NORTHEAST UTILITIES

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July 3, 1980

Dockets No. 50-245
50-336
A01039

Director of Nuclear Reactor Regulation
Attn: Mr. D. M. Crutchfield, Chief
Operating Reactors Branch #5
Mr. R. A. Clark, Chief
Operating, Reactors Branch #3
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

References:
(1) Letter, W. G. Counsil to D. L. Ziemann and R. Reid, dated July 2, 1979

(2) Letter, P. M. Crutchfield to W. G. Counsil, dated May 7, 1980

(3) Letter, R. E. Moore, CT DEP, to W. G. Counsil, dated June 11, 1980

(4) Letter, D. C. Switzer to G. Lear, dated February 3, 1978

(5) Letter, W. G. Counsil to D. L. Ziemann and R. Ried, dated February [illegible], 1979

Gentlemen:

Millstone Nuclear Power Station, Unit Nos. 1 and 2
Proposed Revisions to Environmental Technical Specifications

In Reference (1), Northeast Nuclear Energy Company (NNECO) proposed to amend its Environmental Technical Specification (ETS), pursuant to 10 CFR 50.59, for Millstone Unit No. 1 (License No. DPR-21) and Millstone Unit No. 2 (License No. DPR-65). In reference (2), you requested additional information with respect to that proposed amendment. Enclosure 1 to this letter is intended to provide the additional information requested in Reference (2).

Also be advised that, in Reference (3) (copy enclosed), the Connecticut Department of Environmental Protection (CT DEP) has approved our Thermal Plume Study Report as the basis for corroborating their previous finding

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that the thermal component of the discharge does not result in a violation of Connecticut Water Quality Standards. This action further supports our request (Reference (1)) for deletion of ETS Section 4.6 (Thermal Plume Study).

Further, in Reference (4), NNECO requested other changes to its ETS, but in Reference (5), it clarified that request by withdrawing changes to certain sections, and deferring other changes because they related to radiological effluents. We would appreciate it if the remaining changes indicated in Enclosure 2 to Reference (5), could be processed at this time also. This action, along with removal of the radiological effluent specifications, will provide an updated ETS and facilitate conversion of the ETS in response to the Yellow Creek and other subsequent ASLAB decisions, in an expeditious manner.

Should you have any questions or require further information regarding Enclosure 1 to this letter, please contact our Mr. Paul M. Jacobson at (203) 447-1205.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

W.G. Counsil

W. G. Counsil
Senior Vice President

Enclosure

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE OFFICE BUILDING HARTFORD, CONNECTICUT 06115

June 11, 1980

Approval

RECEIVED
JUN 13 1980
SC. VICE PRESIDENT
Nuclear Engineering & Operations

Northeast Nuclear Energy Company
P.O. Box 270
Hartford, Connecticut 06101

Attention: Mr. W.G. Counsil,
Vice President

Re: DEP/WPC 152-001
Town of Waterford
Long Island Sound Watershed

Dear Mr. Counsil:

The following reports have been reviewed by the Department of Environmental Protection:

Millstone Nuclear Power Station Units 1,2, and 3 Environmental Assessment of the Condenser Cooling Water Intake Structure 316 (b) Demonstration, Volumes I and II, September 1976 prepared for Northeast Nuclear Energy Company by Northeast Utilities Service Company.

Thermal Plume Modeling at the Millstone Nuclear Power Station August 1979 prepared for Northeast Utilities Service Company by Stolzenbach and Adams.

Annual Reports on a Monitoring Program of the Marine Environment of the Millstone Point, Connecticut Area 1975, 1976, 1977, 1978 prepared by Battelle Laboratories for Northeast Utilities Service Company.

These reports comply with Department of Environmental Protection Water Compliance Unit's Order No. 1505 to Northeast Nuclear Energy Company entered on December 30, 1974, fulfilling requirements of steps 5,14, 15,16, and 17 of the Order. The reports are hereby approved in accordance with Sections 25-54k and 25-54e of the Connecticut General Statutes as amended.

These reports shall be the basis for corroborating the Director's finding that the thermal component of the discharge does not result in a violation of Connecticut Water Quality Standards. These reports shall be the basis of the functional design of the intake structures to minimize adverse environmental impacts which may result from impingement and entrainment.

This approval does not relieve the discharger obligation to obtain any other authorizations as may be required by other provisions of the Connecticut General State agencies.

