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 STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Public 05000530
 STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Public
 AUTH. NAME: AUTHOR AFFILIATION
 VAN BRUNT, E. E. Arizona Public Service Co.
 RECIP. NAME: RECIPIENT AFFILIATION
 TEDESCO, R. L. Assistant Director for Licensing

SUBJECT: Forwards clarification of items on 811005 ltr re human engineering discrepancy summary Categories A, B, & C.

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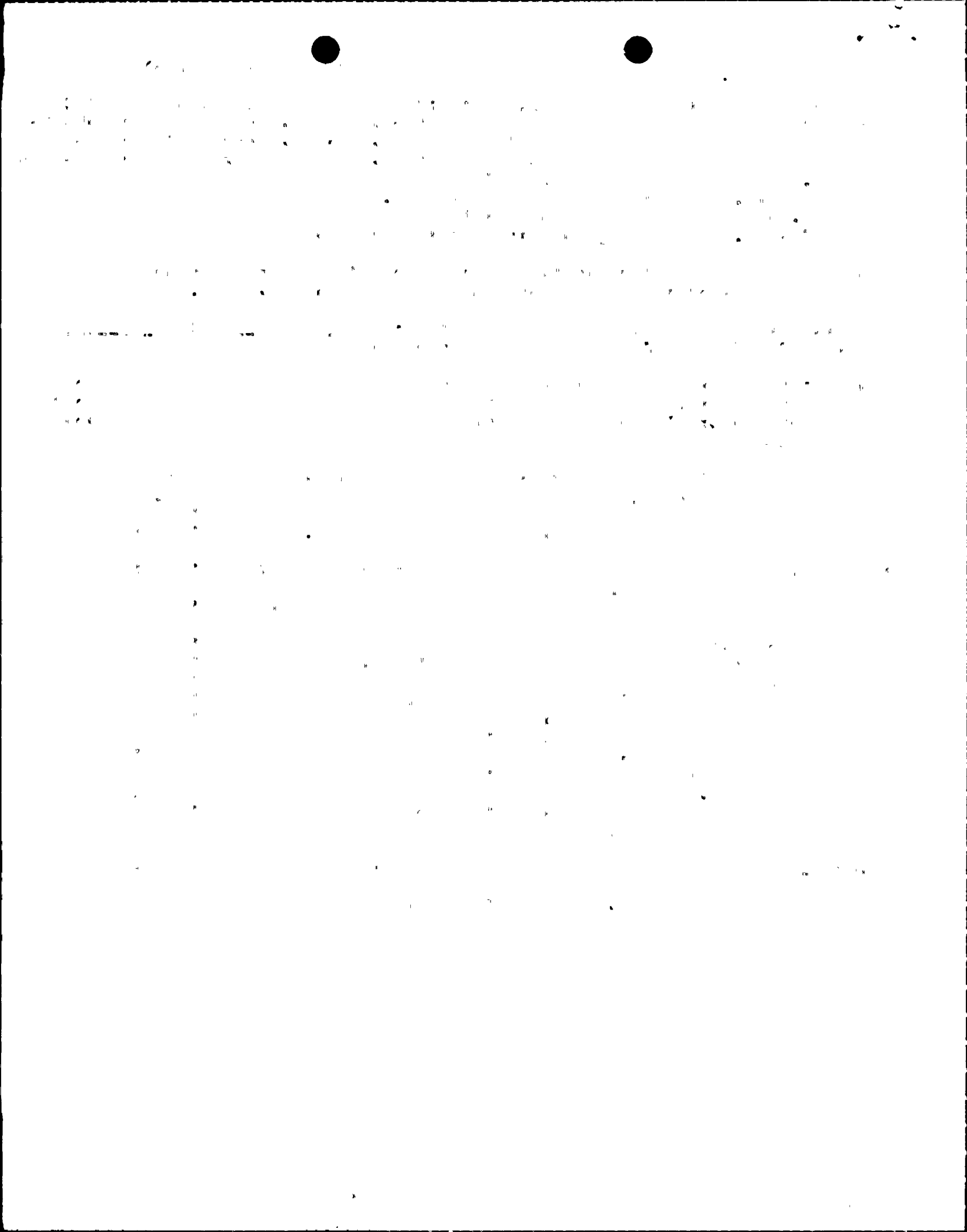
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ARIZONA



