REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8308090497 DOC.DATE: 83/08/03 NOTARIZED: YES DOCKET #
FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529
STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
AUTH.NAME AUTHOR AFFILIATION
VAN BRUNT,E.E. Arizona Public Service Co.
RECIP.NAME RECIPIENT AFFILIATION
KNIGHTON,G. Licensing Branch 3

SUBJECT: Forwards updated response to FSAR Question 8A.16 re undervoltage protection,to reflect most current info on voltage drop predictions & relay settings w/time delays.Info will be included in future FSAR amend.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 5
TITLE: Licensing Submittal: PSAR/FSAR Amdts & Related Correspondence

NOTES:Standardized plant. 05000528
Standardized plant. 05000529
Standardized plant. 05000530

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	NRR/DL/ADL	1	0	NRR LB3 BC	1	0
	NRR LB3 LA	1	0	LICITRA,E. 01	1	1
INTERNAL:	ELD/HDS3	1	0	IE FILE	1	1
	IE/DEPER/EPB 36	3	3	IE/DEPER/IRB 35	1	1
	IE/DEQA/QAB 21	1	1	NRR/DE/AEAB	1	0
	NRR/DE/CEB 11	1	1	NRR/DE/EHEB	1	1
	NRR/DE/EQB 13	2	2	NRR/DE/GB 28	2	2
	NRR/DE/MEB 18	1	1	NRR/DE/MTEB 17	1	1
	NRR/DE/SAB 24	1	1	NRR/DE/SGEB 25	1	1
	NRR/DHFS/HFEB40	1	1	NRR/DHFS/LQB 32	1	1
	NRR/DHFS/PSRB	1	1	NRR/DL/SSPB	1	0
	NRR/DSI/AEB 26	1	1	NRR/DSI/ASB	1	1
	NRR/DSI/CPB 10	1	1	NRR/DSI/CSB 09	1	1
	NRR/DSI/ICSB 16	1	1	NRR/DSI/METB 12	1	1
	NRR/DSI/PSB 19	1	1	NRR/DSI/RAB 22	1	1
	NRR/DSI/RSB 23	1	1	REG FILE 04	1	1
	RGN5	3	3	RM/DDAMI/MIB	1	0
EXTERNAL:	ACRS 41	6	6	BNL(AMDTS ONLY)	1	1
	DMB/DSS (AMDTS)	1	1	FEMA-REP DIV 39	1	1
	LPDR 03	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 53 ENCL 46

AFFILIATION

Arizona Public Service Co.

Licensing Branch 4

SUBJECT: A [illegible] update response to the question [illegible] conservative protection/to protect [illegible] voltage and protection [illegible] setting [illegible] will be included in future [illegible].

[illegible]

Arizona Public Service Company
P.O. BOX 21666 • PHOENIX, ARIZONA 85036

August 3, 1983
ANPP-27482 - WFQ/KEJ

Director of Nuclear Reactor Regulation
Attention: Mr. George Knighton, Chief
Licensing Branch No. 3
Division of Licensing
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: 83-056-026; G.1.01.10

Dear Mr. Knighton:

Please find attached an updated response to FSAR question 8A.16 concerning undervoltage protection at PVNGS to reflect the most current information available concerning voltage drop predictions, relay settings with time delays and present design as changed per BTP PSB-1. This information has been previously discussed with the staff via telecons.

This updated response will be incorporated into a future FSAR amendment.

If you have any questions concerning this matter, please contact me.

Very truly yours,

E. E. Van Brunt

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

EEVB/KEJ/sp
Attachment

cc: E. Licitra (w/a)
O. Chopra "
A. C. Gehr "

B001
1/1

August 3, 1983
ANPP-27482 - WFQ/KEJ

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin 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 to do so, 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

Edwin E. Van Brunt, Jr.

Sworn to before me this 29th day of July, 1983.

Nora C. Meador

Notary Public

My Commission Expires:

My Commission Expires April 6, 1987

QUESTION 8A.16 (Letter from R. L. Tedesco of June 17, 1981 on AC Power)

Part 1

Provide the time delay settings for the two 4160 volt safety related bus undervoltage relays.

