United States
Environmental Protection
Agency

Industrial Technology
Division
WH-552
Washington, DC 20460

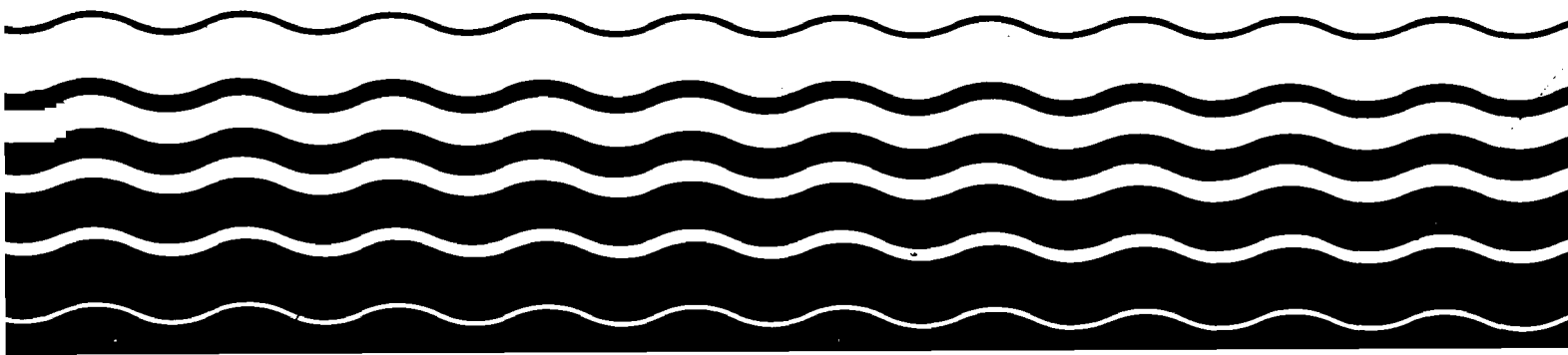
June 1985

Water

EPA

Guide for the Application of Effluent Limitations Guidelines for the

Petroleum Refining Industry



GUIDE FOR THE APPLICATION

OF

EFFLUENT LIMITATIONS GUIDELINES

FOR THE

PETROLEUM REFINING POINT SOURCE CATEGORY

U.S. Environmental Protection Agency
Office of Water Regulations and Standards
Industrial Technology Division
Washington, D.C. 20460

June 1985

FOREWARD

The purpose of this document is to provide a consolidated source for current effluent limitation guidelines (ELG) for the petroleum refining industry as of June 1985 and to explain the present status and applicability of the Best Available Technology (BAT) and Best Conventional Technology (BCT) levels of control for direct discharging petroleum refineries. Its use will hopefully provide for uniform application of the petroleum refining ELG's in the manner intended and supported by the record.

The final BAT and BCT regulations that were promulgated in June 1985 are dependent upon a series of rulemaking processes that commenced with the promulgation of Best Practicable Technology (BPT) in 1974. The procedures for applying the petroleum refining regulations for calculation of water discharge permit limitations is somewhat involved compared to the ELG's for other industries. The procedure has become more intricate with the final promulgation of BCT, revised BAT, and effluent limitations for storm water runoff in June 1985.

This document is structured to guide the permit writer and permit applicant through the procedure to identify information needs (e.g., production data, refining processes, physical plant layout, precipitation data) and perform the appropriate calculations to determine permit effluent limitations (e.g., process wastewater, storm water runoff, ballast water, non-contact cooling water).

The main body of the document is of a "cookbook" format for applying the ELG and, as such, does not present information pertaining to the development or underlying basis for the final regulations. Should the user require such information, the appendices of this document contain a copy of each petroleum regulation preamble for referencing background material. If more detailed background or supporting material (e.g., plant data, treatability information, process information) is required, the user may contact the Industrial Technology Division for technical assistance and access to the official rulemaking records.

Because the complete set of currently applicable regulations were issued in a piecemeal fashion, a comprehensive listing does not appear in the Federal Register. The annual edition of the Code of Federal Regulations, beginning with the July 1986 edition, will contain such a listing for petroleum refining codified at 40 CFR Part 419. For convenience to the user, an unofficial version of the listing is included in Section 2 of this document.

In addition to the rulemaking records, there are two technical development documents supporting the regulations:

Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category, EPA 440/1-74-014-a, April 1974. (BAT, NSPS)

Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category, EPA 440/1-82-014, October 1982. (BAT)

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

SECTION 1

NPDES PERMIT WRITERS WORKSHOP MATERIAL

In an effort to provide guidance on the application of the recent amendments to the BAT/BCT effluent limitations guidelines for the petroleum refining point source category, the Agency's Industrial Technology Division participated in the EPA NPDES Permit Writers Workshops held in San Francisco, California and Dallas, Texas during November and December 1984. Representatives from EPA regional offices, state offices, and local regulatory authorities were presented with the material that follows in this section.

PETROLEUM REFINING INDUSTRY

- SIC Code 2911
- 220 Operating Refineries in 1984
- Crude Capacities Range From 400 to 525,000 Barrels Per Day
- Industry Uses About 150 Unique Processes
- 5 Subcategories:
  - A – Topping
  - B – Cracking
  - C – Petrochemical
  - D – Lube
  - E – Integrated
- Texas, California and Louisiana Are Highest Producing States

PRIOR REGULATIONS & COURT ACTIVITY

- May 9, 1974 Promulgation
  - BPT, BAT, NSPS, PSNS

- May 20, 1975
  - Amendments to BPT Published

- August 11, 1976 Court Decision
  - BPT and NSPS Upheld (Except Storm Water Runoff Remanded)
  - BAT Remanded in Entirety

- March 23, 1977 Promulgation
  - Interim Final PSES

PRIOR REGULATIONS & COURT ACTIVITY

(Continued)

- October 18, 1982 Promulgation
  - BAT, PSES, PSNS

- January 27, 1983 Court Suit by NRDC
  - BAT

- April 17, 1984 Settlement Agreement
  - EPA, NRDC, API, 7 Oil Companies
  - More Stringent BAT
  - BCT
  - Storm Water Runoff

- August 28, 1984 Proposal
  - Settlement Agreement Terms

REGULATION COVERAGE

Process Wastewater

BAT

Pollutant	Technology Basis	Permit Calculations
Ammonia	Biological Treatment	1974 Flow Model
COD	Biological Treatment	1974 Flow Model
Sulfide	Biological Treatment	1974 Flow Model
Phenolics	Flow Red., Bio. Trmt.	1979 Flow Model
Tot. Chrom.	Flow Red., Bio. Trmt.	1979 Flow Model
Hex. Chrom.	Flow Red., Bio. Trmt.	1979 Flow Model

BCT

Pollutant	Technology Basis	Permit Calculations
BOD5	Biological Treatment	1974 Flow Model
Oil & Grease	Bio. Trmt., Polishing	1974 Flow Model
TSS	Bio. Trmt., Polishing	1974 Flow Model
pH	Neutralization	

REGULATION COVERAGE

Ballast Water

BAT

Pollutant	Technology Basis	Permit Calculations
COD	Heat, Settle, Filter and/or Bleed to Proc. Waste Water Trmt. Sys	Flow x Concentration

BCT

Pollutant	Technology Basis	Permit Calculations
BOD5	Same	Flow x Concentration
Oil & Grease	As	Flow x Concentration
TSS	For	Flow x Concentration
pH	BAT	

REGULATION COVERAGE

Once–Through Cooling Water

BAT

Pollutant	Technology Basis	Permit Calculations
Total Organic Carbon	No Leakage, etc. Into Cooling Water System	Concentration (Net)

BCT

Pollutant	Technology Basis	Permit Calculations
No Limitations		

REGULATION COVERAGE

Contaminated Storm Water Runoff

BAT

Pollutant	Technology Basis	Permit Calculations
COD	Treat with Proc. W.W.	Flow x Concentration
Phenolics	Treat with Proc. W.W.	Flow x Concentration
Tot. Chrom.	Treat with Proc. W.W.	Flow x Concentration
Hex. Chrom.	Treat with Proc. W.W.	Flow x Concentration

BCT

Pollutant	Technology Basis	Permit Calculations
BOD5	Treat with Proc. W.W.	Flow x Concentration
Oil & Grease	Treat with Proc. W.W.	Flow x Concentration
TSS	Treat with Proc. W.W.	Flow x Concentration
pH	Neutralization	

EXAMPLE PERMIT CALCULATIONS

BAT/BCT LIMITS FOR PROCESS WASTEWATER

- For All BCT Parameters

  LIMIT = EFFLUENT LIMITATION FACTOR
  X SIZE FACTOR
  X PROCESS FACTOR
  X REFINERY FEEDSTOCK RATE

- For the BAT Parameters:

  Ammonia, Sulfide and COD

  LIMIT = EFFLUENT LIMITATION FACTOR
  X SIZE FACTOR
  X PROCESS FACTOR
  X REFINERY FEEDSTOCK RATE

EXAMPLE PERMIT CALCULATIONS

BAT/BCT LIMITS FOR PROCESS WASTEWATER

- For The BAT Parameters:

  Phenolic Compounds, Tot. Chromium and Hex. Chromium

  LIMIT = CRUDE PROCESS ALLOCATION

  + CRACKING AND COKING PROCESS ALLOCATION

  + ASPHALT PROCESS ALLOCATION

  + LUBE PROCESS ALLOCATION

  + REFORMING AND ALKYLATION PROCESS ALLOCATION

- EACH PROCESS CATEGORY ALLOCATION IS BASED ON THE TOTAL FEEDSTOCK RATE FOR THE PROCESSES UTILIZED TIMES A PROCESS SPECIFIC EFFLUENT LIMITATION FACTOR

EXAMPLE PERMIT CALCULATIONS
HYPOTHETICAL LUBE OIL REFINERY

Processes Utilized	Process Feedstock Rate * (1000 Bbls/Day)	
CRUDE:		USE SUM TO DETERMINE HIGH YEAR
Atm. Dist.	125	
Vac. Dist.	60	
Desalting	125	
CRACKING and COKING:		USE SAME YEAR'S DATA AS ABOVE
FCC	41	
Hydrocracking	20	
LUBE:		
Lube Hydrofining	5.3	
Furfural Extr.	4.0	
Phenol Extrac.	4.9	
ASPHALT:		
Asphalt Prod.	4.0	

* CALCULATED AS PER 40 CFR 122.45(b)(2)

THIS SINGLE VALUE TO BE USED FOR BOTH DAILY MAXIMUM AND 30-DAY AVERAGE CALCULATIONS

EXAMPLE PERMIT CALCULATIONS

PROCESS WASTEWATER

HYPOTHETICAL LUBE OIL REFINERY

STEP 1: DETERMINE SIZE FACTOR

THE SIZE FACTOR IS BASED ON THE REFINERY FEEDSTOCK RATE. THE REFINERY FEEDSTOCK RATE IS THE LARGEST OF ANY OF THE CRUDE PROCESS FEEDSTOCK RATES. FOR THE EXAMPLE, THE REFINERY FEEDSTOCK RATE (IN 1000 BBLS/DAY) IS 125.

