

DOCKET NO. D-1977-110 CP-19

DELAWARE RIVER BASIN COMMISSION

Located in the Drainage Area of Special Protection Waters

**Merrill Creek Owners Group
Merrill Creek Reservoir
Harmony Township, Warren County, New Jersey**

PROCEEDINGS

This docket is issued in accordance with condition C.II.1. of Docket No. D-1977-110 CP-18 and Resolution No. 2018-5 and supersedes Docket No. D-1977-110 CP-18. This docket updates the language used in the Merrill Creek Reservoir (MCR) Plan of Operation to make it consistent with the policy adopted by the Delaware River Basin Commission (DRBC or Commission) in Resolution No. 2018-5. Water Allocation Permit No. 4023PS for the diversion of water into the MCR was renewed by the New Jersey Department of Environmental Protection (NJDEP) on June 12, 2013, effective July 1, 2013.

This update was reviewed for inclusion in the Comprehensive Plan and approval under Section 3.8 of the *Delaware River Basin Compact*. The Warren County Planning Department has been notified of pending action. A public hearing on this update was held by the DRBC on August 15, 2018.

A. DESCRIPTION

1. Purpose. The purpose of this docket is to update and approve the Plan of Operation for the MCR in accordance with Resolution 2018-5. The MCR is used by the docket holder to provide water releases to the Delaware River to replace water that is consumptively used by the energy generating “Designated Units” in EXHIBIT III of ATTACHMENT 2, when a “critical hydrologic condition” occurs as defined in Resolution 2018-5.

MCR also provides some local flood mitigation, as well as recreation opportunities, and preserves open space and wildlife habitat.

2. Location. The general location of the project facilities is shown on **ATTACHMENT 1** below. The MCR is located at River Mile 174.4 – 7.69 – 3.9 (Delaware River – Pohatcong Creek – Merrill Creek), within the drainage area to the Lower Delaware Special Protection Waters (SPW), in Harmony Township, Warren County, New Jersey as follows:

RELEASE WORKS	LATITUDE (N)	LONGITUDE (W)
MCR	40° 43' 38"	75° 6' 7"

3. **Units Served.** The docket holder will continue to release water stored in the MCR to augment the low flows of the Delaware River during drought conditions for the entities and their respective units listed in **EXHIBIT III** of **ATTACHMENT 2**. The Executive Director may approve modifications to this list when appropriate or when designated units change (See condition C.II.s.).

4. **Physical Features.**

a. **Reservoir and Dam Description.** The MCR was completed in 1988 and has a zoned earthen embankment configuration that is approximately 260 feet high (above the original river channel) and 2,450 feet long that spans the Scotts Mountain Gap. There are three saddle dikes, two on the northwest side of the reservoir and one on the southeast side. There is a 400 feet long emergency spillway that spills to Lopatcong Creek. The normal maximum surface elevation of MCR is 923 feet above mean sea level and has approximately 48000 acre-feet (15 billion gallons) of usable water for augmentation needs. The reservoir is approximately 2 miles long and 1 mile wide at its maximum and impounds approximately 650 acres. Additionally, the reservoir is surrounded by a 290-acre preserve and 2,000 additional acres of woods and fields. As determined at the time of the original docket (1984), under dynamic conditions of actual operation, the reservoir could yield up to 162 cfs during a repeat of the drought of record.

Water is released from the reservoir to maintain streamflow in Lower Merrill Creek. Water is drawn into an outlet structure that is constructed atop the former Ingersoll-Rand Reservoir Dam. Prior to entering Lower Merrill Creek, the water passes through an energy dissipater where it is aerated, and through a stilling basin where it is warmed and further aerated.

The relief spillway directs excess water to Lopatcong Creek and is approximately 400 feet long at the crest at elevation 929.0 feet on the reservoir upstream side. Because the reservoir has excess capacity above the normal operating level (923 feet above mean sea level) - capacity adequate to contain the probable maximum precipitation and probable maximum flood - the spillway has not been used but was constructed to insure against the remote possibility that the water level could rise above elevation 929 feet for some unforeseen reason.

The inlet-outlet tower is a vertical structure with multiple ports, approximately 200 feet in vertical height. Each port is at a different level so that water can be released from the reservoir level at which water temperature and quality most nearly match that of the Delaware River at the time of release. Also, the multiple ports permit the discharge of river water into the reservoir at the most advantageous level for control of water quality in the impoundment.

The inlet-outlet tower is connected to the pump house by approximately 17,000 feet of pipeline, 1,400 feet of which is installed in a tunnel. The tunnel has a finished dimension of 96 inches. The pipe has a diameter of 57 inches and, except in the tunnel, is buried a minimum of six feet below the ground surface.

