INSPECTION PROCEDURE 84523

LIQUIDS AND LIQUID WASTES (PREOPERATIONAL AND SUPPLEMENTAL)

PROGRAM APPLICABILITY: 2513, 2515, and 2525

84523-01 INSPECTION OBJECTIVES

01.01 Determine whether the components and installation of the liquid waste system are as described in the FSAR; whether the applicant has conducted preoperational tests of these waste systems to verify operability; whether the applicant's liquid effluent and process monitoring program is adequate and conforms to the FSAR description, and whether preoperational, startup, and operational procedures have been written and approved.

01.02 Determine whether procedures, instrumentation, and equipment to sample and handle radioactive liquids under accident conditions are adequate and operational.

84523-02 INSPECTION REQUIREMENTS

02.01 Liquid Waste System Construction and Installation. Verify that the liquid waste system is built and installed as described in the FSAR and that liquid waste system components have been adequately shielded.

02.02 Liquid Leakage, Overflow, and Spillage. Determine by observation whether the liquid waste system incorporates provisions to prevent and collect leakage, overflows, and spillage.

02.03 Liquid Sampling

a. Determine the adequacy of primary coolant, process and effluent liquid sampling systems for normal operations.

b. Determine the adequacy of provisions for sampling primary coolant (post-accident sampling system), process liquids, and effluents under accident conditions.

02.04 Test Program for Liquid Waste System. Determine whether the test program for the liquid waste system is adequate and observe the performance of preoperational tests of the liquid waste system.

02.05 Test Results Completion for Liquid Waste System. Determine whether appropriate tests of the liquid waste system have been completed.

02.06 Liquid Process and Effluent Monitors. Determine the adequacy of installation, calibration, and testing of liquid process and effluent monitors for the liquid waste system.

02.07 Programs, Plans and Procedures for Liquid Waste and Effluent Systems. Determine the adequacy of the applicant's documented programs, plans, and procedures for liquid waste and effluent systems for normal operations.

84523-03 INSPECTION GUIDANCE

03.01 Liquid Waste System Construction and Installation

a. Comparison of the systems as built and installed with the description in the FSAR may include consideration of type, quantity, and capacity of components and systems, and pumps, tankage, and piping.

b. For radioactive monitors providing alarm and automatic termination of release, sufficient pipe run should exist between the detector and isolation valve to ensure timely isolation of the discharge.

c. Liquid effluent monitors should be easy to decontaminate and replace (smooth finishes, flushing/chemical connections, easily removable shielding).

   Any changes should be supported by an FSAR amendment or an evaluation demonstrating that the change does not alter the technical content of the FSAR.

d. Regulatory Guide 1.143 and ANSI/ANS-N55.6-1979 recommend that the design, operation, and maintenance of the liquid or radwaste system be such that radiation exposures to plant personnel be maintained ALARA.

03.02 Liquid Leakage, Overflows, and Spillage. Design guidance is provided in Regulatory Guide 1.143.

03.03 Liquid Sampling

a. 1. Guidance on good design practice is included in Standard Review Plan Section 9.3.2, "Process and Post-Accident Sampling Systems," and Section 11.5, "Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems."

   2. Sample collection points should be easily accessible, properly shielded, and properly ventilated.

   3. Lists of typically required sampling locations are provided in Standard Review Plan Sections 9.3.2 and 11.5. Consideration of the adequacy of sample collection systems for obtaining routine grab samples may include:

      (a) Normal nonradioactive systems (e.g., service water, demineralized water, auxiliary boiler water, potable water).

      (b) Normal nonradioactive components, such as collection tanks.

      (c) Sampling from control sample stations to reduce leakage, spillage, and radiation exposure.

      (d) Provisions to purge and drain sample lines back to the system of origin or to an appropriate waste treatment system.

b. 1. Use the applicable guidance in 03.03.a, above, in examining the licensee's system for sampling process streams and effluents under accident conditions. See also NUREG-0737, Items II.B.2 and II.B.3, Standard Review Plan Section 9.3.2, and the licensee's Emergency Plan and Implementation Procedures.

2. Consider other specifications applicable to the Post-Accident Sampling System (NUREG-0737, Item II.B.3, Clarification Item 11 and Standard Review Plan Section 9.3.2, Clarification Item 5.c). There should be provisions for:

(a) Purging sample lines.

(b) Minimizing sample loss or distortion.

(c) Preventing blockage of sample lines.

(d) Appropriate disposal of samples.

(e) Flow restrictions or remotely operated isolation valves to limit reactor coolant loss from rupture of sample lines.

(f) Samples shall be representative of reactor coolant in the core area.

(g) Sample lines should be as short as possible to minimize the volume of fluid taken from containment.

(h) If inline monitoring is used, the licensee must provide backup sampling through grab samples.

3. Consider adequacy of shielding of the sampling station, which is considered a vital area in case of an accident.

4. Consider the adequacy of procedures for taking, handling, and transporting samples safely.

5. Laboratory analyses are covered in IP 84525.

03.04 Test Program for Liquid Waste System

a. The applicant should have a detailed test program for the liquid radwaste system including:

1. Test prerequisites (inspections, checks, etc., and a sign-off).

2. Test records.

3. Flushing, cleaning, wiring check, leak tightness tests.

4. Requirements for initial calibration of instrumentation before system testing.

b. The applicant should have a program for review, evaluation, and approval of test results including evaluation and acceptance criteria.

c. Witness one or more tests of waste management systems if convenient. (Do not make extra inspection trips for this purpose.) Determine whether the tests are being performed in accordance with test program requirements.

