

Benzene Waste Operations NESHAP
[40 CFR 61 Subpart FF]
Compliance Options

e-mail: Rob.Ferry@TGBpartnership.com

Facility Applicability.

Recordkeeping & Reporting – required of all affected facilities specified in 61.340 [per 61.356 & 61.357, as applicable].

Treatment & Control – an affected facility with *total annual benzene quantity from facility waste (TAB) ≥ 10 Mg/yr* must comply with one of the options illustrated in the table below [per 61.342(a)]. The TAB is determined as shown on page 2.

Waste Stream Compliance Options for Treatment & Control.

Waste Stream Condition:	61.342(c) Facilities with TAB ≥ 10 Mg/yr must treat and control as follows: 61.342(c)(1)(i) – <i>waste streams</i> shall be treated either onsite per 61.348 or off-site per 61.342(f), except that one of the options below may be chosen as a basis for exempting selected waste streams from treatment. 61.342(c)(1)(ii) – <i>waste management units (WMUs)</i> that receive or manage a nonexempt waste stream shall be controlled per 61.343-61.347 until the waste stream has achieved compliance with 61.342(c)(1)(i). (Streams exempt from treatment & control are still subject to recordkeeping/reporting)				61.348(a)(5) <i>Combined waste streams in a wastewater treatment system must comply with either 61.342(e) or 61.348(b)</i>
	61.342(c)(3)(i)	61.342(c)(3)(ii)	61.342(d)	61.342(e)	61.348(b)
Benzene concentration in a given waste stream is less than 10 ppmw?	Waste stream is exempt per 61.342(c)(2).	Waste stream is exempt per 61.342(c)(2).	Exempt, per 61.342(c)(2), if the waste stream is other than process wastewater.	Exempt, per 61.342(c)(2), if the waste stream is non-aqueous.	Treat & control until the benzene conc < 10 ppmw <u>and</u> the resulting <i>annual benzene quantity</i> < 1 Mg/yr, in aggregate, from all wastewater waste streams.
<i>Process wastewater only?</i>	Individual process wastewater streams with flow rate < 0.02 liter/min (10 Mg/yr) are exempt.	—	Selected process wastewater streams may be exempted, as long as the resulting <i>annual benzene quantity</i> < 1 Mg/yr, in aggregate, from all process wastewater.	—	—
<i>Aqueous waste stream (water content greater than or equal to 10%)?</i>	—	—	—	Selected aqueous streams may be exempted, as long as the resulting <i>annual benzene quantity</i> ≤ 6 Mg/yr, in aggregate, from all aqueous waste streams.	—
Any group of selected waste streams?	—	Exempt any group of waste streams totaling < 2 Mg/yr <i>annual benzene quantity</i> .	—	—	—
<i>An enhanced biodegradation unit becomes exempt if each waste stream entering it has benzene conc < 10 ppmw & all prior WMUs are controlled?</i>	YES [61.342(c)(2) & 61.348(a)(1)(i)] – <u>all waste management units</u> are exempt when the benzene conc < 10 ppmw.	YES [61.342(c)(2) & 61.348(a)(1)(i)] – <u>all waste management units</u> are exempt when the benzene conc < 10 ppmw.	YES [61.342(d)(2)(i)] – <u>unless</u> treatment in the enhanced bio unit is contributing toward achieving the 1 BQ limit for process wastewater.	YES [61.355(k)(4)]; and the annual benzene quantities of the waste streams entering the enhanced bio. unit do not count toward the 6 BQ limit.	YES [61.348(b)(2)]; and the annual benzene quantities of the waste streams entering the enhanced bio. unit do not count toward the 1 BQ limit.

