DECONTAMINATION CHEMISTRY: CURRENT ISSUES

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Objectives: Outline the current state of research and experience with the CAN-DECON and CAN-DEREM processes. The issues addressed include:

1) Qualification in the US
2) AP decomposition and waste generation
3) Effects of zinc addition

Comments: The CAN-DEREM process has been qualified for use in PWR full-system decontaminations (FSD) in a major program carried out by Westinghouse in the US. A five step process (CAN-DEREM/AP/CAN-DEREM/AP/CAN-DEREM) was used as the reference case with the CAN-DEREM step applied at 115 °C (240 °F) for 24 hrs using reagent concentrations of 0.1 wt%. Lower concentrations of reagents and/or fewer steps can be used in order to reduce the volume of resin waste.

For AP/CAN-DEREM applications, examination of the projected ion-exchange resin wastes to be produced during a FSD of a PWR suggests that about 4 times more resin is produced by the AP steps than by the CAN-DEREM steps. In addition, application conditions for AP use have not been optimized, inducing decomposition in some cases.

It was observed that the Co-60 contaminated oxide formed in Zn containing coolant was easily removed without an AP pretreatment. The implication is significant in that ion-exchange resin wastes from decontamination could be dramatically reduced for PWR plants using Zn additions since the AP step could be avoided.

Remarks/Potential for dose limitation: To date, 15 CANDU reactor heat-transport-systems (including cores with fuel in place) have been decontaminated with the CAN-DECON process in Canada. In the US, 19 BWR and 5 PWR sub-systems were decontaminated using CAN-DECON.

Since 1987, 15 BWR and PWR sub-systems have been decontaminated using the CAN-DEREM process.

The decontamination factors for these 2 processes is about 5 to 10.

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CANADA R-388

References: Speranzini, R.A., Miller, D.G., and Allsop, H.A., "Decontamination Chemistry: Current Issues," *Fifth Workshop on Chemical Decontamination*, Electric Power Research Institute, Charlotte, North Carolina, 1993.

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