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AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards preliminary response to NRC 810417 Questions 291.26 -291.30,320.7 & 320.8.Areas addressed include power exchanges,sys capacity,consequences of delay,geography & demography & biocide wastes.

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ARIZONA PUBLIC SERVICE COMPANY
P. O. BOX 21666 · PHOENIX, ARIZONA 85036

May 29, 1981
ANPP-18098-JMA/JRM

RECEIVED
JUN 05 1981
U.S. NUCLEAR REGULATORY COMMISSION

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528/529/530
File: 81-056-026; D.29.01

Reference: (1) Letter dated April 17, 1981 from Robert L. Tedesco, Assistant Director for Licensing, Division of Licensing, USNRC, to E. E. Van Brunt, Jr., Vice President, Nuclear Projects, Arizona Public Service Company

Dear Sir:

Attached, are the responses to Questions 291.26 through 291.30, and 320.7, 320.8 contained in the enclosure to referenced letter.

The next supplement to the ER-OL will incorporate the revised and new pages contained in the attachment.

Please call if further clarification of these items is necessary of if we can provide any assistance in the expeditious processing of our application.

Very truly yours,

E. E. Van Brunt

E. E. Van Brunt, Jr.
APS Vice President
Nuclear Projects
ANPP Project Director

EEVBJr/JRM:skc

Attachment

cc: J. Kerrigan (w/attachment)
R. Tedesco (w/attachment)
V. Harris (w/attachment) (Argonne National Labs)

B001
S
1/1

8106080240

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, E. E. Van Brunt, Jr., represent that I am Vice President, Nuclear Projects of Arizona Public Service Company, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority so to do, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Edwin E. Van Brunt, Jr.

E. E. Van Brunt, Jr.

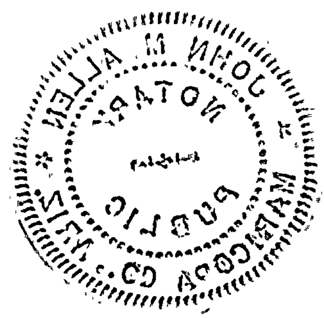
Sworn to before me this 29 day of MAY, 1981.

John Mallen

Notary Public

My Commission Expires:

Jan 23, 1983



units such as PVNGS. The participants will continue seeking means to promote effectively prudent electric energy management practices.

1.1.1.3 Power Exchanges

Past and expected future net power sales and purchases outside the participants' combined system, which are applicable at the time of annual peak demand, are presented in table 1.1-1. Both firm sales and purchases and nonfirm sales and purchases are tabulated; they contribute respectively to load and generation totals. Firm purchases are not included in the resources requiring reserves as the reserves are provided by the seller. Reserve for firm sales is provided on the participants' combined system.

On a load and resource tabulation, firm sales appear as load additions. Firm purchases appear as reductions in load.

A nonfirm sale is a sale of power if that power is available. The delivery of power is contingent on the operation of the stipulated source. The buyer must provide the reserves to back up a nonfirm purchase. 2

On a load and resource tabulation nonfirm sales and purchases are treated as resources. A nonfirm sale of power reduces the capacity of the machine the sale is made from and the resources total is reduced by the amount of the sale. A nonfirm purchase is added to the resources total.

Table 1.1-1, Loads and Resources Summary, tabulates firm sales, firm purchases, nonfirm sales and nonfirm purchases. Table 1.1-2, Load and Energy Requirements by Month, tabulates loads but not resources. It includes firm sales and firm purchases. Table 1.1-3 is a loads and resources summary. It includes firm sales, firm purchases, nonfirm sales and nonfirm purchases. Table 1.1-4 is a monthly loads summary and includes firm sales

and firm purchases. Table 1.1-8, Capability of Resources,
2 tabulates resources but not loads. It includes nonfirm sales
and nonfirm purchases.

1.1.2 SYSTEM CAPACITY

System capabilities for each of the participants at the time of the annual peak demand for 1968 through 1988 are presented in table 1.1-8 along with a combined resources summary for all
1 participants. Representative capacity factors are provided in table 1.1-8A. These resource schedules are the result of generation planning that makes use of the load forecasting discussed in section 1.1.1.2.

Each participant is responsible for determining its own criteria for bulk generation planning, including the methodology for load forecasting. The Reliability Council of the WSCC recently issued guidelines for the measurement of the adequacy of power supply, including as an alternative a reliability test that uses a loss-of-load probability (LOLP) criterion of one day of outage in 10 years.

Table 1.1-9 contains information showing the existing generation capability as of January 1, 1978, for the Arizona-New Mexico Power Area and the Southern California-Nevada Power Area, respectively, as defined in WSCC. Table 1.1-10 is a summary of generation additions for these two power areas. Table 1.1-11
3 provides a comparison of participants generating capacity, load, and energy generation for the period 1981-1990.

