Byron IP 71152 – Information Request – September 09, 2008

Part A. Please send a copy of the following documents and supporting documents to the Region III Office in Lisle IL by September 19, 2008, to support preparation for an on-site NRC baseline inspection in accordance with IP-71152 "Identification and Resolution of Problems." If possible, provide these documents in electronic format (e.g. CD-Rom preferred). Please contact Gerry O'Dwyer (630) 829-9624 or Mel Holmberg – (630) 829-9748 for any questions.

Request No.	Doc Type	Subject	Supporting Documents
		Byron Corrective Actions	
1	Corrective Action Records	ARs 622574, 624329, 649710, 679954, and AR 680626	CAs with due dates, apparent/root
2	Corrective Action Records	Any ARs other than those identified above which have been issued since September 1, 2007, associated with the HUT and/or piping components which discharge into the HUT.	CAs with due dates, apparent/root causes as applicable
3	Corrective Action Records	Provide ARs associated with calculation CN-CRA-00-47 which contained assumptions for HUT level which were not consistent with plant operations (e.g. 80 percent full).	CAs with due dates, apparent/root causes as applicable
4	Drawing	Drawing M-61, Safety Injection System, sheets 1 through 4.	NA

Part B. Please provide a copy of the following documents to the Byron Resident Office by October 6, 2008, to support on-site NRC reviews in accordance with IP-71152 “Identification and Resolution of Problems."

Request No.	Subject	
	Information Associated with Calculations CN-CRA-08-9 and CN-CRA-07-50 associated with the boric acid holdup tank (HUT) tank response to opening of the RHR suction pipe relief valve.	
1	Latest revision of Calculations CN-CRA-08-9 and CN-CRA-07-50, with Byron Station review and acceptance documentation and any other supporting or related calculations.	
2	Was CN-CRA-08-09 site accepted and approved as a Byron design basis calculation? If not, explain.	
3	It is unclear if the inputs of Section 6.2 of CN-CRA-07-50 were verified or peer checked. Were they? Explain.	
4	These calculations do not appear to describe the methodology used. Please identify the methodology used for each calculation.	
5	Different event analyses in these calculations were not defined, and the same events appear to have been designated with multiple names. Also, no clear correlation between the different names (e.g. these discuss different cases, test runs, computer runs, test cases, without definitions). Please clarify the events/scenarios, cases and test runs identified in these calculations.	
6	Calculation CN-CRA-07-50 assumed perfect mixing with respect to hot discharges into the HUT (e.g. locally near nozzles, for the entire tank water volume and for air-gas mixture in HUT). Identify the effects of non-perfect mixing on the calculation results.	
7	These calculations assume 475 gpm at 350 F. If the actual vendor or valve lift test results indicate a greater flowrate will occur than assumed, identify the effects on the calculation results.	
8	During shutdown cooling with two RHR systems in operation, the potential exists for two RHR train suction relief valves (and possibly two pump discharge relief valves) to discharge simultaneously to the HUT. Provide the analysis which identifies the effect of multiple relief valves discharging into the HUT. If no analysis exists, explain why this is not required or identify planned corrective actions.	
9	Calculation CN-CRA-08-9 assumed that design pressure for the air space of the HUT was 15 psig and by inference that the bottom of the HUT was 15 psig + 31'6" of water column. Identify if this is consistent with the tank design specification and design Code, if not identify planned corrective actions.	
10	Section 4.6 of CN-CRA-08-9 stated that Run 1 assumed the initial HUT air gas space is 100% vapor. The HUT tank air-gas space would instead include a non-condensable gas and vapor mixture. Therefore, this assumption is not conservative and would tend to underestimate tank pressure for the scenarios evaluated. Identify the effects on the calculation results.	
11	These calculations indicate that potential for over-pressurization of the HUT tanks exists. Also, this condition applies to both Byron & Braidwood. Identify if this condition has been evaluated in accordance with 10 CFR Part 21 requirements. Explain.	
12	Calculations CN-CRA-07-50 and CN-CRA-08-09 do not address the effect of exceeding 200 F (design basis for HUT - UFSAR 15.7.2.1). Provide the analysis which evaluates the effect on the HUT when exceeding 200F at any location within the HUT. If no analysis exists, identify planned corrective actions.	
13	Calculations CN-CRA-07-50 and CN-CRA-08-09 identify scenarios where the HUT and/or connected piping runs will exceed the design Code temperature (e.g. 200 F) and pressure ratings (e.g. 30 psig - pipe runs to HUT or 15 psig - HUT). Identify the corrective actions	

