoir allows failed components to be replaced without interrupting the operation of the CWS. (Bingham, ff. Tr. 2585, p. 20, Tr. 2675).

b. Water Reclamation Studies.

The water reclamation studies conducted for PVNGS refer to the extensive testing over a 15-month period of prototypes of the WRP and CWS. Intervenor has no compliants about the demonstration reclamation plant,[14/] but instead focuses her attack on the circulating water test studies, especially as they relate to the circulating water test facility ("CWTF"). It should first be noted that Intervenor grossly misstates the first of the four objectives of the circulating water test studies. (Compare IPF, Finding 73 with Bingham, ff. Tr. 2585, p. 2). As Mr. Bingham testified, operating experience available prior to conducting the circulating water tests provided a sound basis on which to proceed with the design of the CWS. (Bingham, ff. Tr. 2585, pp. 2-3). The testing was done to verify the practicality of operation at 15 cycles of concentration (id.), not, as Intervenor states, "to determine if 91st Avenue Plant effluent could be treated . . . to acnieve 15 cycles of concentration . . . ." (IPF at 75). (Emphasis added).

Intervenor also argues that Joint Applicants have not adequately explained the basis for determining that calcium, magnesium, silica, phosphorus and ammonia are the principal constituents of concern with respect to operation

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14/ Her own witness Robinson testified that he had no "complaints" about the operation of the water reclamation test facility. (Robinson, Tr. 1612-13).

of the CWS, in view of the fact that other constituents could also have some impact. (IPF at 30, Finding 71). The evidence shows that, on cross examination, Mr. Bingham was asked whether constituents other than the five problem constituents could also cause corrosion, fouling and scaling. (Bingham, Tr. 1101). Mr. Bingham answered: "I expect so" (id.), and later sponsored an exhibit (JA Ex. Y) listing the other chemicals which would be expected in the CWS and the impact of such chemicals on the CWS. (Bingham, Tr. 1285-87). The reasons why the five problem constituents are of concern is explained in Joint Applicants' Exhibit BB. (JA Ex. BB, Part 1, pp. 1-47, 1-50.) Joint Applicants submit that the explanations in Joint Applicants' Exhibits Y and BB are an adequate basis for concluding that the named constituents are the principal constituents of concern.

Intervenor's chief argument with the circulating water tests is that such tests did not demonstrate that 15 cycles of concentration could be achieved using effluent as cooling water without excessive degradation of the CWS. (IPF, Finding 105). In support of her argument, Intervenor relies almost exclusively on the testimony of her witness Paul Robinson. (Id., Findings 105-10). Intervenor gives four bases for Mr. Robinson's opinion:

> "1 undersized scale, flow rates and volumetric flows of the WRS are not reliable indicators of the conditions and operation of the actual CWS at Palo Verde;

2. The geometry of the CWTF was different than the actual Palo Verde CWS;

3. The two-week test periods were too short to compare to the 11-month expected operational period of the reactors;

4. The coolant chemistry of the CWTF did not react as applicants had hypothesized that it would; nor did the constituents of special concern to applicants concentrate at identical rates, as applicants had predicted. (Robinson, Tr. at 1689)." (IPF, Finding 106).[15]

As to basis no. 1, there was no need to construct a scale model based on the vast operating experience acquired with hundreds of thermal power plants. (Bingham, ff. Tr. 2585, p. 6). Mr. Robinson himself testified, in response to a question as to whether operating experience would provide a basis for the design of the CWS equipment, that "[t]hat would be excellent information to incorporate into analysis and design." (Robinson, Tr. 1747). As to variations in flow rates and volumetric flows[16] in the CWS and CWTF, Mr. Robinson was concerned that such flows might be related to corrosion rates. (Robinson, Tr. 1622-29).