Table 1.1-11
Title (**) (Sheet 1 of 6)
ARIZONA PUBLIC SERVICE

Year	Total Resources Minus Firm Purchases (MW)	Total Projected Load Minus Firm Purchases (MW)	Inter-ruptible Load (MW)	Energy Generation (GWH)
1981	3412	2715	-	12656
1982	3311	2860	-	13754
1983	3573	2962	4	14304
1984	3808	3068	6	14985
1985	3816	3182	13	15670
1986	3923	3319	17	16087
1987	4163	3474	17	17331
1988	4368	3676	27	18601
1989	4610	3847	30	19511
1990	4850	4011	30	20541

3

** To be supplied

Table 1.1-11

Title (**) (Sheet 2 of 6)

LOS ANGELES DEPARTMENT OF WATER AND POWER

Year	Generating Capacity (MW)	Peak Demand (MW)	Energy Generation (GWH)
1981	5684	4220	14317
1982	5684	4351	14932
1983	5971	4223	16068
1984	5974	4292	16486
1985	6051	4382	16488
1986	6019	4453	16576
1987	6231	4536	16811
1988	6485	4636	17148
1989	6632	4737	17383
1990	6988	4862	17723

** To be supplied

PRELIMINARY

Table 1.1-11.
Title (**) (Sheet 3 of 6)
EL PASO ELECTRIC

Year	Generating Capacity (MW)	Peak Demand (MW)	Energy Generation (GWH)
1981	895	742	4139
1982	920	776	4217
1983	1095	809	4346
1984	1289	847	4566
1985	1283	892	4804
1986	1477	936	5053
1987	1502	983	5313
1988	1502	1030	5591
1989	1484	1085	5884
1990	1468	1141	6191

3

** To be supplied

Table 1.1-11
Title (**) (Sheet 4 of 6)
PUBLIC SERVICE OF NEW MEXICO

Year	Generating Capacity (MW)	Peak Demand (MW)	Energy Generation (GWH)
1981	1235	997	6563
1982	1273	1061	8015
1983	1342	1086	9126
1984	1331	1109	9961
1985	1465	1187	10127
1986	1560	1257	10295
1987	1665	1344	10424
1988	1785	1441	10362
1989	1855	1518	10240
1990	2068	1599	10475

3

** To be supplied

Table 1.1-11
Title (**) (Sheet 5 of 6)
SALT RIVER PROJECT

Year	Generating Capacity (MW)	Peak Demand (MW)	Energy Generation (GWH)
1981	3300	2263	10368
1982	3221	2360	11579
1983	3576	2462	12510
1984	3932	2605	13243
1985	3869	2703	13572
1986	4179	2822	13782
1987	4179	2905	14080
1988	4179	3015	14399
1989	4179	3121	14744
1990	4179	3225	15193

3

** To be supplied

Table 1.1-11
Title (**) (Sheet 6 of 6)
SOUTHERN CALIFORNIA EDISON

Year	Generating Capacity (MW)	Peak Demand (MW)	Energy Generation (GWH)
1981	15471	13274	62970
1982	16184	13647	64300
1983	17446	13895	66980
1984	17837	14305	68590
1985	17535	14735	70380
1986	17889	15185	72210
1987	18491	15635	74290
1988	18941	16125	76440
1989	19582	16599	78720
1990	20232	17129	81110

3

** To be supplied

PRELIMINARY

CONSEQUENCES OF DELAY

The participants generally rely on a high percentage of resources that are remote from their load areas, with power carried to the load areas over EHV transmission systems. There is a limited number of interconnections between the participants' service areas and surrounding systems. Even assuming that the large amounts of power that may be needed are available for purchase, the limited number of interconnections and high use of the EHV tranmission system will make it difficult for those large amounts of power to be transmitted to the participants' service areas.

Delays in the construction of PVNGS generating facilities will have the following adverse effects on systems planning and operation.

A. Longer Lead Times - Consistent delays in construction lengthen the lead time required for generation planning. This reduces the flexibility and adaptability of incorporating new technology or changes in load forecasts into the planning process.

B. Decreased System Reliability - Delays will result in lower reserve margins that decrease system reliability and thereby cause more frequent service interruptions.

C. Additional Costs - The delay of a generating facility may require the temporary substitution of a more costly alternative with the possibility of a greater environmental impact. Delays also result in additional costs for interest during construction of the planned facility. The impact of delay on production costs is shown in table 1.3-8. The assumptions regarding heat rate, fuel cost, O&M costs, and discount rates are presented in table 1.3-9. 2

Table 1.3-1
1981
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 1 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	697	697	697	697	697
LADWP	1464	1464	1464	1464	1464
El Paso Electric	153	153	153	153	153
Public Service of New Mexico	238	238	238	238	238
Salt River Project	1037	1037	1037	1037	1037
Southern California Edison	2197	2197	2197	2197	2197
Participants Total	5786	5786	5786	5786	5786

Table 1.3-1
1982
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 2 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay	
Arizona Public Service	451	451	451	451	451	2
LADWP	1333	1333	1333	1333	1333	3
El Paso Electric	144	144	144	144	144	
Public Service of New Mexico	212	212	212	212	212	2
Salt River Project	861	861	861	861	861	
Southern California Edison	2537	2537	2537	2537	2537	
Participants Total	5538	5538	5538	5538	5538	3

PRELIMINARY

Table 1.3-1
1983
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 3 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	611	495	495	495	495
LADWP	1748	1748	1748	1748	1748
El Paso Electric	286	86	86	86	86
Public Service of New Mexico	256	126	126	126	126
Salt River Project	1114	758	758	758	758
Southern California Edison	3551	3364	3364	3364	3364
Participants Total	7566	6577	6577	6577	6577

2
3
2
3

Table 1.3-1

1984

RESERVE MARGIN DUE TO DELAY OF PVNGS

(MW) (Sheet 4 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	740	384	268	268	268
LADWP	1682	1682	1682	1682	1682
El Paso Electric	442	242	42	42	42
Public Service of New Mexico	222	92	0	0	
Salt River Project	1327	971	615	615	615
Southern California Edison	3532	3345	3158	3158	3158
Participants Total	7945	6716	5765	5765	5765

