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SUBJECT: Forwards resolutions to concerns raised in 811028 control room design review & audit rept.

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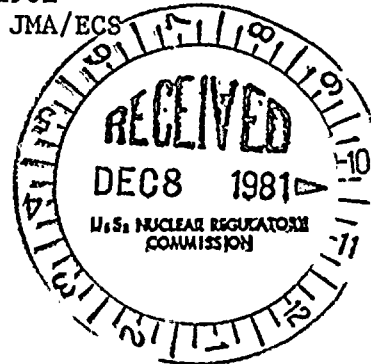
PUBLIC SERVICE COMPANY

STA. \_\_\_\_\_

P.O. BOX 21666 - PHOENIX, ARIZONA 85036

December 1, 1981

ANPP-19564 - 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 No's. STN-50-528/529/530  
File: 81-056-026; G.1.10

Reference: 1) NRC Letter from Frank J. Miraglia, NRC, to E. E. Van Brunt, Jr., October 28, 1981, Subject: Control Room Design Review/Audit Report, Palo Verde Nuclear Generating Station

Dear Mr. Tedesco:

Attached are our resolutions to the concerns raised in Reference 1.

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

Very truly yours,

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

EEVBJr/ECS/mjb  
Attachments

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

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STATE (OF ARIZONA )  
 ) ss.  
COUNTY OF MARICOPA)

I, John M. Allen, represent that I am Nuclear Engineering Manager of Arizona Public Service Company, that the foregoing document has been signed by me for Edwin E. Van Brunt, Jr., Vice President Nuclear Projects, 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.

  
John M. Allen

Sworn to before me this 1<sup>st</sup> day of DECEMBER, 1981.

  
Notary Public

My Commission expires:

June 24, 1983

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APS RESOLUTIONS OF NRC CRDR AUDIT COMMENTS

- A. We understand that the items in the Reference (1) enclosure marked with an "\*" were handled in previous correspondence dealing with the Palo Verde Control Room Human Factors review performed by the applicant and, thus, will not be addressed here.
- B. The following items will be corrected 120 days prior to issuance of a license:
1. 2-1: Will provide instructions.
  2. 2-2: Will provide instructions.
  3. 2-5: Will provide labels for sound-powered phone jacks.
  4. 2-7: Will provide a system to unambiguously identify parties during conversation on walkie-talkies.
  5. 3-6: Suitable tones and volume will be set as a result of the noise survey.
  6. 3-7, 3-28: Will be handled under the disposition of HED-118A.
  7. 3-8: Will provide three auditory signals to indicate work station alarm location.
  8. 3-9: Will consolidate alarm frequencies to limit quantity to 5 different frequencies total.
  9. 3-13: Will provide panel labeling as determined by the demarcation study.
  10. 3-17: Axes of annunciator boxes will be labeled.
  11. 3-20: Will reword title.
  12. 3-29: The procedures will be provided as part of the operator's administrative procedures.
  13. 3-30: Will demarcate the annunciator controls.
  14. 4-1: Will provide a label indicating all channel switches should be activated.
  15. 4-7: Will provide a consistent application of the design criteria.
  16. 5-2: Will provide either a label to say CEAC not active on this channel or cover that position label.
  17. 5-25: Will institute training on the use of the Foxboro displays to preclude the parallax problem.
  18. 6-7, 6-8, 6-9, 6-13, 6-47: Will provide proper labels per HED's-40B and 46B.
  19. 6-10: Will add hierarchical labeling scheme per the demarcation study for HED-112A.
  20. 6-12: Labels will be moved to resolve the concerns of HED-104A.
  21. 6-20, 6-21, 6-23, 6-25: Will provide more descriptive labels.
  22. 6-28, 6-29, 6-30: Will provide consistent abbreviations.
  23. 6-31: Position labeling at detents will be provided.
  24. 6-32: Will delete the word locked.
  25. 6-45: Will add arrows missing from B03 mimic.
  26. 6-48: Will improvise missing mimic with current switch arrangement per HED-115C.
  27. 7-5: Will provide computer operating and contingency procedures.
  28. 7-6: Will provide data point addresses cross-indexed.
  29. 7-8: The flicker was caused by the simulator board changes that were being performed; will not occur in Unit 1 Control Room.
  30. 7-16: Will review with CLD #11.032 (Item 11 of ANPP-19117, October 7, 1981 letter from E. E. Van Brunt, Jr. to R. L. Tedesco).
  31. 7-17: This will not be a problem as operator administrative controls will cover ribbon replacement; simulator ribbon has never been changed.



