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

Dominion

APR 28 2006

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

Serial No.	06-295
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DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
2005 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, describing implementation of the EPP for the previous year. Enclosure 1 transmits information for the period of January 1, 2005 to December 31, 2005.

Should you have any questions regarding this report, please call Mr. Paul Blasioli, Environmental Services, at (860) 447-1971, extension 0417.

Very truly yours,

J. Alan Price
Site Vice President – Millstone

IE25

Enclosures: (1)

Commitments made in this letter: None.

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5/1/06 WLB Bob Griffin
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Lillian Cuoco 4/28/06

David Dodson

Paul Blasioli 4/26/06

Pam Faggert

Verification of Accuracy:

1. Environmental Lab Report as attached, dated April 2006 (Jim Foertch)
2. Executive Summary from DEP Annual Environmental Report

Action Plan/Commitments (Stated or Implied)

1. None

Required Changes to the UFSAR or QA Topical Report

1. None

Serial No. 06-295
2005 Annual Environmental Protection Plan Operating Report
bc Page 1 of 1

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Enclosure 1

Millstone Power Station Unit 3
2005 Annual Environmental Protection Plan Operating Report

Millstone Power Station Unit 3
Dominion Nuclear Connecticut, Inc. (DNC)

Annual Environmental Protection Plan Operating Report
January 1 - December 31, 2005

Millstone Unit 3 Environmental Protection Plan

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

April 2006

2005 Annual Environmental Protection Plan Operating Report (AEPPOR)

1. Introduction

This report covers the period January 1, 2005 through December 31, 2005. During 2005, Millstone Power Station Unit 3 (MP3) operated at a capacity factor of 86.4%; this included a 29-day refueling outage (3R10, 9/29/05 – 10/27/05). The cycle 10 capacity factor was 96.2%; the capacity factor from the end of the refueling outage until the end of 2005 (cycle 11) was 90.7%.

As required by the MP3 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 requires continuation of biological studies of supplying and receiving waters, entrainment studies, 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 permit requires an annual report of these studies to the Commissioner of the Connecticut Department of Environmental Protection (DEP). The report that fulfills these requirements for 2005, Annual Report 2005 - 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 many 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 permit requires a monthly report of this monitoring to the Commissioner of the Connecticut Department of Environmental Protection (DEP). The report that fulfills these requirements, Monthly Discharge Monitoring Report (DMR), includes data from all Millstone units. Consistent with prior annual AEPPOR submissions, water flow, temperature, pH, and chlorine data pertaining to MP3 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. There were no NPDES exceedances or exceptions for MP3 circulating or service water discharges reported in 2005. Other events dealing with NPDES discharges are also included in the DMRs to provide the DEP with additional information. Descriptions of two events that occurred in 2005 and were reported to the DEP in the monthly DMR, while unrelated to MP3's cooling water discharge but potentially containing wastewater inputs from MP3, are excerpted from the August and November 2005 DMRs, respectively.

- DSN 006

  On August 8, 2005, during the weekly composite sampling for DSN 006, a scheduled grab sample analysis result for total residual chlorine (TRC) was recorded as 0.33 parts per million (ppm). The NPDES Permit maximum instantaneous limit for TRC at DSN 006 is 0.24 ppm. Possible inputs to DSN 006 were sampled and analyzed to track the possible input to DSN 006. Analysis of the Unit 3 turbine building sump at 1535 yielded a suspect result of 1.44 ppm. It should be noted that possible background interferences were suspected within the samples. Upon filtering both the same DSN 006 and turbine building sump samples, the results obtained were both <0.03 ppm TRC. A subsequent DSN 006 sample yielded a 0.11 ppm TRC result.

  For background, on August 8, 2005, hydrolazing the seawater side of Turbine Plant Closed Cooling System (CCS) heat exchangers in the turbine building using domestic water was conducted. Filtered effluent from this activity was drained to the turbine building sump, as authorized by NPDES Permit CT0003263. Based on our review of this event, DNC notes the following: 1) total residual chlorine is defined as the amount of free available chlorine along with the combined chlorine present within a sample; 2) free chlorine is present as hypochlorous acid and/or the hypochlorite ion; 3) combined chlorine exists as monochloramine, dichloramine, nitrogen trichloride and other "chloro" derivatives; and 4) the

organic matter in the CCS heat exchangers is continuously chlorinated when the heat exchanger is in service. This results in the formation of various "chloro" derivatives or organic chloramines in this organic matter contained in the heat exchanger. During hydrolazing, the filter used for suspended solids reduction did not remove the smaller sized organic matter and these organic chloramines were deposited in the turbine building sump

Given this information, as a corrective action, for future hydrolazing activities that involve the turbine building sump, a more appropriately sized effluent filter will be used to address the suspended organic matter during these evolutions.