FROM THE SIZE FACTOR TABLE:

1000 BBL OF FEEDSTOCK	SIZE FACTOR
.	.
.	.
.	.
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
.	.
.	.
.	.

THE VALUE 0.97 IS OBTAINED.

EXAMPLE PERMIT CALCULATIONS
PROCESS WASTEWATER
HYPOTHETICAL LUBE OIL REFINERY

STEP 2: DETERMINE PROCESS FACTOR

THE PROCESS FACTOR IS BASED ON THE PROCESS CONFIGURATION. THIS VALUE IS CALCULATED AS FOLLOWS:

PROCESS	PROCESS FEEDSTOCK RATE	PROCESS FEEDSTOCK RATE RELATIVE TO REFINERY FEEDSTOCK RATE	WEIGHT FACTOR	PROCESS CONFIGURATION
CRUDE:				
Atm. Dist.	125.0	1.0		
Vac. Dist.	60.0	0.48		
Desalting	125.0	1.0		
TOTAL		2.48	X 1	= 2.48
CRACKING:				
FCC	41.0	0.328		
Hydrocracking	20.0	0.160		
TOTAL		0.488	X 6	= 2.93
LUBE:				
Lube Hydro.	5.3	0.042		
Furfural Extr	4.0	0.032		
Phenol Extr.	4.9	0.039		
TOTAL		0.113	X 13	= 1.47
ASPHALT:				
Asphalt Prod.	4.0	0.032		
TOTAL		0.032	X 12	= 0.38
TOTAL REFINERY				= 7.26

EXAMPLE PERMIT CALCULATIONS

HYPOTHETICAL LUBE OIL REFINERY

STEP 2: DETERMINE PROCESS FACTOR (CONTINUED)

FROM THE PROCESS FACTOR TABLE:

PROCESS CONFIGURATION	PROCESS FACTOR
Less than 6.49	0.81
6.50 to 7.49	0.88
7.50 to 7.99	1.00
8.00 to 8.49	1.09
.	.
.	.
.	.

THE VALUE 0.88 IS OBTAINED.

EXAMPLE PERMIT CALCULATIONS
PROCESS WASTEWATER
HYPOTHETICAL LUBE OIL REFINERY

STEP 3: CALCULATE EFFLUENT LIMITS

BASED ON THE PRECEDING RESULTS, MAXIMUM DAILY BCT LIMITS AND BAT LIMITS (FOR AMMONIA, SULFIDE AND COD ONLY) WOULD BE CALCULATED AS FOLLOWS:

POLLUTANT PARAMETER	EFFLUENT LIMITATION FACTOR (Lb/1000bbl)	SIZE FACTOR	PROCESS FACTOR	REFINERY FEEDSTOCK RATE (1000 bbl/day)	EFFLUENT LIMIT (Lb/day)
BCT:					
BOD–5	17.9	0.97	0.88	125.0	1900.
TSS	12.5	0.97	0.88	125.0	1330.
O & G	5.7	0.97	0.88	125.0	608.
BAT:					
Ammonia	8.3	0.97	0.88	125.0	886.
Sulfide	0.118	0.97	0.88	125.0	12.6
COD	127.0	0.97	0.88	125.0	13600.

EXAMPLE PERMIT CALCULATIONS

PROCESS WASTEWATER

HYPOTHETICAL LUBE OIL REFINERY

STEP 4: CALCULATE AMENDED BAT LIMITS

BAT LIMITS FOR PHENOLIC COMPOUNDS, TOTAL CHROMIUM AND HEXAVALENT CHROMIUM ARE BASED ON A REVISED (1979 FLOW MODEL) PROCEDURE. THESE LIMITS ARE CALCULATED ON THE BASIS OF TOTAL PROCESS FEEDSTOCK RATE FOR FIVE DISTINCT PROCESS CATEGORIES AS FOLLOWS:

PROCESS CATEGORY	PROCESSES UTILIZED	PROCESS FEEDSTOCK RATE (1000BBLS)	
CRUDE	ATM. DISTILLATION	125	USE SUM TO DETERMINE HIGH YEAR
	VAC. DISTILLATION	60	
	DESALTING	125	
TOTAL		310	
CRACKING & COKING	FCC	41	
	HYDROCRACKING	20	
TOTAL		61	
LUBE	LUBE HYDROFINING	5.3	USE SAME YEAR'S DATA AS ABOVE
	FURFURAL EXTRACT.	4.0	
	PHENOL EXTRACT.	4.9	
TOTAL		14.2	
ASPHALT	ASPHALT PROD.	4.0	
TOTAL		4.0	
REFORMING & ALKYLATION	NONE	0.0	

EXAMPLE PERMIT CALCULATIONS

PROCESS WASTEWATER

HYPOTHETICAL LUBE OIL REFINERY

DAILY MAXIMUM BAT LIMITS FOR PHENOLIC COMPOUNDS, TOTAL CHROMIUM AND HEXAVALENT CHROMIUM USING 1979 FLOW MODEL

POLLUTANT	CRUDE PROCESS LIMIT (lb/day)	CRACKING AND COKING PROCESS LIMIT (lb/day)	ASPHALT PROCESS LIMIT (lb/day)	LUBE PROCESS LIMIT (lb/day)	REFORMING AND ALKYLATION PROCESS LIMIT (lb/day)	TOTAL REFINERY LIMIT (lb/day)
Phenolic Compounds	310 x 0.013 = 4.03	61 x 0.147 = 8.97	4 x 0.079 = 0.32	14.2 x 0.369 = 5.24	0.0 x 0.132 = 0.0	18.56
Total Chromium	310 x 0.011 = 3.41	61 x 0.119 = 7.26	4 x 0.064 = 0.26	14.2 x 0.299 = 4.25	0.0 x 0.107 = 0.0	15.18
Hexavalent Chromium	310 x 0.0007 = 0.217	61 x 0.0076 = 0.464	4 x 0.0041 = 0.016	14.2 x 0.0192 = 0.273	0.0 x 0.0069 = 0.0	0.97

Note: For 30-Day Average Limits, Use Same Production Data As For Daily Maximum Calculations

EXAMPLE PERMIT CALCULATIONS

PROCESS WASTEWATER

HYPOTHETICAL LUBE OIL REFINERY

STEP 5: COMPARE AMENDED BAT LIMITS FOR PHENOLIC COMPOUNDS, TOTAL CHROMIUM AND HEXAVALENT CHROMIUM WITH BPT LIMITS

FOR THE EXAMPLE REFINERY:

	DAILY MAXIMUM (LB/DAY)		30-DAY AVERAGE (LB/DAY)	
	BPT	BAT	BPT	BAT
PHENOLIC COMPOUNDS	14.19	18.56	6.94	4.48
TOTAL CHROMIUM	29.13	15.18	17.07	5.31
HEXAVALENT CHROMIUM	2.56	0.97	1.17	0.43

- SET DAILY MAXIMUM LIMIT TO BPT (I.E., 14.19 LB/DAY) FOR PHENOLIC COMPOUNDS, BECAUSE BAT CANNOT BE LESS STRINGENT THAN BPT.

PROCESS GROUPINGS INCLUDED IN 1974 FLOW MODEL

USE TO CALCULATE ALL BPT/BCT POLLUTANT LIMITS AND BAT LIMITS FOR AMMONIA, SULFIDE AND COD ONLY

PROCESS CATEGORY	PROCESSES INCLUDED	WEIGHTING FACTOR
CRUDE	ATMOSPHERIC DISTILLATION VACUUM DISTILLATION DESALTING	1
CRACKING AND COKING	FLUID CATALYTIC CRACKING VIS BREAKING THERMAL CRACKING MOVING BED CATALYTIC CRACKING HYDROCRACKING FLUID COKING,DELAYED COKING	6
LUBE	LUBE HYDROFINING WHITE OIL MANUFACTURING PROPANE–DEWAXING, DEASPHALTING DUO SOL, SOLVENT DEWAXING VACUUM TOWER, WAX FRACTIONATION CENTRIFUGING AND CHILLING MEK DEWAXING, DEOILING(WAX) NAPHTHENIC LUBES SO2 EXTRACTION WAX PRESSING, WAX SWEATING WAX PLANT(WITH NEUTRAL SEPARATION) FURFURAL EXTRACTION CLAY CONTACTING–PERCOLATION ACID TREATING PHENOL EXTRACTION	13
ASPHALT	PRODUCTION OXIDATION EMULSIFYING	12

PROCESS GROUPINGS INCLUDED IN 1979 FLOW MODEL

USE TO CALCULATE AMENDED BAT LIMITS

FOR PHENOLIC COMPOUNDS, TOT. CHROMIUM AND HEX. CHROMIUM ONLY

PROCESS CATEGORY	PROCESSES INCLUDED
CRUDE	ATMOSPHERIC DISTILLATION
	DESALTING
	VACUUM DISTILLATION
CRACKING	VIS BREAKING
AND	THERMAL CRACKING
COKING	FLUID CATALYTIC CRACKING
	MOVING BED CATALYTIC CRACKING
	HYDROCRACKING
	DELAYED COKING
	FLUID COKING
	HYDROTREATING
LUBE	HYDROFINING,HYDROFINISHING,LUBE HYDROFINING
	,WHITE OIL MANUFACTURE
	PROPANE DEWAXING,PROPANE DEASPHALTING,PROPANE FRACTURING,PROPANE DERESINING
	DUO SOL,SOLVENT TREATING,SOLVENT EXTRACTION,DUOTREATING,SOLVENT DEWAXING,SOLVENT DEASPHALTING
	LUBE VACUUM TOWER,OIL FRACTIONATION,BATCH STILL(NAPHTHA STRIP),BRIGHT STOCK TREATING
	CENTRIFUGE AND CHILLING
	MEK DEWAXING,KETONE DEWAXING,MEK TOLUENE DEWAXING
	DEOILING(WAX)
	NAPHTHENIC LUBES PRODUCTION
	SO2 EXTRACTION
	WAX PRESSING
	WAX PLANT(WITH NEUTRAL SEPARATION)
	FURFURAL EXTRACTION
	CLAY CONTACTING--PERCOLATION
	WAX SWEATING
	ACID TREATING
ASPHALT	PRODUCTION
	200 DEG F SOFTENING POINT UNFLUXED ASPHALT
	OXIDIZING
	EMULSIFYING
REFORMING	H2SO4 ALKYLATION
AND	CATALYTIC REFORMING
ALKYLATION	

