



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket 50-325/324

OCT 6 1978

MEMORANDUM FOR: G. Knighton, Chief, Environmental Evaluation Branch,
DOR

FROM: J. T. Collins, Chief, Effluent Treatment Systems Branch,
DSE

SUBJECT: TAC 7762, REVIEW OF BRUNSWICK 1 LICENSEE EVENT REPORT
NUMBER 1-78-051 ON A RADIOACTIVE RELEASE

In response to your request dated August 3, 1978, we have completed a review of the events and remedial action reported by the Brunswick Steam Electric Plant in LER No. 1-78-051. The event concerned an onsite radioactive release of approximately 20 to 50 gallons of evaporator bottoms with approximately 0.26 to 0.65 millicuries of mixed radionuclides occurred on April 26, 1978.

In our review, we calculated that an individual dose of <70 mrem/yr resulted from the release which was well below the 1500 mrem/yr corresponding to the limit of 10 CFR Part 20 at the unrestricted area boundary (0.91 miles, NE) and out over Cape Fear River. For this determination, we assumed that:

Wind Direction = NE at 10 to 15 mph for 15 minute release time.
X/Q (average) = 9.4×10^{-7} sec m^{-3} (ground release)
D/Q (average) = 1.7×10^{-8} m^{-2} (ground release)

For the nuclides Mn-54 and Co-60 identified in the LER:
Inhalation Dose Factors

P_i (Mn-54) = 2.5×10^4 mrem/yr per uCi/ m^3
 P_i (Co-60) = 3.2×10^4 mrem/yr per uCi/ m^3

Food and Ground Dose Factors

P_i (Mn-54) = 1.1×10^9 $m^2 \cdot$ (mrem/yr) per uCi/sec
 P_i (Co-60) = 4.6×10^9 $m^2 \cdot$ (mrem/yr) per uCi/sec

$Q = \frac{0.65 \text{ mCi} (10^3 \text{ uCi/mCi})}{15 \text{ minutes} (60 \text{ sec/min})} = 0.72 \text{ uCi/sec (assumed)}$

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$$\begin{aligned} \text{Dose} &= \sum_i [P_i (X/Q) + P_i (D/Q)] Q \\ &= [(2.5 + 3.2)(10^4)(9.4)(10^{-7}) + (1.1 + 4.5)(10^9)(1.7)(10^{-8})] 0.72 \\ &= 70 \text{ mrem/yr (assuming that the total release was airborne)} \end{aligned}$$

Since most of the released fluid settled near the loading dock, this is a conservative calculation. The onsite and offsite sampling program to assess any possible environmental impact did not produce any reportable concentrations in soil, water and vegetation, and no individual offsite was exposed to concentrations in excess of 60 CFR Part 20.

The LER 1-78-051 does not follow the guidelines of NUREG-0161, "Instructions for Preparation of Data Entry Sheets for LER File," July 1977. The root cause of the event was the malfunction of the concentrated waste tank heaters due to corrosion that had been out-of-service for about 11 months. The LER reports subsequent events that resulted in the release, action taken to correct the contributing problems and personnel error, but does not address remedial action on the root cause. We recommend that the licensee provide this additional information by amendment to the LER.

Enclosed is a list of our recommendations to reduce personnel error-- often leading to unplanned radioactive releases.

ORIGINAL SIGNED BY
JOHN T. COLLINS

John T. Collins, Chief
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