

SECTION IV

PREPARING PERMIT LIMITS

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A. Use Of Water Quality Standards in VPDES Permits

Questions often arise relative to such things as the definition of state waters, where do the standards apply, what are surface waters, what are intermittent streams, etc. The purpose of this section is to provide direction on the use of the water quality standards in the VPDES permit program.

The State Water Control Law ([§ 62.1-44.3](#)) includes the following definition:

"State Waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction.

The VPDES Permit Regulation ([9VAC25-31-10](#)) includes the following definitions:

"Point Source" means any discernible, defined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture land.

"Surface Water" means

- (i) all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (ii) all interstate waters, including interstate wetlands;
- (iii) all other waters such as inter/intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation or destruction of which would affect or could affect interstate or foreign commerce including any such waters:
 - (1) which are or could be used by interstate or foreign travelers for recreational or other purposes;
 - (2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - (3) which are used or could be used for industrial purposes by industries in interstate commerce;
- (iv) all impoundments of waters otherwise defined as surface waters under this definition;
- (v) tributaries of waters identified in paragraphs (i) to (vi) of this definition
- (vi) the territorial sea; and
- (vii) wetlands adjacent to waters other than waters that are themselves wetlands, identified in paragraphs (i) to (vi) of this definition

The permit regulation also includes the following provisions:

Section 1.5 prohibitions and requirements for permits:

- A. Except in compliance with a VPDES or VPA permit issued by the Department, it shall be unlawful for any person to:
 - 1. Discharge into state waters sewage, industrial wastes or any noxious or deleterious substances; or
 - 2. Otherwise alter the physical, chemical, or biological properties of such state waters and make them detrimental to the public health, or to animal or aquatic life, or the uses of such waters for domestic or industrial consumption, or for recreation, or for other uses.

- B. Point source discharges of pollutants to surface waters may be authorized by a VPDES permit. The management of pollutants that are not point source discharges to surface water may be authorized by a VPA permit.

Section 2.5, establishing limitation, standards, and other permit conditions includes:

C. Water quality standards and state requirements

The permit shall include limitations to prevent violations of water quality standards, narrative and numeric, and to comply with any requirement of the Act or the law. These limitations shall control all pollutants or pollutant parameters (either conventional, non-conventional, or toxic pollutants) which the Board determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any applicable water quality standard.

As indicated by the above section of the permit regulation a VPDES permit may be issued authorizing the point source discharge of pollutants to surface waters. Thus, for a VPDES permit to the applicable there must be:

1. A point source discharge.
2. The point source discharge must contain pollutants.
3. The discharge must be to surface waters.

If any one of these three conditions do not exist then a VPDES permit is not applicable.

As indicated above the VPDES permit shall include limitations to prevent violations of the water quality standards. Therefore, in the issuance of a VPDES permit we must ensure that the limitations therein will result in the water quality criteria being met outside any allowed mixing zones ([9VAC25-260-20.B](#)).

One of the decisions that the staff must make in the permitting process is to determine what are surface waters and what are state waters. The definitions are very broad but there are still some areas in the state where there may be a question as to the location where the water quality standards should apply. Probably the major area of question involves ephemeral or intermittent streams.

These directions will use the following definitions:

Permanent Stream (Relatively Permanent Waters): A waterway that contains water at all times and that has, or could have, a well-established aquatic community. Additionally, EPA defines these streams as relatively permanent waters which are waters that typically (e.g., except due to drought) flow year-round or waters that have a continuous flow at least seasonally (e.g., typically three months). Relatively permanent waters do not include tributaries whose flow is coming and going at intervals and therefore they do not include ephemeral tributaries which flow only in response to precipitation and intermittent streams which do not typically flow year-round or have continues flow at least seasonally.

Note: A spring fed stream should be considered to be a permanent stream unless flow data is available to demonstrate that the spring ceases flow for extended times during the average year.

For permanent streams, the water quality criteria apply at the point where the discharge enters the stream or at the edge of the mixing zone in cases where a mixing zone is allowed.

Intermittent Stream: a waterway that contains water for extended periods during a year, but does not contain water at all times. These streams are likely to have an active aquatic community for at least part of the average year.

For intermittent streams that begin on a permittee's property, the water quality standards apply in the stream at the point where the stream leaves the permittee's property boundary.

For intermittent streams that begin off the permittee's property but crosses the permittee's property, the water quality standards apply at the point where the discharge enters the stream.

Ephemeral Stream: a waterway such as a drainage way, ditch, hollow or swale that contain water only during or immediately following periods of rainfall or water supplied by the discharger.

Note: the discharge of an effluent to an intermittent or ephemeral stream will probably result in the creation of a permanent stream.

For ephemeral streams, the water quality standards apply in the stream at the point where the stream leaves the permittee's property and/or easements.

Note: Other case-by-case decisions may be made where the majority of the discharge conveyance is underground.

DEQ recognizes that there exist facilities that use a man-made open ditch as a conveyance to deliver a treated effluent to its receiving stream, and do not believe that it is reasonable to treat the effluent in such a conveyance as state waters nor to apply the standards to it. DEQ further recognizes that there is little or no difference in theory or fact between such a ditch and a naturally occurring ditch or channel that may be used for the same purpose. However, it is not the intent of these directions to suggest or recommend that owners may avoid the proper application of the water quality standards by purchasing the entire watershed of an ephemeral stream.

B. Effluent Limitations

1. Types of Effluent Limitations

Permit effluent limitations, standards, or conditions shall be in compliance with all applicable Effluent Limitations Guidelines, Water Quality Standards (9VAC25-250) and Best Professional Judgment (9VAC25-31-220 and 9VAC25-31-230).

Permits will often have limitations on individual parameters developed by different means, and occasionally, the limitations on a single parameter will be derived through a combination of methods. For example, an effluent may have total suspended solids limited by effluent guidelines, oil and grease limited by BPJ, ammonia by aquatic toxicity (water quality considerations), and BOD₅ by effluent guidelines for part of the year and by water quality considerations (dissolved oxygen) for the remainder of the year. Theoretically, limits could be established for each parameter by both water quality considerations and by technology-based factors. The permit writer must always apply the more stringent of the two values.

a. Technology-based Effluent Limitations

Effluent limitation guidelines (ELGs) are national standards for industrial wastewater discharges to surface waters and publicly owned treatment works (municipal sewage treatment works). The standards are technology-based (i.e. they are based on the performance of treatment and control technologies); they are not based on risk or impacts upon receiving waters and are used when they will not violate water quality standards. There is no consideration of water quality standards or other in-stream requirements as the basis for these limits. Included in this category are the secondary treatment requirements for POTWs and industrial BAT, BCT, BPT, etc. These limitations are called "technology-based" limitations. In some cases, particularly for toxic pollutants, technology-based limits may also be reached as a result of in-process controls during production.

Also included in this category are effluent limits promulgated as regulations by the state. **These limits are regulations and no alternatives can be accepted.** Examples include: Potomac Embayment standards, Chickahominy Standards, Dulles Watershed Policy, the Occoquan Policy, etc.).

(1) Industrial Effluent Guidelines and Standards

EPA is required to promulgate technology-based limitations and standards that reflect pollutant reductions that can be achieved by categories, or subcategories, of industrial point sources using specific technologies (including process changes) that EPA identifies as meeting the statutorily prescribed level of control under the authority of CWA sections 301, 304, 306, 307, 308, 402, and 501 (33 United States Code [U.S.C.] 1311, 1314, 1316, 1318, 1342, and 1361). For point sources that introduce pollutants directly into the waters of the United States (direct dischargers), the effluent guidelines promulgated by EPA are implemented through NPDES permits as authorized in CWA sections 301(a), 301(b), and 402. For sources that discharge to POTWs (indirect dischargers), EPA promulgates pretreatment standards that apply directly to those sources and are enforced by POTWs and state and federal authorities as authorized in CWA sections 307(b) and (c). The applicable parts of the federal regulations are listed in the VPDES permit regulation at 9VAC25-31-30 A. Permit writers should refer to the latest EPA listings at 40 CFR Chapter I, Subchapter N: Effluent Guidelines and Standards (40 CFR Parts 400 - 471). The most up to date list should be on the EPA website at the following links:

[Parts 400 - 424](#)

[Parts 425-471](#)

- (a) Whenever an effluent guideline applies, the level of control prescribed by the guideline represents the minimum level of control required in the permit.
- (b) Effluent guidelines are not considered to apply if: An effluent guideline has been withdrawn by EPA or remanded by court. However, the Office of General Counsel of EPA may decide that certain determinations made by the Administrator in establishing a guideline were not disturbed by the Court's remand and must still be followed by permit issuers.
- (c) Underlying determinations made by the EPA Administrator in establishing an effluent guideline may include, for example, achievable reductions in flow, achievable end-of-pipe concentrations, or limitations for certain pollutants.
- (d) When developing effluent guidelines limits, use the maximum production rate reported on the application or the projected future production rate, whichever is greater. Multiple production tiers could be used to address future operating projections. If the guidelines require a flow for calculation of the limit, use the maximum 30-day flow value from the application.

There are several possible expressions for the limitations found in effluent guidelines:

- (a) Mass- or Concentration-based Numeric Limitations - Limitations in effluent guidelines generally are expressed as numeric values, which are upper bounds of the amount of pollutant that may be discharged. For most pollutants, these limitations are mass-based or concentration-based values. They are, in effect, measures of how well the production, wastewater treatment, and pollution prevention processes must be operated. The limitations generally are expressed as maximum daily and average monthly limitations. EPA defines the maximum daily limitation as an estimate of the 99th percentile of the distribution of the daily measurements. The average monthly limitation is an estimate of the 95th percentile of the distribution of the monthly averages of the daily measurements.
- (b) Numeric Limitations Established at Minimum Levels - EPA sometimes sets a requirement in the effluent guidelines that the concentration of a pollutant in the discharge must be below a minimum level (ML). The ML is the lowest level at which the entire analytical system must give a recognizable signal and an acceptable calibration point for the pollutant being analyzed. Where a limitation in the effluent guidelines is set at less than the ML, the value of the ML is specified in the Federal Effluent Guidelines regulation on the basis of the analytical methods that EPA used to chemically analyze wastewaters in developing the regulation. For example, in the Pulp, Paper, and Paperboard point source category (Part 430) the Daily Maximum BAT effluent guideline for the Tetrachlorodibenzofuran (TCDF) congener of dioxin is expressed as <ML for papergrade sulfite (Subpart E) mills, which means "less than the minimum level specified in part 430.01(i)" (i.e., 10 picograms/liter for TCDF). If, in the future, analytical methods become more sensitive with lower MLs, EPA would determine whether the technologies for reducing the amount of the pollutant in the discharge are capable of achieving more stringent limitations and, thus, whether it would be appropriate to modify the requirements of the effluent guideline. EPA has not established average monthly limitations in effluent guidelines when the maximum daily limitation is an ML limitation. The purpose of an average monthly limitation is to require continuous dischargers to provide better control, on a monthly basis, than required by the maximum daily limitation. However, for these pollutants, the data were determined by analytical methods that could not measure below the ML specified in the regulations. Thus, even if monitoring for pollutants is more frequently than once a month, average monthly limitations would still be expressed as less than the ML or < ML.