EXAMPLE PERMIT CALCULATIONS

BAT/BCT LIMITS FOR

BALLAST AND ONCE-THROUGH COOLING WATER

- Daily Maximum Limits for Ballast Water

  (50,000 gal/day Flow Basis)

	FACTOR	X	FLOW	=	LIMIT
BOD-5	0.40	X	50	=	20. lb/day
TSS	0.26	X	50	=	13. lb/day
COD	3.9	X	50	=	195. lb/day
O & G	0.126	X	50	=	6.3 lb/day

- Once Through Cooling Water
  - 5 mg/l Total Organic Carbon as Concentration Limitation (Not to Exceed)
  - May be Net Basis if Requested by Permittee

STORM WATER RUNOFF LIMITATIONS

DEFINITIONS

- RUNOFF
  - Precipitation
  - Contact with Petroleum Refinery Property
  - Either Contaminated or Uncontaminated

- CONTAMINATED RUNOFF
  - Runoff
  - Direct Contact With Any:

    Raw Material

    Intermediate Product

    Finished Product

    By–Product, or

    Waste Product

- UNCONTAMINATED RUNOFF
  - Any Other Runoff

STORM WATER RUNOFF LIMITATIONS

OVERVIEW OF REGULATIONS

POLLUTANTS	BPT	BAT	BCT
PHENOLIC COMPOUNDS	*	*	
TOTAL CHROMIUM	*	*	
HEXAVALENT CHROMIUM	*	*	
COD/TOC	*	*	
BIOCHEMICAL OXYGEN DEMAND	*		*
TOTAL SUSPENDED SOLIDS	*		*
OIL & GREASE	*		*
pH	*		*

CASE	DISPOSITION
- COLLECTED SEPARATELY AND DISCHARGED	- NO BPT LIMITS IF O&G $\leq$ 15 mg/l AND TOC $\leq$ 110 mg/l - NO BCT LIMITS IF O&G $\leq$ 15 mg/l - NO BAT LIMITS IF TOC $\leq$ 110 mg/l - OTHERWISE, TECHNOLOGY BASIS FOR PROCESS WASTEWATER APPLIES
- COMMINGLED WITH PROCESS WASTEWATER	- EFFLUENT LIMITS BASED ON SAME TECHNOLOGY AS FOR PROCESS W.W.

STORM WATER RUNOFF LIMITATIONS

PERMIT CALCULATION PROCEDURE

BAT/BCT LIMITS FOR CONTAMINATED STORM WATER RUNOFF

- DETERMINE REFINERY CONTAMINATED STORM WATER VOLUME
- CALCULATE MASS BASED EFFLUENT LIMIT
  (Volume X Effluent Limitation Guideline Concentration)
- INCORPORATE INTO PERMIT

STORM WATER RUNOFF LIMITATIONS

DETERMINATION OF CONTAMINATED STORM WATER VOLUME

- FLEXIBILITY TO PERMIT WRITERS

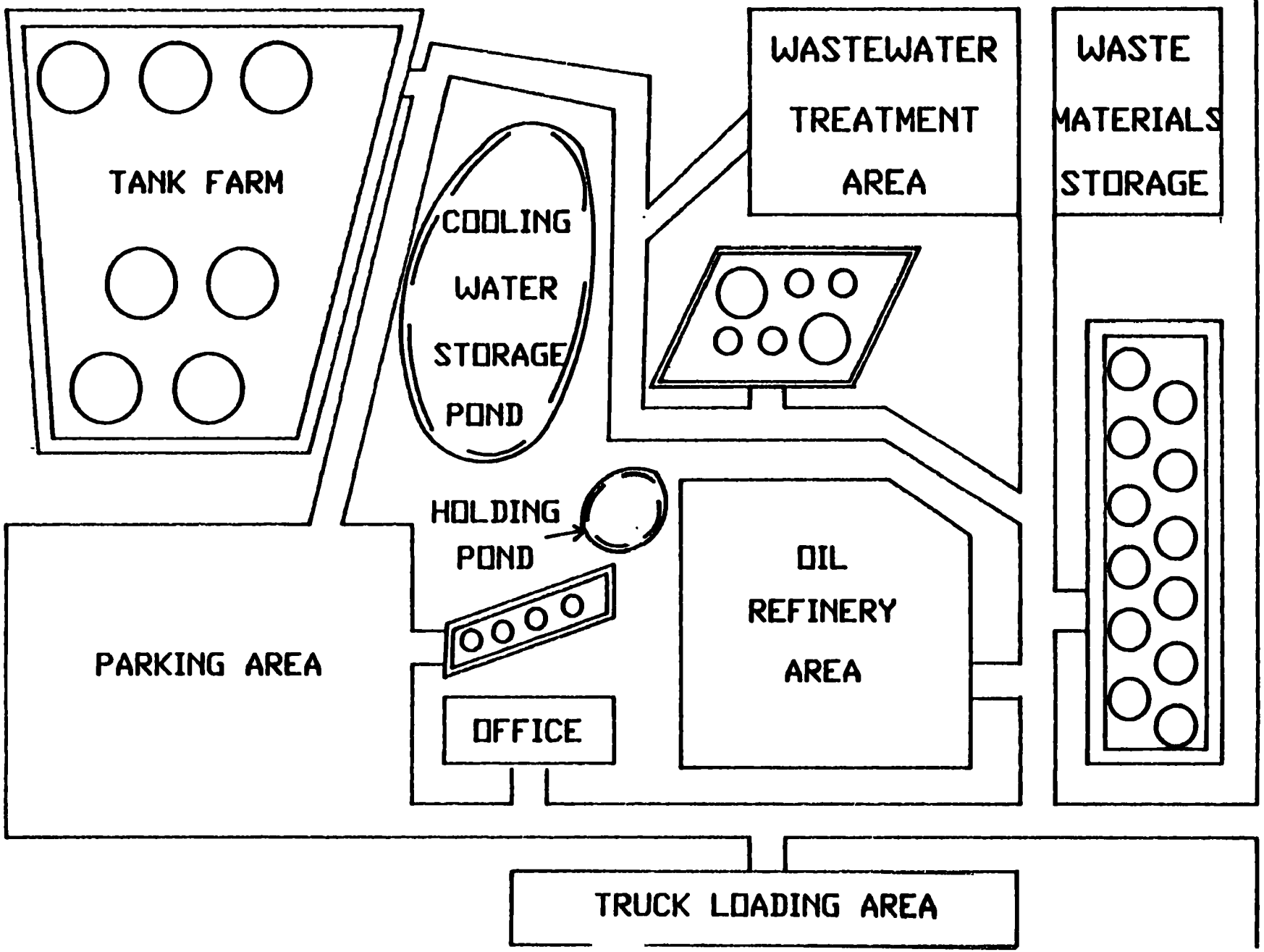
  (Case–by–Case Basis)

- APPROPRIATE METHODS TO CONSIDER
  - Difference in Wet/Dry Weather Flow to Treatment
  - Area Runoff Calculations Based on:

    Recurrent Precipitation Data

    Local Weather Service Data

OIL REFINERY LAYOUT



STORM WATER RUNOFF LIMITATIONS
DETERMINATION OF AREA–RUNOFF VOLUME

(NOTE: STORMWATER SEGREGATION IS NOT REQUIRED BY REG.)

CONTAMINATED AREAS	UNCONTAMINATED AREAS
Processing Areas	Parking Lots
Product Storage Areas	Office Areas
Raw Material Storage Areas	Roads, Access Ways
Tank Farms	
Material Loading/Transfer Areas	
Waste Product Storage Areas	
Wastewater Treatment Areas	
Runoff Holding Ponds	

STORM WATER RUNOFF LIMITATIONS

MASS BASED LIMITS

$$\frac{\text{CONTAMINATED RUNOFF VOLUME}}{\text{DAY}} \times \frac{\text{EFFLUENT LIMITATION CONCENTRATION}}{\text{1000 CU M}} = \frac{\text{MASS LIMIT}}{\text{DAY}}$$

$$\frac{\text{1000 CU M}}{\text{DAY}} \times \frac{\text{KILOGRAMS}}{\text{1000 CU M}} = \frac{\text{KILOGRAMS}}{\text{DAY}}$$

$$\frac{\text{1000 GALS}}{\text{DAY}} \times \frac{\text{POUNDS}}{\text{1000 GALS}} = \frac{\text{POUNDS}}{\text{DAY}}$$

STORM WATER RUNOFF LIMITATIONS

BAT/BCT EFFLUENT LIMITATIONS

Pollutant or Pollutant Property	Maximum for Any 1 Day	Average of Daily Values for 30 Consecutive Days
	Kilograms per 1000 cubic meters of flow (Pounds per 1000 gallons)	
Phenolic Compounds (4AAP)	0.35 (0.0029)	0.17 (0.0014)
Total Chromium	0.60 (0.005)	0.21 (0.0018)
Hexavalent Chromium	0.062 (0.00052)	0.028 (0.00023)
COD	360.0 (3.0)	180.0 (1.5)
BOD-5	48.0 (0.40)	26.0 (0.22)
TSS	33.0 (0.28)	21.0 (0.18)
Oil & Grease	15.0 (0.13)	8.0 (0.067)
pH	Within the range 6.0 to 9.0	

NO ADDITIONAL CREDIT FOR AMMONIA OR SULFIDE

STORM WATER RUNOFF LIMITATIONS

METHODS TO INCORPORATE MASS BASED LIMITS INTO PERMIT

- PROCESS WASTEWATER AND CONTAMINATED RUNOFF TREATED TOGETHER

  1. Continuous Allocation
  2. Variable Allocation
  3. Wet/Dry Weather Allocations

- SELECTION BY PERMIT WRITER

  - Site Specific Factors

    Local Precipitation Patterns,

    Design of Runoff Holding Facilities

  - Determines Method Used to Calculate Contaminated Runoff Volume

STORM WATER RUNOFF LIMITATIONS
CONTINUOUS ALLOCATION METHOD

1. CONTINUOUS ALLOCATION

- One Set of Effluent Limits Which is the Sum of Process Wastewater and Contaminated Runoff Limits