PUBLIC SERVICE COMPANY

STA. _____

P.O. BOX 21666 - PHOENIX, ARIZONA 85036

October 7, 1981

ANPP-19117 - JMA/ECS



Mr. R. L. Tedesco
Assistant Director of Licensing
Division of Licensing
Office 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; G.1.10

Reference: ANPP-19099, E. E. Van Brunt, Jr. to R. L. Tedesco
dated October 5, 1981

Dear Mr. Tedesco:

Attached is our response for clarification of items covered in the
reference letter.

If you have any questions, please contact Ed Sterling on (602) 271-7280.

Very truly yours,

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

EEVBJr/ECS/av
Attachment

cc: J. Kerrigan (w/a)
P. Hourihan (w/a)
A. C. Gehr (w/a)
R. Ramirez (w/a)
A. Ramie-Smith (w/a)

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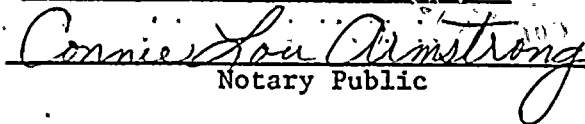
STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

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 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.

Sworn to before me this 17th day of October, 1981.


Notary Public

My Commission expires:

June 24, 1983



CLARIFICATIONS OF ANPP-19099, OCTOBER 5, 1981 LETTER ITEMS

1. The results of studies called out in the "Corrective Action" columns of Attachment A HED 77 and 118 will be provided to the NRC 120 days prior to issuance of license.
2. Enclosed is a revised Attachment A clarifying HED's 4, 30 and 104.
3. Enclosed are revised sheets of Attachment B clarifying HED's 67 and 95.
4. Enclosed are revised sheets of Attachment C clarifying HED's 94, 98, 103 and 109.
5. Revised title on the first sheet of each attachment.
6. To further clarify HED 53, in our lighting survey of the real Unit 1 control room glare measurements will be retaken of the CRT screens to determine if any change to the "Corrective Action" is needed. This will be done 120 days prior to issuance of license.
7. Item 4a - For HED's 1, 2, 3 and 32, we are currently investigating other fixes for detecting lamp failures. Lamp surveillance will be performed each shift.
8. Item 7 - There will be appropriate relamping procedures.
9. Item 8 - If the operator needs the discrete value for a parameter, other indicators on the panel will provide that value.
10. Item 10 - Will review under Item 12.
11. Item 11 - The addition of high speed printers will remain open pending review of system impact.

TABLE 3-2A
HUMAN ENGINEERING DISCREPANCY SUMMARY
CATEGORY A
(Safety; Mandatory Implementation)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
4	Reaching annunciators to replace lamps (B01).	Obtain stepladder for control room of suitable construction to prevent board contact.
7	Units of measured parameter missing from all Foxboro displays.	Add engineering units.
15	Labels missing on "CR ESSENTIAL AHU FAN" switches (B02).	Add labels.
25	Switches too close to panel edge - accidental activation (B03, 04, 06, 07).	Install switch protection devices (e.g., guard rail) or change knobs.
29	Inadequate indication of safety systems status (SIAS, MSIS, CIAS, etc.) on B05.	Add master indicator panel.
30	Logic for reactor trip buttons not clear (B05).	Add instructional label
66	Label not readable for CWP/Bypass switch (B04).	Change to white letters on red background.
74	Wrong label color on "HOT LEG INJECTION B FLOW" (B02).	Change to green label.
76	Inconsistent terminology between SESS and board item labels (B02).	Change labels.
77	High Press Safety Injection Flow indication confusing on loss of one train (B02).	Flow indicator redundancy under study.
79	Mimic missing on CVCS items used during LOP (B03).	Add mimics.
80	Labels on CVCS charging pumps imply incorrect operation (B03).	Change labels.

