NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

August 13, 1985

Docket Nos. 50-245
50-336
50-423
B11645

Director of Nuclear Reactor Regulation
Attn: Mr. J. A. Zwolinski, Chief
Operating Reactors Branch #5
Mr. E. J. Butcher, Chief
Operating Reactors Branch #3
Mr. B. J. Youngblood, Chief
Licensing Branch #1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: (1) J. F. Opeka letter to Messrs. Zwolinski, Butcher and Youngblood, dated June 19, 1985.

Gentlemen:

Millstone Nuclear Power Station, Unit Nos. 1, 2 and 3
Revisions to the Millstone Nuclear Power Station
Radiological Effluent Monitoring Manual

In Reference (1), Northeast Nuclear Energy Company submitted Revision 1 to the Millstone Nuclear Power Station, Radiological Effluent Monitoring and Offsite Dose Calculation Manual. We are hereby submitting revisions to portions of the Radiological Effluent Monitoring Manual to incorporate comments made by the Staff during their review.

Revised pages B-1, C-2, C-3, and E-9 are attached. Change bars have been included in the right margin to highlight where the changes have been made.

A009
1/

If you have any questions related to this submittal, please feel free to contact my staff directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Senior Vice President

cc: W. W. Meinke, NRC Radiological Assessment Branch

B. RESPONSIBILITIES

All changes to this manual shall be reviewed and approved by the Station Operations Review Committee and the Nuclear Regulatory Commission prior to implementation.

All changes and their rationale shall be documented in the Semiannual Radioactive Effluent Release Report.

It shall be the responsibility of the Station Superintendent to ensure that this manual is used in performance of the surveillance requirements and administrative controls of the Technical Specifications.

Table C-1

MILLSTONE 1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

LIQUID RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION[a] (LLD) (uCi/ml)
A. BATCH RELEASE[f]				
1. Waste Sample Tanks	Prior to Each Batch	Prior to Each Batch	Principal Gamma Emitters[b]	5×10^{-7}
2. Floor Drain Sample Tank			I-131, Mo-99	1×10^{-6}
			Ce-141, Ce-144	5×10^{-6}
	One Batch per month	Monthly	Other Dissolved and Entrained Gases	1×10^{-5}
3. Decon Solution Tank	Prior to Each Batch	Monthly Composite	H-3	1×10^{-5}
			Gross alpha	1×10^{-7}
	Prior to Each Batch	Quarterly Composite	Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}
B. CONTINUOUS RELEASE				
Reactor Building Service Water	Daily Grab Sample[d]	Weekly Composite[c]	Principal Gamma Emitters[b]	5×10^{-7}
			I-131, Mo-99	1×10^{-6}
			Ce-141, Ce-144	5×10^{-6}
	Monthly Grab Sample	Monthly	Dissolved and Entrained Gases	1×10^{-5}
	Weekly Grab Sample	Monthly Composite[c]	H-3[e]	1×10^{-5}
			Gross alpha[e]	1×10^{-7}
	Weekly Grab Sample	Quarterly Composite[c]	Sr-89[e], Sr-90[e]	5×10^{-8}
			Fe-55[e]	1×10^{-6}

TABLE C-1 (Continued)

TABLE NOTATIONS

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66\, s_b}{E * V * 2.22 \times 10^6 * Y * \exp(-\lambda \Delta t)}$$

where

LLD is the lower limit of detection as defined above (as uCi per unit mass or volume)

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)

E is the counting efficiency (as counts per transformation)

V is the sample size (in units of mass or volume)

2.22×10^6 is the number of transformations per minutes per microcurie

Y is the fractional radiochemical yield (when applicable)

λ is the radioactive decay constant for the particular radio-nuclide

Δt is the elapsed time between midpoint of sample collection and midpoint of counting time

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as a posteriori (after the fact) limit for a particular measurement.

Analyses shall be performed in such a manner that the stated LLDs will be achieve under routine conditions. Occasionally background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable.

b. The LLD will be 5×10^{-7} uCi/ml. The principal gamma emitters for which this LLD applies are exclusively the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Cs-134, and Cs-137.

TABLE NOTATION

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with a 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66 s_b}{E * V * 2.22 * Y * \exp(-\lambda \Delta t)}$$

where

LLD is the lower limit of detection as defined above (as pCi per unit mass or volume)

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)

E is the counting efficiency (as counts per transformation)

V is the sample size (in units of mass or volume)

2.22 is the number of transformation per minute per picocurie

Y is the fractional radiochemical yield (when applicable)

λ is the radioactive decay constant for the particular radionuclide

Δt is the elapsed time between sample collection (or end of the sample collection period) and time of counting

It should be recognized that the LLD is defined as a priori (before the fact) limit representing the capability of a measurement system and not as a posteriori (after the fact) limit for a particulate measurement.

Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these a priori LLDs unachievable. In such cases, the contributing factors will be identified and described in the Annual Radiological Environmental Operating Report.

b. LLD for leafy vegetables.

c. To be reduced by a factor of two if the fractional beta for the sample exceeds 15 pCi/l.