TO: Director, Nuclear Reactor Regulation - U.S. Nuclear Regulatory Commission

APR 6 1984

SUBJECT:

Millstone Nuclear Power Station, Unit No. 3
Transmittal of Amendment to FSAR/ER
Docket No. 50-423

Enclosed is Amendment 7 to the Millstone Nuclear Power Station, Unit No. 3 Final Safety Analysis Report/Environmental Report. The Control Copy No. of the set assigned to you appears on the above label.

Please complete and return the attached form acknowledging that you have received and incorporated this amendment into your copy of the FSAR/ER. A self-addressed stamped envelope is enclosed for your convenience.

The insertion instructions enclosed should be used to assist you in incorporating the revisions, and as such should be retained until the Effective Page Listing is again updated.

If you have any questions, please contact me at (203) 666-6911 ext. 3285.

Sincerely,

Carol J. Shaffer

Carol J. Shaffer
Generation Facilities Licensing
Northeast Utilities Service Company

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) 666-6911

Mail to:

Carol J. Shaffer
Generation Facilities Licensing
Northeast Utilities Service Company
P. O. Box 270
Hartford, CT 06101

SUBJECT:

Millstone Nuclear Power Plant, Unit 3
Acknowledgement of Distribution of NRC Questions and Responses
and Amendment 7 of the EROLS

NRC Questions and Responses and Amendment 7 of the Millstone Nuclear Power Plant, Unit 3 Environmental Report Operating License Stage have been received.

____
Organization Name

____
Copy Holder's Name

____
Copy Holder's Phone Number

____
Signature Date

____
EROLS Copy Number

NORTHEAST UTILITIES
THE CONNECTICUT LIGHT AND POWER COMPANY
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General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 666-6911

April 5, 1984

Docket No. 50-423
B11115

Director of Nuclear Reactor Regulation
Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3
Transmittal of Amendment 7 to the Environmental Report

In accordance with 10 CFR 50.30(c)(1)(iv), Northeast Nuclear Energy Company, as applicants' representative for an operating license for Millstone Nuclear Power Station, Unit No. 3, hereby submits forty-one (41) copies of Amendment 7 to the Environmental Report (ER).

This amendment is being submitted in order to provide formal responses to all remaining ER review questions and to provide updates and corrections to information contained in the ER.

If you have any questions related to the information contained herein, please contact our licensing representative, Ms. C. J. Shaffer, at (203) 665-3285.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY, Et Al.
By Northeast Nuclear Energy Company, Their Agent

W. G. Counsil
W. G. Counsil
Senior Vice President

W. F. Fee
By: W. F. Fee
Executive Vice President
Engineering & Operations

STATE OF CONNECTICUT)
) ss.Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. F. Fee, who being duly sworn, did state that he is Executive Vice President of Northest Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Notary Public

INSERTION INSTRUCTIONS FOR AMENDMENT 7

Transmittal letters and the attachments, along with these insertion instructions, should either be filed or entered in Volume I in front of any existing letters, instructions, distribution lists, etc.

Remove	Insert	Location
	VOLUME 4	
EPQ-1/EPQ-2	EPQ-1/EPQ-2	After January 31, 1983 Tab
QE291.18/QE311.5	QE291.18/QE311.5	After QE291.17
EPQ-1/Blank	EPQ-1/Blank	After October 7, 1983 Tab
QE290.2-1/Blank	QE290.2-1 thru QE290.2-3	After EROLS Questions (1 of 1)
QE290.3-1/Blank	QE290.3-1/Blank	
-	Tab - February 17, 1984	After QE291.19
	EPQ-1 thru QE290.8-2	After February 17, 1984 Tab

INSERTION INSTRUCTIONS FOR AMENDMENT 7

Remove old pages and insert Amendment 7 pages as instructed below (amendment pages bear the amendment number and date at the foot of the page).

Vertical bars (change bars) have been placed in the outside margins of revised text pages and tables to show the location of any technical changes originating with this amendment. A few unrevised pages have been reprinted because they fall within a run of closely spaced revised pages. No change bars are used on figures or on new sections, appendices, questions and responses, etc.

Transmittal letters along with these insertion instructions should either be filed or entered in Volume I in front of any existing letters, instructions, distribution lists, etc.

LEGEND

Remove/Insert Columns

Entries beginning with "T" or "F" designate table or figure numbers, respectively. All other entries are page numbers:

T2.3-14 = Table 2.3-14   F2.3-14 = Figure 2.3-14

2.1-9 = Page 2.1-9   EP2-1 = Page EP2-1   vii = Page vii

Pages printed back to back are indicated by a "/":

1.2-5/6 = Page 1.2-5 backed by Page 1.2-6

T2.3-14(5 of 5)/15(1 of 3) = Table 2.3-14, sheet 5 of 5, backed by Table 2.3-15, sheet 1 of 3

Location Column

Ch = Chapter, S = Section, Ap = Appendix

INSERTION INSTRUCTIONS FOR AMENDMENT 7 (Cont)

Remove	Insert	Location
	VOLUME 1	
EP2-1 thru EP2-9	EP2-1 thru EP2-9	After Ch. 2 Tab
F2.1-5	F2.1-5	F2.1-4
	VOLUME 2	
EP3-1/EP3-2	EP3-1/EP3-2	After Ch. 3 Tab
3.5-5 thru 3.5-8	3.5-5 thru 3.5-8	After S3.5 Tab
3.5-11/3.5-12	2.5-11/3.5-12	
3.6-1 thru 3.6-5	3.6-1 thru 3.6-5	After S3.6 Tab
T3.6-1 (1 of 3) thru T3.6-2 (1 of 1)	T3.6-1 (1 of 3) thru T3.6-2 (1 of 1)	
	VOLUME 3	
EP7-1/Blank	EP7-1/Blank	After Ch. 7 Tab
F7.1-5 thru F7.1-6	F7.1-5 thru F7.1-6(1)	After S7.1 Tab
EP-C-1/Blank	EP-C-1/Blank	After Ap C Tab
C-19/C-20	C-19/C-20	
EP-E-1/Blank	EP-E-1/Blank	After Ap E Tab
F E-3	F E-3	

NOTE:

1. These figures were sent to the NRC in March 1984 as Amendment 6; however, they were not distributed to other holders of the EROLS. Therefore, they are included in the Amendment 7 package.

(January 31, 1983 Letter)

LIST OF EFFECTIVE PAGES

Page, Table (T), or Figure (F)	Revision Number	Date
EROLS Questions (Index)		
(1 thru 2 of 2)	0	April 1983
QE100.2-1	1	September 1983
TQE100.2-1 (1 of 9 thru 9 of 9)	1	September 1983
Q231.1-1	0	April 1983
Q240.1-1 thru Q240.1-2	1	September 1983
FQ240.1-1	1	September 1983
FQ240.1-2	1	September 1983
FQ240.1-3	1	September 1983
FQ240.1-4	1	September 1983
FQ240.1-5	1	September 1983
Exhibit 240.1-1 (25 pages)	0	September 1983
Q240.2-1	0	April 1983
QE290.1-1	0	April 1983
QE291.1-1 thru QE291.1-3	0	April 1983
QE291.2-1	0	April 1983
TQE291.2-1 (1 thru 2 of 2)	0	April 1983
TQE291.2-2 (1 of 1)	0	April 1983
TQE291.2-3 (1 of 1)	0	April 1983
TQE291.2-4 (1 of 1)	0	April 1983
QE291.3-1 thru QE291.3-2	0	April 1983
QE291.4-1	0	April 1983
QE291.5-1	0	April 1983
QE291.6-1	0	April 1983
QE291.7-1	0	April 1983
QE291.8-1	0	April 1983
QE291.9-1	0	April 1983
QE291.10-1	0	April 1983
QE291.11-1	0	April 1983
QE291.12-1	0	April 1983
FQE291.12-1	0	April 1983
QE291.13-1	0	April 1983
QE291.14-1	0	April 1983
QE291.15-1	0	April 1983
QE291.16-1	0	April 1983
QE291.17-1	0	April 1983
QE291.18-1	1	April 1984
QE311.5-1	0	April 1983
TQE311.5-1 (1 of 1)	0	April 1983
TQE311.5-2 (1 of 1)	0	April 1983
TQE311.5-3 (1 of 1)	0	April 1983
TQE311.5-4 (1 of 1)	0	April 1983
TQE311.5-5 (1 of 1)	0	April 1983
TQE311.5-6 (1 of 1)	0	April 1983
TQE311.5-7 (1 of 1)	0	April 1983
TQE311.5-8 (1 of 1)	0	April 1983

(January 31, 1983 Letter)
LIST OF EFFECTIVE PAGES (Cont)

NRC Letter: January 31, 1983

Question No. QE291.18 (Section Appendix C)

Provide a copy of all reports available from the effluent toxicity testing program. Indicate which "other suitable organisms indigenous to the Millstone area" will be used in effluent toxicity testing.

Response:

The following reports, providing summaries and interpretation of data from the effluent toxicity testing program, were submitted under separate cover on February 2, 1984.

- Effluent Toxicity Testing at Millstone Nuclear Power Station using the Sheepshead Minnow (Cyprinodon Variegatus) during 1981 and 1982. Northeast Utilities Environmental Laboratory, July 1983.

- Development of Long Term Effluent Toxicity Testing Procedure with the Bay Mysid (Mysidopsis Bahia) and Preliminary Testing Results at Millstone Nuclear Power Station, Northeast Utilities Environmental Laboratory, July 1983.

Future effluent toxicity testing includes two common indigenous species, winter flounder (Pseudopleuronectes americanus) and Atlantic silversides (Menidia menidia). Winter flounder testing is proposed for 1985 and will consist of testing yolk sac and post-yolk sac larvae during their seasonal occurrence. Preliminary testing will be conducted under static conditions with renewal. Flow through testing will be evaluated for feasibility. Atlantic silverside effluent testing is proposed for 1986. Testing will be conducted on the larval stage and year round laboratory spawning may be possible. Parameters to be examined in winter flounder and Atlantic silverside effluent testing include mortality, growth, and morphological anomalies. (Refer to EROLS Appendix C, revised Section C7.)

NRC Letter: January 31, 1983

Question No. QE311.5 (Section 2.1)

It is noted in Tables 2.1-1 through 2.1-20 that the population data has been given in metric measurement. Please provide this data in the English system of miles to correspond with the distances given in Regulatory Guide 1.70, Section 2.1-3 Population Distribution.

Response:

Population per sector, based on distances in English system miles is provided in attached Tables QE311.5-1 through QE311.5-14. Per NRC agreement, distances do not correspond to those given in Regulatory Guide 1.70 but instead are provided in distances suitable for the Probabilistic Safety Study. Transient population distribution is listed by distance and direction in Tables QE311.5-15 through QE311.5-17.

(October 7, 1983 Letter)
LIST OF EFFECTIVE PAGES

Page, Table (T), or Figure (F)	Revision Number	Date
EROLS Questions (Index)	0	January 1984
QE290.2-1 thru QE290.2-3	1	April 1984
QE290.3-1	1	April 1984
QE291.19-1	0	January 1984

NRC Letter: October 7, 1983

Question No. QE290.2 (Section 2.1)

During the public meeting held on July 21, 1983, to gather information on environmental concerns over Millstone Unit 3, M.A. Cotter of 50 New Shore Road in Pleasure Beach indicated that representatives of Northeast Utilities visited his residence for the purpose of obtaining noise level data in response to his complaint regarding noise from the Millstone plant site. Provide the noise level data gathered, if any, in response to Mr. Cotter's complaint. Indicate the status of construction (i.e., types of activities) ongoing at the Millstone site during noise measurements and similarly indicate the operational status for Millstone Units 1 and 2. Indicate any follow-up actions taken to resolve Mr. Cotter's noise complaint.