Very truly yours,

Robert E. Moore
Director
Water Compliance Unit

REM/dsm

cc: Northeast Utilities Service Co.

Enclosure 1

Response to Request for Additional Information

Proposed Revisions to Environmental Technical Specification

Millstone Nuclear Power Station

Unit Nos. 1 & 2

Docket Nos. 50-245 and 336

Northeast Nuclear Energy Company

July 3, 1980

Question 1:

A technical justification as to why the subtidal rocky substrate sampling program should be discontinued--provide the results of this study for 1979, contrast and compare the 1979 data with the data collected over the last several years.

Response:

The justification for deletion of subtidal rock sampling from the Benthic Survey, ETS Section 3.1.2.1.5, is based on the knowledge that the current sampling procedures for subtidal rock substrates provide data of questionable value with regard to the stated objective, that rock accounts for only a small portion of the available subtidal substrate, and that additional effort presently being expended on the Rocky Shore Survey has resulted in a significant improvement in our ability to assess the potential impact of power plant operations on benthic communities.

Long Island Sound in general, and the Greater Millstone Bight in particular, are characterized by a soft bottom and a concommitant scarcity of subtidal rocks suitable for attachment and growth of marine algae (Sanders 1956; Lund, Stewart & Rathbun 1973; McCall 1975); this lack of available substrate necessitates rescraping the same rock surfaces every three months at our study sites.

Even when substrate is not a limiting factor, researchers in other areas of New England have found that intersample variability of biomass values is so great that only extensive harvesting (large area and/or many replicates) can permit valid comparisons between even the most similar stations (Vadas et al. 1976; Wilce et al. 1978). Giants Neck and Effluent differ with respect to exposure, water velocity, and slope, as well as degree of rescraping the same surfaces (Battelle 1977); as the subtidal rock sampling program is now implemented, it is impossible to distinguish possible man-induced impact from natural spatial and temporal variability.

Researchers at other power stations have reported that the environmental damage caused by repeated destructive sampling is more extensive than the studies can justify (and far more extensive than possible power plant impact), and have shifted the emphasis of their sampling programs away from biomass determinations and towards nondestructive growth studies and succession studies (Vadas et al. 1976; Wilce et al. 1978).

To this end, although the subtidal rock stations were sampled quarterly in 1979, and the collections preserved, further processing and analyses were deferred; effort was concentrated on the Rocky Shore Survey, whose scope has recently been increased to the extent that it is now more sensitive to minor variations in the benthic rock communities (see Pages 101-142 of 1979 Annual Report). Instead of a single horizontal transect at the mid-tide level, percent of substrate coverage is based on five vertical transects at each of the seven rocky intertidal sites. At four of the sites, three additional vertical transects were denuded for study of recolonization rates and succession patterns. These patterns were also studied in areas under wire mesh cages that excluded predators and grazers. Recruitment and growth of Fucus vesiculosus was also investigated at the same four stations.

The growth of Ascophyllum nodosum is particularly sensitive to environmental conditions (Prinz 1956; Baardseth 1970; Keser 1978), and other investigators have used this alga as a bioindicator of thermal stress associated with power plant effluents (Vadas et al. 1978; Wilce et al. 1978). To identify a possible thermal impact, populations of Ascophyllum were chosen at four sites for growth and mortality studies.

The results of the Rocky Shore Survey are included in the 1979 Annual Report, and summarized on pages 138 and 139 therein. The larger number of data points, and larger area nondestructively sampled provide a more accurate representation of the local benthic rock communities than the subtidal rock program could.

In conclusion, we again request that subtidal rock sampling be deleted from the environmental monitoring program; many reports in recent years have stressed the inadequacy of repeated destructive sampling, especially when available substrate is limiting. The expanded scope and sensitivity of the Rocky Shore Survey should be ample to allow us to meet the stated objectives, namely, determination and description of any potential impact due to the operation of Millstone Nuclear Power Station on the benthic rock communities.

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Northeast Utilities Service Company, March, 1980, Annual Report 1979, Monitoring the Marine Environment of Long Island Sound at Millstone Nuclear Power Station, pp. 101-142.

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Question 2:

The data on reproductive activity and condition factors collected during the trawling survey--using this data present a technical justification as to why continued collection of this data is not warranted.

