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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Serial No.	17-157
MPS Lic/GJC	R0
Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
2016 ANNUAL ENVIRONMENTAL PROTECTION PLAN OPERATING REPORT

In accordance with Section 5.4.1 of the Environmental Protection Plan (EPP), Appendix B to the Millstone Power Station Unit 3 Operating License, Dominion Nuclear Connecticut, Inc. hereby submits the Annual Environmental Protection Plan Operating Report (AEPPOR), describing implementation of the EPP for the previous year. Enclosure 1 transmits information for the period of January 1, 2016 to December 31, 2016.

Should you have any questions regarding this report, please contact Mr. Jeffry A. Langan at (860) 444-5544.

Sincerely,

B. L. Stanley
Director, Nuclear Station Safety and Licensing

IE25
NRR

Enclosures: 1

Commitments made in this letter: None.

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Serial No. 17-157
Docket No. 50-423
License No. NPF-49

Enclosure 1

MILLSTONE POWER STATION UNIT 3
2016 ANNUAL ENVIRONMENTAL PROTECTION PLAN OPERATING REPORT
JANUARY 1 – DECEMBER 31, 2016

MILLSTONE POWER STATION UNIT 3
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)

2016 Annual Environmental Protection Plan Operating Report (AEPPOR)

1. Introduction:

   This report covers the period January 1, 2016 through December 31, 2016. During 2016, Millstone Power Station Unit 3 (MPS3) completed refueling outage 3R17 (April 9 – May 13). Capacity factor for Cycle 17 (beginning Nov 17, 2014) was 95.51%, and for Cycle 18 through December 31, 2016 was 94.82%. Overall MPS3 capacity factor for 2016 was 85.80%.

   As required by the MPS3 Environmental Protection Plan (EPP), Appendix B to the MPS3 Operating License, this AEPPOR includes:

   - summaries and analyses of the results of environmental protection activities,
   - a list of EPP noncompliances,
   - a list of all changes in station design or operation which involved a potentially significant unreviewed environmental question, and
   - a list of non-routine reports, describing events that could have resulted in significant environmental impact.

2. Environmental Protection Activities:

   2.1 Annual National Pollutant Discharge Elimination System (NPDES) Report of Ecological Monitoring (EPP Section 4.2).

   Section 10(A) of Millstone Power Station's (MPS) NPDES permit (the Permit), as issued to Dominion Nuclear Connecticut, Inc. (DNC) by the Connecticut Department of Environmental Protection (now the Department of Energy and Environmental Protection, or DEEP) on September 1, 2010, requires, among other things, continuation of biological studies of supplying and receiving waters. These studies include analyses of intertidal and subtidal benthic communities, finfish communities, entrained plankton, lobster populations, and winter flounder populations. Section 10(A)(2) of the Permit requires an annual report of these studies to be sent to the DEEP Commissioner on or before July 31 of each year. The latest report that fulfills these requirements, "Annual Report 2015 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut" (Annual Report), dated July 2016, presents results from studies performed during construction and operation of MPS, emphasizing those of the latest sampling year. Characteristics of and changes to the biological communities noted in these studies are summarized in the Executive Summary section of the Annual Report, which is attached as part of this report.

   2.2 Effluent Water Quality Monitoring:

   Sections 1 and 5 of the Permit require monitoring and recording of various water quality parameters at MPS intakes and at multiple monitoring points within the plant, including outfalls of each unit to the effluent quarry, and outfall of the quarry to Long Island Sound. Section 8 of the Permit requires that a monthly report of this monitoring be submitted to the DEEP. The report that fulfills these requirements, the "Monthly Discharge Monitoring Report" (DMR), includes discharge data from all MPS units. Consistent with prior annual

AEPPOR submissions, water flow, temperature, pH, and chlorine data pertaining to MPS3 are summarized in Table 1.

Each monthly DMR identifies NPDES permit exceedances (i.e., events where a parameter value was beyond permitted limits) or exceptions (i.e., events where Permit conditions were not met) for the month. During 2016, there was one exceedance at a discharge associated with MPS3. Although the discharge from DSN 006 is not exclusively from MPS3 (many other discharge streams are included), a period of elevated pH was recorded at this point in March, and it is included in this report. A description of the event, and of corrective actions, is excerpted from the March DMR (D18688).

