

Reasonably Available Control Technology for water quality:

EPA: https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=2734

Effluent Limits

Effluent limits can be calculated based on current treatment technologies (technology-based - TBEL) or on discharge levels consistent with meeting ambient WQS (water quality based - WQBEL). This slide illustrates the differences between technology-based and water quality-based approaches to setting limits on loadings of pollutants. "Water body" is put in parenthesis to make the point that under the technology-based approach, success is measured primarily by reductions in discharges of pollutants, not effects on receiving waters. As a historical side-note, before 1972, water quality-based standards were too hard and slow to impose on individual dischargers, with little water quality improvement as the result. The 1972 amendments established the Effluent Limit Guideline (ELG) program as a first line of defense because they were relatively easy to set and were intended as the initial and uniformly imposed effluent control requirement. At the same time, Congress planned the Water Quality-Based Effluent Limits as the back-stop for the ELGs. The ELG program has been successful in the amount of nationally imposed limits on dischargers and the comparatively few (when compared to pre-1972) instances where the more analytically difficult WQBELs are required.

Technology-Based Effluent Limits

Technology-based effluent limits do not specify what technologies must be employed, but only the state levels of specific parameters that are allowed in the discharger's wastewater. Such limits are called "[performance standards](#)".

Performance Standards: Effluent (discharge) limits

- All effluent limits are end-of-pipe performance standards
- All permits must contain source category-specific, nationally applicable, "technology based" limits for certain types of pollutants.

Where tech-based limits are not adequate to achieve water quality standards for one or more parameter, additional facility-specific water quality-based" limits are also required for those parameters only (based on WLAs when TMDL available)

- Limits may be expressed as maximum loads and/or long-term averages.

Technology-based limits are derived from studies of facilities within a specific industrial category aimed at determining what levels of discharge, pollutant by pollutant, can be achieved using the most cost-effective set of available pollution prevention and control techniques applicable to those types of facilities. EPA publishes packages of regulations, called "effluent guidelines," which lay out performance standards for different types of facilities within major industrial categories. All dischargers within each of these subcategories are required to meet these end-of-pipe limits, regardless of the condition of the water into which they discharge, their contribution of a pollutant relative to other sources or other "risk-based" factors.

For existing direct dischargers, effluent guidelines are referred to as best available technology economically achievable (BAT). An existing industrial direct discharger is subject to BAT if the pollutant being discharged is either a toxic or gray area pollutant. Nevertheless, "best conventional technology" (BCT) applies if the pollutant from an industrial direct discharger is a conventional pollutant such as TSS, pH, oil and grease, BOD, etc. Similarly, POTWs discharging conventional pollutants are subject to "best practicable technology" (BPT), essentially a 1972 version of BCT. For new sources, technology-based limits are called New Source Performance Standards. Limits for new sources are often more stringent than those for existing sources, because new facilities can employ more options for building pollution prevention systems into their in-plant processes.

(Note: EPA also includes in its effluent guidelines package for a specific industrial category technology-based limits for "indirect" dischargers. These are called "categorical pretreatment standards," and cover performance standards for existing and new sources.) The following is an [example](#) of technology-based effluent limits for an industrial category.

EXAMPLE:

NPDES Permitting

Effluent Guideline Excerpt

Metal Finishing Subcategory

| | Direct Dischargers | | | | Indirect Dischargers | | | |
|----------------|--------------------|------------------|-----------------|------------------|----------------------|------------------|-----------------|------------------|
| | BAT | | NSPS | | PSES | | PSNS | |
| | 1-day (mg/L) | 30-day (mg/L) | 1-day (mg/L) | 30-day (mg/L) | 1-day (mg/L) | 30-day (mg/L) | 1-day (mg/L) | 30-day (mg/L) |
| Cadmium | 0.69 | 0.26 | 0.11 | 0.07 | 0.69 | 0.26 | 0.11 | 0.07 |
| Copper | 3.38 | 2.07 | 3.38 | 2.07 | 3.38 | 2.07 | 3.38 | 2.07 |

Note: Several other parameters also are limited but are not included here.

NSPS = New Source Performance Standards

PSES = Pretreatment Standards: Existing Sources

PSNS = " " " New " "

This is an excerpt from the Code of Federal Regulations, showing examples of technology-based limits.

Definitions:

BAT—Best Available Technology or Best Available Technology Economically Achievable (BATEA)

NSPS—New Source Performance Standards

PSES—Pretreatment Standards for Existing Sources

PSNS—Pretreatment Standards for New Sources

The limits that appear on the right side of the table (PSES and PSNS) apply to indirect discharges—those going into community sewer systems rather than a stream, lake, bay, estuary, and so forth. These technology-based requirements for indirect industrial discharges are often called "categorical" pretreatment requirements. (Note: The limits for direct and indirect dischargers are exactly the same.)

For cadmium, limits on new sources (NSPS, PSNS) are more than those for existing sources (BAT, PSES). New facilities can build pollution prevention and other techniques into their systems. This pattern does not always hold. For copper, for example, BAT, NSPS, PSES, and PSNS are all the same. Note that for both chemicals, BAT and PSES are the same, as are NSPS and PSNS.

For more information on EPA Effluent Guidelines, see EPA's [Effluent Limitation Guidelines](#) Web page.