TABLE 3-2A (Continued)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
81	Annunciator legend incorrect for T-AVE and T-REF temperature deviation and for RC SYS TRBL (B04).	Correct window legend.
84	Missing labels on RAS ACTIVATION controls (B05).	Add labels.
86	Lacking adequate switch guards on reactor trip buttons (B05).	Change to deep-ring type button.
89	Inadequate SG level indication during manual auxiliary and main feedwater control (B06).	Add wide-range level indicators.
104	Obscured label viewing on Foxboro displays on most vertical panels. <i>Labeling on dual indicators is ambiguous.</i>	Relocate labels <i>and make unambiguous.</i>
108	Wrong location and lack of valve position indication on jog-open valves.	Relocate and add position indicators.
112	Lacking demarcation of all major systems on most boards.	Demark affected control boards.
118	Annunciator System has several deficiencies.	Initiate study to determine corrections.

TABLE 3-2B
HUMAN ENGINEERING DISCREPANCY SUMMARY
CATEGORY B
(Reliability - 90% Availability Criterion;
Mandatory Implementation)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
11	Labels missing on Electric Mimic Bus (B01).	Add labels.
17	Lacking wide-range pressure and level indication near pressurizer controls (B03).	Add wide-range indicator.
35	Incorrect color of ON/Off buttons on Generex panels (B06).	Change pushbuttons to correct color.
40	Labels missing and non-descriptive on FW & SR Systems Board (B06).	Add and correct labels.
45	Lacking main generator trip alarms near controls (B06).	Move alarms to near controls.
46	Labels missing on MSR switches (B06).	Add labels.
59	One key-operated switch requires teeth pointing up (B03).	Orient switch for teeth pointing down.
60	Missing NORMAL label on some key-operated switches.	Add label.
67	Lacking phone Coverage on some panels.	Study effect of longer cords on simulator or provide other means for adequate phone coverage.
68	Control room floor is hard.	Install carpet.
70	Diesel generator synchrosopes ~ 9 feet from controls (B01).	Add synchrosopes near controls.
71	Wrong label on diesel generator Start/Stop switch (B01).	Change label.
83	SG level scales are 0-100% for both narrow and wide range indicators (B05).	Change scales to Engineering Units.

TABLE 3-2B (Continued)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
87	PPS relay status lights are wrong color (B05).	Change to blue lens.
88	PPS controls illuminated when OFF (B05).	Change to black lenses due to addition of logic alarm box.
95	Condensate low vacuum alarm location not convenient on B05 should be on B07.	Move alarm from B05 to B07.
96	Reactor coolant pump and backup heater switches are similar and closely located (B04).	Change knob on backup heater switch.
100	Specular glare on Foxboro displays from polished surfaces.	Change to matt surfaces.
101	Varying specular glare on Foxboro displays from flexible surfaces.	Change to rigid surfaces.
106	Lacking narrow range trend information on Foxboro recorders (B02).	Change to 2-speed recorders where needed.
122	Uncomfortable knob on CMC switches for jog-valves.	Review compliance and criteria for Push-to-Stop switches.

TABLE 3-2C
HUMAN ENGINEERING DISCREPANCY
CATEGORY C
(Reliability-Enhancement; Mandatory Implementation)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
1	Lack of distinction between lamp failure and status change in CMC switches.	<i>Reviewing for suitable fix.</i>
2	Lacking lamp redundancy in CMC switches.	<i>Reviewing for suitable fix.</i>
3	Lacking lamp test capability for CMC switches.	<i>Reviewing for suitable fix.</i>
5	Interchange of legend screens on Electric Bus panel (B01).	Change procedure to single-legend screen removal.
13	Sharp edges on book stops (B02, 07).	Round all edges and corners.
14	Interchange of legend screens on SESS panel (B02).	Change procedure to single-legend screen removal.
20	Confusing mimic of flow to and from reactor on CVCS panel (B03).	Change mimic to clarify.
21	Interchange of legend screens on CEDM panel and Reactor Power cutback system (B04).	Change procedure to single-legend screen removal.
23	Wrong label on Reactor Coolant Pump 1B Start/Stop switch.	Change label.
31	Lacking valve position indication on demineralizer bypass jog valve (B05).	Add valve position indicator.
32	Lacking lamp redundancy on Generex panel (B06).	<i>Reviewing for suitable fix.</i>
33	Lamp removal is from back of Generex panel (B06).	Redesign for removal from front. of panel

