

# BNL ALARA Center Data Base

FRANCE

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## UTILITY DECONTAMINATION EXPERIENCE

**Keywords:** CONTAMINATION REMOVAL; DECONTAMINATION; EMMA

**Principal Investigator:**

**Project Manager:**

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**Objectives:** Develop the EMMA decontamination process used in France.

**Comments:**

- To apply it on stainless steel, the EMMA process uses 2 cycles: an oxidizing step (15 hrs) and a reducing step (5 hrs) at a temperature of 80 C.
- The oxidizing solution is a mixture of  $\text{KMnO}_4$  (0.1% wt), nitric acid (0.013% wt) and sulfuric acid (0.005% wt).
- The reducing solution contains 0.1% wt ascorbic acid and 0.05% wt of citric acid.
- When conditions permit, ultrasound is applied during the treatment.
- The process is effective and relatively easy to implement (stable chemical products, operation at atmospheric pressure).
- It has been used since 1989 for the decontamination of primary pump hydraulic systems.
- Dose rate reduction factor ranges from 6 to 20.

**Remarks/Potential for dose limitation:**

**References:** Dupin, M., "Utility Decontamination Experience," *Fifth Workshop on Chemical Decontamination*, Electric Power Research Institute, Charlotte, North Carolina, 1993.

**Duration:** from: 1989 to: 1993

**Funding:** N/A

**Status:** Completed

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