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STATISTICAL ANALYSIS OF REACTOR WATER DATA

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Principal Investigator:

H.-P. Alder
Paul Scherrer Institute
CH-5232 Villigen-PSI
SWITZERLAND
Phone: +41 56 99 21 11

Project Manager:

H. Loner
Paul Scherrer Institute
CH-5232 Villigen-PSI
SWITZERLAND
Phone: +41 56 99 21 11

Objectives: To show that regression analysis is a simple tool to get an idea of which impurities in a reactor are important for the transport and deposition of Co-60 for further mechanistical studies.

Comments: The reactor water in BWRs is analyzed regularly and it is possible to obtain much information from these analyses. In this work, the regression analysis was chosen to produce empirical models for the Co-60 activity in the reactor water, taking account of other impurities over a time period where the reactor water chemistry was changed dramatically. The most simple regression is the linear regression:

$y = Xa + b$, where

- y vector of dependent variable
- X matrix including one constant predictor and m vectors x_i of explanatory variables
- a estimated parameters
- b residuals of the model compared to the measured values

Remarks/Potential for dose limitation: Mathematical modeling of the primary cooling system helps to see effects in the activity buildup due to changes in the reactor water chemistry. The primary cooling system of a BWR is a very complex system and difficult to model, but various efforts have been made creating mathematical models for radiation control in the primary system.

References: Loner, H., Alder, H.-P., Covelli. B., "Statistical Analysis of Reactor Water Data," *Water Chemistry of Nuclear Reactor Systems 6*, Vol. 1, pp. 200-201, British Nuclear Energy Society, London, 1992.

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