NORTHEAST UTILITIES

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

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September 7, 1982

Docket No. 50-245
B10551

Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

References: (1) D. M. Crutchfield letter to W. G. Counsil, dated June 30, 1982.

(2) D. M. Crutchfield letter to R. P. Werner, dated November 3, 1981.

(3) W. G. Counsil letter to D. M. Crutchfield, dated January 13, 1982.

(4) W. G. Counsil letter to D. M. Crutchfield, dated June 30, 1981.

Gentlemen:

Millstone Nuclear Power Station Unit No. 1
SEP Topic XV-18, Radiological Consequences of Main Steam Line Failure Outside Containment

In References (1) and (2), the Staff noted that, when using the present Technical Specification limits for Iodine-131, the radiological consequence analysis of a main steam line failure outside containment results in a calculated thyroid dose at the exclusion area boundary of nearly four times that allowed by 10CFR100 and Standard Review Plan Section 15.6.4. In Reference (3), Northeast Nuclear Energy Company (NNECO) disputed the assumption made by the Staff in Reference (2) that the total Iodine allowed by Technical Specifications would be Iodine - 131. NNECO provided the results of calculations performed assuming different isotopic mixes to demonstrate that the doses resulting from a main steam line break would be within a small fraction of the 10CFR100 limits.

This topic was discussed during meetings with the Integrated Assessment team held at the Millstone site on July 13-15, 1982. It was agreed during these meetings that NNECO would provide the Staff with documentation of historical Iodine concentrations in the primary coolant to support NNECO's position that no changes to the Technical Specifications are required. The purpose of this submittal is to provide this information.

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A table listing the total Iodine and DEQ Iodine - 131 concentrations in the primary coolant for Cycle 7 (July 6, 1979 to October 3, 1980) is included as Attachment 1. More recent data were not included due to the fact that the Cycle 8 refueling outage lasted from October, 1980 to the middle of June, 1981, with a brief period of power operation in April, 1981. Cycle 8, the current cycle, is scheduled to end in early September, 1982. Therefore, in order to provide useful data for a complete cycle, it was necessary to use the time frame selected. Samples taken at times when the reactor was shut down are not included as the radiological consequences of this event would be negligible if it occurred when the reactor is at zero power.

Included in Attachment 1 are the date, reactor power, total Iodine concentration, and Dose Equivalent Iodine - 131 (DEQ I-131) concentration for each sample taken. The ratio of DEQ I-131 concentration to the total Iodine concentration was calculated on a sample-by-sample basis. As seen in Attachment 1, the ratio remained relatively constant over the cycle. The following values were determined from these data:

Mean Value of Ratio:		0.0544 ± 0.00474
Maximum Value	:	0.0873
Minimum Value	:	0.0464

It should be noted that the DEQ I-131 values given in Attachment 1 were taken directly from printouts of the Millstone Chemistry Department computer code, which is outdated in that it uses TID-14844 dose conversion factors to perform the conversion from total Iodine to I-131. Use of the Regulatory Guide 1.109, Rev. 1, dose conversion factors, which are more appropriate, would further reduce the ratios by approximately 20%. When the difference in dose conversion factors is taken into account, the value of ratio shown above is in agreement with that supplied in Reference (3). The value given in Reference (3) for normal operating conditions was calculated using the Regulatory Guide 1.109 dose conversion factors.

The above calculated ratio of 0.0544 is a factor of 2 below the value of 0.12 used by NNECO in the calculation of the radiological consequences of design basis events which were provided in Reference (4). Since the ratio of 0.0544 uCi DEQ I-131 per uCi total Iodine was derived from over 180 samples taken over a period of 15 months, it can be used with confidence to predict DEQ I-131 from total Iodine in the primary coolant. Likewise, the assumed value of 0.12 uCi DEQ I-131 per uCi total Iodine is conservative enough to provide assurance that it is unlikely that it would be exceeded during operation. Therefore, NNECO maintains that the dose consequences submitted in Reference (4) are conservative.