> "During the 16 minute period from March 31, 2016 at 1906 to March 31, 2016 at 1921, the MPS Plant Process Computer (PPC) recorded DSN 006 pH greater than the Permit limit of 9.0 su. At 1911, the highest pH recorded by the PPC was 9.28 su and at 1916, a DSN 006 grab sample pH collected by MPS3 Chemistry was reported as 9.18 su.
>
> A Condition Report was written to document this incident. A subsequent investigation lead to the discovery that a Field Service Representative for the vendor company that operates the on-site facility supplying demineralized water to MPS had, while in the process of dewatering ion exchange vessels for shipping, inadvertently drained some anion resin to the makeup system sample sink which drains to DSN 006. The anion resin was ultimately recovered in a downstream manhole catch basin, but not until it had caused the high pH condition at DSN 006. To prevent reoccurrence, effective immediately, the drainage of ion exchange vessels to the system sample sink is prohibited and signage was applied clearly stating that non-process wastewater is not authorized for discharge from the sink."

2.3 NPDES Permit Renewal

By way of background, in 2014 MPS established a team, and scheduled milestones, to ensure that a completed permit renewal application was submitted to the DEEP, in accordance with general requirements, prior to the permit's expiration in August 2015. The permit renewal application was submitted on February 6, 2015, and the DEEP issued a Notice of Sufficiency on March 6, 2015; therefore, the permit is administratively continued and in effect until its reissuance.

3. Environmental Protection Plan Noncompliances:

   No EPP noncompliances were identified for MPS3 in 2016.

4. Environmentally Significant Changes to Station Design or Operation:

   No MPS3 design change records or system operating procedure changes initiated during 2016 included a determination that a significant unreviewed environmental impact could occur.

   On April 6, Engineering turned over the MPS3 Advanced Liquid Processing System (ALPS) to Operations; the system removes waste, including radiological waste, from station water prior to its discharge to the environment. Its use, and the addition of the MPS2 ALPS in 2017, will significantly improve discharge water quality.

5. Non-Routine Reports of Environmentally Significant Events:

No MPS3 events in 2016 involved a situation that could result in a significant environmental impact. Of the four licensee events that occurred at MPS3, reportable to the NRC, none involved an environmental issue or significant environmental impact.

Although not causally related to MPS operation, and not reportable to the NRC as a Licensee Event Report, one event in 2016 involved an unusual fish impingement event at the MPS3 intake structure, and is included here for information (summarized from Attachment 1 to the January 2016 DMR).

On January 2, 2016, a Plant Equipment Operator reported 406 Atlantic Menhaden (*Brevoortia tyrannus*) in the MPS3 intake over-flow debris basket. Notifications were made to the NRC and the State of Connecticut in accordance with station procedures and historical correspondence with the State of Connecticut regarding unusual impingement events (CT DEP 1987), which stated that should there be "unusual impingement event of more than 300 organisms per 24-h period...biologists will identify, count, and measure up to 50 specimens of each species and report results to the State as part of the monthly operating report."

Beginning on January 3, 2016, Environmental Lab biologists initiated monitoring of the impingement event at MPS3 intake. Live, dead, and moribund fish were counted and a representative sample of the fish were measured (fork length, FL) and weighed to characterize the population. All efforts were made to return any live fish to Niantic Bay. Water quality parameters were measured on several occasions around the MPS3 intakes. No parameters, besides ambient water temperatures, appeared out of the ordinary or potentially responsible for unhealthy conditions. Total Residual Chlorine (TRC) samples were taken on January 3 and 7, and both results showed values <0.02 ppm. Daily counts of impinged fish in the MPS3 over-flow debris basket continued through January until the presence of fish ended. Between January 2 and January 26, 2016, 9,567 Atlantic Menhaden were counted in the MPS3 over-flow debris basket. After January 26, no more Atlantic Menhaden were observed during inspections of the debris basket. Of note, no reports of Atlantic Menhaden impingement at the MPS2 intake were made during this period, and no impingement occurred at either Unit during previous summer months when massive schools of the fish were observed throughout local waters.