- Problem – Allocation When No Runoff is Present

- Appropriate –
  - Where Precipitation Patterns Relatively Constant
  - When Holding Facilities Used to Bleed Runoff to Treatment During Most or All of the Year

STORM WATER RUNOFF LIMITATIONS

VARIABLE ALLOCATION METHOD

2. VARIABLE ALLOCATION

- One Set of Effluent Limits for Process Wastewater Only
- An Additional Prorated Allocation for Each 1000 Gal. of Contaminated Runoff, Specific to Each Precipitation Event
- Most Ideal
- Based on Measurement or Calculation of Actual Contaminated Runoff (for the Specific Precipitation Period)
- Similar to Variable Batch Discharge Allocation
- Compliance Measurement and Enforcement Complexities

STORM WATER RUNOFF LIMITATIONS

WET/DRY WEATHER ALLOCATION METHOD

3. WET/DRY WEATHER ALLOCATION

- One Set of Effluent Limits for Process Wastewater Only
  - Dry Weather Limits

- One Set of Mass Limits Based on the Sum of Process and Contaminated Runoff Allocations
  - Wet Weather Limits
  - Contaminated Runoff Portion is a Fixed Mass Allocation, Based on Historic Precipitation Data

- Triggered by Either
  - Time of Year
  - Precipitation Events, or
  - Actual Contaminated Runoff Volume

- Used When:
  - Precipitation Amount and Frequency Varies Significantly During the Year
  - Significant Precipitation Events Occur Infrequently

STORM WATER RUNOFF LIMITATIONS
EXAMPLE PERMIT CALCULATIONS

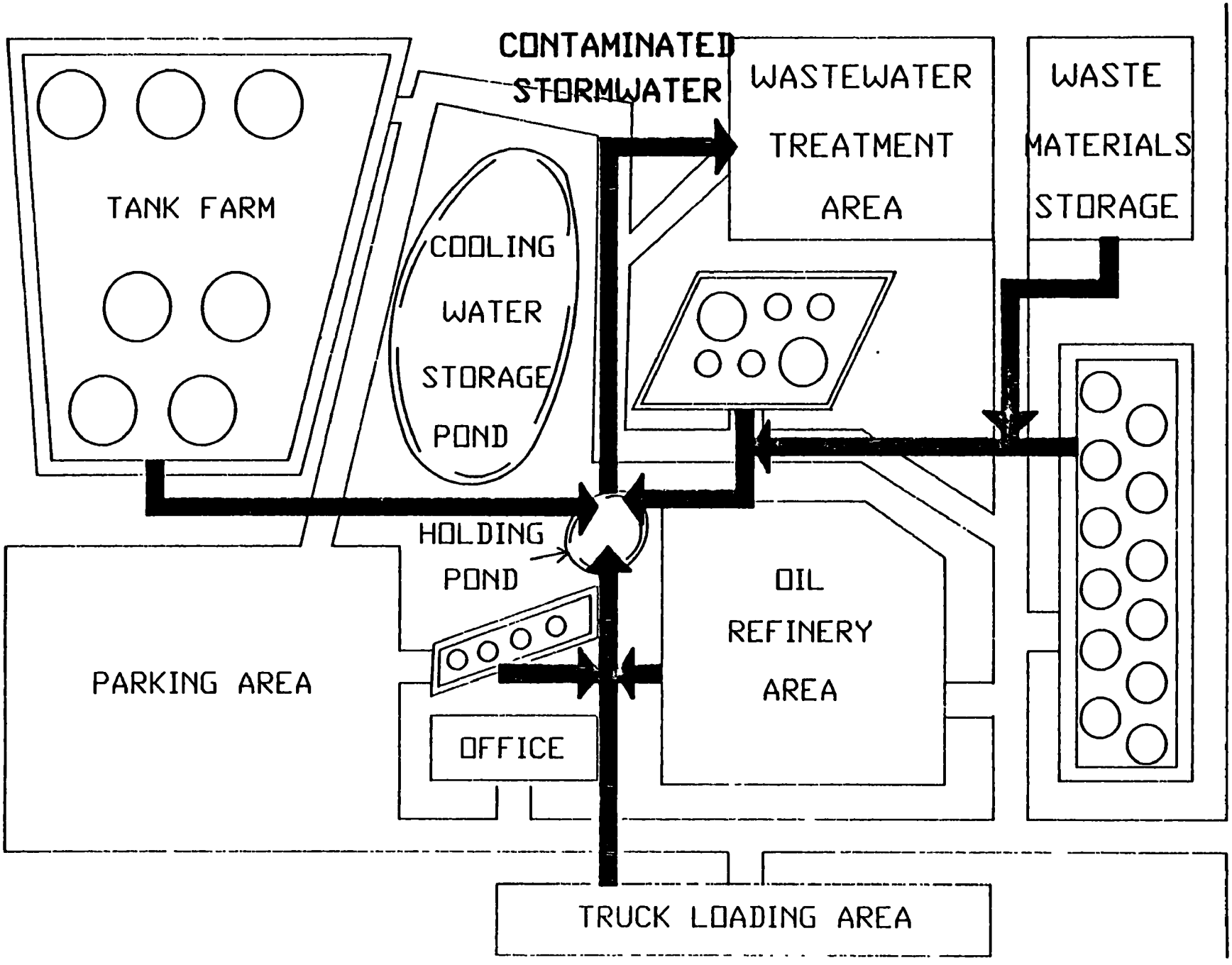
A. DIVERT CONTAMINATED RUNOFF TO SURGE POND/TANK, AND BLEED BACK TO PROCESS WASTEWATER TREATMENT SYSTEM

1. Wet/Dry Weather Allocation (Bleed Rate Intermittent)
2. Continuous Allocation (Bleed Rate Continuous)

B. DIRECT CONTAMINATED RUNOFF DIRECTLY TO PROCESS WASTEWATER TREATMENT SYSTEM

1. Variable Allocation

EXAMPLE A


CONTAMINATED STORMWATER
WASTEWATER TREATMENT AREA
WASTE MATERIALS STORAGE
TANK FARM
COOLING WATER STORAGE POND
HOLDING POND
PARKING AREA
OIL REFINERY AREA
OFFICE
TRUCK LOADING AREA

STORM WATER RUNOFF LIMITATIONS

EXAMPLE PERMIT CALCULATIONS

EXAMPLE A – DETERMINATION OF CONTAMINATED RUNOFF VOLUME

ANNUAL PRECIPITATION = 60 IN/YR

Source Area	Areal Extent (acres)	Permeability Factors	Sq. Ft. / Acre	Runoff Area (Sq. Ft)
Process Units	5.0 x	1.0 x	43,560 =	217,800
Storage	2.0 x	0.6 x	43,560 =	52,300
Tank Farm	15.0 x	0.4 x	43,560 =	261,400
Truck Loading	3.0 x	1.0 x	43,560 =	174,200
Holding Pond	1.0 x	1.0 x	43,560 =	43,600
Waste Storage	1.0 x	0.8 x	43,560 =	34,800
WWT Area	3.0 x	1.0 x	43,560 =	130,700
TOTAL AREA				914,800

ANNUAL RUNOFF = 914,800 Sq.Ft. x 60 In/Yr x 1/12 Ft/In x 7.48 Gal/CuFt

= 34,210,000 Gal/Yr

AVER. DAILY RUNOFF = 34,210,000/365 = 94,000 Gal/Day

STORM WATER RUNOFF LIMITATIONS

EXAMPLE PERMIT CALCULATIONS

EXAMPLE A.1 – RUNOFF BLEED RATE = 120,000 GAL/DAY

- WET WEATHER LIMITS = DRY WEATHER (e.g., PROCESS WASTEWATER) LIMITS PLUS STORM WATER ALLOCATION

- FOR PRECEDING LUBE REFINERY EXAMPLE AND 120,000 GAL/DAY STORMWATER:

POLLUTANT	STORMWATER FLOW (1000GAL/DAY)	DAILY MAX. FACTOR (LBS/1000GAL)	30–DAY FACTOR (LBS/1000GAL)	DAILY MAX. LIMIT (LBS/DAY)	30–DAY AVG. LIMIT (LBS/DAY)
BOD–5	120	0.40	0.22	48.00	26.40
TSS	120	0.28	0.18	33.60	21.60
O&G	120	0.13	0.067	15.60	8.04
ETC.	.	.	.	.	.

- ADDITION OF ABOVE VALUES TO DRY WEATHER LIMITS RESULTS IN WET WEATHER LIMITS ON FOLLOWING PAGE

EXAMPLE A.1 WET/DRY WEATHER LIMITS

(INTERMITTENT BLEED RATE = 120,000 GAL/DAY)

DRY WEATHER LIMITS

PARAMETER	DAILY MAXIMUM (LBS/DAY)	30-DAY AVERAGE * (LBS/DAY)
BOD-5	1900.00	970.97
TSS	1330.00	853.60
OIL & GREASE	608.00	320.10
AMMONIA	886.00	405.46
SULFIDE	12.60	5.66
COD	13600.00	7042.20
PHENOLIC COMPOUNDS	18.56	4.48
TOTAL CHROMIUM	15.18	5.31
HEXAVALENT CHROMIUM	0.97	0.43

WET WEATHER LIMITS (FOR DAYS WHEN BLEEDING TO PROCESS TREATMENT SYSTEM OCCURS)

PARAMETER	DAILY MAXIMUM (LBS/DAY)	30-DAY AVERAGE ** (LBS/DAY)
BOD-5	1948.00	997.37
TSS	1363.60	875.20
OIL & GREASE	623.60	328.14
AMMONIA	886.00	405.46
SULFIDE	12.60	5.66
COD	13960.00	7222.20
PHENOLIC COMPOUNDS	18.91	4.65
TOTAL CHROMIUM	15.78	5.52
HEXAVALENT CHROMIUM	1.03	0.46

* 30-DAY AVERAGE COMPLIANCE BASED ON AVERAGE OF ALL ANALYTICAL RESULTS FOR DRY WEATHER SAMPLES.

** 30-DAY AVERAGE COMPLIANCE BASED ON AVERAGE OF ALL ANALYTICAL RESULTS FOR WET WEATHER SAMPLES, PROVIDING MORE THAN ONE SAMPLE WAS TAKEN DURING 30 DAY PERIOD. OTHERWISE, 30-DAY AVERAGE NOT APPLICABLE.