The pump house water intake facility is located 130 feet out from the shore of the Delaware River at river mile 192 and is connected to the pump house by three 54-inch diameter buried pipes. The intake consists of an array of 72 cylindrical wedge-wire screens, each 30 inches in diameter. The slotted screen openings are 2 millimeters (mm) each. The pump house contains three pumps, each with a capacity of 72.5 cfs at maximum static hydraulic head. Utilizing all three pumps, the pump house intake facility has the capacity to transmit water at a rate of 217 cfs from the Delaware River to MCR, based on the maximum static head. Under the design conditions, the velocity of water through the intake screens does not exceed 0.5 feet per second. Water released from the reservoir to the river passes through an energy dissipater and spills over the pump house wall.

b. **Cost.** There are no construction costs associated with this update.

c. **Relationship to the Comprehensive Plan.** The MCR was incorporated into the Comprehensive Plan upon issuance of Docket No. D-77-110 CP on October 24, 1984 and was thereafter modified by eighteen docket amendments. Issuance of this docket continues the inclusion of the MCR in the Comprehensive Plan (See condition C.I.c.).

B. **FINDINGS**

Utilizing the MCR, the docket holder provides releases to the Delaware River to replace water that is consumptively used by the energy generating “Designated Units” in EXHIBIT III of ATTACHMENT 2, when a “critical hydrologic condition” occurs as defined in Resolution 2018-5. The MCR is operated in accordance with the terms and conditions of this docket and the approved Plan of Operation (See condition C.II.1.).

The docket holder operates two (2) on-site wells. One well is located at the visitor center and is used for public water supply at the visitor’s center and the other is located at the pump house and is used for domestic supply at the pump house. The total withdrawal of water from these wells is less than 100,000 gallons per day as a 30-day average and is not required to have Commission approval. The NJDEP will continue to regulate these withdrawals via Well Permits Nos. 2400039127 and 2400022733.

On July 16, 2008, the DRBC approved amendments to its *Water Quality Regulations (WQR)* that provide increased protection for waters that the Commission classifies as SPW. The portion of the Delaware River and its tributaries within the boundary of the Lower Delaware River Management Plan Area was approved for SPW designation.

Article 3.10.3A.2.e.1). and 2). of the Commission’s *WQR* states that projects subject to review under Section 3.8 of the Compact that are located in the drainage area of SPW must submit for approval a Non-Point Source Pollution Control Plan (NPSPCP) that controls the new or increased non-point source loads generated within the portion of the docket holder’s service area which is also located within the drainage area of SPW. MCR is located within the drainage area to the SPW. Since this project does not entail additional construction and expansion of facilities (i.e., there are not any new or increased non-point source loads associated with this

approval), the NPSPCP requirement is not applicable at this time. Accordingly, condition C.II.h. is included in this docket.

Condition C.II.e. requires that the docket holder continue to maintain a minimal flow in Merrill Creek within the MCOG property boundary, 800 feet downstream of the dam, by a combination of seepage, leakage, and controlled releases of at least 3.0 cfs. When MCR is full (water surface elevation at 923 feet above mean sea level) the docket holder shall pass all the water entering the reservoir, up to a maximum of 20 cfs. As noted in the Final Environmental Impact Statement (FEIS) for the MCR, such augmentation to meet streamflow objectives was considered during the environmental review process as mitigation to provide partial compensation for the 3.7 miles of trout habitat that would be inundated by the reservoir. The mitigation was established through implementation of the National Environmental Policy Act (NEPA).

Dockets Nos. D-77-110 CP and D-77-110 CP (Amendment 1) required the docket holder to create and/or implement a Fishery Management Plan, Operating Plan, and Environmental Management Plan. The docket holder has developed and maintained these three plans and is required to continue to do so as part of this docket.

This update 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.

C. DECISION

I. Effective on the approval date for Docket No. D-1977-110 CP-19 below:

a. The MCR project described in Docket No. D-77-110 CP-18 is removed from the Comprehensive Plan to the extent that it is not included in Docket No. D-1977-110 CP-19; and

b. Docket No. D-1977-110 CP-18 is terminated and replaced by Docket No. D-1977-110 CP-19; and

c. The project and the appurtenant facilities described in Section A “Physical Features” of this docket shall be continued in the Comprehensive Plan.