- (c) Other Expressions for Numeric Limitations - EPA also promulgates effluent guidelines for pollutants that cannot be expressed in terms of mass or concentration (e.g., pH, temperature, radiation) or are better expressed through other means (e.g., unitless ratios). For example, pH is generally expressed as an acceptable range (e.g., 6.0–9.0 standard pH units).
- (d) Nonnumeric Effluent Limitations - Nonnumeric effluent limitations might include specific BMPs or requirements to minimize or eliminate discharges. CWA sections 304(e), 308(a), 402(a), and 501(a) authorize the Administrator to prescribe BMPs as part of effluent guidelines and as part of an NPDES permit. CWA section 304(e) authorizes EPA to include supplemental BMPs in effluent guidelines for toxic or hazardous pollutants for the purpose of controlling “plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage.”

For additional information and procedures for applying federal effluent guidelines, see [Chapter 5 of the NPDES Permit Writer's Manual](#).

(2) Technology-based Effluent Limitations for POTWs

EPA has promulgated regulations in 40 CFR Part 133 establishing secondary treatment standards, equivalent to secondary treatment standards, and a number of special considerations applied on a case-by-case basis. In addition, by state law, §62.1-44.15(14), no treatment can be less than secondary or its equivalent unless the discharger can demonstrate a lesser level of treatment will still meet the requirements of the law. See Section MN-2 for the incorporation of the secondary treatment standards in the VPDES permits.

(a) Secondary Treatment Standards

For municipal treatment facilities, 40 CFR Part 133 specifies technology-based limits for the minimum level of treatment that must be met through the application of secondary treatment. Exhibit IV-1 below summarizes the standards:

Exhibit IV-1 Secondary Treatment Standards

Parameter	30-day average	7-day average
BOD₅	30 mg/L (or 25 mg/L CBOD ₅)	45 mg/L (or 40 mg/L CBOD ₅)
TSS	30 mg/L	45 mg/L
BOD₅ and TSS removal (concentration)	85% (min)	--
pH	Within the limits of 6.0-9.0 S.U.	

Refer to Section MN-1 for further details on how to incorporate these limits into the VPDES permits.

(b) Equivalent to Secondary Treatment

Some biological treatment technologies, such as trickling filters or waste stabilization ponds, are capable of achieving significant reductions in BOD₅ and TSS but might not consistently achieve the secondary treatment standards for these parameters.

The equivalent to secondary treatment standards, as specified in § 133.105 are shown in Exhibit IV-2 below.

Exhibit IV-2 Equivalent to Secondary Treatment Standards

Parameter	30-day average	7-day average
BOD₅	Not to exceed 45 mg/L (or not to exceed 40 mg/L CBOD ₅)	Not to exceed 65 mg/L (or not to exceed 60 mg/L CBOD ₅)
TSS	Not to exceed 45 mg/L	Not to exceed 65 mg/L
BOD₅ and TSS removal (concentration)	Not less than 65% (min)	--
pH	Within the limits of 6.0-9.0 S.U.	

Refer to Section MN-1 for further details on how to incorporate these limits into the VPDES permits.

(c) Variances from Technology-based Limits

- (1) Variance from BAT limits for "nonconventional" pollutants may be granted **only** as follows:
 - CWA Section 301(c) economic variances from BAT limits for "nonconventional" pollutants
 - CWA Section 301(g) water quality-based variance from BAT limits for "nonconventional" pollutants
 - CWA Section 316(a) variances for the thermal component of wastewater discharges
- (2) [Fundamentally Different Factor \(FDF\)](#) variances from BAT or BCT may be allowed by an applicable effluent guideline. The DEQ is not authorized to grant FDF variances; however, EPA may grant an FDF variance. Consult the Office of VPDES Permits for assistance on FDF variance requests.
- (3) Monitoring waivers ([9VAC25-31-220.A.2](#)): An industrial discharger can request a waiver from monitoring a parameter that is limited by an effluent limitation guideline. The permittee must show to the Department's satisfaction, through monitoring data and other evidence, such as knowledge about the facility's process and infrastructure, that the pollutant in question is not present, or expected to be present, in the effluent. If the pollutant's presence is due to background concentrations in the intake water, the permittee cannot contribute to that concentration. The waiver is good only during a single permit term and is not available during the first five years of a new permit. The permittee must request the waiver with every reissuance application. DEQ is authorized to grant this type of waiver without EPA concurrence.

If the waiver is granted, the permit must still contain the limitation required by the ELG, but the monitoring frequency on the Part I.A page will be 0 and sample type will be NA. Any permit with this waiver must also contain the Limitation Monitoring Waiver special condition. The fact sheet must contain the rationale for the special condition and the documentation provided by the permittee that justified the waiver.

b. Water Quality-based Effluent Limitations

Many situations require the development of limitations according to water quality considerations. When drafting a VPDES permit, a permit writer must consider the impact of the proposed discharge on the quality of the receiving water. Water quality goals for a waterbody are defined by state water quality standards. By analyzing the effect of a discharge on the receiving water, a permit writer could find that technology-based effluent limitations (TBELs) alone will not achieve the applicable water quality standards. In such cases, the SWCL and its implementing regulations require development of water quality-based effluent limitations (WQBELs). WQBELs are designed to protect water quality by ensuring that water quality standards are met in the receiving water.

These limits result:

- When the minimum effluent limit guidelines are not sufficiently stringent to maintain compliance with a water quality standard and a more stringent limit is required.
- When a water quality criteria exists and where the permit limit needed to attain compliance can be reasonably quantified, e.g. based on modeling studies.
- Where necessary to assure that effluent limitations in the permit are consistent with the assumptions and requirements of any applicable TMDL or waste load allocation resulting from the continuing planning process.

Water quality-based effluent limits, more stringent than ELG's, are developed to protect the quality of the receiving waters (called ambient conditions). Such bodies of water are called "water quality-limited." WQS are found in State Water Control Board's Water Quality Standards Regulation ([9VAC25-260](#)). Permit writers should determine what water quality standards apply to the receiving waters at the discharge point. If analytical results from effluent and receiving stream monitoring are available, review this information for water quality standards violations and antidegradation effects. It will be necessary in most cases for the region to determine critical stream flows in order to calculate water quality-based effluent limits.

The permit writer should evaluate mixing zones and calculate wasteload allocations/permit limits using the following standard DEQ protocols. Calculate limits for all pollutants having a reasonable potential to cause or contribute to a violation of water quality standards. Establish effluent limitations for wastewaters containing oxygen-demanding waste using the latest version of the Regional Water Quality Model for Free Flowing Streams or the Regional Tidal Modeling System. Establish effluent limitations for toxic compounds using the latest versions of the computer programs MIX (for flowing streams only) and STATs.

For stormwater discharges and intermittent discharges (≤ 4 days duration), water quality-based effluent limitations can be established using standards for acute toxicity only. Because chronic and human health standards are based on longer term exposure, they are not applicable to these discharges. However, consider evaluating intermittent discharges into PWS for human health effects.

Attach the output from the model or computer program to the Fact Sheet to document the development of the limits. The models should be re-run, or a narrative explanation provided, whenever there is a change in the facility or the stream that would invalidate the assumptions used previously.

When a permit is reissued and there have been no changes to the facility or receiving waters that would invalidate the old model, there is no need to re-run the model. However, the original model results should be included in the Fact Sheet for the reissued permit to provide the basis for the limits in the new permit. If the same model used in the previous issuance is used for the reissuance, Office of VPDES Permits review is not required, unless the model is outdated. Contact the Office of VPDES Permits for more information on model applicability.

If a model other than one identified above is utilized, transmit the stream model to the Office of VPDES Permits for review. All stream analyses submitted for review will be reviewed within **14 days**.

Office of VPDES Permits review is not required if a consultant utilizes any of the models identified above. Review the consultant's modeling work to confirm the validity of the data and make sufficient computer runs to ensure that the models were applied properly.

Transmit all other models submitted by consultants to the Office of VPDES Permits for review.

Water quality-based requirements must be included in all reissued permits whenever such requirements are more stringent than technology-based requirements. Permit writers should consider the impact of production increases on the potential need for water quality-based limits or water quality standards violations.

1) Variances from Water Quality-based Limits

The permit public notice must contain language identifying DEQ's intent to grant the water quality standards variance or accept a new water effect ratio in (a) through (e) below. See the Generic Public Notice format in [Section VI](#).

- (a) **Changing or removing stream use designations (9 VAC 25-260-140 E):** Water quality criteria are established to protect the beneficial uses designated for state waters. Water quality-based limits are developed to ensure maintenance of the criteria. Where a site-specific study demonstrates that attaining the designated use is not feasible in the waterbody receiving the discharge, a **temporary (5 years)** variance to the standards is allowed. Variances result in changes to the water quality criteria. New effluent limits are then written to ensure compliance with the new criteria. Under no circumstances may a water quality variance result in a loss of existing stream uses or a worsening of stream quality. **These variances may not be applied to new discharges.** They also are not allowed to excuse a discharger from any applicable technology-based effluent limitations. Variances are only allowed under certain conditions.

The conditions for granting variances (i.e. removing stream use designations) are described in 9 VAC 25-260-10 G. In addition, variances to limits based on human health criteria can only be granted for the metals criteria designed to protect human health and for the criteria for taste, odor and aesthetic compounds which apply in public water supplies. Taste, odor, and aesthetic compounds include chloride, foaming agents, iron, manganese, nitrate, sulfate, total dissolved solids and zinc. Variances may not be granted for the human health criteria.

- (b) **Halogen Ban Variances (socio-economic demonstrations):** Halogen ban variances are described in 9VAC25-260-110 and in Section MN-1.

Changes to stream use designations or halogen ban variances should follow these basic procedures:

- A completed use attainability study or halogen ban variance (socio-economic demonstration) study may be included with an application for permit reissuance or modification. If the study/demonstration report is acceptable to DEQ, the permit can be drafted with interim limits based on the variance study and final limits (with a compliance schedule) based on the water quality criteria. The final limits and compliance schedule only begin if EPA disapproves the variance. If EPA approves the variance, the interim limits remain effective throughout the permit term.
- Permittees may conduct these studies during the compliance schedule for new water quality-based limits. In these cases, the study report will be submitted with a request for permit modification and the modification will be processed as described above.
- Contact the Office of Water Quality Standards (OWQS) for guidance on the conduct of use attainability studies, socio-economic demonstrations and WER studies for details on what the study must contain.
- **Since the use designation change or halogen ban variance essentially changes the Water Quality Standards, EPA must approve all variances and they have to follow specific public participation rules.** OWQS will forward the variance study to EPA during the permit public notice period. Conditional approval of the variance will be sought at that time. Final approval from EPA cannot occur until the public notice period has closed and the permit has been issued and the Attorney General's Office has certified that the variance was processed according to state law. The Regional Office is responsible for certifying that all required procedures were followed in processing the variance request. See [DEQnet](#) for the Water Quality Standards Variance Certification Form. OWQS will be responsible for submitting the final paperwork to EPA.
- Use designation variances are only good for the term of the permit in which they are granted. When that permit expires, the permittee must demonstrate that the variance should be continued or modified. Otherwise, the variance ceases to exist on the permit expiration date. Continuation of use designation variances from one permit term to the next require EPA approval. Contact OWQS for guidance on the information required to grant a continuation.

The following site-specific considerations for the development of water quality-based effluent limits are not considered changes to the Water Quality Standards and do not require separate EPA approval. They are reviewed, if necessary, when EPA sees the draft, or final, permit.