PRELIMINARY

Table 1.3-1
1985
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 5 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	634	634	278	162	162
LADWP	1669	1669	1669	1669	1669
El Paso Electric	391	391	191	(9)	(9)
Public Service of New Mexico	278	278	148	18	18
Salt River Project	1166	1166	810	454	454
Southern California Edison	2800	2800	2613	2426	2426
Participants Total	6938	6938	5709	4720	4720

PRELIMINARY

Table 1.3-1
1986
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 6 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	604	248	248	(108)	(224)
LADWP	1566	1566	1566	1566	1566
El Paso Electric	541	341	341	141	(59)
Public Service of New Mexico	303	173	173	43	0
Salt River Project	1357	1001	1001	645	289
Southern California Edison	2704	2517	2517	2330	2142
Participants Total	7075	5846	5846	4617	3714

Table 1.3-1
1987
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 7 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	689	689	333	333	(379)
LADWP	1695	1695	1695	1695	1695
El Paso Electric	519	519	319	319	(81)
Public Service of New Mexico	321	321	191	191	0
Salt River Project	1274	1274	918	918	206
Southern California Edison	2856	2856	2669	2669	2294
Participants Total	7354	7354	6125	6125	3735

Table 1.3-1
1988
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 8 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	692	692	692	336	(376)
LADWP	1849	1849	1849	1849	1849
El Paso Electric	472	472	472	272	(128)
Public Service of New Mexico	344	344	344	214	0
Salt River Project	1164	1164	1164	808	96
Southern California Edison	2816	2816	2816	2629	2254
Participants Total	7337	7337	6865	6108	3695

Table 1.3-1
1989
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 9 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	763	763	763	763	(305)
LADWP	1895	1895	1895	1895	1895
El Paso Electric	399	399	399	399	(201)
Public Service of New Mexico	337	337	337	337	0
Salt River Project	1058	1058	1058	1058	(10)
Southern California Edison	2983	2983	2983	2983	2421
Participants Total	7435	7435	7435	7435	3800

PRELIMINARY

Table 1.3-1
1990
RESERVE MARGIN DUE TO DELAY OF PVNGS
(MW) (Sheet 10 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	839	839	839	839	(229)
LADWP	2126	2126	2126	2126	2126
El Paso Electric	327	327	327	327	(273)
Public Service of New Mexico	469	469	469	469	79
Salt River Project	954	954	954	954	(114)
Southern California Edison	3103	3103	3103	3103	2541
Participants Total	7818	7818	7818	7818	4130

Table 1.3-2
1981
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 1 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	25.7	25.7	25.7	25.7	25.7
LADWP	34.7	34.7	34.7	34.7	34.7
El Paso Electric	20.6	20.6	20.6	20.6	20.6
Public Service of New Mexico	23.9	23.9	23.9	23.9	23.9
Salt River Project	45.8	45.8	45.8	45.8	45.8
Southern California Edison	16.6	16.6	16.6	16.6	16.6
Participants Average	27.9	27.9	27.9	27.9	27.9

PRELIMINARY

Table 1.3-2
1982
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 2 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	15.8	15.8	15.8	15.8	15.8
LADWP	30.6	30.6	30.6	30.6	30.6
El Paso Electric	18.6	18.6	18.6	18.6	18.6
Public Service of New Mexico	20.0	20.0	20.0	20.0	20.0
Salt River Project	36.5	36.5	36.5	36.5	36.5
Southern California Edison	18.6	18.6	18.6	18.6	18.6
Participants Average	23.4	23.4	23.4	23.4	23.4

Table 1.3-2
1983
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 3 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	20.7	16.7	16.7	16.7	16.7
LADWP	41.4	41.4	41.4	41.4	41.4
El Paso Electric	35.4	10.6	10.6	10.6	10.6
Public Service of New Mexico	23.6	11.6	11.6	11.6	11.6
Salt River Project	45.2	30.8	30.8	30.8	30.8
Southern California Edison	25.6	24.2	24.2	24.2	24.2
Participants Average	32.0	22.6	22.6	22.6	22.6

PRELIMINARY

Table 1.3-2
1984
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 4 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	24.2	12.5	8.8	8.8	8.8
LADWP	39.2	39.2	39.2	39.2	39.2
El Paso Electric	52.2	28.6	5.0	5.0	5.0
Public Service of New Mexico	20.0	8.3	0	0	0
Salt River Project	50.9	37.3	23.6	23.6	23.6
Southern California Edison	24.7	23.4	22.1	22.1	22.1
Participants Average	35.2	24.9	16.5	16.5	16.5

Table 1.3-2

1985

RESERVE MARGIN DUE TO DELAY OF PVNGS

(% OF PEAK) (Sheet 5 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	20.0	20.0	8.8	5.1	5.1
LADWP	38.1	38.1	38.1	38.1	38.1
El Paso Electric	43.8	43.8	21.4	(1.0)	(1.0)
Public Service of New Mexico	23.4	23.4	12.5	1.5	1.5
Salt River Project	43.1	43.1	30.0	16.8	16.8
Southern California Edison	19.0	19.0	17.7	16.5	16.5
Participants Average	31.2	31.2	21.4	12.8	12.8

PRELIMINARY

Table 1.3-2
1986
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 6 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	18.3	7.5	7.5	(3.3)	(6.8)
LADWP	35.2	35.2	35.2	35.2	35.2
El Paso Electric	57.8	36.4	36.4	15.1	(6.3)
Public Service of New Mexico	24.1	13.8	18.8	3.4	0
Salt River Project	48.1	35.5	35.5	22.9	10.2
Southern California Edison	17.8	16.6	16.6	15.3	14.1
Participants Average	33.6	24.2	25.0	14.8	9.0