DSN 009

On November 9, 2005, a monthly sample for Total Suspended Solids (TSS) analysis was obtained from DSN 009 during the yearly surveillance run of the Millstone Station diesel fire pump. Results of this analysis were 51.2 ppm. The permit limit at DSN 009 for TSS is 30 ppm. DNC believes this TSS value was a result of suspended solids that collected in the associated storm drains during the numerous October 2005 rain events and were subsequently disturbed during the annual diesel fire pump surveillance. As of December 13, 2005, all accessible storm drains associated with this discharge have been evaluated and cleaned.

3. Environmental Protection Plan Noncompliances

No EPP noncompliances were identified for MP3 in 2005.

4. Environmentally Significant Changes to Station Design or Operation

No MP3 Design Change Records or System Operating Procedure changes met the acceptance 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 MP3 events met the acceptance 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.

None of the 5 licensee events that constituted reportable occurrences at MP3 in 2005 were determined to cause a significant environmental impact.

Table 1. MP3 NPDES Data Summary, Jan. 1 - Dec. 31, 2005. Selected water quality parameters for Unit 3[(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	7.8-7.9	51.1-63.8	57.6	18.0	0.17	0.06	0.20
Feb.	1357	7.8-8.0	52.2-58.3	54.5	17.8	0.18	<0.03	0.17
Mar.	1357	7.8-8.0	51.2-60.2	53.9	16.9	0.16	<0.03	0.22
Apr.	1357	7.7-8.0	43.0-65.3	52.9	9.1	0.21	0.03	0.20
May	1357	7.8-8.0	54.4-75.5	66.1	15.4	0.13	0.05	0.19
June	1357	7.7-8.0	68.4-79.5	75.4	14.3	0.08	0.04	0.21
July	1357	7.4-7.9	76.7-86.5	81.2	15.2	0.08	0.05	0.24
Aug.	1357	7.5-7.9	83.0-89.5	85.6	15.4	0.15	<0.03	0.20
Sep.	1357	7.7-8.0	66.3-90.7	84.7	15.4	0.07	0.04	0.19
Oct.	1357	7.3-7.9	57.3-76.3	66.0	3.4	0.05	<0.03	0.22
Nov.	1357	7.7-7.9	65.8-78.2	72.0	16.7	0.18	0.05	0.20
Dec.	1357	7.8-7.9	48.5-69.0	61.2	15.6	0.19	0.04	0.22

Notes:

(1) Parameters are measured at MP3 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 temperatures)
FAC = Free Available Chlorine
TRC = Total Residual Chlorine
SWS = Service Water System

Attachment to the

2005 Annual Environmental Protection Plan Operating Report

January 1 – December 31, 2005

Executive Summary Section of

"Annual Report 2005 - Monitoring the Marine Environment of Long Island Sound at Millstone Power Station, Waterford, Connecticut"

dated April 2006

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. Adult spawners are assessed by a survey in the Niantic River during late winter and early spring, larvae are sampled at the plant discharges and in Niantic River and Bay, and settled age-0 juveniles are collected within the river during summer. During the past 2 decades, Niantic River winter flounder represented about 2% of the entire winter flounder resource in Long Island Sound (LIS).

The relative abundance of adult spawners in 2005 was 1.6 fish per trawl tow, about the same value as last year. Absolute abundance of the spawning population present in 2004 (the latest year for which an estimate could be made) was 1.3 thousand fish. Both were among the lowest estimates of the 30-year time-series. Using another methodology, female spawner abundance estimates ranged from approximately 2 thousand (2001, 2004, 2005) to 75 thousand (1982) and corresponding total egg production estimates were 1.7 to 44.8 billion. The decline after the early 1980s was attributed to low recruitment in years when adult stock size was high; a general winter warming trend, which negatively affects winter flounder reproduction; and increased rates of exploitation by various fisheries. Niantic River abundance is significantly positively correlated with two other abundance indices in southern New England, which have also shown declines.

