Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Rope Ferry Road
Waterford, CT 06385

Dominion℠

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

Serial No.	09-201
MPS Lic/GJC	R0
Docket Nos.	50-423
License Nos.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
2008 ANNUAL ENVIRONMENTAL PROTECTION PLAN OPERATING REPORT

In accordance with Section 5.4.1 of the Environmental Protection Plan (EPP), 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, 2008 to December 31, 2008.

Should you have any questions regarding this report, please contact Mr. William Bartron, at (860) 447-1791, extension 4301.

Sincerely,

4/27/09

R. T. Griffin
Director, Nuclear Station Safety and Licensing

IE25
NRR

Enclosures: 1

Commitments made in this letter: None.

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Serial No. 09-201
Docket No. 50-423
License No. NPF-49

Enclosure 1

MILLSTONE POWER STATION UNIT 3
2008 ANNUAL ENVIRONMENTAL PROTECTION PLAN OPERATING REPORT
JANUARY 1 – DECEMBER 31, 2008

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

Annual Environmental Protection Plan Operating Report
January 1 - December 31, 2008

Millstone Power Station Unit 3 Environmental Protection Plan

Dominion Nuclear Connecticut, Inc.
Millstone Power Station
Rope Ferry Road
Waterford, Connecticut 06385

April 2009

2008 Annual Environmental Protection Plan Operating Report (AEPPOR)

1. Introduction

   This report covers the period January 1, 2008 through December 31, 2008. During 2008, Millstone Power Station Unit 3 (MPS3) completed refueling outage 3R12 (October 11, 2008 - November 24, 2008). Cycle 12 capacity factor was 98.8%; the current cycle 13 (through 12/31/08) capacity factor was 102.2%.

   As required by the MPS3 Environmental Protection Plan (EPP), 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)

   Paragraph 5 of the Millstone Power Station (MPS) NPDES permit, issued to Dominion Nuclear Connecticut, Inc. (DNC), requires continuation of biological studies of supplying and receiving waters, entrainment, and intake impingement monitoring. These studies include analyses of intertidal and subtidal benthic communities, finfish communities, entrained plankton, lobster populations, and winter flounder populations. Paragraph 7 of the NPDES permit requires an annual report of these studies to be sent to the Commissioner of the Connecticut Department of Environmental Protection (DEP). The report that fulfills these requirements for 2008, "Annual Report 2008 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut" (Annual Report), presents results from studies performed during construction and operation of MPS, emphasizing those of the latest sampling year. 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

   Paragraph 3 of the MPS NPDES permit requires 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. Paragraph 11 of the NPDES permit requires a monthly report of this monitoring to the Commissioner of the Connecticut DEP. The report that fulfills these requirements, the "Monthly Discharge Monitoring Report" (DMR), includes 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 NPDES permit conditions were not met) for the month. There were no NPDES exceedances or exceptions for MPS3 circulating or service water discharges reported in 2008.

Information pertaining to events that occurred in 2008 and were reported to the DEP in the monthly DMRs, while unrelated to MPS3's cooling water discharge but containing wastewater inputs from MPS3, are summarized from the July and October 2008 DMR (as revised by the March 2009 DMR) as follows. Both events described below relate to discharges from DSN 006 (MPS2 & 3 non-contaminated floor drains):