STORM WATER RUNOFF LIMITATIONS

EXAMPLE PERMIT CALCULATIONS

EXAMPLE A.2 – RUNOFF BLEED RATE = 94,000 GAL/DAY

- WET WEATHER LIMITS = DRY WEATHER (e.g., PROCESS WASTEWATER) LIMITS PLUS STORM WATER ALLOCATION

- FOR PRECEDING LUBE REFINERY EXAMPLE AND 94,000 GAL/DAY STORMWATER:

POLLUTANT	STORMWATER FLOW (1000GAL/DAY)	DAILY MAX. FACTOR (LBS/1000GAL)	30–DAY FACTOR (LBS/1000GAL)	DAILY MAX. LIMIT (LBS/DAY)	30–DAY AVG. LIMIT (LBS/DAY)
BOD–5	94	0.40	0.22	37.60	20.68
TSS	94	0.28	0.18	26.32	16.92
O&G	94	0.13	0.067	12.22	6.30
ETC.	.	.	.	.	.

- ADDITION OF ABOVE VALUES TO DRY WEATHER LIMITS RESULTS IN WET WEATHER LIMITS ON FOLLOWING PAGE

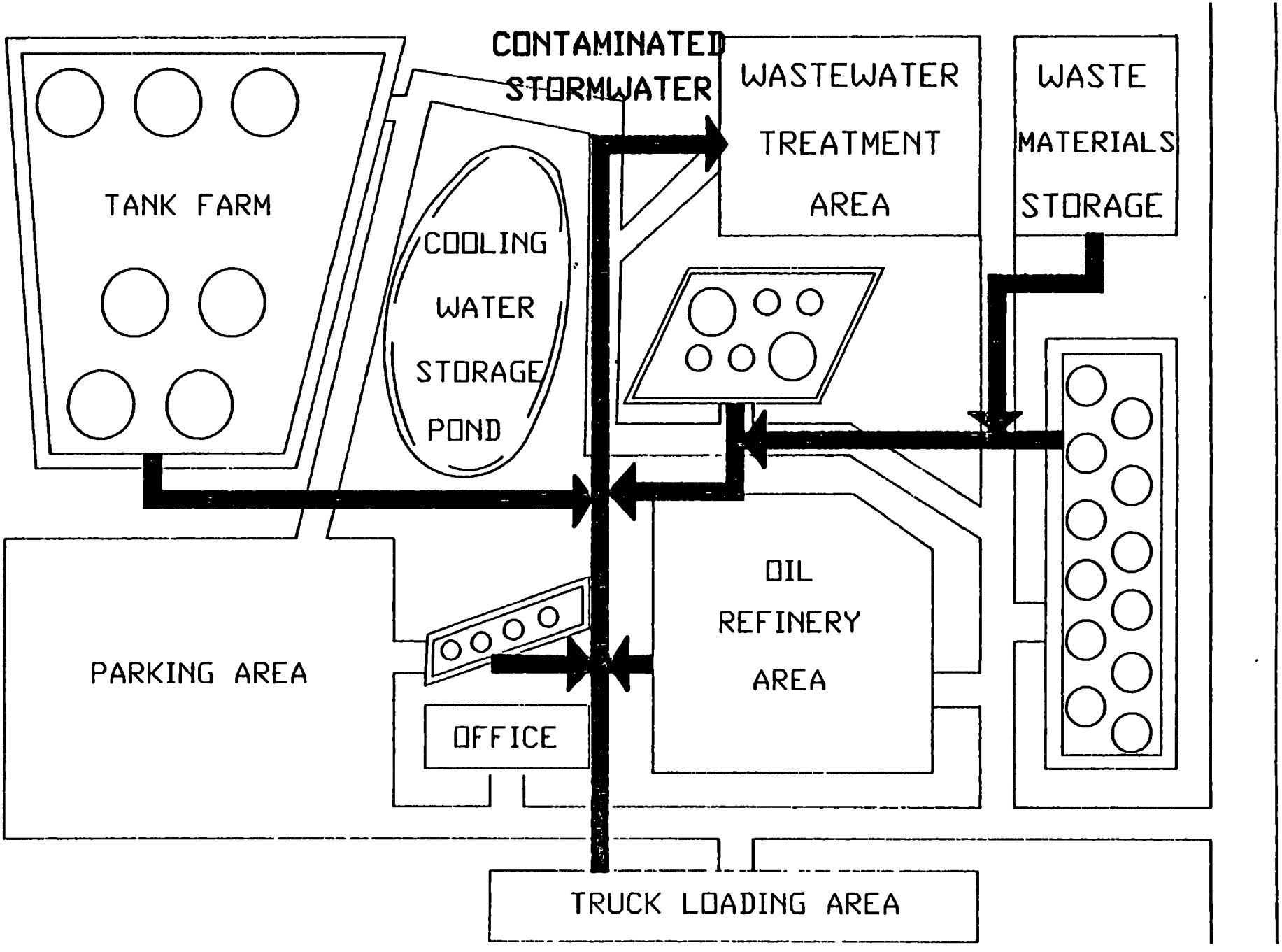
EXAMPLE A.2 CONTINUOUS RUNOFF ALLOCATION

(CONTINUOUS BLEED RATE = 94,000 GAL/DAY)

EFFLUENT LIMITS (THE FOLLOWING VALUES ARE APPLICABLE AT ALL TIMES)

PARAMETER	DAILY MAXIMUM (LBS/DAY)	30-DAY AVERAGE (LBS/DAY)
BOD-5	1937.60	991.65
TSS	1356.32	870.52
OIL & GREASE	620.22	326.40
AMMONIA	886.00	405.46
SULFIDE	12.60	5.66
COD	13882.00	7183.20
PHENOLIC COMPOUNDS	18.83	4.61
TOTAL CHROMIUM	15.65	5.48
HEXAVALENT CHROMIUM	1.02	0.45

EXAMPLE B


CONTAMINATED STORMWATER
WASTEWATER TREATMENT AREA
WASTE MATERIALS STORAGE
TANK FARM
COOLING WATER STORAGE POND
OIL REFINERY AREA
PARKING AREA
OFFICE
TRUCK LOADING AREA

EXAMPLE B.1 VARIABLE ALLOCATION

(RUNOFF DIRECTLY TO PROCESS TREATMENT SYSTEM)

DRY WEATHER LIMITS

PARAMETER	DAILY MAXIMUM (LBS/DAY)	30-DAY AVERAGE * (LBS/DAY)
BOD-5	1,900.00	970.97
TSS	1,330.00	853.60
OIL & GREASE	608.00	320.10
AMMONIA	886.00	405.46
SULFIDE	12.60	5.66
COD	13,600.00	7042.20
PHENOLIC COMPOUNDS	18.56	4.48
TOTAL CHROMIUM	15.18	5.31
HEXAVALENT CHROMIUM	0.97	0.43

WET WEATHER LIMITS

(ADDITIONAL ALLOCATION FOR EVERY 1000 GALLONS OF CONTAMINATED RUNOFF BASED ON CONTINUOUS FLOW MONITORING LESS NORMAL DRY WEATHER FLOW)

PARAMETER	DAILY MAXIMUM (LBS/1000GAL/DAY)	30-DAY AVERAGE
BOD-5	0.40	NA
TSS	0.28	NA
OIL & GREASE	0.13	NA
AMMONIA	0.00	NA
SULFIDE	0.00	NA
COD	3.00	NA
PHENOLIC COMPOUNDS	.00	NA
TOTAL CHROMIUM	0.01	NA
HEXAVALENT CHROMIUM	.00	NA

* 30-DAY AVERAGE COMPLIANCE BASED ON AVERAGE OF ALL ANALYTICAL RESULTS FOR DRY WEATHER SAMPLES.

SECTION 2

AMENDED REGULATIONS
40 CFR PART 419

The following is a complete set of the amended regulations that will appear in the upcoming edition of the Code of Federal Regulations, Title 40, Chapter I, Part 419, Petroleum Refining Point Source Category:

Authority: Secs. 301, 304(b), (c), (e), and (g), 306(b) and (c), 307(b) and (c), and 501, Federal Water Pollution Control Act as amended (the Act); 33 U.S.C. 1311, 1314(b), (c), (e), and (g), 1316(b) and (c), 1317(b) and (c), and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567. Pub. L. 95-217.

Subpart A - Topping Subcategory

419.10 Applicability; description of the topping subcategory.

The provisions of this subpart apply to discharges from any facility that produces petroleum products by the use of topping and catalytic reforming, whether or not the facility includes any other process in addition to topping and catalytic reforming. The provisions of this subpart do not apply to facilities that include thermal processes (coking, visbreaking, etc.) or catalytic cracking.

419.11 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water resulting from precipitation coming into contact with petroleum refinery property.

(c) The term "ballast" shall mean the flow of waters, from a ship, that is treated along with refinery wastewaters in the main treatment system.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate, or finished product.

(f) The following abbreviations shall be used: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

(g) The term "contaminated runoff" shall mean runoff which comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property.

419.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	22.7	12.0
TSS	15.8	10.1
COD (1)	117.	60.3
Oil and grease	6.9	3.7
Phenolic compounds	0.168	0.076
Ammonia as N	2.81	1.27
Sulfide	0.149	0.068
Total chromium	0.345	0.20
Hexavalent chromium	0.028	0.012
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	5.6	3.6
COD (1)	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	0.060	0.027
Ammonia as N	0.99	0.45
Sulfide	0.053	0.024
Total chromium	0.122	0.071
Hexavalent chromium	0.01	0.0044
pH	(2)	(2)

1 See footnote following Table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38

125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BPT effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	0.033	0.021
COD (1)	0.47	0.24
Oil and grease	0.015	0.008
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	0.26	0.17
COD (1)	3.9	2.0
Oil and grease	0.126	0.067
pH	(2)	(2)

1 See footnote following Table in 419.13(d).
2 Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease and 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, the

quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent Limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
COD (1)	360.	180.
Oil and grease	15.	8.
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
COD (1)	3.0	1.5
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

419.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
COD (1)	117.	60.3
Ammonia as N	2.81	1.27
Sulfide	0.149	0.068
	English units (pounds per 1,000 bbl of feedstock)	
COD (1)	41.2	21.3
Ammonia as N	0.99	0.45
Sulfide	0.053	0.024

1 See footnote following Table in 419.13(d).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17

6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factor times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088
	English units (pounds per 1,000 bbl of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) See the comprehensive example in Subpart D, 419.43(c)(2).