- (c) **Water Effect Ratio (WER)** (9VAC25-260-140.F): Water effect ratios measure the toxicity or bioavailability of heavy metals in the effluent once it mixes in the receiving water. The permittee may conduct a water effect ratio study to justify a change to a water quality-based metals limit. WERs are typically greater than 1.0 but less than 2.0. WQS staff are responsible for reviewing and approving the proposed study plan, and the final results. Once an acceptable WER is established for a metal in an effluent, the numeric water quality criterion for that metal is multiplied by the WER to produce a new instream criterion for determining the WLA. The permit writer should include the WER in the fact sheet rationale for the limit to which it

applies. A WER may be continued from one permit to the next as long as the conditions on which it was originally based have not changed. When a permit is reissued, the permittee does not have to conduct another study for the WER. The continuation of the WER should be noted in the fact sheet. The WER study report should be part of the new permit file. The DEQ WQS staff should be consulted before any WER study plan is approved or implemented (including copper).

- (d) **Variances to the Temperature Standards:** Temperature variances must follow the requirements for alternative effluent limitations under § 316(a) of the CWA. Contact OWQS for guidance if a permittee requests a variance for a water quality-based temperature limit.
- (e) **Metals Translator for Metals Limits:** Water quality-based limits for heavy metals are to be written as total recoverable whenever practicable (9VAC 25-31-230.C). In order to convert a water quality criterion for metals from dissolved to total recoverable, a chemical translator must be used. The default ratio between dissolved and total recoverable is 1:1. The permittee may wish to establish an effluent-specific ratio to show that an alternate metals limit is appropriate. The use of any ratio other than the default should be discussed in the fact sheet. Contact WQS staff for details on chemical translator studies. **This permit provision does not have to be specifically identified in the public notice.**

c. TMDL-based Water Quality Limitations

New or modified VPDES permits must be consistent with the assumptions and requirements of TMDL Waste Load Allocations (WLAs) as per federal regulations (40 CFR §122.44 (d)(1)(vii)(B)), and EPA approval is needed for any changes to the WLA and TMDL, regardless of the rationale for such a change. The Board approves all TMDLs and adopts wasteload allocations as part of the Water Quality Management Planning Regulation (9VAC 25-720), except in those cases when permit limitations are equivalent to numeric criteria contained in the Virginia Water Quality Standards, such as for bacteria.

In cases where a proposed permit or modification is affected by a TMDL WLA, permit and TMDL staff must coordinate to ensure that new or expanding discharges are consistent with the assumptions and requirements of the TMDL WLA. The procedures below describe the available options and the process that should be followed under those circumstances, including public participation, EPA approval, State Water Control Board actions, and coordination between permit and TMDL staff.

Procedure: There are several options available for sediment, bacteria, and nutrients, (see [GM14-2015](#)) to process a permit or modification that is affected by a TMDL WLA. Other pollutant parameters should be evaluated on a case-by-case basis and are thus not addressed in this section. In all cases, the permit staff and the TMDL staff must coordinate activities to ensure effluent limits are consistent with the assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA. .

- (1) Process a permit or modification that maintains the existing TMDL WLA loading.

In this case, no TMDL modification is required and the permit processing continues. (TMDLs are sometimes based on expansion scenarios that account for growth of facilities, or the permit modification can be processed while maintaining the existing TMDL WLA, e.g. by reducing concentrations limits in the permit to account for increasing flow.)

- (2) Process a permit or modification that provides an insignificant increase to the TMDL.

This is usually accepted to be an increase of less than 1% of the annual allowable loading, but other demonstrations of no significant impact may be possible (e.g.

additional allocation scenarios developed as part of TMDL development, but not selected as the basis for the final TMDL). To ensure that a new or modified permit is written in accordance with an approved TMDL, the TMDL must be modified and approved by EPA before the permit is issued. The TMDL must be public noticed with the proposed permit action. The steps in this process are:

- Verify that the percentage increase in the WLA needed to accommodate this permit modification is less than 1% of the WLA. RO permit and TMDL staff must agree on this decision.
 - Prepare a letter requesting EPA modification of the TMDL WLA for the Central Office TMDL Modeling Coordinator signature and transmit for processing. An example is provided in [Guidance Memorandum 14-2015](#).
 - Submit the permit or modification package to EPA as required for the issuance or modification of a permit and include the TMDL information. The permit package must include the permit fact sheet which should describe the WLA and TMDL changes needed to accommodate the increasing discharge. The fact sheet should also state DEQ's rationale for supporting the change (e.g. no impact to water quality since the increase is < 1% of the total load, or other demonstration of no significant impact).
 - After EPA provisional agreement with the TMDL modification, public notice the permit action as required and include the TMDL modification information. Example language for inclusion in the public notice is included in [Guidance Memorandum 14-2015](#).
 - Obtain final approval for the TMDL modification from EPA TMDL staff upon completion of the comment period.
 - Notify the Watershed Program Staff to publish amendment of the Water Quality Management Planning Regulation in the Virginia Register and obtain Board approval for TMDL modification and, if needed, regulatory amendment.
 - Issue the final permit, deferring issuance until after the regulatory amendment has been approved by the Board.
- (3) A TMDL modification may be required for new or expanding discharges in non-bacteria watersheds with no future growth allocation, or where the above referenced tracking thresholds have been exceeded. Regional staff should work with the Central Office TMDL Modeling Coordinator to determine if a TMDL modification is warranted. (See [GM14-2015](#)).
- (4) A TMDL modification may be required for non-bacteria TMDLs without a Future Growth allocation, and for watersheds that are not effluent dominated. Individual permit issuances or reissuances that result in a) additional nonpoint source reductions or b) an overall increase to the TMDL waste load allocation require a TMDL modification. (See [GM14-2015](#)).
- (5) A TMDL modification may be needed for bacteria TMDLs without a future growth allocation to maintain Water Quality Standards with increases to the TMDL WLA. For bacteria TMDLs with no explicit Future Growth allocation or where Future Growth allocation has been depleted, issuance of most individual permits which involve bacterial discharges may proceed without a TMDL modification or notification of Region III EPA TMDL staff provided a) the permit is consistent with water quality standards for bacteria, and b) the watershed is not effluent dominated (i.e., $WLA > LA$). In effluent dominated streams, the concentration of bacteria in the expanded discharge may have a direct relationship to the bacteria concentration in the waterbody. In non-point source

dominated systems, DEQ has found that discharges which meet water quality standards generally dilute the non-point source loadings of bacteria in the receiving stream. (See [GM14-2015](#)).

- (6) Process a permit modification that requires remodeling of the TMDL, potentially resulting in additional nonpoint source reductions.

The processing of these requests is similar to the process in item (2) above, with the additions shown below. The permit documentation and the letters referenced in item (2) must be modified accordingly.

If additional loading must be accommodated, permit staff will request a TMDL remodeling effort to evaluate the impact of the additional loading on in-stream water quality. Any costs incurred by the TMDL remodeling effort will be paid for by the permittee.

If the modeling shows that the extent of the proposed TMDL modification does not require a change in the nonpoint source load allocations, follow the procedures outlined in (2) above.

If the modeling shows that the extent of the proposed TMDL modification requires a change in the nonpoint source load allocations, a public comment period will be scheduled to present the proposed modifications to the public. EPA TMDL staff will be notified of the proposed change at the same time. There will be a 30-day comment period associated with the presentation of the draft TMDL modification, and the public notice procedures as outlined in Guidance Memo No. 04-2010 (Public Participation Procedures for Water Quality Management Planning) will be followed. After the conclusion of the public comment period, follow the procedures outlined in item (2) above.

Additional Considerations: Because of the additional workload associated with TMDL and regulatory modifications, regional TMDL and permit staff should ensure to the extent possible that the wasteload allocations developed for TMDLs consider expansion plans by permitted facilities in the watershed.

Additionally, wasteload allocations in watersheds without permitted facilities should not be shown as zero. Rather, they should be represented in the TMDL, expressed in terms of "less than" a number equal to or smaller than 1% of the Total Maximum Daily Load.

d. Professional Judgment (PJ) Limits

As noted in GM00-2011, when developing effluent limits, a permit writer must consider limits based on both the technology available to treat the pollutants (i.e., technology-based effluent limits), and limits that are protective of the designated uses of the receiving water (water quality-based effluent limits). There are two general approaches for developing technology-based effluent limits for industrial facilities: (1) using national effluent limitations guidelines (ELGs) and (2) using Professional Judgment (PJ) on a case-by-case basis (in the absence of ELGs). Technology-based effluent limits for municipal facilities (POTWs) are derived from secondary treatment standards. For industrial sources, the national ELGs are developed based on the demonstrated performance of a reasonable level of treatment that is within the economic means of specific categories of industrial facilities. Where national ELGs have not been developed, the same performance-based approach is applied to a specific industrial facility based on the permit writer's PJ. PJ is not an independent basis for VPDES limitations or other requirements, although it is a proper basis, based on facts and proper reasoning, for determinations leading to or part of water quality-based requirements. All POTW requirements must be based on either water quality protection or secondary treatment or other technology-based requirements established by regulation.

Section 402(a)(1)(B) of the Clean Water Act (the Act) authorizes “such conditions as the Administrator determines are necessary to carry out the provisions of this Act.” This authorization is also set forth in 9VAC25-31-210 A which states in part “in all permits, the department shall establish conditions, as required on a case-by-case basis, to provide for and assure compliance with all applicable requirements of the Law.” These provide the basis for the so-called PJ limits. Virginia regulations don’t have any requirements as to what basis needs to be considered when a PJ limit is formulated. It could be based on water quality considerations in a particular case or on the capability of a particular installed (or proposed) treatment technology. Neither the federal nor state regulations prohibit the application on a case-by-case basis of any PJ permit limitation that is needed to protect the quality and beneficial uses of a specific receiving stream.

PJ limitations are defined as those limitations that are developed based on either a technology or water quality basis. These limitations are developed for a category of discharges or for individual dischargers based on knowledge of treatment processes, analytical data, empirical evidence from similar facilities, site conditions, cost, *etc.* PJ limits fall into two categories: those that are adopted as regulation in accordance with 40 CFR § 125 and the Virginia APA; and those that are established on a case-by-case basis for an individual discharge.

These limits result:

- When the minimum effluent guideline limits are not sufficiently stringent to maintain compliance with a water quality standard and a more stringent limit is required.
- When a numerical standard exists and where the permit limit needed to attain compliance can be reasonably quantified, e.g. based on modeling studies.
- As a result of a TMDL or waste load allocation resulting from the continuing planning process.

The basis for such limits generally fall into one of two categories:

- Agency guidance – The judgement is contained in guidance that reflects a consensus of the agency’s opinion. Such guidance is not regulation and reasonable, valid alternatives are acceptable. Such guidance provides adequate justification for permit limits that are normally included for specific parameters in certain types of permits.
- Case by case decisions – The difference between this and “a” above is that these are case by case considerations made by specific permit writers for specific permits and are not contained in formal agency guidance.

A PJ limit developed for a specific facility as authorized by section 402(a)(1)(B), is based on the judgment of the permit writer (or collective judgment of the issuing agency and confirmed by the permit writer) where that judgment is considered and applied on a case-by-case basis. The judgment may consider available or installed technology, the required water quality, or any combination of these considerations.

Agency guidance should be evaluated for its application on a case-by-case basis considering the specific facility in question before it is used as the basis for a PJ limit. All fact sheets for permits that contain a limit based on agency guidance should include a statement that the permit writer has reviewed and evaluated the guidance to confirm its

applicability to the case being considered before it was applied to a particular discharge. The permit writer should also evaluate other valid, reasonable alternatives to the agency guidance before setting the limit.