a) On July 7, 2008 at 2:04 PM, the city water (domestic) line which supplies water to the General Electric (GE) Makeup Water Facility Building was identified by operations personnel to have failed. Domestic water entered the nearby storm drain system associated with discharge serial number (DSN) 006. Upon discovery, the leak was immediately isolated. Analysis results of a grab sample taken at DSN 006 on July 7, 2008 at 2:25 PM was 0.30 mg/L Total Residual Chlorine (TRC). The NPDES permit's instantaneous limit at DSN 006 is 0.24 mg/L TRC. Subsequent samples collected by chemistry personnel at 3:05 and 4:00 PM were within permit limits, reading 0.14 mg/L and 0.07 mg/l TRC, respectively. Water flow data recorded on the MPS Plant Process Computer (PPC) for DSN 006 indicated the pipe failure occurred just prior to 2:00 PM with DSN 006 water flow data peaking at approximately 345 gallons per minute (gpm) at 2:14 PM, and then slowly returning to normal flow (approximately 40 gpm) at 3:30 PM. Total daily flow was calculated using the MPS PPC for DSN 006 on July 7, 2008 at approximately 72,400 gallons per day (gpd), well within the NPDES permit limit of 432,000 gpd. The GE Makeup Water Facility was restored to full capacity following the successful repair of the water line on July 8, 2008 at 4:45 PM.

b) On October 14, 2008 at 4:11 PM while analyzing a DSN 006 weekly grab sample for Total Residual Chlorine (TRC), chemistry personnel received a result of 0.25 mg/L TRC. The NPDES permit instantaneous limit at DSN 006 for TRC is 0.24 mg/L. Samples at 4:15, 4:25, and 4:50 PM were 0.29 mg/L, 0.46 mg/L, and 0.35 mg/L, respectively. Subsequently, sampling confirmed TRC concentrations were within NPDES permit limits; at 6:18 PM, the TRC analysis was 0.13 mg/L at DSN 006. Earlier in the day, main condenser tube cleaning commenced at MPS3 as part of the refueling outage. Consistent with protocols previously established with the DEP for this type of maintenance, both the influent and effluent sides of the waterbox are pumped to a collection container adjacent to the MPS3 Turbine Building. This water is held for a period of time, which allows for settling of the debris; a pH analysis is performed on the collection container to ensure compliance with the NPDES permit, and then the water is discharged via DSN 006. When notified of the increasing TRC results from DSN 006 at 2:30 PM, the city water discharges (i.e., waterbox influent) to DSN 006 were stopped. The domestic water that had been

flowing to DSN 006 was directed to the grassy area adjacent to the work area. The normal drainage from this grassy area is to a Stormwater Discharge (DSN 027). For the remainder of the cleaning, the influent discharge line was redirected to DSN 027, where sampling for TRC was performed daily. Additionally, after settling and prior to discharge to DSN 006, both pH and TRC analyses were performed on the collection container to ensure compliance with DSN 006 NPDES permit parameters.

2.3 NPDES Permit Renewal Process

The MPS NPDES permit renewal process is continuing. Hearings on the revised draft NPDES permit commenced on December 4, 2008 and concluded on February 26, 2009. Post hearing submittals as requested by the DEP hearing officer are due May 8, 2009.

3. Environmental Protection Plan Noncompliances

No EPP noncompliances were identified for MPS3 in 2008.

4. Environmentally Significant Changes to Station Design or Operation

No MPS3 Design Change Records or System Operating Procedure changes met the criteria for inclusion in this report, i.e.,

- were initiated during the report year, and
- included a determination that a significant unreviewed environmental impact could occur.

5. Non-Routine Reports of Environmentally Significant Events

No MPS3 events met the criteria for inclusion in this year's report, i.e.,

- required the submittal of a Licensee Event Report (LER), and
- involved a situation that could result in a significant environmental impact.

Only eight licensee events that constituted reportable occurrences at MPS3 were submitted in 2008; they all were determined not to cause a significant environmental impact.

Table 1

MPS3 NPDES Data Summary, Jan. 1 - Dec. 31, 2008. Selected water quality parameters for MPS3[1].

