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

Serial No.	15-192
MPS Lic/GJC	R0
Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
2014 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, 2014 to December 31, 2014.

Should you have any questions regarding this report, please contact Mr. Thomas G. Cleary at (860) 447 1791 extension 3232.

Sincerely,

D. B. Blakeney
Director, Nuclear Station Safety and Licensing

IE25
NRR

Enclosures: 1

Commitments made in this letter: None.

cc: U. S. Nuclear Regulatory Commission
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Serial No. 15-192
Docket No. 50-423
License No. NPF-49

Enclosure 1

MILLSTONE POWER STATION UNIT 3
2014 ANNUAL ENVIRONMENTAL PROTECTION PLAN OPERATING REPORT
JANUARY 1 – DECEMBER 31, 2014

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

2014 Annual Environmental Protection Plan Operating Report (AEPPOR)

1. Introduction:

   This report covers the period January 1, 2014 through December 31, 2014. During 2014, Millstone Power Station Unit 3 (MPS3) completed refueling outage 3R16 (October 11 – November 16). Capacity factor for Cycle 16 was 97.6%, and for Cycle 17 through Dec 31, 2014 was 99.1%. Overall capacity factor for 2014 was 88.1%.

   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 2013 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut" (Annual Report), dated July 2014, 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:

   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 2014, one exceedance and one exception were identified for discharges associated with MPS3 (identified as Discharge Serial Number, or DSN). The descriptions below are excerpted from the November and December DMRs.

a) MPS3 Steam Generator Chemical Cleaning Wastewater (DSN 001C-6(a))

"On November 8, 2014, during the discharge of DSN 001C-6(a), a grab sample for pH was obtained and analyzed. The results of the sample were 5.16 su. The sample point used for DSN 001C-6(a) is listed in the Permit as the same point where another permitted discharge, DSN 001C-2, is sampled. In accordance with Permit Section 5, Table R, (DSN 001C-2), analysis for pH is required weekly, as a grab sample and no pH range limits are associated with it. However, in accordance with Permit Section 5, Table W, (DSN 001C-6(a)), analysis for pH is required as a weekly grab sample and the results have a range limit of 6.0 to 9.0 su. All additional Permit-required samples were collected for the discharge, and all results were within Permit limits. Upon completion of the discharge, laboratory personnel identified that the incorrect table was referred to for discharge pH determination. Upon this discovery, MPS Supervision was immediately notified.

To maintain compliance with Permit Section 5, Table W, the Permit-required weekly grab sample for pH will be obtained from the tank used for discharging DSN 001C-6(a) after the required recirculation time has been met. If the pH of the tank is not within the Permit limits, the pH will be adjusted to between 6.0 to 9.0 su using either sodium hydroxide or sulfuric acid (as appropriate), recirculated again to ensure homogeneity, and the pH verified to be in compliance with the Permit prior to discharge."

b) MPS2 and MPS3 Turbine Building Discharges (DSN 006)

"In accordance with Permit Section 5, Table DD (DSN 006), flow based, quarterly monitoring for total oil and grease is to be performed during discharges of (upstream) oil water separators to DSN 006. The sample type for this parameter is identified as grab sample average. According to the Regulations of Connecticut State Agencies, Section 22a-430-3(a)(3) – Definitions, "Grab sample average" is the arithmetic average of all grab sample analyses. Grab samples shall be collected at least once every four hours over a full operating day for as long as a discharge exists on that day (minimum of two grab samples per day).

On September 1, 2010, NPDES Permit CT0003263 was renewed and issued by the CT DEEP to MPS. Subsequently, MPS was required to revise all station procedures to implement the Permit. In the process of updating and reviewing the MPS procedure that identifies the sampling requirements for the Permit, the sample type for the quarterly DSN 006 total oil and grease was inadvertently changed from "grab sample average" to "grab sample." Due to this change, since September 1, 2010, a single quarterly grab sample for total oil and grease has been collected and analyzed for DSN 006. This issue was identified during discharge sampling for the 5-year Permit renewal application to be submitted by March 4, 2015. CTDEEP was notified of the discrepancy on December 22, 2014, shortly after its discovery.

As part of the corrective actions to prevent reoccurrence: 1) all chemistry personnel responsible for Permit sampling were notified to ensure all Permit compliance sampling is correct as listed; 2) the MPS Permit sampling procedure will be revised to correct the DSN 006 total oil and grease sample type from "grab sample" to "grab sample average"; and, 3) the MPS Permit sampling procedure will be reevaluated for compliance with all requirements of the Permit. Any additional identified discrepancies will be corrected."

Results from all single quarterly grab samples for total oil and grease collected at DSN 006 since September 1, 2010 were <15.0 mg/L and within Permit limits.

2.3 NPDES Permit Renewal

As the MPS NPDES permit will expire in 2015, MPS has established a team and has scheduled milestones to ensure that a completed permit application is submitted to the DEEP in accordance with general requirements. The permit application was submitted on February 6, 2015, and the DEEP issued a Notice of Sufficiency on March 6, 2015.

3. Environmental Protection Plan (EPP) Noncompliances:

No EPP noncompliances were identified for MPS3 in 2014.

4. Environmentally Significant Changes to Station Design or Operation:

No MPS3 design change records or system operating procedure changes initiated during 2014 included a determination that a significant unreviewed environmental impact could occur.

5. Non-Routine Reports of Environmentally Significant Events:

No MPS3 events in 2014 involved a situation that could result in a significant environmental impact.