II. The MCR 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. The MCR shall be available at all times for inspection by the DRBC.

b. The MCR shall be operated at all times to comply with the requirements of the Commission’s *WQR* and *Water Code*.

c. 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.

d. The docket holder shall release water from MCR in such a manner as to avoid injury or damage to fish or wildlife and shall avoid any injury to public or private property.

e. The docket holder shall maintain a minimum flow of 3.0 cfs in Merrill Creek within the MCOG property boundary, 800 feet downstream of the dam, using a combination of seepage, leakage, and controlled releases. When MCR is full (water surface elevation at 923 feet above mean sea level) the docket holder shall pass all the water entering the reservoir, up to a maximum of 20 cfs.

f. The docket holder shall continue to monitor the impact of the MCR on the fish population of Upper and Lower Merrill Creek as well as the MCR in accordance with the docket holder's approved Fishery Management Plan. The docket holder will increase the rate of release to lower Merrill Creek, or otherwise adjust flow conditions, to maintain the desired fish population based on the results of the monitoring studies. Increased releases (to maintain the desired fish population) that exceed reservoir inflow or 3 cfs, whichever is greater, shall be considered as part of the "Compensation Releases," if compensation for consumptive water losses at electric generating stations is required at that time.

g. 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.

h. Prior to performing any modifications to the MCR, dam, or supporting facilities, the docket holder shall submit and have approved by the Executive Director of the DRBC, a NPSPCP in accordance with Articles 3.10.3A.2.e.1). and 2). of the Commission's *WQR*.

i. The docket holder is responsible for timely submittal to the DRBC of a docket renewal application on the appropriate application form including the appropriate docket application filing fee (see 18 CFR 401.43) at least 6 months in advance of the docket expiration date set forth below. The docket holder will be subject to late filed renewal surcharges 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, 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.

j. 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.

k. The Executive Director reserves the right to reopen this docket at any time, and to reconsider this decision and any and all conditions imposed hereunder in light of further information developed by, or decisions rendered in, pending or future proceedings conducted by other State and/or Federal agencies. The Executive Director may at any time modify existing conditions, or impose additional conditions, upon the operation of this facility to reflect new or changed information or to conform to requirements imposed on the project by other agencies.

l. The docket holder shall continue to be responsible for the operation of the project facilities in accordance with the Plan of Operation, which is attached to this docket (see **ATTACHMENT 2**), in a manner that will insure compliance with all streamflow and use limitations and will conform with the conditions stated in this docket. The Executive Director may approve modifications to the Plan of Operation if a review of the hydrologic or hydraulic data and/or any other information indicates such action is necessary.

m. 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.

n. The withdrawal of water from the Delaware River at the pumping station for diversion into MCR may only be made in conformance with the schedule and conditions located in the Plan of Operation (see **ATTACHMENT 2**).

o. With prior consent of the DRBC and NJDEP, water that would otherwise be released directly to the Delaware River, may be released to Lower Merrill Creek for the benefit of the stream's aquatic biota as outlined in the docket holder's Merrill Creek Reservoir Plan of Operation (See **ATTACHMENT 2**).

p. Releases to Lower Merrill Creek shall be regulated so that rapid fluctuations in streamflow do not occur.

q. The docket holder shall continue to implement the mitigating measures described in the Environmental Management Plan.

r. Compensation releases, in lieu of curtailment, shall be made for all Designated Units in **EXHIBIT III** of **ATTACHMENT 2** (See condition C.II.m.) whenever the Commission notifies Merrill Creek that a critical hydrologic condition (as defined in Attachment 2) is occurring. In addition, the Commission may direct Compensation Releases to be made on any day when the Equivalent Flow at Trenton was below 3,000 cfs for five (5) consecutive days due to reasons beyond the control of the Commission, even if the flow objective at the Trenton Gage has not been reduced to less than 3,000 cfs

s. The Executive Director may provide written approval of the addition of electric generating Stations to the Designated Units list in the Plan of Operation (See **EXHIBIT III** of **ATTACHMENT 2**), or other modifications thereto, when the Executive Director determines that designated units have received approval under Section 3.8 of the Compact and

the requested modifications: will continue to protect the water resources of the Basin; will not result in MCR being over-allocated; and will not impair operations at the MCR. The docket holder shall submit to the Executive Director any request to modify the Plan of Operation, including Exhibit III..

t. Each electric generating unit which is a Designated Unit from **EXHIBIT III** of **ATTACHMENT 2** shall be exempt from curtailment by the DRBC so long as the freshwater equivalent consumptive use resulting from the operation of that unit is being replaced by Compensation Releases from the MCR in accordance with the Plan of Operation or from other sources approved by the Commission.