(d) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to ballast, which may be discharged after the application of best available technology economically achievable by a point source subject to the provisions of this subpart. These allocations are in addition to the discharge allowed by paragraphs (b) and (c) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BAT effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
COD (1).....	0.47	0.24
	English units (pounds per 1,000 gal of flow)	
COD (1).....	3.9	2.0

1 In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the permitting authority may substitute TOC as a parameter in lieu of COD. A TOC effluent limitation shall be based on effluent data from the particular refinery which correlates TOC to BOD5. If in the judgment of the permitting authority, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(e) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraphs (b) and (c) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(f) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD (1)	360.	180.
	English units (pounds per 1,000 gal of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD1	3.0	1.5

1 See footnote following table in 419.13(d).

419.14 Effluent limitations guidelines representing the degree of effluent reduction available by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	22.7	12.0
TSS	15.8	10.1
Oil and grease	6.9	3.7
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	5.6	3.6
Oil and grease	2.5	1.3
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95

5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best conventional pollutant control technology by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BCT effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	0.033	0.021
Oil and grease	0.015	0.008
pH	(1)	(1)

	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	0.26	0.17
Oil and grease	0.126	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)

	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

419.15 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduced pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.13(a) and (b).

419.16 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD5	11.8	6.3
TSS	8.3	4.9
COD (1)	61.0	32.0
Oil and grease	3.6	1.9
Phenolic compounds	0.088	0.043
Ammonia as N	2.8	1.3
Sulfide	0.078	0.035
Total chromium	0.18	0.105
Hexavalent chromium	0.015	0.0068
pH	(2)	(2)

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	English units (pounds per 1,000 gal of flow)	
BOD5	4.2	2.2
TSS	3.0	1.9
COD (1)	21.7	11.2
Oil and grease	1.3	0.70
Phenolic compounds	0.031	0.016
Ammonia as N	1.0	0.45
Sulfide	0.027	0.012
Total chromium	0.064	0.037
Hexavalent chromium	0.0052	0.0025
pH	(2)	(2)

1 See footnote following Table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum

for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged by a new source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/Mgal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	NSPS effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	0.033	0.021
COD (1)	0.47	0.24
Oil and grease	0.015	0.008
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	0.27	0.17
COD (1)	3.9	2.0
Oil and grease	0.126	0.067
pH	(2)	(2)

1 See footnote following table in 419.13(d.
2 Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Runoff - (Reserved)

419.17 Pretreatment standards for new sources (PSNS)

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.16(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Total chromium	1

Subpart B - Cracking Subcategory

419.20 Applicability; description of the cracking subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking. The provisions of this subpart are not applicable, however, to facilities that include the processes specified in Subparts C, D, or E of this part.

419.21 Specialized definitions.

The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in 419.11 shall apply to this subpart.

419.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	28.2	15.6
TSS	19.5	12.6
COD (1)	210.	109.
Oil and grease	8.4	4.5
Phenolic compounds	0.21	0.10
Ammonia as N	18.8	8.5
Sulfide	0.18	0.082
Total chromium	0.43	0.25
Hexavalent chromium	0.035	0.016
pH	(2)	(2)

	English units (pounds per 1,000 bbl of feedstock)	
BOD5	9.9	5.5
TSS	6.9	4.4
COD (1)	74.0	38.4
Oil and grease	3.0	1.6
Phenolic compounds	0.074	0.036
Ammonia as N	6.6	3.0
Sulfide	0.065	0.029
Total chromium	0.15	0.088
Hexavalent chromium	0.012	0.0056
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/1 oil and grease and 110 mg/1 total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/1 oil and grease or 110 mg/1 TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
COD (1)	360.	180.
Oil and grease	15.	8.
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
COD (1)	3.0	1.5
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

419.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
COD (1)	210.	109.
Ammonia as N	18.8	8.5
Sulfide	0.18	0.082
	English units (pounds per 1,000 bbl of feedstock)	
COD (1)	74.0	38.4
Ammonia as N	6.6	3.0
Sulfide	0.065	0.029

1 See footnote following Table in 419.13(d).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09

6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factory times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106

Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088

English units (pounds per 1,000 bbl of feedstock)

Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) See the comprehensive example in Subpart D, 419.43(c)(2).

(d) The provisions of 419.13(d) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(e) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraphs (b) and (c) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(f) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD1	360.	180.
	English units (pounds per 1,000 gal of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD1	3.0	1.5

1 See footnote following table in 419.13(d).

419.24 Effluent limitations guidelines representing the degree of effluent reduction available by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	28.2	15.6
TSS	19.5	12.6
Oil and grease	8.4	4.5
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	9.9	5.5
TSS	6.9	4.4
Oil and grease	3.0	1.6
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88

5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

419.25 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.23(a) and (b).

419.26 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	16.3	8.7
TSS	11.3	7.2
COD (1)	118.	61.0
Oil and grease	4.8	2.6
Phenolic compounds	0.119	0.058
Ammonia as N	18.8	8.6
Sulfide	0.105	0.048
Total chromium	0.24	0.14
Hexavalent chromium	0.020	0.0088
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	5.8	3.1
TSS	4.0	2.5
COD (1)	41.5	21.0
Oil and grease	1.7	0.93
Phenolic compounds	0.042	0.020
Ammonia as N	6.6	3.0
Sulfide	0.037	0.017
Total chromium	0.084	0.049
Hexavalent chromium	0.0072	0.0032
pH	(2)	(2)

1 See footnote following Table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Runoff-(Reserved)

419.27 Pretreatment standards for new sources (PSNS)

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and Grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.26(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Total chromium	1

Subpart C - Petrochemical Subcategory

419.30 Applicability; description of the petrochemical subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping, cracking, and petrochemical operations whether or not the facility includes any process in addition to topping, cracking, and petrochemical operations. The provisions of this subpart shall not be applicable, however, to facilities that include the processes specified in Subparts D or E of this part.

419.31 Specialized definitions.

For purposes of this subpart:

(a) The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in 419.11 shall apply.

(b) The term "petrochemical operations" shall mean the production of second-generation petrochemicals (i.e., alcohols, ketones, cumene, styrene, etc.) or first generation petrochemicals and isomerization products (i.e. BTX, olefins, cyclohexane, etc.) when 15 percent or more of refinery production is as first-generation petrochemicals and isomerization products.

419.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	34.6	18.4
TSS	23.4	14.8
COD (1)	210.0	109.0
Oil and grease	11.1	5.9
Phenolic compounds	0.25	0.120
Ammonia as N	23.4	10.6
Sulfide	0.22	0.099
Total chromium	0.52	0.30
Hexavalent chromium	0.046	0.020
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.1	6.5
TSS	8.3	5.25
COD (1)	74.0	38.4
Oil and grease	3.9	2.1
Phenolic compounds	0.088	0.0425
Ammonia as N	8.25	3.8
Sulfide	0.078	0.035
Total chromium	0.183	0.107
Hexavalent chromium	0.016	0.0072
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100 to 124.9	0.99

125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/1 oil and grease and 110 mg/1 total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/1 oil and grease or 110 mg/1 TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as

determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
COD (1)	360.	180.
Oil and grease	15.	8.
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
COD (1)	3.0	1.5
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

419.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
COD (1)	210.	109.
Ammonia as N	23.4	10.6
Sulfide	0.22	0.099
	English units (pounds per 1,000 bbl of feedstock)	
COD (1)	74.0	38.4
Ammonia as N	8.25	3.8
Sulfide	0.078	0.035

1 See footnote following Table in 419.13(d).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17

7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factory times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106

Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088

English units (pounds per 1,000 bbl of feedstock)

Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) See the comprehensive example in Subpart D, 419.43(c)(2).

(d) The provisions of 419.13(d) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(e) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraphs (b) and (c) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(f) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD (1)	360.	180.
	English units (pounds per 1,000 gal of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD (1)	3.0	1.5

1 See footnote following table in 419.13(d).

419.34 Effluent limitations guidelines representing the degree of effluent reduction available by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	34.6	18.4
TSS	23.4	14.8
Oil and grease	11.1	5.9
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.1	6.5
TSS	8.3	5.25
Oil and grease	3.9	2.1
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99

6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

419.35 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and Grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.33(a) and (b).

419.36 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	21.8	11.6
TSS	14.9	9.5
COD (1)	133.	69.0
Oil and grease	6.6	3.5
Phenolic compounds	0.158	0.077
Ammonia as N	23.4	10.7
Sulfide	0.140	0.063
Total chromium	0.32	0.19
Hexavalent chromium	0.025	0.012
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	7.7	4.1
TSS	5.2	3.3
COD (1)	47.0	24.0
Oil and grease	2.4	1.3
Phenolic compounds	0.056	0.027
Ammonia as N	8.3	3.8
Sulfide	0.050	0.022
Total chromium	0.116	0.068
Hexavalent chromium	0.0096	0.0044
pH	(2)	(2)

1 See footnote following Table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff - (Reserved)

419.37 Pretreatment standards for new sources (PSNS)

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.36(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Total chromium	1

Subpart D - Lube Subcategory

419.40 Applicability; description of the lube subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping, cracking, and lube oil manufacturing processes, whether or not the facility includes any process in addition to topping, cracking, and lube oil manufacturing processes. The provisions of this subpart are not applicable, however, to facilities that include the processes specified in Subparts C and E of this part.

419.41 Specialized definitions.

The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in 419.11 shall apply to this subpart.

419.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	50.6	25.8
TSS	35.6	22.7
COD (1)	360.	187.
Oil and grease	16.2	8.5
Phenolic compounds	0.38	0.184
Ammonia as N	23.4	10.6
Sulfide	0.33	0.150
Total chromium	0.77	0.45
Hexavalent chromium	0.068	0.030
pH	(2)	(2)

	English units (pounds per 1,000 bbl of feedstock)	
BOD5	17.9	9.1
TSS	12.5	8.0
COD (1)	127.	66.0
Oil and grease	5.7	3.0
Phenolic compounds	0.133	0.065
Ammonia as N	8.3	3.8
Sulfide	0.118	0.053
Total chromium	0.273	0.160
Hexavalent chromium	0.024	0.011
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) Example of the application of the above factors. Example - Lube refinery 125,000 bbl per stream day throughput.

