

DOCKET NO. D-1981-020 CP-2

DELAWARE RIVER BASIN COMMISSION

**Calpine Mid-Atlantic Generation, LLC
Edge Moor and Hay Road Energy Centers
Non-contact Cooling Water & Process Water Discharge
City of Wilmington and New Castle County, Delaware**

PROCEEDINGS

This docket is issued in response to an Application submitted to the Delaware River Basin Commission (DRBC or Commission) by the Calpine Mid-Atlantic Generation, LLC (Calpine or docket holder) on May 7, 2012 (Application), for renewal of the docket holder's existing discharge of non-contact cooling water (NCCW) and process water. National Pollutant Discharge Elimination System (NPDES) Permit No. DE0000558 for this facility was issued by the Delaware Department of Natural Resources and Environmental Control (DNREC) on May 7, 2001.

The Application was reviewed for continuation of the project discharge in the Comprehensive Plan and approval under Section 3.8 of the Delaware River Basin Compact. The New Castle County Department of Land Use has been notified of pending action. A public hearing on this project was held by the DRBC on August 10, 2016.

A. DESCRIPTION

1. **Purpose.** The purpose of this docket is to renew approval of the docket holder's existing discharge of up to 870.2 million gallons per day (mgd) of NCCW, boiler and cooling tower blowdown, and intake screen backwash water from three (3) existing outfalls associated with the Edge Moor Energy Center and Hay Road Energy Center power generating units. No modifications to the facilities are proposed.

2. **Location.** The Edge Moor and Hay Road Energy Centers are located along the Delaware River north of the mouth of Shellpot Creek, in the City of Wilmington and in New Castle County, Delaware. The facility will continue to discharge untreated process water to Delaware River Water Quality Zone 5 at River Mile 72 via existing Outfalls Nos. 001, 006, and 007.

The project outfalls discharge to Water Quality Zone 5 as follows:

OUTFALL NO.	DISCHARGE TYPE	LATITUDE (N)	LONGITUDE (W)
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001	NCCW, boiler & cooling tower blowdown, & cooling tower intake screen backwash	39° 44' 8"	75° 30' 14"
006	Pumphouse #2 intake screen backwash	39° 44' 17"	75° 30' 10"
007	Pumphouse #3 intake screen backwash	39° 44' 14"	75° 30' 12"
016 (Internal)	Cooling tower blowdown	39° 44' 13"	75° 30' 18"

3. **Area Served.** The Edge Moor and Hay Road Energy Centers provide electricity to the Pennsylvania-New Jersey-Maryland (PJM) Interconnection (the regional transmission organization). Wastewater streams consist of NCCW, cooling tower blowdown, intake screen backwash, and storm water runoff that are generated on-site by the docket holder's power generation facilities.

For the purpose of defining the Area Served, Section B (Type of Discharge) and D (Service Area) of the docket holder's Application are incorporated herein by reference, to the extent consistent with all other conditions contained in the DECISION Section of this docket.

4. **Physical features.**

a. **Design criteria.** The Edge Moor Energy Center consists of three (3) boiler/turbine power generating units (Units 3, 4 and 5). Units 1 and 2 ceased operation in 1983. The units are fueled by oil or natural gas and are load cycled, with maximum generation typically maintained during the day and lower loads at night. The three units have a generating capacity of 710 MW (nominal). The units utilize a once-through cooling system and discharge NCCW and boiler blowdown to an artificial canal (Edge Moor Discharge Canal) which discharges to Delaware River Water Quality Zone 5 just north of Shellpot Creek, via Outfall No. 001.

The Hay Road Energy Center, located adjacent to the Edge Moor Energy Center, is a combined cycle power plant comprised of six (6) simple-cycle combustion turbines and heat recovery steam generator units (Units 1, 2, 3, 5, 6 and 7) and two (2) steam turbine units (Units 4 and 8). The combined cycle process utilizes the waste heat generated from the combustion turbines to generate steam and power an additional steam turbine unit. This system allows for the production of supplemental electric capacity without the use of additional fuel combustion. The simple-cycle combustion units are fueled primarily by natural gas; however, low-sulfur liquid distillate (No. 2 fuel oil or kerosene) is used as a back-up source when natural gas is unavailable or uneconomical. The generating capacity of the Hay Road Energy Center is 1,100 MW (nominal). The Hay Road units withdraw water from the Edge Moor Discharge Canal, as detailed below.

b. **Facilities.** NCCW for the Edge Moor Energy Center's once-through cooling system is withdrawn from the Delaware River via circulating water pumps from two (2) shoreline pumphouses, referred to as Pump house 2 and Pump house 3. Pump house 2 serves Units 3 and 4 and Pump house 3 serves Unit 5. Boiler blowdown from Unit 5 (via Outfall No. 003) and NCCW from the three units at the Edge Moor facility is discharged to the Edge Moor Discharge Canal. During operation, the intake screens for Pump houses 2 and 3 are continuously

cleaned and cleared of debris by backwashing with river water which is discharged to Delaware River Water Quality Zone 5 at the intake location, via Outfall Nos. 006 and 007 respectively. The maximum instantaneous flows for Outfall Nos. 006 and 007 are 1.1 mgd and 3.5 mgd, respectively.