u. DECISION Condition I. of Docket No. D-77-110 CP (Amendment 1) denied the request to establish credits (as Compensation Releases) for water released, in excess of reservoir inflow, to meet the parameters of condition C.II.f. of this docket [formerly DECISION Condition III.h. of Docket No. D-77-110 CP Amendment 1)]. That denial is hereby continued. Should the Executive Director direct the docket holder to make releases for purposes other than specified in the DECISION Section of this docket, it shall consider a docket holder request for relief and the Executive Director shall determine and provide relief that is equitable.

x. The docket holder shall be subject to applicable DRBC regulatory program fees, in accordance with duly adopted DRBC resolutions and/or regulations. (see 18 CFR 401.43).

y. This approval is transferable by request to the DRBC Executive Director provided that the project purpose and area served approved by the Commission in this docket will not be materially altered because of the change in project ownership. The request shall be submitted on the appropriate form and be accompanied by the appropriate fee (see 18 CFR 401.35).

z. The docket holder shall request a name change of the entity to which this approval is issued if the name of the entity to which this approval is issued changes its name. The request for name change shall be submitted on the appropriate form and be accompanied by the appropriate fee (see 18 CFR 401.35).

BY THE COMMISSION

DATE APPROVED: September 13, 2018

EXPIRATION DATE: September 13, 2028

MERRILL CREEK OWNERS GROUP

PLAN OF OPERATION

FOR THE

MERRILL CREEK RESERVOIR

**Prepared by Merrill Creek Owners Group in accordance with:
Delaware River Basin Commission (DRBC) Docket No. D-1977-110 CP-19**

Approved September 13, 2018

PLAN OF OPERATION
FOR THE
MERRILL CREEK RESERVOIR

PREAMBLE: This Plan of Operation is in fulfillment of condition C.II.1. of Docket No. D-1977-110 CP-19, hereinafter referred to as “the Docket”. When appropriate, conditions of the Docket that prescribe operating criteria set forth in this Plan of Operation are indicated in parentheses.

- I. Definitions and abbreviations for the purpose of this Plan of Operation
 - A. DRBC or Commission: the Delaware River Basin Commission.
 - B. MCOG: the Merrill Creek Owners Group.
 - C. MCR: Merrill Creek Reservoir
 - D. cfs: cubic feet per second.
 - E. m.s.l.: mean sea level.
 - F. AF: acre-feet.
 - G. mg: million gallons.
 - H. mg/l: milligrams per liter.
 - I. Designated Units: the generating units listed in Exhibit III of this Plan of Operation.
 - J. FECU: the Freshwater Equivalent Consumptive Use (mg) of a Designated Unit as calculated in accordance with Exhibit I of this Plan of Operation.
 - K. Compensation Releases: releases (in mg) from MCR to compensate for the FECUs of the Designated Units, in lieu of curtailment of the consumptive use by the Designated Units (See condition C.II.t.). The Compensation Release on a given day shall equal the combined total of the FECUs of all Designated Units on the previous day excluding FECUs compensated by releases from, or operation of, sources other than MCR as approved by the Commission. Until a Designated Unit begins commercial operation, that unit’s FECU shall not be included in the Compensation Release.
 - L. Trenton Gage: the USGS gaging station on the Delaware River at Trenton.
 - M. Equivalent Flow at Trenton: the flow (cfs) measured at the Trenton gage adjusted to include the directed release from Blue Marsh Reservoir, an amount of water determined by the Commission to account for flows withdrawn above and returned below the USGS Trenton gage and the exclusion of the Compensation Release from MCR.

- N. critical hydrologic condition: A critical hydrologic condition is deemed to exist whenever the following conditions are satisfied:
1. the Flow Objective at the USGS Trenton gage is reduced to a level below 3,000 cfs in accordance with the Delaware River Basin Water Code; and
 2. the sum of the following flows and releases remains below 3,000 cfs:
 - (a) the flow measured at the USGS Trenton gage at approximately 8:00 AM; plus
 - (b) average daily releases from Blue Marsh Reservoir in excess of the minimum conservation release rate; plus
 - (c) an amount of water as determined by the Commission to account for flows withdrawn above and returned below the USGS Trenton gage; less
 - (d) the average daily release of Compensation releases from Merrill Creek Reservoir for the previous day.