	Discharge Flow (max) (10^6 gpd)	Discharge PH Range	Discharge Temp. Range (°F)	Discharge Temp. (avg) (°F)	Avg ΔT (°F)	Max FAC (ppm)	Max TRC (ppm)	Max SWS FAC (ppm)
Jan.	1357.2	7.9-8.1	56.0-65.3	60.1	16.9	0.15	<0.03	0.20
Feb.	1356.7	7.9-8.0	55.3-69.1	58.6	19.0	0.20	<0.03	0.17
Mar.	1357.2	7.9-8.1	55.3-68.2	59.1	17.1	0.18	<0.03	0.19
Apr.	1357.2	7.9-8.1	59.0-70.0	64.3	17.9	0.09	0.03	0.17
May	1356.5	7.9-8.1	66.3-76.2	70.0	17.3	0.12	<0.03	0.19
June	1357.4	7.9-8.1	70.9-83.0	76.8	15.4	0.10	0.03	0.20
July	1357.2	8.0-8.1	80.3-88.1	84.0	15.1	0.07	0.04	0.23
Aug.	1357.2	7.9-8.1	83.2-89.3	85.6	15.6	0.06	0.04	0.17
Sep.	1357.3	7.8-8.1	81.8-93.6	84.7	15.9	0.08	0.04	0.17
Oct.	1357.2	7.6-8.1	55.1-86.2	69.5	7.0	0.12	0.05	0.20
Nov.	1356.5	7.8-8.1	45.2-70.0	57.5	3.6	0.10	<0.03	0.17
Dec.	1357.0	7.8-8.1	58.4-72.7	64.6	18.0	0.10	0.03	0.20

Notes:

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

Abbreviations Used:
Temp. = Water Temperature
ΔT = Delta-T (difference between discharge and intake water temperature)
FAC = Free Available Chlorine
TRC = Total Residual Chlorine
SWS = Service Water System

Attachment to the
2008 Annual Environmental Protection Plan Operating Report
January 1 – December 31, 2008

Executive Summary Section of
"Annual Report 2008 - Monitoring the Marine Environment of Long Island Sound
at Millstone Power Station, Waterford, Connecticut"
dated April 2009

Executive Summary

Winter Flounder Studies

The local Niantic River winter flounder population is potentially affected by the operation of Millstone Power Station (MPS) primarily through entrainment of larvae in the condenser cooling water systems. To assess possible effects, the abundance of adult spawners is measured within the Niantic River and larvae are sampled at the plant discharges and in the Niantic River and Bay during late winter and early spring. Settled age-0 juveniles are collected in the river in summer. Winter flounder are also collected year-round in the trawl monitoring program.

The relative abundance of adult spawners in 2008 was 0.5 fish per trawl tow (catch-per-unit-effort; CPUE), which is the lowest value since these studies began in 1976. Over the past 14 years, CPUE of winter flounder spawners in the Niantic River has remained at a relatively low level, but similar to levels found throughout Long Island Sound (LIS) by the Connecticut Department of Environmental Protection. During the past 27 years, annual Niantic River winter flounder abundance represented an estimated 0.4 to 3.3% of the entire LIS winter flounder resource (mean = 1.32%).

Absolute abundance of the 2007 spawning population (the latest year for which an estimate could be made) was estimated at approximately 53,000 fish. However, this estimate and those of the previous 2 years are imprecise, having large 95% confidence intervals. The three most recent absolute abundance estimates are not considered reliable, given that previous estimates were highly correlated with CPUE values and the latter remain low. Using another methodology termed standardized catch,, female spawner abundance in 2008 was estimated at only 987 fish, which produced about 700 million eggs. Other annual standardized catch estimates ranged from approximately 1.6 thousand females in 2006 to 75 thousand in 1982 and corresponding total egg production estimates were 1.1 to 44.8 billion.

In 2008, overall abundance of winter flounder larvae in the Niantic River was the lowest found over the time-series going back to 1983 and was second lowest in Niantic Bay. In most years since 1995, more Stage 1 larvae were found than expected from low adult spawner abundance, suggesting a density dependent compensatory mechanism during the egg stage that enhanced survival. This was attributed to reduced predation on eggs by sevenspine bay shrimp, such that when egg densities are low, higher egg survival produces more Stage 1 larvae. Density-dependent mortality is also present throughout the larval period of life, as an analysis suggested that mortality decreases with decreasing egg production (a measure of early larval abundance), which is further moderated by warmer spring water temperatures allowing for faster larval development. However, in 2008, Stage 4 (pre-metamorphosis) larvae in the Niantic River and Bay were in low abundance. One factor likely contributing to reduced larval abundance this year was unprecedented high densities of jellyfish in the Niantic River.