The Hay Road Energy Center utilizes a closed loop NCCW system with two (2) wet, mechanical drift cooling towers for condenser cooling of the steam turbines (Hay Road Units 4 and 8). Up to 7.9 mgd of makeup water for the cooling system is obtained by means of an intake (the Hay Road Intake) located at the head of the Edge Moor Discharge Canal. At times when the Edge Moor units are not operating and thus not producing discharge flows, a condenser pump at Edge Moor Energy Center is operated to transfer water to the Hay Road intake via the Discharge Canal. Boiler water necessary for the operation of the six (6) simple-cycle combustion units at the Hay Road Energy Center is supplied by United Water of Delaware. Cooling tower blowdown and intake screen backwash water from the Hay Road facility is discharged back to the Edge Moor Discharge Canal via internal Outfall No. 016. The combined discharge from the Edge Moor and Hay Road Energy Centers to Outfall No. 001 via the Edge Moor Discharge Canal is a maximum instantaneous flow up to 865.6 mgd.

In order to meet pH limits, the cooling water for the Edge Moor and Hay Road Energy Centers is pH-adjusted, when needed, prior to discharge. Additionally, the cooling water may receive a variety of DNREC-approved additives to prevent scaling, corrosion, and biofouling of the facilities and for system cleaning. Sanitary wastewater and non-process wastewater flows from the facilities are directed to the City of Wilmington wastewater treatment plant, most recently approved by DRBC Docket No. D-1998-026 CP-1 on November 15, 2000.

No modifications to the existing facilities are proposed.

The Commission originally approved the Edge Moor Energy Center, Units 1 through 4 via Docket No. D-1964-017 on May 27, 1964. Additional facilities and modifications at the Edge Moor and Hay Road Energy Centers were approved as follows:

DOCKET NO.	DRBC APPROVAL DATE	FACILITIES
D-1970-225-1	May 31, 1973	Edge Moor Unit No. 5
D-1977-024-1	April 27, 1977	Edge Moor Discharge
D-1981-020-1	June 17, 1981	Edge Moor Discharge
D-1990-045 CP-1	September 26, 1990	Hay Road Units 1 through 4
D-2000-012 CP-1	September 28, 2000.	Hay Road Units 5 through 8

c. **Water withdrawals.** The surface water withdrawals for the Edge Moor units were originally approved by DRBC Docket No. D-1964-017-1 on May 27, 1964 and modified via Docket No. D-1970-225-1 on May 31, 1973. The surface water withdrawal for the Hay Road units was originally approved by Docket No. D-1990-045 CP-1 on September 26, 1990 and modified via Docket No. D-2000-012 CP-1 on September 28, 2000. The docket holder's previous water withdrawal approvals have been consolidated and are described in draft Docket

No. D-2000-012 CP-2, which is scheduled for hearing at the August 10, 2016 Commission hearing.

d. NPDES Permit / DRBC Docket. NPDES Permit No. DE0000558, issued by the DNREC on May 7, 2001, includes effluent limitations for the existing discharge to surface waters classified as Delaware River Water Quality Zone 5 via Outfall No. 001 and for the internal discharge to the Edge Moor Discharge Canal via Outfall No. 016. The following average monthly effluent limits for Outfall No. 001 are among those listed in the NPDES permit and meet or are more stringent than the effluent requirements of the DRBC. Note: The NPDES permit lists the daily average flow of Outfall No. 001 as 871 mgd, however, the docket holder's current daily instantaneous design flow from Outfall No. 001 is 865.6 mgd.

EFFLUENT TABLE A-1: DRBC parameters included in NPDES permit

Outfall No. 001 (Water Quality Zone 5)		
PARAMETER	LIMIT	MONITORING
pH (Standard Units)	6.0 to 9.0 (at all times)	As required by NPDES permit
Temperature*		As required by NPDES permit
9/16 – 6/30	96° F (instantaneous maximum)	
7/1 – 9/15	103° F (instantaneous maximum)	

* See Findings section and Condition II.h. in the Decision Section

The following effluent monitoring requirements are requirements of the DRBC for Outfall No. 001 and are not listed in the NPDES permit.