Table 1.3-2
1987
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 7 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	19.9	19.9	9.6	9.6	(11.0)
LADWP	37.4	37.4	37.4	37.4	37.4
El Paso Electric	52.8	52.8	32.5	32.5	(8.2)
Public Service of New Mexico	23.9	23.9	14.2	14.9	0
Salt River Project	43.9	43.9	31.6	31.6	7.1
Southern California Edison	18.3	18.3	17.1	17.1	14.7
Participants Average	32.7	32.7	23.7	23.8	6.7

Table 1.3-2
1988
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 8 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	19.0	19.0	19.0	9.2	(10.3)
LADWP	39.9	39.9	39.9	39.9	39.9
El Paso Electric	45.8	45.8	45.8	26.4	(12.4)
Public Service of New Mexico	23.9	23.9	23.9	14.9	0
Salt River Project	38.6	38.6	38.6	26.8	3.2
Southern California Edison	17.5	17.5	17.5	16.3	14.0
Participants Average	30.7	30.7	30.7	22.2	5.7

PRELIMINARY

Table 1.3-2
1989
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 9 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	20.0	20.0	20.0	20.0	(8.0)
LADWP	40.0	40.0	40.0	40.0	40.0
El Paso Electric	36.8	36.8	36.8	36.8	(18.5)
Public Service of New Mexico	22.2	22.2	22.2	22.2	0
Salt River Project	33.9	33.9	33.9	33.9	(0.3)
Southern California Edison	18.0	18.0	18.0	18.0	14.6
Participants Average	28.5	28.5	28.4	28.4	4.6

Table 1.3-2
1990
RESERVE MARGIN DUE TO DELAY OF PVNGS
(% OF PEAK) (Sheet 10 of 10)

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Arizona Public Service	21.1	21.1	21.1	21.1	(5.8)
LADWP	43.7	43.7	43.7	43.7	43.7
El Paso Electric	28.7	28.7	28.7	28.7	(23.9)
Public Service of New Mexico	29.3	29.3	29.3	29.3	4.9
Salt River Project	29.6	29.6	29.6	29.6	(3.5)
Southern California Edison	18.1	18.1	18.1	18.1	14.8
Participants Average	28.4	28.4	28.4	28.4	5.0

2
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PRELIMINARY

Table 1.3-3

EFFECT OF DELAY ON PARTICIPANT'S SYSTEM RELIABILITY

(Sheet 1 of 5)

ARIZONA PUBLIC SERVICE

RELIABILITY INDEX (ONE DAY IN _ YEARS)

Year	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
1981	29.52	29.52	29.52	29.52	29.52
1982	5.62	5.62	5.62	5.62	5.62
1983	40.99	3.09	3.09	3.09	3.09
1984	47.66	3.67	0.18	0.18	0.18
1985	15.43	10.07	0.45	0.08	0.08
1986	6.86	0.66	0.47	0.06	0.01
1987	4.61	3.43	0.48	0.23	0.01
1988	5.64	4.23	3.16	0.42	0.01
1989	6.92	6.28	4.75	3.59	0.01
1990	6.90	6.90	6.31	4.82	0.01

Table 1.3-5

EFFECT OF DELAY ON PARTICIPANT'S GAS CONSUMPTION
(Sheet 4 of 7)
PUBLIC SERVICE OF NEW MEXICO

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Year	10^9 CF	10^9 CF	10^9 CF	10^9 CF	10^9 CF
1981	10.328	10.328	10.328	10.328	10.328
1982	10.667	10.667	10.667	10.667	10.667
1983	8.370	11.181	11.181	11.181	11.181
1984	8.568	10.890	12.637	12.637	12.637
1985	8.949	9.659	11.760	13.750	13.750
1986	6.931	10.055	10.712	12.635	13.462
1987	6.637	6.835	9.448	9.976	12.463
1988	5.762	6.173	6.445	8.937	12.362
1989	5.677	5.517	5.951	6.183	11.523
1990	4.428	4.881	4.584	4.914	11.685
Total	76.317	86.186	93.713	101.208	120.058
Year	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU
1981	10.829	10.829	10.829	10.829	10.829
1982	11.186	11.186	11.186	11.186	11.186
1983	8.774	11.702	11.702	11.702	11.702
1984	8.979	11.397	13.220	13.220	13.220
1985	9.392	10.125	12.317	14.384	14.384
1986	7.273	10.538	11.223	13.218	14.086
1987	6.973	7.175	9.894	10.446	13.036
1988	6.053	6.483	6.858	9.359	12.931
1989	5.970	5.794	6.251	6.486	12.041
1990	6.661	5.133	4.819	5.173	12.225
Total	82.090	90.662	98.299	106.003	125.640

