

DOCKET NO. D-1996-011-5

DELAWARE RIVER BASIN COMMISSION

**Evonik Corporation
Industrial Wastewater Treatment Plant
City of Chester, Delaware County, Pennsylvania**

PROCEEDINGS

This docket is issued in response to an application submitted to the Delaware River Basin Commission (DRBC or Commission) on May 26, 2023 (Application), for renewal of the docket holder's existing industrial wastewater treatment plant (IWTP) and its discharge. The PADEP issued National Pollutant Discharge Elimination System (NPDES) Permit No. PA0051713 for this discharge.

The application was reviewed for continued approval under Section 3.8 of the *Delaware River Basin Compact*. The Delaware County Planning Commission has been notified of pending action. A public hearing on this project was held by the DRBC on February 7, 2024

A. DESCRIPTION

- 1. Purpose.** The purpose of this docket is to renew approval of the docket holder's existing 1.8 million gallons per day (mgd) IWTP and its discharge of treated industrial process wastewater and non-contact cooling water (NCCW).
- 2.** The docket holder's Evonik Chester facility is located between Front Street and the Delaware River, 0.5 miles northeast of the Commodore Barry Bridge, in the City of Chester, Delaware County, Pennsylvania. The facility will continue to discharge to Water Quality Zone 4 of the Delaware River at River Mile 82.2.

The project outfall is located in the Delaware River Watershed as follows:

OUTFALL NO.	LATITUDE (N)	LONGITUDE (W)
001	39° 50' 8.0"	75° 22' 7.9"

- 3. Area Served.** The docket holder's IWTP will continue to receive industrial process wastewater from the silica production and processing operations at the Evonik Chester facility, located in the City of Chester, Delaware County, Pennsylvania. For the purpose of defining the Area Served, the Type of Discharge and the Service Area sections from the docket holder's Application are incorporated herein by reference, to the extent consistent with all other conditions contained in Section C. DECISION of this docket.

4. **Design Criteria.** The docket holder's 1.8 mgd IWTP currently treats industrial process water and non-contact cooling water generated from silica manufacturing operations. The IWTP utilizes the following treatment processes: pH neutralization, cooling through heat exchangers, polymer addition to static mixers to increase flocculation and sedimentation, clarification in cyclators, which employ centrifugal force action, further neutralization, and equalization.

5. **Facilities.** The IWTP facilities include three wastewater collection tanks/sumps with pH neutralization, three (3) centrifugal pumps, three (3) heat exchangers, two (2) static mixers with polymer addition, three (3) cyclators, three (3) neutralization tanks, and one (1) equalization tank.

The IWTP outfall consists of a 12-inch diameter outfall pipe and 3-port, 12-inch diameter horizontal diffuser. The outfall runs along an existing pier and bends 90 degrees in a downward direction prior to the end of the pier, vertically into the River, under the pier. When the vertical portion of the outfall pipe approaches the River bottom, there is another 90-degree bend that sends the outfall pipe horizontal, at which point a diffuser is attached to the end of the outfall. The diffuser is 12 inches in diameter and 32.8 feet (10 meters) long, oriented perpendicular to the predominant river flow direction. The diffuser contains three 5-inch diameter ports, spaced 16.4 feet (5 meters) apart, with the ports discharging three feet above the River bottom. The diffuser is located close to the bottom of the River and aligned perpendicular to the shoreline and ambient currents in order to maximize mixing of the effluent with the River. The diffuser ports are oriented vertically up towards the surface in order to maximize the travel time of the plume before contact with the bottom since the effluent discharge is denser than that of the River. The diffuser ports contain Tideflex valves that further increase dispersion and mixing in the River. The Tideflex valves were not included in the original diffuser design approved by DRBC Docket No. D-1996-011-3, which approved the construction of the diffuser and an associated acute whole effluent toxicity (WET) mixing zone based on the diffuser design. Docket No. D-1996-011-4 revised the size and extent of the mixing zone based on the addition of the Tideflex valves to the diffuser design.

The docket holder is prepared to haul wasted sludge off-site by a licensed hauler for disposal at a State-approved facility; however, sludge generated by the IWTP is returned to the production process. Otherwise, sludge is handled in accordance with the requirements of NPDES Permit No. PA0051713.

6. **Water Withdrawals.** The potable water supply in the project service area is provided by wells owned and operated by the City of Chester Water Authority. The water withdrawal is described in detail in Docket No. D-1989-017 CP-1, which was approved on January 12, 1990.

7. **NPDES Permit / DRBC Effluent Requirements.** NPDES Permit No. PA0051713 issued by the PADEP includes final effluent limitations for the project discharge to surface waters classified by the PADEP as supporting warm water and migratory fishes (WWF/MF). EFFLUENT TABLES C-1 & C-2 included in Section C. DECISION condition C.1. of this docket, contain effluent requirements for DRBC parameters that must be met as a condition of this approval. Effluent requirements for Outfall No. 001 are based on a discharge rate of 1.8 mgd.