As stated in Reference (3), the doses resulting from various isotopic mixes, other than the mix in which all Iodine is assumed to be I-131, are all well within the review guidelines for this topic. Only when it is assumed that, although physically impossible, all Iodine is I-131 do inacceptable doses result. NNECO does not consider a physically impossible assumption to be appropriate justification for the Staff to recommend changes to the Millstone Unit 1 Technical Specifications.

Therefore, no further action is planned to resolve this SEP topic.

We trust that Staff will find the above information sufficient to concur in NNECO's determination that no Technical Specification changes are required.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil
Senior Vice President

Docket No. 50-245

SEP Topic XV-18, Radiological Consequences of Main Steam Line Failure Outside Containment

Concentrations of Iodine in Reactor Coolant

September, 1982

MP-1 IODINE CONCENTRATIONS IN REACTOR COOLANT
JULY 6, 1979 - OCTOBER 3, 1980

Date of Sample	Rx Power[1]	Total Iodine Concentration[2]	DEQ I-131 Concentration[2]	DEQ I-131 To Total Iodine Ratio
July 6, 1979	1998	4.055-1*	1.960-2	4.834-2
9	1965	3.151-1	1.602-2	5.084-2
11	1996	3.509-1	1.689-2	4.813-2
13	2000	3.563-1	2.065-2	5.796-2
16	2000	3.941-1	2.044-2	5.187-2
18	2000	4.328-1	2.409-2	5.566-2
20	1999	4.428-1	2.349-2	5.305-2
23	2001	3.674-1	1.836-2	4.997-2
25	1999	3.443-1	1.838-2	5.338-2
27	1997	3.402-1	1.935-2	5.688-2
30	2009	3.906-1	2.037-2	5.215-2
Aug. 3, 1979	2006	3.276-1	1.709-2	5.217-2
6	2003	4.635-1	2.509-2	5.413-2
8	2003	4.261-1	2.178-2	5.111-2
10	2006	4.144-1	2.627-2	6.339-2
13	2007	4.298-1	2.375-2	5.526-2
15	829	2.576-1	1.501-2	5.827-2
17	2004	3.806-1	2.135-2	5.610-2
18	1703	3.465-1	1.794-2	5.177-2
20	2004	4.144-1	2.117-2	5.109-2
22	2006	3.675-1	1.969-2	5.358-2
24	2011	4.010-1	2.052-2	5.117-2
27	2003	4.761-1	2.424-2	5.091-2
29	2008	3.708-1	2.026-2	5.464-2
31	2003	5.050-1	2.560-2	5.069-2
Sept. 3, 1979	2002	3.938-1	1.993-2	5.061-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
5	Outage for Isolation Condenser Valve Repair			
7	1458	2.268-1	1.188-2	5.238-2
10	2002	3.912-1	2.087-2	5.335-2
12	2003	3.869-1	2.172-2	5.614-2
14	2002	3.878-1	1.969-2	5.077-2
17	2006	3.909-1	2.113-2	5.405-2
19	2002	3.307-1	1.714-2	5.183-2
21	2001	4.055-1	2.163-2	5.334-2
24	2003	3.526-1	1.925-2	5.459-2
26	2001	3.112-1	1.744-2	5.604-2
28	2004	4.476-1	2.566-2	5.733-2
Oct. 1, 1979	2006	4.124-1	2.145-2	5.201-2
3	1891	3.709-1	1.998-2	5.387-2
5	2010	3.798-1	2.277-2	5.995-2
8	2009	3.503-1	1.884-2	5.378-2
10	2004	3.700-1	1.981-2	5.354-2
12	2002	3.733-1	1.969-2	5.275-2