Based upon the timing of the event, environmental conditions, fish weights and lengths, and peer-reviewed literature search, it appears that once ambient Niantic Bay temperatures stayed consistently below 10°C, the menhaden schools that remained in the local waters may have suffered from cold shock. The population, which would have been expected to have already migrated south, in response to cooling water temperatures, remained in the area, owing to much warmer than normal conditions; the November and December 2015 and January 2016 monthly average water temperatures were 2.1, 3.1, and 2.1°C respectively, above the 40-year means for those months. However, the plankton community (based on phytoplankton, whose phenology is more dependent on photoperiod/day-length than temperature) is typically at its lowest abundance this time of year, and likely not abundant enough to support the planktivorous menhaden population. Undernourished and weakened fish are more susceptible to being drawn into the intake bays and impinged on the traveling screens. Observation in the MPS3 fore-bay, over the course of the event, showed two size-classes of menhaden actively schooling and slowly swimming in front of the trash racks. Furthermore, based on the expected weight to length ratio from Smith et al. (2008), all of the menhaden >200mm that were sampled were underweight. Without proper food resources and lipid reserves, these fish were unable to migrate from, or survive, the rapid decline in water temperature.

This event does not appear to be unique to the MPS area. The delay in southern migration and a presence of large schools of Atlantic Menhaden, in addition to moribund menhaden, has been communicated to Millstone biologists from several regional sources, including CT DEEP biologists in reference to the Connecticut River, inhabitants of Rocky Neck and Niantic River shorelines, University of Rhode Island Fish Trawl Survey in Narragansett Bay, and biologists at Manchester Street Station on the Providence River.

Table 1. MPS3 NPDES data summary, Jan 1-Dec 31, 2016. Selected water quality parameters for MPS3[(1)].

2016	Maximum Discharge Flow (10^6 gpd)	Discharge pH Range (SU)		Discharge Temp. Range (°F)		Average Discharge Temp. (°F)	Average Δ Temp. (°F)	Maximum FAC (ppm)	Maximum TRC (ppm)	Maximum SWS FAC (ppm)
		Min	Max	Min	Max					
January	1360.5	7.9	8.1	40.4	77.0	61.4	17.8	0.05	0.09	0.20
February	1360.6	8.2	8.4	52.0	70.5	60.5	19.3	<0.02	0.04	0.19
March	1361.8	8.2	8.5	59.4	69.1	62.2	18.7	0.03	0.05	0.18
April	1353.7	7.0	8.5	44.7	82.8	57.4	10.0	0.04	0.05	0.19
May	1360.3	6.9	8.6	47.7	79.6	61.4	8.3	0.02	0.04	0.20
June	1360.2	7.7	8.0	58.3	86.0	71.9	10.4	0.03	0.04	0.17
July	1360.3	7.8	8.0	80.6	89.3	85.2	16.6	0.03	0.05	0.18
August	1360.5	7.7	8.0	85.4	92.7	88.9	16.5	0.04	0.03	0.20
September	1360.4	7.7	8.0	85.7	94.8	88.2	17.7	0.03	0.04	0.20
October	1360.3	7.8	8.1	75.4	88.9	82.1	18.3	0.02	0.05	0.19
November	1360.3	7.8	8.1	66.0	79.4	74.1	19.1	<0.02	0.03	0.22
December	1361.0	7.9	8.1	60.9	74.6	66.8	20.8	0.03	0.04	0.20

Notes:

(1) Parameters are measured at MPS3 discharge (DSN 001C), except for TRC (total residual chlorine), which is measured at MPS discharge (quarry cuts; DSN 001-1), and SWS FAC (service water system free available chlorine; DSN 001C-5).

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Attachment to the
2016 Annual Environmental Protection Plan Operating Report
January 1 – December 31, 2016

Executive Summary Section of
"Annual Report 2015 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut"
dated July 2016

Serial No. 17-157
Docket No. 50-423
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Executive Summary – 2015 Environmental Monitoring Annual Report

This report summarizes results of ongoing environmental monitoring programs conducted in relation to the operation of Millstone Power Station (MPS). MPS can affect local marine biota in the following ways: large organisms may be impinged on the traveling screens that protect the condenser cooling and service water systems; smaller ones may be entrained through the condenser cooling-water system, which subjects them to various mechanical, thermal, and chemical effects; and marine communities in the discharge area may also be subjected to mechanical, thermal, and chemical effects resulting from the outflow of the cooling water.

This report contains a separate section for each major biological monitoring program, some of which have been conducted without interruption since 1976. These long-term studies have provided the representative data and scientific bases necessary to assess potential biological impacts as a result of MPS construction and operation.

