Chapter

7

POLLUTANTS SELECTED FOR REGULATION

Chapter 6 details the pollutants of concern for each subcategory and the methodology used in selecting the pollutants. As expected for the CWT industry, these pollutants of concern lists contain a broad spectrum of pollutants. EPA has, however, chosen not to regulate all of these parameters. This chapter details the pollutants of concern which were not selected for regulation under the proposed options and provides a justification for eliminating these pollutants. (The proposed options are detailed in Chapter 9.) Additionally, Figures 7-1 and 7-2 illustrate the procedures used to select the regulated pollutants for direct and indirect dischargers.

TREATMENT CHEMICALS *7.1*

EPA excluded all pollutants which may serve as treatment chemicals: aluminum, calcium, chloride, fluoride, iron, magnesium, phosphorus, potassium, sodium, and sulfur. EPA eliminated these pollutants because regulation of these pollutants could interfere with their beneficial use as wastewater treatment additives.

NON-CONVENTIONAL BULK PARAMETERS *7.2*

EPA excluded many non-conventional bulk parameters such as total dissolved solids (TDS), chemical oxygen demand (COD), organic carbon (TOC), nitrate/nitrite, total phenols, total phosphorus, and total sulfide. EPA excluded these parameters because it is more appropriate to target specific compounds of interest rather than a parameter which measures a variety of pollutants for this industry. The specific pollutants which comprise the bulk parameter may or may not be of concern to EPA. EPA also excluded amenable cyanide since the proposed total cyanide limit would also control amenable cyanide.

POLLUTANTS NOT DETECTED AT TREATABLE LEVELS *7.3*

EPA eliminated pollutants that were present below treatable concentrations in wastewater influent to the treatment system(s) selected as the basis for effluent limitations. For a pollutant to be retained, the pollutant: a) had to be detected in the influent sample at treatable levels (ten times the minimum analytical detection limit) in at least fifty percent of the samples; or b) had to be detected at any level in the influent samples at least 50 percent of the time and the combined mean of the influent samples for the entire episode had to be greater than or equal to ten times the minimum analytical detection limit. EPA added the second condition to account for instances where a slug of pollutant was treated during the sampling episode. EPA added this condition since the CWT industry's waste receipts vary daily and EPA wanted to incorporate these variations in the calculations of long term averages and limitations. Pollutants excluded from regulation for the selected subcategory options because they were not detected at treatable levels are presented in Table 7-1.

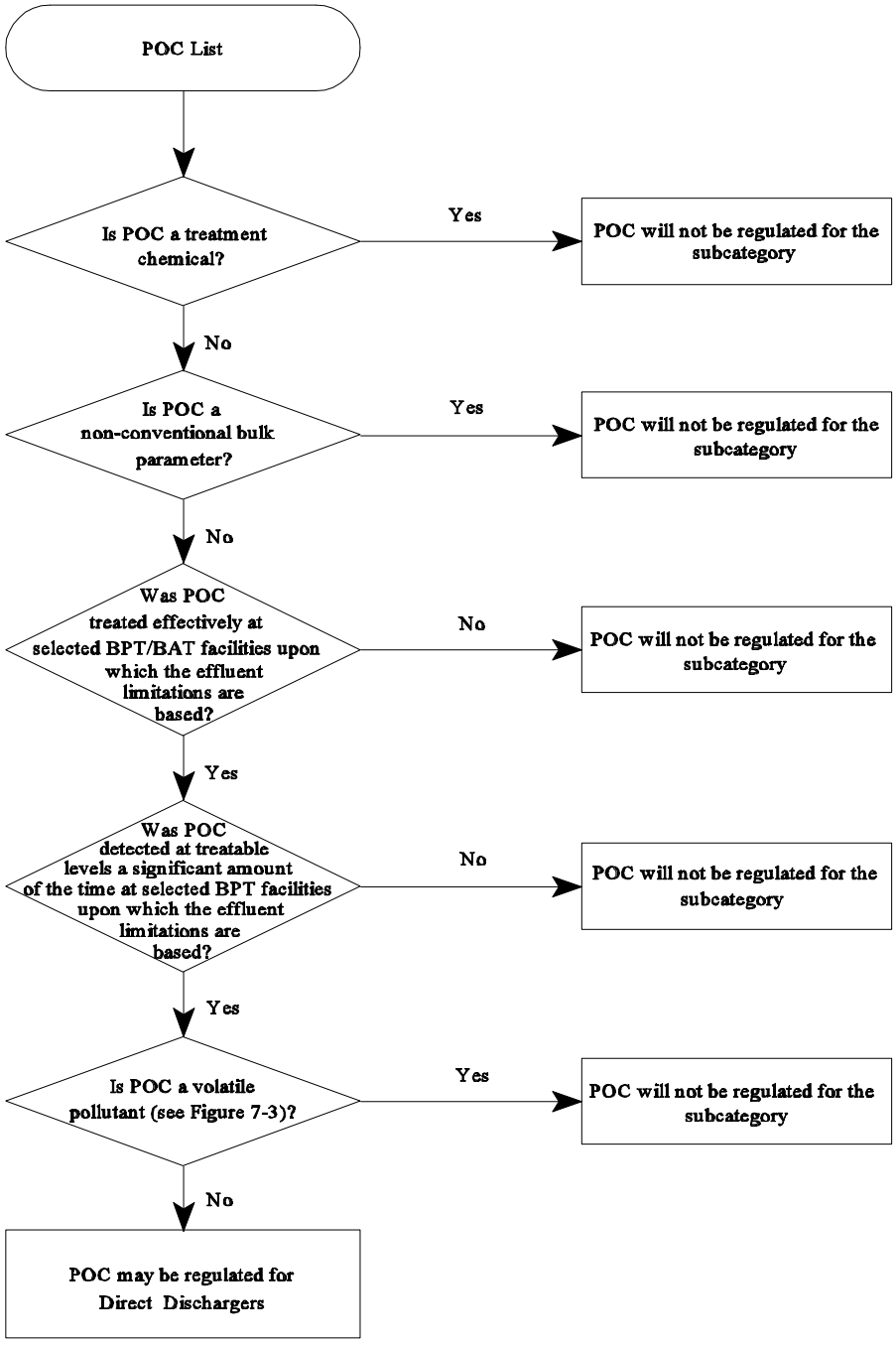

Figure 7-1. Selection of Pollutants That May Be Regulated for Direct Discharges for Each Subcategory

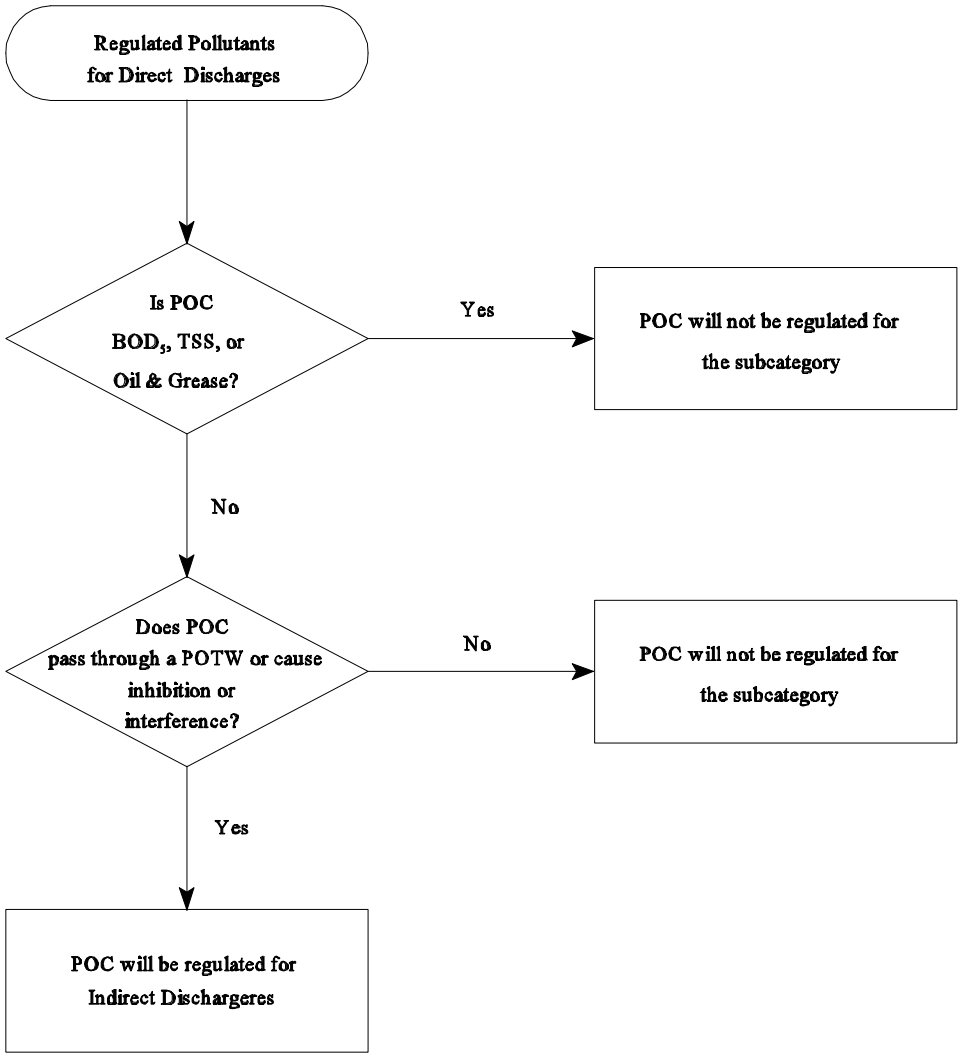

Figure 7-2. Selection of Pollutants to be Regulated for Indirect Discharges for Each Subcategory