Response:

Mr. A. Cotter's residence has been visited with the intent of assessing the noise level; however, a noise survey was not conducted in response to his complaint. In response to a complaint by J. Sexton, on October 6, 1983 daytime and nighttime sound level measurements were recorded to determine the background levels created by the Millstone Nuclear Power Station in the vicinity of Millstone Road and Windworthway in Niantic, Connecticut. A-weighted, linear and one-third octave band readings were taken in front of 283 Millstone Road, Niantic, Connecticut, J. Sexton residence. The levels measured are below the maximum levels set by the State of Connecticut, Office of Noise Control. The results of this survey were submitted under separate cover on March 15, 1984. Millstone Unit 1 was operating at 100 percent power on October 6, 1983 and Unit 2 was down for refueling. The following construction activities were in progress during October 1983; however, specific activities occurring on October 6, 1983 are not available.

October 1983

In the containment structure, work on the upper pressurizer shield walls and the snubber installation continued as did piping, instrumentation, HVAC, and electrical work. In the north and east yard, piping continued. For the hydrogen recombiner building, electrical installation continued. In the fuel building, structural work on the roof, building walls, and the railroad canopy superstructure continued as did installation on piping, HVAC, and electrical. In the auxiliary building, work proceeded on painting, ironwork, piping, electrical work, and HVAC. For the waste disposal building, work on the interior walls continued as did piping, electrical, and HVAC installation. In the southwest yard, work on nitrogen and hydrogen storage equipment, piping, and electrical work continued. In the turbine building, turbine assembly continued as did electrical, piping, and instrumentation installation. In the

main steam valve building, piping, electrical, and HVAC work continued. Piping, electrical, and HVAC work continued in the emergency generator enclosure. In the engineered safety features building, piping, electrical, and HVAC work continued. Piping, electrical, and HVAC work continued in the condensate polishing enclosure. In the control building, piping, electrical, and HVAC work continued. In the service building, erection of masonry walls, finish plumbing, piping, instrumentation, electrical, and HVAC work continued. For the auxiliary boiler building, piping, electrical, and HVAC work continued. Piping and electrical work continued for the intake structure. In the main transformer areas, work continued on support steel for nonsegregated bus duct; installation of iso-phase bus duct and buried conduit continued.

As described in the Environmental Report - Operating License Stage (EROLS), Section 2.7, two 3-day ambient noise surveys were conducted for the preparation of the report. One was conducted in October 1979 and the other in April 1980. The purpose of the surveys was to characterize the ambient noise environment in the residential areas surrounding the Millstone site (see Tables 2.7-1, 2.7-2 and 2.7-3 of the EROLS). The results of the surveys were compared with the last ambient noise survey in 1970 and used to estimate total sound levels from Millstone Units 1, 2, and 3 (see Table 5.6-1 of the EROLS).

As the time of the surveys Millstone Units 1 and 2 were in operation and the following construction activities were in progress.

October 1979

Concrete placement for the east wall beam, personnel hatch, and slab at elevation 24 feet in the containment was completed. Main rebar installation for the crane wall was completed, while concrete and embedment installation continued. Construction of stairs to elevation 3 feet-8 inches was initiated. The exterior wall has been poured to a maximum elevation of 64 feet-10 inches and the crane wall to elevation 91 feet. Work on piping and pipe supports, the refueling cavity liner and dome liner continued.

In the auxiliary building, the walls to elevation 41 feet-6 inches were completed and initial concrete pours were made for the slab at 43 feet-6 inches, while shoring, embedments, and rebar continued. Rebar and conduit installation began for the slab at elevation 4 feet-6 inches, Section 3, and work on piping and pipe supports continued inside the building. The boron evaporator was set in place at elevation 24 feet-6 inches.

Rebar erection for the walls to elevation 36 feet-6 inches began, while rebar and formwork erection continued along with concrete placement for the walls to elevation 21 feet-6 inches in the engineering safety features building.

The fire protection system piping was completed and water treatment system pumps and turbine plant component cooling water pump motors were set in place in the turbine building. Work also continued on

piping and pipe supports for various systems, cable trays and hangers; conduit and termination installation for the EVH system unit heaters; condensers A, B, and C; and turbine sole plates.

Erection of structural steel for the control building above elevation 47 feet-6 inches continued, as did cable tray hanger installation inside the building. Excavation for the service building foundation was initiated and construction of the EGE fuel oil storage vault walls to elevation 24 feet-6 inches continued.

In the yard, the dome assembly area was completed while work proceeded on the intake structure and yard piping and ductlines.

April 1980

In the containment, the south cavity wing walls finished to elevation 46 feet-10 inches, as were the pressurizer storage location temporary supports, the painting and assembly of the dome liner, Rings C2 through C5, and the reactor coolant pump volute welds. Work on the elevator pit was finished, except the ramp. The pressurizer was set into its storage location against the crane wall, and the polar crane rear girder was also set in place on top of the crane wall. Assembly of the G2 crane girder and installation of the temporary construction bridge began, and one of the pedestal cranes was relocated to the yard west of the containment. Work also continued on the refueling cavity walls; cubicle space frames; annulus and miscellaneous platforms; piping installation for various systems, including piping and hangers under the dome and annulus piping and supports; stairs; and the dome liner assembly, Ring C6 through C12.

Erection of formwork and embeds for various walls in the auxiliary building continued along with installation of piping and pipe racks inside the building. Welding of antivibration clips continued for Condenser C in the turbine building and the temporary heating boiler was shut down. Construction of the intake structure walls to elevation 11 feet-6 inches continued, and formwork and fill concrete for the demineralized water storage tank foundation slab began.

NRC Letter: October 7, 1983

Question No. QE290.3 (Section 2.1)

Provide information on noise related complaints associated with operation of the Millstone Nuclear Power Station. Include date and time of complaint, the location of the complaintant, the nature of the complaint and the actions taken by Northeast Utilities to resolve the complaint and to prevent its reoccurrence.

Response:

There is no formal procedure for the handling of noise complaints. The Public Information Officer for the Millstone Nuclear Power Station is generally the point of contact for complaints from the local community. The Public Information Officer forwards the complaints to the Station Superintendent or the Superintendent, New Site Construction. Noise complaints are dispositioned jointly by Public Information and the Plant. Dispositioning of complaints usually involves an explanation to the party complaining of off normal events responsible for increased noise levels and corrective action where appropriate. For example, in response to complaints received regarding the public address system at the site, personnel at the site were directed not to use the public address system between 6:30 p.m. and 8:00 a.m., except for emergencies. In addition, specialists were assigned to review the position, direction, and volume of each of the loudspeakers. This resulted in a substantial reduction in the overall offsite noise caused by the daytime use of the public address system. A noise survey was conducted in response to one complaint, as noted in the response to NRC Question E290.2; however, noise surveys are not conducted in response to complaints as a matter of routine.

(February 17, 1984 Letter)

LIST OF EFFECTIVE PAGES

Page, Table (T), or Figure (F)	Revision Number	Date
EROLS Questions (Index)	0	April 1984
QE290.4-1	0	April 1984
T QE290.4-1 (1 of 1)	0	April 1984
F QE290.4-1	0	April 1984
QE290.5-1	0	April 1984
QE290.6-1	0	April 1984
QE290.7-1	0	April 1984
QE290.8-1 thru QE290.8-2	0	April 1984

EROLS QUESTIONS

MILLSTONE NUCLEAR POWER STATION - UNIT 3
DOCKET NO. 50-423

NRC Question	EROLS Section	Keywords
Environmental Engineering Branch (EEB)		
E290.4	-	Position of loudspeakers
E290.5	-	Noise calculations/surveys
E290.6	-	Warehouse complex
E290.7	-	Main and auxiliary transformers
E290.8	-	Transformer data

NRC Letter: February 17, 1984

Question No. QE290.4

Provide a map containing the position of the loudspeakers that will be present during plant operation, and which may have an impact on Jordan Cove and Pleasant Beach. Indicate their coordinates and main axis of directivity.

Response:

There will be five loudspeakers present during plant operation. Their locations and directivities are shown on Figure QE290.4-1 and Table QE290.4-1, respectively.

