From: JAMES, DALE E [mailto:DJAMES@entergy.com]
Sent: Wednesday, February 11, 2015 8:52 AM
To: Pruett, Troy
Subject: ANO Flooding NOV Review Comments

Troy

Attached are some observations from our review of the final significance determination letter on flooding. As Jeff Forbes indicated in his call with Marc Dapas we will not be appealing the violation or the final risk significance. This information is provided for discussion purposes only. I would like to talk briefly about these observation in are call this afternoon.

Thanks

Dale

Arkansas Nuclear One
Review of Final Significance of Yellow Finding and NOV
(IR 05000313/2014010 and 05000368/2014010, EA-14-088)

Comment #	Page / Section	Statement	Review Comment
1.	2/NOV	*The licensee failed to assure that the Unit 1 DH vault drain valves were specified as safety-related, as required to maintain the vaults watertight.*	In response to CR-ANO-C-2014-01477 and documented in CR-ANO-C-2014-02716 (see attached), ANO concluded that the non-safety related classification for ABS-13 and ABS-14 is consistent with the ANO licensing basis. The ANO position on the component classification of ABS-13 and ABS-14 RBS/DH Room Drain Isolation Valves was provided to the NRC Resident in a white paper and will be addressed in the response to the NOV. These valves are maintained closed are in the preventative maintenance program which provides inspection on a periodic frequency, component reliability is maintained.
2.	7/B.2. Final SD	*…there is a single annunciator for all three vaults in Unit 2, and therefore, given flooding in the auxiliary building, operators would be unable to confirm if one or multiple vaults were flooding. Though operators would likely recognize that a flood alarm would be associated with water intrusion from the site flooding event, the combination of the inability to validate the alarm, the lack of indications for individual vaults, and the likely belief by operators that the vaults would not flood since the vaults were thought to be watertight, supported the use of poor ergonomics in the SPAR-H model for human reliability analysis.*	2203.012L, Annunciator 2K12 Corrective Actions (page 92 of 116) provides instructions to provide indication of which room is affected. Specifically, step 2.1 states, "Check Annunciator 2K426 in 2C14 to determine affected room. To allow reflash, acknowledge RIS unit (2K420) in back of 2C-14." The ACA then directs an Operator to be dispatched to the affected room to determine the cause. Also reference E-2193, Schematic Diagram Annunciator Reflash Module 2K426.
3.	8/B.2.a Final	*The NRC determined that the proposed*	2CV-1460 (known as the squeeze valve) is not

	SD	*mitigation strategy/recovery action may not result in adequate flow to the steam generators without further operator diagnosis and action. (Unit 2 SW option)*	required for SW system operation, but exists only to provide a slight backpressure on the SW system in order to force makeup flow to the Cooling Tower (Main Condenser cooling medium). A white paper was provided to the inspector comparing previous SW pressure/flow testing against simulator alignments. The white paper assumed normal non-vital SW loads remained aligned, which results in greater flow and less pressure than would be available if SW were aligned to the accident response mode. The white paper estimated that with the squeeze valve failed open, the SW pressure at the EFW pump suction would be ~69 psig, sufficient to provide sufficient flow to the SG to maintain SG level (margin of ~3 gpm). The inspection report, however, states that SW pressure at the EFW pump suction would be in the order of 55-60 psig. The basis for this assumption is unclear. Although the aforementioned white paper indicated sufficient SW flow and pressure to support maintaining SG level, it was recognized that the estimation was based on simulator modeling and not verified via an actual hydraulic calculation. However, such a calculation was deemed to not be warranted based on proceduralized simplistic action available to raise SW pressure significantly. Based on the information previously provided, it is unclear why the NRC believes SW pressures would be significantly lower than that presented by the licensee, or why elevating SW pressure would be considered a complex scenario.
4.	9/B.2.b Final SD	*Following the Regulatory Conference, NRC inspectors determined that the*	The amount of ingress required to initiate the DH-vault A / B alarm is ~1200 / 850 gal respectively. In