Response:

Qualitative observations of reproductive activity of fish caught in trawls have been made routinely since the study inception and have been recorded for winter flounder (Pseudopleuronectes americanus) since 1976. Emphasis has been placed on winter flounder since it is the most important local recreational and commercial fish species and is the only fish species caught in large numbers during its reproductive phases. Detailed information on the repreductive activity of winter flounder is also collected annually during the tag and recapture program in the Niantic River (ETS Section 4.4). The data thus far collected in trawls (Table 1) is in agreement with that obtained in the Niantic River winter flounder tag-recapture study. The mean percent of trawled females was between 60-75% and the number of fish in spawning condition was greatest before the second week of April. Most fish in spawning condition after the first week of April were mature males. (Annual Report, 1979).

Since the information on reproductive activity collected from trawls is useful only for winter flounder and since that species is studied in more detail during the Niantic River study, we suggest that specifying reproductive activity as an objective of trawls is redundant and no longer necessary.

Condition factor is usually considered as the relationship of weight to length. The coefficient of condition, K, is obtained using the following formula (from Carlander, K.D. 1969. Handbook of Freshwater Fishery Biology, Volume One. Iowa State University Press, Ames, Iowa.):

$$K = \frac{W \cdot 10^5}{L^3}$$

Where W = weight in grams

L = length in millimeters

10^5 is a factor to bring the value of K near unity

The condition factor is usable only where accurate lengths and weights can be obtained. On the basis of our initial measurements during 1973 through 1975 we found that accurate weights could not be obtained on board the boat due to wave action. The technical specification requires that efforts be made to release uninjured individuals alive. Since the taking of weights is not part of the specifications and all fish would have to be sacrificed in order to obtain an accurate weight, the weighing of fish was discontinued as part of the trawling procedure in January 1975. Tables 2 and 3 show the condition factor for 3 of the major species for which weights were obtained during 1973 through 1974. The Niantic River winter flounder length-weight data was compared to the 1974 trawl data.

The maximum variation in condition factor units is equivalent to approximately 25 gm. Since the fish weights taken on board the boat could have been in error up to 25 - 50 gm, it is impossible to determine if the differences were due to changes in the weight length ratio or to variability of the weighing procedure.

Condition factor is not a widely used procedure in marine fisheries biology. A similar procedure where growth (length) per age is compared by year is part of the Niantic River winter flounder study.

When condition factors were originally placed in the technical specifications, it was not necessarily referring to the length-weight condition factor but as an observed adverse physical condition of fish in the sampling area which may have been caused by the power station.

To date no adverse physical condition of fish has been noted that could be considered other then normal net damage or a result of natural factors. These observations will continue to be made, however condition factors are no longer considered as a major objective of the trawling survey.

Table 1. Percent of winter flounder in spawning condition before the second week of April (SB) and after the first week of April (SA) in the Millstone Point area based on routine otter trawls.

YEAR	% SB	% SA
1976	88.4	1.2
1977	44.0	0.0
1978	77.0	18.0
1979	83.7	28.8
MEAN	73.3	12.2

Table 2. Condition factors (CF) for Winter Flounder caught in the trawl survey (TS) and the Niantic River Winter Flounder STudy (NRWF).

Study	Year	Months	Mean CF	(+) 95% C I	Min. CF	Max. CF
T S(1)	1973	Oct.-Dec.	1.428	.038	.326	2.963
T S(1)	1974	Oct.-Dec.	1.257	.017	.527	2.903
T S(2)	1974	March-April	1.177	.017	.408	2.448
NRWF	1977	March-April	1.135	.021	.626	1.878
NRWF	1978	March-April	1.110	.025	.421	.1697

(1) All stations in the Millstone Point area.

(2) Niantic River Station only.

Table 3. Condition factors (CF) for Window pane Flounder (WP) and Skates (SK).

Species	Year	Mean CF	± 95% C I	Min. CF	Max. CF
WP	1973	1.293	0.101	0.656	5.368
WP	1974	1.026	0.028	0.603	2.034
SK	1973	0.589	0.044	0.246	0.942
SK	1974	0.588	0.019	0.347	1.391

Question 3:

The results of the offshore ichthyoplankton net tows made in 1979 at station 5--provide as a minimum, percent composition, mean seasonal density and rank order of abundance; also, contrast and compare the results with the results from the discharge collections.