With the exception of a few years, densities of age-0 young in the Niantic River following larval metamorphosis and settlement were linearly related to Stage 4 larval abundance. However, at higher larval abundance juvenile densities apparently reached an asymptote of about 250 young per 100 m^2 of bottom, which could represent the carrying capacity of the river habitat. As expected from low larval abundance in 2008, initial settled juvenile abundance was relatively low. Coupled with an above-average mortality rate, late summer abundance was the second lowest on record, exceeding only 2006. CPUE indices of age-0 fish were either not significantly correlated or were negatively correlated with the abundance of female adult spawners 3 to 5 years later. Conversely, positive correlations were found between age-1 abundance indices and older fish.

The number of larvae entrained is a measure of potential impact to winter flounder. In most years, Stage 3 larvae dominated entrainment collections. Annual estimates of entrainment are related to both larval densities in Niantic Bay and MPS operation. The 2008 entrainment estimate of about 39 million reflected low larval densities and a spring refueling outage at Unit 2. The refueling outage and the 1996 retirement of Unit 1 reduced potential MPS entrainment in 2008 by an estimated 22 million larvae.

Annual entrainment density (abundance index divided by total seawater volume) has varied without trend since 1976, indicating that larval production and availability in Niantic Bay remained relatively stable despite increased water use during the 1986-95 period of three-unit operation and reduced cooling-water demand 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 to be entrained, the more larvae that 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 the most important factor in determining juvenile abundance.

The potential impact of larval entrainment on the Niantic River stock depends upon the fraction of the annual winter flounder reproduction entrained each year (termed production loss in this report), which was calculated as equivalent eggs removed by entrainment. Empirical mass-balance model calculations showed that a large number of entrained larvae came from a number of sources in LIS besides the Niantic River. In 2008, approximately 10% of the entrained larvae were attributed to the river. Based on the increase in egg survival noted in recent years, a factor that was not originally incorporated into the mass-balance model, most production loss estimates made after 1994 were conservatively high. Correcting the post-1994 estimates by using a higher egg survival rate resulted in lower production loss estimates, with 2008 estimate of 8.4% (long-term mean = 10.7%).

The small adult spawning stock in the river continued to produce relatively large numbers of larvae and young fish in recent years, which likely resulted from population compensatory mechanisms. Despite relatively good abundance of age-0 winter flounder (a life stage not entrained) in several recent years, significant recruitment to the adult spawning population has not occurred. 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 produce fewer adults. A bottleneck appears to be occurring during the late juvenile life stage (ages-1 and 2), probably from predation. Environmental effects, including changes to the Niantic River habitat (e.g., increased eelgrass abundance), a warming trend in regional sea water temperature, and interactions with other species (e.g., predation), especially during early life history, are also important processes affecting winter flounder population dynamics. Relatively weak year-classes produced in 2006-08 are indications of likely continued poor recruitment to the Niantic River spawning population in forthcoming years.

Fish Ecology Studies

Monitoring during 2008 indicated that no long-term abundance trends in various life stages of seven selected taxa could be directly related to the operation of MPS. No significant long-term trends were detected in populations of juvenile or adult silversides collected by trawl or seine. Similarly, no long-term trends were identified in various life stages of grubby, cunner, and tautog. Atlantic menhaden larvae showed a significantly increasing trend in abundance, as did juveniles taken by seine and trawl. Densities of both anchovy eggs and larvae and American sand lance larvae continued to show significant negative trends. The bay anchovy has experienced a regional decline in abundance. This species is important forage for predatory fishes and birds. In particular, the striped bass has recently increased in abundance along the Atlantic coast and may have contributed to reduced numbers of bay anchovy. Abundance of American sand lance larvae has been relatively stable over the past 25 years following a decline that occurred during the early 1980s. These changes were likely due to interactions with fishes that prey upon larval sand lance.

