

**Standard Operating Procedure (SOP)¹ for Clean Water Program
Establishing Effluent Limitations for Individual Industrial Permits
SOP No. BCW-PMT-032
Final, November 9, 2012
Revised, February 5, 2024
Version 1.7**

This SOP describes the procedures by which application managers will identify pollutants of concern, determine whether those pollutants should be monitored only or also be subject to numeric limitations, and determine the numeric values for effluent limitations when developing limit sets for individual NPDES industrial waste and industrial stormwater permits. This SOP applies to the following authorization types: “MIIW1” (Minor IW Facility without ELG), “MIIW2” (Minor IW Facility with ELG), “MAIW1” (Major IW Facility < 250 MGD), “MAIW2” (Major IW Facility ≥ 250 MGD), “NSIR” (NPDES Pmt Stormwater Industrial Site Runoff (Individual)), and “CAAP1” (CAAP Individual Permit).

This SOP is referred to within the SOP for New and Reissuance Industrial Waste and Industrial Stormwater Individual NPDES Permit Applications (BCW-PMT-001). It presents the general sequence of activities that application managers will undertake to establish effluent limitations.

In general, application managers will not make limitations less stringent in reissued permits unless the conditions of federal anti-backsliding regulations are met and the rationale is explained in the fact sheet.

I. Apply Minimum Technology and Treatment Standards

- A. If federal Effluent Limitations Guidelines (ELG) are applicable for the applicable SIC/NAICS code or industrial subcategory, as described in 40 CFR Parts 405 through 471, derive effluent limits for all pollutants addressed by the ELG.

NOTE 1 – If provided for in the ELG, certain technology-based limitations or monitoring requirements may be waived; in such cases the fact sheet will justify use of the waiver.

- B. Establish pH requirements of 6.0 (minimum) and 9.0 S.U. (maximum) for all industrial waste process and non-process discharges (see 25 Pa. Code §§ 92a.48(a)(2) and 95.2), unless the application manager determines there is no potential for the facility’s operations to affect the pH of influent (source) waters. Consider applying these requirements for industrial stormwater discharges where control of effluent pH is desired (e.g., stormwater discharges from concrete batch facilities). A maximum limit exceeding 9.0 S.U. may be granted in certain cases in accordance with 25 Pa. Code § 95.2(1).
- C. If a treatment standard has been established in the regulations, determine if there is reasonable potential for the facility’s effluent to approach the treatment standard. In general, if the maximum effluent concentration is expected to exceed 50% of the treatment standard, apply the treatment standard as an effluent limit in the permit.

¹ **DISCLAIMER:** The process and procedures outlined in this SOP are intended to supplement existing requirements. Nothing in the SOP shall affect regulatory requirements. The process, procedures and interpretations herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in this SOP that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

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1. If chlorination is used, the average monthly limitation of 0.5 mg/L for TRC is applicable under § 92a.48, and an IMAX limit of 1.6 mg/L normally is BPJ. If the federal ELG addresses chlorination or TRC, apply the federal ELG. If a facility-specific BAT limit has been developed by DEP as per § 92a.48(b)(1), then apply the facility-specific BAT limit.

NOTE 2 – Application managers may substitute “Total Residual Halogens” for TRC where it is known that other disinfection chemicals such as bromine will be introduced, particularly for non-contact cooling waters.

2. In general, if the maximum concentration of Oil and Grease in the discharge is 4 mg/L or greater, establish a monitor only requirement. If the maximum concentration of Oil and Grease in the discharge is 8 mg/L or greater, establish an effluent limitation for Oil and Grease of 15 mg/L as an average monthly limit and 30 mg/L as an IMAX limit. If the federal ELG addresses Oil and Grease, apply the more stringent requirements.

NOTE 3 – The Oil and Grease treatment requirements at 25 Pa. Code § 95.2(2)(ii) should be applied to all cases where an oil-water separator is used to treat stormwater and in other situations at the discretion of the application manager.

3. Determine if the treatment requirements of Chapter 95.10 related to TDS and its constituent parameters are applicable. Refer to *Policy and Procedure for NPDES Permitting of Discharges of Total Dissolved Solids (TDS) -- 25 Pa. Code §95.10* (DEP-ID: 385-2100-002). At a minimum, establish a monitoring requirement for TDS for any discharge that exceeds 1,000 mg/L TDS.