II. Data to be used by MCR Staff to determine whether filling is permissible, or releasing is required and for filling and/or releasing operations

- A. Each day during the normal workweek, Commission Staff will make the following data available to MCR Staff:
1. Average daily flow (cfs) measured at the Trenton Gage on the previous day.
 2. Flow (cfs) at the Trenton Gage at approximately 8:00 AM on the current day.
 3. Average daily directed release (cfs) in excess of the conservation release (cfs) from Blue Marsh Reservoir for the previous day and (if not provided earlier) for the second previous day.
 4. Seven-day average location of salt front (250 mg/l isochlor).
 5. Flow objective (cfs) at the Trenton Gage.
- B. Other than during the normal work week, or if the data are not available from the Commission, MCR Staff shall obtain and use data as follows:

1. Average daily flow (cfs) measured at the Trenton Gage on the previous day as posted on the USGS website. If not available, then the most recent available average daily flow (cfs) shall be used.
2. Flow (cfs) at the Trenton Gage at approximately 8:00 AM on the current day as obtained via from the gage via telephone or as posted on the USGS website. If not available, then the most recent flow (cfs) measured at the Trenton Gage either provided by Commission Staff or posted on the USGS website shall be used.
3. Most recent average daily directed release (cfs) in excess of the conservation release (cfs) from Blue Marsh Reservoir provided by Commission Staff.
4. Most recent seven-day average location of salt front (250 mg/l isochlor) provided by Commission Staff.
5. Most recent flow objective at the Trenton Gage provided by Commission Staff.

III. Filling

- A. All inflow to MCR may be retained provided that releases are made in accordance with Section IV.
- B. Delaware River water may be withdrawn for filling MCR in accordance with the pumping schedule set forth in Table EXHIBIT 2 of this Plan of Operation (See condition C.II.n.). When using EXHIBIT 2 for determination of the maximum number of pumps to be operated on a given day, the “Delaware River flow at Trenton” is:
 1. The average daily flow (cfs) measured at the Trenton Gage on the previous day
 2. Plus, the average quantity withdrawn on the second previous day (cfs).

IV. Releasing

- A. Delaware River:
 1. Compensation Releases shall be made to the Delaware River whenever DRBC notifies the docket holder that a critical hydrologic condition is occurring.

2. The Commission may direct Compensation Releases to be made on any day when the Equivalent Flow at Trenton was below 3,000 cfs for five (5) consecutive days due to reasons beyond the control of the Commission, even if the flow objective at the Trenton Gage has not been reduced to less than 3,000 cfs (See condition C.II.r.).
3. Releases to the Delaware River shall be coordinated with the Commission.

B. Lower Merrill Creek

1. Water shall be released in sufficient quantity to maintain a minimum flow of 3.0 cfs downstream of the dam at all times (See condition C.II.e.).
2. Additional releases may be required to maintain the desired fish population as determined by monitoring studies. Such increased releases that exceed reservoir inflow or 3 cfs, whichever is greater, shall be considered as part of Compensation Releases, if being made (See condition C.II.f.).
3. The maximum rate of release shall be 20 cfs (See condition C.II.f.).
4. Releases shall be regulated so that rapid fluctuations in stream flow do not occur (See condition C.II.p.).
5. With prior consent of the Commission and the NJDEP, water that would otherwise be released directly to the Delaware River may be released to Lower Merrill Creek for the benefit of the stream's aquatic biota (See condition C.II.o.).

V. Reporting

A. When MCR is releasing to the Delaware River:

1. The following information will be provided daily to the Commission:
 - a. Estimated average rate (cfs) and total amount (mg) of release to the river expected for that day. Name of each Designated Unit and the quantity (mg) of Compensation Release for each. Description and respective amount (mg) of any other release to the river.

- b. Actual amount (mg) and average daily rate (cfs) of the Compensation Release made the previous day.
 - c. Any portion of the water released to Lower Merrill Creek that is considered part of the Compensation Release will be stated separately (See condition C.II.f).
 - d. Reservoir water surface elevation (ft. m.s.l.) and volume of useable storage (AF) as of approximately 8:00 AM on that day.
 - 2. A written report summarizing the daily information for the preceding calendar month will be provided to the Commission by the 10th day of each month.
 - B. When MCR is withdrawing from the Delaware River:
 - 1. The following information will be provided weekly (on Monday) to the Commission:
 - a. Estimated average rate (cfs) and total amount (mg) of withdrawal from the river each day for the previous seven days.
 - b. Reservoir water surface elevation (ft. m.s.l.) and volume of useable storage (AF) as of approximately 8:00 AM on Monday morning.
 - 2. A written report summarizing the daily information for the preceding calendar month will be provided to the Commission by the 10th day of each month.
 - C. When Merrill Creek Reservoir is neither releasing to nor pumping from the Delaware River:
 - 1. A written report on reservoir water surface elevation (ft. m.s.l.) and volume of useable storage (AF) as of each Monday will be provided to the Commission by the 10th day of each month.
 - 2. Any significant event that could affect the normal operation of the Merrill Creek Reservoir will be reported promptly to the Commission.
- VI. Modification of Plan of Operation
- A. Should modification of this Plan of Operation seem appropriate or necessary, MCOG may present information in support of the modification

to the Executive Director of the Commission for consideration and action
(See condition C.II.1.).