- 32. 8-10: Differences will be reported.
- 33. 8-11: Will provide tags that will not obscure nearby controls/displays.
- 34. 9-1: Will be moved per HED's 118A and 45B.
- 35. 9-2: Will revise label to indicate the lights reflect auto control system demand.

C. The following finds are not considered discrepancies as the control boards and room reflect the desired configuration:

- 1. 2-3: The Control Room operator does have priority access to the telephone switch. There are priority trunks.
- 2. 2-6: It is our intent to ban EMI source items. This will be dealt with as an ICSB technical matter.
- 3. 3-2, 3-27: The system trouble annunciation informs the operator that there are alarms on the local panels operated by the auxiliary operator. The Control Room operator has no controls for these items; his only action is to dispatch an auxiliary operator to the local panel.
- 4. 3-3: The Plant Monitoring System typer prints out the individual alarm to clarify the element triggering the multiple input window. The annunciator response procedure will direct the operator to board indicators and/or the alarm typer to determine which input is causing the alarm.
- 5. 3-4, 3-5: The first-out annunciators are an overall summary diagnostic located in the panel in front of the operator console. This is a small annunciator used to retrace the event steps and help diagnose which plant parameters caused the Reactor or turbine trip. The panel is at eye level and the operator must walk up to it to acknowledge the alarms. There is no need for larger print.
- 6. 3-14: The legend tile is not removed to perform lamp replacement.
- 7. 3-16: The annunciators are tested once per shift, which also tests the flasher. If the flasher fails, the horn and the steady burn feature, once acknowledged, still function. When the horn sounds and there is no fast flash window, the operator will acknowledge each panel to determine, by a new steady burn window, which alarm came in. This would show a flasher failure which would be repaired. The operator will acknowledge each panel to check for multiple windows alarming at the same time.
- 8. 3-18: There are 6 boxes on 3 panels that are 4 x 16 (64 windows). They are standard Beta window boxes. Their function in the Control Room has been reviewed and is acceptable.
- 9. 3-19: The lights, flasher and horns will be tested once per shift and power supply failure is alarmed. The alarm typer is not affected by an annunciator failure and the operator will be directed to use it if annunciator failure occurs.
- 10. 4-2: The target on the SBM switch is a standard feature to indicate last switch position. There are status lights above the switch that the operator will use to assess status of the controlled device.





11. 4-14: When the keylock switches were used in the Control Room, they were to enhance the administrative controls for lineup of the SIS systems. It has been determined that the administrative controls themselves will be sufficient, therefore, all the keylocks on board B02 will be keyed alike except for those required for equipment protection.
12. 5-3: The helipot control is used to match the CAL SUM power (displayed on recorder above the pot) to the Calorimetric Power as determined by the CPC. The individual subchannel outputs are not affected by this adjustment. The helipot has a friction locking device to prevent inadvertent movement. All changes to the board settings are logged.
13. 5-11: The correct label for the refueling water tank level is LI-200. This loop is the channel A loop through which an isolation device interlocks to stop the boric acid makeup pumps on low-low tank level. This indicator is driven from the non-IE CVCS process control. It is, though, redundant to LI-201.
14. 5-18: The small scale size has been determined as adequate. The operator is not looking for a detailed value, just verification of on or off, or large inrush current while starting.
15. 5-22, 6-41, 7-14, 7-15: The color coding follows industry convention in its various applications. The application of colors cannot be applied without taking into account the other factors, such as shapes, item colored and surroundings. The training and experiences of the operators have had this color scheme as its base. In our system factors review, we found no discrepancy with this concept as long as it is applied consistently. The blue light will be changed to white for the automatic feature. The color coding used on the CRT is also based on the technical display problems associated with CRT's, such as the color blue does not display very well.
16. 5-35: The control rod array on B04 is not the primary indication of rod bottom position. The rod control insert has position lights for rod-on-the-bottom and the CEAC position CRT on B04 displays rod positions. The array insert will be re-located on B04 to a less prominent position.
17. 5-37: The PPS relay status lights are connected across that channel's actuation relay. When power is removed from that relay whether by actuation of that channel's logic train or a power failure, the relay de-energizes (the tripped state) and the light goes out. This action is per system design and functional criteria. If a channel's light goes out, the operator can confirm the channel action from the PPS backpanel while investigating the cause. If the light burnt out, the backpanel light will still be lit.
18. 6-16: Present label is correct. There are two cold legs per loop and one hot leg per loop.
19. 6-22: The channel designation is included in the switch designator.
20. 6-26: The annunciator reflects the Plant Protection System parameter tripping on SG1 > SG2. That one steam generator has higher pressure than the other is fact the operator is looking for. The AFAS logic is designed that way and all documentation and training reflect this.