NOTE 4 – More stringent treatment requirements may apply under DRBC and ORSANCO regulations. Where a pollutant has a more stringent standard in DRBC and ORSANCO regulations, the more stringent standard will be used by the application manager to establish effluent limitations, as applicable.

NOTE 5 – In general, industrial facilities that discharge phosphorus in quantities that may exceed 25 lbs/day should at minimum receive a monitoring requirement for Total Phosphorus. In addition, facilities within the Chesapeake Bay watershed will generally receive monitoring for any discharge in which there is the possibility of a net increase in Total Phosphorus in comparison to influent (source) waters, and facilities that discharge 25 lbs/day (net) will receive annual mass load limitations, in accordance with the Chesapeake Bay Phase 2 WIP Supplement.

NOTE 6 – In general, industrial facilities that discharge nitrogen in quantities that may exceed 75 lbs/day should at minimum receive a monitoring requirement for Total Nitrogen. In addition, facilities within the Chesapeake Bay watershed will generally receive monitoring for any discharge in which there is the possibility of a net increase in Total Nitrogen in comparison to influent (source) waters, and facilities that discharge 75 lbs/day (net) will receive annual mass load limitations, in accordance with the Chesapeake Bay Phase 2 WIP Supplement.

NOTE 7 – If an industrial discharge contains treated sewage or other sanitary wastewater, establish limits consistent with the *SOP for Establishing Effluent Limitations for Individual Sewage Permits* (SOP No. BCW-PMT-033). Where ultraviolet (UV) disinfection is used, the limits table(s) in Part A will generally contain, at a minimum, routine monitoring of UV transmittance (%), UV dosage ($\mu\text{W}/\text{cm}^2$ or $\text{mjoules}/\text{cm}^2$) or UV intensity ($\mu\text{W}/\text{cm}^2$ or $\text{mjoules}/\text{cm}^2$) at the same monitoring frequency that would be used for TRC.

NOTE 8 – Where a General Permit exists for the industrial sector, the effluent limits and monitoring requirements should generally be considered minimum standards for discharges from that industry, unless the application manager can document that the requirements of the General Permit are not

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applicable to a specific individual permit. For example, the limits and monitoring requirements contained in the PAG-11 General Permit for aquaculture discharges should be considered applicable standards for use in individual aquaculture NPDES permits.

- D. Determine if any Best Professional Judgment (BPJ) technology-based effluent limits (TBELs) are appropriate for toxic pollutants. BPJ-based limits may be applicable if there is no applicable federal ELG, or there is an applicable ELG but there is an aspect, activity, or pollutant associated with the discharge that the ELG does not address. A BPJ-based TBEL should be considered for any pollutant that is present, or expected to be present, in the discharge in concentrations or amounts that can be treated or otherwise removed. Any BPJ-based determination must be performed consistent with the requirements of 40 CFR § 125.3. At a minimum, check the DEP BPJ database for pollutant-specific information that may be used as a starting point in any BPJ-based determination.

NOTE 9 – Where the application manager will be pursuing development of a BPJ TBEL for a parameter that is not in DEP’s database, the application manager should 1) consult with Central Office for assistance as necessary, and 2) describe how the factors in 40 CFR § 125.3 were considered in deriving the limit. It is not necessary for the application manager to exert the same level of effort in deriving BPJ TBEL limits under 40 CFR § 125.3 as an agency would in developing ELGs for an industrial sector.

NOTE 10 – Where concentrations of CBOD5/BOD5 or TSS exceed 100 mg/L in the permit application or DMRs, there is no applicable ELG, and/or the WQBELs for CBOD5 or TSS exceed 100 mg/L for discharges to large water bodies, application managers should develop BPJ TBELs based on 40 CFR § 125.3.

- E. To determine applicability of standards associated with dry streams, application managers will generally consider the following:
1. If the stream flow (Q7-10) to wastewater flow (design flow) ratio is less than 3:1, proceed to paragraph E.2, otherwise skip to the next section.
 2. For new or expanding discharges, apply the more stringent treatment requirements in DEP’s *Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers* (391-2000-014).
 3. For existing discharges, if the more stringent treatment requirements cannot be achieved, do not apply the standards in DEP guidance (391-2000-014) unless the receiving stream is impaired and the point source discharge contributes to the impairment. If this is the case, apply the more stringent treatment requirements and provide a schedule to meet final limitations not exceeding three years in the draft permit. Do not approve design flow increases without applying the more stringent treatment requirements where the discharge meets the criteria in the guidance for a dry stream.

