

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

October 19, 1979

IE Circular No. 79-21

PREVENTION OF UNPLANNED RELEASES OF RADIOACTIVITY

Numerous incidents of unplanned releases of radioactivity have been reported to the NRC within the past few months. These incidents of leaks, overflows and spills have resulted in contamination of areas outside of plant buildings. The attached table provides you with summary information on these events, their apparent causes, the radiological consequences and the corrective actions.

We believe that a number of these incidents could have been avoided and preventive actions for these types of unplanned releases should be instituted by all reactor licensees. Based on the reported incidents, the following preventive measures can minimize the occurrence of such events.

1. Review of procedures for transfer of radioactive liquids. Errors in written procedures have led to mistakes in valve line-ups and tank overflows. Written procedures, including check lists for valve line-ups, should be developed and followed for operations which could cause spills of radioactivity. Management controls, including audits, should be employed to assure verbatim compliance with such procedures.
2. Review of "as built" systems having the potential of inadvertent releases because of design or construction errors. Consider items such as:
 - a. Tank overflows should be routed to liquid radwaste tanks.
 - b. Storm drains should be located away from areas with a high potential for spills.
 - c. Consideration should be given to drip pans under equipment, such as pumps and valves, from which leakage is expected.
 - d. Cofferdams should be installed under doors to areas with a potential for radioactive spills.
 - e. Preoperational testing should verify that crossconnects do not exist that would permit radioactivity to flow from operating unit(s) to unit(s) under construction.
3. Periodically functionally test and perform inspections to verify integrity of systems that could cause an inadvertent release. Excessive wear and corrosion degradation have occurred in valves, seals and piping systems to cause leaks. New permanent and temporary piping systems should be

hydrostatically tested prior to first use. Underground piping should be periodically hydrostatically tested. Preventive maintenance programs should be implemented and identified problems, such as leaking equipment and plugged floor drains, should be promptly repaired.

No written response to this Circular is required. If you require additional information regarding this subject, contact the Director of the appropriate NRC Regional Office

Enclosure:
Recent Events of Radioactive
Contamination

RECENT EVENTS OF RADIOACTIVE CONTAMINATION OUTSIDE BUILDINGS

| Plant | Date | Apparent cause | Radiological Consequence | Licensee Followup Action |
|------------------|---------|---|---|--|
| Turkey Point 3/4 | 6/11/79 | Operator Error 900 gallons of water processed by radwaste system overflowed from waste processing tank because of error in valve line-up. The Aux. Bldg. floor drain backed up to the on-site storm drain. The drain system discharged to an on-site underground tile bed. | Total of 0.01 mCi of Co-58 Co-60 released to storm drain | Procedure reviewed with operator. |
| Palisades | 6/9/79 | Inadequate Procedures Contaminated secondary system spent powdered resins were transferred to an outside storage bin without monitoring. Rain storm caused resins to overflow the storage bin and be washed to Lake Michigan via storm drain. | Resins activity at 10^{-5} $\mu\text{Ci}/\text{cc}$; total release about 10 μCi of Co-60 | The monitoring procedure to determine the routing of the secondary spent resins has been replaced by a procedure requiring all spent secondary system resins to be handled and shipped as solid waste. |
| Surry 2 | 5/21/79 | Equipment Failure. Core spray pump isolation valve leaked during RWST transfer to Spent Fuel Pit. Water leaked to Safeguards Bldg. floor. Floor drain plugged; resulted in water flow out of building. | 5 gallons spilled; 2 gallons outside of bldg. 0.02 $\mu\text{Ci}/\text{cc}$, Co-58 0.035 $\mu\text{Ci}/\text{cc}$, H-3. | Leak repaired Three 55-gallon drums of contaminated dirt removed |

| Plant | Date | Apparent Cause | Radiological Consequence | Licensee Follow-up Action |
|--------------|--------------------|---|---|--|
| Oconee 3 | 5/16/79 5/17/79 | Operational Error. Normally closed valve left open during pumping of fuel transfer canal water to BWST. Water overflowed the BWST to Aux. Bldg. penetration room, down a stairway to area outside Aux. Bldg. | 2000 gallons overflowed; 200-300 gallons out of building. ⁴ 3.1 x 10 ⁻⁴ µCi/cc, I-131. | Procedure reviewed with operating personnel. Areas outside of Aux. Bldg. decontaminated. |
| Farley 1/2 | 5/14/79 | Design Error. Decontamination drains from Unit 1 routed to Unit 2 sump and released to flush pond via tendon access area. Those drains should have been routed to Unit 1 floor drain system. | 1860 gallons of contaminated water discharged to pond. Estimated maximum activity of 10 mCi - Co-58. Pond mud activity < 500 pCi/Kg. No pond water activity detected. | Review all drains from Unit 1 and Unit 2. Six such drains were located and plugged. |
| Oyster Creek | 4/17/79 | Equipment Failure. Leakage from a Drywell Equipment Drain Tank (DEDT) line. | Water in pipe tunnel @ 0.3 µCi/cc and soil in vicinity of penetration to the reactor building were found to be contaminated. | DEDT line repaired. Structure to enclose pipe from Rx. Bldg. to main pipe tunnel to constructed. |