Table 7.1 Pollutants Not Detected At Treatable Levels

Metals Option 3	Metals Option 4	Oils Option 8	Oils Option 9	Organics Option 3/4
Amenable cyanide	Amenable cyanide	Amenable cyanide	Amenable cyanide	Amenable cyanide
SGT-HEM	SGT-HEM	Beryllium	Beryllium	Oil & Grease
Total cyanide	Arsenic[1]	Germanium	Germanium	Arsenic
Oil & Grease[2]	Barium	Lutetium	Lutetium	Barium
Barium	Beryllium	Silver	Silver	Iodine
Gallium	Gallium	Vanadium	Vanadium	Lead
Indium	Indium	Aniline	Aniline	Titanium
Iodine	Iodine	Benzyl alcohol	n-Hexacosane	Bromodichloromethane
Iridium	Neodymium	Diphenyl ether	n-Tetracosane	Carbon disulfide
Lithium	Niobium	n-Hexacosane	n,n-Dimethylformamide	Chlorobenzene
Neodymium	Osmium	n-Tetracosane	1,4-dioxane	Diethyl ether
Niobium	Tantalum	n,n-Dimethylformamide		Ethane, Pentachloro-
Osmium	Tellurium	o-Cresol		Hexachloroethane
Strontium	Thallium	1,4-dioxane		Isophorone
Tantalum	Benzyl alcohol	2-phenylnaphthalene		o+p-Xylene
Tellurium	Bis(2-ethylhexyl) phthalate	2,3-benzofluorene		1,1,2,2-tetrachloroethane
Zirconium	Carbon disulfide	2,4-dimethylphenol		1,2-dichlorobenzene
Benzoic acid	Hexanoic Acid	3,6-dimethylphenanthrene		1,3-dichloropropane
Benzyl alcohol	Methylene chloride	4-chloro-3-methylphenol		2-picoline
Bis(2-ethylhexyl) phthalate				2,4-dimethylphenol
Bromodichloromethane				3,4,5-trichlorocatechol
Carbon disulfide				3,4,6-trichloroguaiacol

Table 7.1 Pollutants Not Detected At Treatable Levels

Metals Option 3	Metals Option 4	Oils Option 8	Oils Option 9	Organics Option 3/4
Chloroform				3,6-dichlorocatechol
Dibromochloromethane				4-chlorophenol
Hexanoic Acid				4,5-dichloroguaiacol
Methylene chloride				4,5,6-trichloroguaiacol
n-Nitrosomorpholine				5-chloroguaiacol
n,n-Dimethylformamide				6-chlorovanillin
Pyridine				
Tribromomethane				
Trichloroethene				
Tripropyleneglycol methyl ether				
2-Butanone				
2-Propanone				

[1] While arsenic was not detected at treatable levels at the facility forming the basis of Metals Option 4, EPA is transferring data from single stage precipitation and regulating arsenic for Metals Option 4.

[2]While oil and grease was not detected at treatable levels at the facility forming the basis of Metals Option 3, EPA is transferring data from Metals Option 4 and proposing regulation of Oil & Grease for Metals Option 3.

POLLUTANTS NOT TREATED *7.4*

EPA excluded all pollutants for which the selected technology option was ineffective (i.e., pollutant concentrations remained the same or increased across the treatment system). For the oils subcategory option 8, phenol and 2-propanone were ineffectively treated, and for the oils subcategory option 9, 2-propanone and 2,4-dimethylphenol were not treated effectively. For the organics subcategory, the selected treatment technology did not effectively treat boron, chromium, lithium, nickel, and tin. For the metals subcategory options, with the exception of selenium (for Option 3), all pollutants of concern were effectively treated.

VOLATILE POLLUTANTS *7.5*

EPA detected volatile organic pollutants in the waste receipts of all three subcategories. For this rule, EPA defines a volatile pollutant as a pollutant which has a Henry's Law constant in excess of 10^{-4} atm m^3 mol^{-1}. Table 7-2 lists the organic pollutants (those analyzed using method 1624 or 1625) by subcategory along with their Henry's Law constant. For pollutants in the oils subcategory, the solubility in water was reported in addition to the Henry's Law constant to determine whether volatile pollutants remained in the oil-phase or volatilized from the aqueous phase. If no data were available on the Henry's Law constant or solubility for a particular pollutant, then the pollutant was assigned an average pollutant group value. Pollutant groups were developed by combining pollutants with similar structures. If no data were available for any pollutant in the group, then all pollutants in the group were not considered volatile. The assignment of pollutant groups is discussed in more detail in Section 7.6.2.