B. FINDINGS

The docket holder applied to renewal approval of their existing 1.8 mgd Evonik IWTP and its discharge.

1. TDS Determination

This docket continues a TDS determination consisting of a monthly average effluent concentration limit of 30,000 mg/l and daily maximum effluent concentration limit of 32,000 mg/l. Under design flow conditions (1.8 mgd) the resultant monthly average and daily maximum load based on the monthly average and daily maximum effluent concentration limits of 30,000 mg/l and 32,000 mg/l are 450,360 lbs/day and 480,384 lbs/day, respectively. The TDS mixing zone is 1,007 feet long by 117 feet wide for the existing outfall and diffuser at a flow of 1.8 mgd, for a total surface area of 117,971 ft² (2.71 acres). See EFFLUENT TABLE C-1 and Conditions C.3. and C.7. in Section C. DECISION of this docket.

2. Regulatory Mixing Zone (RMZ) and Associated Dilution Factors

The Evonik IWTP discharges treated industrial wastewater effluent to Delaware Water Quality Zone 4. DRBC Water Quality Regulations (WQR) include stream quality objectives for Zone 4, including criteria to protect the taste and odor of ingested water and fish (Table 4 of WQR), to protect aquatic life (Table 5), and to protect human health (Tables 6 & 7). Toxicity in effluent is measured as Whole Effluent Toxicity (WET), and results from both acute and chronic exposures. The acute toxicity stream quality objective for Zone 4 is 0.3 Toxic Units (TU_a = 0.3). The chronic toxicity stream quality objective for Zone 4 is 1.0 Toxic Units (TU_c = 1.0).

Section 4.20.5.A.1. of the WQR states that:

“In establishing wasteload allocations and other effluent requirements, exceedances of stream quality objectives for the protection of aquatic life from acute effects may be permitted in small areas near outfall structures, provided that all of the following requirements are met:

- a. As a guideline, the dimensions of the area where objectives are exceeded should be limited to the more stringent of the following structures:
 - 1). A distance of 50 times the discharge length scale in any direction from the outfall structure, or*
 - 2). A distance of 5 times the local water depth in any direction from the outfall structure.**
- b. Stream quality objectives shall not be exceeded in areas designated as critical habitat for fish and benthic organisms.*
- c. Stream quality objectives shall not be exceeded where effluent flows over exposed benthic habitat prior to mixing with the receiving waters.*

- d. *A zone of passage for free-swimming and drifting organisms equal to 50% of the surface width of the river at the location of the discharge shall be provided.*
- e. *The total surface area of the Delaware River Estuary where stream quality objectives for the protection of aquatic life from acute effects are exceeded shall be limited to: 5% of the total surface area of Zone 5.”*

The discharge length scale referred to in Item a. above is defined in Section 4.20.5.B.2. of the WQR as the square root of the discharge cross-sectional area. The 10-meter long submerged multi-port diffuser is oriented perpendicular to the shoreline and includes a total of three ports, spaced 5 meters apart, with each port containing a Tideflex valve. Port diameter with the Tideflex valve is 5 inches (0.4167 feet). For the diffuser discharge, the discharge cross-sectional area is 0.136 ft² per port. The local water depth is 14.5 ft (4.4 meters). The resulting dimensions for the guideline mixing zone, referred to as the regulatory mixing zone, or RMZ, are calculated as the more stringent of:

- 1). $50 * (\sqrt{0.136}) = 18.5 \text{ ft (5.6 meters)}$
or
- 2). $5 * 14.5 = 72.5 \text{ ft (22.1 meters)}$

The controlling dimension is the discharge length scale, and therefore the RMZ for the outfall and diffuser is a radius of 5.6 meters (18.5 feet) about each port. The total regulatory mixing area for the entire diffuser is the rectangular area formed by the radii around the ports; dimensions are 11.2 meters (36 feet) in length by 69 feet (21.0 meters) in width, equating to an area of approximately 235 meter² (2,500 ft²).

As part of the review for Docket No. D-1996-0111-4, DRBC staff evaluated the modeling work on the outfall diffuser configuration and concluded that under design flow conditions (hydraulic design capacity of 1.8 mgd), with the installation of Tideflex valves, dilution factors of 23.1 to 1 (not accounting for tidal build-up) and 21.7 to 1 (accounting for tidal build-up correction) are achieved at the edge of the RMZ. This docket continues approval of this RMZ (see Section C. DECISION Condition C.4.).

