

From Tony  
12/1/97

Palo Verde Nuclear Generating Station  
 Augmented Inspection Team  
 Issues List

H/H 9

Focus Area	Potential Issues/Apparent Cause	Publish	Tracking	Recommendations
Off-site Power Systems	Reliability of 230kV protective relays	Public	URI 2004012-01	<ul style="list-style-type: none"> <li>1. Verify that Deer Valley and Liberty transmission protective relay schemes have some redundancy.</li> <li>2. Verify that over current protection installed on Arizona Power System transformers connected to Palo Verde 500kV systems.</li> <li>3. Verify that breakers in West Wing and Devers have been modified to include dual trip coils.</li> </ul>
	Independence of 500kV transmission	Public	URI 2004012-02	<ul style="list-style-type: none"> <li>1. Verify that the Hassayampa negative sequence protective relaying modifications were incorporated and are appropriate.</li> </ul>

Information in this record was deleted  
 in accordance with the Freedom of Information  
 Act, exemptions  
 FOIA-2004-0807

Ex2

Ex2

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<b>U1, Atmospheric Dump Valve 185 Failure</b>	Apparent cause was internal control air leakage allowing valve to drift close on low demand signals. [OK] Operator distraction during event.	Public	URI 2004012-03	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Review licensee's use of industry operating experience for AOVs.</li> <li>4. Assess significance of operator distractions during event.</li> </ol>
<b>U1, Letdown Heat Exchanger Isolation Failure</b>	Apparent cause was poor design control, inadequate training on design modification, and inadequate procedures. [OK] Operator distraction during event.	Public	URI 2004012-04	<ol style="list-style-type: none"> <li>1. Review adequacy of temporary modification.</li> <li>2. Review adequacy of training.</li> <li>3. Review adequacy of procedures.</li> <li>4. Assess significance of operator distractions during event.</li> </ol>
<b>U2, Train "A" Emergency Diesel Generator Failure</b>	Apparent cause of EDG failure was failure of diode in exciter rectifier circuit. [OK] Resulted in loss of power to Train "A" ESF busses.	Public	URI 2004012-05	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Review licensee's use of industry operating experience for diodes.</li> </ol>
<b>U3, Bypass Valve 1003 Malfunction</b>	Apparent cause unknown, AOV stroked slower than other valves resulting in excessive U3 cool down.	Public	URI 2004012-06	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Determine if a finding or violation occurred and assess significance.</li> </ol>

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	Less than one-minute after the U3 load reject, the bypass valve controls opened all the bypass valves at once causing a MSIS. This appeared to be an unanticipated control system/electrical power interaction associated with the "re-connection timer."	Public	URI 2004012-07	<ol style="list-style-type: none"> <li>1. Review the electrical characteristics of the U3 event. Focus particularly on how the control cabinets are powered and what role the D-11 static switch had on the controls.</li> <li>2. Review adequacy of past design changes to control cabinets.</li> <li>3. Determine if a design control violation occurred.</li> <li>4. Review extent of condition.</li> <li>5. Assess significance.</li> </ol>
<b>U3; Reactor Coolant Pump Lift Oil Pump Breaker Thermal Overloads</b>	Reactor coolant pump lube oil lift pump circuit breaker thermal overloads are only set 0.1 amp above normal running current. This results in increased probability of breaker tripping and operator distraction during plant recovery.	Public	URI 2004012-08	<ol style="list-style-type: none"> <li>1. Review design of thermal overload protection of RCP lube oil pump breakers.</li> <li>2. Assess significance of delay on plant recovery.</li> </ol>
	Reactor coolant pump starting procedures do not caution operators on potential thermal overload trip if pumps are operated for an extended duration.	Public	URI 2004012-09	<ol style="list-style-type: none"> <li>1. Review design control aspects of modifications to the thermal overload protection of RCP lube oil pump breakers.</li> <li>2. Determine if design control or procedure violation occurred.</li> </ol>

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<b>U3, Low Pressure Safety Injection System In-leakage</b>	<p>Operators were required to manually implement low pressure safety injection system depressurization procedures to prevent over-pressurization.</p> <p>Operator distraction. Licensee apparent cause involved a thermal and hydraulic phenomena that caused the leakage. [Not OK]</p> <p>Most likely apparent cause was mechanical misalignment of Borg-Warner check valves.</p>	Public	URI 2004012-10	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Determine if a finding or violation occurred focusing particularly on the effectiveness of Borg-Warner corrective actions from past issues.</li> <li>4. Focus on whether the licensee is adequately assuring check-valve operability.</li> <li>5. Focus on adequacy of check-valve as-found testing and what the results of as-found testing imply about operability.</li> <li>6. Assess significance.</li> </ol>
<b>Assess difference in U3 response to LOOP.</b>	<p>The Unit 1 and 2 reactors tripped on DNBR and the Unit 3 reactor tripped on VOPT. The Unit 3 response was not the anticipated plant response documented in the FSAR for a LOOP. A review of data indicated that U1, U2, and U3 bus frequency increased to nearly 67Hz, much higher than anticipated. Apparent cause may be associated with turbine control response.</p>	Public	URI 2004012-11	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Focus on the licensee's assessment of the impact of the high frequency (e.g., RCS hydraulic affects, electrical affects @ high frequency, etc.)</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ol>