In addition to sections related to the biological monitoring program, this report includes a section providing a complete and thorough description of all NPDES permit compliance work undertaken for the implementation of flow reduction and/or entrainment mitigation technologies, operational methods or other measures undertaken in 2015, and a section which provides a comprehensive summary of DNC's activities and accomplishments in the Niantic River Nitrogen Work Group effort.

Rocky Intertidal Studies

Rocky intertidal habitats are extensive in the Millstone area, and support rich and diverse communities of attached algae and animals. Rocky intertidal studies at Millstone Power Station (MPS) are designed and implemented to characterize these communities. Analyses of rocky shore data to date indicate that changes attributed to MPS operation are minor, transient, and restricted to a small area along 150 m of shoreline in the immediate vicinity of the discharge.

The total number of algal species identified in 2015 was 93, well within the range of annual totals for previous study years (73-99). This total includes two species that were found at rocky shore study sites for the first time this year (*Bryopsis maxima* and *Gracilaria vermiculophylla*).

As in previous years, seasonal shifts in occurrence of annual algal species were noted at Fox Island-Exposed (FE) during 2015. These shifts included absence or abbreviated season for cold-water species (e.g., *Monostroma grevillei, Spongomorpha arcta,* and *Dumontia contorta*) and extended season for warm-water species (e.g., *Grinnellia americana, Dasya baillouviana,* and *Bryopsis hypnoides*). Similar shifts have been observed in most years since Unit 3 began operation (1986), with the exception of the extended shutdown of all MPS Units from March 1996 to June 1998, when seasonality of these species at FE was more typical of other sites.

Thermal effects on dominant species' abundance and distribution patterns were also evident at FE in 2015, and most apparent in the low intertidal zone. Seasonally high abundance of *Hypnea musciformis*, a species observed for the first time in 2001, and expanded populations of *Sargassum filipendula, Corallina officinalis*, and *Gelidium pusillum* now characterize the lower shore community at FE. *Neosiphonia harveyi* has maintained a perennial population at FE in 2015, but occurred mainly as a summer annual at sites unaffected by MPS.

Ascophyllum nodosum growth, represented as the most recent internodal length, was greatest at Millstone Point in 2015, but not significantly different from that at White Point or Fox Island. This continues to demonstrate no clear relationships among monitoring sites, or correlation with station operating conditions, indicating that the thermal plume from MPS has had little effect on local populations. Natural influences of other factors, such as ambient temperature conditions, storms and wave action, nutrients and light, play the dominant role in determining *Ascophyllum* growing conditions in the Millstone area.

The rocky intertidal monitoring program has also documented regional patterns and modifications to shore communities unrelated to MPS operation. These include the introduction to the region of three exotic red algae (*Antithamnion pectinatum* in 1986, *Grateloupia turuturu* in 2004, and *Dasysiphonia japonica* in 2010), decreases in barnacle abundance in recent years, and long-term increases in abundance of the common seaweeds *Fucus vesiculosus* and *Chondrus crispus.*

Eelgrass

Eelgrass (*Zostera marina* L.) was monitored at three locations in the vicinity of MPS. Data from 2015 surveys indicated that the two study sites nearest to the MPS thermal plume (Jordan Cove and White Point) supported healthy and expansive eelgrass populations, consistent with results since the study began in 1985. While there has been moderate variability in abundance and distribution over the entire study period at these two sites, this variability was not related to MPS operation. Both predicted and measured thermal input to these sites from the cooling water discharge is at most minimal (<1°C above ambient conditions) and well below levels considered stressful to eelgrass.

By comparison, high eelgrass population variability has been observed in the Niantic River, where complete and often sudden eelgrass bed losses were documented on six separate occasions prior to 2015. Data from the 2015 survey show recolonization of some eelgrass beds in the Niantic River. Because the Niantic River is located well away from any influence of the MPS thermal plume, eelgrass population fluctuations there must be related to environmental factors such as increasing ambient seawater temperatures, disease, increased turbidity, and waterfowl grazing. Results from this monitoring therefore suggest that fluctuations in eelgrass populations observed at sites in the Niantic River are due to changes in local and regional environmental conditions and not to MPS operation.