Enclosure
IE Circular No. 79-21
Page 2 of 3

| Plant | Date | Apparent Cause | Radiological Consequence | Licensee Follow-up Action |
|-------------|----------|---|---|--|
| Brunswick 1 | 5/8-9/79 | Operator Error and Equipment Failure. Air mixing valve of RWCU backwash tank left open after liquid transfer. Dried tank residue released to building ventilation system via loose access cover. | Total release of 12 mCi of corrosion product. | Tank transfer procedure reviewed. Caution tag on valve installed. Loose access cover repaired. |
| Hatch 1/2 | 3/20/79 | Construction Error. Buried temporary line for N ₂ tank in yard for feed-water heaters was not capped after tank removal. Rx steam released into ground from buried line. | Highest on-site ground water of 3×10^5 pCi/l - H ₃ Highest qtr. avg. off-site outfall of subsurface drainage was 1.8×10^3 pCi/l. | Temporary line broken inside turbine building and capped. |
| North Anna | 9/25/79 | Construction Error Relief valve on the volume control tank lifted thus transferring reactor coolant to the high level waste drain tank and releasing dissolved noble gases to the auxiliary building via the waste system vent. An incorrectly connected vent line allowed venting directly to the auxiliary building. | Airborne radioactivity levels in the Auxiliary Building reached 150 X MPCs. Auxiliary Building was evacuated. | Still under investigation |

Enclosure
IE Circular No. 79-21
Page 3 of 3

LISTING OF IE CIRCULARS ISSUED IN
LAST SIX MONTHS

| Circular No. | Subject | Date of Issued | Issued to |
|----------------------------|---|----------------|---|
| 79-21 | Prevention of Unplanned Releases of Radioactivity | 10/19/79 | All Power Reactor Operating facilities and all facilities having a CP |
| 79-20 | Failure of GTE Sylvania Relay, Type PM Bulletin 7305, Catalog 5U12-11-AC With A 120V AC Coil | 9/24/79 | All Power Reactor Operating facilities and all utilities having a CP |
| 79-19 | Loose Locking Devices on Ingersoll-Rand Pumps | 9/13/79 | All Power Reactor Operating facilities and all utilities having a CP |
| 79-18 | Proper Installation of Target Rock Safety-Relief Valves | 9/10/79 | All Power Reactor Licensees with a CP and/or OL |
| 79-17 | Contact Problem in SB-12 Switches on General Electric Company Metalclad Circuit Breakers | 8/14/79 | All Power Reactor Licensees with a CP and/or OL |
| 79-16 | Excessive Radiation Exposures To Members Of The General Public And A Radiographer | 8/16/79 | All Radiography Licensees |
| 79-15 (Correc- tion) | Bursting of High Pressure Hose and Malfunction of Relief Valve "O" Ring in Certain Self-Contained Breathing Apparatus | 8/22/79 | All Research Reactors |
| 79-15 | Bursting of High Pressure Hose and Malfunction of Relief Valve "O" Ring in Certain Self-Contained Breathing Apparatus | 8/8/79 | All Materials Priority I, Fuel Cycle and Operating Power Reactor Licensees |
| 79-14 | Unauthorized Procurement and Distribution of XE-133 | 7/13/79 | All Medical Licensees except Teletherapy Medical Licensees and to all Radiopharmaceutical Suppliers |

LISTING OF IE CIRCULARS ISSUED IN
LAST SIX MONTHS

| Circular No. | Subject | Date of Issue | Issued to |
|--------------|--|---------------|---|
| 79-13 | Replacement of Diesel Fire Pump Starting Contactors | 7/13/79 | All Power Reactor Operating Facilities and all Utilities having a CP |
| 79-12 | Potential Diesel Generator Turbocharger Problem | 6/28/79 | All Power Reactors Operating Facilities and all Utilities having a CP |
| 79-11 | Design/Construction Interface Problem | 6/27/79 | All Applicants for, and Holders of Power Reactor CPs |
| 79-10 | Pipefittings Manufactured from Unacceptable Material | 6/26/79 | All Power Reactor Licensees with a CP and/or OL |
| 79-09 | Occurrences of Split or Punctured Regulator Diaphragms In Certain Self Contained Breathing Apparatus | 6/22/79 | All Materials Priority I, Fuel Cycle and Operating Reactor Licensees |
| 79-08 | Attempted Extortion - Low Enriched Uranium | 5/18/79 | All Fuel Facilities Licensed by NRC |
| 79-07 | Unexpected Speed Increase of Reactor Recirculation MG Set Resulted in Reactor Power Increase | 5/2/79 | All Holders of BWR OL's or CP's |
| 79-06 | Failure to Use Syringe and Bottle Shields in Nuclear Medicine | 4/19/79 | All Holders of Medical Licensees except teletherapy licensees |