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[15] At the transcript page cited by Intervenor, Mr. Robinson does give the basis for his opinion. However, the basis given by him is not what Intervenor sets forth in her proposed finding 106. Mr. Robinson, at page 1689 of the Transcript, does not base his opinion on whether or not the constituents in the CWTF concentrate at identical rates.

[16] According to Mr. Robinson, he used these two terms to mean the same thing. (Robinson, Tr. 1616).

Mr. Robinson relied on Intervenor's Exhibit XXVI for his opinion that flow may influence corrosion. (Id.). As explained by Mr. Bingham, it is tube flow velocity that is relevant to corrosion because it determines whether protective oxide films would be stripped away from the tube surface. (Bingham, ff. Tr. 2585, p. 7). Tube flow velocities between the CWS and the CWTF were quite similar. (Id.). Mr. Bingham also noted that Mr. Robinson misapplied Intervenor's Exhibit XXVI, since such exhibit dealt with a system containing copper. (Id., pp. 20-21).

The second basis given for Mr. Robinson's opinion is that the geometry of the CWTF was different from the actual CWS. Mr. Robinson's testimony was that the CWTF did not analyze the metals to be included in the CWTF in the array or geometry in which they would occur in the CWS. (Robinson, Tr. 1622). However, Mr. Bingham testified that the CWTF heat exchanger was configured in a manner similar to the tube to tubesheet arrangement found in typical condensers, including the PVNGS condenser. (Bingham, ff. Tr. 2585, p. 9; Tr. 2624-25). And tubes made of titanium, the same material as is used in the PVNGS condensers, were used in the CWTF heat exchanger for four of the tests run. (Robinson, Tr. 1725).

As to the third basis for Mr. Robinson's opinion, the criticism is without merit. It ignores one of the specific purposes of the Bench Scale tests, which was to look

at accelerated corrosion. Furthermore, the laboratory apparatus permitted setting up extreme conditions under a broad spectrum of chemistries. (Bingham, ff. Tr. 2585, pp. 5-6). In addition, the criticism ignores the fact that the four final tests with the CWTF, which used a titanium heat exchanger, represented not two, but eight weeks of continuous and successful operation. (Id. at 12).

As to the final of the four bases, Intervenor is mistaken in alleging that Joint Applicants had predicted at the time of the tests that the five problem constituents would concentrate at the same rate in the CWTF tests. There is nothing in the water reclamation studies (JA Ex. BB) that indicates Joint Applicants had made such prediction in advance of the tests. As Mr. Bingham testified, the CWTF was a simulation of an actual circulating water system, and not a hypothetical, closed, steady-state system. (Bingham, ff. Tr. 2585, p. 16).[17/] The CWS at PVNGS is, of course, not a closed or steady-state system. The circulating water is constantly being evaporated via the cooling towers. Furthermore, acid, scale inhibitors, antifoam agents and chlorine are added as necessary. (Id., p. 19). The circulating water tests were not done under steady-state condi-

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17/ Intervenor herself admits that the relationship between CWS makeup and cycles of concentration, as graphically depicted in Joint Applicants' Exhibit U and expressed in Intervenor's Exhibit IX , applies only under steady-state conditions. (IPF, Finding 115).

tions, and, therefore, could not be expected to show that the constituents concentrate at the same rate. That was not a purpose of the tests. (Id. pp. 15-16).

In summary, in view of (1) Mr. Robinson's own admission respecting the value of operating data to support the CWS design, (2) the physical phenomena respecting corrosion, (3) the actual configuration of the heat exchanger in the CWTF, (4) the purpose of the Bench Scale tests, (5) the eight weeks of continuous and successful testing with titanium in the CWTF heat exchanger, and (6) the insignificance of the rate of concentration of the problem constituents in a non-steady-state system, the bases for Mr. Robinson's opinion are seriously undermined. The water reclamation studies were sufficient to verify the practicality of operating the CWS at 15 cycles of concentration.