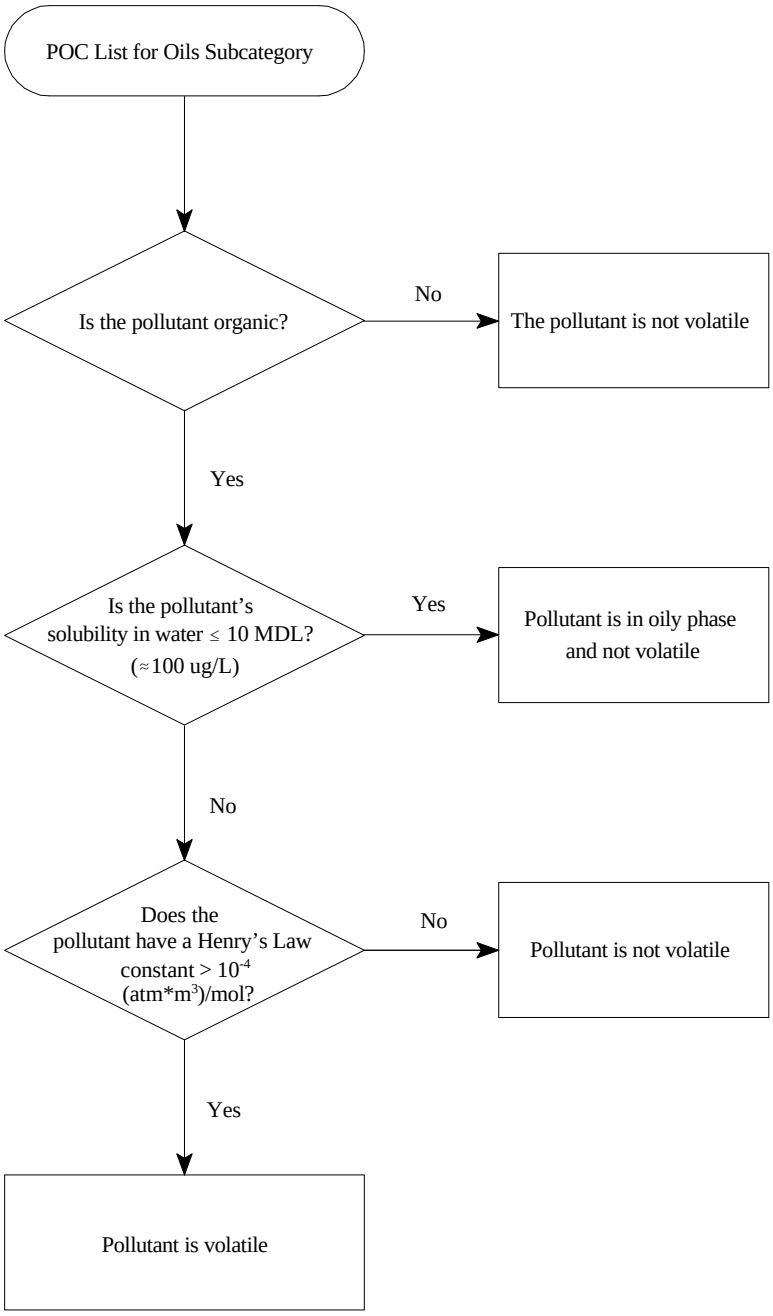

Figure 7-3. Determination of Volatile Pollutants for Oils Subcategory

Table 7.2. Volatile Organic Pollutant Properties By Subcategory

Organic Pollutant	CAS #	Method	Subcategory			Henry's Law Constant $\frac{atm * m^3}{mol}$	Solubility (mg/L)	Solubility Ref. and Temp.	Pollutant Group	Volatile ?	Volatile for Oils?
			Metals	Oils	Organics						
1-methylfluorene	1730376	1625		X		4.26E-03	1.81E+04			yes	yes
1-methylphenanthrene	832649	1625		X		>E-04	1.21E+03		Group DD	yes	yes
1,1-dichloroethane	75343	1624			X	5.50E-03				yes	
1,1-dichloroethene	75354	1624		X	X	1.90E-01	2.10E+02	25		yes	yes
1,1,1-trichloroethane	71556	1624		X	X	3.00E-02	4.40E+03	20		yes	yes
1,1,1,2-tetrachloroethane	630206	1624			X	3.00E-02				yes	
1,1,2-trichloroethane	79005	1624			X	1.20E-03				yes	
1,2-dibromoethane	106934	1624			X	2.00E-02				yes	
1,2-dichloroethane	107062	1624		X	X	9.14E-04	8.69E+03	20		yes	yes
1,2,3-trichloropropane	96184	1624			X	2.10E-04				yes	
1,2,4-trichorobenzene	120821	1625		X		2.30E-03	1.90E+01	22		yes	yes
1,4-dichlorobenzene	106467	1625		X		3.10E-03	7.90E+01	25		yes	yes
2-butanone	78933	1624	X	X	X	2.70E-05	2.75E+05			no	no
2-methylnaphthalene	91576	1625		X		7.98E-04	2.60E+01	25		yes	yes
2-phenylnaphthalene	612902	1625		X		>E-04	1.21E+03		Group DD	yes	yes
2-propanone	67641	1624	X		X	2.10E-05				no	
2,3-benzofluorene	243174	1625		X		>E-04	1.21E+03		Group DD	yes	yes
2,3-dichloroaniline	608275	1625			X	<E-04				no	
2,3,4,6-tetrachlorophenol	58902	1625			X	3.00E-04				yes	
2,4,5-trichlorophenol	95954	1625			X	2.20E-04				yes	
2,4,6-trichlorophenol	88062	1625			X	4.00E-06				no	
3,4-dichlorophenol	95772	1625			X	>10E-4					

Table 7.2. Volatile Organic Pollutant Properties By Subcategory

Organic Pollutant	CAS #	Method	Subcategory			Henry's Law Constant $\frac{atm * m^3}{mol}$	Solubility (mg/L)	Solubility Ref. and Temp.	Pollutant Group	Volatile ?	Volatile for Oils?
			Metals	Oils	Organics						
3,5-dichlorophenol	591355	1625			X	>10E-4					
3,6-dimethylphenanthrene	1576676	1625		X		>E-04	1.21E+03		Group DD	yes	yes
4-chloro-3-methylphenol	59507	1625		X		2.50E-06	3.85E+03	20		no	no
4-methyl-2-pentanone	108101	1624		X	X	3.80E-04	1.91E+04			yes	yes
Acenaphthene	83329	1625		X		9.10E-05	3.42E+00	25		no	no
Acetophenone	98862	1625			X	<E-04	5.50E+03			no	
Alpha-terpineol	988555	1625		X		6.90E-05				no	no
Ammonia-N	7664417	350.2	X	X	X						
Aniline	62533	1625			X	<E-04			Group J	no	
Anthracene	120127	1625		X		8.60E-05	1.29E+00	25		no	no
Benzene	71432	1624		X	X	5.50E-03	1.78E+03	20		yes	yes
Benzo (a) anthracene	56553	1625		X		1.00E-06	1.00E-02	24		no	no
Benzo (a) pyrene	50328	1625		X		4.90E-07	3.80E-03	25		no	no
Benzo (b) fluoranthene	205992	1625		X		1.22E-05	1.37E-02			no	no
Benzo (k) fluoranthene	207089	1625		X		3.87E-05	1.37E-02			no	no
Benzoic acid	65850	1625	X	X	X	7.00E-08	2.90E+03	20		no	no
Benzyl alcohol	100516	1625		X		1.10E+00	3.50E+04	20		yes	yes
Biphenyl	92524	1625		X		4.80E-04	7.50E+00	25		yes	yes
Bis(2-ethylhexyl)phthalate	117817	1625		X		3.00E-07	1.30E+00	25		no	no
Bromodichloromethane	75274	1624	X			2.10E-03				yes	
Butyl benzyl phthalate	85687	1625		X		8.30E-06	2.90E+00			no	no
Carbazole	86748	1625		X		<E-04			Group J	no	no

Table 7.2. Volatile Organic Pollutant Properties By Subcategory

Organic Pollutant	CAS #	Method	Subcategory			Henry's Law Constant $\frac{atm * m^3}{mol}$	Solubility (mg/L)	Solubility Ref. and Temp.	Pollutant Group	Volatile ?	Volatile for Oils?
			Metals	Oils	Organics						
Carbon disulfide	75150	1624		X		1.20E-02	2.90E+03	20		yes	yes
Chlorobenzene	108907	1624		X		3.58E-03	4.88E+02	25		yes	yes
Chloroform	67663	1624	X	X	X	2.88E-03	9.30E+03	25		yes	yes
Chrysene	218019	1625		X		1.50E-06	6.00E-03	25		no	no
Dibenzofuran	132649	1625		X		>E-04	1.00E+01			no	no
Dibenzothiophene	132650	1625		X		4.40E-04	soluble		Group II	no	no
Dibromochloromethane	124481	1624	X			>E-04				yes	
Diethyl ether	60297	1624			X						
Diethyl phthalate	132650	1625		X		1.20E-06	8.96E+02			no	no
Dimethyl sulfone	67710	1625			X	>E-04	very soluble			no	
Di-n-butyl phthalate	84742	1625		X		2.80E-07	4.00E+02	25		no	no
Diphenyl ether	101848	1625		X		6.60E-03	2.10E+01	25		yes	yes
Ethyl benzene	100414	1624		X		6.60E-03	1.52E+02	20		yes	yes
Ethylenethiourea	96457	1625			X	>E-04			Group I	no	
Fluoranthene	206440	1625		X		6.50E-06	2.65E-01	25		no	no
Fluorene	86737	1625		X		6.40E-05	1.90E+00	25		no	no
Hexanoic Acid	142621	1625		X	X	1.90E+00	1.10E+04			yes	yes
Methylene chloride	75092	1624		X	X	2.30E-03	1.67E+04	25		yes	yes
m-Xylene	108383	1624		X	X	1.10E-02	2.00E+02			yes	yes
Naphthalene	91203	1625		X		4.60E-04	3.00E+01	25		yes	yes
N-decane	124185	1625		X		7.14E+00	9.00E-03			yes	no

Table 7.2. Volatile Organic Pollutant Properties By Subcategory

Organic Pollutant	CAS #	Method	Subcategory			Henry's Law Constant $\frac{atm * m^3}{mol}$	Solubility (mg/L)	Solubility Ref. and Temp.	Pollutant Group	Volatile ?	Volatile for Oils?
			Metals	Oils	Organics						
n-Docosane	629970	1625		X		>E-04	4.78E-03		Group CC	yes	no
n-Dodecane	112403	1625		X		>E-04	4.78E-03		Group CC	yes	no
n-Eicosane	112958	1625		X		>E-04	4.78E-03		Group CC	yes	no
n-Hexadecane	544763	1625		X		>E-04	9.00E-04	25		yes	no
n-Nitrosomorpholine	59892	1625	X			>E-04			Group I	no	
n-Octadecane	593453	1625		X		>E-04	7.00E-03	25		yes	no
n-Tetradecane	629594	1625		X		>E-04	2.20E-03	25		yes	no
n,n-Dimethylformamide	68122	1625	X		X	<E-04				no	
o-Cresol	95487	1625		X	X	1.60E-06	3.10E+04			no	no
o+p-Xylene	136777612	1624		X		7.00E-03	1.87E+02	20		yes	yes
p-Cresol	106445	1625		X	X	9.60E-07	2.40E+04	40		no	no
p-Cymene	99876	1625		X		>E-04	3.40E+02			yes	yes
Pentachlorophenol	87865	1625			X	2.80E-06				no	
Pentamethylbenzene	700129	1625		X		>E-04	4.96E+02		Group K	yes	yes
Phenanthrene	85018	1625		X		2.26E-04	8.16E-01	21		yes	yes
Phenol	108952	1625		X	X	4.54E-07	8.00E+04	25		no	no
Pyrene	129000	1625		X		5.10E-06	1.60E-01	26		no	no
Pyridine	110861	1625	X	X	X	2.10E-06	3.88E+05			no	no
Styrene	100425	1625		X		2.80E-03	3.00E+02	20		yes	yes
Tetrachloroethene	127184	1624		X	X	1.53E-03	1.50E+02	25		yes	yes
Tetrachloromethane	56235	1624			X	2.90E-02				yes	
Toluene	108883	1624		X	X	6.66E-03	5.15E+02	20		yes	yes