21. 6-33: The AFAS-1, AFAS-2 are maintained switches due to the AFAS design and functional criteria. When actuated the AFAS-1 & -2 signals modulates the auxiliary feedwater valves full open/full closed. Because of this on-off action, this switch cannot be momentary as the others are designed to be.
22. 6-34: The ESFAS manual actuation switches have no position function. They trip their channel logic when turned. Their movement conforms to standard control design for actuation, and is left to right. If an operator attempts to turn these to the left, they will not turn. The indication of successful operation is the ESFAS logic trip annunciation on that panel directly above the switch.
23. 6-35: The writing by grease pencil on the metal plates of the simulator addressable trend recorders was hastily put on when the machine was delivered a year ago. With proper application, there is enough contrast with this method to be suitable; training will reinforce this concept.
24. 6-44: The bus designator on each label indicates the proper unit number on Busses S05 and S06. Also, the breaker numbers on the source and alternate source labels carry a unit designator.
25. 6-46: All the Motor Operated Disconnect (MOD) switch controls are placed next to their respective MOD mimic designators.
26. 7-3, 7-4: A keyboard is a single device where the keys are used as necessary to perform a communication with a computer. Its design and function are consistent with computer utilization anywhere in the industry. It is consistent with operator training and experience.
27. 7-12: The computer will indicate when the operator gives a command it cannot perform. There are no instructions prompted by the computer because the machine does not know what the operator desires to occur. Training and the user's manual in conjunction with error messages will provide the operator with the knowledge to utilize the computer.
28. 7-13: The only operation that takes longer than 3 to 5 seconds to respond is the printing of logs. The operator knows this is occurring by observing the log typer functioning immediately to his right. Training will show those items that take 5 seconds to respond and the operator will be aware, so a prompting is superfluous.
29. 7-18: In our review of the control board and operator actions, this was not identified as necessary information.
30. 8-2: The Reactor Protection System (RPS) Pretrip/Trip indicators are diagnostic in nature, and are intended to show what parameter in each channel caused the problem. There is no functional grouping associated with their use.
31. 8-4, 8-6, 8-7, 8-8, 9-4, 9-6: The Systems Factors Group's review of the configuration of plant systems and of the current and new board configuration to the operator tasks has shown the new configuration is optimal for proper systems operation.



32. 8-5: There is no functional relationship between the ESFAS manual actuation switches and the ESFAS actuation relay status lights. The two elements are located in separate places in the logic train.
  33. 8-13: The control rods are functionally grouped. The rods are assignable based on core configuration rod characteristics. The blank rows on the CEDM insert on B04 are for adding rods to accommodate OMR fuel not for demarcation.
  34. 9-3: The trip indicators for High-Log-Power and Low Pressurizer Pressure, and High-Log-Power Bypass and Low Pressurizer Pressure Bypass controls are not functionally related. The operator does not use both together in a task. All RPS trip indicators are functionally related, and are, therefore, located together.
- D. The following findings will be left as open items pending resolution of identified problems. If we are not able to close these items out prior to 120 days before licensing, then a schedule of resolution will be provided for them.
1. 4-12: Will review changeout of this switch.
  2. 5-14, 5-16, 5-19, 5-20, 5-21: Will review problems with Foxboro.
  3. 5-15, 5-38: Will review in the lighting survey item E.3; will submit measurements.
  4. 7-1, 7-2, 7-9: Will review capability of computer system.
  5. 5-26: Will review the use of zone markings. The operational philosophy criteria is to operate to a value not a range.
- E. The following items were not reviewed, as an operating control room is needed. They will be completed by and reported on by 120 days prior to licensing.
1. General Layout: Document organization and storage; spare parts, operating expendables, and tools; supervisor access; and non-essential personnel access.
  2. Emergency Equipment: Storage, access and use.
  3. Environment: Ventilation, noise and light.
  4. CRT displays
  5. Communication within and without control room.