Response:

Table 1 (attached) shows the percent species composition, mean seasonal density and rank of ichthyoplankton collected during January through December 1979 at the discharge and at station 5, located in mid Niantic Bay. These values are slightly different from those of Table 6, attached, in the 1979 plankton report (NUSCO, 1980), because samples collected during the months of November and December were not processed at annual report preparation and were therefore excluded from Table 6. For instance, Table 1 shows the Engraulidae (anchovies) comprised 69.91% of the ichthyoplankton at the discharge (average of $1.670/M^3$). Differences for other species between Table 1 and Table 6 are also very small illustrating that the contribution of fall months to the characterization of the entrained ichthyoplankton is less important than other periods of the year.

The 1979 Report provides additional comparisons between densities at the power plant discharges and at station 5 (see pages 76-83 of the Report). A summary of the major conclusions follows:

Table 1. Percent species composition (o/o), mean seasonal density (#/M3), and rank order of Ichthyoplankton (based on percent composition) collected at the discharges and at station 5 in 1979. Ranks were estimated for species constituting 0.01% or more of percent species composition.

	DISCHARGES			STATION 5		
Species Or Group	o/o	#/M3	Rank	o/o	#/M3	Rank
Engraulidae	69.91	1.670	1	73.34	2.787	1
Ammodytes sp.	10.73	0.206	2	5.83	0.239	2
Pseudopleuronectes Americanus	6.15	0.198	3	4.16	0.139	4
Unindentified	2.30	0.041	4	1.14	0.049	8
Myoxocephalus sp.	2.24	0.065	5	1.02	0.050	9
Syngnathus fuscus	2.17	0.056	6	0.55	0.034	10
Pholis gunnellus	1.42	0.045	7	0.16	0.027	18
Tautogolabrus adspersus	0.71	0.047	8	4.62	0.191	3
Ulvaria subbifurcata	0.68	0.051	9	0.35	0.026	16
Tautoga onitis	0.58	0.042	10	2.33	0.095	5
Liparis sp.	0.54	0.039	11	0.47	0.029	12
Scophthalmus aquosus	0.53	0.028	12	1.92	0.085	6
Enchelyopus cimbruis	0.52	0.035	13	1.56	0.086	7
Cynoscion regalis	0.26	0.081	14	0.36	0.101	15
Stenotomus chrysops	0.22	0.062	15	0.49	0.056	11
Anguilla rostrata	0.22	0.014	16	0.01	0.005	28
Clupeid	0.18	0.027	17	0.03	0.008	23
Menidia sp.	0.16	0.013	18	0.10	0.058	20
Peprilus triacanthus	0.10	0.026	19	0.45	0.074	13
Brevoortia Tyrannus	0.07	0.008	20	0.06	0.015	21
Prionotus sp.	0.07	0.023	21	0.30	0.047	17
Gasterosteus aculeatus	0.06	0.006	22	0.01	0.004	28
Gobiidae	0.03	0.008	23	0.01	0.009	28
Paralichthys oblongus	0.02	0.015	24	0.06	0.076	21
Paralichthys dentatus	0.02	0.003	25	0.00	0.004	
Microgadus tomcod	0.02	0.004	26	0.00	0.003	
Alosa sp.	0.02	0.009	27	0.01	0.006	28
Merluccius bilinearis	0.01	0.019	28	0.11	0.033	19
Scomber scombrus	0.01	0.010	29	0.42	0.056	14
Centropristis striata	0.01	0.020	30	0.00	0.004	
Cod Or Haddock	0.01	0.006	31	Not Found		
Gadus morhua	0.01	0.004	32	0.01	0.005	28
Lumpenus Lumpretaeformis	0.01	0.050	33	Not Found		
Sphaeroides maculatus	0.00	0.011		0.06	0.113	21
Urophysic so.	0.00	0.004		0.02	0.021	24
Labridae	0.00	0.005		0.02	0.032	25
Apeltes Quadracus	0.00	0.004		Not Found		
Conger Oceanicus	0.00	0.002		0.00	0.003	
Hemitripterus americanus	0.00	0.004		Not Found		
Pungitius pungitius	0.00	0.007		Not Found		
Fundulus majalis	0.00	0.005		Not Found		
Trinectes maculatus	0.00	0.011		Not Found		
Lophius americanus	0.00	0.003		0.00	0.002	
Limanda ferruginea	0.00	0.007		0.00	0.005	
Osmerus mordax	0.00	0.003		0.00	0.006	
Myoxocephalus scorpius	0.00	0.005		Not Found		
Etropus microstomus	0.00	0.003		Not Found		
Alosa aestivalis	Not Found			0.00	0.013	
Micropogon undulatus	Not Found			0.00	0.003	
Rissola marginata	Not Found			0.00	0.006	

Table 6 . Percent species composition, mean seasonal density (#/m^3) and rank order of ichthyoplankton (based on percent composition) collected at the discharges 1976 through 1979.