CALCULATION OF THE PROCESS CONFIGURATION

Process category	Process included	Weighting factor
Crude	Atm crude distillation Vacuum crude distillation Desalting	1
Cracking and coking	Fluid cat. cracking Visbreaking Thermal cracking Moving bed cat. cracking Hydrocracking Fluid coking Delayed coking	6
Lube	Further defined in the development document.	13
Asphalt	Asphalt production Asphalt oxidation Asphalt emulsifying	12

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput	Weighting Factor	Process configuration
Crude:				
Atm	125.0	1.0		
Vacuum	60.0	0.48		
Desalting	125.0	1.0		
Total		2.48	X1	=2.48
Cracking:				
FCC	41.0	0.328		
Hydro-cracking	20.0	0.160		
Total		0.488	X6	=2.93
Lube:	5.3	0.042		
	4.0	0.032		
	4.9	0.039		
Total		0.113	X13	=1.47
Asphalt:	4.0	0.032		
Total		0.032	X12	=0.38
		Refinery process configuration=7.26		

Notes:
See Table 419.42(b)(2) for process factor. Process factor = 0.88.
See Table 419.42(b)(1) for size factor for 125,000 bbl per stream day lube refinery. Size factor = 0.97.
To calculate the limits for each parameter, multiply the limit given in 419.42(a) by both the process factor and size factor.
BOD5 limit (maximum for any 1 day) = 17.9 x 0.88 x 0.97 = 15.3 lb. per 1,000 bbl of feedstock.

(c) The provisions of 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease and 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
COD (1)	360.	180.
Oil and grease	15.	8.
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
COD (1)	3.0	1.5
Oil and Grease	0.13	0.067
Phenolic Compounds (4AAP)	0.0029	0.0014
Total Chromium	0.0060	0.0035
Hexavalent Chromium	0.00052	0.00023
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

419.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
COD (1)	360.	187.
Ammonia as N	23.4	10.6
Sulfide	0.33	0.150
	English units (pounds per 1,000 bbl of feedstock)	
COD (1)	127.	66.0
Ammonia as N	8.3	3.8
Sulfide	0.118	0.053

1 See footnote following Table in 419.13(d).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19

9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factory times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092

Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088

English units (pounds per 1,000 bbl of feedstock)

Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) Example Application of Effluent Limitations Guidelines as Applicable to Phenolic Compounds, Hexavalent Chromium, and Total Chromium.

The following example presents the derivation of a BAT phenolic compounds (4AAP) effluent limitation (30 day average) for a petroleum refinery permit. This methodology is also applicable to hexavalent chromium and total chromium.

Refinery Process	Process Feedstock Rate (1,000 bbl/day)	
1. Atmospheric Crude Distillation	100	
2. Crude Desalting	50	
3. Vacuum Crude Distillation	75	
Total Crude Processes (C)		225
6. Fluid Catalytic Cracking	25	
10. Hydrocracking	20	
Total Cracking and Coking Processes (K)		45
18. Asphalt Production	5	
Total Asphalt Processes (A)		5
21. Hydrofining	3	
Total Lube Processes (L)		3
8. Catalytic Reforming	10	
Total Reforming and Alkylation Processes (R)		10

Note: 30 day average effluent limitation for phenolic compounds (4AAP), lb/day = (0.003)(225) + (0.036)(45) + (0.019)(5) + (0.090)(3) + (0.032)(10) = 2.98 lb/day.

(d) The provisions of 419.13(d) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(e) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraphs (b) and (c) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(f) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following

table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD1	360.	180.
	English units (pounds per 1,000 gal of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD (1)	3.0	1.5

1 See footnote following table in 419.13(d).

419.44 Effluent limitations guidelines representing the degree of effluent reduction available by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	50.6	25.8
TSS	35.6	22.7
Oil and grease	16.2	8.5
pH	(1)	(1)

	English units (pounds per 1,000 bbl of feedstock)	
BOD5	17.9	9.1
TSS	12.5	8.0
Oil and grease	5.7	3.0
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(c) The provisions of 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through

cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

419.45 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a

publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and Grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.43(a) and (b).

419.46 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	34.6	18.4
TSS	23.4	14.9
COD (1)	245.	126.
Oil and grease	10.5	5.6
Phenolic compounds	0.25	0.12
Ammonia as N	23.4	10.7
Sulfide	0.220	0.10
Total chromium	0.52	0.31
Hexavalent chromium	0.046	0.021
pH	(2)	(2)

	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.2	6.5
TSS	8.3	5.3
COD (1)	87.0	45.0
Oil and grease	3.8	2.0
Phenolic compounds	0.088	0.043
Ammonia as N	8.3	3.8
Sulfide	0.078	0.035
Total chromium	0.180	0.105
Hexavalent chromium	0.022	0.0072
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff - (Reserved).

419.47 Pretreatment standards for new sources (PSNS)

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.46(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Total chromium.....	1

Subpart E - Integrated Subcategory

419.50 Applicability; description of the integrated subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping, cracking, lube oil manufacturing processes, and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking, lube oil manufacturing processes, and petrochemical operations.

419.51 Specialized definitions.

The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in 419.31 shall apply to this subpart.

419.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	54.4	28.9
TSS	37.3	23.7
COD (1)	388.	198.
Oil and grease	17.1	9.1
Phenolic compounds	0.40	0.192
Ammonia as N	23.4	10.6
Sulfide	0.35	0.158
Total chromium	0.82	0.48
Hexavalent chromium	0.068	0.032
pH	(2)	(2)

	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.2	10.2
TSS	13.2	8.4
COD (1)	136.	70.0
Oil and grease	6.0	3.2
Phenolic compounds	0.14	0.068
Ammonia as N	8.3	3.8
Sulfide	0.124	0.056
Total chromium	0.29	0.17
Hexavalent chromium	0.025	0.011
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease and 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
COD (1)	360.	180.
Oil and grease	15.	8.
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
COD (1)	3.0	1.5
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

419.53 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30-.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
COD (1)	388.	198.
Ammonia as N	23.4	10.6
Sulfide	0.35	0.158
	English units (pounds per 1,000 bbl of feedstock)	
COD (1)	136.	70.0
Ammonia as N	8.3	3.8
Sulfide	0.124	0.056

1 See footnote following Table in 419.13(d).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30

10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factory times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106

Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088

	English units (pounds per 1,000 bbl of feedstock)	
Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) See the comprehensive example in Subpart D, 419.43(c)(2).

(d) The provisions of 419.13(d) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(e) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraphs (b) and (c) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(f) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD (1)	360.	180.
	English units (pounds per 1,000 gal of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD (1)	3.0	1.5

1 See footnote following table in 419.13(d).

419.54 Effluent limitations guidelines representing the degree of effluent reduction available by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	54.4	28.9
TSS	37.3	23.7
Oil and grease	17.1	9.1
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.2	10.2
TSS	13.2	8.4
Oil and grease	6.0	3.2
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225.0 or greater	1.04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10

9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD5	48.	26.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

1 Within the range of 6.0 to 9.0

419.55 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and Grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.53(a) and (b).

419.56 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of feedstock)	
BOD5	41.6	22.1
TSS	28.1	17.9
COD (1)	295.	152.
Oil and grease	12.6	6.7
Phenolic compounds	0.30	0.14
Ammonia as N	23.4	10.7
Sulfide	0.26	0.12
Total chromium	0.64	0.37
Hexavalent chromium	0.052	0.024
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	14.7	7.8
TSS	9.9	6.3
COD (1)	104.	54.0
Oil and grease	4.5	2.4
Phenolic compounds	0.105	0.051
Ammonia (as N)	8.3	3.8
Sulfide	0.093	0.042
Total chromium	0.220	0.13
Hexavalent chromium	0.019	0.0084
pH	(2)	(2)

1 See footnote following table in 419.13(d).
2 Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, 419.42(b)(3).

(c) The provisions of 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff - (Reserved).

419.57 Pretreatment standards for new sources (PSNS)

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia as N (1)	100

1 Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in 419.56(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources - maximum for any 1 day
	(Milligrams per liter (mg/l))
Total chromium	1

REGULATION APPENDIX A
PROCESSES INCLUDED IN THE DETERMINATION OF BAT EFFLUENT LIMITATIONS FOR TOTAL CHROMIUM, HEXAVALENT CHROMIUM, AND PHENOLIC COMPOUNDS (4AAP)

Crude Processes:

1. Atmospheric Crude Distillation
2. Crude Desalting
3. Vacuum Crude Distillation

Cracking and Coking Processes:

4. Visbreaking
5. Thermal Cracking
6. Fluid Catalytic Cracking
7. Moving Bed Catalytic Cracking
10. Hydrocracking
15. Delayed Coking
16. Fluid Coking
54. Hydrotreating

Asphalt Processes:

18. Asphalt Production
32. 200°F Softening Point Unfluxed Asphalt
43. Asphalt Oxidizing
89. Asphalt Emulsifying

Lube Processes:

21. Hydrofining, Hydrofinishing, Lube Hydrofining
22. White Oil Manufacture
23. Propane Dewaxing, Propane Deasphalting, Propane Fractioning, Propane Deresining
24. Duo Sol, Solvent Treating, Solvent Extraction, Duotreating, Solvent Dewaxing, Solvent Deasphalting
25. Lube Vac Twr, Oil Fractionation, Batch Still (Naptha Strip), Bright Stock Treating
26. Centrifuge & Chilling
27. MEK Dewaxing, Ketone Dewaxing, MEK-Toluene Dewaxing
28. Deoiling (wax)
29. Naphthenic Lubes Production
30. SO2 Extraction
34. Wax Pressing
35. Wax Plant (with Neutral Separation)
36. Furfural Extraction
37. Clay Contacting - Percolation
38. Wax Sweating
39. Acid Treating
40. Phenol Extraction

Reforming and Alkylation Processes:

8. H2S04 Alkylation
12. Catalytic Reforming

APPENDIX A

PRODUCTION-BASED EFFLUENT LIMITATIONS

Memorandum from J. William Jordan, Chief, NPDES Technical Support Branch, U.S. EPA to Regional Permits Branch Chiefs, re: Calculation of Production-Based Effluent Limits, December 18, 1984.

40 CFR 122.45(b)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 18 1984

OFFICE OF
WATER

MEMORANDUM

SUBJECT: Calculation of Production-Based Effluent Limits

FROM: J. William Jordan, Chief
NPDES Technical Support Branch (EN-336)

TO: Regional Permits Branch Chiefs

The purpose of this memorandum is to clarify the procedure for calculating production-based effluent limitations and to provide guidance on the use of alternate limitations. Many effluent guidelines are expressed in terms of allowable pollutant discharge rate per unit of production. To determine permit limits, these standards are multiplied by an estimate of the facility's actual average production.

