

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, 10 NRC 775 (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-

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

Such speculation, however, does not put in question that, as shown by the 1982 MAG projections, by 2005 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 in 2005 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 for the City of Phoenix (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

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 "whether or not" any of the options is exercised. 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

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, 793). 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 allotted 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. (IPF at 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

the WRP.<sup>13/</sup> 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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<sup>13/</sup> 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 synonymous. (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. 2585, 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 complaints about the demonstration reclamation plant,<sup>14/</sup> 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 achieve 15 cycles of concentration . . . ." (IPF, Finding 73). (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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<sup>14/</sup> Her own witness Robinson testified that he had no "complaints" about the operation of the water reclamation test facility. (Robinson, Tr. 1612-13).

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).<sup>15/</sup>

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 an analysis and design." (Robinson, Tr. 1747). As to variations in flow rates and volumetric flows<sup>16/</sup> 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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<sup>15/</sup> 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.

<sup>16/</sup> According to Mr. Robinson, he used these two terms to mean the same thing. (Robinson, Tr. 1616).

(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.<sup>18/</sup> 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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<sup>18/</sup> 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. 1747; see discussion at page 30, supra).

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 92). 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. 1497), 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

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).<sup>19/</sup>

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<sup>19/</sup> Intervenor restates her proposed contention in two substantially different forms elsewhere in her Proposed Decision. (See IPF at 39, Finding 122).

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 feed-water 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) (Emphasis added).

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 connection 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 not relevant 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) (Emphasis added).

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

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CERTIFICATE OF SERVICE

I hereby certify that copies of "Notice of Corrections to Joint Applicants' Reply to Intervenor Patricia Lee Hourihan's Proposed Findings of Fact and Conclusions of Law" have been served upon the following listed persons by deposit in the United States mail, properly addressed and with postage prepaid, this 5th day of October, 1982.

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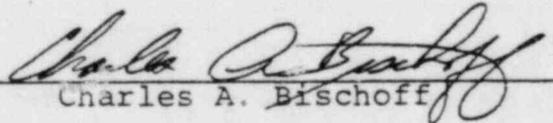
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