II. Evaluate Water Quality-Based Effluent Limitations

A. Review Final TMDLs.

1. For reissuances, if a final TMDL has been approved for any waters downstream of the discharge, review the TMDL for WLA(s) that are specific to the discharge. If WLA(s) in any final TMDL is applicable for any pollutant, establish effluent limit(s) consistent with the WLA(s) in the permit.

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2. For new applications, consult with the Bureau of Clean Water, Division of Water Quality to determine whether there is available capacity for pollutants of concern in the TMDL that may be assigned to the new discharge(s).
- B. In general, run the WQM 7.0 Model if the maximum BOD5/CBOD5 concentration exceeds 30/25 mg/L in the permit application or DMRs or if the application manager believes that effluent NH3-N concentrations may need to be evaluated.
1. For IW discharges, the flow to use in modeling normally is the average flow during production or operation, which may be taken from the permit application. If the maximum flow during production or operation reported on the permit application is, however, much greater than the average flow, the permit writer should investigate to determine the flow value that is most representative of actual and typical flow conditions for the discharge. Within the range established by the average and maximum flows reported on the application, the application manager has discretion to determine the most appropriate flow value to use in modeling.
 2. Run the WQM 7.0 model to determine if limitations for CBOD5 or NH3-N should be applied, using the latest information on Q7-10 stream flow, background water quality, and discharge characteristics. Use the 90th percentile of long-term data for background and discharge characteristics. Use the DO minimum criterion from Chapter 93 as the in-stream objective for the model.

NOTE 11 – For new and expanding discharges to a CWF with naturally reproducing salmonid in early life stages, additionally run the WQM 7.0 model with only the new discharge (i.e., no other discharges) using a DO goal of 8.0 mg/L (DO Module only). Establish the resulting limits as winter time limits if they are more stringent than the results from the initial model run.
 3. The default deoxygenation coefficient may need to be adjusted for industrial wastewaters.
 4. For discharges to large water bodies, the application manager may:
 - Model the discharge using the Toxics Management Spreadsheet (TMS).
 - Multiply the acute partial mix factor by the Q7-10 of the receiving waters.
 - Run the WQM 7.0 model using the adjusted Q7-10 and apply the WQBELs in the permit, if less than the technology-based limits.
 - Establish the average monthly concentration limit for TSS at the same concentration as for CBOD5 using BPJ, if the CBOD5 limit is a WQBEL.
- C. For TRC, follow the procedures described in the *SOP for Establishing Effluent Limitations for Individual Sewage Permits* (BCW-PMT-033).
- D. If the discharge may involve thermally-elevated cooling or process waters, consider whether effluent limits for temperature (°F) or heat load (million BTUs/day) are appropriate. Apply *Implementation Guidance Temperature Criteria* (DEP ID: 391-2000-017) and the temperature spreadsheet as needed to produce effluent limits. If an applicant requests a variance under Section 316(a) of the Clean Water Act, consider the variance request following procedures contained in *Implementation Guidance Evaluation & Process Thermal Discharge (316 (a)) Federal Water Pollution Act* (DEP ID: 391-2000-002).
- E. For new and expanding discharges to HQ/EV waters, evaluate anti-degradation requirements.

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1. Ensure that an adequate non-discharge alternatives analysis was completed that evaluates the land discharge alternative, at a minimum.
 2. Determine WQBELs that will protect and maintain existing water quality for discharges to EV waters. If insufficient data exists to determine existing water quality characteristics, the application may require the collection of this information. Consult with Central Office as needed for guidance.
 3. Determine WQBELs that will protect and maintain existing water quality for discharges to HQ waters, except where an SEJ has been approved in consultation with Central Office, in which case “ABACT” limits will be established for parameters of concern.
- F. Evaluate reasonable potential (RP) for other toxic pollutants to cause an excursion above water quality standards.
1. For the renewal of individual industrial waste permit applications, application managers will follow the *SOP for Establishing Water Quality-Based Effluent Limitations (WQBELs) and Permit Conditions for Toxic Pollutants in NPDES Permits for Existing Dischargers* (SOP No. BCW-PMT-037).
 2. For new discharges, application managers will complete an RP analysis and use the TMS to determine WQBELs consistent with the applicable specifications in Section I of SOP No. BCW-PMT-037.
- G. For conservative pollutants (e.g. TDS), consider whether a multiple discharge or multiple source analysis is necessary, based on whether the conservative pollutant is known to be an issue in the watershed. Central office may assist where required.
- H. Where a WQBEL is established in the permit and is less than the Target QL in the application instructions, the application manager will generally establish a condition in Part C of the permit addressing WQBELs below quantitation limits (Part C 116) unless the application manager is aware that the permittee (i.e., permittee’s laboratory) can achieve the WQBEL. The Target QL from the application instructions will generally be established in the permit condition as the QL that must be met for compliance purposes. The application manager may use a more stringent QL if the justification is documented in the fact sheet.