5-14-81

PRELIMINARY

Table 1.3-5

EFFECT OF DELAY ON PARTICIPANT'S GAS CONSUMPTION
(Sheet 5 of 7)
SALT RIVER PROJECT

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Year	10^9 CF	10^9 CF	10^9 CF	10^9 CF	10^9 CF
1981	5.222	5.217	5.217	5.217	5.194
1982	7.405	7.305	7.304	7.304	7.256
1983	6.032	9.366	9.373	9.372	9.263
1984	4.743	8.148	10.855	10.860	10.861
1985	5.022	5.243	9.076	10.275	10.395
1986	4.880	5.991	6.160	7.076	7.074
1987	3.436	3.609	4.209	4.326	4.331
1988	1.655	1.655	1.656	1.655	1.659
1989	.086	.087	.086	.085	.086
1990	.001	.001	.001	.001	.001
Total	38.482	46.622	53.937	56.171	56.120
Year	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU
1981	5.744	5.739	5.739	5.739	5.713
1982	8.146	8.036	8.034	8.034	7.982
1983	6.635	10.303	10.310	10.309	10.189
1984	5.217	8.963	11.941	11.946	11.947
1985	5.524	5.767	9.984	11.303	11.435
1986	5.368	6.590	6.776	7.784	7.781
1987	3.780	3.970	4.630	4.759	4.764
1988	1.821	1.821	1.822	1.821	1.825
1989	.095	.096	.095	.094	.095
1990	.001	.001	.001	.001	.001
Total	42.330	51.284	59.331	61.788	61.732

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Table 1.3-6

EFFECT OF DELAY ON PARTICIPANT'S COAL CONSUMPTION
(Sheet 3 of 7)
EL PASO ELECTRIC

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Year	1000 Tons	1000 Tons	1000 Tons	1000 Tons	1000 Tons
1981	283	283	283	283	283
1982	303	303	303	303	303
1983	313	313	313	313	313
1984	217	278	311	311	311
1985	176	200	268	303	303
1986	153	192	216	272	301
1987	155	174	223	246	318
1988	155	165	195	244	319
1989	166	163	167	179	303
1990	300	285	293	303	523
Total	2221	2356	2572	2757	3277
Year	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU
1981	4.929	4.929	4.929	4.929	4.929
1982	5.245	5.245	5.245	5.245	5.245
1983	5.416	5.416	5.416	5.416	5.416
1984	3.785	4.865	5.400	5.400	5.400
1985	3.085	3.501	4.666	5.228	5.228
1986	2.650	3.377	3.734	4.748	5.205
1987	2.681	3.015	3.931	4.248	5.525
1988	2.716	2.885	3.381	4.300	5.557
1989	2.891	2.803	2.914	3.120	5.273
1990	5.132	4.916	5.017	5.227	8.925
Total	38.530	40.952	44.333	47.861	56.703

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PRELIMINARY

Table 1.3-6

EFFECT OF DELAY ON PARTICIPANT'S COAL CONSUMPTION
(Sheet 4 of 7)
PUBLIC SERVICE OF NEW MEXICO

	No Delay	1 Year Delay	2 Year Delay	3 Year Delay	Indefinite Delay
Year	1000 Tons	1000 Tons	1000 Tons	1000 Tons	1000 Tons
1981	3139	3139	3139	3139	3139
1982	3866	3866	3866	3866	3866
1983	4166	4233	4233	4233	4233
1984	4192	4276	4297	4297	4297
1985	4111	4135	4203	4223	4223
1986	3976	4114	4137	4170	4176
1987	3981	4014	4140	4153	4215
1988	3969	3973	4014	4160	4270
1989	3796	3742	3733	3788	4052
1990	3768	3752	3736	3796	4056
Total	38964	39244	39498	39825	40527
Year	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU	10^{12} BTU
1981	55.857	55.857	55.857	55.857	55.857
1982	68.959	68.459	68.959	68.959	68.959
1983	74.499	75.711	75.711	75.711	75.711
1984	76.889	78.405	78.769	78.769	78.769
1985	76.664	77.096	78.332	78.665	78.665
1986	76.302	76.862	77.299	77.949	78.089
1987	74.325	75.033	77.324	77.601	78.761
1988	74.067	74.176	75.017	77.645	79.835
1989	73.499	72.452	72.299	73.320	78.554
1990	72.819	72.503	72.248	73.427	78.535
Total	723.880	726.554	662.225	737.903	751.735

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QUESTION 1A.8 (NRC No. 320.7) 1.3

Explain the inconsistencies in reserve margins (Table 1.3-1 and 1.3-2), i.e., the reserve capacity and percent margin should correspond to the same peak demand for a given year.

RESPONSE: Tables 1.3-1 and 1.3-2 have been revised. As revised, inconsistencies do not exist.

QUESTION 1A.9 (NRC No. 320.7) 1.3 3

Provide updated annual information (values incorporated in production cost run) on system generating capacity at time of expected peak demand, on adjusted peak demand, and on energy generation for each participant's system for 1981-1990.

RESPONSE: The response is provided in the revised section 1.1 and table 1.1-11.

The types of establishments that exist include a combination grocery store-gas station and two cafes and bars.

2.1.3.1.3 Special Land Use

Within a 5-mile radius of PVNGS, there are two parcels zoned by the Maricopa County Planning Department for special use as a mobile home park and a travel trailer park, respectively.[9] Both are located near the intersection of Wintersburg and Buckeye-Salome Roads.

One parcel, located east of the Wintersburg and Buckeye-Salome Roads intersection has been given a special use permit for a mobile home park valid for 25 years, beginning in 1975.[12] The owner of the property has indicated that he intends to initiate development.[13]

The other parcel, located on the northwestern corner of the same intersection has been given a special use permit for travel trailer park valid for 3 years beginning March 27, 1978.[12] The representative of the property owner has indicated that he intends to develop the parcel.[14]

2.1.3.1.4 Institutional Land Use

There are no public facilities or institutional land uses within a 5-mile radius of the plant site.

2.1.3.1.5 Agricultural Land Use

Agricultural land uses are discussed in section 2.1.3.4.