RESPONSE: The Palo Verde design has four 4160 volt safety related bus induction disc undervoltage relays, and four instantaneous undervoltage relays with associated time delay relays. The induction disc relays have a dropout voltage that varies with time, so that they will commence time out if the voltage falls below 78% for a long time or below about 70% for a short time (11.4 sec or less) at time dial setting of 4. And a tap block setting of 93 volts. The parallel instantaneous undervoltage relays will commence timeout of the series connected time delay relays when the bus voltage drops to less than 90% of design in a maximum of 35 seconds. Recovery of the bus voltage before timeout is completed will reset the timedelay relays for the full 35 seconds.

Part 2

Submit the following information: the voltage levels at the safety-related buses optimized for the maximum and minimum load conditions that are expected throughout the anticipated range of voltage variations of the off-site power sourced by appropriate adjustment of the voltage tap settings of the intervening transformers. The tap settings selected should be based on an analysis of the voltage at the terminals of the Class IE loads. The analyses performed to determine minimum operating voltages should typically consider maximum unit steady state and transient loads for event such as a unit trip, loss of coolant accident, startup or shutdown; with the off-site power supply (grid) at minimum anticipated voltage and only the off-site source being considered available. Maximum voltages should be analyzed with the off-site power supply (grid) at maximum expected voltage concurrent with minimum unit loads (e.g. cold shutdown, refueling). A separate set of the above analyses should be performed for each available connection to the off-site power supply.

RESPONSE: The maximum load condition at the minimum anticipated off-site voltage was considered when 1) winding "Z" of a start-up transformer was feeding normal train A loads of Unit 1 while undergoing a trip and train B of Unit 3 was supplying accident loads associated with a LOCA, and 2) the "Y" winding of the same start-up transformer was supplying normal train ESF loads of Unit 2. The analysis indicated the following worst-case Class IE per unit voltage levels at 0.95 per unit switchyard voltage:

	Bus Voltage	Motor Voltage
o 4.16KV Switchgear	0.8350	0.8684
o 480V Load Center	0.8318	0.8679
o 480V Motor Control Center	0.8297	0.8658

The steady state per unit voltages with all normally running loads on Unit 1 while supplying one train of accident loads to Unit 3 and normal grid voltage (100%) in the switchyard are:

	Bus Voltage	Motor Voltage
o 4.16KV Switchgear	1.0108	1.0512
o 480V Load Center	1.0260	1.0707
o 480V Motor Control Center	1.0244	1.0689

The per unit voltages expected during situations of light loading such as refueling or cold shutdown with maximum grid voltage (105%) and supplying one train of accident loads to Unit 3 are:

	Bus Voltage	Motor Voltage
o 4.16 KV Switchgear	1.0697	1.1125
o 480V Load Center	1.0906	1.1380
o 480V Motor Control Center	1.0890	1.1363

RESPONSE: PVNGS will measure the station distribution buses including Class IE buses initially, prior to loading and record voltages. PVNGS will also measure and record the station distribution buses including Class IE buses upon loading the bus to at least 30%. This will occur prior to start-up.

PVNGS will measure and record grid and Class IE bus voltages and bus loading during the start-up of a large Class IE motor and also during the starting of a large non-Class IE motor.

The above information will be reviewed to verify analytic data.

QUESTION 8A.16 (Letter from R. L. Tedesco of June 17, 1981 on AC Power)

Relype

6 Part 1

Provide the time delay settings for the two 4160 volt safety related bus undervoltage relays.

(INSERT A)

RESPONSE: The induction disc relays have a dropout voltage that varies with time, so that they WILL COMMENCE TIME ~~drop~~ out if the voltage falls below 78% ~~90%~~ for a long time ~~(9 sec or less)~~ or below about 70% ~~75%~~ for a short time (11.4 ~~4 sec~~ sec or less) at TIME dial setting 4 OF 3 ~~of the undervoltage relays~~. AND A TAP BLOCK SETTING OF 93 VOLTS. THE PARALLEL INSTANTANEOUS UNDERVOLTAGE RELAYS WILL COMMENCE TIMEOUT OF THE SERIES CONNECTED TIME DELAY RELAYS WHEN THE BUS VOLTAGE DROPS TO LESS THAN 90% OF DESIGN IN A MAXIMUM OF 35 SECONDS. RECOVERY OF THE BUS VOLTAGE BEFORE TIMEOUT IS COMPLETED WILL RESET THE TIMEDELAY RELAYS FOR THE FULL 35 SECONDS.

Part 2

Submit the following information: the voltage levels at the safety-related buses optimized for the maximum and minimum load conditions that are expected throughout the anticipated range of voltage variations of the off-site power sources by appropriate adjustment of the voltage tap settings of the intervening transformers. The tap settings selected should