Table 7.2. Volatile Organic Pollutant Properties By Subcategory

Organic Pollutant	CAS #	Method	Subcategory			Henry's Law Constant $\frac{atm * m^3}{mol}$	Solubility (mg/L)	Solubility Ref. and Temp.	Pollutant Group	Volatile ?	Volatile for Oils?
			Metals	Oils	Organics						
Trans-1,2-dichloroethene	156605	1624			X	5.30E-03				yes	
Tribromomethane	75252	1624	X			5.30E-04				yes	
Trichloroethene	79016	1624	X	X	X	9.10E-03	1.10E+03	25		yes	yes
Tripropyleneglycol methyl ether	20324338	1625	X	X		>E-04			Group GG	no	no
Vinyl chloride	75014	1624			X	2.80E-02				yes	

As shown in Table 7-2, volatile pollutants were regularly detected at treatable levels in waste receipts from CWT facilities, particularly in the oils and organics subcategory. However, treatment technologies currently used at many of these facilities, while removing the pollutants from the wastewater, do not "treat" the volatiles. The volatile pollutants are simply transferred to the air. For example, in the metals subcategory, wastewater treatment technologies are generally based on chemical precipitation, and the removal of volatile pollutants from wastewater following treatment with chemical precipitation is due to volatilization. Some CWT facilities recognize that volatilization may be occurring and have installed air stripping systems equipped with emissions control to effectively remove the pollutants from both the water and the air.

EPA evaluated various wastewater treatment technologies during the development of this rule. These technologies were considered because of their efficacy in removing pollutants from wastewater. Since EPA is concerned about removing pollutants from all environmental media, EPA also evaluated wastewater treatment trains for the oils and organics subcategories which included air stripping with emissions control.

EPA is not proposing to regulate any predominantly volatile parameters. The non-regulated volatile parameters for the metals, organics, and oils subcategory options that were not already excluded as detailed in Sections 7.1, 7.2, 7.3, and 7.4 are presented in Table 7-3. Unlike the metals and the organics subcategories, for the oils subcategory, volatilization can not be predicted using the Henry's Law constant only. Henry's Law constants are established for pollutants in an aqueous phase only. For other non-aqueous single phase or two-phase systems (such as oil-water), other volatilization constants apply. Estimating these constants in oil-water mixtures can lead to engineering calculations which are generally based on empirical data. EPA chose an approach which is depicted in Figure 7-3 and discussed below.

First, EPA reviewed water solubility data to estimate whether the organic pollutants would be primarily in an oil phase or aqueous phase. For pollutants which have a solubility less than ten times the minimum analytical detection limit (the same edit used to determine pollutants of concern and long term averages), EPA assumed that the amount of pollutants in the aqueous phase would be negligible and that all of the pollutant would be primarily in an oil phase. For pollutants which have a solubility greater than ten times the minimum analytical detection limit, EPA assumed that the amount of pollutant in the oil phase would be negligible and that all of the pollutant would be primarily in an aqueous phase. For pollutants determined to be in an aqueous phase, EPA then reviewed the Henry's law constant in the same manner as the other two subcategories. For pollutants determined to be in an oil phase, EPA assumed that volatilization would be negligible (regardless of their volatility in the aqueous phase) and has not categorized them as volatile pollutants.

Even though EPA has not regulated volatile pollutants through this rulemaking, EPA encourages all facilities which accept waste receipts containing volatile pollutants to incorporate air stripping with overhead recovery into their wastewater treatment systems. EPA also notes that CWT facilities determined to be major sources of hazardous air pollutants are subject to maximum achievable control technology (MACT) as promulgated for off-site waste and recovery operations on July 1, 1996 (61FR34140) as 40 CFR Part 63.

Table 7-3. Non-Regulated Volatile Organic Pollutants by Subcategory and Option

Metals Option 3	***Metals Option 4***	***Organics Option 3/4***	***Oils Option 8***	***Oils Option 9***
Ammonia-N	Ammonia-N	1,1,1,2-tetrachloroethane	1-methylfluorene	1-methylfluorene
Carbon disulfide	Bromodichloromethane	1,1,1-trichloroethane	1-methylphenanthrene	1-methylphenanthrene
	Chloroform	1,1,2-trichloroethane	1,1,1-trichloroethane	1,1,1-trichloroethane
	Dibromochloromethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloroethene
	n-Nitrosomorpholine	1,1-dichloroethene	1,2-dichloroethane	1,2-dichloroethane
	n,n-Dimethylformamide	1,2,3-trichloropropane	1,2,4-trichlorobenzene	1,2,4-trichlorobenzene
	Tribromomethane	1,2-dibromoethane	1,4-dichlorobenzene	1,4-dichlorobenzene
	Trichloroethene	1,2-dichloroethane	2-methylnapthalene	2-methylnapthalene
	Tripropyleneglycol methyl ether	2,3,4,6-tetrachlorophenol	4-methyl-2-pentanone	2-phenylnaphthalene
		2,4,5-trichlorophenol	Ammonia-N	2,3-benzofluorene
		3,4-dichlorphenol	Benzene	3,6-dimethylphenanthrene
		3,5-dichlorphenol	Biphenyl	4-methyl-2-pentanone
		4-methyl-2-pentanone	Carbon disulfide	Ammonia-N
		Ammonia-N	Chlorobenzene	Benzene
		Benzene	Chloroform	Benzyl alcohol
		Chloroform	Dibenzofuran	Biphenyl
		Dimethyl sulfone	Dibenzothiopene	Carbon disulfide
		Ethylenethiourea	Ethyl benzene	Chlorobenzene
		Hexanoic Acid	Hexanoic Acid	Chloroform
		Methylene chloride	Methylene chloride	Dibenzofuran
		m-Xylene	m-Xylene	Dibenzothiopene
		Tetrachloroethene	Naphthalene	Diphenyl ether
		Toluene	o+p-Xylene	Ethyl benzene
		Trans-1,2-dichloroethene	p-Cymene	Hexanoic Acid
		Trichloroethene	Pentamethylbenzene	Methylene chloride
		Vinyl chloride	Phenanthrene	m-Xylene
			Styrene	Naphthalene
			Tetrachloroethene	o+p-Xylene
			Toluene	p-Cymene
			Trichloroethene	Pentamethylbenzene
			Tripropyleneglycol methyl ether	Phenanthrene
				Styrene
				Tetrachloroethene
				Toluene
				Trichloroethene
				Tripropyleneglycol methyl ether

POLLUTANTS SELECTED FOR PRETREATMENT STANDARDS AND PRETREATMENT STANDARDS FOR NEW SOURCES (INDIRECT DISCHARGERS) *7.6*

Background *7.6.1*

Unlike direct dischargers whose wastewater will receive no further treatment once it leaves the facility, indirect dischargers send their wastewater streams to a POTW for further treatment. Therefore, for indirect dischargers, before proposing pretreatment standards, EPA examines whether the pollutants discharged by the industry "pass through" a POTW to waters of the U.S. or interfere with the POTW operation or sludge disposal practices. Generally, to determine if pollutants pass through a POTW, EPA compares the percentage of the pollutant removed by well-operated POTWs achieving secondary treatment with the percentage of the pollutant removed by facilities meeting BAT effluent limitations. A pollutant is determined to "pass through" a POTW when the average percentage removed by a well-operated POTW is less than the percentage removed by direct dischargers complying with BPT/BAT effluent limitations. In this manner, EPA can ensure that the combined treatment at indirect discharging facilities and POTWs is at least equivalent to that obtained through treatment by a direct discharger.

This approach to the definition of pass-through satisfies two competing objectives set by Congress: (1) that standards for indirect dischargers be equivalent to standards for direct dischargers, and (2) that the treatment capability and performance of the POTW be recognized and taken into account in regulating the discharge of pollutants from indirect dischargers. Rather than compare the mass or concentration of pollutants discharged to the POTW with the mass or concentration of pollutants discharged by a BAT facility, EPA compares the percentage of the pollutants removed by the facility with the POTW removal. EPA takes this approach because a comparison of the mass or concentration of pollutants in a POTW effluent with pollutants in a BAT facility's effluent would not take into account the mass of pollutants discharged to the POTW from non-industrial sources, nor the dilution of the pollutants in the POTW effluent to lower concentrations from the addition of large amounts of non-industrial water.