VII. Communications

A. All communications concerning this Plan of Operation should be addressed to the following duly authorized representatives of the Commission and MCOG, or in the absence of such representatives to their alternates. The Commission and MCOG may change their respective authorized representatives and alternates at any time by written notice to the other's authorized representative.

1. Commission:

a. Phone/E-mail:

Steven J. Tambini (Executive Director)
609-477-7200
Steve.Tambini@drbc.nj.gov

David Kovach (Project Review Manager)
609-477-7264
david.kovach@drbc.nj.gov

Amy Shallcross (Water Resources Operations Manager)
609-477-7232
amy.shallcross@drbc.nj.gov

b. Mail:

Delaware River Basin Commission
25 Cosey Drive
Post Office Box 7360
West Trenton, NJ 08628-0360

2. MCOG:

a. Phone/E-mail

James Mershon (On-Site Coordinator)
908-454-1252 (o)
609-932-8396 (c)
jmershon@merrillcreek.com

Jane Bullis (Administrator)
908-454-3339 (o)
609-932-8395 (c)
jbullis@merrillcreek.com

b. Mail:

Merrill Creek Reservoir
34 Merrill Creek Road
Washington, NJ 07882

EXHIBIT I: FECU

FRESHWATER EQUIVALENT CONSUMPTIVE USE METHOD OF CALCULATION

The Freshwater Equivalent Consumptive Use of a Designated Unit on a given day shall be calculated according to one of the methods described below, as appropriate.

Method A. Designated Units for which Consumptive Water Use is Calculated Based on Generation

$$\text{FECU} = \frac{\text{MMCUC} \times \text{REF} \times \text{ACTUAL NET GENERATION} \times \text{K}}{\text{RATED CAPACITY}}$$

Where:

FECU is the volume of the freshwater equivalent consumptive use of the unit in million gallons for the given day.

MMCUC is the monthly maximum consumptive use of the unit in cubic feet period second (cfs), defined as the maximum rate at which water is evaporated based on operation of the unit at its rated capacity, average monthly weather conditions and, for once through units, average monthly receiving water temperature. The MMCUC values shall be (a) the values reported to the Commission by the Delaware River Basin Electric Utility Group (DRBEUG) on October 2, 1985 or as subsequently revised or (b) values determined subsequent to October 2, 1985 and accepted by the Commission Staff.

REF is the relative effect factor of the unit (a) as reported to the Commission by DRBEUG on October 2, 1985 or as subsequently revised or (b) a value determined subsequent to October 2, 1985 and accepted by the Commission Staff. The REF applies to the Designated Units that withdraw water from the Delaware River Estuary.

ACTUAL NET GENERATION is the actual net megawatt-hours (MWH) generated by the unit on the given day.

RATED CAPACITY is the unit's summer net capacity in MW.

K = .0269 million gallons per cfs-hour.

The owner/operator of the Designated Unit reports the daily ACTUAL NET GENERATION to MCR Staff. MCR Staff enter the reported daily ACTUAL NET GENERATION into the Merrill Creek Reservoir FECU Calculation & Reporting System. The System contains the MMCUC, the REF, the RATED CAPACITY and the value of K, and calculates the FECU by applying those factors to the daily ACTUAL NET GENERATION.

EXHIBIT I: FECU (continued)

Method B. Designated Units for which Consumptive Water Use is Determined by Metering

$$\text{FECU} = \text{METERED CONSUMPTIVE USE} \times \text{REF}$$

Where:

FECU and REF are as defined for Method A, above.

METERED CONSUMPTIVE USE is the gross consumptive water use of the unit on the given day in million gallons, as determined by metering. If the Designated Unit has a discharge, METERED CONSUMPTIVE USE is the difference between the metered withdrawal and the metered discharge. If the Designated Unit has no discharge, METERED CONSUMPTIVE USE is the metered withdrawal.

The owner/operator of the Designated Unit reports daily METERED CONSUMPTIVE USE to MCR Staff. MCR Staff enter the reported daily METERED CONSUMPTIVE USE into the Merrill Creek Reservoir FECU Calculation & Reporting System. The System contains the REF and calculates the daily FECU by applying the REF to the daily METERED CONSUMPTIVE USE.