Determination of TAB for Applicability of the BWON to a Facility

Procedure	Additional Guidance
61.355(a) Determine <i>total annual benzene quantity from facility waste</i> (TAB) for the <i>facility</i> as outlined below:	
61.355(a)(1) For each <i>waste stream</i> , determine whether it has a <i>flow-weighted annual average water content greater than 10 percent water</i> – let us call these <i>aqueous</i> waste streams.	
61.355(a)(1) The <i>aqueous</i> waste streams to be included are specified in 61.342(a).	61.342(a) The benzene quantity in a waste stream is to be counted only once (& thus would typically not include sludge and slop oil removed from waste management units). 61.342(a)(1) Wastes that are exempted from controls are still to be included in the TAB determination, if they are aqueous. 61.342(a)(2) Benzene in a waste material subject to this part that is to be sold shall be included in the TAB determination, if the material is aqueous. 61.342(a)(3) Wastes from remediation activities are not included in the TAB determination if generated on-site, but they are included if generated off-site, if they are aqueous. If the facility's TAB is ≥ 10 Mg/yr, then these waste streams are subject to 61.342(c)-(h), even if generated on-site.
61.355 (a)(1)(i) For each waste stream to be included, determine the <i>annual waste quantity</i> per 61.355(b).	61.355(b) Make the determination at the <i>point of waste generation</i> , except as noted in paragraphs (1)-(4), using paragraph (5), (6), or (7). 61.355(b)(4) <i>Process unit turnaround waste</i> that is generated only at 2-year or greater intervals may be annualized over the period between turnarounds. 61.355(a)(6) Other less-frequent-than-annual aqueous waste streams shall be included in the TAB determination for the year in which they are generated (i.e., no annualizing).
61.355 (a)(1)(ii) For each waste stream to be included, determine the <i>flow-weighted annual average benzene concentration</i> per 61.355(c).	61.355(c) Meet the requirements of (c)(1), and use the methods of (c)(2) or (c)(3). 61.355 (c)(1)(i) Make the determination at the <i>point of waste generation</i> , except as noted in paragraphs (A)-(D). 61.355 (c)(1)(ii) Make the determination prior to loss of benzene by volatilization. 61.355 (c)(1)(iii) Make the determination prior to loss of benzene concentration due to mixing or diluting. 61.355 (c)(1)(iv) & 61.342(a)(4) Make the determination prior to loss of benzene by treatment, except as noted in (c)(1)(i)(A)-(D). [61.342(a)(4) says except as in (c)(1)(i)(A)-(C).] 61.355 (c)(1)(v) For multiphase streams, determine the weighted-average benzene concentration.
61.355 (a)(1)(iii) Calculate the <i>annual benzene quantity</i> for a given waste stream by multiplying the <i>annual waste quantity</i> times the <i>flow-weighted annual average benzene concentration</i> .	
61.355(a)(2) Calculate the TAB for the facility by adding: The <i>annual benzene quantity</i> for each <i>waste stream</i> specified in 61.355(a)(1) [which cites 61.342(a)]; and The <i>annual benzene quantity</i> for each <i>process unit turnaround waste</i> , annualized.	61.342(a) Specifies the aqueous waste streams to be included in the determination of TAB (see above).
61.355(a)(3) If TAB for the facility ≥ 10 Mg/yr, comply with 61.342.	61.342(c)-(e) See the table on the previous page for the control options.
61.355 (a)(4) & (5) If TAB for the facility < 10 Mg/yr, comply with the specified recordkeeping and reporting requirements.	

Definitions.

Annual benzene quantity is calculated for a given *waste stream* by multiplying the *annual waste quantity* of the waste stream times its *flow-weighted annual average benzene concentration* [61.355(a)(1)(iii)]. Determination of a facility’s *total annual benzene quantity from facility waste* for purposes of TAB determination is summarized on page 2. For specific compliance options, the total annual benzene quantity (*BQ*) for that option is determined as follows:

	Compliance Option (see page 1)			
	61.342(c)(3)(ii) (2 BQ exemption)	61.342(d) (1 BQ exemption)	61.342(e) (6 BQ exemption)	61.348(b) combined waste streams
<u>Determine BQ per:</u>	61.355(a) & (j)	61.342(d)(2)(i)	61.355(a) & (k)	61.348(b)(2)(ii)
<u>Waste streams to be included in BQ:</u>	All waste streams chosen for exemption, regardless of water content or flow rate.	All process wastewater streams, regardless of water content or flow rate.	All aqueous waste streams (including from remediation & turnaround), regardless of flow rate, that do not enter exempt bio units (& no annualizing of turnaround wastes).	All waste streams in the facility wastewater treatment systems, regardless of water content or flow rate, that do not enter exempt bio units.
<u>For treated waste streams:</u>	Determine <i>BQ</i> at the <i>point of waste generation</i> (i.e., prior to treatment).	Determine <i>BQ</i> after treatment (even if treated off-site).	Determine <i>BQ</i> entering the first exempt (uncontrolled) <i>waste management unit</i> (even if treated off-site).	Determine <i>BQ</i> entering the first exempt (uncontrolled) <i>waste management unit</i> (even if treated off-site).

