PROJECTED COST BENEFIT FOR FULL SYSTEM CHEMICAL
DECONTAMINATION PROJECTS

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Objectives: To evaluate the cost benefit impact of performing a full system chemical
decontamination under various realistic assumptions, including various recontamination rates,
dollar per person-rem values, costs of the decontamination, and decontamination factors. The
first PWR chemical decontamination in the United States was completed in early 1995 at a cost
of $32M, including the research and development costs and a number of first time expenses.
Estimates are that the next Full System Decontamination (FSD) will cost a utility between $8M
and $13M. For the decontamination to be beneficial to the utility it should pay for itself in
reduced critical path time and/or reduced radiation exposure to the workers. Theoretical as
well as actual recontamination rates have been determined from various sources. These
recontamination rates have been utilized to determine the long-term resultant
decontamination factor and therefore the savings in person-rem exposure that can be achieved
over time.

Comments: The following parameters were assumed for this work:

* Decontamination factors were allowed to vary in three steps, from 5.0 to 7.5 to 10.0
* Cost of a person-rem was assumed to be either $10,000 or $15,000
* Average person-rem expended annually per plant was 200 to 300
* Cost of a critical path hour was assumed as $15,000
* Cost of the FS decontamination project was assumed as $7.5M or $10M or $12.5M
* Recontamination rates were derived theoretically and compared with those obtained from
  various sources

Potential for dose limitation: Assuming the cost of an FSD of $12.5M, $12.5K per
person-rem, and the plant average annual collective dose of 250 person-rem, various initial
decontamination factors (DF) were used. Net savings ranged from a loss of $1.7M for an initial
DF of 5 to a saving of $1.5M for an initial DF of 10. Further analysis showed that the return on
investment is fairly sensitive to the assumed dollar per person-rem cost. The initial
decontamination factor (DF) for breakeven of costs and savings were also evaluated. If the FSD
cost was below $10M then there would be a net saving with an initial DF as low as 5. If the
FSD cost were $12.5 then an initial DF of at least 8 would be required for breakeven.

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