2.1.3.1.6 Transportation Land Use

2.1.3.1.6.1 Roads. Figure 3.1-3 illustrates the road system within a 5-mile radius of the plant site. It is essentially a rectangular grid oriented on north-south and east-west axes, following township and sectional lines. The plant site is bounded on two sides by Wintersburg Road and Ward (Elliot) Road. At its closest point, Buckeye-Salome Road is located 2 miles north-northeast of Unit 2. Table 2.1-4 lists Average Daily Traffic (ADT) counted within a 5-mile radius of the PVNGS plant site during a June, 1978 traffic survey.[15] These counts are well below design levels.[16]

Based on a traffic volume survey[35] made by the Maricopa
2 County Highway Department, the average 1980, 24-hour weekday
traffic in the vicinity of the plant site is:

3 355th Avenue

- Between Broadway Road and Salome Highway: 79
- Between I-10 and Van Buren: 75

Elliot (Ward) Road

- West of Wintersburg Rd (383 Ave.): 90
- East of Wintersburg Rd (383 Ave.): 402

339th Avenue

- Between Broadway Road and Salome Highway: 100
- 2 Between I-10 and Van Buren: 150

Van Buren Street

- East of 379 Avenue: 100

Wintersburg Road heading south from the site.

- No counts have been made on Wintersburg Road heading south from the site. However the sum of the counts, east and west of Wintersburg on Elliot Road can provide an approximate estimate. This sum is 492.

following items will be sent under separate cover in fulfillment of this request:

Zoning Information

1. Maricopa County, Unincorporated Area, Zoning District Maps, various dates.
2. City of Phoenix Zoning Maps, various dates.
3. Pinal County Zoning Map, including Hidden Valley area inset, May 13, 1968.
4. Yuma County Zoning Maps (Area No. 4).

Current and Future Land Use Plans 2

1. Maricopa Association of Governments, Transportation and Planning Office: Guide for Regional Development and Transportation, July 23, 1980.
2. Maricopa County Planning and Zoning Department, Westcentral Maricopa County, Arizona Plan, October 1971.
3. City of Phoenix, Arizona, Phoenix Concept Plan 2000: A Program for Planning.
4. City of Phoenix, Arizona, Interim 1985 Plan.
5. Northern Arizona Council of Governments, "Regional Comprehensive Plan" and "Existing Population/Land Use" (Yavapai County). 3

QUESTION 2A.8 (NRC No. 310.5) 2.1.2

Explain the method by which the 5-50 mile radius population figures in Section 2.1.2.1 were calculated. 2

RESPONSE: The 5-50 mile radius population figures were calculated in the same manner as the 5-10 mile radius population figures, as noted in sections 2.1.2.1 and 2.1.2.2.

QUESTION 2A.9 (NRC No. 310.6) 2.1.3

In addition to traffic counts provided in the OL-ER Table 2.1-4, please provide traffic counts on the following roads:

355th Avenue
Elliot (Ward) Road
339th Avenue
Van Buren Street
Wintersburg road heading south from the site, and
U.S. Highway approaches (I-10).

Identify any places where traffic congestion or problems of interference with patterns of local and pedestrian traffic might be anticipated.

RESPONSE: The response is provided in the revised
2 section 2.1.3.1.6.

QUESTION 2A.10 (NRC No. 311.1) 2.1

A number of discrepancies between information supplied in the PSAR vs. the FSAR have been noted regarding information concerning the site vicinity. Examples of such discrepancies are as follows:

(a) The CP lists the PVNGS site as being 15 miles west of Buckeye and 36 miles west of Phoenix, whereas the FSAR lists these distances as 16 and 34 miles, respectively.

(b) The PSAR lists the elevation of the northern site boundary as 975 feet MSL, whereas the FSAR indicates 1030 feet MSL.

(c) There are some differences between the PSAR and FSAR in the distances and even some directions of the towns and communities listed.

3.6 CHEMICAL AND BIOCIDE WASTES

Information presented in ER-CP Section 3.6 and the FES has been updated. As part of this update, detailed parameters such as flowrates, chemical consumption and operational frequencies are presented.

3.6.1 PREOPERATIONAL AND PERIODIC CLEANING WASTES

Prior to the initial startup of each unit, the feedwater system from the condensers to the containment isolation valves (approximately 450,000 gal) will be flushed and chemically cleaned to remove dirt, grease, oil, rust, and mill scale. This will be accomplished by the following operations:

A. Dirt and construction debris, estimated at 7470 lb, will be removed by flushing the piping with a high velocity water flush of approximately two system volumes of demineralized water.

B. Chemical cleaning is not expected to be required. Should it become necessary, however, the following steps would be performed:

   1. Grease, oil, and dirt, estimated at 3735 lb, will be removed by flushing each system with approximately 450,000 gallons of an alkaline phosphate solution of approximately 1% concentration. This will be followed with a rinse of approximately two system volumes of demineralized water.

   2. Rust and mill scale will be removed from each system by circulating a 3% organic acid (2% hydroxyacetic, 1% formic) solution containing a 0.2% acid inhibitor, such as Dow Chemical Co. A-145, for several hours. This will be followed with a rinse of approximately two system volumes of demineralized water containing an estimated 5600 lb of citric acid. An estimated 33,615 lb of iron will be removed.

c. The system may be passivated by filling with demineralized water containing 200-400 ppm hydrazine and 0-60 ppm ammonia, to a pH of 9.0-10.0.

Estimated total water volume used in a complete cleaning would be approximately 4,050,000 gallons.

Wastes from this cleaning process will be directed to the onsite evaporation ponds. Periodic, non-radioactive operational equipment cleaning wastes will be discharged to the evaporation ponds.