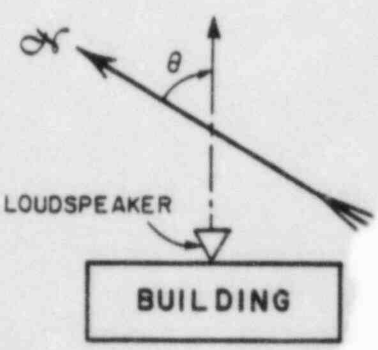
TABLE QE290.4-1

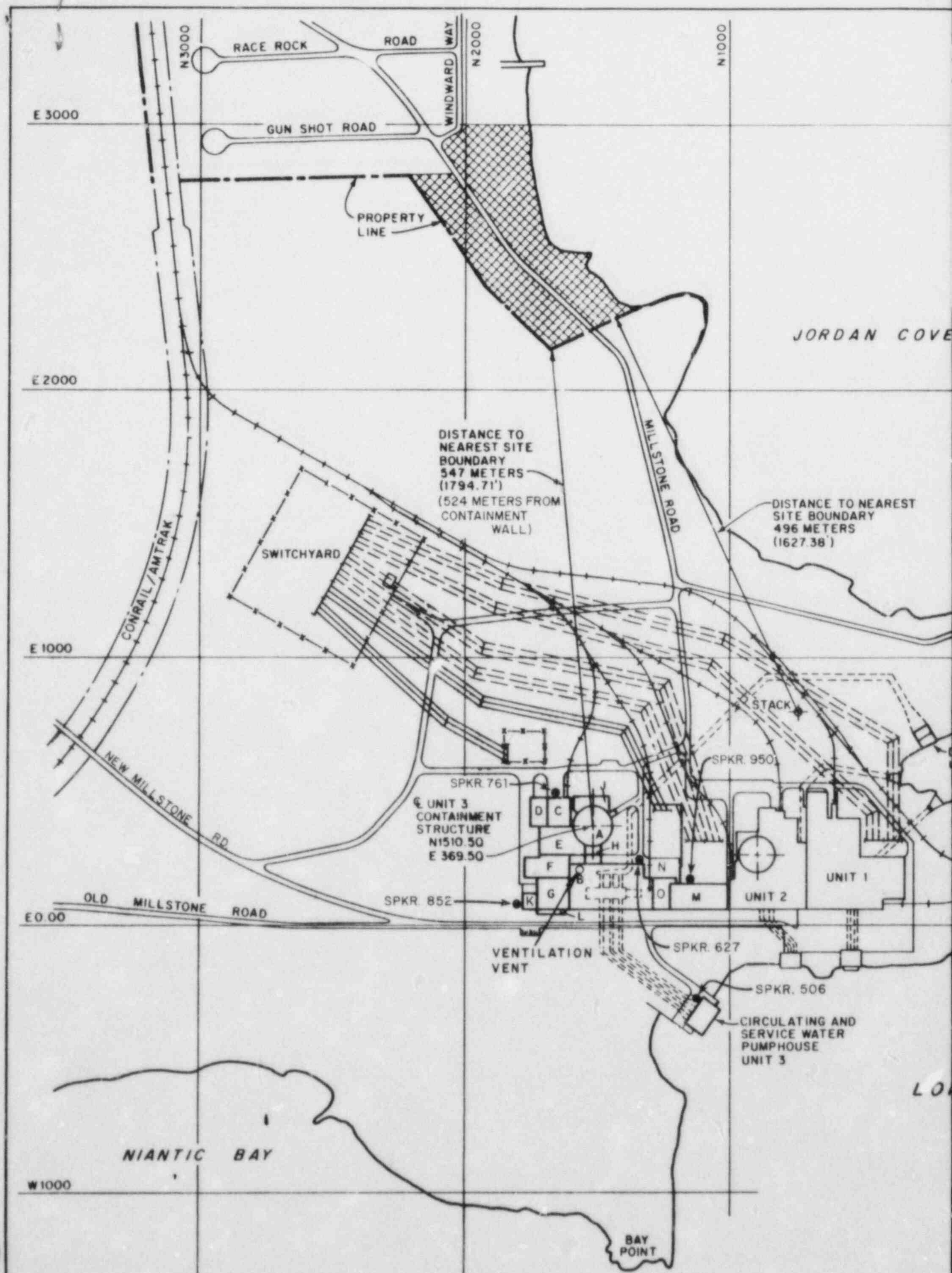
LOCATION AND DIRECTIVITY OF LOUDSPEAKERS
TO BE PRESENT DURING PLANT OPERATION

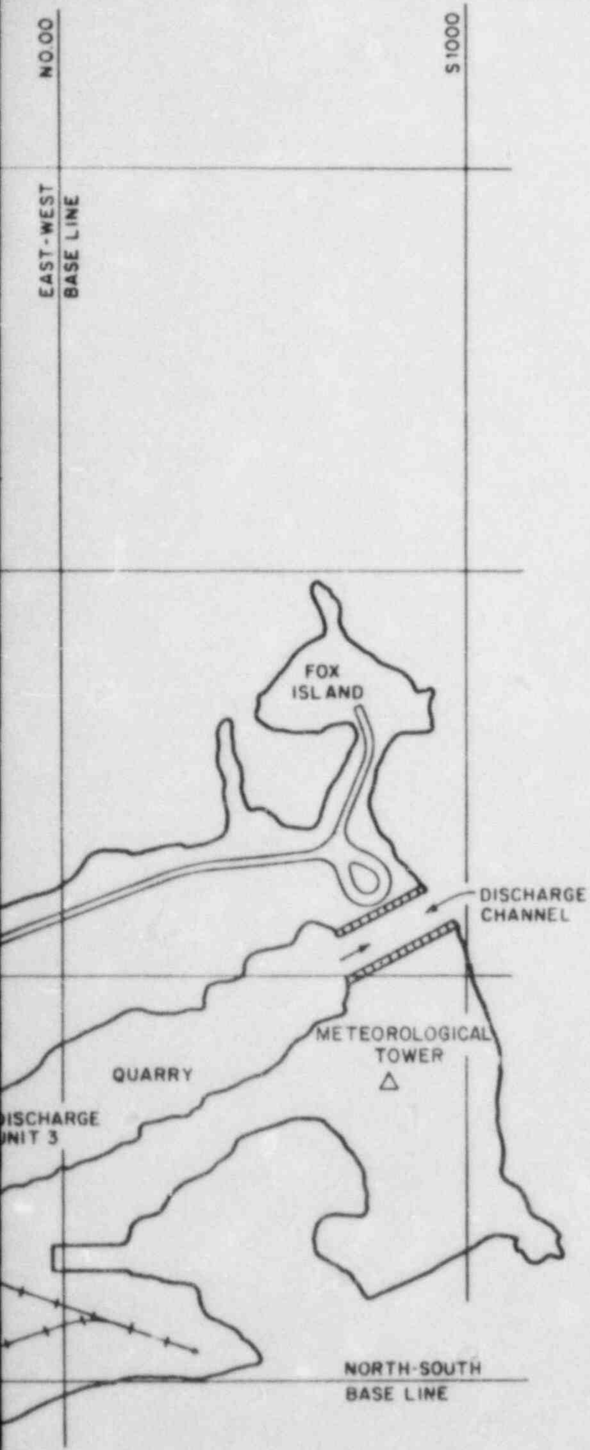
Mark Number	Location: Building	Location: Elevation (MSL)	Main Axis of Directivity[1]
3COP-SPKR506	Circulating and Service Water Pumphouse	27 ft-6 in.	20°
SPKR627	Turbine Building	38 ft-6 in.	57°
SPKR761	Fuel Building	40 ft-0 in.	57°
SPKR852	Emergency Diesel Generator Enclosure	34 ft-3 in.	333.5°
SPKR950	Warehouse No. 5	38 ft-6 in.	73°

NOTE:

1. The angle (θ) between the north direction and the main axis of the loudspeaker in degrees.




RACE ROCK
ROAD
WINDWARD WAY
N3000
N2000
N1000
E 3000
GUN SHOT ROAD
PROPERTY LINE
JORDAN COVE
E 2000
DISTANCE TO NEAREST SITE BOUNDARY 547 METERS (1794.71')
(524 METERS FROM CONTAINMENT WALL)
MILLSTONE ROAD
DISTANCE TO NEAREST SITE BOUNDARY 496 METERS (1627.38')
SWITCHYARD
CONRAIL/AMTRAK
E 1000
STACK
NEW MILLSTONE RD
SPKR. 950
SPKR. 761
℄ UNIT 3 CONTAINMENT STRUCTURE N1510.50 E 369.50
D
C
J
A
E
H
F
B
N
G
K
O
M
L
UNIT 2
UNIT 1
SPKR. 852
OLD MILLSTONE ROAD
E 0.00
VENTILATION VENT
SPKR. 627
SPKR. 506
CIRCULATING AND SERVICE WATER PUMPHOUSE UNIT 3
NIANTIC BAY
W 1000
BAY POINT



EXPLANATION

A CONTAINMENT STRUCTURE
B TURBINE BUILDING
C FUEL BUILDING
D WASTE DISPOSAL BUILDING
E AUXILIARY BUILDING
F SERVICE BUILDING
G CONTROL BUILDING
H MAIN STEAM VALVE BUILDING
J ENGINEERED SAFETY FEATURES BUILDING
K EMERGENCY DIESEL GENERATOR BUILDING
L TECHNICAL SUPPORT CENTER
M WAREHOUSE & UNIT 2 CONDENSATE POLISHING FACILITY
N AUXILIARY BOILER
O CONDENSATE POLISHING ENCLOSURE

TI APERTURE CARD

LEGEND

PRIVATELY OWNED RECREATION AREA

0 250 500
SCALE-FEET

0 125 250
SCALE-METERS

Also Available On Aperture Card

FIGURE QE290.4-1
LOCATIONS OF LOUDSPEAKERS TO BE PRESENT DURING PLANT OPERATION
MILLSTONE NUCLEAR POWER STATION
UNIT 3
ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

8404190136 -01

NRC Letter: February 17, 1984

Question No. QE290.5

Provide any supplementary (to ER) documentation (if available) describing the details of noise calculations (tonal and broadband) done for the site. Provide any supporting reports on the ambient noise surveys including octave band noise spectra measured during the daytime and nighttime at sites 1-8.

Response:

A noise calculation to predict sound level contributions from each noisy source in operation on Millstone 3 at selected locations, representing the surrounding communities, and a summary of octave band noise data (daytime and nighttime) measured during the ambient noise survey, October 1979, and April 1980, at sites 1-8, have been provided under separate cover on March 16, 1984.

NRC Letter: February 17, 1984

Question No. QE290.6

Indicate whether the warehouse complex (located between the transformers and Jordan Cove homes) will be removed after construction. If not, indicate the height, width, and length of the warehouse complex and its location on a map.

Response:

The warehouse complex is temporary and will be removed after construction.

NRC Letter: February 17, 1984

Question No. QE290.7

Provide construction layout drawings for the region around the main and auxiliary transformers. These drawings should provide the details of the locations and dimensions of the main and auxiliary transformers and their firewalls.

Response:

The following construction layout drawings for the region around the main and auxiliary transformers, which show the details of the locations and dimensions of the main and auxiliary transformers and their firewalls, have been provided under separate cover on March 16, 1984.

SWEC Drawing No. 12179-EC-21A-2
SWEC Drawing No. 12179-EC-21B-1
SWEC Drawing No. 12179-EC-21C-3
SWEC Drawing No. 12179-EC-59A-2

NRC Letter: February 17, 1984

Question No. QE290.8

For all transformers at the site:

a. Indicate the names of the manufacturers, the equivalent two-winding ratings, the NEMA ratings, and the breakdown insulation levels (BIL).

b. Indicate the type of cooling system.

c. Indicate whether there is a three-phase transformer system, and, if so, whether each phase is in a separate tank.

d. Provide the core tone sound power levels if available from the manufacturer. If not known, provide the sound power level octave band spectra used in your noise analyses.

Response:

Main Transformers - 15G-3X-A and 15G-3X-B

a. Manufacturer - Westinghouse

Equivalent Two Winding Ratings - 345 kV/22.8 kV

NEMA Rating - 630 MVA

BIL - 900 kV/150 kV
BIL - 150 kV (Neutral)

b. Cooling System - FOA (Force Oil Air - Pumps and Fans)

c. Transformer System - Three Phase (3ϕ), all phases in 1 tank.

d. Sound Power Level -

1. Unit A - 78.1 dBA with 6 coolers out of a total of 12 running.

2. Unit B - 77.5 dBA with 6 coolers out of a total of 12 running.

Reserve Station Service Transformers - 15G-23SA and 15G-23SB

a. Manufacturer - Westinghouse

Equivalent Two Winding Ratings -

1. Unit A - 345 kV/4.16 kV/4.16 kV

2. Unit B - 345 kV/6.9 kV/6.9 kV

NEMA Ratings -

1. Unit A - 27 MVA/36 MVA/45 MVA

2. Unit B - 30 MVA/40 MVA/50 MVA

BIL - Both Units A and B
BIL - 900 kV (Highside)
BIL - 110 kV (Lowside)
BIL - 150 kV (Neutral)

b. Cooling System - OA/FOA/FOA

c. Transformer System - Three Phase (3ϕ), all phases in 1 tank.

d. Sound Power Level -

1. Unit A - 68.2 dBA, OA Rating, no coolers running

2. Unit B - 62.7 dBA, OA Rating, no coolers running

Normal Station Service Transformers - 15G-3SA and 15G-3SB

a. Manufacturer - McGraw - Edison

Equivalent Two Winding Ratings -

1. Unit A - 22.8 kV/4.16 kV/4.16 kV

2. Unit B - 22.8 kV/6.9 kV/6.9 kV

NEMA Ratings -

1. Unit A - 24/32/40 MVA

2. Unit B - 30/40/50 MVA

BIL - 150 kV (Highside)
BIL - 95 kV (Lowside)

b. Cooling System - OA/FA/FA

c. Transformer System - Three Phase (3), all phases in 1 tank

d. Sound Power Level -

1. Unit A - 65 dBA

2. Unit B - 66 dBA

LIST OF EFFECTIVE PAGES

Page, Table (T), or Figure (F)	Amendment Number
2-i	5
2-ii thru 2-viii	0
2-ix	5
2-x thru 2-xii	0
2-xiii	5
2-xiv	0
2-xv	5
2-xvi	0
2-xvii	5
2.1-1 thru 2.1-2	0
2.1-3 thru 2.1-5	5
2.1-6	0
2.1-7	1
2.1-8	4
2.1-9 thru 2.1-10	0
2.1-11	4
2.1-12 thru 2.1-30	0
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T2.1-2 (1 of 1)	0
T2.1-3 (1 of 1)	0
T2.1-4 (1 of 1)	0
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T2.1-9 (1 of 1)	0
T2.1-10 (1 of 1)	0
T2.1-11 (1 of 1)	0
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T2.1-24 (1 thru 2 of 2)	0
T2.1-25 (1 of 3)	4
T2.1-25 (2 thru 3 of 3)	0
T2.1-26 (1 of 1)	0