Benthic Infauna

Benthic infaunal monitoring documented long-term trends in sediment characteristics at all the subtidal sites in the vicinity of MPS. At the effluent station (EF), the sedimentary environment remains coarse, with low silt/clay which is related to discharge of cooling water into LIS at the Quarry cuts. Sediments at the intake station (IN) were consistent with sediment characteristics prior to dredging during MPS Unit 3 construction. Sediments at Jordan Cove (JC) have stabilized following an earlier siltation event when increased water flow from the discharge after startup of MPS Unit 3 scoured fine sediments surrounding EF and deposited them at JC. Sedimentary characteristics at the reference site at Giants Neck (GN) were similar to previous years' observations and continued to reflect natural variability unrelated to MPS.

The 2015 infaunal communities at all sampling sites continued to respond to sedimentary environments. Dominant taxa at all sites were reflective of climax communities that have undergone long-term successional development in response to more stable sedimentary environments. Surface deposit-feeding oligochaetes and polychaetes continued to be dominant organisms at all sites in 2015. Multidimensional scaling showed distinct separation of communities affected by construction (IN) and initial operation of Unit 3 (JC and EF). Changes in community structure and functional group dominance at subtidal benthic infaunal stations during the period 1980-2015 reflect not only effects related to construction and initial operation of MPS Unit 3, but other regional and/or local biotic and abiotic factors. Community changes at the reference site (GN) during the period 1980-2015 were attributed solely to these latter factors, and not to operation of MPS.

Lobster Studies

Impacts associated with recent MPS operations on the local lobster population were assessed by comparing results of the 2015 study year to data collected from 1978 through 2014. Emphasis has been placed on assessing long-term trends in the abundance and population characteristics of lobsters collected in the Millstone Point area.

Throughout LIS, the lobster population was stable or increasing from 1978 through 1999. Commercial lobster catches in LIS precipitously declined from 2000 to 2013 and have stabilized at record low levels through 2015. In this study, lobsters in the MPS area have shown a similar trend, with abundance indices (total catch and CPUE) >74% lower in research pots and >99% lower in trawls during the past four years (2012-2015), compared to highest levels in the 1990s. Declines in pot and in trawl catches were unrelated to MPS operations and attributed to an increase in mortality associated with ambient seawater temperature rise and temperature mediated stressors that include a shell disease affecting lobster populations from eastern LIS to the Gulf of Maine. Declines in the abundance of legal-size lobsters were attributed in part to the outbreak of shell disease and to a nearly 5 mm increase in the minimum legal-size since 1978. Recent reductions in landings of legal-size lobsters harvested by commercial lobstermen in eastern LIS coincided with declines observed in this study, and lobster catches remained severely depressed in other areas of LIS since the lobster die-off observed in 1999.

Long-term trends observed in lobster population characteristics over the past three decades (growth, female maturity, and egg-bearing lobsters) appear related to warmer ambient seawater temperatures and/or the recent outbreak of shell disease, and not MPS operation. Increased ambient water temperature may be responsible for the increased susceptibility and transmission of diseases affecting lobsters in LIS, which is at the southern boundary of their range of distribution in nearshore waters. Recent research suggests that ocean acidification may also exacerbate shell disease.

The number of lobster larvae entrained through the MPS cooling water systems was highly variable and low in recent years, due to low adult lobster abundance and low larval densities throughout LIS. Impacts associated with impingement of lobsters at MPS have been greatly reduced by the use of aquatic organism return systems at Units 2 and 3, which return impinged lobsters to Niantic Bay with documented very high survival rates.

Winter Flounder Studies

Various life history stages of Winter Flounder have been monitored since 1976 to determine what effect, if any, MPS may have on the local Niantic River population, particularly through the entrainment of larvae. Over the past two decades, low Winter Flounder abundance levels have been found throughout LIS by the Connecticut Department of Energy and Environmental Protection (CTDEEP). During the same time period, adult Winter Flounder abundance in the Niantic River has remained low. A total of 40 adult flounder were captured in the 2015 Winter Flounder spawning survey, with two recaptures from 2014. Reflecting the continued trend of low abundance, CPUE in 2015 was 0.6 fish per standardized tow.

In 2015, overall combined larval abundances in Niantic Bay (Stations EN and NB) and Niantic River (Stations A, B, and C) were near average for their respective time-series. Stage 1 and 4 larval abundances in the River stations were low, while Stage 2 and 3 were high. Stage 1 and 4 larval abundances in the Niantic Bay Stations were high, Stage 2 was moderate, and Stage 3 was low. Relative to the Niantic River, larval abundance in Niantic Bay has increased in recent years, suggesting higher production in LIS rather than in estuaries such as the Niantic River. Summer juvenile abundance from the Niantic River beam trawl survey was the highest in almost a decade, but relatively low for the 30-year time-series.