The federal minimum effluent guidelines may be consulted to assist a permit writer in formulating judgment regarding both the types of pollutants that a certain process may be expected to produce and the capabilities of treatment technology to remove them. However, federal guidelines cannot be arbitrarily applied to a facility that is not in the category. The judgment that leads to a limit must be considered on a case-by-case basis and formulated for the specific facility in question. It should be clearly stated in the fact sheet that the guidelines were consulted only to help in formulating a PJ limit.

The permit writer may consider each pollutant that can reasonably be expected to be present in a discharge, how each would impact a water quality standard and formulate a judgment regarding what limits would prevent objectionable conditions. A limit based on the judgment of the individual permit writer and/or his supervisors is acceptable providing the basis is properly documented in the fact sheet.

C. Antidegradation (9VAC25-260-30)

Whenever a discharge permit is issued, reissued, or modified, an antidegradation review must be performed on the discharge and documented in the Fact Sheet. Antidegradation policies can play a critical role in helping states protect the public resource of water whose quality is better than established criteria levels and ensure that decisions to allow reductions in water quality are made in a public manner and serve the public good. This review is also required for new sources or new discharges to impaired waters (9VAC25-31-50.C.9).

9VAC25-260-30 establishes three categories of antidegradation protection for the surface waters of the state. These categories will be referred to as Tier 1, 2 and 3. If data or information is not available to make a determination, the stream is assumed to be Tier 2. Public water supplies and trout streams are assumed to be Tier 2 unless information is available to indicate otherwise.

1. Tier 1

9VAC25-260-30.1 requires that the existing beneficial uses and the quality necessary to protect such existing uses be maintained.

2. Tier 2

9VAC25-260-30.2 requires that the existing water quality be maintained for all waters wherein the existing quality exceeds the water quality standards.

Note: There are certain waters that do not attain the standards due to natural causes. These waters fall into two primary categories:

- a. Periodic, short-term exceedance of generally one criteria, e.g. periodic summer exceedance of the temperature criteria in class VI waters.

The exceedance may not necessarily be considered a violation of the standards. This is particularly true if the uses are not adversely impacted. Waters may be assigned to Tier 2 provided the periodic excursions above the criteria do not curtail the uses of the water body. This will depend on the specific case and the judgement of the DEQ employee investigating the water in question.

- b. Routine and long-term exceedance of one or more criteria, e.g. swamps that practically never attain the 5 mg/l D.O. criteria during critical conditions.

When waters fail to meet the standards due to natural causes then it is apparent that the standard is in error and requires modification. In this case, it is not possible to assign a Tier ranking because there is no valid standard to compare the quality to. Permits should contain limitations that are designed to allow no significant additional impact due to the discharge of pollutants.

3. Tier 3

9VAC25-260-30.3 prohibits permanent new or increased discharges into waters designated by the Board as providing exceptional environmental setting, aquatic communities, or recreational opportunities. Existing mixing zones from upstream or tributary discharges existing in these waters cannot be expanded and no new mixing zones will be allowed to be created in or extend into these waters. Only temporary, short – term impacts shall be allowed on a case-by-case basis.

Note: Permits for existing sources may be reissued but may not allow expansions of flow, mixing zones or pollutants (neither mass loading nor concentration may be raised).

Any entity seeking to lower water quality in Tier 2 waters through a new or increased discharge of pollutants must submit an antidegradation socioeconomic demonstration for consideration by the

regional office. Any discharger seeking such an action should first submit a proposed study work plan to the regional office for review, comment and/or approval before undertaking such a demonstration. (The same rationale for application or collection of data provided in the guidance for antidegradation category determination applies for this demonstration).

The antidegradation demonstration shall identify the important social or economic developments to the area in which the waters are located that will not occur if the significant lowering of water quality is not allowed. Developments considered, should, as a minimum, fall into one or more of the following categories:

- Increase in the number of jobs;
- Increase in personal income or wages;
- Reduction in the unemployment rate or other social service expenses;
- Increase in tax revenues;
- Provision of necessary social services.

Prior approval from DEQ staff shall be required for use of any alternative economic indicators. In conducting the analysis of social or economic development, the applicant should follow the [EPA Water Quality Standards Handbook](#) and the EPA draft Economic Guidance Workbook for Water Quality Standards. The EPA workbook provides worksheets to assist applicants in their evaluation of socioeconomic impacts, but the applicants should feel free to use anecdotal information to describe any current community characteristics or anticipated impacts that are not listed in the worksheets. The workbook provides few useful economic ratios and tests for evaluating socioeconomic impacts, so the applicant's demonstration will primarily consist of a narrative evaluation of the relative magnitude of indicators such as increases in unemployment, losses to the local economy, decreases in tax revenues, and indirect effects on other businesses. Bureau of Economic Analysis multipliers can also be used by the applicant to estimate the effect of reduced economic activity on output (sales), earnings, and employment.

D. Antibacksliding (9VAC25-31-220.L)

Anti-backsliding refers to statutory and regulatory provisions that prohibit the renewal, reissuance, or modification of an existing NPDES permit that contains effluent limitations that are less stringent than those established in the previous permit. The CWA as well as state regulations include a prohibition on specific forms of backsliding, exceptions to the prohibition, and a backstop provision that provides an absolute limitation on backsliding. Note that State anti-backsliding regulations at 9VAC25-31-220 L are effectively the same as the provisions in CWA section 401(o) and both are referenced in the discussion below. Federal antibacksliding regulations are found at 40 CFR 122.44(l).

1. Prohibition Against Backsliding

CWA section 402(o)(1) prohibits the relaxation of effluent limitations in two situations:

- a. To revise an existing TBEL that was developed on a case-by-case basis using best professional judgment (BPJ) to reflect subsequently promulgated effluent limitations guidelines and standards (effluent guidelines) that would result in a less stringent effluent limitation.
- b. Relaxation of an effluent limitation that is based on state standards, such as water quality standards or treatment standards, unless the change is consistent with CWA section 303(d)(4).

The two prohibitions against relaxation of effluent limitations are subject to the exceptions in CWA section 402(o)(2) (9VAC25-31-220 L 2), which are outlined below. In addition, limitations based on state standards may also be relaxed if the change is consistent with the provisions of CWA section 303(d)(4). Section 303(d)(4) may be applied independently of section 402(o).

2. Exceptions to Anti-backsliding Prohibition

CWA section 402(o)(2) (9VAC25-31-220 L 2) outlines specific exceptions to the two prohibitions specified above. CWA section 402(o)(2) provides that relaxed effluent limitations may be allowed where:

- There have been material and substantial alternations or additions to the permitted facility that occurred after permit issuance and that justify the relaxation.
- New information (other than revised regulations, guidance, or test methods) is available that was not available at the time of permit issuance and that would have justified a less stringent effluent limitation.
- Technical mistakes or mistaken interpretations of the law were made in issuing the permit under CWA section 402(a)(1)(B) (i.e., a BPJ-based permit).
- Good cause exists because of events beyond the permittee's control (e.g., natural disasters) and for which there is no reasonably available remedy.
- The permit has been modified under the law and CWA sections 301(c), 301(g), 301(h), 310(i), 301(k), 301(n), or 316(a).
- The permittee has installed and properly operated and maintained treatment facilities required to meet the effluent limitations in the previous permit but still has been unable to meet the effluent limitations. Relaxation may be allowed only to the treatment levels actually achieved, but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification.

Note: The exceptions for new information and for technical mistakes or mistaken interpretations of law for permits issued under 401(a)(1)(B) shall not apply to any revised waste load allocations

or any alternative grounds for translating water quality standards into effluent limitations, except where the cumulative effect of such revised allocations results in a decrease in the amount of pollutants discharged into the concerned waters, and such revised allocations are not the result of a discharger eliminating or substantially reducing its discharge of pollutants due to complying with the requirements of the law or the CWA or for reasons otherwise unrelated to water quality.

3. Relaxing Limitations Based on WQS Through Compliance with CWA 303(d)(4)

Under CWA section 402(o)(1) (9VAC25-31-220 L 1), effluent limitations based on state standards (e.g., WQS), a TMDL, or the state's continuing planning process may be relaxed if the revised effluent limitation is in compliance with CWA section 303(d)(4).

CWA section 303(d)(4), *Revisions of Certain Effluent Limitations*, has two parts: paragraph (A), which applies to nonattainment waters, and paragraph (B), which applies to attainment waters.

- a. Nonattainment water: CWA section 303(d)(4)(A) allows the establishment of a less stringent effluent limitation when the receiving water has been identified as not meeting the applicable water quality standard if the permittee meets two conditions. First, the existing effluent limitation must have been based on a total maximum daily load (TMDL) or other wasteload allocation (WLA) established under CWA section 303. Second, relaxation of the effluent limitation is only allowed if attainment of the water quality standard will be ensured or the designated use not being attained is removed in accordance with the water quality standards regulations. This subsection does not provide an exception for establishing less stringent limitations where the original limitation was based on state permitting standards (e.g., state treatment standards) and was not based on a TMDL or WLA.

For purposes of implementation, a nonattainment water is one where the applicable water quality standard (i.e., the standard underlying the effluent limit being relaxed) is not being met. To determine nonattainment, review, or ask planning (specifically your regional office TMDL Water Planning staff) to review, the most recent water quality assessment data for the pollutant(s) of concern for the relevant segment of the receiving water.

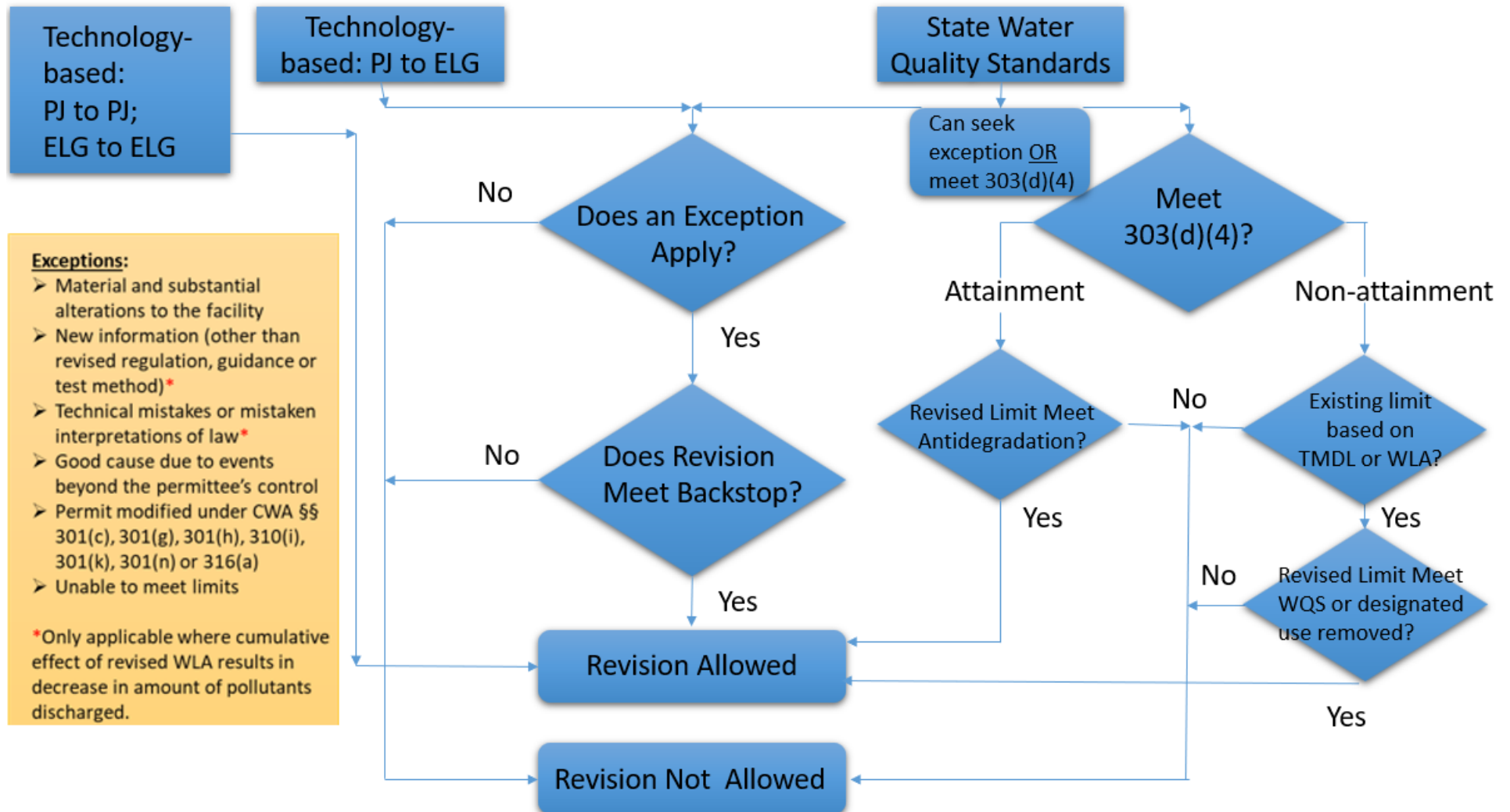
- b. Attainment water: CWA section 303(d)(4)(B) applies to waters where the water quality equals or exceeds levels necessary to protect the designated use, or to otherwise meet applicable water quality standards (i.e., an attainment water). Under CWA section 303(d)(4)(B), a limitation based on a TMDL, WLA, other water quality standard, or any other permitting standard may only be relaxed where the action is consistent with state's antidegradation policy.