TABLE 3-2C (Continued)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
47	Inconsistent terminology on alarm window for header pressure (B06).	Change alarm window.
49	High glare on Cooling Tower Fan Control panel displays (B07).	Change to matt finish displays.
50	Interchange of legend screens on Cooling Tower Fan Control panel (B07).	Change procedure to single-legend screen removal.
51	Typing-over of data on multipoint recorders (B07).	<i>Review data use; revise hardware as necessary to fit data use.</i>
52	Non-functional colored strips on some boards.	Remove strips.
53	Glare on CRT screens.	Install CRT hoods.
54	Missing labels on CRT data display.	Reprogram to add labels.
55	Lacks label highlighting on CRT data display.	Reprogram to highlight labels.
56	Inadequate bookshelves.	Add bookshelves.
58	Lack of operator understanding of control board design.	Provide operator training.
63	Lack of distinction between legend switches and backlighted displays.	<i>Provide distinguishing markings on switches and displays.</i>
64	Specular glare from all displays on lower 2 slopes of each board.	Use matt surfaces for these displays.
65	Excessive CRT brightness from room lighting (B01).	allow operator discretion on room lighting level.
69	Glare on SESS panel hinders light-on determination.	Change to matt surface displays.

TABLE 3-2C (Continued)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
72	Use of green light brightness for faulted vs. normal status on Electric Bus (B01).	Ensure a clear distinction in light brightness.
73	Inconsistent terminology between H ₂ train alarms and control labels (B02).	Change alarm windows.
75	Lacking overload indications on ammeters for large pumps.	Add overload markings.
78	Non-conformance between SESS panel and control panel layouts (B02).	Change SESS panel layout.
82	Inconsistent label location for the four DNBR/LPD calculators (B05).	Relocate labels.
85	Inconsistent alarm legends for linear power density (B05).	Change window legend.
90	Inconsistent alarm legends - COND vs. CNDS on B06.	Change legend to correct terminology.
91	Inconsistent terminology between alarms and controls for generator seal oil (B06).	Change alarm window legend.
92	Large size of Power Factor meters not consistent with importance. (B06).	Change to smaller MEGAVAR meters.
93	Inconsistent mode select sequence of MSR switches (B06).	Change mode select lineup.
94	PMS trouble alarm location not convenient (B01).	Move alarm to B04.
97	Interference of Control Knobs at lower board slope change (B07).	Move knobs.

TABLE 3-2C (Continued)

<u>HED No.</u>	<u>Discrepancy</u>	<u>Corrective Action</u>
98	Glare on switch surfaces hinders light-on determination.	Change to matt surfaces or adjust ambient lighting levels
102	Moving scales in Foxboro displays.	Change procedures to preclude movement by operators.
103	Low light intensity on scales of Foxboro controllers.	Change to lighter colored filters and investigate alternative ways of improvement
105	Over-similarity in appearance of the 5 types of Foxboro controllers/displays.	Color code facing.
109	Wrong label for alarm acknowledge button on Radiation Monitor Terminal.	Change three labels.
111	Lacking parameter units on Foxboro recorders.	Use pre-printed paper.
113	Uncomfortable key size on key-switches for jog-valves.	Change to larger keys.
114	More than 3 lines of text on several legends and indicators.	Reduce text where possible.
115	Missing mimics on Electric Mimic Bus (B01).	Add mimics.
116	Wrong colored lights on CPC mode indicators.	Change lenses.
117	Unnecessary location of Generator Ground Voltmeter on B06.	Move to miscellaneous cabinet.