Species or Group	1979			1978			1977			1976		
	%	#/m^3	Rank	%	#/m^3	Rank	%	#/m^3	Rank	%	#/m^3	Rank
Engraulidae	71.71	1.820	1	30.32	0.407	2	63.37	1.109	1	71.19	1.260	1
Ammodytes sp.	10.10	0.234	2	43.73	0.538	1	11.85	0.199	2	2.91	0.053	3
Pseudopleuronectes americanus	6.08	0.195	3	13.26	0.261	3	5.40	0.183	3	11.30	0.271	2
Unidentified	2.29	0.044	4	1.12	0.020	7	2.75	0.046	4	1.48	0.036	5
Myoxocephalus sp.	2.27	0.065	5	2.21	0.047	5	2.42	0.075	6	1.34	0.039	7
Pholis gunnellus	1.43	0.048	6	1.56	0.034	6	1.26	0.041	9	0.64	0.021	13
Syngnathus fuscus	0.95	0.026	7	0.82	0.015	10	0.84	0.021	12	0.41	0.015	14
Tautogolabrus adspersus	0.72	0.048	8	0.13	0.008	18	2.59	0.163	5	1.47	0.089	6
Ulvaria subbifurcata	0.68	0.050	9	0.95	0.056	8	0.25	0.031	19	0.93	0.048	10
Tautoga onitis	0.59	0.042	10	0.13	0.010	17	2.07	0.091	7	1.82	0.082	4
Liparis sp.	0.55	0.039	11	2.52	0.071	4	1.13	0.069	10	0.28	0.018	17
Enchelyopus cimbrius	0.53	0.035	12	0.83	0.036	9	0.51	0.039	14	0.32	0.018	15
Scophthalmus aquosus	0.53	0.028	13	0.26	0.003	13	1.45	0.042	8	1.08	0.031	9
Cynoscion regalis	0.26	0.088	14	0.00	0.004	37	0.19	0.062	20	0.05	0.034	28
Stenotomus chrysops	0.22	0.062	15	0.04	0.012	22	0.41	0.061	16	0.29	0.071	16
Anguilla rostrata	0.22	0.014	16	0.34	0.015	12	0.35	0.027	17	0.10	0.008	25
Clupeidae	0.18	0.027	17	0.08	0.007	19	0.10	0.009	23	0.02	0.003	34
Menidia sp.	0.15	0.014	18	0.22	0.010	15	0.03	0.007	31	0.14	0.015	23
Peprilus triacanthus	0.09	0.024	19	0.15	0.013	16	0.26	0.026	18	1.25	0.101	8
Prionotus sp.	0.07	0.025	20	0.02	0.010	26	0.17	0.019	21	0.20	0.030	19
Brevoortia tyrannus	0.05	0.012	21	0.79	0.026	11	0.59	0.025	13	0.77	0.022	12
Scomber scombrus	0.01	0.010	32	0.06	0.011	20	0.93	0.105	11	0.17	0.034	21

1) Total fish larvae, sand lance, grubby sculpin and winter flounder showed no significant difference in mean seasonal density at the two stations.

2) Total fish eggs, anchovies, cunner and mackerel were higher in mean seasonal density at station 5 than at the plant discharges.

3) When the 1979 data was reduced to periods of peak and post-peak density, winter flounder and anchovy larvae showed a higher mean density, over these time periods, at the plant discharge than at station 5.

4) Using the 1979 fish larvae data from station 5 and the discharges, power curves were developed giving the probability of detecting different levels of density at the discharge and station 5 (in units of the log transformed mean seasonal density, I.G. the geometric mean). Figure 14 of the 1979 Report showed that:

   - Winter flounder, sand lance, cunner, and tautog had similar power curves suggesting that the sampling program had a 90% probability of detecting a change of 0.25 units.