Data collected in 2008 continue to show no long-term abundance trends in the numbers of entrained cunner eggs and larvae. Juvenile and adult cunner have significantly decreased at the Intake trawl station, but the decline was attributed to the 1983 removal of the Unit 3 intake cofferdam, a preferred habitat for this species. Since that time, no significant abundance trend was found from 1984 through 2008. Cunner abundance significantly increased at the Niantic River trawl station and continued to fluctuate without trend at Jordan Cove. Tautog larvae showed a significant increasing trend in abundance and a significant rise in the abundance of juveniles and adults was also noted in the trawl and lobster pot catches.

Changes in the species composition and temporal and spatial abundance of fishes and shellfishes collected by trawl over the past 32 years appeared to be unrelated to MPS operation. Shifts in the dominance of individual taxa were attributed to changes in habitat, range extensions or contractions, and warmer ambient seawater temperatures occurring over the past 3 decades.

Cooling-water use at MPS was reduced 23% from the shutdown of Unit 1 in 1995, resulting in less entrainment and impingement. Fish return systems at Units 2 (2000) and 3 (1986) further reduce impingement mortality at MPS. Based on increasing

trends in abundance or the lack of decreasing trends, it appears that MPS has had minimal effect on local fish and shellfish assemblages.

Lobster Studies

Impacts associated with recent MPS operations on the local lobster population were assessed by comparing results of the 2008 study to data collected from 1978 through 2007. 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. The abundance of lobsters in LIS was lower from 2000 to 2008, but unrelated to MPS operations. Rather, the lobster abundance declines were attributed to a significant mortality event in western LIS and to an outbreak of shell disease affecting lobster populations from eastern LIS to the Gulf of Maine. In the MPS area, no significant long-term trends were identified in the annual CPUE of lobsters (combined over all sizes and stations) collected either in pots or by trawl. The total pot-CPUE of lobsters at the three monitoring stations has varied without trend since 1978. However, annual CPUE of legal-size lobster has exhibited a significant declining trend at the Jordan Cove and Twotree stations, but not at the Intake station located nearby MPS. Significant declines in the abundance of legal-size lobsters were due in part to shell disease and to a 3 mm increase in the minimum legal size since 1978.

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 temperature 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 are near their southern range of distribution in nearshore waters.

The number of lobster larvae entrained through the MPS cooling water systems was highly variable and has not resulted in a decrease in local lobster abundance. Impacts associated with entrainment and impingement of lobsters at MPS have been greatly reduced by the shutdown of Unit 1, which eliminated 23% of the cooling water used, and the installation of aquatic organism return systems at Units 2 and 3, which return impinged lobsters to Niantic Bay.

Rocky Intertidal Studies

Rocky intertidal monitoring studies during 2008 continued to document ecological changes to the shore community near, and associated with, the MPS thermal discharge. These changes are not wide-spread, and remain restricted to approximately 150 m of shore-line on the east side of the power station discharge to LIS.

Seasonal shifts in occurrence of annual algal species were noted at Fox Island-Exposed (FE) during 2008. These shifts included 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 reactors from March 1996 to June 1998 when seasonality of these species at FE during the recent shutdown period was more typical of other sites.

Thermal effects on dominant species abundance and distribution patterns were also evident at FE in 2008 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. *Polysiphonia* spp. maintained a perennial population at FE in 2008, but occurred mainly as a summer annual at sites unaffected by MPS.