3. Alternative Mixing Zone and Associated Dilution Factor

Based on quarterly acute toxicity data from 2013 - 2018 provided by the docket holder, it was determined that the discharge would need to achieve a dilution factor of 28 to 1 at the edge of the RMZ after consideration of tidal build-up to meet DRBC's in-stream water quality criteria for acute WET. Not accounting for the adjustment for the tidal-build-up, a dilution factor of 30.4 to 1 is required. The effective (or tidal build-up corrected) dilution factor is calculated by following equation,

$$S_e = \frac{S_o \times S_{ff}}{[S_{ff} + S_o - 1]}$$

Where,

S_e = effective (or tidal build-up corrected) dilution factor,

S_{ff} = far-field dilution factor based on dye study (using a value of 337 for 1.8 MGD)

S_o = Initial (CORMIX predicted) dilution factor without tidal build up

Tideflex valves are installed on each diffuser port. Although the discharge cross-sectional area of each port is the same (0.136 ft²) as the original circular port opening design, the shape of the port opening is longer and less wide for the Tideflex valves. This opening configuration results in larger exit velocities for the discharge effluent and more rapid dispersion, and this mixing, of the effluent in the river.

With the Tideflex valve diffuser, the size of the mixing zone required to achieve a dilution of 28:1 is 12.4 meters (40.7 ft) upstream and downstream of each port, for a total length of 24.8 meters (81.3 ft). The width of this mixing zone is 21 meters or 69 feet. The total surface area of this mixing zone is 24.8 meters by 21 meters or 520.8 m² (5,600 ft²). This mixing zone area is 2.2 times larger than the RMZ (235 meter² or 2,500 ft²). This docket continues the AMZ consisting of 24.8 meters by 21 meters or 520.8 m² (5,600 ft²) and the dilution factors of 28:1 (considering the tidal buildup correction) and 30.4:1 (not accounting for the adjustment for the tidal-build-up). At this dilution factor, the acute WET effluent limit for the discharge is 8.4 TUa (see EFFLUENT TABLE C-2 and Condition C.5. in Section C. DECISION).

4. Heat Dissipation Area

Section 4.30.6.C. of the Commission's WQR require that discharges to Zone 4 shall not result in an induced temperature increase of more than 5°F above the average 24-hour temperature gradient displayed during the 1961-1966 period, or a maximum of 86°F (30°C), whichever is less, which temperatures shall be measured outside of designated heat dissipation areas as described in 4.30.6.F of the WQR.

This Docket continues a heat dissipation area of approximately 41 feet (12.5 meters) upstream and 41 feet (12.5 meters) downstream of the diffuser ports for the 1.8 mgd IWTP design discharge from Outfall No. 001. The calculated heat dissipation area is 83 feet (25.3 meters) in length and 38 feet (11.6 meters) in width, equating to a total area of approximately 3,150 ft² (295 m²). See Section C. DECISION Condition C.6. of this docket.

5. Other Findings

There are no public water supply intakes downstream 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 effluent limits in the NPDES Permit conform with Commission effluent quality requirements, where applicable.

The project is designed to produce a discharge that meets the effluent requirements as set forth in the Commission's *Water Quality Regulations (WQR)*.

C. DECISION

D-1996-011-4 is terminated and replaced by Docket No. D-1996-011-5. The project and appurtenant facilities as described in Section A. of this docket are approved pursuant to Section 3.8 of the *Compact*, subject to the following conditions:

Monitoring and Reporting

1. The docket holder shall comply with the requirements contained in the EFFLUENT TABLES below. The docket holder shall submit the required monitoring results electronically to the DRBC Project Review Section via email aemr@drbc.gov on the **Annual Effluent Monitoring Report Form** located at this web address: <https://www.nj.gov/drbc/programs/project/docket-app-info.html#3>. 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. The following average monthly effluent limits are among those listed in the NPDES Permit and meet or are more stringent than the effluent requirements of the DRBC.

EFFLUENT TABLE C-1: DRBC Parameters Included in NPDES Permit

OUTFALL001 (Delaware River Water Quality Zone 4)		
PARAMETER	LIMIT	MONITORING
Flow	Monitor & Report	As required by NPDES permit
pH (Standard Units)	6 to 9 at all times	As required by NPDES Permit
Total Suspended Solids*	100 mg/l 85% minimum removal when TSS effluent is greater than 30 mg/l *	As required by NPDES Permit
Total Dissolved Solids (TDS)**	30,000 mg/l (monthly avg) 450,360 lbs/day (monthly avg) 32,000 mg/l (daily max) 480,384 lbs/day (daily max)	As required by NPDES Permit
Temperature	110 ° F (Max)	As required by NPDES Permit
PCBs	Monitor & Report	As required by NPDES Permit

* The 85% minimum removal requirement for TSS is applicable when effluent TSS is greater than 30 mg/l.

** See Condition C.7. below.

The following monitoring requirements and average monthly effluent limits are for DRBC parameters different from those listed in the NPDES Permit.