This year, Stage 1 (newly hatched) larvae were initially abundant in the Niantic River, but suffered high mortality. Reduced mortality in later developmental stages, however, resulted in relatively abundant Stage 4 (pre-metamorphosis) larvae in Niantic Bay. In recent years, more Stage 1 larvae were found than expected from low adult spawner abundance, suggesting an important density-dependent compensatory mechanism during the egg stage as a result of reduced predation on eggs by sevenspine bay shrimp. Thus, when egg densities are low, there is higher egg survival producing more Stage 1 larvae. Density-dependent mortality is also present during the larval period of life, as an analysis suggested that mortality decreased with decreasing egg production (a measure of early larval abundance), which was further moderated by warmer April water temperatures that allowed for faster larval development.

Following larval metamorphosis and settlement, densities of age-0 young in the Niantic River this year were similar to 2004. Overall, abundance of young in 2005 was about average, although their mortality rate was higher than the long-term average. Mean length of young this year exceeded only that in 2001. High juvenile mortality rates in some years have reduced abundance of larger year-classes. Abundance 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 these older fish. However, there was much scatter in these relationships and none of the early life stages were considered to be reliable predictors of potential future year-class strength.

Unknown processes not related to MPS operation occurring after juvenile winter flounder leave shallow nursery waters in the fall of their first year of life seem to be operating such that fewer adults are produced from more abundant year-classes of younger fish. The older juvenile life stage (ages-1 and 2) may be where a bottleneck is occurring in winter flounder population dynamics, perhaps from predation.

The number of larvae entrained is a measure of potential impact to winter flounder. Similar to most years, Stage 3 larvae predominated in 2005 entrainment collections. Annual estimates of entrainment are related to both larval densities in Niantic Bay and MPS operation. The 2005 entrainment estimate of about 91 million was the lowest found since 1998. A spring refueling outage at Unit 2, an unplanned shutdown at Unit 3, and the retirement of Unit 1 reduced potential MPS entrainment by an estimated 52 million larvae this year. 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, the more 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 indicated 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 calculations showed that a large number of entrained larvae come from a number of sources in LIS besides the Niantic River. The Niantic River production loss estimate of about 19% in 2005 was the lowest one since 2002 and just above the long-term (1984-2005) average of 15%. However, based on an apparent increase in egg survival noted in recent years, a factor that was not originally incorporated into this model, most production loss estimates since 1995 were probably conservatively high. Correcting the more recent estimates by using a higher egg survival estimate results in lower production loss estimates (revised long-term mean = 10%).

The small adult spawning stock in the river continues to produce relatively large numbers of larvae and young fish, which are a likely result of population compensatory mechanisms. The effective retirement of Unit 1 in late 1995 resulted in an immediate reduction of about one-quarter of the MPS cooling-water flow. Despite relatively good abundance of age-0 winter flounder (a post-entrainment life stage), significant recruitment to the adult spawning population has not occurred in recent years. This is due to factors unrelated to MPS operation removing these fish from the population. Environmental effects, including changes to the Niantic River habitat, a warming water temperature trend, and interactions with other species (e.g., predation), especially during early life history, are also important processes affecting winter flounder population dynamics.

Fish Ecology Studies

Monitoring during 2005 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 for juvenile or adult silversides collected by trawl or seine. Similarly, no long-term trends were identified in American sand lance larvae and grubby larvae, juveniles, and adults. 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 during 2005 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.

Data collected during 2005 continued to show no long-term abundance trends in the numbers of entrained cunner and tautog eggs and larvae. Juvenile and adult cunner and tautog 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 these species. Since that time, no significant abundance trend was found from 1984 through 2005. Cunner abundance at the Jordan Cove and Niantic River trawl stations continued to fluctuate without trend during 2005. Numbers of juvenile and adult tautog increased in Niantic River trawl catches and in both Jordan Cove trawl and lobster pot catches.

Changes in the species composition and temporal and spatial abundance of fishes and macroinvertebrates collected by trawl over the past 29 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 seawater temperatures occurring over the past 3 decades.

Cooling-water use at MPS was reduced 23% from the shutdown of Unit 1, resulting in less entrainment and impingement. Fish return systems at Units 2 and 3 further reduce impingement mortality at MPS. Based on increasing trends in abundance and the lack of decreasing trends, MPS has had minimal effect on local fish and macroinvertebrate assemblages.