Ascophyllum nodosum growth during 2007-08 continued to exhibit no clear relationships among our monitoring stations, or correlation with plant 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 two exotic red algae (*Antithamnion pectinatum* in 1986 and *Grateloupia turuturu* in 2004), decreases in barnacle abundance in recent years, and a long-term

increase in abundance of the common brown rockweed, *Fucus vesiculosus.*

Eelgrass

Eelgrass (*Zostera marina* L.) population dynamics were monitored from 1985 to 2008 at three locations in the vicinity of MPS. Some long-term declines in one or more eelgrass population parameters (e.g., shoot density, shoot length, and standing stock biomass) were observed at all three areas monitored over the entire 24-year study period. Eelgrass populations at two monitoring sites to the east of MPS near the fringes of the thermal plume (<1.5 km from the MPS discharge to LIS) have exhibited gradual declines since 1985. These declines were not associated with MPS operation, as thermal input from the cooling water discharge to these sites is at most minimal (<1°C above ambient conditions). Monitoring results from 2008 indicate population improvement at all sites, which continued trends observed over the last 3 or more years.

By comparison, complete and often sudden eelgrass bed losses were documented on five separate occasions prior to 2000 in the Niantic River. This estuary is located well beyond (>2 km) waters influenced by the MPS thermal discharge. Since 2001, eelgrass distribution in the Niantic River has expanded, with gradual, steady increases in shoot density, shoot length, and biomass observed through 2008. Ongoing extensions of municipal sewerage lines in the Niantic River watershed, possibly coupled with depletion of nutrient inputs from old septic systems, may be contributing to population recovery during the last 7 years.

In previous years, three short-term declines in eelgrass abundance have been directly associated with fouling and overgrowth of eelgrass: once by blue mussels (*Mytilus edulis*) at the Niantic River in 1992 and twice by blooms of green algae (*Cladophora* spp.) at White Point in 1991 and 2004. Recent research from New England and mid-Atlantic states suggests nutrient loading from land-based sources as the cause of eelgrass disappearance in LIS to the west and elsewhere. Excess nutrients, coupled with increases in regional water temperature and waterfowl grazing, may factor strongly in declines of populations near MPS. Eelgrass distribution once extended over the entire Connecticut coastline, but has constricted from west to east such that populations around Millstone Point now represent the western range limit of eelgrass in LIS.

Benthic Infauna

Benthic infaunal monitoring during 2008 documented continuation of long-term trends in sediment composition at the Effluent (EF) and Intake (IN) stations in the vicinity of MPS. In general, sediments at these stations have become coarser (larger mean grain size) and the silt/clay fraction smaller. This coarsening of sediments was attributed to MPS-influenced water flow characteristic at each site: intake of cooling water at IN and discharge of cooling water at EF. Mean grain size and silt/clay estimates at Jordan Cove (JC) have remained relatively consistent since the siltation event related to sediment scouring near the MPS discharge observed in 1986. Sedimentary parameters at the reference station Giants Neck (GN) in 2008 were within the limits of previous observations and continued to exhibit variability unrelated to MPS. Community abundance and numbers of species at all sampling stations in 2008 were generally intermediate when compared to historical ranges. Surface deposit-feeding oligochaetes and polychaetes were the dominant organisms at all stations in 2008. Observed changes in abundance of infaunal taxa resulted in rank order changes among the dominant taxa at all stations, but overall, benthic communities sampled in 2008 were comprised of fauna that had been present in previous years. Multivariate analyses showed higher community similarity among recent years and illustrated changes in community composition in earlier study years related to sediment disturbances at IN and JC. Changes in community composition from early sampling years to more recent years were also observed at EF, a location continuously affected by MPS cooling water discharge flow. The GN reference station, beyond any MPS influence, has also exhibited temporal changes in benthic community structure during the study period. Temporal and spatial variation in the MPS benthic communities observed in 2008 is typical of near-shore marine environments. There were no unusual events, either natural or MPS-related, that caused any large-scale shifts in benthic infaunal communities monitored in 2008, and under current environmental conditions, these infaunal communities appeared relatively stable.