Furthermore, it is not Mr. Bingham's testimony alone that establishes the adequacy of the water reclamation studies. The Nalco Chemical Company's independent review of the water reclamation studies concluded that the circulating water test program was adequate not only to represent the circulating water at 15 and 20 cycles of concentration, but also to evaluate corrosion and the use of chlorination. (JA Ex. DD; see Bingham, ff. Tr. 2585, pp. 14-15).

c. Industry Experience.

Mr. Bingham testified that cycles of concentration do not determine a limit for the operation of the CWS.

(Bingham, ff. Tr. 2585, p. 16). The vast amount of operating data reflected in Joint Applicants' Exhibit EE and Staff's Exhibit 8 show that the concentrations of the five problem constituents and total dissolved solids ("TDS") for PVNGS are well within the envelope of the concentrations of such constituents and TDS at the other plants. The sole exception is for phosphate. However, the concentration of phosphate at PVNGS is lower than at other operating plants using municipal effluent for condenser cooling. (Bingham, ff. Tr. 2585, p. 17).

Intervenor chooses to attack Joint Applicants' use of operating data from other plants to support the PVNGS design.[18] These challenges can be disposed of quite readily. As to the assertion that no other nuclear plant in the United States utilizes effluent for condenser cooling (IPF at 31, Finding 80), the uncontroverted testimony was that operating experience of plants using effluent is applicable without regard to whether the plant is a nuclear plant or a fossil plant. (Bingham, Tr. 1196).

As to Intervenor's comment that no plant using wastewater as condenser cooling concentrates it to greater than 5 cycles of concentration (IPF at 31, Finding 81), it

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[18] She does this in spite of her own witness' testimony that operating data would be "excellent information" to incorporate into the analysis and design of the CWS. (Robinson, Tr. 1745; see discussion at page 30, supra).

suffices to note that what is important in assessing the impacts on the CWS of the circulating water is the constituents of the circulating water. It is for this reason that data accumulated at plants with circulating water high in levels of the problem constituents is applicable to PVNGS.

As to the charge that no other plant using effluent for cooling uses titanium tubes and an aluminium bronze tubesheet as does PVNGS (IPF at 31-32, Finding 82), inspection of page 2 of Staff's Exhibit 9 shows that most of the plants using effluent for cooling use admiralty as the condenser tubing material. Based on corrosion tests, the number one tube and tubesheet material is titanium, the tube material for PVNGS. (Bingham, ff. Tr. 2585, p. 13). The tubesheet material for PVNGS is aluminium bronze, which also ranks higher than admiralty. (Id.). In sum, if existing plants are being operated satisfactorily with less corrosion-resistant materials than are used at PVNGS, the conclusion follows that the combination of titanium tubes and aluminium bronze tubesheets is a proper choice. (See Staff Ex. 8).

d. Other Factors.

Intervenor alleges that Joint Applicants have failed to consider several matters which would be expected to affect the use of treated effluent in the CWS at 15 cycles of concentration. The first of these factors is that the quality of the effluent to the PVNGS site is expected to decrease. Intervenor argues that this decrease in quality

will occur as CAP water is added to the cities' raw water sources and as the cities increase their reliance on groundwater. (IPF at 36, Finding 80). Intervenor's bases for this allegation do not withstand scrutiny. CAP water is intended to displace the need for groundwater (Steiner, Tr. 752-55; Lorah, Tr. 1947), and the quality of groundwater in terms of TDS is, according to Intervenor's witness Lorah, generally poorer than CAP water. (Lorah, Tr. 1412, 1414). Therefore, as this displacement occurs, the quality of the raw water sources should actually increase. Furthermore, Mr. Lorah testified that the TDS level for groundwater in the Phoenix area varies from 500 to 1500 ppm. (Lorah, Tr. 1497). The Mohave Plant operates with makeup at a TDS level of 1500 ppm and 30 cycles of concentration, or 45,000 ppm TDS. (Bingham, Tr. 1330). This operating experience shows that even if the Multi-Cities do increase their reliance on groundwater, and the TDS level increases, that would not be a problem for PVNGS.