EFFLUENT TABLE C-2: DRBC Parameters Not Included in NPDES Permit

OUTFALL001 (Delaware River Water Quality Zone 4)		
PARAMETER	LIMIT	MONITORING
Acute WET LC50 Stat 48 hr (C. dubia)	8.4 TUa	Quarterly, must report test results of LC50 in TUa

2. The docket holder shall continue to submit Polychlorinated Biphenyl (PCB) monitoring data and PMP Annual Reports to the Commission's Science & Water Quality Management Branch as required in the existing/proposed NPDES Permit.
3. This docket continues a TDS mixing zone at the diffuser that is 1,007 feet long by 117 feet wide under a design flow of 1.8 mgd, for a total area of 117,971 ft² (2.71 acres).
4. This docket continues a regulatory mixing zone (RMZ) for acute criteria consisting of a radius of 5.6 meters (18.5 ft) around the end of the each of the three (3) ports on the existing outfall pipe diffuser, which in total is 11.2 meters (36 feet) long by 21 meters (69 feet) wide with a total regulatory mixing zone (RMZ) area of 235 m² (2,500 ft²). The critical one-hour dilution factor at the edge of the RMZ is 8.3 to 1.
5. This docket continues an alternative mixing zone (AMZ) for acute WET criteria for the existing outfall under design flow conditions of 1.8 mgd that is 24.8 meters long (81.3 feet) by 21 meters wide (69 feet), equating to 520.8 m² (5,600 ft²) in area. The critical one-hour dilution factor at the edge of the AMZ under design flow conditions of 1.8 mgd is 28 to 1.
6. The discharge of wastewater shall not increase the ambient temperatures of the receiving waters by more than 5°F above the average 24-hour temperature gradient displayed during the 1961-1966 period, nor shall such discharge result in stream temperatures exceeding 86°F except within an assigned heat dissipation area consisting of 295 m² or 3,150 ft²).
7. The docket holder may request in writing for approval from the Executive Director for 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.
8. 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.

Other Conditions

9. Nothing in this docket constitutes a defense to any penalty action for past conduct of the docket holder or ongoing activity not authorized by this approval. In particular, renewal of this docket does not resolve violations – whether in the past or continuing – of provisions of the Delaware River Basin Compact (“Compact”) or any rule, regulation, order or approval duly issued by the Commission or the Executive Director pursuant to the Compact. The Commission reserves its right to take appropriate enforcement action against the docket holder, including but not limited to recovery of financial penalties consistent with Section 14.17 of the Compact, for any and all such prior or continuing violations.

10. Section 2.3.10 of the Commission’s *Rules of Practice and Procedure (RPP)* (18 C.F.R. 401.41), limiting the Commission’s approval to three years in the absence of an expenditure of substantial funds by the project sponsor in reliance on the approval, is hereby waived for good cause shown in accordance with Section 2.9.3 (18 C.F.R. 401.123) of the same regulations. This approval shall expire on the expiration date set forth below unless prior thereto the docket holder has applied to the Commission to renew or extend this approval.

11. 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 C.F.R. 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 DRBC issues a reminder notice in advance of the deadline or the docket holder receives such notice. If 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 pending the grant or denial of the application for docket approval.

12. The docket holder is permitted to treat and discharge wastewater as set forth in the Area Served Section of this docket, which incorporates by reference the Type of Discharge and Service Area sections of the docket holder’s Application to the extent consistent with all other conditions of this section.

13. In accordance with the Commission’s regulations at 18 C.F.R. Part 440, the docket holder is prohibited from discharging wastewater from high volume hydraulic fracturing (“HVHF”) or HVHF-related activities to waters or land within the Basin. The docket holder is further prohibited from discharging hydraulic fracturing wastewater, whether treated or untreated, from sources within or outside the Basin, without obtaining the Commission’s prior review and express approval in the form of a revised docket. Violation of this or any condition of this docket approval may result in enforcement, including the risk of financial penalties, pursuant to Section 14.17 of the Delaware River Basin Compact and Section 2.7.8 (18 CFR 401.98) of the Commission’s Rules of Practice and Procedure.

14. The facility and operational records shall be available at all times for inspection by the DRBC.

15. The facility shall be operated at all times to comply with the requirements of the Commission's *WQR*.
16. 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.
17. 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.
18. 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.
19. 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 Resolution No. 88-2 (Revision 2).
20. 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, to ensure proper control, use and management of the water resources of the Basin.
21. The docket holder shall be subject to applicable DRBC regulatory program fees, in accordance with duly adopted DRBC resolutions and/or regulations (see 18 C.F.R. 401.43).
22. 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 C.F.R. 401.43).
23. 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 C.F.R. 401.43).
24. 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.
25. 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 (RPP)*. 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.

BY THE COMMISSION

APPROVAL DATE: March 6, 2024

EXPIRATION DATE: March 6, 2029