NOTE 12 - Where a limit is established for Total Mercury and there is a method that is capable of detecting Total Mercury at or below the limit value (i.e., EPA Method 1631), a Target QL should not be established in the permit. For example, where a Total Mercury limit of 0.09 µg/L is established, do not list the Target QL identified in the industrial wastewater permit application instructions (3800-PM-BCW0008a) in the permit because a QL below the permit limit can be achieved by using Method 1631.

- I. Consider special monitoring requirements and conditions for per- and polyfluoroalkyl substances (PFAS)-related compounds.
- a. If sampling that is completed as part of the permit renewal application reveals a detection of PFOA, PFOS, HFPO-DA or PFBS (any of these compounds), the application manager will establish a quarterly monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds) in the permit.
 - b. If sampling that is completed as part of the permit renewal application demonstrates non-detect values at or below the Target QLs for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds in a minimum of 3 samples), the application manager will establish an annual monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS in the permit.

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- c. In all cases the application manager will include a condition in the permit that the permittee may cease monitoring for PFOA, PFOS, HFPO-DA and PFBS when the permittee reports non-detect values at or below the Target QL for four consecutive monitoring periods for each PFAS parameter that is analyzed. Use the following language: *The permittee may discontinue monitoring for PFOA, PFOS, HFPO-DA, and PFBS if the results in 4 consecutive monitoring periods indicate non-detects at or below Quantitation Limits of 4.0 ng/L for PFOA, 3.7 ng/L for PFOS, 3.5 ng/L for PFBS and 6.4 ng/L for HFPO-DA. When monitoring is discontinued, permittees should enter a No Discharge Indicator (NODI) Code of “GG” on DMRs.*
- J. Consider special water quality requirements applicable based on interstate agreements.
 1. Bioaccumulative pollutants for discharges direct to Lake Erie (e.g., Mercury, where criteria must be met end-of-pipe).
 2. Water Quality criteria for discharges to basins that drain to the Great Lakes (Note – select the proper criteria in the TMS).
 3. DRBC criteria and treatment requirements for discharges to the Delaware River Basin.
 4. ORSANCO criteria and treatment requirements for discharges direct to the Ohio River (Note – select the proper criteria in the TMS).
- K. Consider downstream impairment where a TMDL has not been finalized or when a TMDL has been finalized but there is no WLA for the discharge(s).
 1. If downstream waters (any waters downstream to the first order stream) are impaired for any pollutant that will not already be monitored as determined through the steps above, and that pollutant is present in the effluent at detectable concentrations, establish a monitor only requirement, at minimum. Consider applying a limit of the most stringent Chapter 93 criterion as an average monthly limit where the limit can be achieved.
 2. Otherwise, if downstream waters are impaired for any pollutant, and that pollutant is present in the effluent at concentrations or loadings that have caused or contributed to the impairment as determined by the application manager or regional biologist, establish an effluent limit stringent enough to prevent or minimize contribution to the impairment until a new or revised final TMDL is issued. At a minimum, loadings of pollutants associated with the impairment must be “frozen” at existing levels such that no increase in loading of pollutants associated with the impairment may be authorized. In this context, “frozen” means that an average monthly mass loading limit will be applied. The limit should be calculated by multiplying the long-term mean of daily concentrations by the long-term mean of daily flows and the conversion factor (8.34), where long-term means two or more years.
 3. Prior to the issuance of a final TMDL, any more stringent allocations necessary to prevent or remediate downstream impairment is at the discretion of the permits chief and the application manager.
- L. Consider chemical additives.
 1. Application managers will follow the *SOP for Chemical Additives* (SOP No. BCW-PMT-030) for industrial waste discharges with the general exception of aquaculture discharges.