15	2005	2.998-1	1.539-2	5.133-2
17	2004	3.446-1	1.789-2	5.192-2
19	2005	3.388-1	1.730-2	5.106-2
22	2009	3.898-1	2.049-2	5.257-2
24	2001	3.710-1	1.925-2	5.189-2
26	2006	4.002-1	2.028-2	5.067-2
29	2008	4.393-1	2.363-2	5.379-2
31	2007	3.325-1	1.754-2	5.275-2
Nov. 2, 1979	2004	3.420-1	2.090-2	6.111-2
5	2007	3.596-1	1.801-2	5.008-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
7	1916	2.178-1	1.175-2	5.395-2
9	1904	3.188-1	1.826-2	5.728-2
12	1721	3.859-1	2.166-2	5.613-2
14	1884	3.844-1	1.975-2	5.138-2
16	920	2.429-1	1.313-2	5.406-2
19	1997	3.658-1	1.957-2	5.350-2
21	1995	3.593-1	1.894-2	5.271-2
23	2005	3.635-1	2.083-2	5.730-2
26	2003	3.378-1	1.921-2	5.687-2
28	2010	3.025-1	1.568-2	5.183-2
30	2007	2.941-1	1.500-2	5.100-2
Dec. 3, 1979	2000	2.904-1	1.679-2	5.782-2
5	1873	4.176-1	2.109-2	5.050-2
7	1890	3.805-1	1.979-2	5.201-2
10	2007	3.879-1	2.033-2	5.241-2
12	2009	3.785-1	2.072-2	5.474-2
14	1997	4.202-1	2.243-2	5.338-2
17	2002	3.200-1	1.642-2	5.131-2
19	2003	4.071-1	2.083-2	5.117-2
21	Outage for Generator Voltage Regulator Repairs			
24	2004	3.599-1	1.892-2	5.257-2
26	2003	3.796-1	1.980-2	5.216-2
28	2003	3.508-1	1.814-2	5.171-2
31	2007	4.023-1	1.999-2	4.969-2
Jan. 2, 1980	2006	3.894-1	1.938-2	4.977-2
4	2009	3.988-1	2.324-2	5.827-2
7	802	1.624-1	9.237-3	5.688-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
8	796	2.374-1	1.200-2	5.055-2
9	792	1.846-1	1.018-2	5.515-2
11	797	1.887-1	1.039-2	5.506-2
14	798	1.873-1	1.047-2	5.590-2
16	800	2.297-1	1.252-2	5.451-2
18	802	2.531-1	1.352-2	5.342-2
21	796	2.152-1	1.218-2	5.660-2
23	801	1.959-1	1.082-2	5.523-2
25	805	1.808-1	1.059-2	5.857-2
28	805	1.917-1	1.197-2	6.244-2
30	805	1.539-1	1.147-2	7.453-2
Feb. 1, 1980	804	1.538-1	9.662-3	6.282-2
4	600	2.411-1	1.242-2	5.151-2
6	801	2.618-1	1.395-2	5.328-2
8	801	1.137-1	7.462-3	6.563-2
11	803	2.386-1	1.275-2	5.344-2
13	1986	4.382-1	2.411-2	5.502-2
15	2002	4.657-1	2.428-2	5.214-2
18	2006	3.932-1	2.059-2	5.237-2
20	2001	3.968-1	2.130-2	5.368-2
22	2000	4.136-1	2.304-2	5.571-2
25	2006	4.398-1	2.171-2	4.936-2
27	2003	3.403-1	2.073-2	6.092-2
29	2000	2.950-1	1.639-2	5.556-2
March 3, 1980	2004	4.798-1	2.441-2	5.088-2
5	1925	3.463-1	1.989-2	5.744-2
7	2002	3.225-1	2.054-2	6.369-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
10	2004	4.539-1	2.384-2	5.252-2
12	2005	4.663-1	2.456-2	5.267-2
14	2003	4.295-1	2.695-2	6.275-2
17	2004	3.416-1	1.840-2	5.386-2
19	2000	3.623-1	2.052-2	5.664-2
21	2001	2.881-1	1.459-2	5.064-2
24	2000	3.634-1	2.170-2	5.971-2
26	2010	2.877-1	1.502-2	5.221-2
28	1997	4.742-1	2.476-2	5.221-2
31	2006	3.904-1	2.091-2	5.356-2
April 2, 1980	1992	4.400-1	2.480-2	5.636-2