		licensee used assumptions in its decay heat vault flooding analysis that were non-conservative. Specifically, the licensee calculated flows into the vaults assuming empty electrical conduits even though the conduits could be up to 20 percent full of wires. The licensee assumed up to 10 outlets per conduit even though it could be as few as two. The licensee assumed that the conduit high points were at the observed junction boxes even though construction photographs indicated they could be as much as one foot higher than the connection at the junction boxes. The NRC inspectors recalculated the time available between receipt of the decay heat vault alarm and submergence of the service water valves using more realistic assumptions, and determined that the operators would have approximately one hour to diagnose and take action to implement this recovery strategy between the first vault alarm and submergence of the valves.	order to obtain the timing as described in B.2.b of EA-14-088 the flow-rate would have to be reduced considerably. Any reduction in flow-rate that would delay the alarms would also delay the loss of P-35A/B. The increased time the components will be available directly relates to the additional analyses as it would reduce the decay heat load, the required SG makeup flow rate, etc. The method of recovery options would also increase and would extend the time that the DH pumps would be available. Additionally, the assumptions used in the ANO analyses were consistent. In applying modifications to the proposed inflow rates based on system resistance for the DH vaults and not applying the same assumptions to the general AB ingress rates as was done in the referenced finding report, the allotted time before alarm and the time to achieve a water level of 335' in the AB general area is not conservative and would provide questionable results.
5.	11/B.2.c. Final SD	(B.5.b Strategy) *The licensee presented a one-hour timeline for this recovery strategy based on a walkthrough of required actions on dry ground…..While the licensee presented a one-hour time to transport and align the portable pump, the NRC determined that the transport and system alignment time could be greater than seven hours…* *The NRC noted that electrical equipment on the pump skid could be submerged at*	Condition report CR-ANO-C-2014-02804 documented the results of time validating the B.5.b strategy to feed both the Unit 1 and Unit 2 Steam generators IAW OP-1203.048 (Security Event), Attachment J, Sect 10. The B.5.b pump and equipment trailer were timed from the RERTC overflow parking lot to the Protected Area at the Sally Port. RERTC was used as a starting point due to procedural guidance that directs locating the equipment to higher elevations. Also, the Secondary OSC location (RERTC) would be manned due to site flooding. The travel time

		flood levels of 355 feet or higher during transportation on the normal trailer…	required for all normal security checks was included to account for any slower travel that would occur due to postulated flood waters. The time validation to >200 gpm feed to Unit 1 Steam Generators was validated to be less than one hour for each unit and includes an additional 15 minutes added for starting pump, charging fire water hoses, and manipulating plant valves to send water to Steam Generators. In addition, follow-up information was provided to the NRC Resident Inspector regarding transportation of the normal trailer through flood waters. As provided to the NRC Resident Inspector, movement of the portable pump is judged to be practical using normal means (towing) up to a water level of 356'. Specific components that would be wetted or submerged during the fording event were evaluated and no impact due to submergence would be expected.
6.	12/B.3. Final SD	*Failure of expansion boots in the Unit 1 and Unit 2 circulating water system is the highest contributor to risk for internal flooding in both Units…* *The licensee stated that the initiating event frequency for internal flooding for Unit 1 was minimal …* *The NRC agreed that the failure frequency of the circulating water system was lower for Unit 1 than for Unit 2; however, because the circulating water expansion joints in Unit 1 had a metallic component and were not all hard piping as assumed in the licensee's failure probability model, the NRC determined that a more appropriate model of the Unit 1 expansion joints would provide a higher failure frequency for the*	Unit 1 has Rubber expansion joints which have a higher rupture frequency than Unit 2 with metal expansion joints based on EPRI data on pipe rupture frequencies. The initiating event frequency for internal flooding for Unit 1 was not provided since the consequence is insignificant which is based on determination of flood water hydraulics. The frequency and consequence are the basis for change in risk, and since the consequence is minimal, the risk is minimal. The circulating water drains to the lake for Unit 1. See *ANO-1 Internal Flood Risk Assessment of Degraded Flood Barriers.docx*

		circulating water system than provided by the licensee.	
7.	12/B.3 Final SD	*The licensee stated that both units' steam generators would be placed in wet layup, which would provide for additional time to respond to, and recover from, a subsequent loss of decay heat removal. However, according to the operations managers for both units, if the licensee anticipates a short outage and chooses to maintain condenser vacuum, the steam generators would not be placed in wet layup.*	The basis for the Unit 1 Steam Generators to be in a wet layup condition during an external flooding event was provided in a position paper to the NRC Resident Inspector on December 4, 2014. Fist, steps 12 and 13 of Natural Emergencies procedure 1203.025 requires the following the removal of equipment from service AND de-energize power supplies to below-grade equipment prior to flooding and securing of nonessential loads prior to flood waters exceeding elevation 354'. Second, the completion of these steps will require securing the Condensate pumps and Condenser Vacuum pumps located below grade in the Turbine Building basement and lastly, for chemistry control with the secondary system secured, Steam Generators will be placed in a wet layup condition per step 11.9.3 of OP-1102.010 Plant Shutdown and Cooldown and OP-1106.008 OTSG Secondary Fill, Drain, and Layup.