Under antidegradation, for Tier 1 waters that just attain the applicable standards, no further lowering of water quality is allowed. For Tier 1 waters that do not attain the applicable standards, the water quality must be improved to the point where the standards are attained. In both cases the TMDL or WLA must ensure that the applicable standards are attained. For Tier 2 waters, existing water quality that exceeds water quality standards must be maintained.

4. Any Relaxed Effluent Limitation Must Meet Backstop

In no event may a permit with respect to which an anti-backsliding exception applies be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by applicable effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a Virginia water quality standard applicable to such waters.

Overview of Anti-Backsliding Based on 9VAC25-31-220 L



E. Permit Drafting Procedures

1. **Research background of the facility:** Permit writers should review current file and ECM to become familiar with site operations and overall condition of the facility. It is helpful to do this prior to sending the reissuance reminder letter, to ensure the permit writer is requesting everything that is needed to draft the permit.
2. **Maintenance Fees:** Check the Finance tab in CEDS to ensure the facility is up to date on its maintenance fees. If the facility is delinquent on its fees, contact the office of Financial Management to verify if the fee has been paid. Once you confirm that the fee has not been paid, send an email to the permittee with an invoice provided by the finance department and let the permittee know that the permit cannot be processed or administratively continued if the fees are not paid and provide a deadline of one week. If payment is not received, refer the facility to compliance. If the fee is not paid before the expiration date, the permit should be allowed to expire, as administrative continuation is not allowed. Additionally, the permittee should be referred to Compliance. However, if the fees are paid and current when the application is submitted, but the permittee falls behind on a fee during the drafting phase, the permit can still be reissued.
3. **Outfall Numbering:** Number outfalls as follows:
 - a. Begin numbering external process discharges as 001, 002, 003, etc.
 - b. Begin internal process discharges with the last number of the corresponding external discharge (example External Outfall 001, Internal Outfalls 101, 102; External Outfall 002, Internal Outfalls 201, 202, etc.).
 - c. For outfalls comprised solely of stormwater associated with a regulated industrial activity and outfalls which have comingled discharges of process water and stormwater where the stormwater regulations dictate sampling of the outfall during a storm event, substitute the leading 0 with a 9 for storm event sampling and follow numeric order with the other outfalls (i.e. 001, 002 etc.). For example, comingled outfall 001 is designated 901 for storm event monitoring, and stormwater only outfalls are designated as 902, 903, etc.
 - d. For municipal sludge monitoring, there are two types of outfall numbers. The first designates the DMR for reporting sludge production and use. This outfall number begins with SP and is followed by one number, e.g. SP1. The number designates the type of sludge treatment. Most permittees will have only one process for sludge and thus will only need a SP1 outfall. If the plant uses more than one sludge treatment method, e.g. anaerobic digestion and composting, then each process will have its own outfall designation for production and use reporting: SP1 – anaerobic digestion and SP2 – composting. Record the outfall number and the corresponding treatment process in the Fact Sheet and notify the permittee which is which.

For the DMR for reporting sludge quality monitoring results, the outfall number begins with an S and is followed by two numbers, e.g. S01 or S02. The numbers designate the site receiving the sludge. For facilities who are responsible for sludge quality, but not for land application activities, only S01 will be needed. If the facility is land applying its own sludge, it must have a S[XX] outfall number for each land application site. If these outfall numbers are not consistent with the site identification numbers in the Sludge Management Plan, the permittee should provide a site reference table along with the DMRs. Contact the Office of Land Application to ensure all land application sites are correctly mapped in CEDS.

- e. In certain cases, the above numbering system will not work (i.e. ≥ 100 external outfalls). Where necessary, assign alternative numbers to internal outfalls provided that the corresponding external outfall is clearly identified in the Fact Sheet and permit. All outfall numbers are limited to 3 digits; **do not use letters, except for sludge DMRs**.
- f. Once an outfall number is assigned to a location, either an external or an internal outfall number, it must remain with that location. Renumbering outfalls at reissuance will cause CEDS to find false violations and Significant Noncompliance determinations. Render old outfall numbers inactive, but do not reassign the number to another location.

4. Effluent Screening and Limitation Development (Section C of the Fact Sheet)

- a. Pull DMR data for the current permit cycle and export to an excel file.
 - 1) Create a summary table that compiles all DMR data into one spreadsheet. Replace all <QL values with zero.
 - 2) Calculate statistics for the DMR data, including the average, maximum, minimum for all parameters, 90th percentile for temperature, and 90th, 75th, 50th, and 10th percentiles for pH.
 - 3) New ammonia criteria calculations (freshwater): For all municipals, and industrials with ammonia limits or detected results for ammonia in the application, request a minimum of 1 year (preferably 2 years) of daily temperature and pH data to calculate the 90th percentile for temperature and the 90th, 75th, 50th, and 10th percentiles for pH to use in MSTRANTI.

For saltwater: Although the new ammonia criteria are not applicable, permit writers should request a minimum of 1 year (preferably 2 years) of daily temperature and pH data to calculate the 90th percentile for temperature and the 90th and 10th percentiles for pH.
 - 4) In the absence of effluent temperature data for municipal facilities or industrial facilities without a heated discharge, the permit writer may assume an annual 90th percentile temperature value as follows: PRO and TRO - 28 degrees C (annual) and 18 degrees C (wet), BRRO, NRO, and VRO - 25 degrees C (annual) and 15 degrees C (wet), and SWRO – 24 degrees C (annual) and 14 degrees C (wet). For industrial facilities with heated discharges that do not provide discrete data, the permit writer may use the 90th percentile of the monthly maximum temperature data for the current permit cycle reported on the DMR to substitute for the 90th percentile of daily temperature values.
 - 5) While it is preferred that permit writers request daily pH data, in the absence of daily pH data for facilities that discharge to freshwater, monthly effluent DMR data for the current permit cycle may be used to derive conservative approximations. Use the 50th percentile of the monthly maximum pH data reported on the DMRs for the current permit cycle for the 90th, 75th, and 50th percentile of daily pH values. Calculate the 10th percentile using monthly maximum pH DMR data.

For saltwater: In the absence of daily pH data for facilities that discharge to saltwater, monthly effluent DMR data for the current permit cycle may be used to derive conservative approximations. Use the 50th percentile of the monthly maximum pH data reported on the DMRs for the current permit cycle for the 90th

percentile of daily pH values. Calculate the 10th percentile using monthly maximum pH DMR data.

- 6) If available, calculate mean of effluent hardness or assume default value of 50 mg/L east of the Blue Ridge and 100 mg/L west of the Blue Ridge.
- 7) Extract any pages from the application that provide data to be used in the evaluation to include in the Fact Sheet Attachments (e.g., data found in the EPA Forms and Attachment A - Water Quality Monitoring Form data). Identify all data "hits" that are >QL, and <QL when the QL used is greater than the Site-Specific Target Value (SSTV), which is the same as the Method Target Value (MTV) provided in the MSTRANTI output from the previous reissuance.

R Studio is used to perform the Reasonable Potential Analysis (RPA). The R Studio website can be found at:
<https://rconnect.deq.virginia.gov/landing/#WPTools>

- b. **MIX** is used when there is no site-specific model available at the outfall discharges to a free-flowing stream (i.e. MIX is not used for tidal, intermittent streams, or swamps). The MIX program estimates the maximum size of a mixing plume from a discharge that enters the side of a free-flowing stream. Please note that this program is intended solely to determine if a complete mix assumption is appropriate and cannot be used to estimate the actual size of an expected mixing zone. Save the MIX output and include in the Fact Sheet attachments.

MIX inputs:

- 1) Effluent flow:
 - Municipal: Enter facility design flow
 - Industrial: Calculate from DMR data – the greater of either the maximum of 30-day average flows or the average of 30-day maximum flows
- 2) Stream flows: From Planning Coordination Form
- 3) Stream slope: It is suggested that using the slope for the first 0.5 to 1 mile below the discharge is a reasonable approximation. If not calculated from a topographical map or GIS, assume the following (as noted in GM00-2011):
 - 0-2 ft/mile (0.00038 ft/ft) – flat water with minor riffles
 - 3-6 ft/mile (0.00057 – 0.001 ft/ft) – moderate rapids or pool and riffle
 - 6 ft/mile – heavy rapids or pool and riffle
- 4) Stream width: Use the width that was used in the previous reissuance. If you believe that number is incorrect or you need to determine the width, you may use GIS or aerial imagery to measure the stream width in the vicinity of the outfall or perform a site inspection. **Please note that the width needed is that associated with a drought flow.**
- 5) Bottom scale: The number representing bottom roughness is on a scale of 1 to 5:
 - "1" represents a sand or silt bottom that is very smooth and even.
 - "2" through "4" grade between two extremes with 3 representing the "average stream."

