

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

February 13, 2008

**NRC REGULATORY ISSUE SUMMARY 2008-03
RETURN/RE-USE OF PREVIOUSLY DISCHARGED
RADIOACTIVE EFFLUENTS**

ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel, and fuel cycle licensees.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to clarify its regulations related to controls over previously discharged radioactive materials in gaseous or liquid effluents that are returned from the environment to an operating nuclear power facility or to an operating nuclear fuel cycle facility. This RIS requires no action or written response on the part of an addressee.

BACKGROUND INFORMATION

During an NRC inspection at the Wolf Creek Generating Station, NRC inspectors found that tritium was present in the fire protection system as a result of using Coffey County Lake as a water supply. The Coffey County Lake is in the unrestricted area and serves as the plant's ultimate heat sink and recipient of discharges of radioactive liquid effluents.

As part of its operations, the Wolf Creek plant releases radioactive liquid effluent (primarily tritium) into the Coffey County Lake in accordance with NRC regulations and its Offsite Dose Calculation Manual. The lake water contains an average tritium concentration of approximately 13,000 picocuries per liter. The NRC has determined that there is very little risk significance to this concentration of radioactivity and that prior effluent disposals were within the criteria of Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as Is Reasonable Achievable' for Radioactive Material in Light-Water-Cooled Power Reactors," to Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," of the *Code of Federal Regulations* (10 CFR Part 50).

ML072120368

The water supply for the Wolf Creek fire protection system is the Coffey County Lake and, thus, the fire protection system contains tritium that has been returned from the environment to the plant. During routine maintenance of the fire protection system, workers flush the system by opening the onsite fire hydrants and discharging the fire system water onto the ground. Most of the water returns to the lake as surface water runoff. The Wolf Creek plant also draws large amounts of cooling water from the lake into its circulating water and service water systems, which is then promptly returned to the lake.

SUMMARY OF ISSUE

The NRC inspector questioned whether the discharge of fire protection system water containing tritium was subject to the radiological survey requirements in 10 CFR Part 20, "Standards for Protection Against Radiation," Subpart F, "Surveys and Monitoring," and the effluents disposal requirements of 10 CFR Part 20, Subpart K, "Waste Disposal."

The NRC has determined that radioactive material properly released in gaseous or liquid effluents to the environment is not considered licensed material when returned to the facility as long as the concentration of radioactive material does not exceed 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," exempt concentration limits (otherwise a general or specific license is required). The water containing radioactive material returned from the environment can be used by the licensee and returned to the environment without being considered a new radioactive material effluent release. The basis for this determination is that the licensee has already accounted for this radioactive material when the effluent was originally released, provided that the subsequent use, possession, or release does not introduce a new significant dose pathway to a member of the public, as explained below.

Licensees are responsible for evaluating any new exposure pathways and the resultant radiological hazards associated with the return of radioactive material to the operating facility and its subsequent discharge to the environment. As described in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, issued October 1977, licensees must evaluate any new exposure pathways to members of the public that contribute 10 percent or more of the total effluent dose and include these dose assessments in their demonstration of compliance with Appendix I to 10 CFR Part 50.

Furthermore, before returning radioactive materials to the environment, licensees must demonstrate that these radioactive materials were previously disposed of in accordance with 10 CFR 20.2001(a)(3), or that the material is naturally occurring background radiation. Radioactive material, previously not accounted for as an effluent, that is entrained with returned/re-used water must be considered a new effluent disposal per 10 CFR 20.2001.

This RIS applies to radioactive material in gaseous and liquid effluents, and does not apply to radioactive material in solid materials or soil. Nothing in this RIS is intended to alter the requirement for decommissioning facilities to account for all radioactive material resulting from activities under the licensee's control. During decommissioning, licensees must meet the decommissioning standards of 10 CFR Part 20, Subpart E as they apply to residual radioactivity as that term is defined in 10 CFR 20.1003.

This RIS provides two example scenarios that may occur during plant operations. The first is the return and re-use of lake water containing radioactive material by the licensee (as at Wolf Creek), and the second is the return of radioactive material to the site as the result of a natural process, such as rainfall, or through equipment condensation.