LIST OF EFFECTIVE PAGES (Cont)

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T2.1-30 (1 of 1)	0
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T2.1-34 (1 thru 3 of 3)	0
T2.1-35 (1 thru 4 of 4)	0
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T2.1-48 (1 thru 2 of 2)	0
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F2.1-17	0
F2.1-18	0
F2.1-19	0
F2.1-20	0
F2.1-21	0

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LIST OF EFFECTIVE PAGES (Cont)

LIST OF EFFECTIVE PAGES (Cont)

LIST OF EFFECTIVE PAGES (Cont)

Page, Table (T), or Figure (F)	Amendment Number
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F2.2-47	0
F2.2-48	0
F2.2-49	0
F2.2-50	0
F2.2-51	0
Summary TC i thru ii	0
2.3-1	0
2.3-2	4
2.3-3 thru 2.3-6	0
2.3-7	1
2.3-8	1
2.3-9	1
2.3-10	1
2.3-11	1
2.3-12	1
2.3-13 thru 2.3-15	5
2.3-16 thru 2.3-17	0
2.4-18 thru 2.3-19	5
2.4-20 thru 2.3-24	0
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T2.3-22 (1 of 1)	1

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LIST OF EFFECTIVE PAGES (Cont)

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T2.3-68 (1 of 1)	0
T2.3-69 (1 of 1)	0
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F2.3-2	0
F2.3-3	0
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F2.3-5 (2 sheets)	0
F2.3-6 (2 sheets)	0
F2.3-7	0
2.4-1	5
2.4-2 thru 2.4-10	0
2.4-11	5
2.4-12	0
2.4-13	2
2.4-14 thru 2.4-17	0
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T2.4-3 (1 of 1)	0
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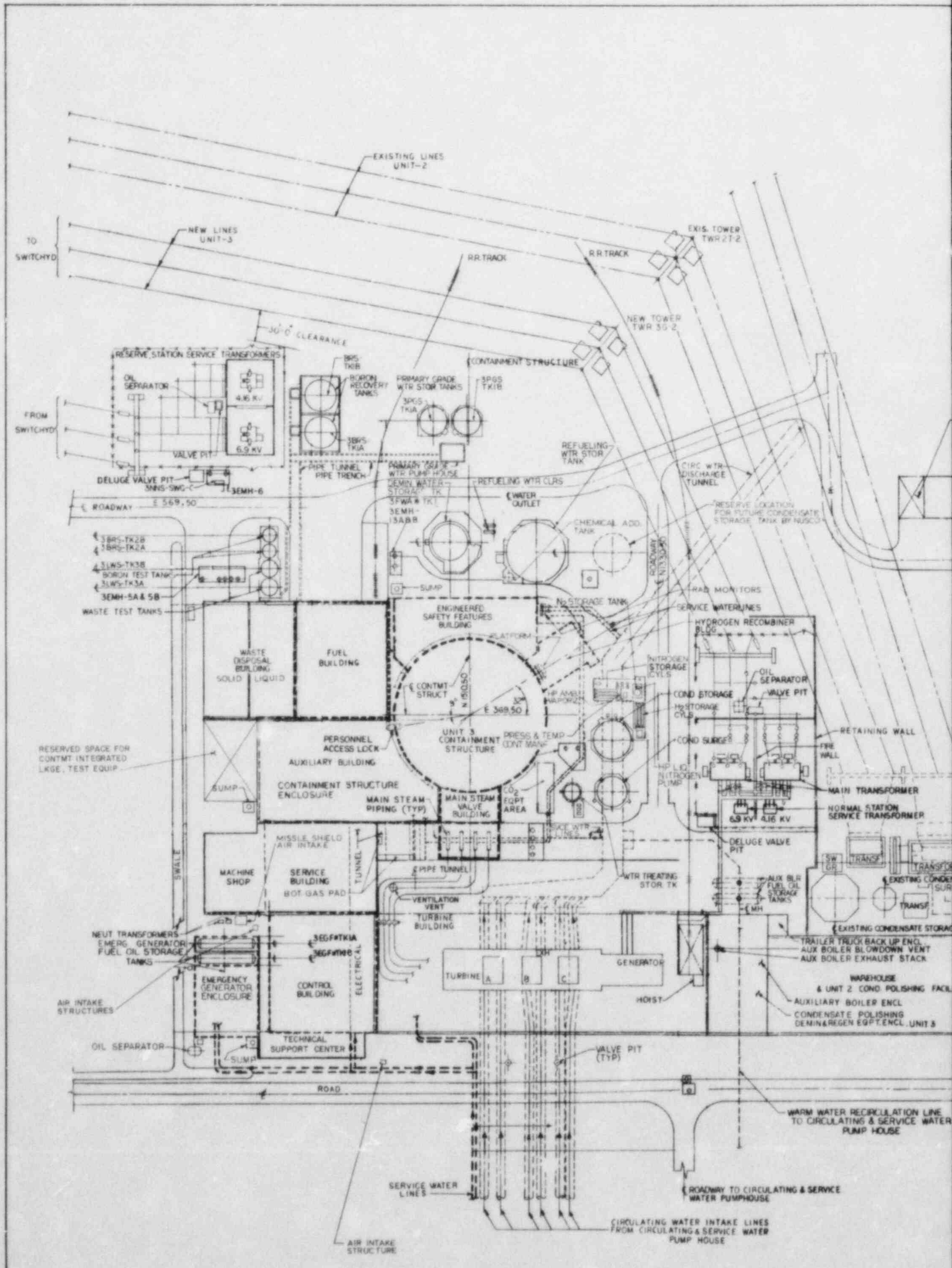
2.5-1 thru 2.5-2	2
F2.5-1	0
F2.5-2	0
2.6-1 thru 2.6-3	0
T2.6-1 (1 thru 2 of 2)	0
T2.6-2 (1 of 1)	0
Attachment 2.6A (Cover) - 1 page	0

LIST OF EFFECTIVE PAGES (Cont)

Page, Table (T), or Figure (F)	Amendment Number
Attachment 2.6A - 1 page	0
Attachment 2.6A (letter) - 3 pages	0
Attachment 2.6A (list) - 15 pages	0
Attachment 2.6B (cover) - 1 page	0
Attachment 2.6B - 1 page	0
Attachment 2.6B (letter) - 2 pages	0
2.7-1	5
2.7-2 thru 2.7-3	0
T2.7-1 (1 of 1)	0
T2.7-2 (1 of 1)	0
T2.7-3 (1 thru 2 of 2)	0
F2.7-1	0
F2.7-2	2


EXISTING LINES
UNIT-2
TO
SWITCHYD
NEW LINES
UNIT-3
R.R.TRACK
R.R.TRACK
EXIS. TOWER
TWR 2T-2
NEW TOWER
TWR 3G-2
30'-0" CLEARANCE
RESERVE STATION SERVICE TRANSFORMERS
OIL SEPARATOR
4.16 KV
6.9 KV
VALVE PIT
FROM
SWITCHYD
DELUGE VALVE PIT
3NNS-SWG-C
3EMH-6
3BRS-TK1B
BORON RECOVERY TANKS
3BRS-TK1A
PIPE TUNNEL
PIPE TRENCH
CONTAINMENT STRUCTURE
PRIMARY GRADE WTR STOR TANKS
3PGS-TK1B
3PGS-TK1A
PRIMARY GRADE WTR PUMP HOUSE
DEMIN WATER STORAGE TK
3FWA TK1
3EMH-13A&B
REFUELING WTR STOR TANK
REFUELING WTR CLRS
WATER OUTLET
CHEMICAL ADD. TANK
CIRC WTR DISCHARGE TUNNEL
RESERVE LOCATION FOR FUTURE CONDENSATE STORAGE TANK BY NUSCO
ROADWAY
E 569.50
3BRS-TK2B
3BRS-TK2A
3LWS-TK3B
BORON TEST TANK
3LWS-TK3A
3EMH-5A & 5B
WASTE TEST TANKS
SUMP
RAD MONITORS
N2 STORAGE TANK
SERVICE WATER LINES
HYDROGEN RECOMBINER BLDG
ENGINEERED SAFETY FEATURES BUILDING
PLATFORM
WASTE DISPOSAL BUILDING
SOLID
LIQUID
FUEL BUILDING
CONTMT STRUCT
N 1510.50
E 369.50
NITROGEN STORAGE CYLS
HP AMB VAPORIZ
COND STORAGE
H2 STORAGE CYLS
OIL SEPARATOR
VALVE PIT
RETAINING WALL
FIRE WALL
RESERVED SPACE FOR CONTMT INTEGRATED LKGE. TEST EQUIP.
PERSONNEL ACCESS LOCK
AUXILIARY BUILDING
UNIT 3 CONTAINMENT STRUCTURE
PRESS & TEMP CONT MANF
COND SURGE
HP LIQ NITROGEN PUMP
MAIN TRANSFORMER
CONTAINMENT STRUCTURE ENCLOSURE
MAIN STEAM PIPING (TYP)
MAIN STEAM VALVE BUILDING
CO2 EQPT AREA
NORMAL STATION SERVICE TRANSFORMER
6.9 KV
4.16 KV
DELUGE VALVE PIT
SWALE
MISSLE SHIELD AIR INTAKE
MACHINE SHOP
SERVICE BUILDING
BOT. GAS PAD
TUNNEL
PIPE TUNNEL
WTR TREATING STOR TK
AUX BLR FUEL OIL STORAGE TANKS
SW GR
TRANSF
EXISTING CONDENSATE STORAGE
VENTILATION VENT
TURBINE BUILDING
NEUT TRANSFORMERS
EMERG. GENERATOR FUEL OIL STORAGE TANKS
3EGF TK1A
3EGF TK1B
ELECTRICAL
TRAILER TRUCK BACK UP ENCL
AUX BOILER BLOWDOWN VENT
AUX BOILER EXHAUST STACK
TURBINE
A
B
C
GENERATOR
WAREHOUSE & UNIT 2 COND. POLISHING FACIL
AIR INTAKE STRUCTURES
EMERGENCY GENERATOR ENCLOSURE
CONTROL BUILDING
HOIST
AUXILIARY BOILER ENCL
CONDENSATE POLISHING DEMIN & REGEN EQPT. ENCL. UNIT 3
OIL SEPARATOR
SUMP
TECHNICAL SUPPORT CENTER
VALVE PIT (TYP)
ROAD
WARM WATER RECIRCULATION LINE TO CIRCULATING & SERVICE WATER PUMP HOUSE
SERVICE WATER LINES
ROADWAY TO CIRCULATING & SERVICE WATER PUMPHOUSE
CIRCULATING WATER INTAKE LINES FROM CIRCULATING & SERVICE WATER PUMP HOUSE
AIR INTAKE STRUCTURE