Annual waste quantity is determined for each waste stream in accordance with 61.355(b) [61.355(a)(1)(i)].

Aqueous is short hand for a waste stream that has *flow-weighted annual average water content greater than 10 percent water*, on a volume basis as total water, or is mixed with water or other wastes at any time and the resulting mixture has an annual average water content greater than 10 percent [61.355(a)(1)].

Enhanced biodegradation unit is a suspended-growth process that generates biomass, uses recycled biomass, and periodically removes biomass from the process [61.348(b)(2)(ii)(B)]. {common example – activated sludge system}

Combined waste stream means a waste stream in which nonexempt *process wastewater*, *product tank drawdown*, or *landfill leachate* is combined with other waste streams [61.348(a)(5)].

Facility means all process units and product tanks that generate waste within a stationary source, and all waste management units that are used for waste treatment, storage, or disposal within a stationary source [61.341].

Flow-weighted annual average benzene concentration is determined for each waste stream in accordance with 61.355(c) [61.355(a)(1)(ii)].

Flow-weighted annual average water content greater than 10 percent water [see *aqueous*].

Landfill leachate means any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste in a landfill [260.10].

Point of waste generation means the location where the *waste stream* exits the process unit component or storage tank prior to handling or treatment in an operation that is not an integral part of the production process, or in the case of *waste management units* that generate new wastes after treatment, the location where the waste stream exits the waste management unit component [61.341].

Process unit turnaround means the shutting down of the operations of a process unit, the purging of the contents of the process unit, the maintenance or repair work, followed by restarting of the process [61.341].

Process unit turnaround waste means a waste that is generated as a result of a *process unit turnaround* [61.341].

Process wastewater means water which comes in contact with benzene during manufacturing or processing operations conducted within a process unit. Process wastewater is not organic wastes, process fluids, *product tank drawdown*, cooling tower blowdown, steam trap condensate, or *landfill leachate* [61.341].

Product tank drawdown means any material or mixture of materials discharged from a product tank for the purpose of removing water or other contaminants from the product tank [61.341].

Slop oil means the floating oil and solids that accumulate on the surface of an oil-water separator [61.341].

Total annual benzene quantity from facility waste (TAB) is the sum of the *annual benzene quantities* for each of the individual *aqueous waste streams* at the facility [paraphrased from 61.342(a)]. The procedure for determining TAB is outlined on page 2.

Waste management unit (WMU) means a piece of equipment, structure, or transport mechanism used in handling, storage, treatment, or disposal of waste. Examples of a waste management unit include a tank, surface impoundment, container, oil-water separator, individual drain system, steam stripping unit, thin-film evaporation unit, waste incinerator, and landfill [61.341].

Waste stream means the waste generated by a particular process unit, product tank, or *waste management unit*. The characteristics of the waste stream (e.g., flow rate, benzene concentration, water flow rate, benzene concentration, water content) are determined at the *point of waste generation* {except as specified in 61.342(d)(2)(i), 61.348(b)(2)(ii), and 61.355(k)(2)}. Examples of a waste stream include *process wastewater*, *product tank drawdown*, sludge and *slop oil* removed from waste management units, and *landfill leachate* [61.341].

Wastewater treatment system means any component, piece of equipment, or installation that receives, manages, or treats *process wastewater*, *product tank drawdown*, or *landfill leachate* prior to direct or indirect discharge in accordance with the NPDES permit regulations under 40 CFR part 122. These systems typically include individual drain systems, oil-water separators, air flotation units, equalization tanks, and biological treatment units [61.341].