EFFLUENT TABLE A-2: DRBC parameters not included in NPDES permit

Outfall No. 001 (Water Quality Zone 5)		
PARAMETER	LIMIT	MONITORING
Total Suspended Solids	Monitor & Report	Bi-Monthly (once every other month)
Total Dissolved Solids*	Monitor & Report	Bi-Monthly (once every other month)

* See FINDINGS section and DECISION Condition II.q.

The following average monthly effluent limits and monitoring requirements for Outfall No. 016 are among those listed in the NPDES permit and meet or are more stringent than the effluent requirements of the DRBC.

EFFLUENT TABLE A-3: DRBC parameters included in NPDES permit

Outfall No. 016 (Internal)		
PARAMETER	LIMIT	MONITORING
pH (Standard Units)	6.0 to 9.0 (at all times)	As required by NPDES permit

The following effluent monitoring requirements are requirements of the DRBC for Outfall No. 016 and are not listed in the NPDES permit.

EFFLUENT TABLE A-4: DRBC parameters not included in NPDES permit

Outfall No. 016 (Internal)		
PARAMETER	LIMIT	MONITORING
Total Suspended Solids	Monitor & Report	Bi-Monthly (once every other month)
Total Dissolved Solids*	Monitor & Report	Bi-Monthly (once every other month)

* See FINDINGS section and DECISION Condition II.q.

e. Relationship to the Comprehensive Plan. The Edge Moor and Hay Road Energy Centers' power generating units, surface water withdrawals, and discharges were originally added to the Comprehensive Plan via Docket No. D-1990-045 CP-1 on September 26, 1990 and modified via Docket No. D-2000-012 CP-1 on September 28, 2000. The discharges associated with the Edge Moor Energy Center and Hay Road Energy Center will be continued in the Comprehensive Plan via this docket.

B. FINDINGS

The purpose of this docket is to renew the approval of the docket holder's existing discharge of up to 870.2 mgd of NCCW, boiler and cooling tower blowdown, and intake screen backwash water from the existing Edge Moor Energy Center and Hay Road Energy Center, and to update the approval to reflect the current facility description. No modifications to the facilities are proposed.

Thermal Mixing Zone

Zone 5 stream quality objectives for temperatures require that the ambient river temperature shall not be raised by more than 4°F (2.2°C) from September to May and 1.5°F (0.8°C) from June to August, nor shall such discharge result in stream temperatures exceeding 86°F (30.0°C). The Commission's Interpretive Guideline No. 1 also requires an effluent limitation of 110°F (43.3°C) where the discharge is readily accessible to human contact for the protection of Public Safety.

DRBC performed a heat dissipation area determination for the discharge associated with the Edge Moor generating units and granted the docket holder a thermal mixing zone for Outfall No. 001 via Docket No. D-1970-225-1, approved on May 31, 1973, consisting of 700 feet upstream, 600 feet downstream, and 300 feet channel ward, as measured from the mouth of the Edge Moor Discharge Canal.

Docket No. D-1990-045 CP-1 and Docket No. D-2000-012 CP-1, approved on September 26, 1990, and September 28, 2000, respectively, determined that the change in the thermal plume being produced in the Delaware River by the total discharge from the Edge Moor Discharge Canal as a result of the addition of the Hay Road Generating Units would be insignificant.

Accordingly, this thermal mixing zone is continued via this docket (D-1981-020 CP-2). In order to demonstrate compliance with DRBC's thermal requirements, the docket holder is

required to meet the effluent limits for temperature contained in EFFLUENT TABLE A-1 in Section A.4.d. of this docket (See DECISION Condition II.h).

The Delaware River is tidal at the point of discharge. There are no surface water intakes of record for public water supply downstream of the facilities' discharges. The nearest upstream surface water intake of record for public water is operated by the City of Philadelphia, and is located on the Delaware River 38 river miles upstream of the project discharge.

The project does not conflict with the Comprehensive Plan and is designed to prevent substantial adverse impact on the water resources related environment, while sustaining the current and future water uses and development of the water resources of the Basin.

The limits in the NPDES Permit for the existing discharges are in compliance with Commission effluent quality requirements, where applicable.

The project is designed to produce a discharge meeting the effluent requirements as set forth in the Water Quality Regulations (WQR) of the DRBC.

C. DECISION

I. Effective on the approval date for Docket No. D-1981-020 CP-2 below,

a. The projects described in Docket Nos. D-1970-225-1, D-1977-024-1 and D-1981-020-1 are terminated and replaced by Docket No. D-1981-020 CP-2; and

b. The project and the appurtenant facilities described in the Section A "Physical features" shall be continued in the Comprehensive Plan.