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	<p>FSAR Section 10.2.2.3.1.4, "Power/Load Unbalance," indicates that.... "The 150 ms delay is based on a three-phase bolted fault at PVNGS 525 kV switchyard as a worst case scenario...." In addition, the FSAR indicates that.... "Associated with the load control unit is a rate sensitive power/load unbalance circuit whose purpose is to initiate control valve fast closing action under load rejection conditions that might lead to rapid rotor acceleration and consequent overspeed."</p> <p>Given the characteristics of the LOOP which occurred @ PVNGS, it appeared that the FSAR did not identify the worst-case scenario.</p>	Public	URI 2004012-12	<ol style="list-style-type: none"> <li>1. Review licensee's assessment of whether the June 14, 2004 LOOP represented a new worst-case scenario and proposed corrective actions to update the FSAR analyses.</li> <li>2. Determine if a finding or violation occurred and assess significance.</li> </ol>

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<b>General Electric Magna Blast Breakers</b> <i>(Issue - apparent cause was not cycled often enough)</i>	<p>Two GE Magna Blast breakers failed to operate upon demand during plant recovery. The licensee's <u>apparent cause was that</u> the breakers "were not cycled often enough." [Not OK] NRC raised issues associated with licensee's apparent cause and planned review.</p> <p><i>- Human factors / performance of safety systems</i></p>	Public	URI 2004012-13	<ol style="list-style-type: none"> <li>Review licensee determination of root and contributing cause(s).</li> <li>Review licensee's extent of condition analysis.</li> <li>Assess licensee corrective actions.</li> <li>Review licensee's use of industry operating experience for GE Magna Blast breakers.</li> <li>Assess whether the issues identified involved any human performance or PI&amp;R aspects.</li> <li>Determine if a finding or violation occurred and assess significance.</li> </ol>
<b>Turbine-Driven Auxiliary Feedwater System</b> <i>(Piping cold H<sub>2</sub>O into hot piping, not control, just Ed H<sub>2</sub>O)</i>	<p>During plant recovery, U1 experienced thermally induced vibration of the feedwater piping.</p> <p><i>- piping cold H<sub>2</sub>O into hot piping, not control, just Ed H<sub>2</sub>O piping</i></p>	Public	URI 2004012-14	<ol style="list-style-type: none"> <li>Review licensee determination of root and contributing cause(s).</li> <li>Review licensee's extent of condition analysis.</li> <li>Assess licensee corrective actions.</li> <li>Determine if a finding or violation occurred and assess significance.</li> </ol>
<i>(ES initial)</i>	<p>Emergency procedures which direct a main steam isolation do not caution operators on the fact that the MSIS isolated TDAFW steam drains. The emergency procedures do not result in the implementation of manual drain processes to ensure TDAFW operability.</p>	Public	URI 2004012-15	<ol style="list-style-type: none"> <li>Review design control aspects of the TDAFW manual drains.</li> <li>Determine if a design control or inadequate procedure violation exists.</li> <li>Assess whether the issues identified involved any human performance or PI&amp;R aspects.</li> </ol> <p><i>1. Review design control aspects of the TDAFW manual drains.</i></p>

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<b>Use of Plant Technical Specifications</b>	Following the 1990 TDAFW overspeed trip, the licensee implemented corrective actions that included the installation of manual drains.	Public	URI 2004012-16	<ol style="list-style-type: none"> <li>1. Review design control aspects of the TDAFW manual drains. - <i>only 1 setting found</i></li> <li>2. Determine if a design control or inadequate procedure violation exists.</li> <li>3. Assess whether the issues identified involved any human performance or PI&amp;R aspects.</li> </ol>
	Assess licensee management emergency response effectiveness in directing the equipment needed to manually drain the TDAFW steam traps away from U2 (the unit with one ESF bus deenergized).	Public	URI 2004012-17	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess significance.</li> </ol>
	Inspectors noted that the licensee did not enter TS LCO's until EOP's directed a review of LCO status. This occurred very late into EOP implementation. In addition, when the LCO was entered, the time clock started when directed in the EOPs. This resulted in LCO entry hours after the condition occurred. If the practice continued, the inspectors were concerned that some TS LCO Action Statements could not be implemented when necessary.  <i>EOP's about 1 hour after entry. That's why access until end of EOP</i>	Public	URI 2004012-18	<ol style="list-style-type: none"> <li>1. Evaluate potential Conduct of Operations and TS violations for the event: <ul style="list-style-type: none"> <li>a. TDAFW operability</li> <li>b. U2 EDG operability</li> <li>c. U2 Train "A" Battery Charger</li> <li>d. U3 Low Pressure Safety Injection</li> <li>e. </li> </ul> </li> <li>2. Assess significance.</li> <li>3. <i>need to assure not bypassed by EOP's. LCO's need to be initiated in EOP's. What's procedure? Start use 5-2-52 X, 52 which used to be 5-2-52</i></li> </ol>

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<b>Technical Support Center Emergency Diesel Generator Trip</b>	Licensee electrician failed to return test switch to the normal position following a test run six-days prior to the event.	Public	URI 2004012-19	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess licensee corrective actions.</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ol>
<i>3, (B)</i> <b>Emergency Response Organization Challenges</b>	Problems were identified with the emergency notification of state and local officials.	Public	URI 2004012-20	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess licensee corrective actions.</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ol>
	Problems were identified with the ability to develop protective action recommendations following a LOOP.	Public	URI 2004012-21	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess licensee corrective actions.</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ol>
	Problems were identified with the implementation of emergency response organization notification of an event.	Public	URI 2004012-22	<ol style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess licensee corrective actions.</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ol>

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<b>U2 Station Battery</b>	Considering the discharge of the U2 station battery, need to evaluate whether battery discharge characteristics are as expected.	Public	URI 2004012-25	<ul style="list-style-type: none"> <li>1. Review licensee determination of root and contributing cause(s).</li> <li>2. Review licensee's extent of condition analysis.</li> <li>3. Assess licensee corrective actions.</li> <li>4. Determine if a finding or violation occurred and assess significance.</li> </ul>

Ex1  
Ex2  
Ex3