For specific pollutants, such as volatile organic compounds, EPA may use other means to determine pass-through. Generally, for volatile compounds, a volatile override test based on the Henry's Law constant is used to determine pass-through. The volatile override test is applied where the overall percent removal estimated for a well-operated POTW substantially includes emission of the pollutant to the air rather than actual treatment. Therefore, for volatile pollutants, even though the POTW percent removal data indicate that the pollutant would not pass through, regulation of the pollutant is warranted to ensure "treatment" of the pollutant.

As detailed in Section 7.5, for all three subcategories, EPA selected technology options which are not designed to control the emission of volatile pollutants. Therefore, for the selected options, removal of volatile pollutants from wastewater is largely due to the emission of the pollutant rather than treatment. As such, for this rulemaking, EPA believes the volatile override test is inappropriate and has determined pass-through solely by comparing percent removals.

In selecting the regulated pollutants under the pretreatment standards, EPA starts with the pollutants regulated for direct dischargers under BPT/BAT. For pretreatment standards, EPA then excludes three conventional parameters, BOD_5, total suspended solids (TSS), and oil and grease (measured as HEM) from further consideration without conducting the percent removal comparison because POTWs are designed to treat these parameters. Therefore, for this rulemaking, EPA evaluated 23 pollutants for

metals option 3, 31 pollutants for metals option 4, 51 pollutants for oils option 9, and 23 pollutants for Organics Option 4 for possible PSES and PSNS regulation. The following sections describe the methodology used in determining percent removals for the option technologies, percent removals for a "well-operated" POTW, and the results of EPA's pass-through analysis.

Determination of Percent Removals for Well-Operated POTWs *7.6.2*

The primary source of the POTW percent removal data was the "Fate of Priority Pollutants in Publicly Owned Treatment Works" (EPA 440/1-82/303, September 1982), commonly referred to as the "50-POTW Study". However, the 50-POTW Study did not contain data for all pollutants for which the pass-through analysis was required. Therefore, EPA obtained additional data from EPA's National Risk Management Research Laboratory's (NRMRL) Treatability Database (formerly called the Risk Reduction Engineering Laboratory (RREL) Treatability Database). These sources and their uses are discussed below.

The 50-POTW Study presents data on the performance of 50 well-operated POTWs achieving secondary treatment in removing toxic pollutants. The work performed with this database included some data editing criteria. Because the data collected for evaluating POTW removals included influent levels that were close to the detection limit, EPA devised the data editing hierarchal rules to eliminate low influent concentration levels, thereby minimizing the possibility that low POTW removals might simply reflect low influent concentrations instead of being a true measure of treatment effectiveness. The hierarchial data editing rules for the 50-POTW Study were as follows: 1) detected pollutants must have at least three pairs (influent/effluent) of data points to be included, 2) average pollutant influent levels less than 10 times the pollutant minimum analytical detection limit were eliminated, along with the corresponding effluent values, and 3) if none of the average pollutant influent concentrations exceeded 10 times the minimum analytical detection limit, then the average influent values less than 20 ug/L were eliminated, along with the corresponding effluent values. EPA then calculated each POTW percent removal for each pollutant based on its average influent and its average effluent values. The POTW percent removal used for each pollutant in the pass-through test is the median value of all the POTW pollutant specific percent removals.

EPA's NRMRL Treatability Database provides information, by pollutant, on removals obtained by various treatment technologies. The database provides the user with the specific data source and the industry from which the wastewater was generated. EPA used the NRMRL database to supplement the treatment information provided in the 50-POTW Study when there was insufficient information on specific pollutants. For each of the pollutants of concern not found in the 50-POTW database, EPA obtained data from portions of the NRMRL database. EPA then edited these files so that only treatment technologies representative of typical POTW secondary treatment operations (activated sludge, activated sludge with filtration, aerobic lagoons) were used. EPA further edited these files to include information pertaining only to domestic or industrial wastewater. EPA used pilot-scale and full-scale data only, and eliminated any bench-scale data. EPA retained data from papers in a peer-reviewed journal or government report, but edited out lesser quality references, such as reports which were not reviewed. Zero and negative percent removals were eliminated, as well as data with less than two pairs of influent/effluent data points. Finally, EPA calculated the average percent

removal for each pollutant from the remaining pollutant removal data.

EPA selected the final percent removal for each pollutant based on a data hierarchy, which was related to the quality of the data source. The following data source hierarchy was used for selecting a percent removal for a pollutant: 1) if available, the median percent removal from the 50-POTW Study was chosen using all POTWs data with influent levels greater than or equal to 10 times the pollutant minimum analytical detection limit, 2) if not available, the median percent removal from the 50-POTW Study was chosen using all POTWs data with influent levels greater than 20 ug/L, 3) if not available, the average percent removal from the NRMRL Treatability Database was chosen using only domestic wastewater, 4) if not available, the average percent removal from the NRMRL Treatability Database was chosen using domestic and industrial wastewater, and finally 5) a pollutant was assigned an average group percent removal, or "generic" removal if no other data was available. Pollutant groups were developed by combining pollutants with similar chemical structures. (A complete list of pollutants and pollutant groupings are available in Appendix A). EPA calculated the average group percent removal by using all pollutants in the group with selected percent removals from either the 50-POTW Study or the NRMRL Treatability Database. EPA then averaged percent removals together to determine the average group percent removal. Pollutant groups and generic removals used in the pass-through analysis are presented in Table 7-4. Only groups A, J, and CC are presented in Table 7-4 since these are the only groups for which EPA assigned a pollutant an average group percent removal in its pass-through analysis. The final POTW percent removal assigned to each pollutant is presented in Table 7-5, along with the source and data hierarchy of each removal.

Table 7.4 CWT Pass-Through Analysis Generic POTW Percent Removals

Pollutant	CAS NO.	% Removal	Source
Group A: Metals			
Barium	7440393	27.66	50 POTW - 10 X NOMDL
Beryllium	7440417	61.23	RREL 5 - (ALL WW)
Cadmium	7440439	90.05	50 POTW - 10 X NOMDL
Chromium	7440473	91.25	50 POTW - 10 X NOMDL
Cobalt	7440484	6.11	50 POTW - 10 X NOMDL
Copper	7440508	84.11	50 POTW - 10 X NOMDL
Iridium	7439885	74.00	RREL 5 - (ALL WW)
Lead	7439921	91.83	50 POTW - 10 X NOMDL
Lithium	7439932	26.00	RREL 5 (ALL WW)
Manganese	7439965	40.60	RREL 5 - (ALL WW)
Mercury	7439976	90.16	50 POTW - 10 X NOMDL
Molybdenum	7439987	52.17	RREL 5 - (DOM WW)
Nickel	7440020	51.44	50 POTW - 10 X NOMDL
Silver	7440224	92.42	50 POTW - 10 X NOMDL
Strontium	7440246	14.83	RREL 5 - (DOM WW)
Thallium	7440280	53.80	RREL 5 - (ALL WW)
Tin	7440315	65.20	RREL 5 - (ALL WW)
Titanium	7440326	68.77	RREL 5 - (ALL WW)
Vanadium	7440622	42.28	RREL 5 - (ALL WW)
Yttrium	7440655	57.93	RREL 5 - (ALL WW)
Zinc	7440666	77.97	50 POTW - 10 X NOMDL
Zirconium	7440177		Average Group Removal
Average Group Removal		60.00	

Pollutant	CAS NO.	% Removal	Source
Group J: Anilines			
Aniline	62533	62.00	RREL 5 - (ALL WW)
Carbazole	86748		Average Group Removal
Average Group Removal		62.00	

Pollutant	CAS NO.	% Removal	Source
Group CC: n-Paraffins			
n-Decane	124185	9.00	RREL 5 - (ALL WW)
n-Docosane	629970	88.00	RREL 5 - (ALL WW)
n-Dodecane	112403	95.05	RREL 5 - (ALL WW)
n-Eicosane	112958	92.40	RREL 5 - (ALL WW)
n-Hexacosane	630013		Average Group Removal
n-Hexadecane	544763		Average Group Removal
n-Octadecane	593453		Average Group Removal
n-Tetradecane	629594		Average Group Removal
Average Group Removal		71.11	