03.05 Test Results Completion for Liquid Waste System

a. Operational performance tests on the radwaste treatment system should include verification of:

1. System design flow rates and differential pressures.

2. Mechanical equipment operability.

b. Capacity of tanks should be verified.

c. Tests of sampling systems to demonstrate that samples are representative should include:

1. Verification of sample line input and source.

2. Operability of purge and recycle of sample lines.

3. Determination of recirculation times for holdup tanks to ensure that contents are thoroughly mixed before sampling.

d. Tests of operability of system isolation features should include verification that auto-isolation fails in the closed position.

03.06 Liquid Process and Effluent Monitors

a. The installation of all liquid process and effluent monitors (radiation, differential pressure, flow rate, level indicators) that are included in the FSAR should be verified. A list of monitors typically required is included in Standard Review Plan Section 11.5, which incorporates some guidance on good design practice.

b. Monitoring instrumentation should provide for representative monitoring with adequate detection capability, sensitivity, and range (technical specifications and ANSI N42.18), and accessibility under accident conditions.

c. Requirements and guidance on calibration and testing of effluent monitors are contained in the technical specifications, Regulatory Guide 1.21, and Regulatory Guide 4.15.

03.07 Program Plans and Procedures for Liquid Waste and Effluent Systems

a. Relevant procedures are listed in Appendix A of Regulatory Guide 1.33; these procedures are usually required by technical specifications.

b. Procedures for liquid releases should include release rates, alarm setpoints, laboratory analyses, compliance with regulatory limits, total activity release, total volumes, valve line-up, and appropriate reviews and approvals. Alarm and trip setpoints for each release point should be determined in accordance with the ODCM.

c. Procedures for sampling and analysis should specify types of samples to be collected, analyses to be performed on each sample, and appropriate sampling and analysis schedules.

d. There should be procedures for each routine calibration and surveillance tests for all instrumentation.

e. The applicant should have a plan/program for routine maintenance (including preventive maintenance) to ensure availability of equipment under accident conditions and to maintain releases and worker exposure ALARA.

f. The applicant should have a program for evaluating system performance including:

1. Efficiency evaluation.

2. Identification of need for corrective action.

3. Verification of system operation as designed.

g. Procedures should be clear on division of responsibilities and lines of communications among different organizational units (e.g., radwaste operations/management and radiation protection) involved in radwaste operations.

03.08 Definition of Liquid Radioactive Waste Processing System. As defined in ANSI/ANS-N55.6-1979, the liquid radioactive waste processing system begins at the interfaces with the reactor coolant pressure boundary and points of discharge in lines from other systems (including the steam generator blowdown system downstream from the outermost containment isolation valve), or at those sumps and floor drains provided for liquid waste with the potential of containing radioactive material. It terminates at the point of controlled discharge to the environment, at the point of interface with the waste solidification system, and at the point of recycle back to storage for reuse.

84523-04 REFERENCES

Standard Review Plan Section 9.3.2, "Process and Post-Accident Sampling Systems," NUREG-0800.

Standard Review Plan Section 11.5, "Process and Effluent Radiological Monitoring Instrumentation and Sampling Systems," NUREG-0800.

Regulatory Guide 1.21, "Measuring and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants."

Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)."

Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant Conditions During and Following an Accident."
Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors."

Regulatory Guide 1.143, "Design Guidance for Radioactive Waste Management Systems, Structures, and Components in Light-Water-Cooled Nuclear Reactor Power Plants."

Regulatory Guide 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment."

Regulatory Guide 8.8, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable."

NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," November 1980.

NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

ANSI N42.18-1980 (Reaffirmation and Redesignation of ANSI N13.10-1974), "Specification and Performance of Onsite Instrumentation for Continuously Monitoring Radioactivity in Effluents."

ANSI/ANS-N55.6-1979, "Liquid Radioactive Waste Processing System for Light-Water Reactor Plants."

IE Bulletin No. 80-10, "Contamination of Nonradioactive System and Resulting Potential for Unmonitored, Uncontrolled Release of Radioactivity to Environment," May 6, 1980.

IE Circular No. 77-10, "Vacuum Conditions Resulting in Damage to Liquid Process Tanks," July 15, 1977.

IE Circular No. 77-14, "Separation of Contaminated Water Systems from Uncontaminated Plant Systems," November 22, 1977.

IE Circular No. 79-21, "Prevention of Unplanned Releases of Radioactivity," October 17, 1979.

IE Circular No. 80-18, "10 CFR 50.59 Safety Evaluations for Changes to Radioactive Waste Treatment Systems," August 22, 1980.

IE Circular No. 81-09, "Containment Effluent Water that Bypasses Radioactivity Monitor," July 10, 1981.

IE Information Notice No. 79-07, "Rupture of Radwaste Tanks," March 26, 1979.

IE Information Notice No. 79-09, "Spill of Radioactively Contaminated Resin," March 30, 1979.

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