   - Anchovy larvae had lower detectability, perhaps associated with increased patchiness and variability over their growth season, - total larvae had relatively high detectability since more samples were represented.

The request for the reduction of fall (October, November, and December) sampling from the present 18 samples (3 days/nights) per week at the discharge to 6 samples (1 day/night) would have little, if any, impact on the above conclusions or on the overall annual composition or density estimates of the resident and representative fish larvae around Millstone, larvae ranked among the top ten and comprising over 95% of the species composition (Tables 1 & 6) largely do not occur during these fall months either at the discharge or at station 5.

Question 4:

An assessment of the significance of Teredo bartschi population discovered in 1975 at the effluent sampling station--address the potential for expansion in range of this species, T. navalis and Limnoria spp. under both present two-unit operation and future three-unit operation.

Response:

The following discussion has been prepared in response to your request for additional information concerning present and potential biological changes in marine, wood-boring communities surrounding the Millstone Nuclear Power Stations. Data from the Millstone environmental monitoring program describes population fluctuations in these communities over the last eleven years. Considering these long term data and the biology of wood-boring molluscs, Teredo navalis and Teredo bartschi, we conclude that Units 1 and 2 have had no detectable effects on the population of wood-boring organisms. The percent destruction of wood exposure panels by Teredo spp. has been monitored since 1968 (Table 1) and the numerical abundance of Limnoria since 1971 (Table 2). During this time the dominant aspect from these data has been the variability in population density both among stations within the same year and between years at the same station. Many factors could influence the abundance and distribution of wood boring species; among which, temperature, salinity, currents and availability of substratum are most important (Turner, 1966). In the case of Limnoria, our data point to the availability of wood, as well as the distance of the panel from the bottom sediments, as the most critical factors controlling abundance. This is supported by the low numbers of Limnoria collected at the Intake. At this site the exposure panels are moored from floats 25 feet from the bottom where no wooden structures are present; the other panels are located at dock sites placing them near the bottom sediments and close to wooden structures.

The wood-boring molluscan, Teredo navalis, has shown less dependency than Limnoria on panel location and availability of wooden structures, which can probably be attributed to the extended planktonic life of its veliger stages,

4 - 20 days (Turner and Johnson, 1971). However, considerable fluctuations in the average annual attack of wooden panels has been observed (Table 1). These fluctuations could be caused as much by biological factors as by the previously stated physical facters (Temperature, salinity, current, and availability of substratum).

Fouling species such as Limnoria (Battelle, 1976), encrusting bryozoans, compound tunicates, barnacles, or mussels, which dominate wood surfaces during certain periods of the year could possibly reduce substratum availability for metamorphosing Teredo larvae. In addition, parasitism of adult populations of Teredo (Turner and Johnson, 1971; Hillman, 1978) or poor phytoplankton blooms during critical reproductive phases (Turner, 1966) could, in any given year, influence the attack of Teredo on wooden structures.

Teredo bartschi, a species more common south of Long Island Sound, was first documented in the Millstone area in 1975 and since that time has only been found at the Effluent site. The reason for its appearance and existence can only be hypothesized. Since this species is larviperous, retaining its young in a brood pouch to the veliger stage, and does not release its young until the pediveliger stage, the last stage before metamorphosing into is adult form, it is highly probable that some transient wood structure or debris brought reproductive individuals into the Millstone area. An alternate possibility, but less likely, is if the brief planktonic stage of these larvae were transported to the Effluent site by a southern current. An explanation for the occurrence of *Teredo bartschi* at the Effluent site is most likely temperature related. It is not known whether the temperature in the effluent counters a lower lethal limit for the adults in the winter or provides the only temperature regimes needed for successful reproduction.

The ability of *T. bartschi* to remain at the Effluent site is probably associated with the pediveliger larvae metamorphosing within hours after release from the parent's gills (Turner, 1971). Our data further suggests that *Teredo bartschi* is a poor competitor in this extended range, and *Teredo navalis* is able to dominate the panels at the Effluent site.

It would seem highly unlikely that the operation of Unit 3 will alter the population dinamics previously described for the wood-boring species. First of all, we are only expecting a two degree centrigrade increase in the immediate area around Millstone point (Stolzenbach and Adams, 1979). This is only a rise of 2°C over a total annual range of 26°C. Secondly, if this slight increase in the annual range did benefit the range extension of *Teredo bartschi* or increase fecundity of other wood-boring species, this effect would be restricted to a small area of low substratum availability.