Table 7.5 Final POTW Percent Removals

Pollutant	Metals	Oils	Organics	CAS NO.	Percent Removal	Source
CLASSICAL						
Ammonia as N	X	X	X	766417	40.85	50 POTW - 10 X NOMDL
BOD_5	X	X	X	C-002	91.32	50 POTW - 10 X NOMDL
Hexavalent Chromium	X			18540299	5.68	50 POTW - 10 X NOMDL
Oil + Grease	X	X		C-007	81.41	50 POTW - 10 X NOMDL
Total Cyanide	X	X	X	57125	70.44	50 POTW - 10 X NOMDL
Total Suspended Solids	X	X	X	C-009	90.29	50 POTW - 10 X NOMDL
METALS						
Antimony	X	X	X	7440360	71.13	50 POTW - 10 X NOMDL
Arsenic		X		7440382	90.89	50 POTW - 10 X NOMDL
Barium		X		7440393	27.66	50 POTW - 10 X NOMDL
Beryllium	X			7440417	61.23	RREL 5 - (ALL WW)
Boron	X	X		7440428	20.04	50 POTW - >20 PPB
Cadmium	X	X		7440439	90.05	50 POTW - 10 X NOMDL
Chromium	X	X		7440473	91.25	50 POTW - 10 X NOMDL
Cobalt	X	X	X	7440484	6.11	50 POTW - >20 PPB
Copper	X	X	X	7440508	84.11	50 POTW - 10 X NOMDL
Iridium	X			7439885	74.00	RREL 5 - (ALL WW)
Lead	X	X		7439921	91.83	50 POTW - 10 X NOMDL
Lithium	X			7439932	26.00	RREL 5 - (ALL WW)
Manganese	X	X	X	7439965	40.60	RREL 5 - (ALL WW)
Mercury	X	X		7439976	90.16	50 POTW - 10 X NOMDL
Molybdenum	X	X	X	7439987	52.17	RREL 5 - (DOM WW)
Nickel	X	X		7440020	51.44	50 POTW - 10 X NOMDL
Selenium	X	X		7782492	34.33	RREL 5 - (DOM WW)
Silicon	X	X	X	7440213	27.29	RREL 5 - (ALL WW)
Silver	X			7440224	92.42	50 POTW - 10 X NOMDL
Strontium	X	X	X	7440246	14.83	RREL 5 - (DOM WW)
Thallium	X			7440280	53.80	RREL 5 - (ALL WW)
Tin	X	X		7440315	65.20	RREL 5 - (ALL WW)
Titanium	X	X		7440326	68.77	RREL 5 - (ALL WW)
Vanadium	X			7440622	42.28	RREL 5 - (ALL WW)
Yttrium	X			7440655	57.93	RREL 5 - (ALL WW)
Zinc	X	X	X	7440666	77.97	50 POTW - 10 X NOMDL
Zirconium	X			7440677	60.00	Generic Removal-Group A
ORGANICS						
2-butanone	X	X	X	78933	96.60	RREL 5 - (DOM WW)
2-propanone	X		X	67641	83.75	RREL 5 - (ALL WW)
2,3-dichloroaniline			X	608275	41.00	RREL 5 - (ALL WW)

Table 7.5 Final POTW Percent Removals

Pollutant	Metals	Oils	Organics	CAS NO.	Percent Removal	Source
2,4,6-trichlorophenol			X	88062	65.00	RREL 5 - (ALL WW)
4-chloro-3-methylphenol		X		59507	63.00	RREL 5 - (ALL WW)
Acenaphthene		X		83329	98.29	50 POTW - 10 X NOMDL
Acetophenone			X	98862	95.34	RREL 5 - (ALL WW)
Alpha-terpineol		X		988555	94.40	RREL 5 - (ALL WW)
Aniline			X	62533	62.00	RREL 5 - (ALL WW)
Anthracene		X		120127	95.56	50 POTW - 10 X NOMDL
Benzo (a) anthracine		X		56553	97.50	RREL 5 - (DOM WW)
Benzo (a) pyrene		X		50328	95.20	RREL 5 - (ALL WW)
Benzo (b) fluoranthene		X		205992	95.40	RREL 5 - (ALL WW)
Benzo (k) fluoranthene		X		207089	94.70	RREL 5 - (ALL WW)
Benzoic Acid	X	X	X	65850	80.50	RREL 5 - (ALL WW)
Bis(2-ethylhexyl) phthalate		X		117817	59.78	50 POTW - 10 X NOMDL
Butyl benzyl phthalate		X		85687	94.33	50 POTW - 10 X NOMDL
Carbazole		X		86748	62.00	Generic Removal-Group J
Chrysene		X		218019	96.90	RREL 5 - (DOM WW)
Diethyl phthalate		X		84662	59.73	50 POTW - > 20 PPB
Di-n-butyl phthalate		X		84742	79.31	50 POTW - > 20 PPB
Fluoranthene		X		206440	42.46	50 POTW - > 20 PPB
Fluorene		X		86737	69.85	50 POTW - > 20 PPB
n-Decane		X		124185	9.00	RREL 5 - (ALL WW)
n-Docosane		X		629970	88.00	RREL 5 - (ALL WW)
n-Dodecane		X		112403	95.05	RREL 5 - (ALL WW)
n-Eicosane		X		112958	92.40	RREL 5 - (ALL WW)
n-Hexadecane		X		544763	71.11	Generic Removal-Group CC
n-Octadecane		X		593453	71.11	Generic Removal-Group CC
n-Tetradecane		X		629594	71.11	Generic Removal-Group CC
n,n-Dimethylformamide	X		X	68122	84.75	RREL 5 - (ALL WW)
o-Cresol		X	X	95487	52.50	RREL 5 - (ALL WW)
p-Cresol		X	X	106445	71.67	RREL 5 - (ALL WW)
Pentachlorophenol			X	87865	13.88	50 POTW - >20 PPB
Phenol		X	X	108952	95.25	50 POTW - 10 X NOMDL
Pyrene		X		129000	83.90	RREL 5 - (DOM WW)
Pyridine	X	X	X	110861	95.40	RREL 5 - (ALL WW)

Methodology for Determining Treatment Technology Percent Removals *7.6.3*

EPA calculated treatment percent removals for each selected BAT option using the data used to determine the option long term averages and limitations. Therefore, the data used to calculate treatment option percent removals was subjected to the same data editing criteria as the data used in calculating the long-term averages and limitations as described in Section 10. This editing included excluding the influent and effluent data for pollutants that were not detected in the influent at treatable levels, excluding data for pollutants which were not treated by the technology, and excluding data that were associated with process upsets.

After the data were edited, EPA used the following methodology to calculate percent removal:

1) For each pollutant and each sampled facility, EPA averaged the remaining influent data and effluent data to give an average influent concentration and an average effluent concentration, respectively.

2) EPA calculated percent removals for each pollutant and each sampling episode from the average influent and average effluent concentrations using the following equation:

$$\% \text{ Removal} = \frac{(\text{Avg Influent} - \text{Avg Effluent})}{\text{Average Influent}} \times 100$$

3) EPA calculated the median percent removal for each pollutant for each option from the facility-specific percent removals.

Pass-Through Analysis Results *7.6.4*

The results of the Pass-Through Analysis are presented in Tables 7-6 through 7-9 by subcategory and treatment option.

Pass-Through Analysis Results for the Metals Subcategory *7.6.4.1*

For metals subcategory option 3, pass-through results are presented in Table 7-6. All pollutants analyzed passed through and may be regulated under PSES and PSNS. For metals subcategory option 4, pass-through results are presented in Table 7-7. All non-conventional pollutants analyzed passed through, and all metals passed through with the exception of molybdenum and zirconium. However, for organic pollutants analyzed, only benzoic acid passed through. All pollutants that passed through are regulated under PSES and PSNS.

Table 7.6 Final Pass-Through Results For Metals Subcategory Option 3

Pollutant Parameter	Option 3 Removal (%)	POTW Removal (%)	Pass-Through
CLASSICALS			
Hexavalent Chromium	93.36	5.68	yes
METALS			
Antimony	99.71	71.13	yes
Arsenic	99.77	90.89	yes
Beryllium	99.00	61.23	yes
Boron	75.15	20.04	yes
Cadmium	99.96	90.05	yes
Chromium	99.98	91.25	yes
Cobalt	99.59	6.11	yes
Copper	100.00	84.11	yes
Lead	99.67	91.83	yes
Manganese	99.99	40.60	yes
Mercury	99.80	90.16	yes
Molybdenum	88.20	52.17	yes
Nickel	99.87	51.44	yes
Selenium	92.66	34.33	yes
Silicon	99.75	27.29	yes
Silver	99.32	92.42	yes
Thallium	95.99	53.80	yes
Tin	99.83	65.20	yes
Titanium	99.76	68.77	yes
Vanadium	99.48	42.28	yes
Yttrium	94.25	57.93	yes
Zinc	99.99	77.97	yes

Table 7.7 Final Pass-Through Results For Metals Subcategory Option 4

Pollutant Parameter	Option 4 Removal (%)	Median POTW Removal (%)	Pass-Through
CLASSICALS			
Hexavalent Chromium	98.01	5.68	yes
Total Cyanide	97.07	70.44	yes
METALS			
Antimony	94.30	71.13	yes
Arsenic	91.71	90.89	yes
Boron	54.70	20.04	yes
Cadmium	99.97	90.05	yes
Chromium	99.91	91.25	yes
Cobalt	98.47	6.11	yes
Copper	99.91	84.11	yes
Iridium	99.69	74.00	yes
Lead	99.95	91.83	yes
Lithium	66.83	26.00	yes
Manganese	99.87	40.60	yes
Mercury	98.38	90.16	yes
Molybdenum	26.40	52.17	no
Nickel	99.59	51.44	yes
Selenium	57.54	34.33	yes
Silicon	98.58	27.29	yes
Silver	99.62	92.42	yes
Strontium	95.89	14.83	yes
Tin	99.94	65.20	yes
Titanium	99.84	68.77	yes
Vanadium	99.46	42.28	yes
Yttrium	95.39	57.93	yes
Zinc	99.93	77.97	yes
Zirconium	42.13	61.00	no
ORGANICS			
2-Butanone	74.72	96.60	no
2-Propanone	65.62	83.75	no
Benzoic Acid	82.99	80.50	yes
n,n-Dimethylformamide	54.81	84.75	no
Pyridine	48.49	95.40	no

Pass-Through Analysis Results for the Oils Subcategory *7.6.4.2*

The final pass-through analysis results for the oils subcategory option 9 are presented in Table 7-8. Several metals and organic pollutants passed through, and therefore may be regulated under PSES and PSNS.