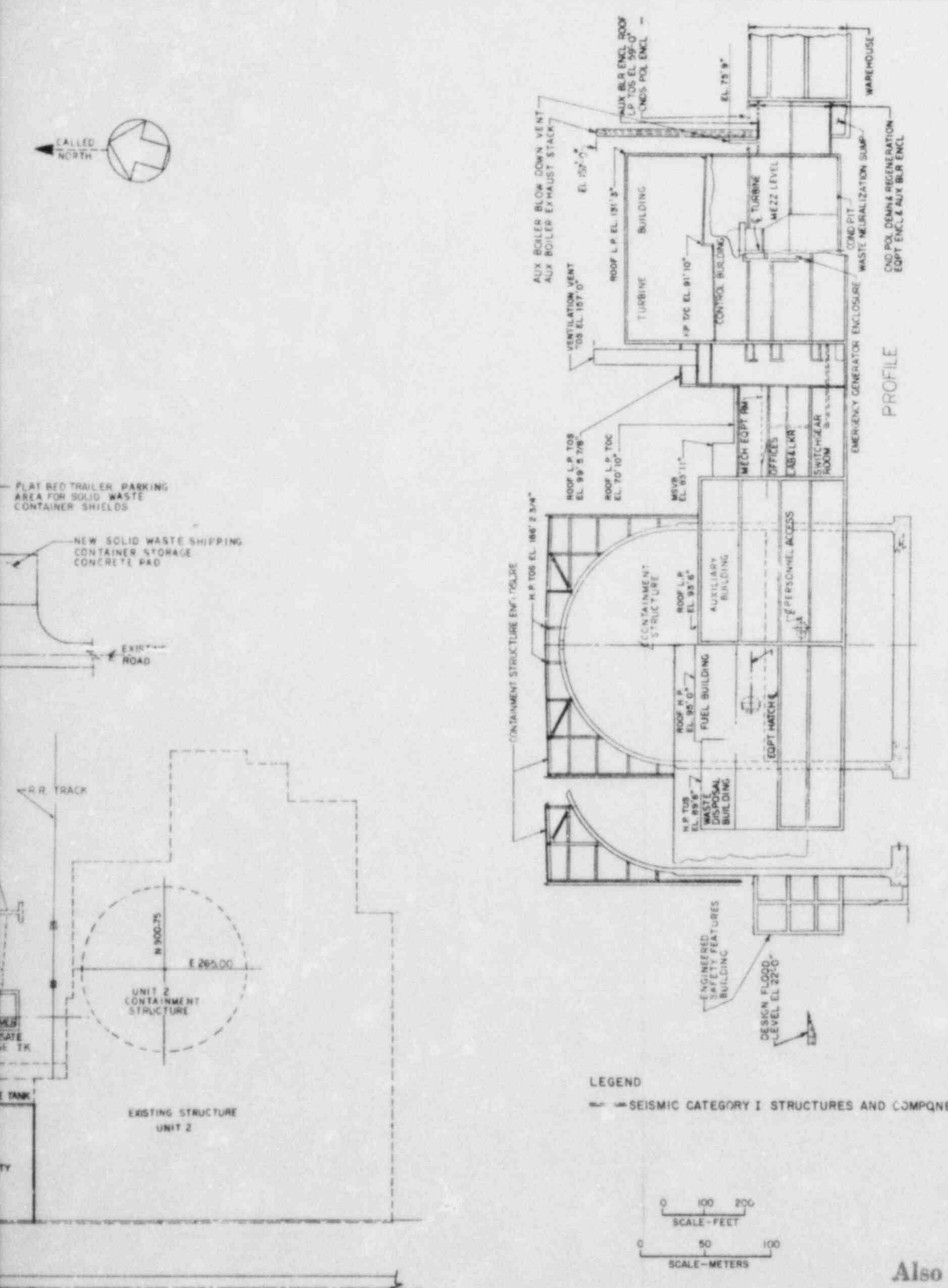


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FIGURE 2.1-5
PLOT PLAN
MILLSTONE NUCLEAR POWER STATION
UNIT 3
ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

AMENDMENT 7 APRIL 1984

8404190136 -02

LIST OF EFFECTIVE PAGES

Page, Table (T), or Figure (F)	Amendment Number
3-i thru 3-ii	0
3-iii	5
3-iv thru 3-v	0
3.1-1	0
F3.1-1	0
3.2-1 thru 3.2-3	0
F3.2-1	0
F3.2-2	0
F3.2-3	0
3.3-1	2
3.3-2	0
T3.3-1 (1 of 1)	0
F3.3-1	0
3.4-1	0
3.4-2 thru 3.4-2a	2
3.4-3 thru 3.4-6	0
T3.4-1 (1 of 1)	2
F3.4-1	0
F3.4-2	0
F3.4-3	0
F3.4-4 (2 sheets)	0
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3.5-8	7
3.5-9 thru 3.5-10	0
3.5-11	7
3.5-12	0
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T3.5-2 (1 thru 2 of 2)	0
T3.5-3 (1 thru 3 of 3)	0
T3.5-4 (1 of 1)	0
T3.5-5 (1 of 1)	0
T3.5-6 (1 thru 2 of 2)	0
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T3.5-10 (1 of 1)	0
T3.5-11 (1 thru 2 of 2)	0
T3.5-12 (1 thru 3 of 3)	0
T3.5-13 (1 thru 2 of 2)	0

3.5.2 Liquid Radwaste System

The liquid radwaste system collects, stores, monitors, and reduces the concentration of radioactive nuclides in liquid effluents to a level as low as reasonably achievable. The liquid radwaste system discharges to the circulating water discharge tunnel or to the primary grade water for reuse.

Figure 3.5-1 is a flow diagram of the system, showing interconnections with other systems. Table 3.5-8 shows the component capacities and flow rates. Table 3.5-9 gives the estimated quantities and flow rates to the system from liquid radwaste sources. Table 3.5-10 lists minimum expected decontamination factors and holdup times.

The liquid radwaste system consists of the waste evaporator system and regenerant evaporator system. These subsystems, as well as the boron recovery system, are discussed in the following sections. More detailed information is contained in Millstone 3 FSAR, Section 11.2.

3.5.2.1 Waste Evaporator System

The waste evaporator system collects liquid radwaste from the sources identified in Table 3.5-9 and produces a distillate suitable for reuse or discharge. The high level waste drain tanks store the liquid radwaste prior to processing in the waste evaporator. The waste evaporator is designed with an external reboiler, a large liquid disengaging space, a vapor-liquid separator, and a tray section. These features combine to form a system with extremely high separation factors for nonvolatile nuclides.

Distillate from the waste evaporator is collected in waste test tanks, sampled, and, if within allowable chemistry and activity limits, is recycled to the primary grade water tanks for reuse in the unit. If required by tritium or water balance requirements, distillate may alternately be discharged via the circulating water discharge tunnel.

If samples indicate that the distillate is unacceptable for reuse or discharge, it is either passed through the waste demineralizer and resampled, or sent back to the high level waste drain tanks for reprocessing. The demineralizer is a bed of mixed ion exchange resins in the H^+ and OH^- form.

It is expected that the liquid from the waste test tanks will be totally recycled. However, for the purpose of evaluating the radiological impact on the environment, 10 percent of this process waste is assumed to be discharged in accordance with NUREG-0017. Assurance that waste above activity limits is not inadvertently discharged to the environment is provided through sampling of the effluent prior to discharge and radiation monitoring of the effluent stream.

7 Isotopic analysis is performed on each batch prior to discharge and the total activity discharged is recorded. Detailed administrative records of all radioactive releases are maintained. Table 3.5-11 presents annual expected liquid discharge activity for significant isotopes. Table 3.5-12 presents radioactive liquid concentrations from various input streams.

Waste evaporator bottoms are allowed to concentrate until either approximately 25 percent solids by weight or an activity level to be determined by the characteristics of the container used to ship the evaporator bottoms offsite is accumulated. Evaporator bottoms are pumped to the solid radwaste system (Section 3.5.4).

3.5.2.2 Regenerant Evaporator System

The regenerant evaporator system collects, chemically treats, and concentrates liquid waste from the condensate demineralizer system. Radioactivity exists in the system only after a primary to secondary leak from the reactor coolant to a steam generator. The system collects radioactive liquid waste from the sources identified in Table 3.5-9 and produces a distillate. The regenerant evaporator feed tanks store any liquid radwaste prior to processing in the regenerant evaporator. The regenerant evaporator is similar to the waste evaporator.

During evaporator operation, the distillate leaving the demineralizer filter is continuously sampled for radioactivity, conductivity, and pH. If either the radioactivity, conductivity level and pH is unacceptable, the distillate is automatically returned to the feed tanks. If the distillate is acceptable, it is forwarded to the condensate surge tank or to the condensate storage tank. The distillate can also be discharged offsite through the circulating water discharge system.

The regenerant evaporator is operated so as to discharge bottoms at about 25 percent by weight solids concentration to the regenerant bottoms holding tank for storage and then to the waste solidification system.

3.5.2.3 Boron Recovery System

The boron recovery system processes reactor coolant to recover primary grade water and boric acid for reuse or disposal. The liquid that enters the boron recovery system is a result of the feed and bleed operations necessary to maintain the boron concentration in the reactor coolant at the desired level. This liquid is reactor coolant letdown from the chemical and volume control system (CHS) and has been passed through a mixed bed demineralizer and from the reactor plant gaseous drains system (DGS).

In the boron recovery system, the reactor coolant letdown passes through the cesium removal ion exchangers, boron recovery tanks, and the boron evaporator. The distillate is transferred to either the primary grade water system for reuse or to the circulating water

discharge tunnel (via the liquid radwaste system). The bottoms from the boron evaporator are filtered and sent either to the CVCS for reuse or to the solid radwaste system for solidification and offsite shipment.

3.5.3 Radioactive Gaseous Waste System

The gaseous radwaste system consists of the process gas stream (hydrogenated) and the low activity process vent stream (aerated).

Each of the Millstone site units has a separate gaseous radwaste system, as described in this section. Figure 3.5-2 is a flow diagram of the system, which shows interconnections with other systems. Table 3.5-13 shows the component capacities. Table 3.5-14 shows effluent releases from each release point.

The gaseous radwaste system treats specific gas streams The treated effluent is discharged to the Millstone 1 Stack.

In addition, the exhaust from the reactor plant ventilation system is discharged to the ventilation vent. These exhausts come from the auxiliary building ventilation system, the waste disposal building ventilation system, the fuel building ventilation system, the containment purge air system, and the containment atmosphere filtration system. Exhausts from the engineered safety features (ESF) building are vented from a release point atop the south wall of the building, but in terms of gaseous releases reports in Table 3.5-14, releases from the ESF building are included in the auxiliary building releases as part of the normal composite ventilation releases from the station buildings.

Figure 3.5-3 is a diagram for the reactor plant ventilation system. Table 3.5-15 lists the expected decontamination factors for the reactor plant ventilation system. Table 3.5-16 defines the release points and rates.

The two portions of the radioactive gaseous waste system and the ventilation systems are discussed in the following sections. More detailed information is contained in Millstone 3 FSAR, Section 11.3.

3.5.3.1 The Process Gas (Hydrogenated) Portion of the Radioactive Gaseous Waste System

The process gas (hydrogenated) portion dehydrates the noncondensable fission product gas stream, removes radioactive iodine, and provides for activity reduction of radioactive xenon and krypton. It can also recycle the purified hydrogen stream back to the reactor coolant system through the volume control tank or release it to the atmosphere via interfacing systems.