Method C. Designated Units for which Consumptive Water Use is Determined by Other Method Approved by the Commission

$$\text{FECU} = \text{CONSUMPTIVE USE} \times \text{REF}$$

Where:

FECU and REF are as defined for Method A., above.

CONSUMPTIVE USE is the gross consumptive water use of the unit on the given day in million gallons, as determined by a method approved by the Commission specifically for the unit.

The owner/operator of the Designated Unit calculates daily CONSUMPTIVE USE and reports it to MCR Staff. MCR Staff enter the reported daily CONSUMPTIVE USE into the Merrill Creek Reservoir FECU Calculation & Reporting System. The System contains the REF and calculates the daily FECU by applying the REF to the daily CONSUMPTIVE USE.

EXHIBIT II: Filling Schedule

Merrill Creek Reservoir---Alternative Filling Schedule

Seven-day average location of "salt front," ^a River Mile	Actual Delaware River flow at Trenton, cfs ^e	Maximum number of pumps ^b		
		Dec.- Mar.	Apr.- Jun.	Jul.- Nov.
(1)	(2)	(3)	(4)	(5)
---	Less than 3,072	0 ^c	0 ^c	0 ^c
Upstream of R.M. 92.5	---	0 ^d	0 ^d	0 ^d
R.M. 92.5 to R.M. 87.0	3,072 to 3,144	1	1	0
R.M. 92.5 to R.M. 87.0	3,145 to 4,000	2	1	0
R.M. 92.5 to R.M. 87.0	4,001 and up	3	3	2
R.M. 87.0 to R.M. 82.9	3,072 to 3,144	1	1	1
R.M. 87.0 to R.M. 82.9	3,145 to 3,216	2	2	1
R.M. 87.0 to R.M. 82.9	3,217 to 4,000	3	2	1
R.M. 87.0 to R.M. 82.9	4,001 and up	3	3	2
Seaward of R.M. 82.9	3,072 to 3,144	1	1	1
Seaward of R.M. 82.9	3,145 to 3,216	2	2	2
Seaward of R.M. 82.9	3,217 to 4,000	3	2	2
Seaward of R.M. 82.9	4,001 and up	3	3	3

^a Measured in statute miles along the navigation channel from the mouth of Delaware Bay. The "salt front:" is defined as the 250-mg/l isochlor.

^b Pumping rate, based on rated pump capacity for a dynamic head of 775 feet, is 72 cfs for one pump, 145 cfs for two pumps, and 217 cfs for three pumps.

^c No pumping-except for maintenance purposes--is allowed regardless of salt-front location.

^d No pumping-except for maintenance purposes-is allowed regardless of flow at Trenton.

^e USGS Gage No. 01463500 Delaware River at Trenton NJ.

EXHIBIT III: Designated Units

Plan of Operation for the MCR

Exhibit III, List of Designated Units [Note 1] as of September 13, 2018

Sheet 1 of 3

Designated Unit	1 st Year of Operation	Consumptive Use (cfs) [Notes 2,3]	Relative Effect Factor	FECU (cfs) [Notes 3,4]	Method of Calculation [Note 5]	Reservoir Ownership (%)
Served by Atlantic City Electric Co. share of MCR						4.834
Pedricktown (PCLP) Cogen	1995	0.83	0.68	0.57	B	
Served by Delmarva Power & Light Company share of MCR						11.909
Bethlehem	2003	6.62	1.00	6.62	B	
Deepwater #1	1958	1.03	0.51	0.52	A	
Deepwater #6	1954	0.96	0.51	0.49	A	
Edge Moor #3	1954	0.90	0.59	0.53	A	
Edge Moor #4	1966	1.76	0.59	1.04	A	
Edge Moor #5	1973	4.31	0.59	2.54	A	
Hay Road #4	1993	4.86	0.59	2.87	B	
Hay Road #8	2001	3.15	0.59	1.86	B	
Liberty Electric	2001	4.49	1.00	4.49	B	
Served by Jersey Central Power and Light Co. share of MCR						8.370
FPL Energy Marcus Hook, LP MH750	2002	5.10	0.72	3.67	B	
Gilbert #8	1976	2.26	1.00	2.26	A	
Gilbert #9	1995	0.30	1.00	0.30	A	
Keystone/Logan Cogen	1995	5.27	0.71	3.74	B	
Northampton Cogen	1995	1.90	1.00	1.90	B	

Notes:

[1] This List of Designated Units replaces Table A of Docket No. D-77-110 CP (Amendment 1). The FECU values presented (also see Notes 2, 3 and 4) are estimates based either on certain modeling assumptions or on actual experience and do not necessarily represent actual operation of the respective Designated Unit or the unit's need for releases from MCR during an extended drought. In providing the estimates, the units' owners and operators neither make any operational commitment nor limit unit consumptive use at any time.