4	1994	2.378-1	1.304-2	5.484-2
7	1999	4.527-1	2.363-2	5.220-2
9	2006	2.477-1	1.319-2	5.325-2
11	2006	3.838-1	1.925-2	5.016-2
14	2003	4.348-1	2.172-2	4.995-2
16	1982	3.853-1	1.999-2	5.188-2
18	1978	3.531-1	1.880-2	5.324-2
21	1974	3.874-1	2.109-2	5.444-2
23	980	2.307-1	1.316-2	5.704-2
25	2002	2.583-1	1.414-2	5.474-2
28	2007	4.057-1	2.142-2	5.280-2
30	2004	3.826-1	2.139-2	5.591-2
May 2, 1980	2005	4.208-1	2.101-2	4.993-2
5	2003	3.428-1	1.916-2	5.589-2
7	1942	3.594-1	1.963-2	5.462-2
9	1757	5.277-1	3.112-2	5.897-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
12	2006	5.845-1	3.181-2	5.442-2
14	2002	5.160-1	2.790-2	5.407-2
16	2004	5.187-1	2.760-2	5.321-2
19	2008	2.428-1	1.320-2	5.437-2
21	1991	4.922-1	2.834-2	5.758-2
23	1691	4.230-1	2.247-2	5.312-2
26	1678	3.861-1	2.340-2	6.061-2
28	1682	4.122-1	2.502-2	6.070-2
30	1676	4.166-1	2.537-2	6.090-2
June 2, 1980 to June 26: Outage for Turbine Expansion Joint/LPCI Support Repairs				
27	1023	2.884-1	1.381-2	4.788-2
30	Outage for Minor Steam Leak Repairs			
July 2, 1980	1996	3.812-1	1.867-2	4.898-2
4	1996	4.051-1	2.048-2	5.056-2
7	1998	4.547-1	2.108-2	4.636-2
9	1997	4.631-1	2.285-2	4.934-2
11	1999	3.963-1	2.142-2	5.405-2
14	1848	4.796-1	2.292-2	4.779-2
16	2000	5.294-1	2.732-2	5.161-2
18	1999	4.979-1	2.400-2	4.820-2
21	1969	3.910-1	3.008-2	7.693-2
23	2001	5.172-1	2.569-2	4.967-2
25	1997	5.327-1	4.649-2	8.727-2
28	2001	4.883-1	2.428-2	4.972-2
30	1991	4.483-1	2.300-2	5.130-2
Aug. 1, 1980	2005	5.164-1	2.637-2	5.107-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio
4	2000	4.897-1	2.537-2	5.181-2
6	2005	4.681-1	2.547-2	5.441-2
8	1868	4.791-1	2.581-2	5.387-2
11	2005	5.195-1	2.691-2	5.180-2
13	2005	4.419-1	2.345-2	5.307-2
15	2004	4.206-1	2.285-2	5.433-2
18	1941	4.997-1	2.743-2	5.489-2
20	1998	6.875-1	4.076-2	5.929-2
22	1983	4.793-1	2.678-2	5.587-2
25	1991	5.039-1	2.439-2	4.840-2
27	1989	4.451-1	2.605-2	5.853-2
29	1995	5.298-1	2.827-2	5.336-2
Sept. 1, 1980	199	4.284-1	2.434-2	5.682-2
3	1987	4.550-1	2.525-2	5.549-2
5	1983	4.898-1	2.665-2	5.441-2
8	1970	4.378-1	2.500-2	5.710-2
10	1975	4.395-1	2.445-2	5.563-2
12	1959	4.046-1	2.321-2	5.737-2
15	1933	4.332-1	2.524-2	5.826-2
17	1919	4.453-1	2.448-2	5.497-2
19	1905	4.384-1	2.422-2	5.525-2
22	1880	3.951-1	2.207-2	5.586-2
24	1867	4.009-1	2.283-2	5.695-2
26	1877	4.844-1	2.573-2	5.312-2
29	1831	5.986-1	3.099-2	5.177-2
Oct. 1, 1980	1821	3.070-1	1.710-2	5.565-2
3	1836	4.604-1	2.433-2	5.285-2

Date of Sample	Rx Power	Total Iodine Concentration	DEQ I-131 Concentration	DEQ I-131 To Total Iodine Ratio

Oct. 4, 1980 to June 16, 1981: Refueling Outage

1 - Megawatts thermal
2 - In uCi/gm
*Read as 4.055×10^{-1}