Table 7.8 Final Pass-Through Results For Oils Subcategory Option 9

Pollutant Parameter	Option 9 Removal (%)	Median POTW Removal (%)	Pass-Through
CLASSICALS			
Total Cyanide	64.38	70.44	no
METALS			
Antimony	87.99	71.13	yes
Arsenic	57.64	90.89	no
Barium	91.91	27.66	yes
Boron	33.01	20.04	yes
Cadmium	88.08	90.05	no
Chromium	86.24	91.25	no
Cobalt	52.20	6.11	yes
Copper	93.85	84.11	yes
Lead	88.26	91.83	no
Manganese	46.03	40.60	yes
Mercury	77.43	90.16	no
Molybdenum	53.73	52.17	yes
Nickel	41.24	51.44	no
Selenium	36.94	34.33	yes
Silicon	42.07	27.29	yes
Strontium	50.68	14.83	yes
Tin	90.78	65.20	yes
Titanium	89.99	68.77	yes
Zinc	78.25	77.97	yes
ORGANICS			
2-Butanone	15.41	96.60	no
4-chloro-3-methylphenol	27.48	63.00	no
Acenapthene	96.75	98.29	no
Alpha-terpineol	94.77	94.40	yes
Anthracene	96.67	95.56	yes
Benzo (a) anthracene	95.70	97.50	no
Benzo (a) pyrene	96.27	95.20	yes
Benzo (b) flouranthene	95.92	95.40	yes
Benzo (k) fluoranthene	95.89	94.70	yes

Benzoic acid	19.32	80.50	no
Bis (2-ethylhexyl) phthalate	94.09	59.78	yes
Butyl benzyl phthalate	92.60	94.33	no
Carbazole	81.09	62.00	yes
Chrysene	97.22	96.90	yes
Di-n-butyl phthalate	88.07	79.31	yes
Diethyl phthalate	63.97	59.73	yes
Fluoranthene	96.43	42.46	yes
Fluorene	92.86	69.85	yes
n-Decane	94.98	9.00	yes
n-Docosane	96.87	88.00	yes
n-Dodecane	96.50	95.05	yes
n-Eicosane	95.54	92.40	yes
n-Hexadecane	96.53	71.11	yes
n-Octadecane	97.20	71.11	yes
n-Tetradecane	96.85	71.11	yes
o-cresol	21.08	52.50	no
p-cresol	34.88	71.67	no
Phenol	14.88	95.25	no
Pyrene	97.63	83.90	yes
Pyridine	21.45	95.40	no

Pass-Through Analysis Results for the Organics Subcategory *7.6.4.3*

The results of the pass-through analysis for the organics subcategory option 3/4 are presented in Table 7-9. Several metals and organic pollutants passed through, and therefore may be regulated under PSES and PSNS.

Table 7.9 Final Pass-Through Results For Organics Subcategory Option 3/4

Pollutant Parameter	Option 3/4 Removal (%)	Median POTW Removal (%)	Pass-Through
CLASSICALS			
Total Cyanide	33.46	70.44	no
METALS			
Antimony	33.27	71.13	no
Cobalt	17.31	6.11	yes
Copper	38.04	84.11	no
Manganese	4.22	40.60	no
Molybdenum	57.10	52.17	yes
Silicon	4.71	27.29	no
Strontium	59.51	14.83	yes
Zinc	60.51	77.97	no
ORGANICS			
2-butanone	69.20	96.60	no
2-propanone	68.57	83.75	no
2,3-dichloroaniline	80.45	41.00	yes
2,4,6-trichlorophenol	45.16	65.00	no
Acetophenone	92.44	95.34	no
Aniline	92.88	62.00	yes
Benzoic Acid	94.29	80.50	yes
n,n-Dimethylformamide	89.26	84.75	yes
o-Cresol	98.39	52.50	yes
p-Cresol	85.38	71.67	yes
Pentachlorophenol	23.19	13.88	yes
Phenol	87.08	95.25	no
Pyridine	61.69	95.40	no

FINAL LIST OF POLLUTANTS SELECTED FOR REGULATION *7.7*

Direct Dischargers *7.7.1*

After EPA eliminated pollutants of concern which were treatment chemicals, non-conventional bulk parameters, not detected at treatable levels, not treated, or volatile, EPA still had a lengthy list of pollutants which could be regulated -- particularly in the oils subcategory. EPA further eliminated pollutants that were identified during screening, but not analyzed in a quantitative manner[1]. These pollutants are iridium, lithium, silicon, and strontium. EPA also eliminated pollutants that are not toxic as quantified by their toxic weighting factor (TWF)[2]. A single pollutant, yttrium, has a TWF of zero and was, therefore, eliminated. EPA also eliminated pollutants that were removed by the proposed treatment technologies, but whose removal was not optimal. EPA eliminated pollutants that were removed by less than 30% with the proposed technology options for the organics subcategory and by less than 50% with the proposed technology options for the metals and oils subcategories. These pollutants are listed in Table 7-10.

Table 7-10 Pollutants Eliminated Due to Non-Optimal Performance

Metals Option 4	Metals Option 3	Oils Option 8	Oils Option 9	Organics Option 3/4
BOD_5	None	BOD_5	BOD_5	Cobalt
Molybdenum		Boron	Boron	Manganese
Pyridine		Manganese[3]	Manganese	Pentachlorophenol
Zirconium		Nickel	Nickel	
		Selenium	Selenium	
		Benzoic Acid	Benzoic Acid	
		p-Cresol	o-Cresol	
		Phenol	p-Cresol	
		Pyridine	Phenol	
		2-butanone	Pyridine	
			2-butanone	
			4-methyl-2-pentanone	

Finally, EPA eliminated those pollutants for which the treatment technology forming the basis of the option is not a standard method of treatment. For example, chemical precipitation systems are not designed to remove BOD_5. Table 7-11 lists these pollutants for each subcategory and option.

[1]Analyses for these pollutants were not subject to the quality assurance/quality control (QA/QC) procedures required by analytical Method 1620.

[2]Toxic weighting factors are derived from chronic aquatic life criteria and human health criteria established for the consumption of fish. Toxic weighting factors can be used to compare the toxicity of one pollutant relative to another and are normalized based on the toxicity of copper. TWFs are discussed in detail in the Cost Effectiveness Analysis Document.

[3]Removals for this pollutant for option 8 were not less than 50%. However, since removals for this pollutant for option 9 (the BAT selected option) were less than 50%, for consistency, they were similarly eliminated for option 8.

Table 7-11. Pollutants Eliminated Since Technology Basis is Not Standard Method of Treatment

Metals Option 4	Metals Option 3	Oils Option 8/9	Organics Option 3/4
BOD_5 Boron	Benzoic Acid Boron 2-butanone 2-propanone	Total Cyanide	Total Cyanide

For the organics subcategory, EPA's final list of regulated pollutants for direct discharging CWT facilities was based on the previous edits. For the metals subcategory, three pollutants, beryllium, molybdenum, and thallium, remained for metals option 3, but had been eliminated for metals option 4. For consistency, EPA also eliminated these three pollutants for metals option 3. EPA's final list of regulated pollutants for direct discharges in the metals subcategory was based on these additional edits.

However, for the organic pollutants in the oils subcategory, EPA further reduced the number of regulated pollutants as detailed in the following paragraphs. EPA selected this approach based on comments to the 1995 proposal.