3.6.2 NONRADIOACTIVE OPERATIONAL WASTES

The plant is designed to have no requirement for offsite disposal of any chemical or liquid wastes. Operational nonradioactive liquid wastes are collected and discharged to the onsite evaporation ponds.

During normal operation of the plant, nonradioactive wastes come from the following sources:

- Water reclamation plant
- Circulating water system
- Demineralized water system
- Domestic water system
- Condensate polishing demineralizer system
- 3 Floor drains

Figure 3.3-1 diagrams all plant water and wastewater flows and includes a tabulation of the respective flow rates at various operating conditions. Table 3.6-1 includes a summary of the expected maximum and average concentrations of dissolved solids in the plant influent water from the City of Phoenix 91st Avenue Sewage Treatment Plant and the onsite wells. The

Table 3.6-1

ESTIMATED MAXIMUM AND AVERAGE CONCENTRATION OF CHEMICALS IN THE INFLUENT AND PROCESS WATER SYSTEMS (mg/l) (Sheet 1 of 3) 2

Chemical	Influent Streams				Process Streams		
	Influent from Phoenix 91st Avenue Sewage Treatment Plant		Influent from Onsite Wells		Water Reclamation Plant Effluent	Circulating Water System (Cooling Tower Blowdown and Drift)	
	Maximum	Average	Maximum	Average	Average	Maximum (20 cycles)	Average (15 cycles)
Calcium	67.2	52.9	16.0	14.0	28.0	560.0	420.0
Magnesium	29.6	22.9	8.0	4.6	10.0	200.0	150.0
Sodium	192	186	269.0	225.0	225.0	4,500.0	3,375.0
Chloride	270	253	290.0	232.0	160.0	3,200.0	2,400.0
Sulfate	95.0	91.0	131.0	103.0	150.0	3,000.0	2,250.0
Nitrate	4.20	1.85	12.0	6.5	110.0	2,200.0	1,650.0
Silica	32.0	28.8	55.0	45.0	10.0	200.0	150.0
Phosphate	68.9	22.1	0.1	0.1	<0.1	2.0	1.5
Fluoride	4.8	3.5	10.0	6.2	--	70.0	52.5
Potassium	14.7	13.8	2.0	1.1	--	276.0	207.0
Copper	0.26	0.017	0.1	0.02	0.013	0.4	0.3
Zinc	0.080	0.067	--	--	0.05	1.3	1.0

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PRELIMINARY

Table 3.6-1

ESTIMATED MAXIMUM AND AVERAGE CONCENTRATION OF CHEMICALS IN THE INFLUENT AND PROCESS WATER SYSTEMS (mg/l) (Sheet 2 of 3)

	Influent Streams				Process Stream		
	Influent from Phoenix 91st Avenue Sewage Treatment Plant		Influent from Onsite Wells		Water Reclamation Plant Effluent	Circulating Water System (Cooling Tower Blowdown and Drift)	
Chemical	Maximum	Average	Maximum	Average	Average	Maximum (20 cycles)	Average (15 cycles)
Iron	0.15	0.035	0.1	0.8	0.005	0.1	0.075
Arsenic	0.02	0.007	0.02	0.01	0.008	0.16	0.12
Boron	0.09	0.037	7.0	3.2	--	0.74	0.56
Ammonia-N	45.4	30.9	0.3	0.08	5.0	100.0	75.0
Phenol	0.018	0.009	0.01	0.009	--	0.18	0.14
Dissolved Oxygen	3.0	2.0	--	--	4.5	4.5	4.5
Suspended Solids	68	35.7	--	--	10.0	200.0	150.0
COD	187.7	87	14.0	6.0	--	1740.0	1305.0
Alkalinity	285	272	230.0	143.0	100.0	2000.0	1500.0
TDS	1,083	1,039	886.0	740.0	800.0	16,000.0	12,000.0
Silver	0.02	<0.006	--	--	0.003	0.06	0.05

3.6.2.4 Demineralized Water System

The demineralized water system consists of three mixed bed ion exchangers, two normally operating in series and one on standby. Water is supplied to the demineralized water system from the reverse osmosis units in the domestic water system. A schematic flow diagram of the demineralized water system is shown as figure 3.6-4.

The reverse osmosis product water is next passed through a degasifier, then is pumped through two mixed ion exchangers in series to remove dissolved solids to produce demineralized water.

Periodically, the resins become depleted and the ion exchangers must be regenerated. The regeneration cycle consists of a backwash to remove particulate matter, and to loosen and separate the resins, regeneration with an acid or caustic solution as appropriate, and a rinse to remove the spent regenerant. The backwash, spent regenerant, and rinse water are discharged into the spent regenerant sump. The neutralized waste in the sump is pumped to the evaporation ponds.

It is estimated that the total PVNGS use of regenerant chemicals is approximately 850 lb of sodium hydroxide and 1000 lb of sulfuric acid per day.

3.6.2.5 Condensate Polishing Demineralizer System

The secondary system fullflow condensate polishing demineralizer system, shown in figure 3.6-5, removes dissolved solids in the secondary system. The system consists of six mixed bed demineralizers (five normally in service and one on standby) with the required regeneration equipment.

In the event of a steam generator tube leak, radioactive chemical regenerant waste will be directed to the liquid radwaste system, as discussed in section 3.5. Nonradioactive, concentrated chemical regenerant waste is directed to the evaporation ponds. Dilute waste is discharged to the main circulating water system.