Intervenor also refers to the testimony of her witness Lemmon to support her argument that the quality of effluent to the PVNGS site is expected to decrease. However, Mr. Lemmon did not give such an opinion. Mr. Lemmon was concerned solely with raw sewage delivered to the 91st Avenue Plant. He suggested, without the benefit of any studies, that the TDS level in such sewage could be expected to increase. (Lemmon, Tr. 1965). Furthermore, Mr. Lemmon was

not familiar with the treatment of the sewage at the 91st Avenue Plant. (Id.). This being so, he could not possibly testify as to the quality of effluent from the 91st Avenue Plant. In any event, none of Mr. Lemmon's testimony dealt with the five problem constituents of concern to the operation of the CWS.

Intervenor's argument respecting a decrease in effluent quality is further undermined by the fact that her witness Lemmon testified that over the past several years the use of groundwater has increased from 40 percent to 50 percent of the raw water sources to the cities. (Int. Ex. XXXIII, p. 3). If greater reliance on groundwater in fact results in a deteriorating effluent quality, then one would expect to see such decrease in the effluent quality tests performed by Joint Applicants. These tests show no such trend, however. (JA Ex. U Revised, pp. WGB-8 to WGB-17B). In general, these tests show the quality to be stable as to some constituents, and to be improving as to the others.

The second factor pointed to by Intervenor is the alleged "volatile nature" of the effluent. (IPF at 37). Intervenor points to the variation in the concentration of phosphorus and an operating problem at the 23rd Avenue Plant. (Id., Findings 92-100). As to the concentration of phosphorous, the water sampling conducted by Joint Applicants during the demonstration plant studies identified the peaks in phosphate concentration on certain days. (JA Ex.

AA). It was believed such peaks were due to use of laundry detergents. Later sampling during the 1976-80 period also disclosed peaks in phosphate. (JA Ex. U Revised, pp. WGB-16, WGB-17). Nothing was noted during such tests which would suggest that the source of such peaks is anything other than laundry detergents.

As to the testimony respecting the 23rd Avenue Sewage Treatment Plant, the facts are that the problem was corrected easily enough when the cities took action and industries began to meter their waste flows. (Int. Ex. XXXIII, p. 8). More important, Joint Applicants' sources of effluent will be the 91st Avenue Plant and the Tolleson Plant; and there is no evidence in the record that either of these two plants has been forced to shut down.

The final factor discussed by Intervenor is that Joint Applicants have failed to demonstrate that the WRP can be consistently operated at up to twice the performance warranty limits. (IPF at 38, Finding 104). Intervenor's discussion of this matter is rather surprising; Joint Applicants never claimed that the WRP would be operated consistently with concentrations of the problem constituents at such levels. As Intervenor herself acknowledges, the effluent quality tests from 1973-74 showed the concentrations of the five problem constituents to be lower than the performance warranty limits. (IPF at 38, Finding 102). In fact, the same can be said for the tests conducted after the

1973-74 period. This being so, the need to operate the WRP with concentrations of the problem constituents at levels higher than the performance warranty limits will be infrequent, if at all.

Intervenor also attempts to show that Mr. Van Brunt's testimony is inconsistent with Mr. Bingham's testimony respecting operation of the WRP above the performance warranty limits. (IPF, Finding 113). Mr. Van Brunt's testimony about the need for increased water requirements if Buckeye groundwater were used at PVNGS was made with reference to the fact that such groundwater contained TDS levels on the order of 3100-3900 ppm. (Van Brunt, Tr. 2155-56). Such concentrations are from three to four, not two, times the level of TDS in the effluent from the 91st Avenue Plant. (JA Ex. U Revised, p. WGB-5). The inconsistency noted by Intervenor is a mirage.

