

**CALCULATIONAL ERROR AFFECTING THE DESIGN PERFORMANCE OF A SYSTEM FOR CONTROLLING pH OF CONTAINMENT SUMP WATER FOLLOWING A LOCA****DESCRIPTION OF CIRCUMSTANCES**

On September 29, 1977, the Baltimore Gas and Electric Company reported that for Calvert Cliffs Unit 1 and Unit 2, the amount of trisodium phosphate dodecahydrate (TSP) specified in the technical specifications may not be sufficient under all operating conditions to perform its intended design function.

The TSP is used to control the pH of the containment sump water following a LOCA in order to reduce the probability of chloride stress corrosion cracking leading to equipment failure or loss of containment integrity and to ensure low volatility of dissolved radioiodines. At Calvert Cliffs, the TSP is stored in three dissolving baskets located on the lowest level of the containment. Original design specifications (FSAR) required a sufficient quantity of TSP to raise the pH of the sump water to approximately 7.0. The more recent guidance provided by the Standard Review Plan (SRP) states that, for Post Accident Chemistry, the optimum pH control consists of stabilizing pH between 7 and 8 within four hours.

For the Calvert Cliffs facilities, the quantity of TSP required to meet the FSAR design specifications was initially calculated to be 75 cubic feet. However, these calculations were not based on maximum boron concentrations and water volumes permitted by the technical specifications for the containment sump water sources, e.g., Refueling Water Tank (RWT), Safety Injection Tanks (SIT), Boric Acid Tanks (BAT) and the Reactor Coolant System (RCS). Revised calculations indicated that the quantity of TSP required to meet design specifications under worst case conditions was approximately 82 cubic feet.

As a result, administrative controls have been implemented at the Calvert Cliffs facilities to limit the maximum boron concentration in the RWT and SITs to 2200 ppm. The minimum boron concentration specified in the technical specifications will still apply. Although the problem described above occurred at a facility utilizing TSP for pH control of containment sump water, this problem may be applicable to facilities utilizing different methods of pH control of containment sump water e.g., sodium hydroxide (NaOH). This would be the case if chemical requirements for pH control were based on values less than the maximum values for boron concentrations and water volume permitted by the technical specifications for the containment sump water sources.

**Action to be Taken by Licensees and Permit Holders:**

**For all PWR Power Reactor Facilities with an operating license or a construction permit:**

1. If your facility utilizes or plans to utilize a system for pH control of containment sump post LOCA solution, describe what action you have taken or plan to take to assure that the system design specifications will be met for all operating conditions permitted by the technical specifications, as applicable to the containment sump water sources.
2. Report in writing within 45 days for facilities with an operating license and within 60 days for facilities with a construction permit, your plan of action and schedule with regard to Item 1. Reports should be submitted to the Director of the appropriate NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Operations Inspection, Washington, D.C. 20555.

Approved by GAO, B-180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

IE Bulletin 77-04  
November 4, 1977

LISTING OF IE BULLETINS  
ISSUED IN 1977

Bulletin No.	Subject	Date Issued	Issued To
77-03	On-Line Testing of the W Solid State Protection System	9/12/77	All W Power Reactor Facilities with an Operating License or Construction Permit
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77-01	Pneumatic Time Delay Set Point Drift	4/29/77	All Holders of Operating Licenses (OL) or Construction Permits (CP)

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