Therefore, EPA organized the remaining organic pollutants in the oils subcategory into pollutant groups. As detailed in Section 7.6.2, pollutant groups were developed by combining pollutants of similar structures. The remaining list of organics pollutants in the oils subcategory are in four pollutant groups: n-paraffins, polyaromatic hydrocarbons, phtalates, and aliphatic alcohols. EPA reviewed the influent characterization data from oils subcategory facilities (including the additional data collected at non-hazardous oils facilities) to determine which pollutants in each structural group are always detected together. If pollutants in a structural group are always detected together, then EPA can establish some (or one) pollutants in each group as indicator pollutants. Since the effectiveness of the treatment technologies which form the basis of the proposed oils subcategory limitations is similar for pollutants in each group, EPA can be confident that regulation of the group indicator pollutant(s) will ensure control of all the group pollutants. This approach allows EPA to reduce the list of regulated pollutants for the oils subcategory substantially. Tables 7-12, 7-13, and 7-14 summarize the data for each structural group. In these tables, an "X" indicates the pollutant was detected at the sampled facility while a "blank" indicates the pollutant was not detected at the sampled facility.

Data for n-paraffins show that while n-decane is usually detected in combination with other n-paraffins, it was the sole n-paraffin detected at one facility. Therefore, no other n-paraffins in this group can be used as an indicator parameter for n-decane. Additionally, the data show that n-decane is not an acceptable indicator parameter for the other pollutants in this group. The data also show that n-hexadecane, n-octadecane and n-tetradecane were always detected together and vice versa. Finally, the data show that the other n-paraffins were also detected with n-hexadecane, n-octadecane and n-tetradecane, but that the reverse statement is not always true. Therefore, along with n-decane, EPA can select n-hexadecane, n-octadecane or n-tetradecane as an indicator parameter for the majority of the n-paraffins. EPA selected n-octadecane.

Data for the polyaromatic hydrocarbons show that fluroanthene and pyrene were always detected together and vice-versa. Likewise, when the other polyaromatic hydrocarbons were detected, both fluoranthene and pyrene were

always detected. However, the reverse statement is not true. Therefore, EPA can select either fluoranthene or pyrene as an indicator parameter for all of the polyaromatic hydrocarbons. EPA selected fluoranthene since it was detected most often. Data for the phthalate group show that while bis-2-ethylhexylphthalate is usually detected with other phthalates, it is sometimes the only pollutant detected in this group. Therefore, no other n-pollutant in this group can be used an indicator parameter for bis-2-ethylhexylphthlate. The data also show that butyl benzyl phlalate is usually detected with other phlalates, but that it was the only phthalate detected at one facility. Therefore, no other n-pollutant in this group can be used an indicator parameter for butyl benzyl phthlate. Finally, the data show that diethylphthalate and di-n-butylphthlate are always detected with bis-2-ethylhexylphthlate. As a result, EPA selected bis-2-ethylhexylphthlate and butyl benzylphthlate for regulation in the pthalate group.

Table 7-15 shows the final list of pollutants selected for regulation for direct dischargers.

Table 7-12. Frequency of Detection[4] of n-Paraffins in CWT Oils Subcategory Wastes

Pollutant	Facility																Total Number of Detects at Combined Facilities
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
n-Decane	X		X	X	X	X	X	X	X	X		X	X				29/37
n-Docosane	X		X	X	X	X	X	X	X	X			X	X			23/37
n-Dodecane	X	X	X	X	X	X	X	X		X			X	X			28/37
n-Eicosane	X	X	X	X	X	X	X	X	X	X			X	X			31/37
n-Hexadecane	X	X	X	X	X	X	X	X	X	X			X	X		X	32/37
n-Octadecane	X	X	X	X	X	X	X	X	X	X			X	X		X	31/37
n-Tetradecane	X	X	X	X	X	X	X	X	X	X			X	X		X	32/37

X = Pollutant was detected at the sampled facility

"blank = Pollutant was not detected at the sampled facility

[4]For some facilities, the data represent composite samples collected over three to five days, while for other facilities the data represent grab samples collected once.

Table 7-13. Frequency of Detection[5] of Polyaromatic Hydrocarbons in CWT Oils Subcategory Wastes

Pollutant	Facility																Total Number of Detects at Combined Facilities
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
Acenaphthene						X	X	X	X								9/37
Anthracene					X	X	X	X	X								14/37
Benzo(a)anthracene					X	X	X	X									14/37
Benzo(a)pyrene						X	X	X									6/37
Benzo(b)fluoranthene					X	X	X										7/37
Benzo(k)fluoranthene						X	X										5/37
Chrysene					X	X	X	X	X								15/37
Fluoranthene					X	X	X	X	X					X			18/37
Fluorene					X	X	X	X	X								14/37
Pyrene					X	X	X	X	X					X			14/37

X = Pollutant was detected at the sampled facility

"blank = Pollutant was not detected at the sampled facility

[5]For some facilities, the data represent composite samples collected over three to five days, while for other facilities the data represent grab samples collected once.

Table 7-14. Frequency of Detection[6] of Phthalates in CWT Oils Subcategory Wastes

Pollutant	Facility																Total Number of Detects at Combined Facilities
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	
Bis-2-ethylhexylphthalate	X		X		X	X	X	X		X			X	X	X	X	22/37
Butylbenzylphthalate		X				X	X	X									9/37
Diethylphthalate					X	X	X	X						X			15/37
Di-n-butylphthalate					X	X	X	X									6/37

X = Pollutant was detected at the sampled facility

"blank = Pollutant was not detected at the sampled facility

[6]For some facilities, the data represent composite samples collected over three to five days, while for other facilities the data represent grab samples collected once.

Table 7-15. Final List of Regulated Pollutants for Direct Discharging CWTs

Metals Subcategory Option 4 (BPT, BAT)	Metals Subcategory Option 3 (NSPS)	Oils Subcategory Option 9 BPT, BAT, NSPS	Organics Subcategory Option 3 BPT, BAT, NSPS
TSS	TSS	Oil and Grease	BOD_5
Oil and Grease	Oil and Grease	TSS	TSS
Antimony	Antimony	Antimony	Antimony
Arsenic	Arsenic	Arsenic	Copper
Cadmium	Cadmium	Barium	Molybdenum
Chromium	Chromium	Cadmium	Zinc
Cobalt	Cobalt	Chromium	Acetophenone
Copper	Copper	Cobalt	Aniline
Hex chromium	Hex Chromium	Copper	Benzoic Acid
Lead	Lead	Lead	o-Cresol
Manganese	Manganese	Mercury	p-Cresol
Mercury	Mercury	Molybdenum	Phenol
Nickel	Nickel	Tin	Pyridine
Selenium	Silver	Titanium	2-butanone
Silver	Tin	Zinc	2-propanone
Tin	Titanium	Alpha-terpineol	2,3-dichloroaniline
Titanium	Total cyanide	Bis(2-ethylhexyl) phthalate	2,4,6-trichlorophenol
Total cyanide	Vanadium	Butylbenzyl phthalate	
Vanadium	Zinc	Carbazole	
Zinc		Fluoranthene	
		N-decane	
		N-octadecane	
		SGT-HEM [7]	

[7]EPA has not proposed regulating SGT-HEM. However, EPA has asked for comment on whether SGT-HEM should be used as an indicator parameter for the organic analytes in this subcategory.

Indirect Dischargers *7.7.2*

As detailed in Section 7.6, all pollutants regulated for direct dischargers which pass-through well-operated POTWs are regulated for indirect dischargers. Table 7-16 shows the final list of regulated pollutants for indirect dischargers selected by EPA.

Table 7-16. Final List of Regulated Pollutants for Indirect Discharging CWT Facilities

Metals Subcategory Option 4 PSES	Metals Subcategory Option 3 PSNS	Oils Subcategory Option 8 (PSES) Option 9 (PSNS)	Organics Subcategory Option 3 PSES, PSNS
Antimony	Antimony	Antimony	Molybdenum
Arsenic	Arsenic	Barium	Aniline
Cadmium	Cadmium	Cobalt	Benzoic Acid
Chromium	Chromium	Copper	o-Cresol
Cobalt	Cobalt	Molybdenum	p-Cresol
Copper	Copper	Tin	2,3-dichloroaniline
Hex chromium	Hex chromium	Titanium	
Lead	Lead	Zinc	
Manganese	Manganese	Alpha-terpineol	
Mercury	Mercury	Bis-2-ethylhexyl	
Nickel	Nickel	phthalate	
Selenium	Silver	Carbazole	
Silver	Tin	Fluoranthene	
Tin	Titanium	N-decane	
Titanium	Total cyanide	N-octadecane	
Total cyanide	Vanadium	SGT-HEM [8]	
Vanadium	Zinc		
Zinc			

[8]EPA has not proposed regulating SGT-HEM. However, EPA has asked for comment on whether SGT-HEM should be used as an indicator parameter for the organic analytes in this subcategory.