The reactor coolant letdown, containing the dissolved hydrogen and fission product gases, is directed to the degasifier. The liquid collected by the reactor plant gaseous drains system is also directed to the degasifier.

Effluent gases from the degasifier primarily contain hydrogen and water vapor. A small amount of nitrogen and traces of xenon, krypton, and iodine are also present in the effluent gases.

These gases and any hydrogenated gas stream from the reactor plant gaseous vent header are dehumidified in the process gas refrigerant dryers and passed through and filtered by the process gas charcoal bed adsorbers (to limit the buildup of long-lived fission product gases dissolved in the reactor coolant) and released to the environment via the Millstone 1 Stack. The charcoal beds are designed to delay xenon isotopes for a minimum of 142 days and krypton for 6 days. In addition, a decontamination factor of 10^6 for iodine is obtained during passage through the charcoal beds. The charcoal is divided evenly between two vertical tanks in series.

3.5.3.2 Process Vent Portion of the Radioactive Gaseous Waste System

The process vent portion collects, dehydrates, and discharges aerated gas streams to the Millstone 1 stack. It also collects relief valve effluents from the degasifier, liquid waste evaporator, and boron evaporator and discharges them to the reactor plant ventilation vent. The releases are monitored prior to discharge.

3.5.3.3 Reactor Plant Ventilation Systems

The reactor plant ventilation systems consist of the auxiliary building ventilation system, the waste disposal building ventilation system, the fuel building ventilation system, the containment purge air system and the containment atmosphere filtration system. These
7 systems are described in the following sections and shown on figures contained in Millstone 3 FSAR, Section 9.4.

3.5.3.3.1 Auxiliary Building Ventilation System

The exhaust may be discharged to the atmosphere filtered or unfiltered. The auxiliary building exhaust system includes one normal exhaust and two fan-filter trains. Each filter bank includes an electric heating coil, prefilter, a carbon adsorber and two high efficiency particulate air (HEPA) filters (one upstream and one downstream of the carbon adsorber). The prefilters have a minimum filter efficiency of 80 percent based on ASHRAE Standard 52-68. The carbon adsorbers are of the gasketless nontray type to facilitate replacement. The carbon adsorber is designed for maximum flow velocity of 12 meters/min (40 fpm) to give sufficient residence time (0.25 sec/5.1-cm [2-inch] bed depth). Anticipated operational pressure surges will not affect the carbon adsorbers. The HEPA filters have a minimum filter efficiency of 99.95 percent when filtering particulates that are 0.3 micron or larger.

shipping container at the fill station. Then, waste concentrates are pumped into the container along with catalyst. Solidification occurs in the container.

Resins sluiced from demineralizers and ion exchangers are stored in the spent resin hold tank. The resins are then slurried to a 2.83-cubic meter (100-cubic) foot high integrity container, where they are allowed to settle. Excess water is removed by the spent resin dewatering pump and returned to the resin dewatering tank. Dewatered resin in high integrity containers in shielded shipping casks is suitable for offsite shipment.

Spent filters, contaminated tools, and other incompressible contaminated solid wastes are placed in 2.83- to 8.50-cubic meters (100- to 300-cubic foot) shipping containers. Either evaporator bottoms or water plus a solidification agent are added to the shipping container to immobilize the waste.

The system is designed to prevent external contamination of the containers by use of reliable container sealing, appropriate system flushing, and instrumentation interlocks that prevent overfilling the containers. The containers and shields are handled by a 907-kg (25-ton) capacity overhead bridge crane.

Compressible dry solid waste (e.g., contaminated clothing, wipe up toweling) is compacted into 55-gallon drums by a waste compactor. The filled drums are capped and placed in a storage area prior to shipment to a waste burial site. The drums are handled with the aid of a manually operated device, such as a forklift fitted with a drum lifting attachment.

The solidification area is located on the ground floor of the waste disposal building. Wastes are packaged to allow for immediate 7
shipment after processing. Shipping containers may be stored in the solidification area and placed in shields, if necessary, until ready for shipment.

An average of si: 5.52-cubic meter (195-cubic foot) high integrity 7
resin containers will be processed per year.

Storage capacity and storage time are based solely on anticipated operational factors, including shipping delays. Holding capacity for radioactive decay is not required, since individual containers are shielded as necessary. However, based on routine storage of 2 weeks and minimum expected holdup and process times of 2 weeks, average decay time prior to shipping is 4 weeks.

7

Components of low activity, such as contaminated tools, can be packaged in available or specially designed shipping containers and stored, if necessary, in the solid waste building. However, it is expected that the latter type components will be shipped immediately.

The average processing rate for compressible waste is six drums per week. The estimated maximum processing rate is 30 drums per week. One shipment would contain approximately 60 drums.

3.5.5 Process and Effluent Monitoring

The radioactive gaseous waste release points are the ventilation vent located on the turbine building and the Millstone 1 stack. The radioactive liquid waste discharge point is the circulating water discharge tunnel (Figure 2.1-3).

The Millstone 1 stack via supplementary leak collection and release system (SLCRS) is the discharge point for the reactor plant gaseous drains, chemical and volume control, reactor plant gaseous and aerated vents, condenser air removal and containment vacuum pumps system.

The ventilation vent and the Millstone 1 stack are continuously monitored. The process gas monitors in the individual gas streams alarm effluent discharges from the specific stream upon high activity signal.

The turbine building ventilation exhaust air is released from the turbine building roof vents. The effect of turbine building roof vent exhaust air on total offsite doses is negligible. Therefore, this release point is not monitored.

The liquid waste system discharge line is monitored upstream of the circulating water discharge tunnel. Upon high activity, this discharge is automatically terminated.

3.6 CHEMICAL AND BIOCIDE WASTES

This section describes the nonradioactive liquid waste discharges from Millstone 3. The chemical additions to water used for the station operation are presented in Table 3.6-1.

3.6.1 Makeup Water Treatment System

3.6.1.1 Makeup Demineralizer Regeneration

The makeup demineralizer system for Millstone 3 consists of two trains, each having a capacity of 469 liters/min (124 gpm). Each train consists of an activated carbon filter, a cation demineralizer, an anion demineralizer, and a mixed bed demineralizer, arranged in series. An ultrafiltration system is provided upstream of the demineralizers to remove suspended solids and large organic molecules to prevent fouling of the demineralizer resins. Under average operating conditions, the demineralizers require chemical regeneration of the resins of one of the two trains approximately every 3 days. The total regeneration waste volume per train is approximately 190,000 liters (50,000 gallons). 7

The main constituent of the regeneration wastes is sodium sulfate, resulting from the use of sulfuric acid and sodium hydroxide as the regenerating chemicals. Regeneration of one train of the cation and anion demineralizers requires the use of approximately 189 liters (50 gallons) of acid (66°Be) and 363 liters (96 gallons) of caustic (50-percent solution), respectively. Regeneration of the mixed bed demineralizer resins requires approximately 30 liters (8 gallons) of acid and 45 liters (12 gallons) of caustic. The combined regeneration wastes contain approximately 3,230 mg/l of sulfate and 1,460 mg/l of sodium (Table 3.6-2). Regeneration wastes from the cation, anion, and mixed bed demineralizers are neutralized to a pH between 6.0 and 9.0 and discharged to the circulating water system as discussed in Section 5.3.

The waste neutralization system is shown schematically on Figure 3.6-1. The system is a batch neutralization process in which wastes are recirculated within the waste regenerant neutralizing sump. Acid and caustic are added to the sump, as required, to adjust the pH of the wastes to within a range of 6.0 to 9.0. When the pH is within this range, the sump contents are discharged to the circulating water discharge tunnel.

3.6.1.2 Condensate Polisher Regeneration

Condensate polishing demineralizers maintain the condensate and feedwater system water quality. A total of eight mixed bed demineralizers (seven operating and one spare), each with a capacity of 10,690 liters/min (2,825 gpm), are provided to demineralize condensate flow. Each polisher requires periodic regeneration of the resins with sulfuric acid and sodium hydroxide. It is expected that under average operating conditions, one polisher per day will be regenerated. The total regeneration waste volume per polisher is

approximately 121,000 liters (32,000 gallons), of which 87,100 liter (23,000 gallons) are discharged to the chemical waste sump to be neutralized and monitored for radioactivity. The remaining 34,100 liters (9,000 gallons) are recycled to the water recovery tank.

The condensate polishing regeneration wastes are discharged after neutralization to a pH between 6.0 and 9.0 to the circulating water discharge tunnel. The main constituent of these wastes is sodium sulfate, resulting from the use of acid and caustic for regeneration. It is estimated that the concentrations of sulfate and sodium in the wastes discharged to the circulating water are 3,930 mg/l and 1,770 mg/l, respectively.

If the condensate polishing regeneration wastes are determined to be
7 radioactive, they will be treated as discussed in Section 3.5.2.

The waste neutralization system for condensate polisher regeneration wastes is similar to that described for the makeup demineralizer except that two sumps are supplied and are equipped with a common radiation monitor to detect potentially radioactive waste.

3.6.2 Biocide Wastes

The circulating water system (Section 3.4) is a once-through cooling system which draws water from the Niantic Bay area of Long Island Sound at a rate of approximately 56.6 cubic meters/sec (2,000 cfs). This water passes through the main condenser, which condenses steam exhausted from the turbine generator. Physical and chemical characteristics of Long Island Sound water are discussed in Section 2.4 and Section 5.3.

The six circulating water pumps are arranged in pairs such that the three pairs of pumps serve the three condenser shells (Section 3.4). Interconnection of each pair of pumps provides recirculation of the discharged water for backflushing of the condenser and for biofouling control of the intake lines and the pumphouse. A mechanical condenser tube cleaning system (Amertap), employing sponge rubber balls, provides for control of biofouling in the condenser. Chlorination of the circulating water for biofouling control is not anticipated.

The service water system is a once-through cooling system which draws water from Long Island Sound at a rate of 1.87 cubic meter/sec (66 cfs). This water cools the components and heat exchangers in the engineered safety features building, control building, auxiliary building, turbine building, and other unit structures. After passing through these heat exchangers, the service water is discharged to the circulating water discharge tunnel, where it is mixed with the circulating water and discharged to the quarry located on the southeast extremity of Millstone Point.

A gaseous chlorine solution is injected into the service water system to control biofouling. Chlorination of the service water occurs three times a day for 30-minute periods, for a total of 1 1/2 hours

per day. Chlorination is controlled by grab sample monitoring such that the concentration of free available chlorine at the point where the mixture of service water and circulating water is discharged to the quarry is maintained at a maximum of or less than 0.25 ppm. 291.9 7
After mixing with the quarry water, the concentration of free available chlorine is reduced to a concentration below detectable limits (i.e., less than 0.05 ppm). In addition, the chlorine demand of the circulating water will further reduce the free residual chlorine concentration below that which would occur through dilution alone. It is estimated that approximately 3,720 kg/yr (8,200 lb/yr) of chlorine (as Cl_2) will be used for service water chlorination.

3.6.3 Floor and Equipment Drainage

Radioactive and potentially radioactive floor drainage is conveyed to the liquid radwaste treatment system (Section 3.5). Nonradioactive floor and equipment drainage, resulting from pump seal leaks, pump seal and bearing water, floor washing, etc, is discharged to the yard storm sewer. Oil contaminated floor drainage is conveyed to oil/water separators before discharge. The oil removed is collected in drums and hauled offsite for recycle or disposal. The amount of floor drainage discharged to the yard storm sewer on a daily basis is variable. There are three oil/water separators, each having a design capacity of 379 liters/min (100 gpm), for the Millstone 3 plant areas. Oil and grease concentrations in the separate effluent are limited to 10 mg/l, average and 20 mg/l, maximum.