[2] Estimated average assuming continuous operation at rated capacity for months July through November.

[3] Values are shown to 0.00 cfs for uniformity; does not imply that degree of precision.

[4] "FECU" stands for "Freshwater Equivalent Consumptive Use."

[5] Method of calculation as defined in Exhibit I.

EXHIBIT III: Designated Units (Continued)

Plan of Operation for the MCR
 Exhibit III, List of Designated Units [Note 1] as of September 13, 2018
 Sheet 2 of 3

Designated Unit	1 st Year of Operation	Consumptive Use (cfs) [Notes 2,3]	Relative Effect Factor	FECU (cfs) [Notes 3,4]	Method of Calculation [Note 5]	Reservoir Ownership (%)
Served by Metropolitan Edison Co. share of MCR						8.370
Portland #5	1995	0.72	1.00	0.72	B	
West Deptford	2014	4.11	0.93	3.82	B	
Served by Exelon Generation Company share of MCR						44.241
Eddystone #3	1974	4.97	0.84	4.17	A	
Eddystone #4	1977	4.97	0.84	4.17	A	
Fairless Hills	1997	1.32	1.00	1.32	C	
Grays Ferry - Cogen Units	1998	1.24	1.00	1.24	C	
Limerick #1 [Note 6]	1986	32.57	1.00	32.57	B	
Limerick #2 [Note 6]	1990	32.57	1.00	32.57	B	
Salem #1 (42.59%)	1977	8.09	0.18	1.46	A	
Salem #2 (42.59%)	1981	8.09	0.18	1.46	A	

Notes:

[1] This List of Designated Units replaces Table A of Docket No. D-77-110 CP (Amendment 1). The FECU values presented (also see Notes 2, 3 and 4) are estimates based either on certain modeling assumptions or on actual experience and do not necessarily represent actual operation of the respective Designated Unit or the unit's need for releases from MCR during an extended drought. In providing the estimates, the units' owners and operators neither make any operational commitment nor limit unit consumptive use at any time.

[2] Estimated average assuming continuous operation at rated capacity for months July through November.

[3] Values are shown to 0.00 cfs for uniformity; does not imply that degree of precision.

[4] "FECU" stands for "Freshwater Equivalent Consumptive Use."

[5] Method of calculation as defined in Exhibit I.

[6] Total or partial compensation for FECU may be provided by releases from other sources (Wadesville Mine and Tamaqua reservoirs) in accordance with the "Limerick Generating Station Water Supply Program Operations and Maintenance Plan" under Docket No. D-1969-210 CP-13.

EXHIBIT III: Designated Units (Continued)

Plan of Operation for the MCR
 Exhibit III, List of Designated Units [Note 1] as of September 13, 2018
 Sheet 3 of 3

Designated Unit	1 st Year of Operation	Consumptive Use (cfs) [Notes 2,3]	Relative Effect Factor	FECU (cfs) [Notes 3,4]	Method of Calculation [Note 5]	Reservoir Ownership (%)
Served by PSEG Power, LLC share of MCR						13.906
Hope Creek #1	1986	27.88	0.18	5.02	A	
Salem #1 (57.41%)	1977	10.91	0.18	1.96	A	
Salem #2 (57.41%)	1981	10.91	0.18	1.96	A	
Served by Realty Company of Pennsylvania share of MCR [Note 7]						8.370
Lower Mount Bethel Energy	2003	4.95	1.00	4.95	B	
Martins Creek #3	1975	15.14	1.00	15.14	A	
Martins Creek #4	1977	15.14	1.00	15.14	A	
Ironwood	2001	1.67	1.00	1.67	B	

Notes:

[1] This List of Designated Units replaces Table A of Docket No. D-77-110 CP (Amendment 1). The FECU values presented (also see Notes 2, 3 and 4) are estimates based either on certain modeling assumptions or on actual experience and do not necessarily represent actual operation of the respective Designated Unit or the unit's need for releases from MCR during an extended drought. In providing the estimates, the units' owners and operators neither make any operational commitment nor limit unit consumptive use at any time.

[2] Estimated average assuming continuous operation at rated capacity for months July through November.

[3] Values are shown to 0.00 cfs for uniformity; does not imply that degree of precision.

[4] "FECU" stands for "Freshwater Equivalent Consumptive Use."

[5] Method of calculation as defined in Exhibit I.

[7] Talen Energy will meet the Commission's consumptive use compensation requirement by operating Lake Wallenpaupack per DRBC Resolution No. 2002-33.