- “5” represents a very rough bottom consisting of large rocks and boulders.
- 6) **Channel scale:** The number representing the degree of meandering or bank irregularities, and should be determined based on knowledge of stream, Google aerial view, and/or what was previously selected in prior reissuances.
 - “1” represents a moderately meandering channel of moderate uniformity.
 - “2” represents a smaller stream with more significant meandering and less uniform channel.
 - “3” represents a severely meandering and very non-uniform channel.
- c. **MSTRANTI (Water Quality Criteria/Wasteload Analysis program)** is used to estimate appropriate Wasteload Allocations (WLAs) for various parameters based on user input stream and effluent information. MSTRANTI considers acute, chronic, and human health standards when computing a WLA. Additionally, the program adapts the most recent Water Quality Criteria for WLA computations and considers antidegradation when appropriate. The program can compute WLAs for saltwater, transition zones, tidal freshwater, and freshwater (free-flowing) depending on the user input.
 - 1) Enter stream information:
 - (a) For intermittent streams or swamps – there is no ambient flow so effluent information is also entered for the stream.
 - (b) pH: Background data obtained from planning staff or MSTRANTI background tool.
 - (c) Temperature: Background data obtained from the planning coordination.
 - (d) Hardness: Background data obtained from the planning coordination or MSTRANTI Background Tool (default value of 50 mg/l east of the Blue Ridge and 100 mg/l west of the Blue Ridge may be used). Regardless of the mix value or ambient data, the minimum hardness value used to set the WQS cannot be less than 25 mg/l, and the maximum value used to set the WQS cannot be greater than 400 mg/l. This is because hardness values outside these values are off the scale used to establish the WQS hardness equation.
 - (e) Tier Designation: Obtained from planning staff. If the facility was discharging prior to the adoption of the revised ammonia criteria (October 8, 2021), use Tier 1 in MSTRANTI to calculate the WLAs for ammonia only. For all other parameters, use Tier 2 if the receiving stream is Tier 2.
 - (f) Early Life Stages Present: Always select “Yes” per the reasoning described in 9VAC25-260-155.
 - (g) Type of Analysis: Choose based on the receiving stream.
 - (h) Use Default Water Effect Ratio (WER) of 1: Always choose “Yes” (unless the facility completed a WER study). Otherwise, users may select metals from the list that appear after clicking “No” to enter WERs for a given metal. Water effect ratios are NOT applied to Copper Special Standards (see below).
 - (i) Include Copper Special Standards in Parameter List: Answering “Yes” to this will allow users to select some of the special standards present in 9VAC25-260-310 for analysis. Selecting a standard will cause it to be included in the

parameter selection described below. Users may request additional standards be added to the program by contacting Connor Brogan at the Central Office.

- (j) Chemical Selection: Permit writers are required to pick chemicals from the drop-down menu for analysis. Multiple chemicals may be selected, but only chemicals selected in this menu will be displayed in the results. You may select "ALL CHEMICALS" if you would like to see the results for all 100+ chemicals in the MSTRANTI program (this will include copper special standards only if they have been selected from the "Copper Special Standards" question). Alternatively, the permit writer may select "ALL METALS" to have the program compute WLAs for all metals in the DEQ WQC standards in 9VAC25-260-140.
- (k) Background Concentrations: Permit writers must input receiving waterbody background concentrations for EACH chemical selected from the drop-down menu. Most concentrations should be entered as ug/L; however, some chemicals are quantified in other units (i.e. ammonia is measured in mg N/L).

Users may input background concentration using one of four methods:

- Method 1: Manually enter each background concentration on a new line in the order of selected chemical.
- Method 2: Download the provided template and enter background concentrations where prompted. It is recommended that the permit writer does not delete any rows or parameters from the *.CSV file. Upload background concentrations by uploading this modified CSV file. Only chemicals selected in the "Chemical Selection" step will be used in the analysis, background concentrations for other parameters will be ignored.
- Method 3: Assume all background concentrations are zero. Clicking this button will set background concentrations of all selected parameters to zero. This method may be used in the absence of background data.
- Method 4: Use the MSTRANTI Background Concentration tool. This tool uses the DEQ probabilistic monitoring dataset to generate relevant background concentrations for certain parameters based on the input user geologic scale and allows export into MSTRANTI. This tool is limited to the parameters evaluated within the DEQ probabilistic monitoring dataset. *Please note that the Tool exclusively incorporates freshwater data gathered from wadable, free-flowing streams and rivers. No tidal or estuarine data is included in the Tool.* Consequently, the Tool is specifically suited for application to **free-flowing freshwater streams and rivers**. At this time, it should not be employed for tidally influenced rivers.

- (l) Public Water Supply: Indicate whether the receiving stream is used as a public water supply. If so, this program will use the appropriate human health standards to calculate WLAs.
- (m) New Ammonia Criteria: Select "Yes" as all facilities should have the new ammonia criteria implemented after 10/8/2023.

2) Enter stream flows:

- (a) Modeled: If the facility or DEQ performed a site-specific model, enter stream ratios from the model.

- (b) Free flowing stream: Stream flows are found in the Flow Frequency Memo or DFLOW.
 - (c) Intermittent Stream/Swamps/Marshes: Mixing is not allowed, so permittee must meet standards at the end of pipe. Enter zero for flows.
 - (d) Lakes: It is recommended that no mixing zones be allowed in lakes unless the discharger provides actual physical/chemical data to demonstrate acceptable conditions both within the mixing and the lake as a whole. This means that the effluent itself should meet all applicable criteria prior to discharge. In order to consider decay, the actual boundaries of the mixing zone and the residence time within it for passing or drifting organisms must be known. The model included with this guidance is not suitable for this application because it was not formulated to accurately model a mixing zone. If a discharger wishes to account for decay within a mixing zone, it is recommended that the discharger be required to submit a study that defines the boundaries of the actual mixing zone and associated hydraulic considerations.
 - (e) Tidal: Tidal: Use tidal dilution ratios. Historically, default ratios of 2:1 acute and 50:1 chronic have been applied generally; however, a 50:1 chronic ratio may not be appropriate in all cases. If a default 50:1 chronic ratio was used previously, contact the Office of VPDES Permits. If the permittee does not concur with the ratios, a permit can require a site-specific study to be conducted to determine ratios. MSTRANTI is set up to account for the parts of the stream versus the effluent in the tidal freshwater and saltwater modules; therefore, enter the ratios as they appear (e.g. if the dilution ratios are 2:1 acute and 10:1 chronic, you will enter 2 for the Acute WLA Multiplier, and 10 for the Chronic and Human Health multipliers in MSRANTI). In MSTRANTI, choose "Tidal Freshwater" option.
 - (f) Wet seasons inputs: Only applicable for temperature/flow tiering for ammonia to provide relief from stringent limits in the winter months when the stream flows are higher and the temperatures are lower. Wet season limits will be expressed as ammonia limits for certain months of the year [e.g., Ammonia (May – November) and Ammonia (December – April)]. In these cases, the permit writer needs to calculate the 90% Temperature (Wet Season) for the effluent and stream using the temperature data for the winter months to input in MSTRANTI and will enter the wet season stream flows from the flow frequency memo/DFLOW. For example, to determine the 90th percentile for temperature for Ammonia (December - April), the permit writer will only use the effluent temperature data during December – April in the calculation and then enter that in for 90% Temperature (Wet Season). The permit writer will use all the temperature data for all months to calculate the Ammonia (May – November) limits. Seasonal limits may also be provided for intermittent streams (based on low temperature months).
 - (g) Enter mixing information:
 - i. Use MIX outputs for free flowing streams
 - ii. Assume 100% for intermittent streams, swamps, tidal (because mixing or the lack of mixing is accounted for in the stream to effluent ratios)
- 3) Enter effluent information:

- (a) Hardness: Calculate mean of effluent or assume default value of 50 mg/L east of the Blue Ridge and 100 mg/L west of the Blue Ridge.
- (b) Temperature: Use 90th percentile of daily effluent temperature data. For all municipals, and industrials with ammonia limits or detected results for ammonia in the application, request a minimum of 1 year (preferably 2 years) of daily temperature data to calculate the 90th %tile for temperature to use in MSTRANTI.

In the absence of effluent temperature data for municipal facilities or industrial facilities without a heated discharge, the permit writer may assume an annual 90th percentile temperature value as follows: PRO and TRO - of 28 degrees C (annual) and 18 degrees C (wet), BRRO, NRO, and VRO - 25 degrees C (annual) and 15 degrees C (wet), and SWRO – 24 degrees C (annual) and 14 degrees C (wet). For industrial facilities with heated discharges that do not provide discrete data, the permit writer may use the 90th percentile of the monthly maximum temperature data for the current permit cycle reported on the DMR to substitute for the 90th percentile of daily temperature values.

- (c) pH: Use 90th, 75th, 50th, and 10th percentiles from daily effluent pH data.

For all municipals, and industrials with ammonia limits or detected results for ammonia in the application, request a minimum of 1 year (preferably 2 years) of pH data to calculate the 90th, 75th, 50th, and 10th for pH to use in MSTRANTI. In the absence of daily pH data, typically monthly effluent DMR data for the current permit cycle may be used to derive conservative approximations. Use the 50th percentile of the monthly maximum pH data reported on the DMRs for the 90th, 75th, and 50th percentile of pH values.

- (d) Discharge flow:

- 1) For municipal facilities: enter facility design flow
- 2) For industrial facilities: if there is a design flow specified, use that; otherwise, calculate from DMR data the greater of either the max of 30-day average flows or the average of 30 day max flows.

- d. Complete **MSTRANTI Data Source Sheet** to use in the Fact Sheet Attachments
- e. **STATs (Statistically Derived Permit Limits program)** estimates the variability associated with materials in an effluent and determines appropriate permit limits that take that variability into account. STATs balances WLAs against user-input effluent data to evaluate appropriate limits abased on an assumed effluent data distribution.

Limits are required based on the following case structure for acute and chronic conditions:

- If the WLAa is greater than the 97th percentile of the daily values then no acute limit is needed, otherwise a limit is needed.
- If the WLAc is greater than the 97th percentile of the 4-day averages (30-day average for ammonia) then no chronic limit is needed, otherwise a limit is needed.

Select "Yes" if running the RPA for ammonia (a 30-day average will be used as the averaging period in chronic calculations). Otherwise, select "No" (a 4-day average will be used as the averaging period in chronic calculations).

If there is a limited dataset and STATs shows a limit may be needed based on one data point, there are two options available depending on the permit expiration date:

- (1) If the permit is close to expiration and there is not enough time to collect another sample using the correct QL (i.e., DEQ MTV for metals), perform the following:
 - i. Confirm with the permittee that they are committed to resampling using the appropriate QL (DEQ MTV for metals).
 - ii. Administratively Continue the current permit for a minimum of 6 months.
 - iii. Permittee conducts as many samples as practical, preferably ten, but no fewer than two samples, either on a weekly, monthly or quarterly frequency.
 - iv. If the pollutant is detected, use the new detected result(s) and the previous result(s) to see if a limit is needed. If no limit is needed, you are done. Stop here.
 - v. If a limit is needed, add the limitation for the pollutant to the permit (if this is for a metal, add quarterly monitoring for hardness).
- (2) If there is enough time to collect a sample, ask the permittee to resample using the appropriate QL (DEQ MTV for metals).
 - i. If the pollutant is detected, use the new detected result(s) and the previous result(s) to see if a limit is needed. If no limit is needed, you are done. Stop here.
 - ii. If a limit is needed, add the limitation for the pollutant to the permit (if this is for a metal, add quarterly monitoring for hardness).

Example 1: The permit currently does not have a zinc limitation. A compliance schedule was provided for a new zinc limitation. The permit writer should include dissolved zinc monitoring and final total recoverable zinc limitation.

Example 2: The permit has a zinc limitation and STATs calculated a more stringent zinc limitation. A compliance schedule was included in the permit. The permit should include interim total recoverable zinc limitation and final total recoverable zinc limitation.

WLAa and WLAc: The WLAs are obtained from MSTRANTI and can be found in the "Most Limiting Allocations" column.

Units: Please ensure the same units are used for the WLAs from MSTRANTI and effluent data and select the appropriate unit.