8. RELATIONSHIP BETWEEN EFFLUENT AND SAFETY

Notwithstanding the Board's ruling at the hearing, Intervenor takes the position that the following issue was litigated:

> "Applicants have not demonstrated that they have an assured and adequate water supply to shutdown the three units safely and maintain them in a safe shutdown condition." (IPF at 2).[19]

19/ Intervenor restates her proposed contention in two substantially different forms elsewhere in her Proposed Decision. (See IPF at 39, 88).

How Intervenor could reasonably believe that the "issue" was litigated at the hearing is beyond Joint Applicants' imagination. A review of the record shows that at the time that the Board heard arguments on Intervenor's motion to add new contentions, Judge Lazo said to counsel for Joint Applicants:

> "You said on two different occasions that it [Contention No. 5] is not a safety issue and that it involves only a NEPA issue and I want to be just sure that I understand in my own mind whether or not there are any circumstances in which effluent water would get involved in let's say at a normal shut down situation--if there is a shut down, and you have to rely on the steam generator to dispose of heat, rely on your feedwater system to dump decay heat right after you shut down, do you also have to rely [to] any extent on an adequate supply [of] effluent from your reclamation plant?" (Tr. 329-30).

In response to Judge Lazo's question, counsel for Joint Applicants offered to put on a witness who could respond to such question and would be made available for cross-examination. (Tr. 330). The Board basically adopted this suggestion in deciding to expand the scope of Contention No. 5 and allowing the parties to put on their witnesses on the expanded contention. (Tr. 345-46).

The foregoing confirms the narrow issue that was litigated at the hearing with respect to safety. The issue is derived from Judge Lazo's question and, stated simply, is: "What is the relationship, if any, between the ultimate

heat sink ("UHS") and the treated effluent to be used for condenser cooling?"

The scope of the inquiry into the matter of safety did not vary during the course of the hearing. During the examination of Mr. Van Brunt on June 23, 1982, by counsel for the Intervenor in connec ion with Intervenor's Exhibit XXXV, Mr. Van Brunt testified that the source for makeup to the UHS is the regional aquifer, that there has been no requirement for any backup source for makeup, and that Joint Applicants have not taken credit for any backup source. (Van Brunt, Tr. 2109-10). Mr. Van Brunt was later questioned about the initiating event requiring use of the UHS and whether the Staff would be satisfied with Joint Applicants' June 17, 1982, response (Int. Ex. XXXV) to the Staff regarding the 26-28 day water supply in the UHS. During the course of such questioning, Judge Lazo commented that the subject of the UHS "has a tenuous relationship at best with the contention at issue in this proceeding" (Tr. 2115), and that the "matter of relying on the reservoir had been put to rest." (Tr. 2116). He later added:

> "The issue [whether Joint Applicants' response of June 17, 1982, would be satisfactory to the Staff] that you wish to proceed with at this time is simply <u>not relevent</u> to the contention that is at issue in this proceeding. It is, as I say, a very--has always had a very tenuous relationship with the contention, and I think that relationship has evaporated." (Tr. 2120).

Although the Board permitted further questioning of Mr. Van Brunt, certainly such questioning did not in any way affect the scope of Contention No. 5 as established by the Board on April 27, 1982, and confirmed by the Board on June 23, 1982.

In sum, at no time during the course of the hearing was a safety contention litigated. Accordingly, it is absurd for Intervenor to argue in her Proposed Findings that Applicants have not satisfied Regulatory Guide 1.27, Rev. 2, and have not met the requirements of GDC 2 and 442 (IPF at 45-46), and Applicants must provide two sources of water to ensure continued capability of the UHS beyond the 26 to 28-day period. (IPF at 46). Intervenor's arguments are totally irrelevant to the contention litigated in this proceeding.

Because Intervenor has failed to focus on the question which was of interest to the Board, there is no necessity to address Part C of Intervenor's Proposed Findings. However, in her attempt to raise new issues, Intervenor has made several arguments which warrant a response.

