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CONTAMINATION OF NONRADIOACTIVE SYSTEM AND RESULTING POTENTIAL FOR UNMONITORED, UNCONTROLLED RELEASE OF RADIOACTIVITY TO ENVIRONMENT

Description of Circumstance

At the Brunswick Nuclear Facility, the auxiliary boiler was operated for an extended period of time, with radioactively contaminated water in the boiler at levels up to 2×10^2 micro curies per milliliter. A tube leak in the firebox of the oil fired auxiliary boiler resulted in an unmonitored, uncontrolled release of radioactivity to the environment.

The initial contaminating event was caused by the use of a temporary heating hose from the auxiliary boiler to a radioactive waste evaporator concentrate tank. Upon cooling and condensation of the steam in the temporary hose, contaminated water siphoned from the concentrate tank back to the auxiliary boiler. Due to additional, continuing leaks in the heat exchanger of the waste evaporator (to which the auxiliary boiler also provides process steam), the licensee's efforts to decontaminate the auxiliary boiler feedwater had been ineffective.

Maintenance of proper boiler chemistry was difficult because blowdown options were severely restricted due to the contamination. As a result, a boiler tube failure caused on the order of 100 millicuries of radioactive material to be released off-site via the auxiliary boiler fire box and smokestack in the form of steam. This resulted in increased environmental levels of cesium and activation products being detected as far as eight miles downwind from the site boundary.

Action to be Taken by Licensee with an Operating License

1. Review your facility design and operation to identify systems that are considered as nonradioactive (or described as nonradioactive in the FSAR), but could possibly become radioactive through interfaces with radioactive systems, i.e., a nonradioactive system that could become contaminated due to leakage, valving errors or other operating conditions in radioactive systems. In particular, special consideration should be given to the following systems: auxiliary boiler system, demineralized water system, isolation condenser system, PWR secondary water clean-up system, instrument air system, and the sanitary waste system.
2. Establish a routine sampling/analysis or monitoring program for these systems in order to promptly identify any contaminating events which could lead to unmonitored, uncontrolled liquid or gaseous releases to the environment, including releases to on-site leaching fields or retention ponds.

3. If these nonradioactive systems are or become contaminated, further use of the system shall be restricted until the cause of the contamination is identified and corrected and the system has been decontaminated. Decontamination should be performed as soon as possible. However, if it is considered necessary to continue operation of the system as contaminated, an immediate safety evaluation of the operation of the system as a radioactive system must be performed in accordance with the requirements of 10 CFR 50.59. The 10 CFR 50.59 safety evaluation must consider the level of contamination (i.e., concentration and total curie inventory) and any potential releases (either routine or accident) of radioactivity to the environment. The relationship of such releases to the radioactive effluent limits of 10 CFR 20 and the facility's Technical Specification and to the environmental radiation dose limits of 40 CFR 190 must also be evaluated. The record of the safety evaluation must set forth the basis and criteria on which the determination was made.
4. If it is determined in the 10 CFR 50.59 safety evaluation that operation of the system as a radioactive system is acceptable (i.e., does not involve an unreviewed safety question or a change to the Technical Specifications), provisions must be made to comply with the requirements of 10 CFR 20.201, General Design Criterion 64 to 10 CFR 50, Appendix I to 10 CFR 50 and the facility's Technical Specifications. In specific, any potential release points must be monitored and all releases must be controlled and maintained to "As Low As is Reasonably Achievable" levels as addressed in Appendix I to 10 CFR 50 and within the corresponding environmental dose limits of 40 CFR 190. However, if in the 10 CFR 50.59 determination it is determined that operation of the system as a radioactive system does constitute an unreviewed safety question or does require a change to the Technical Specifications, the system shall not be operated as contaminated without prior Commission approval.

Actions taken in response to Items 1 and 2 above shall be completed within 45 days from the date of this Bulletin. A verification letter shall be submitted within an additional 15 days to the Director of the appropriate NRC Regional Office. This letter shall document the completion of the required actions but need not delineate the specific actions taken. The specifics shall be documented and made available to the NRC for review during future onsite inspection efforts.

For facilities with a construction permit, no action is required. The Bulletin is provided for information. The subject of the Bulletin and the action required of operating plants should prove useful in the planning of systems designs and future operations.

Approved by GAO, B180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

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Enclosure

RECENTLY ISSUED
IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-09	Hydramotor Actuator Deficiencies	4/17/80	All power reactor operating facilities and holders of power reactor CPs
80-08	Examination of Containment Liner Penetration Welds	4/7/80	All power reactors with a CP and/or OL no later than 4/7/80
80-07	BWR Jet Pump Assembly Failure	4/4/80	All GE BWR-3 and BWR-4 facilities with an OL
80-06	Engineered Safety Feature (ESF) Reset Controls	3/13/80	All power reactor facilities with an OL.
80-05	Vacuum Condition Resulting In Damage To Chemical Volume Control System (CVCS) Holdup Tanks	3/10/80	All PWR power reactor facilities holding OLs and to those with a CP
80-04	Analysis of a PWR Main Steam Line Break With Continued Feedwater Addition	2/8/80	All PWR reactor facilities holding OLs and to those nearing licensing
80-03	Loss of Charcoal From Standard Type II, 2 Inch, Tray Adsorber Cells	2/6/80	All holders of Power Reactor OLs and CPs
80-02	Inadequate Quality Assurance for Nuclear Supplied Equipment	1/21/80	All BWR licenses with a CP or OL
80-01	Operability of ADS Valve Pneumatic Supply	1/11/80	All BWR power reactor facilities with and OL
79-01B	Environmental Qualification of Class IE Equipment	1/14/80	All power reactor facilities with an OL