QL: Use the DEQ QL or Method Target Value (for metals) from MSTRANTI. The QL (sometimes referred to as the "censoring point"), signifies the point in the effluent distribution below which data exists but their actual value cannot be determined. Below are QLs for commonly analyzed parameters:

1. TRC QL = 0.1 mg/L
2. Ammonia QL = 0.2 mg/L
3. All metals QL = Site Specific Target Values (SSTVs), which are labeled as Method Target Value (MTV) in the MSTRANTI output spreadsheet. The permit writer should use these values as long as they are not less than the following:

Silver 0.2 µg/L
 Aluminum 2.0 µg/L
 Arsenic 1.0 µg/L
 Cadmium 0.3 µg/L
 Chromium 0.5 µg/L
 Copper 0.5 µg/L
 Iron 1.0 µg/L
 Mercury 1.0 µg/L
 Manganese 0.2 µg/L
 Nickel 0.5 µg/L
 Lead 0.5 µg/L
 Antimony 0.2 µg/L
 Selenium 2.0 µg/L
 Zinc 2.0 µg/L

(all other QLs are included in the OneDEQ permit templates)

samples/mo and #samples/wk: Enter the sampling frequency from the VPDES Permit Writers' Manual, MN-1 "Sample Schedule Table" based on design flows for municipals. Typically use 1 per month for industrials. *If the facility was given reduced monitoring frequencies, do not use that frequency in STATs. Always use the frequencies listed in the "Sampling Schedule Table" to calculate limits.*

Data input: Enter available DMR or application data for the pollutant either manually or upload from CSV file with the following exceptions:

1. Ammonia

- (a) Ammonia (municipals): For all municipal facilities input 9 mg/L (do not use DMR data). *If the permit contains ammonia limitations greater than 9mg/L or actual effluent ammonia data indicate that the expected value is greater than 9 mg/L, then the analysis should be performed using the actual data rather than the default value.*

Additionally, if ammonia limits are necessary, the permit writer will enter actual daily ammonia effluent data into the STATS R-Tool to determine if a schedule of compliance is necessary. Please note that the values from the DMRs are monthly averages and weekly averages (when monitoring is greater than once per month) and should not be used for this determination. The permit writer will need the discrete (daily) values, for the current permit term, for this evaluation. **If the program notes that "No Limit is Necessary" when actual data is used, then the facility should not be granted a schedule of compliance.**

- (b) Ammonia (industrials): Use the effluent data to determine if a limit is needed. *If limit already exists for ammonia or TKN, use fictitious high datum to force the program to calculate a limit. The resulting limit can be compared to the existing limit to determine if it is sufficiently stringent.*
- (c) If there is a TKN limitation of 3 mg/L in the permit, the permit writer should use 3 mg/L in STATs for ammonia. *If STATs shows that TKN is not protective of weekly average limitation but is protective of monthly average limitation, the permit writer can disregard the weekly average limitation as the new ammonia chronic criteria is expressed as a 30-day average, and therefore an ammonia*

limit does not need to be included in the permit. If STATS shows that TKN is not protective of monthly average ammonia limitation, the permit writer should include the new ammonia limitation and may consider removing the TKN limitation or reducing TKN monitoring. Since TKN is composed of organic nitrogen and ammonia as N and is being replaced with a more protective ammonia limitation, this action would not contravene the antibacksliding provisions as set forth in the VPDES regulation at 9VAC25-31-220.L. Additionally, when placing an ammonia effluent limit in a permit in-lieu of a TKN limit, it is recommended that BOD5 effluent limits replace carbonaceous biochemical oxygen demand-5 day (CBOD5) limits as BOD5 accounts for both nitrogenous and carbonaceous demand. TKN addresses the nitrogenous demand component and CBOD5 addressed the carbonaceous demand.

Please contact the Office of VPDES Permit if substitutions are requested for water-quality based BOD₅/CBOD₅ effluent limitations. See Section MN-1.D.1.c for technology-based BOD₅/CBOD₅ effluent limitation substitutions.

- (d) Calculate acute and chronic WLAs in MSTRANTI R-tool using the revised criteria as if the discharge were to a Tier I stream. Determine if the previous Tier II effluent limits or the new Tier I effluent limits are more limiting. If the existing Tier II effluent limits based on the previous WQC are more limiting, then they should be maintained under the Board's Anti-backsliding Policy. If the limits based on the revised criteria and a Tier I evaluation are more limiting, then the new limits should be included in the permit and the WLA is considered to be protective of a Tier I stream. In this situation the STATS R-Tool should be run a second time for any municipal facility using any actual data rather than the default value of 9 mg/L. If the use of actual data for a municipal facility results in a finding of "no limit necessary", then the facility has demonstrated that it consistently complies with the new limit and no schedule of compliance is provided. A four-year schedule of compliance should suffice for most permittees. All schedules must require compliance as soon as possible on a case-by-case basis (9VAC25-260-155 G 3 a; also see 9VAC25-31-250 A 1) and must include interim milestones in accordance with 9VAC25-31-250.A. Documentation that the schedule represents "as soon as possible" should be included in the fact sheet. For those permittees that request a schedule of compliance greater than a permit cycle (five years), the regulations (9VAC25-260-155 G 3 a) specify four factors that DEQ may consider as to whether an extended schedule of compliance is justified. (*see the Ammonia Phased Implementation Guidance for more information*)
- (e) In no case should previously effective ammonia limits be relaxed based on the transition from a Tier II to a Tier I reasonable potential determination. Nor should water quality tier determinations or effluent limits for any other parameters be modified.
- (f) In the case of an unbuilt facility, **the current tier designation of the stream** should be used for the RPA. New WQC is the basis for all future permitting decisions; however, there should be no regression from any limitation based on the application of Tier 2 for the previous WQC.

2. Chlorine and Chlorine Produced Oxidants (CPO): For chlorine and CPO, effluent data are not necessary to determine that a reasonable potential exists for the facility to cause or contribute to a violation of the standards.
 - (a) For municipal facilities that use chlorine for disinfection, input 20 mg/L (do not use DMR data). You can use this same approach for any industrial facility that is treating waste like a WWTP.
 - (b) If the WLA is greater than 4.0 mg/L, STATs should be run with the following inputs:
 - (1) WLAa = 4.0
 - (2) WLAc = 4.0
 - (3) One datum of 20 mg/L is input to force the program to calculate a limit.
 - (c) If the WLA is less than 4.0 mg/L, run STATs with the following inputs:
 - (1) WLAa = calculated values
 - (2) WLAc = calculated values
 - (3) One datum of 20 mg/L is input to force the program to calculate a limit.
3. Total Metals vs. Dissolved Metals
 - (a) If only total recoverable metals data is available for a metal from the EPA Forms or DMR data (i.e., no dissolved metals data from Attachment A) use the total metals data to see if the RPA produces a limit. If no limit is needed, no further action needed. If a limit is needed, ask the permittee to resample for the dissolved metal or include monitoring for the dissolved metal in the permit and reevaluate at the next reissuance.
 - (b) If total recoverable metals and dissolved metals data is available for the same metal (i.e., metals data from EPA Forms/DMR data, and Attachment A) only use the dissolved metals data in the RPA. Limits for metals are always imposed as total recoverable.
4. Laboratory's QL greater than QL specified in Attachment A: If the permittee submits the Attachment A Water Quality Criteria Monitoring Form and the QL that the laboratory used is greater than the DEQ Method Target Value (MTV) for metals that was specified for the QL, run STATs using the lab QL to see if a limit is needed.
 - (a) If no limit is needed, no further action is needed. Stop here.
 - (b) If STATs shows a limit is needed based on one data point, there are two scenarios depending on the permit expiration date:
 - (1) If the permit is close to expiration and there is not enough time to collect another sample using the correct QL (i.e., DEQ MTV), add quarterly monitoring for the pollutant in the permit and reevaluate at the next reissuance. Stop here if this is chosen.
 - (2) If there is enough time to collect a sample, ask the permittee to resample using the appropriate QL (DEQ MTV for metals). If the sampling result is <QL (non-detect for the correct QL), no further action is needed. Stop here.
 - i. If the pollutant is detected, use the new detected result and the previous lab QL in STATS to see if a limit is needed (The only

exception to using the previous lab QL in the STATS analysis is if the lab used a much higher QL than the newly detected result, in this case, run STATS using the detected result). If no limit is needed, you are done. Stop here.

- ii. If a limit is needed, add the limitation for the pollutant to the permit (if this is for a metal, add quarterly monitoring for hardness).
5. Human health parameters: STATS should not be used to estimate a reasonable potential for the human health criteria. In general, with parameters that have a human health WQC but no aquatic life acute/chronic WQC, the most limiting HH WLA should be established as the limit. In Tier 2 systems, this includes the antidegradation WLA found in MSTRANTI, which uses just 10% of the unused assimilative capacity of the river (as opposed to 25% for non-HH parameters). For Tier 1 streams, use the HH WLA as the limit. Additionally, the method target value from MSTRANTI should be used for the QL. It is important to note that the criteria for these human health parameters are developed based on long exposure periods. The permittee should perform additional monitoring before a limit is added to the permit. With long exposure periods, a single high sample is less impactful to overall water quality than it would be when dealing with aquatic life criteria, which is based on 1-hour or 4-day (or 30-day for ammonia) exposure periods.

The existing regulations require the inclusion of weekly average and monthly average limits in discharge permits for POTWs and daily maximum and monthly average limits or industrial treatment plants. This approach may be reasonable when applied to limits based on technology studies or when the maximum limit is not a defined function of the average but is some arbitrary number.

However, when the limits are based on a statistical description of the effluent variability, these multiple limits are unnecessary. This is because both average and maximum limits are based on parameters calculated from the same distribution. In this case, all limits that can be derived from that distribution specify exactly the same distribution of effluent concentrations and consequently specify exactly the same effluent quality.

It is recommended that:

Permits for facilities treating domestic waste should have weekly average and monthly average permit limits.

Permits for facilities treating industrial waste should have daily maximum and monthly average permit limits.

5. Additional Considerations

All effluent limitations should generally be written using two significant figures with the following exceptions:

- a. More than two significant figures may be necessary for water quality-based limits (to be consistent with the underlying standard) or for limits expressed as large numbers that do not contain decimal points.

- b. One significant figure is acceptable for bacteriological limits, acute and chronic WET endpoints, and BOD only if a single digit effluent is required.
- c. Bacteriological and WET data are based on “counts” and therefore not subject to significant figure rules and the method for determining BOD is not accurate enough to provide data beyond a whole number.

Permittees are only required to report the same number of significant digits as the permit limit. Two-digit whole numbers should be footnoted and larger numbers that are multiples of 10 should be in scientific notation (e.g., 10 footnote would read “Limit given is expressed in two significant figures”; 760,000 should be 7.6×10^5). See rules for significant figures, rounding and precision in [GM06-2016](#) and [Amendment #1](#) for measured concentration values (not counts, days or conversion factors).

Any outfall comprised solely of stormwater associated with a regulated industrial activity should be identified on a Part I.A page to authorize the discharge of 2x only.

F. Effluent Monitoring Frequency

Minimum frequencies for monitoring effluent quality and quantity for the purpose of determining compliance with VPDES permits are recommended in Sections MN-1 and IN-1. Reductions in those frequencies have usually been made only when requested by a permittee and when there was overwhelming evidence that effluent quality could not be manipulated by a permittee.

EPA published *Interim Guidance For Performance-Based Reduction Of NPDES Permit Monitoring Frequencies* (EPA 833-B-96-001) in April 1996. This initiative is an effort to reduce the cost of environmental compliance and to provide incentives to facilities that demonstrate outstanding performance and consistent compliance with their permits. DEQ supports this initiative and Sections MN and IN contain recommendations, based on this EPA document, for routine consideration of reduced monitoring frequency during processing of all VPDES permit reissuance applications. The three steps of the protocol are:

1. Upon receipt of an application for permit reissuance, determine if the facility qualifies for reduced monitoring.
2. Determine the degree of monitoring reduction that should be allowed.
3. Make provisions in the permit to require increased monitoring if the facility does not continue to maintain its past compliance record.