Lobster Studies

Impacts associated with recent MPS operations on the local lobster population were assessed by comparing results of the 2005 study to data collected from 1978 to 2004. Emphasis has been placed on assessing long-term trends in the abundance and population characteristics of lobsters collected in the Millstone Point area. Results of lobster monitoring from 1978 to 1999 indicated the local lobster population abundance was stable or increasing. The lower abundance of lobsters observed from 2000 to 2005 was unrelated to MPS operations and attributed to an increase in natural mortality associated with a shell disease affecting lobster populations from eastern LIS to the Gulf of Maine.

No significant long-term trends were identified in the overall total catch-per-unit-effort (CPUE) of lobsters or in the total CPUE at the three monitoring stations. The CPUE of legal-size lobster has exhibited a significant declining trend at the Jordan Cove and Twotree stations. However, no significant trend in legal lobster CPUE

occurred at the Intake station located nearby MPS. The combined CPUE of legal-size lobster at the three stations has almost doubled over the past 2 years, when compared to catches in 2003. Similar results were reported for commercial lobster catches in our area; the catch of legal lobsters during 2005 was 30% higher than the catch of legal lobsters reported during 2003.

Long-term trends observed in lobster population characteristics over the past 28 years were related to natural increases in 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 is near their southern range of distribution in nearshore waters.

The number of lobster larvae entrained through the MPS cooling water systems 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 returns impinged lobsters to Niantic Bay.

Eelgrass

Eelgrass (*Zostera marina* L.) population dynamics were monitored during summer months from 1985 to 2005 at three locations near MPS. Long-term declines in eelgrass shoot density, shoot length, and standing stock biomass were observed at all three areas monitored through 2005. Two populations to the east of MPS and near the fringes of the thermal plume (<1.5 km from the MPS discharge to LIS) exhibited gradual declines over the study period. These declines were not associated with MPS operation as thermal input from the cooling water discharge to these sites is minimal (<1°C above ambient conditions).

By comparison, heavy, often sudden, eelgrass 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, and gradual, steady increases in shoot density and biomass were observed through 2005. In previous years, three short-term declines in eelgrass abundance have been directly associated with fouling and overgrowth of eelgrass; one by blue mussels (*Mytilus edulis*) at the Niantic River in 1992, and two by blooms of green algae (*Cladophora* spp.) at White Point in 1991 and 2004. Recent research 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

During 2005, community composition and sedimentary characteristics at IN (Intake) and JC (Jordan Cove) showed increased similarity to pre-Unit 3 operational conditions. Mean grain size and silt/clay values have also become more constant at IN and JC following disturbances during Unit 3 construction and start-up. In 2005 there was evidence that the MPS discharge influences structure of both the sedimentary environment and infaunal community at the EF (Effluent) station. Sediments at EF showed an increase in grain size, and in the absence of *Mytilus*, currents scoured the fine sediment fraction resulting in lower silt-clay content. Sediment grain size and silt/clay content at the GN (Giants Neck) reference station continues to exhibit variability unrelated to MPS. The infaunal community at GN exhibited a decreasing trend in faunal abundance and numbers of species over the study period. In contrast, there was a significant increasing trend in faunal abundance and number of species at IN. There was a significant decreasing trend in the numbers of species at EF. There were no significant trends in numbers of species or community abundance at JC. Multivariate analyses showed increased community similarity between collections made in recent years and those collected before the disturbances at IN and JC. Changes in community similarity between early samples and more recent samples were also observed at EF, and at the reference station GN, where the effects of MPS are not present.

Overall, benthic communities sampled in 2005 were comprised of fauna that were present in previous years. Observed changes in abundance of these infaunal taxa resulted in rank order changes among the dominant taxa at all stations and appear relatively stable under current environmental conditions.

Rocky Intertidal Studies

Rocky intertidal monitoring studies during 2005 continued to document ecological changes to the shore community near to, and associated with, the MPS thermal discharge. These changes are not widespread, and remain restricted to approximately 150 m of

shoreline on the east side of the power plant discharge to LIS.

Seasonal shifts in occurrence of annual algal species were noted at Fox Island-Exposed (FE) during 2005. 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 2005 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 2005, but occurred mainly as a summer annual at sites unaffected by MPS.

Ascophyllum nodosum growth during 2004-05 was not significantly different among any of our monitoring stations, indicating that the thermal plume from MPS had little effect on local populations. Natural influences of other factors such as ambient temperature conditions, nutrients and light also play a 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.*