In light of the above discussion, it is our belief that wood-borer communities will show little or no changes in their natural community dynamics with the operation of Units 1, 2 and 3 at the Millstone Nuclear Power Station.

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Table 1. MEAN ANNUAL PERCENT ATTACK OF *TEREDO* MOLLUSCS ON LONG-TERM EXPOSURE PANELS IN THE MILLSTONE POINT AREA FROM 1968 THROUGH 1979.

Sites (a)	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979 (b)
Effluent												
Teredo navalis			10	39	20	9	38	50	100	57	83	8
Teredo bartschi								8	1	1	5	1
Intake												
Teredo navalis		7	18	49	-	58	66	22	41	57	40	5
Teredo bartschi		0	0	0		0	0	0	0	0	0	0
Fox Island - North												
Teredo navalis	1	35	15	30	20	12	22	8	34	57	53	8
Teredo bartschi		0	0	0	0	0	0	0	0	0	0	0
White Point												
Teredo navalis	15	49	23	23	47	20	76	50	31	47	76	21
Teredo bartschi	0	0	0	0	0	0	0	0	0	0	0	0
Giants Neck												
Teredo navalis						70	90	72	67	86	74	34
Teredo bartschi						0	0	0	0	0	0	0

a) Frame or panel missing at (1) White Point - July and August, 1973.
(2) Intake - December, 1971; January through September, 1972; December 1973; January through March, 1974; March through May, 1975.
(3) Giants Neck - March and April, 1972; January and February, 1973; March, May, June and July, 1974; January, 1977.

b) Numbers base on 3/4 of a years sampling using six month exposure panels.

Table 2. MEAN ANNUAL NUMBER FOR EACH SPECIES OF THE ARTHROPOD BORER, LIMNORIA, OCCURRING ON LONG-TERM EXPOSURE PANELS IN THE MILLSTONE POINT AREA FROM JUNE, 1971 THROUGH NOVEMBER 1979.

(b)	(a)								(d)	
Sites	1971	1972	1973	1974	1975	1976	1977	1978	1979	
Effluent										
<u>Limnoria Lignorum</u>			0	0	0	0	0	0	0	
<u>Limnoria tripunctata</u>			0	14	770	1941	(c)	597	10	
<u>Limnoria tuberculata</u>			0	0	0	0	0	0	0	
Total			0	14	770	1941		597	10	
Intake										
<u>Limnoria lignorum</u>	292	0	0	13	1	0	0	0	0	
<u>Limnoria tripunctata</u>	198	0	0	2	9	0	5	1	0	
<u>Limnoria tuberculata</u>	43	0	0	0	0	0	0	0	0	
Total	533	0	0	15	10	0	5	1	0	
Fox Island North										
<u>Limnoria lignorum</u>	188	144	173	35	27	10	0	120	0	
<u>Limnoria tripunctata</u>	1439	2400	1435	1317	2412	1265	228	167	213	
<u>Limnoria tuberculata</u>	263	132	70	46	38	1	0	0	0	
Total	1890	2676	1678	1398	2477	1276	228	287	213	
White Point										
<u>Limnoria lignorum</u>	86	90	34	13	44	17	126	100	114	38
<u>Limnoria tripunctata</u>	914	1808	249	335	3637	752	1758	1526		457
<u>Limnoria tuberculata</u>	85	101	27	8	24	0	0	0	0	0
Total	1085	1999	310	356	3705	769	1884	1626		495
Giants Neck										
<u>Limnoria lignorum</u>	891	134	147	38	212	299	373	479	416	
<u>Limnoria tripunctata</u>	241	128	247	45	409	308	176	207	1	
<u>Limnoria tuberculata</u>	41	27	20	0	1	0	0	0	0	
Total	1173	289	414	83	622	607	549	686	417	

(a) Counts of individual <u>Limnoria</u> did not begin until May, 1971

(b) Frame or panel missing at (1) White Point - July and August, 1973

(2) Intake - December, 1971; January through September, 1972; December, 1973; January through March, 1974; March through May, 1975

(3) Giants Neck - March and April, 1972; January and February, 1973; March, May, June and July, 1974; January, 1977

(c) Too numerous to count.

(d) Numbers based on 3/4 of a years' sampling using six month exposure panels.