Intervenor first states that Applicants argue that the UHS assures the safe shutdown of Palo Verde under normal or accident conditions. (IPF at 40). Joint Applicants, of course, made no such argument in their Proposed Findings or during the course of the hearing because such matter was not at issue in this proceeding.

Intervenor also attempts to confuse the picture by stating that the onsite wells "will provide a continued capability to dissipate heat by the time water from the spray ponds is depleted." (IPF at 41). The inference which is drawn from Intervenor's statement is that the onsite wells are intended to substitute for the UHS after the expiration of the 26 to 28-day period. Such inference, of course, is contrary to the facts established in this proceeding. In their letter to the Staff of June 17, 1982 (Int. Ex. XXXV), Joint Applicants pointed out that the source of water for makeup to the UHS is the regional acquifer. The onsite wells are part of the delivery system used to transport the water from the regional acquifer to the UHS. This delivery system will not be used to dissipate heat after the 26 to 28-day period. (Van Brunt, Tr. 2111-12, 2136). Consequently, Intervenor's follow-up remark that the onsite wells are not "safety-grade" (IPF at 41) is simply immaterial.

With respect to her remarks that "[t]he NRC Staff has also stated that they may require a second back-up source to ensure continued capability of the spray ponds beyond the 26 to 28-day period" (IPF at 42), there is nothing in the record to suggest that the Staff has stated that they may require a second "back-up source." Mr. Van Brunt testified that the Staff "might or might not" require a back-up source of makeup water (Van Brunt, Tr. 2109), but never

referred to any statements of the Staff to such effect, and, furthermore, never mentioned the need for a second back-up source of makeup water.

Finally, Intervenor emphasizes that the Arizona Department of Water Resources ("DWR") has not yet certified the groundwater rights claimed by Joint Applicants, and leaps to the conclusion that, therefore, Joint Applicants do not have the groundwater rights needed to withdraw groundwater for makeup to the UHS. (IPF at 43).

The evidence shows that APS, as Project Manager of PVNGS, submitted applications for certificates of Type I and Type II non-irrigation grandfathered rights pursuant to the Arizona Groundwater Management Act, which became effective June 12, 1980. (Int. Ex. XXXVI). Applications for certificates of grandfathered rights were due within fifteen months of the effective date of the Act, or September 14, 1981. (A.R.S. §§45-411, -476). The certification applied for by APS could not have been granted prior to July 19, 1982, due to the statutory requirement that the registry of applications must be available for a 180-day public review and protest period. (Int. Ex. XXXVII).

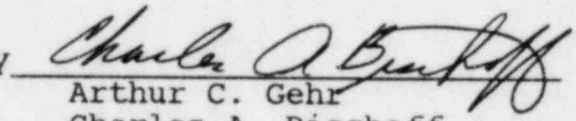
The evidence further shows that the applications were timely filed and were found by DWR to be administratively complete. (Id.). DWR has made a preliminary estimate, pursuant to its established procedures, that a minimum of 1723.7 acres at PVNGS will qualify for a Type I non-

irrigation grandfathered right. (Id.). At 3 acre-feet/acre/year, this right alone would yield 5171.1 acre-feet/year, or approximately 3,200 GPM, which is substantially in excess of the total UHS makeup requirement of 675 GPM for all three PVNGS units. (Id.; see Int. Ex. XXXV). In addition, DWR noted that a Type II right of 576 acre-feet/year can also be supported. In light of the foregoing, Intervenor's allegation respecting groundwater rights is without merit.

CONCLUSION

Based on the discussion provided in this reply, Joint Applicants submit that their Proposed Findings of July 26, 1982, should be adopted by the Board.

Respectfully Submitted,

By 

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Dated: August 30, 1982

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)	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "Joint Applicants' Reply to Intervenor Patricia Lee Hourihan's Proposed Findings of Fact and Conclusions of Law" were mailed to the following individuals, properly addressed and with postage prepaid, this 30th day of August, 1982.

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