II. The project and appurtenant facilities as described in Section A "Physical Features" of this docket are approved pursuant to Section 3.8 of the *Compact*, subject to the following conditions:

a. Docket approval is subject to all conditions, requirements, and limitations imposed by the DNREC in the NPDES permit issued by DNREC to the Edge Moor and Hay Road Energy Centers, and such conditions, requirements, and limitations are incorporated herein, unless they are less stringent than the Commission's.

b. The Edge Moor and Hay Road Generating Centers and their operational records shall be available at all times for inspection by the DRBC.

c. The Edge Moor and Hay Road Energy Centers shall be operated at all times to comply with the requirements of the DRBC WQR.

d. The docket holder shall comply with the requirements contained in the EFFLUENT TABLES in Section A.4.d. of this docket. The docket holder shall submit the required monitoring results electronically to the DRBC Project Review Section via email

aemr@drbc.nj.gov on the **Annual Effluent Monitoring Report Form** located at this web address: <http://www.state.nj.us/drbc/programs/project/application/index.html>. The monitoring results shall be submitted annually, absent any observed limit violations, by January 31. If a DRBC effluent limit is violated, the docket holder shall submit the result(s) to the DRBC within 30 days of the violation(s) and provide a written explanation that states the action(s) the docket holder has taken to correct the violation(s) and protect against any future violations.

e. Except as otherwise authorized by this docket, if the docket holder seeks relief from any limitation based upon a DRBC water quality standard or minimum treatment requirement, the docket holder shall apply for approval from the Executive Director, or for a docket revision in accordance with Section 3.8 of the *Compact* and the *Rules of Practice and Procedure*.

f. If at any time the receiving treatment plant proves unable to produce an effluent that is consistent with the requirements of this docket approval, no further connections shall be permitted until the deficiency is remedied.

g. Nothing herein shall be construed to exempt the docket holder from obtaining all necessary permits and/or approvals from other State, Federal or local government agencies having jurisdiction over this project.

h. The discharge of wastewater shall not increase the ambient temperatures of the receiving waters by more than 4°F (2.2°C) from September to May and 1.5°F (0.8°C) from June to August, nor shall such discharge result in stream temperatures exceeding 86°F, except within the heat dissipation area described in the FINDINGS section of this docket. In order to demonstrate compliance with DRBC's thermal requirements, the docket holder is required to meet the effluent limits for temperature contained in EFFLUENT TABLE A-1 in Section A.4.d. of this docket.

i. The docket holder is permitted to treat and discharge wastewaters as set forth in the Area Served Section (A.3) of this docket, which incorporates by reference Sections B (Type of Discharge) and D (Service Area) of the docket holder's Application to the extent consistent with all other conditions of this DECISION Section.

j. The docket holder shall discharge wastewater in such a manner as to avoid injury or damage to fish or wildlife, and shall avoid any injury to public or private property.

k. No sewer service connections shall be made to newly constructed premises with plumbing fixtures and fittings that do not comply with water conservation performance standards contained in Commission Resolution No. 88-2 (Revision 2).

l. Nothing in this docket approval shall be construed as limiting the authority of DRBC to adopt and apply charges or other fees to this discharge or project.

m. The issuance of this docket approval shall not create any private or proprietary rights in the waters of the Basin, and the Commission reserves the right to amend,

suspend or rescind the docket for cause, in order to ensure proper control, use and management of the water resources of the Basin.

n. Unless the docket holder requests an extension that is approved by the Commission in advance, in accordance with paragraph 11 of the Commission's Project Review Fee schedule (Resolution No. 2009-2), the docket holder is responsible for timely submittal of a docket renewal application on the appropriate DRBC application form at least six (6) months in advance of the docket expiration date set forth below. The docket holder will be subject to late charges in the event of untimely submittal of its renewal application, whether or not DRBC issues a reminder notice in advance of the deadline or the docket holder receives such notice. In the event that a timely and complete application for renewal has been submitted and the DRBC is unable, through no fault of the docket holder, to reissue the docket before the expiration date below (or the later date established by an extension that has been timely requested and approved), the terms and conditions of the current docket will remain fully effective and enforceable against the docket holder pending the grant or denial of the application for docket approval.

o. The Executive Director may modify or suspend this approval or any condition thereof, or require mitigating measures pending additional review, if in the Executive Director's judgment such modification or suspension is required to protect the water resources of the Basin.

p. Any person who objects to a docket decision by the Commission may request a hearing in accordance with Article 6 of the Rules of Practice and Procedure. In accordance with Section 15.1(p) of the Delaware River Basin *Compact*, cases and controversies arising under the *Compact* are reviewable in the United States district courts.

q. The docket holder may request of the Executive Director in writing the substitution of specific conductance for TDS. The request should include information that supports the effluent specific correlation between TDS and specific conductance. Upon review, the Executive Director may modify the docket to allow the substitution of specific conductance for TDS monitoring.

BY THE COMMISSION

DATE APPROVED: September 14, 2016

EXPIRATION DATE: September 14, 2021