In the first scenario, the licensee uses lake water containing previously disposed radioactive material in its plant secondary systems and then subsequently releases that lake water back to the environment. The licensee has evaluated the dose to members of the public under its radiological effluent controls program and determined that there were no new exposure pathways (contributing 10 percent or more of the total dose from all effluent pathways) resulting from the release of the lake water. In addition, the licensee verified that the concentration of radioactive material in the re-used lake water remains within the 10 CFR Part 30 exempt concentration limits and that the discharge of such lake water does not involve the entraining of any unaccounted for radioactive materials. Therefore, the licensee can release the lake water back to the environment, and will not be subject to any additional disposal requirements of 10 CFR 20.2001, "General Requirements." The same applies for other receiving bodies of water (i.e., river or coastal waters) where discharged effluents are returned to the site.

In the second scenario, a licensee disposes of radioactive material within gaseous effluents to the atmosphere in accordance with 10 CFR 20.2001(a)(3), and that radioactive material returns to the licensed facility as part of a natural process, such as rainfall, or through equipment condensation. The radioactive material is subsequently discharged through a drain line to a receiving body of water in the unrestricted area. The licensee has evaluated the radiological hazards to members of the public with the same results as in the first scenario. Thus, the subsequent discharge of this radioactive material would not be subject to additional disposal requirements, provided that the concentration of radioactive material in the discharge remains within the 10 CFR Part 30 exempt concentration limits and that the discharge of such water does not involve the entraining of any unaccounted for radioactive materials.

BACKFIT DISCUSSION

The RIS communicates the NRC's staff position based upon interpretation of current Part 20 regulations in relation to the scenarios described in the RIS. The staff position communicated in this RIS does not impose any new requirements on licensees and thus does not impose any modification or addition to a structure, system, component, or design of a facility; to the design approval or manufacturing license for a facility; or to the procedures or organization required to design, construct, or operate a facility. Consequently, the staff position communicated by issuing this RIS will not meet the criteria of a backfit under 10 CFR 50.109(a).

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the *Federal Register* because this RIS is informational and pertains to a staff position that does not represent a departure from current regulatory requirements and practice.

CONGRESSIONAL REVIEW ACT

This RIS is not a rule as designated by the Congressional Review Act (5 U.S.C. §§ 801 - 808).

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. §§ 3501 - 3520). Existing requirements were approved by the Office of Management and Budget (OMB), approval numbers 3150-0009, 3150-0011, and 3150-0014.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

CONTACT

This RIS requires no specific action nor written response. If you have any questions about this summary, please contact the individual listed below or the appropriate regional office.

/RA/

Robert C. Pierson, Director
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

/RA/

Michael J. Case, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Technical Contacts: Steven Garry
301-415-2766
E-mail: smg2@nrc.gov

Mike Shannon
817-860-8215
E-mail: mps1@nrc.gov

Note: NRC generic communications may be found at the NRC public website at <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. §§ 3501 - 3520). Existing requirements were approved by the Office of Management and Budget (OMB), approval numbers 3150-0009, 3150-0011, and 3150-0014.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

CONTACT

This RIS requires no specific action nor written response. If you have any questions about this summary, please contact the individual listed below or the appropriate regional office.

/RA/
Robert C. Pierson, Director
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

/RA/
Michael J. Case, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Technical Contacts: Steven Garry
301-415-2766
E-mail: smg2@nrc.gov

Mike Shannon
817-860-8215
E-mail: mps1@nrc.gov

Note: NRC generic communications may be found at the NRC public website at <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

DISTRIBUTION:

RIS File
R/F IHPB

ADAMS ACCESSION NUMBER: ML072120368

OFFICE	DIRS:IHPB	DIRS:IHPB:TL	Tech Editor	DIRS:D	FSME:DMSSA
NAME	SGarry	RPedersen	HChang (via email)	FBrown	RLewis (via email)
DATE	10/10/2007	10/23 /2007	8/3/2007	10/23 /2007	1/18/2008
OFFICE	DIRS:ITSP:BC	DORL:D	OE	OGC (NLO)	NMSS
NAME	TKobetz	CHaney	CCarpenter	APessin	YChen
DATE	11/15/2007	11/21/2007	11/15/2007	12/11/2007	11/21/2007
OFFICE	OGC (CRA)	PMDA	OIS	DPR:PGCB:LA	DPR:PGCB
NAME	MBarkman	LHill	MJanney	CHawes CMH	AWMarkley
DATE	11/27/2007	11/14/2007	11/23/2007	01/28/2008	01/29/2008
OFFICE	DPR:PGCB:BC	NMSS:FCSS	DPR:D		
NAME	MMurphy	RCPierson	MCase		
DATE	02/08/2008	11/26/2007	02/13/2008		

OFFICIAL RECORD COPY