

# BNL ALARA Center Data Base

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## EVALUATION OF FACTORS AFFECTING RADIATION FIELD TRENDS IN WESTINGHOUSE-DESIGNED PLANTS

**Keywords:** OPERATIONAL AND MAINTENANCE TECHNIQUES;  
RADIATION FIELD TREND; RADIATION FIELD CONTROL; RADIATION  
FIELD; COBALT; WATER CHEMISTRY; STEAM GENERATOR;  
DECONTAMINATION

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**Objectives:** Quantify the effects of cobalt input variations, operational chemistry, steam generator replacements, and decontamination on plant dose rates.

**Comments:** This is a summary of the third report of the Standard Radiation Monitoring Program initiated by Westinghouse and EPRI in 1977. It discusses the evaluation techniques and presents the results of the evaluation.

**Remarks/Potential for dose limitation:** Some of the changes in radiation fields are:

- \* Plant startup with Zircaloy vs Inconel fuel grids: 19% reduction
- \* Coordinated vs Uncoordinated. Chemistry: 15% reduction
- \* Inconel fuel grids without high cobalt impurity vs ones with high impurity: 18% reduction
- \* Overall improvement with initial Zircaloy fuel grids and coord. chemistry: 45% reduction
- \* channel head radiation levels in plants that have replaced steam generators with low Co impurity tubing are 65% of previous levels
- \* The dose rate in channel heads that have been chemically decontaminated builds up to only 60% of pre-decontamination levels
- \* Modified primary coolant chemistry (PCC) results in about 25% lower component dose rates compared with coordinated PCC
- \* An elevated coolant pH results in lower radiation levels by a factor of two compared to modified or coordinated pH
- \* Plants started in 1985 and after have a factor of 2 less doses compared to pre-1985 plants

**References:** Bergmann, C.A., Perock, J.D., "Evaluation of Factors Affecting Radiation Field Trends in Westinghouse-Designed Plants," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 2, pp. 16-23, British Nuclear Energy Society, London, 1992.

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