An additional demineralizer system is provided for the steam generator blowdown. This system consists of a heat exchanger, mixed bed demineralizers, and the required regeneration equipment. Upon depletion of the resin in a given mixed bed, the resin is regenerated in place. The concentrated regenerant wastes are neutralized, analyzed for radioactivity, and are discharged to the evaporation ponds or to the liquid radwaste system as appropriate. Wastes low in dissolved solids are analyzed for radioactivity and are discharged to the radwaste system or to the main circulating water system.

It is estimated that one condensate polisher per unit will be regenerated every 140 hours, and that 1040 lb of sodium hydroxide and 1870 lb of sulfuric acid will be required for each regeneration. It is estimated that a blowdown polisher will be regenerated every 900 hours, using 560 lb of sodium hydroxide and 750 lb of sulfuric acid for each regeneration.

3 3.6.2.6 DELETED

3.6.2.7 Floor Drains

Floor drains from each unit are routed to the unit's oily-water separator prior to discharge to the evaporation ponds.

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QUESTION 3A.25 (NRC No. 291.24) 3.6.3.2

Identify the type of liner and specifications (e.g., permeability, thickness, composition, temperature and pH tolerance, susceptability to chemical degradation) of the liner to be used in the evaporation ponds. Describe the inspection and maintenance procedures to be used to assure the integrity of the liner. Provide the Resource Conservation and Recovery Act determination as to whether all contaminants contained in the plant waste streams discharging to the evaporation ponds may be as discharged.

RESPONSE: Liner specifications and maintenance procedures are provided in the revised section 3.6.3.1. Wastewater flow to the evaporation pond will come from three sources: (1) cooling tower blowdown; (2) spent demineralizer regenerants and (3) power plant washdown. Flow is made via a retention basin. The approximate composition and concentration of these sources as they exist in the retention basin was estimated and submitted to the Arizona Department of Health Services. It was their conclusion that the material would be nonhazardous according to current criteria established in their regulations[a]. A sample solution was also analyzed by an independent laboratory and was determined to be nonhazardous per EPA criteria. As there is no appreciable holdup time at the retention basin prior to transfer to the evaporation pond, the chemical concentrations at the inlet to the evaporation pond should be essentially the same as the retention basin. However, a final determination of RCRA compliance for the evaporation ponds will not be made until the chemical composition can be exactly determined. 2

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a Letter from Mapes, S.L., Hazardous Waste Specialist, Division of Environmental Health Services, Arizona Department of Health Services, to Lay, T., Arizona Public Service, August 26, 1980

QUESTION 3A.26 (NRC No. 291.25)

Estimate the final total area to be occupied by the evaporation ponds over the life of the plant, assuming that no additional
2 water recovery/reclamation plans are implemented at the site.

RESPONSE: The response is given in the revised section 3.6.3.1.

QUESTION 3A.27 (NRC No. 291.26) 3.6.2

In table 3.6-1 of the OL-ER, Supplement 2, the maximum and average concentrations of dissolved oxygen in the circulating water system appear to be too high, re-examine these figures and, either revise them or explain their derivation.

RESPONSE: Table 3.6-1 has been revised to correct dissolved oxygen concentrations.

QUESTION 3A.28 (NRC No. 291.27) 3.6.2

3 The response to question 291.19 indicates that the oxygen from the air injected at the Hassayampa Pumping Station will be used up as quickly as it is dissolved. This statement appears to be inconsistent with the relatively high concentration of dissolved oxygen in the influent from the 91st Avenue sewage treatment plant (listed in Table 3.6-1 of the OL-ER, Supplement 2.). Explain this apparent discrepancy.

RESPONSE: Table 3.6-1 has been revised to correct dissolved oxygen concentrations.

QUESTION 3A.29 (NRC No. 291.28) 3.6

The response to question 291.24 states that waste flow to the evaporation pond is made via a retention basin. Indicate whether the solids are allowed to settle before the basin or in the basin. If solids settle in the basin, identify the disposal method. Also, indicate whether these solids have been determined hazardous wastes.

RESPONSE: Solids may settle out in the retention basin. When they do, they will be removed and disposed of properly according to their EPA hazard classification.

<u>QUESTION 3A.30</u> (NRC No. 291.29) 3.7.2.2

Indicate whether the wastes sent to the solid waste disposal area have been determined non-hazardous and provide documentation. Identify the type and specifications of the liner to be used for this area, if any.

RESPONSE: The solid waste disposal area will contain the sludge waste produced by the water reclamation plant (WRP). Any contaminants in the sludge that could be of concern from a hazardous waste standpoint are those contaminants that were present in the effluent from the City of Phoenix 91st Avenue Sewage Treatment Plant. The WRP removes these contaminants which would otherwise be distributed throughout the Gila River. 3

While the sludge will contain these contaminants at levels (corresponding to levels in 91st Avenue effluent) that could be considered hazardous if 100% leaching occurred, it is not anticipated that the waste will be classified hazardous due to expected leach rate. Leaching should occur at a low rate due to the clay-like, impermeable nature of the sludge. Leach rate will be established during 1982 as part of the startup of the WRP. If, at that time, the leach rate exceeds the allowable limit, appropriate measures will be provided to handle the waste in accordance with the Resource Conservation and Recovery Act of 1976.

QUESTION 3A.31 (NRC No. 291.30) 3.6

3 Figure 3.6-2 indicates that a foam control agent is used in the circulating water and plant cooling water systems. Identify the foam control agent and provide its concentration in these systems.

RESPONSE: The foam control agent is NALCO 7460. It is used sporadically at 1-2 ppm when foaming (due to detergent level of 91st Avenue wastewater) is noted.