There may be cases where reduced monitoring may be appropriate, but the circumstances do not fit this guidance (e.g., a limit may not be needed, but antibacksliding prevents its removal). Some minimal monitoring frequency may be appropriate, but would not be based on this guidance. In such cases, the permit writer should provide complete documentation regarding his/her decision in the fact sheet.

G. Compliance Schedules

Develop and include schedules of compliance in permits, when appropriate (9VAC25-31-250). See the OneDEQ permit template located on [DEQnet](#). **The permit writer should ensure that the compliance schedule is provided in accordance with the [2007 Hanlon Memorandum](#).** The schedule must include an enforceable sequence of events leading to compliance with interim milestones for schedules longer than one year. Consider the following items when developing schedules of compliance:

1. A schedule of compliance cannot be incorporated into a permit for compliance with a technology-based limit even if the limit is new to the permit. The final deadline for compliance with technology-based limits was March 31, 1989.
2. A schedule is allowable for water quality-based limits. The schedule should be no longer than necessary for compliance with new water quality-based limits (9VAC25-31-250.A.3).
3. Time periods between progress reports cannot be more than one year apart.

Coordinate with enforcement staff and review enforcement files for existing enforcement actions/orders which may contain schedules.

H. Electronic Discharge Monitoring Report (DMR) Preparation

1. Using CEDS, develop limitations and monitoring requirements for each outfall that will be reflected in the e-DMR. The e-DMR should contain the limitations and monitoring requirements (including WET testing requirements) and number of significant figures described in the Part I.A page. Develop DMRs for sludge monitoring where required.

If there are interim and final limits, include only the interim limitations on the DMR. In many cases, the DMR may also reflect limits contained in special conditions in addition to those contained on the Part I.A page. Permits with continuous monitoring of chlorine limits and pH excursion time are examples of this.

NL on the e-DMR should match "NL" on the limits page in CEDS. Where "NA" appears on the limits page in CEDS, "*****" should be on the e-DMR.

2. All permits require, at a minimum, once a year reporting of monitoring results (9VAC25-31-220.1). The yearly reporting requirement applies to existing facilities and facilities not yet constructed. For proposed or non-operational facilities, have the permittee report "no discharge" on the e-DMR.

For facilities not built that require e-DMR submittal as if the facility was built, no additional considerations are needed. The permittee submits a "no discharge" DMR as stated on the effluent limitations page until commencement of discharge or CTO issuance. No notifications to other staff are necessary as the transition in CEDS and ICIS is seamless with this option.

For facilities not built that require annual monitoring until the commencement of discharge or issuance of the CTO, the permit may contain a special condition that recognizes the annual monitoring until commencement of the discharge or issuance of the CTO (e.g. The permittee shall submit DMRs annually until the issuance of the CTO at which time DMR submittal shall be monthly. The annual DMR shall be no later than January 10 of the following year. At that time, a permit authorized change would be initiated in CEDS to increase the typical monitoring frequencies (See CEDS User Manual for VPDES). Regional compliance auditors and central office ICIS coordinator must be notified when discharge begins.

The regional water permit manager may decide for facilities not built to not require a DMR until the facility commences discharge (for industries they provide notice 10 days prior to commencing discharge) or upon issuance of the CTO (for municipalities). Discuss this option with compliance staff before allowing in a permit. For major permits, also notify the

central office ICIS coordinator so that DMR non-receipt violations are not received. The effluent limits pages should contain a statement that recognizes that the permittee is authorized to discharge upon commencement of discharge or issuance of the CTO (e.g. During the period of the issuance of the CTO for a facility or until the permit's expiration date, whichever occurs first, the permittee is authorized to discharge from outfall number 00X. The discharge shall be limited and monitored as specified below or in Part I.A.x).

Other changes to special conditions may be needed to reflect the acknowledgement that commencement of discharge signals other requirements (i.e operations and maintenance manual requirement, water quality criteria monitoring, new discharges permitted from Form 2D and Form 2F sampling). The owner may request a reporting waiver if the facility is not yet constructed, and they submit a schedule for anticipated completion.

3. Consult the most recent listing of DMR parameter codes in CEDS to ensure that current codes are used. If there is no parameter code for a pollutant that requires monitoring, initiate a request for the inclusion of the new code into the list of DMR parameters. Draft a memo describing the requested parameter code, sampling frequency, sampling units, the time (in months) the parameter is to be monitored and the reasons for the request. This memo is from the Water Permits Manager to the Office of VPDES Permits. The Office of VPDES Permits will forward the request to OIS. OIS will create the parameter code and copy all regions and Office of VPDES Permits with the changes.
4. Other actions, such as completion of construction, may necessitate development of a revised DMR. If a consent order or decree supersedes a permit limit, a new DMR should be developed to reflect the new limit. The appropriate DMR should be available to the permittee for the first monitoring report due date after the completion of construction or once the Order or Decree has been issued.
5. Identify Tiered DMR Parameter Codes: Take note of the following when developing tiered limits.
 - a. There should be no more than two tiers in a permit primarily because of the administrative and technical difficulties of drafting, tracking, monitoring, and enforcing the permit. These tiers should be associated with a "wet season" and a "dry season", or "cold" and a "warm" season.
 - b. Tiered permit limits are acceptable for ammonia, BOD, DO, TKN and CBOD. [Even though ammonia has toxic properties, it is non-persistent and biodegradable and therefore tiering ammonia limits is acceptable].
 - c. The toxics, other than ammonia, listed in the Water Quality Standards should not be tiered due to the potential for bioaccumulation. The volatile portions of the toxic pollutants do not have a pronounced tendency to bioaccumulate but may have interactions with others that do have that tendency.
6. DMR Parameter Codes for Chlorine
 - a. Code# 005 - Cl₂ Total - TRC concentration in the final effluent for municipal or industrial dischargers that have a water quality-based limit or a limit based on PJ AND the limit is expressed as a monthly average or a weekly (average) maximum. This is the primary DMR code for chlorine effluent limits.

- b. Code# 157 - Total Cl₂ Contact - For minimum Cl₂ concentration after Cl₂ contact and prior to dechlorination. (Allow for 10% excursions on the DMR for this limit, i.e. daily sampling = 30 per month, therefore 3 excursions per month are allowed. Applies to this parameter ONLY.) This code is used for determining adequate disinfection. Use the same sample type (e.g., grab) for parameter code 213 and parameter code 157.
 - c. Code# 158 - Total Cl₂ Final – TRC concentration in the final effluent for industrial dischargers that have a technology based Cl₂ limit (steam electric for example).
 - d. Code# 213 - Cl₂ Inst. Tech (Min) - Use where exceptions to samples for #157 are allowed. Sections IN-3 and MN-3 have examples. Use the same sample type (e.g., grab) for parameter code 213 and parameter code 157.
7. CEDS Procedures: This section of the VPDES permit manual is to identify CEDS data entry problems and solutions as problems are encountered. The rules that were originally developed in Guidance Memo No. 05-2010, CEDS Data Entry Rules, are listed below. For more information please reference the updated CEDS VPDES IP User's Manual on DEQNET.

If any problem areas that are not addressed below, please pass them on to the Office of VPDES Permits.

Rule 1: Enter the same MONITORING START DATE and same 1ST DMR DUE DATE for interim, final and enforcement limits.

Rule 2: The MONITORING START DATE must be equal to or after the effective date, must be the first day of the month, and must be the first day that begins a monitoring period for which reporting is required.

Rule 3: The 1ST DMR DUE DATE must be separated from the MONITORING START DATE by a monitoring period plus 10 days.

Rule 4: The LIMIT START DATE must be greater than or equal to the effective date.

Rule 5: There must be no time gaps or overlaps between interim and final limit date ranges.

Rule 6: Final limits are always required.

Rule 7: Tier number assignment must be "0" for non-seasonal parameters. If there is more than one seasonal limit value per parameter begin with "1" for the first season.

Rule 8: Check all the monthly check boxes regardless of reporting frequency unless there are seasonal parameters.

Rule 9: In compliance schedule events, DATE RECEIVED = the date that a compliance schedule requirement is received or met but not necessarily completed.

Rule 10: In compliance schedule events, DATE COMPLETED = date event is complete (all requirements met - may be the same as date received).

Rule 11: In compliance schedule events, DATE REVIEWED = date reviewed by appropriate DEQ staff.

Rule 12: Flag the "ADMINISTRATIVELY CONTINUED" box in the general information screen when permits are continued. The box must be checked prior to 10 p.m. on the 20th of the month in which the permit expires.

Rule 13: When representative outfalls are allowed note in the DMR comments section which outfalls are being sampled.

Rule 14: GIS information should be added under the GIS tab on the CEDS facility screen as well as on the outfall screen.

Rule 15: When a permit is modified, update the DATE SIGNED event but do not change the DATE EFFECTIVE event in the events table.

Nutrient Guidance Related CEDS Data Entry Rules

In assigning parameter codes to nutrients for Significant Discharger List (SDL) permits and for making the associated CEDS data entries, please consult the following exhibit:

Exhibit IV-4 Use of Nitrogen and Phosphorus Parameter Codes for Significant Discharger List (SDL) Permits

Parameter Code	Reporting Frequency	Type of Limit	Monitoring Start Date *	When to use code	Compliance Determination
012	Do Not Use for SDL Nutrient Guidance Based Limits			for non-SDL related parameters (e.g., EPA effluent guidelines)	As normal
013	Do Not Use for SDL Nutrient Guidance Based Limits			for non-SDL related parameters (e.g., EPA effluent guidelines)	As normal
791	Monthly	load and concentration	see Rule 2	for monthly limits	End of month, as normal
792	Annual	load only	January 1 (per Rule 2)	for determining compliance with annual load	At the end of the year only
793	Monthly	load and concentration	see Rule 2	for monthly limits	End of month, as normal
794	Annual	load only	January 1 (per Rule 2)	for determining compliance with annual load	At the end of the year only
805	Monthly	load only	see Rule 2	for reporting unlimited cumulative load; always include if annual load limits apply	No limit compliance determination, Limit should be NL, for reporting only
806	Monthly	load only	see Rule 2	for reporting unlimited cumulative load; always include if annual load limits apply	No limit compliance determination, Limit should be NL, for reporting only

*See Rule 2 and 3 from the guidance, appearing above, apply as always.

8. Reporting of Flagged Data

- a. All data, including flagged or qualified data, shall be reported and used in applicable calculations on the DMR, unless disclosed to the Department with technical justification (e.g., laboratory documentation). The permittee shall make a reasonable attempt to notify the Department in advance of submitting the DMR.
- b. The permittee shall provide the certificate of analysis or an equivalent document in a format approved by the Department establishing the basis for qualifying or flagging data due to

any reason such as, but not limited to, failing any aspect of QA/QC criteria; improper preservation or holding times; or presentation of ">" or "<" numerical results.

- c. Upon finalization of guidance by the Department on managing flagged or qualified data, the permittee shall submit flagged or qualified data in accordance with the procedures established in such guidance. Prior to finalization of such guidance, the permittee may include the flagged or qualified data in the specified calculation on the DMR or, if the DMR has already been submitted to the Department, amend the DMR to include such data.
- d. The inclusion of flagged or qualified data in the DMR under this provision shall not be considered a violation of the certification that the DMR is true, accurate, and complete.