Four licensee events occurred at MPS3 that constituted an event or condition that were determined to be reportable to the NRC, however none involved environmental issues, and none were determined to have caused a significant environmental impact.

Table 1. MPS3 NPDES data summary, Jan 1-Dec 31, 2014. Selected water quality parameters for MPS3[1].

2014	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	1360.4	7.8	8.0	54.0	66.4	58.6	19.3	0.13	0.02	0.18
February	1360.4	7.9	8.1	53.3	61.1	56.1	18.9	0.10	0.05	0.20
March	1360.7	7.9	8.1	52.7	60.9	55.8	17.8	0.14	0.03	0.17
April	1328.7	7.6	8.0	56.6	86.0	72.0	28.6	0.07	<0.02	0.20
May	1360.6	7.2	8.1	56.6	88.1	72.5	21.0	0.07	0.03	0.20
June	1361.3	7.7	8.1	58.3	88.8	80.9	18.2	0.09	0.05	0.19
July	1360.8	7.7	8.0	81.2	91.5	85.4	16.6	0.07	0.04	0.18
August	1360.9	7.8	8.1	84.1	90.0	86.6	17.5	0.08	0.05	0.18
September	1360.8	7.8	8.1	84.5	91.5	86.8	18.1	0.09	0.05	0.20
October	1360.3	7.1	8.1	63.4	89.1	73.1	9.6	0.10	0.04	0.17
November	1360.5	7.8	8.2	53.2	77.1	62.9	9.3	0.13	0.05	0.22
December	1361.0	8.0	8.2	62.9	75.8	66.3	19.3	0.13	0.04	0.22

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).

Attachment to the
2014 Annual Environmental Protection Plan Operating Report
January 1 – December 31, 2014

Executive Summary Section of
"Annual Report 2013 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut"
dated July 2014

Executive Summary – 2013 Environmental Monitoring Annual Report

Rocky Intertidal Studies

Rocky intertidal monitoring studies during 2013 continued to document ecological changes to the shore community near, and associated with, the Millstone Power Station (MPS) thermal discharge. These changes are not widespread, and remain restricted to approximately 150 m of shore-line on the east side of the power station discharge to Long Island Sound (LIS).

The total number of algal species identified in 2013 was 74, representing relatively low diversity, compared to most previous years. This phenomenon was primarily attributed to residual impact from Storm Sandy (October 2012), which had moved large quantities of sand into low intertidal and shallow subtidal areas of the study sites, particularly White Point and Millstone Point.

In addition to physical disturbance, seasonal shifts in occurrence of annual algal species were noted at Fox Island-Exposed (FE) during 2013. 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 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 2013, 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 2013, 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 Fox Island in 2013, but continued 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* (formerly *Heterosiphonia*) *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 2013 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 subtle declines in some population parameters (e.g., shoot density, shoot length, and standing stock biomass) 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 2013. Data from the 2013 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 occasional high 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.

Lobster Studies

Impacts associated with recent MPS operations on the local lobster population were assessed by comparing results of the 2013 study year to data collected from 1978 through 2012. 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. Lobster abundance in LIS precipitously declined from 2000 to 2013. In this study, lobsters in the MPS area showed a similar trend, with abundance indices (total catch and CPUE) in research pots and trawls dropping to all-time lows in 2013. Declines in pots 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.

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) continue to show stabilization 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 2013 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 2013. 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 1980-2013 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 1980-2013 were attributed solely to these latter factors, and not to operation of MPS.

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 19 years, 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 25 adult flounder were captured in the 2013 Winter Flounder spawning survey, with no recaptures from past years. Reflecting the trend of record low abundance, CPUE in 2013 was 0.2 fish per standardized tow, tied with 2011 as the lowest value of the time-series (1976-2013).

In 2013, larval abundance in Niantic Bay (Stations EN and NB) and Niantic River (Stations A, B, and C) was higher than 2012 values. Stages 1, 2 and 3 larval abundance in the Niantic River stations were some of the highest of the time-series, and Stage 1 larval abundance in Niantic Bay was the highest of the time-series. 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. In most years since 1995, more Stage 1 larvae were found than expected from low adult abundance, suggesting a density-dependent compensatory mechanism during the egg stage that enhanced survival. Larval mortality is also influenced by prevailing water temperatures, with warmer springs allowing for faster development and lower mortality. As expected from the low, late-stage larval abundance in 2013, initial settled juvenile abundance from the juvenile beam trawl survey was low.

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. Avoided entrainment in 2013 can be attributed to the Unit 3 spring refueling outage, as well as to the use of the circulating water pump 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"). The 2013 entrainment estimate of 115.1 million reflected lower than average Niantic Bay larval densities. 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 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.

Despite a small number of adult Winter Flounder in the river, there have nonetheless been relatively large numbers of larvae in several recent years, probably from population compensatory mechanisms and possibly greater contributions from spawners outside of the Niantic River. However, based on a focused Niantic Bay spawning survey in 2012, there is not a concentrated spawning population located within Niantic Bay.

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 2013 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 2013 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, Grubby, Cunner and Tautog 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. Juvenile and adult Cunner decreased in Intake and Jordan Cove trawl and lobster pot catches and increased in Niantic River trawls. Over the past 38 years, Tautog larval abundance has significantly increased. Trawl catches of juvenile 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. Cooling-water volume at MPS has been reduced 23% due to the shutdown of Unit 1 in November 1995, resulting in less entrainment and impingement, and a reduced thermal plume. Further 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 accordance with the NPDES permit issued on September 1, 2010. 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.