	which preclude the scenarios which exceed these design conditions.	
	Other Documents	
14	Normal valve lineup for the HUT including the portion of piping systems discharging to the HUT.	
15	Normal, abnormal and emergency/ off-normal operating procedures for the HUT.	
16	Identify pending or planned procedure changes associated with operation of the HUT.	
17	Identify any pending or planned design changes associated with the HUT.	
18	B(w)EP ES-1.3 "Transfer to Cold Leg Recirculation."	
19	Analyses/calculations which establish the post-LOCA maximum allowable emergency core cooling systems (ECCS) leakage.	
20	Drawing M-61, Safety Injection System, sheets 1 through 4 (D size).	
21	P&ID drawings showing HUT and all attached piping back to systems which discharge into the HUT(D size).	
22	Elevation/Isometric drawings of HUT and all attached piping back to systems which discharge into the HUT (D size)	
23	Fabrication drawings for HUT (D size)	
24	Design Specification(s) for HUT and for all piping which discharges into the HUT.	
25	For the installed Residual Heat Removal (RHR) suction and discharge relief valves, the CVCS suction relief valves, and the SI suction relief valves. Provide: a) the design specification. b) the document which establishes the design basis relief valve capacity, temperature range and setpoint.	
26	For the installed RHR suction and discharge relief valves, the CVCS suction relief valves, and the SI suction relief valves. Identify a) the limiting design basis system transient for each of these relief valves (e.g. that limiting transient which valves are required to pass their maximum capacity and to prevent overpressure) and the source of the design basis transient (e.g. UFSAR Section, TS or Design Specification). b) if any potential system transients can exist, which would result in more than one of these relief valves lifting at the same time (e.g. a specific pressure induced transient while in solid plant operation in Mode 3 or 4 with RHR inservice).	
27	Copy of the applicable Edition and Addenda of the design Code for the HUT (e.g. ASME Code Section III).	
28	Identify the applicable design Code for each piping input run which discharge into the HUT and provide a.Copy of the applicable Edition and Addenda of the design Code for these piping runs.	
29	In-situ pump curves for the installed RHR pump with the highest measured shut-off head.	
30	Identify and provide a copy of the document which establishes the RHR minimum pump flows and pressures assumed for the DBA analyses with pump curves.	
31	Completed copies of the last two RHR pump performance verification tests for the RHR pump with the highest measured shut-off head.	
32	Provide the RHR, CVCS and SI system relief valve vendor manuals.	
33	Provide the last two lift test results (as-found and as-left) for the installed RHR suction and discharge relief valves (for the RHR train containing the RHR pump with highest shut-off head). Also provide the last two lift test results (as-found and as-left) for the installed CVCS suction relief valves, and the SI suction relief valves associated with this same RHR train.	
34	Conversion table or formula used for the HUT level with respect to each tank level location referenced in calculations CN-CRA-08-9 and CN-CRA-07-50 (e.g. Tank level as a percent of tank volume with respect to inlet pipes or other referenced locations expressed as inches above tank bottom and/or inches above inlet pipe).	

35	Provide access to a copy of the current UFSAR, TS and TRM at on-site review location.	
	Questions/Requested Evaluations	
1	The inspectors were concerned that the off-site dose consequences could be adversely affected by discharges from the CVCS, RHR and SI system suction relief valves when these systems are aligned in post LOCA recirculation mode as described in UFSAR Section 6.3.2.8, “Manual Actions” and UFSAR table 6.3-7, “Sequence of Switchover Operations”. In this post LOCA configuration, the RHR pumps will be aligned to the suction of the CVCS and SI systems and the inspectors postulated that a fault in one of these relief valves could cause the valve to stick open or leak excessively to the HUT. This relief valve discharge to the HUT would cause the HUT tank to fill up, lifting the HUT safety valve and culminate in increased on-site doses and an off-site release of radioactivity which may not have been evaluated. The post-LOCA release consequences from the recirculation loop outside containment are discussed in Section 15.6.5.5 of the UFSAR. However, it does not appear that this evaluation included the potential for off-site release due to discharges from the RHR, SI or CVCS system relief valves to the HUT. The NRC SER (Section 3.2.3) approving the Alternate Source Term (AST) for Byron does not appear to have considered the possibility of the CVCS or SI system suction relief valves lifting and sending highly contaminated post-LOCA reactor coolant to the HUT post-LOCA. Specifically, Section 3.2.3 stated that “The ECCS is assumed to leak 276,000 cc/hr ….”. This equates to 276 liters/hr or 1.2 gpm. The two SI system suction relief valves have a relieving capacity of at least 25 gpm each (USAR table 6.3-2). Therefore if one SI lifted (due to single active failure or stuck open after a pressure transients (see Question 2)) during the scenario discussed above, it would exceed the ECCS leakage limits approved by the NRC. With regards to the scenario discussed above, does your licensing basis require consideration of the release caused by a failed SI, CVCS or RHR system relief valves during the recirculation phase? If so, identify planned corrective actions. If not, please explain why not, and identify the NRC methodology used which allows excluding this single active component failure in the dose analysis assumptions.	
2	The inspectors were concerned that the normal transitional system alignments to the sump recirculation phase could result in lifting of the CVCS and SI relief valves and create a scenario which would causes these relief valves to open or stick open and adversely affect the offsite dose analysis as described in Question 1. During the period of switchover of the ECCS to the Containment Sump from the RWST it appears that there is a possibility of causing a hydraulic pressure transient within the RHR and CVCS and SI systems which exceed the relief valve setpoints. For example, the shutoff head of the RHR pumps 200 psig together with the containment sump pressure post LOCA (may be about 30 psig -please identify the maximum containment pressure expected at this point **(Request A)**), may exceed the CVCS and SI pumps’ suction relief valves setpoints (220 psig) Is this scenario possible? Explain (e.g. does the procedure sequence of valve alignments preclude this)? **(Request B)** If this scenario is possible, why is it not considered in your ECCS leakage analysis which relies on the AST methodology? (**Request C)**	