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2. Where any pollutant, whether it is considered a chemical additive or not, is detected in the effluent, as reported in the permit application or on DMRs, at maximum concentrations that exceed water quality criteria (published or provisional), the application manager should treat the pollutant as a pollutant of concern, and use the TMS to determine whether the additive should receive effluent limitations or monitoring requirements.
3. Additives will only receive limits or monitoring requirements in Part A of the permit if there is a known analytical method that is available for analysis. If the method is not contained in 40 CFR Part 136, a footnote will be added that indicates which method should be used by the permittee.
4. Maximum usage rate limitations will generally not be prescribed in permits.

III. Consider Effluent Limits and Monitoring Requirements for Industrial Stormwater Discharges

- A. Effluent limits and monitoring requirements for industrial stormwater discharges may be important for ensuring that Best Management Practices (BMPs) are adequately implemented.
- B. Application managers will consider, where appropriate, applying treatment standards contained in Chapter 95.
- C. The applicable appendix of the PAG-03 General Permit should be considered the minimum standards for limits, benchmarks and monitoring requirements for individual industrial stormwater permits. The application manager may include other limits, benchmarks and monitoring requirements as justified in the fact sheet.
- D. In general, if actual stormwater concentrations exceed 100 times the most stringent Chapter 93 criterion (or a lesser amount for large industrial areas that drain to small streams), or exceed 100 mg/L for pollutants without criteria, the application manager should consider applying effluent limits for the applicable parameters and/or the implementation of BMPs with compliance schedules as necessary to achieve the limits or otherwise reduce stormwater concentrations.

IV. Compare Technology-Based Limits, Treatment Requirements and Water Quality-Based Limits for Each Pollutant and Apply the Most Stringent

Concentration limits should be rounded in accordance with the *Technical Guidance for the Development and Specification of Effluent Limitations* (“Permit Writer’s Manual”) (362-0400-001). In addition, all concentration limits less than 10 should contain at least one decimal place (e.g., “6.0” instead of “6”). Concentration limits greater than or equal to 10 may or may not contain one or more decimal places, in accordance with the “Permit Writer’s Manual” and professional judgment.

V. Determine Mass Loading Limitations

- A. Establish mass-based effluent limits for all toxic pollutants where concentration-based limits have been developed, unless mass-based limits cannot appropriately be expressed (e.g., radiation) (see 40 CFR § 122.45(f)). Mass-based limits generally should be applied both as average monthly and maximum daily limits. Mass loading limits (lbs/day) will be based on the formula: flow (MGD) x concentration limit (mg/L) at design flow x conversion factor (8.34). The flow value to use in this calculation is the flow value that was used to develop the concentration-based limits. Where necessary for TMDLs, Total Annual load limits (lbs/year) will be based on the average monthly mass loading limit x 365 or otherwise the WLA in the TMDL.
- B. Round mass limits in accordance with Section IV, above, and the “Permit Writer’s Manual.”

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Version History

Date	Version	Revision Reason
2/5/2024	1.7	Added Note 12 to clarify a TQL should not be set for Mercury and added Section II.I for Special PFOA and PFOS requirements
10/1/2020	1.6	Updated references of PENTOXSD to the TMS; Removed requirements for special parameters monitoring
1/10/2019	1.5	Revisions to Section II.B to remove reference to old DO criteria. Revisions to Section II.F to refer to SOP No. BCW-PMT-037 for determining WQBELs for toxic pollutants. Added new section regarding emerging pollutants of concern.
2/15/2017	1.4	Revised Section II B.1 and F.1 to clarify that the average flow during production or operation (as opposed to the maximum daily flow) is normally used for water quality modeling.
9/10/2013	1.3	Revised Section II B.1 to indicate that use of the “average monthly flow” as indicated on the industrial wastewater permit application or a different flow that is most representative of actual production should be used in lieu of the maximum daily flow the facility is capable of discharging at its maximum rate of production. Clarified in Section II I that the Chemical Additives SOP does not generally apply to aquaculture discharges.
8/23/2013	1.2	Updated the notes to Section II F.3 by removing references to the most sensitive MDLs in Chapter 16 and referring to Target QLs contained in the application instructions (for Major Sewage Facilities) for the toxic screening analysis. Added paragraph 6 to Section II F to instruct application managers to use appropriate Part C permit language where appropriate when WQBELs are less than Target QLs.
5/16/2013	1.1	Updated footnote 5 in Section I A to include additional options for parameters and units for monitoring ultraviolet (UV) disinfection.
11/9/2012	1.0	Original