3.6.4 Other Liquid Wastes

3.6.4.1 Steam Generator Blowdown

The design of the steam generator blowdown system provides a means of controlling the suspended solids concentration and the chemical composition of the steam generator shell water. The system is capable of blowing down water from each of the four steam generators at various blowdown rates up to a maximum of 341 liters/min (90 gpm) per steam generator. Blowdown from each steam generator is conveyed to the blowdown flash tank in which pressure is maintained at a point slightly above the normal operating pressure of the fourth point feedwater heater shells. Characteristics of steam generator blowdown are presented in Table 3.6-3.

Steam from the flash tank is conveyed to the feedwater heaters. The remaining liquid in the flash tank drains by pressure differential to the condensate side of the condenser. Contaminants are removed from the liquid in the condensate polishing demineralizers, which are located downstream of the condenser. By using the above system, steam generator blowdown will not be discharged to the environment under normal plant operating conditions. During an extended plant outage, the steam generator shells may be drained through the blowdown lines to the condensate polishing system waste neutralization sump or, if required, to the low level waste drain tanks in the liquid radwaste system (Section 3.5).

3.6.4.2 Low Level Waste Drain Tank

Approximately 473,000 liters (125,000 gallons) of distillate are discharged, on an annual basis, to the circulating water discharge tunnel from the boron evaporator for tritium control. This waste is initially stored in the 15,000-liter (4,000-gallon) low level waste drain tank prior to discharge to the circulating water. The waste is released from the low level waste drain tank at a rate of 189 liters (50 gpm) on an average of once every 18 days.

The bulk of the discharges occurs during the 6 weeks prior to refueling. Distillate from the boron evaporator is treated using the boron demineralizers, boron demineralizer filter, and the effluent filters. Boron is the only constituent in this waste.

Potentially radioactive floor and equipment drainage is collected and fed into the low level waste drain tanks via the aerated drains system and discharged to the circulating water at a rate of 189 liters (50 gpm) for approximately 4 hours on an average of once every month. Contaminated shower drainage is also collected in the low level waste drain tanks and demineralized and discharged to the circulating water at 189 liters (50 gpm) in a manner similar to the boron recovery evaporator distillate. In both cases, the main contaminants are detergents from showers and floor washes.

Approximately 1,290 liters (340 gallons) of leakage from the reactor coolant system are assumed to occur on an annual basis. This leakage is diluted by washing down for decontamination purposes and further diluted in the low level waste drain tanks by other equipment and floor drainage. Small quantities, less than 1 ppm of lithium hydroxide used for pH control, could be released from this source.

3.6.4.3 Waste Test Tank Discharges

The high level radioactive liquid waste treatment system is described in Section 3.5. Distillate from the waste evaporators is conveyed to the waste test tank and discharged after demineralization to either primary grade water storage or to the circulating water discharge tunnel, depending on the plant water balance.

The waste evaporators are designed assuming that all distillate will be discharged to the circulating water. Whenever steam generator leaks exceeding the maximum allowable leak occur, the steam generator blowdown is processed by the waste evaporator.

The following are the maximum amounts of liquids handled by the waste evaporators annually:

1.	Condensate demineralizer - mixed bed system regenerant	18,200,000 liters/yr (4,800,000 gal/yr)
2.	Reactor plant aerated drains	2,160,000 liters/yr (570,000 galyr)
	Total feed to waste evaporator	20,325,000 liters/yr (5,370,000 gal/yr)

3.6.4.4 Corrosion Inhibitors

Hydrazine is the corrosion inhibitor used in the Millstone 3 component cooling system to remove trace quantities of dissolved oxygen. Due to pump gland leakage and other equipment leakage, small quantities of hydrazine could be released into the circulating water. The hydrazine reacts chemically with oxygen to form water and nitrogen. At high temperatures, hydrazine decomposes to form ammonia and nitrogen. 7

7

TABLE 3.6-1

CHEMICAL ADDITIONS TO WATER USED FOR STATION OPERATION

Chemical Use and System Involved	Reason for Use or Source of Chemical	Estimated Monthly Quantities (lb/mo) Addition to System Average	Addition to System Maximum	Station Discharge Average	Station Discharge Maximum	Frequency of Chemical Addition	
Boron (as B):							
Reactor coolant system	Soluble neutron adsorber	20,000 lb/yr	NA	0.86	0.17 lb/day	NA	
Chromates (as K_2CrO_4):							
Neutron shield tank cooling	Corrosion control	10 lb/yr	NA	None	None	NA	
Ammonia (as NH_3 (25%):							7
Auxiliary steam and condensate	Corrosion control	6	12	None	None	Continuous	
Steam and power conversion	Corrosion control	26,100	27,900	None	None	Continuous	
Hydrazine (as N_2H_4) (40%):							
Reactor plant component cooling water, charging pumps cooling, safety injection pumps cooling	Corrosion control	90 lb/yr	NA	None	None	NA	7
Auxiliary steam and condensate	Corrosion control	62.5	125	None	None	Continuous	
Steam and power conversion	Corrosion control	735	870	None	None	Continuous	
Chilled water system	Maintain pH; control O	7.5	12.5	None	None	Once per day	
Chlorine (as Cl_2):							
Service water system	Biofouling control	507.6	1268.7	507.6	1268.7	3 times per day	

TABLE 3.6-1 (Cont)

Chemical Use and System Involved	Reason for Use or Source of Chemical	Estimated Monthly Quantities (lb/mo) Addition to System Average	Addition to System Maximum	Station Discharge Average	Station Discharge Maximum	Frequency of Chemical Addition	
Sodium Hypochlorite (as Cl_2) (15%):							
Makeup ultrafiltration system	Ultrafiltration cleaning cycle	1,070	4,270	1,070	4,270	Once per day	
Sulfuric Acid (as H_2SO_4) (100%):							
Makeup demineralizer equipment	Regeneration of ion exchange resins	7,962	15,924	*	*	Once every 3 days	
Condensate polishing mixed bed	Regeneration of ion exchange resins	19,110	38,220	*	*	6 times per week	
Sodium Hydroxide (as NaOH) (50%):							7
Makeup demineralizer equipment	Regeneration of ion exchange resins	13,650	27,300	*	*	Once every 3 days	
Condensate polishing mixed bed	Regeneration of ion exchange resins	32,760	65,520	*	*	6 times per week	
Makeup ultra-filtration system	pH adjustment	NA	NA	NA	NA	As necessary	
Lime (as $Ca(OH)_2$) (100%):							
Condensate polishing mixed bed	Regeneration of ion exchange resins	400	3,200	400	3,200	Once every 4 days	7
Dow Binder:							
Radioactive solid waste	Waste solidification agent	32,500 lb/yr	40,000 lb/yr	None	None	Once per year	
Dow Catalyst:							
Radioactive solid waste	Waste solidification agent	800 lb/yr	1,000 lb/yr	None	None	Once per year	

TABLE 3.6-1 (Cont)

Chemical Use and System Involved	Reason for Use or Source of Chemical	Estimated Monthly Quantities (lb/mo)				Frequency of Chemical Addition
		Addition to System		Station Discharge		
		Average	Maximum	Average	Maximum	
Dow Promoter:						
Radioactive solid waste	Waste solidification agent	32 lb/yr	40 lb/yr	None	None	Once per year

NOTES:

NA = Not available

* = At the addition rates of 27,072 lb/mo average and 54,144 lb/mo maximum of sulfuric acid and 46,410 lb/mo average and 92,820 lb/mo maximum of sodium hydroxide, Millstone 3 will discharge an average of 39,325 lb/mo of sodium sulfate (Na_2SO_4) and a maximum of 78,650 lb/mo 7

TABLE 3.6-2

CHEMICAL COMPOSITION OF REGENERATION WASTES
FROM MAKEUP DEMINERALIZER SYSTEM

Parameter	Concentration as Ion (ppm)
Sodium	1,460
Calcium	115
Magnesium	57
Total iron	0.7
Sulfate	3,230
Bicarbonate	290
Silica	89
Total dissolved solids	5,300

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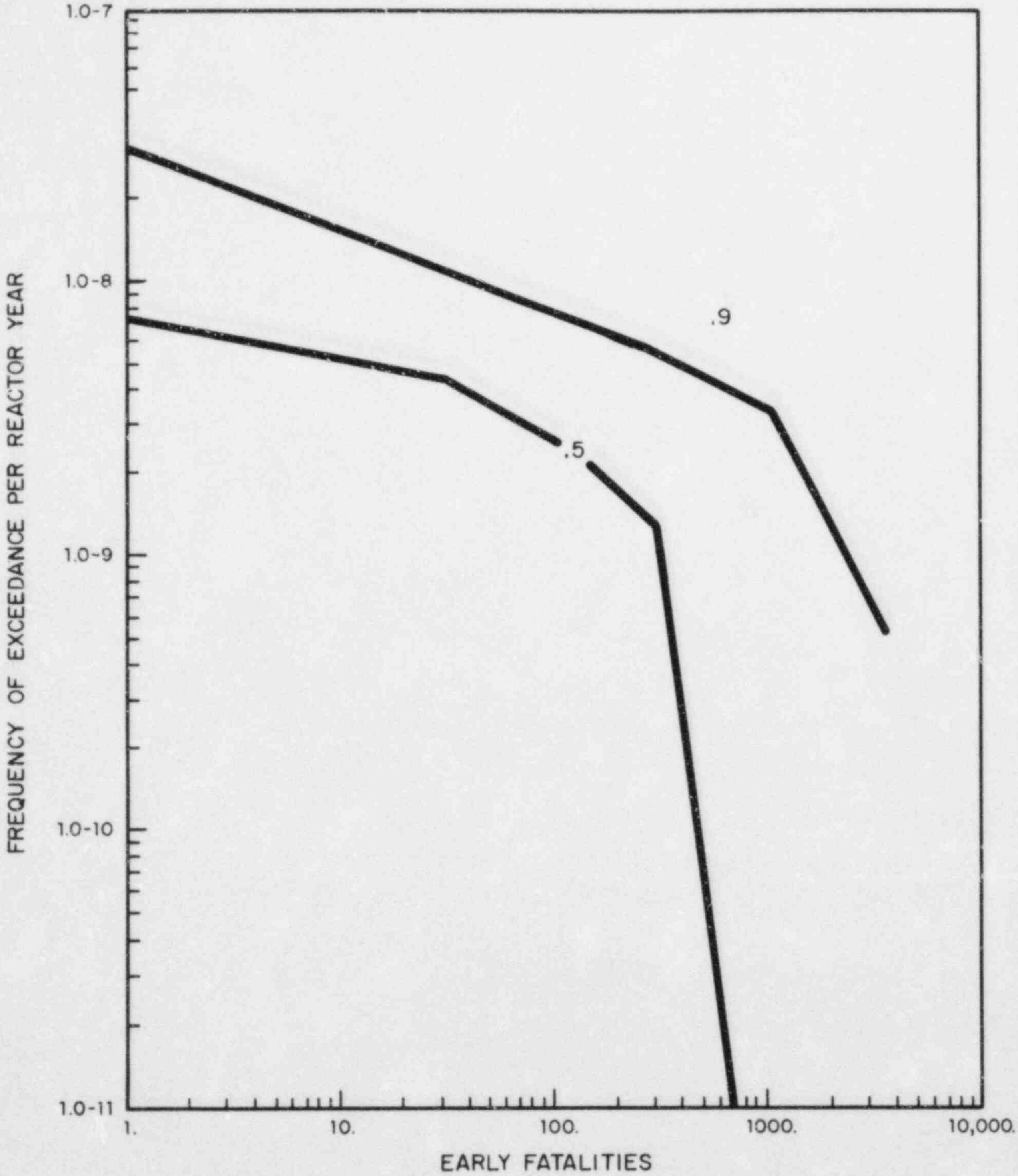