The number of larvae entrained at MPS is a measure of potential impact to Winter Flounder. Annual estimates of entrainment are related to both larval densities in Niantic Bay and MPS cooling-water volume. The 2015 entrainment estimate of 149.2 million reflected slightly lower than average Niantic Bay larval densities. An entrainment reduction of 32.7% (based on maximum permitted flow) in 2015 can be attributed to the use of the variable frequency drives (VFDs) during the "Interval" (defined in the MPS NPDES permit as the period "from April 4 to May 14 or the first day after May 14 when the intake water temperature reaches 52 °F, whichever is later, but no later than June 5"). Annual entrainment density (abundance index divided by total cooling water volume) has varied without trend since 1976, indicating that larval production and availability in Niantic Bay remained relatively stable despite increased cooling water use during the 1986-95 period of three-unit operation and reduced cooling-water use in 1995-97. Correlations between entrainment estimates and abundance indices of post-entrainment age-0 juveniles were positive. This implies no entrainment effect, as the more larvae that were available for entrainment, the more larvae metamorphosed and settled in Niantic River and Bay. This was also demonstrated by a comparison of annual entrainment and juvenile year-class abundance, which suggested that entrainment estimates were simply a measure of emerging year-class strength. Thus, entrainment is not an important factor in determining juvenile abundance.

Processes that are unrelated to MPS operation and which occur after juvenile Winter Flounder leave shallow nursery waters during the fall of their first year of life seem to be operating to account for fewer adults. A bottleneck in recruitment may occur during the late juvenile life stage (ages-1 and 2), probably from predation. Environmental effects, including changes to the Niantic River habitat (e.g., widely fluctuating eelgrass abundance), a warming trend in regional seawater temperature, and interactions with other species (e.g., predation), especially during early life history, are also important processes affecting Winter Flounder population dynamics.

Results from Winter Flounder studies through 2015 suggest that MPS operations have had minimal effects on Winter Flounder biomass in the Niantic River. Declines in stock size have been greatly evident on a regional basis, including Long Island Sound, Rhode Island and all other Southern New England waters. Entrainment during the larval life stages of Winter Flounder occurs, however there has been large variation in the amount of larval mortality and recruitment in recent years, both occurring independently of MPS operations.

Fish Ecology Studies

Results from the Fish Ecology monitoring studies during 2015 indicate that no long-term abundance trends for various life stages of seven selected species could be directly related to MPS operation. No significant long-term trends in abundance were identified for Anchovy, Cunner and Tautog eggs, American Sand Lance, Anchovy, and Grubby larvae, or juvenile and adult Silversides. Atlantic Menhaden larvae showed a significantly increasing trend in abundance, as did juveniles taken by seine and trawl. A significant decreasing trend was exhibited for Grubby collected at the Intake, Jordan Cove, and Niantic River trawl stations. Over the past 40 years, Cunner and Tautog larval abundances have significantly increased. Juvenile and adult Cunner decreased in Intake and Jordan Cove trawl and lobster pot catches and increased in Niantic River trawls. Trawl catches of juvenile and adult Tautog have significantly increased at the Niantic River station, but decreased at Intake.

The magnitude of entrainment is dependent upon egg and larval densities and condenser cooling water flows during their periods of occurrence. Reductions in

cooling-water flows have been implemented at MPS with the use of VFDs during the peak period of Winter Flounder annual spawning. In addition to the Unit 3 fish return, which was in operation at unit start-up in 1986, impingement impacts were further reduced at MPS with the installation of a fish return at Unit 2 in early 2000. The implementation of these mitigation measures serve to minimize entrainment and impingement impacts at MPS.

Annual variations in ichthyoplankton entrainment likely reflected differences in spawning and transport of eggs and larvae within LIS. Other factors, such as extremes in seasonal water temperature, may also affect larval growth and development. A number of temporal and spatial changes were identified in the community of fishes and macroinvertebrates collected in the MPS trawl monitoring program. These changes were unrelated to the operations of MPS, but rather were associated with shifts in the dominance of individual taxa from changes in habitat, range extensions or contractions related to a warming trend in ambient seawater temperature that has occurred over the past three decades, and changes in fishing rates and fishing regulations.