FIGURE 7.1-5
RISK DIAGRAM FOR EARLY FATALITIES DUE TO EXTERNAL EVENTS
MILLSTONE NUCLEAR POWER STATION
UNIT 3
ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

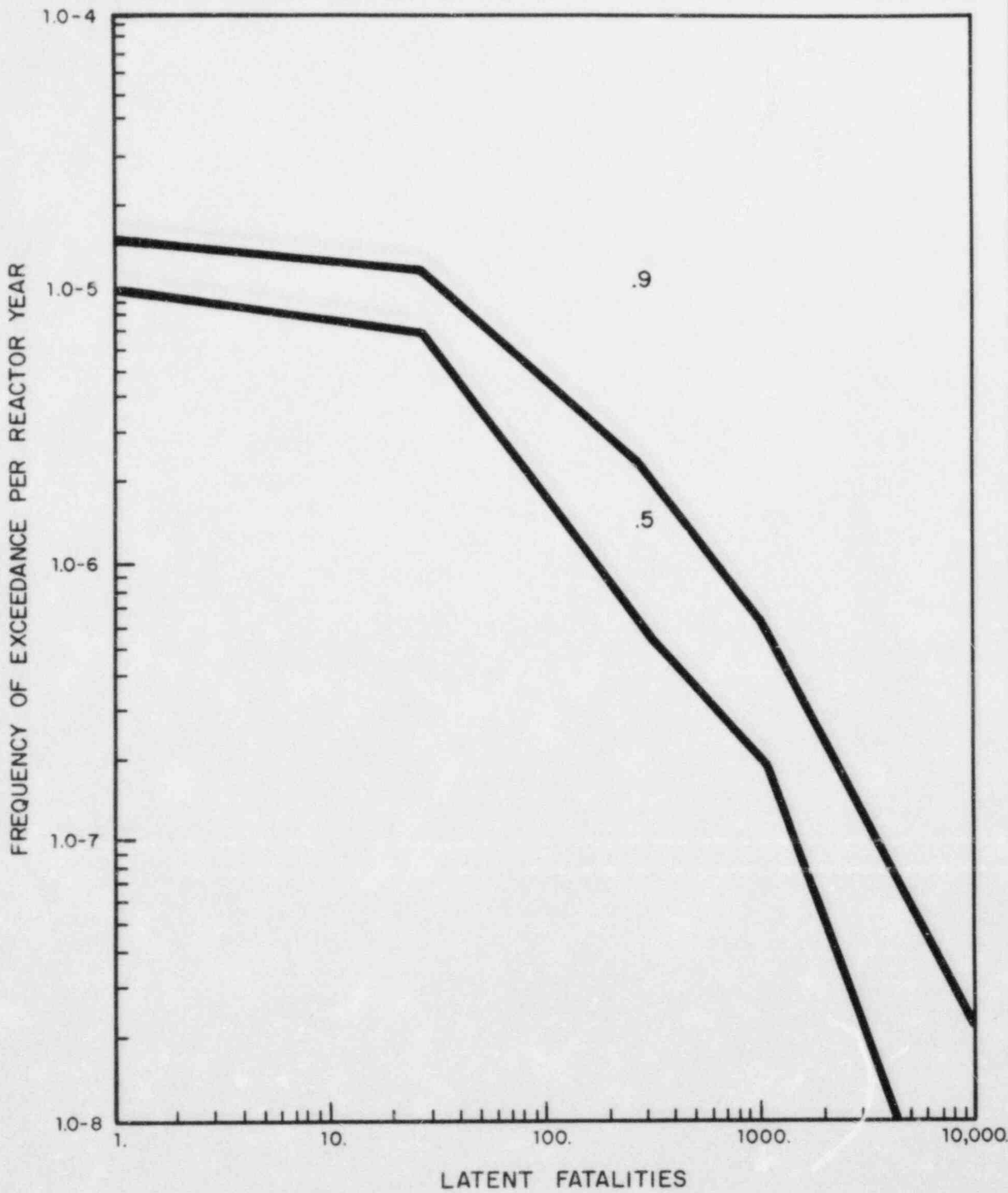

FIGURE 7.1-6
RISK DIAGRAM FOR LATENT CANCER FATALITIES DUE TO EXTERNAL EVENTS
MILLSTONE NUCLEAR POWER STATION UNIT 3
ENVIRONMENTAL REPORT
OPERATING LICENSE STAGE

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C7 EFFLUENT TOXICITY TESTING

Routine effluent toxicity tests have been conducted on the discharge from Millstone Nuclear Power Station since 1981. Sheepshead minnow (*Cyprinodon varigatus*) and mysid shrimp (*Mysidopsis bahia*) have been tested under flow through conditions at 20°C ± 1 with undiluted effluent. Future testing will include the common indigenous species, winter flounder (*Pseudopleuronectes americanus*) and Atlantic silverside (*Menidia menidia*).

Ten partial life cycle tests from egg to juvenile stage have been conducted with sheepshead minnow. Tests consisted of three replicates/treatment (control and effluent) with ten individuals/replicate. No difference was found between treatments for egg viability, mortality, growth, or morphological anomalies.

Eight toxicity tests were conducted with mysid shrimp. These tests included several different procedures that were evaluated for long-term effluent toxicity assessment. The most efficient procedure consisted of a multiple generation exposure during a two to three month period with three replicates/treatment. No differences between control and effluent treatments were found in individual growth, brood size, and population growth rates. 7

Future effluent toxicity testing includes two common indigenous species, winter founder and Atlantic silversides. Winter flounder testing is proposed for 1985 and will consist of testing yolk sac and post-yolk sac larvae during their seasonal occurrence. Preliminary testing will be conducted under static conditions with renewal. Flow through testing will be evaluated for feasibility. Atlantic silverside effluent testing is proposed for 1986. Testing will be conducted on the larval stage, and year round laboratory spawning may be possible. Parameters to be examined in winter flounder and Atlantic silverside effluent testing include mortality, growth, and morphological anomalies.

C8 REFERENCES FOR APPENDIX C

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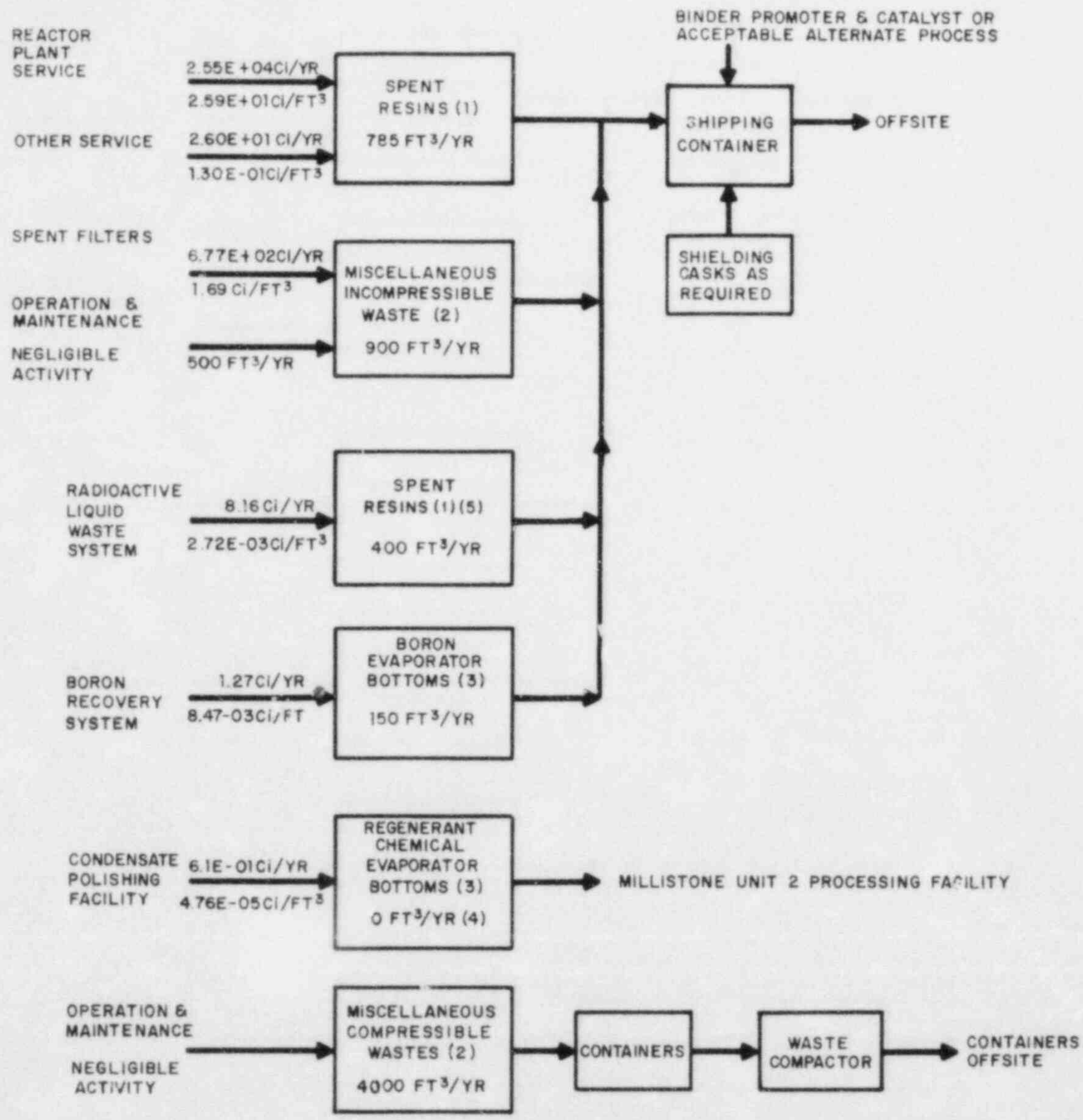

NOTES:

1. CI/FT^3 VALUES BASED UPON VOLUME OF RAW SPENT RESINS
2. CI/FT^3 VALUES BASED UPON VOLUME OF PACKAGED WASTE
3. CI/FT^3 VALUES BASED UPON VOLUME OF RAW BOTTOMS
4. NORMAL EXPECTED RADIATION LEVELS WILL BE NEGLIGIBLE AND EVAPORATION WILL NOT BE NECESSARY
5. ALTERNATE METHOD WOULD PRODUCE APPROXIMATELY 3000 FT^3/YR OF RAW EVAPORATOR BOTTOMS. THIS METHOD WOULD NOT BE THE NORMAL OR PREFERRED METHOD OF DISPOSAL.

FIGURE E-3

RADIOACTIVE SOLID WASTE SYSTEM EXPECTED QUANTITIES

MILLSTONE NUCLEAR POWER STATION UNIT 3

ENVIRONMENTAL REPORT OPERATING LICENSE STAGE