Section 122.45(b) of the NPDES permit program regulations sets forth the requirements for calculating production-based effluent limitations. The central feature of this section is the requirement that limitations be based upon a "reasonable measure of the actual production of the facility", rather than upon design capacity. Interpretation of this requirement has proven confusing in the past. This memorandum provides recommendations for developing production-based limitations and alternate limitations. The Agency is also planning to revise this portion of the regulations, and has revised Part III of Application Form 2C, in order to clarify language which might lead to the use of inappropriate production-based limitations.

Background

The proper application of production-based effluent limitation guidelines is dependent upon the methodology that is used to develop the guidelines. When most guidelines are developed, a single long term average daily production value and its relationship to flow are determined. This is combined with effluent concentration data collected from plants to form the basis of the guideline standards. Variability factors are developed on concentration data obtained from samples taken during periods of varying production. The variability factors and performance data are then used to derive the guideline standards.

Calculation of Limitations

To apply these guidelines, permit writers should determine

a single estimate of the expected production over the life of the permit using the long term average production from the plant's historical records. Usually, a five year production history would be used to derive this value. This single production value is then multiplied by both the daily maximum and monthly average guidelines limitations to obtain permit limits. In determining this single estimate, the permit writer should take into account the distribution of production by analyzing data taken as frequently as possible. For most cases, monthly data compiled from daily data would be sufficient.

The permit writer should avoid the use of a limited amount of production data in estimating the production for a specific facility. For example, the data from a particular month may be unusually high and thus lead to the derivation of effluent limitations which are not actually reflective of normal plant operations. As previously explained, effluent limitations guidelines already account for some of the variations which occur within long term production rates. Therefore, the use of too short a time frame in the calculation of production based limitations for a specific industrial facility may lead to "double accounting" of the variability factors.

In some cases, the historical data may show large random or cyclic fluctuations in production rates, of either a short or long term nature. In those situations, it may be appropriate to have alternate limits which are applicable at some increased production rate (see discussion of Alternate Limits) or setting the limit based upon a level of production higher than the average (e.g. 10-20 percent or higher).

However, the primary objective is to determine a production estimate for a facility which approximates the long term average production rate (in terms of mass of product per day) which can reasonably be expected to prevail during the next term of the permit. The following example illustrates the proper application of guidelines:

> Example: Company A has produced 331,500 tons, 292,000 tons, 304,000 tons, 284,000 tons, and 312,000 tons per year for the previous five years. The use of the highest year of production (331,500 tons per year) might be an appropriate and reasonable measure of expected production. One check on this could be to determine if maximum yearly values are within a certain percent of the average, such as 20 percent.
>
> One of several methods may be appropriate to convert from the annual production rate to average daily production. One method takes the annual production rate and divides it by the number of production days per year. To determine the number of production days, the total number of normally scheduled non-production days are subtracted from the total days in a year.
>
> This method is appropriate in cases where the plant

discharges intermittently as a direct result of production flows. In cases where the plant discharges continuously, even on days when there are no production activities, other methods may be appropriate.

If Company A normally has 255 production days per year, which are approximately equal to the number of discharge days, the annual production rate of 331,500 tons per year would yield an average daily rate of 1,300 tons per day. If pollutant X has an effluent limitation guideline of 0.10 lbs./1000 lbs. for the monthly average and 0.15 lbs./1000 lbs. for the maximum daily average, the effluent limitations would be calculated as follows:

Monthly Average Limit (Pollutant X)

$$1{,}300 \frac{\text{tons}}{\text{day}} \times \frac{2000 \text{ lbs.}}{\text{ton}} \times \frac{0.10 \text{ lbs.}}{1000 \text{ lbs.}} = 260 \text{ lbs./day}$$

Daily Maximum Limit (Pollutant X)

$$1{,}300 \frac{\text{tons}}{\text{day}} \times \frac{2000 \text{ lbs.}}{\text{ton}} \times \frac{0.15 \text{ lbs.}}{1000 \text{ lbs.}} = 390 \text{ lbs./day}$$

In the example above, the production during the highest year of the last five years was used as the estimate of production. This estimate is appropriate when production is not expected to change significantly during the permit term. However, if historical trends, market forces, or company plans indicate that a different level of production will prevail during the permit term, a different basis for estimating production should be used.

Alternate Limits

If production rates are expected to change significantly during the life of the permit, the permit can include alternate limits. These alternate limits would become effective when production exceeds a threshold value, such as during seasonal production variations. Definitive guidance is not available with respect to the threshold value which should "trigger" alternate limits. However, it is generally agreed that a 10 to 20 percent fluctuation in production is within the range of normal variability, while changes in production substantially higher than this range (such as 50 percent) could warrant consideration of alternate limitations. The major characteristics of alternate limits are best described by illustration and example:

Example: Plant B has produced 486,000 tons, 260,400 tons, 220,000 tons, 240,800 tons, and 206,500 tons per year for the previous five years. The high year is significantly higher than the rest and the permittee has made a plausible argument that production is expected to return to that level The guideline for pollutant X is 0.8 lbs/1000 lbs for the monthly average and 0.14 lbs/1000 lbs for the daily maxi-

mum. The alternate effluent limitations could be calculated as follows:

Primary Limits:

- Basis of calculation: 260,400 tons/yr. = 1,050 tons/day (248 production days per year)

- Applicable level of production: less than 1,050 tons per day average production rate for the month

  Monthly Average Limit

  $$1{,}050 \frac{\text{tons}}{\text{day}} \times 2000 \frac{\text{lbs.}}{\text{ton}} \times \frac{0.08 \text{ lbs.}}{1000 \text{ lbs.}} = 168 \text{ lbs./day}$$

  Daily Maximum Limit

  $$1{,}050 \frac{\text{tons}}{\text{day}} \times 2000 \frac{\text{lbs.}}{\text{ton}} \times \frac{0.14 \text{ lbs.}}{1000 \text{ lbs.}} = 294 \text{ lbs./day}$$

Alternate Limits:

- Applicable threshold level of production = more than 1,260 tons/day average production rate for the month (20 percent above normal production levels)

- Basis of calculation: 486,000 tons/yr. = 1,350 tons/day (based upon historical data and to be applicable beyond a 20 percent increase in production)

  Monthly Average Limit = 216 lbs./day

  Daily Maximum Limit = 378 lbs./day

Alternate limits should be used only after careful consideration and only when a substantial increase or decrease in production is likely to occur. In the example above, the primary limits would be in effect when production was at normal levels. During periods of significantly higher production, the alternate limits would be in effect. When production reverted to normal levels, the primary limits would have to be met. The thresholds, measures of production, and special reporting requirements must be detailed in the permit.

If you have any questions concerning the calculation of production-based limitations or the use of alternate limitations, please call me or have your staff contact James Taft at (202/FTS-426-7010).

40 CFR Part 122 - EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

Subpart C - Permit Conditions

§ 122.45 Calculating NPDES permit conditions (applicable to State NPDES programs, see § 123.25).

(a) *Outfalls and discharge points.* All permit effluent limitations, standards and prohibitions shall be established for each outfall or discharge point of the permitted facility, except as otherwise provided under § 122.44(j)(2) (BMPs where limitations are infeasible) and paragraph (i) of this section (limitations on internal waste streams).

(b) *Production-based limitations.* (1) In the case of POTWs, permit limitations, standards, or prohibitions shall be calculated based on design flow.

[122.45(b)(2) revised by 49 FR 38046, September 26, 1984]

(2)(i) Except in the case of POTWs or as provided in paragraph (b)(2)(ii) of this section, calculation of any permit limitations, standards, or prohibitions which are based on production (or other measure of operation) shall be based not upon the designed production capacity but rather upon a reasonable measure of actual production of the facility. For new sources or new dischargers, actual production shall be estimated using projected production. The time period of the measure of production shall correspond to the time period of the calculated permit limitations; for example, monthly production shall be used to calculate average monthly discharge limitations.

(ii)(A)(*1*) The Director may include a condition establishing alternate permit limitations, standards, or prohibitions based upon anticipated increase (not to exceed maximum production capability) or decreased production levels.

(*2*) *For the automotive manufacturing industry* only, the Regional Administrator shall, and the State Director may establish a condition under paragraph (b)(2)(ii)(A)(*1*) of this section if the applicant satisfactorily demonstrates to the Director at the time the application is submitted that its actual production, as indicated in paragraph (b)(2)(i) of this section, is substantially below maximum production capability and that there is a reasonable potential for an increase above actual production during the duration of the permit.

(B) If the Director establishes permit conditions under paragraph (b)(2)(ii)(A) of this section:

(*1*) The permit shall require the permittee to notify the Director at least two business days prior to a month in which the permittee expects to operate at a level higher than the lowest production level identified in the permit. The notice shall specify the anticipated level and the period during which the permittee expects to operate at the alternate level. If the notice covers more than one month, the notice shall specify the reasons for the anticipated production level increase. New notice of discharge at alternate levels is required to cover a period or production level not covered by prior notice or, if during two consecutive months otherwise covered by a notice, the production level at the permitted facility does not in fact meet the higher level designated in the notice.

(*2*) The permittee shall comply with the limitations, standards, or prohibitions that correspond to the lowest level of production specified in the permit, unless the permittee has notified the Director under paragraph (b)(2)(ii)(B)(*1*) of this section, in which case the permittee shall comply with the lower of the actual level of production during each month or the level specified in the notice.

(*3*) The permittee shall submit with the DMR the level of production that actually occurred during each month and the limitations, standards, or prohibitions applicable to that level of production.

[122.45(c) revised by 49 FR 38046, September 26, 1984]

APPENDIX B

EXAMPLE NPDES PERMIT LIMITATIONS

FOR

HYPOTHETICAL LUBE OIL REFINERY

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall(s) serial number(s) 001, refinery wastewater treatment facility effluent

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day)		Other Units (Specify)		Monitoring Requirements	
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
BOD_5	441 (971)	867 (1,900)	NA	NA	3/week	24 hr. composite
TSS	388 (854)	606 (1,330)	NA	NA	3/week	24 hr composite
Oil and Grease	145 (320)	276 (608)	NA	NA	3/week	Grab
Ammonia as N	184 (405)	402 (886)	NA	NA	3/week	24 hr. composite
Sulfide	2.6 (5.7)	5.7 (12.6)	NA	NA	3/week	24 hr. composite
COD	3,200 (7,040)	6,150 (13,600)	NA	NA	3/week	24 hr. composite
Phenolic Compounds	2.04 (4.48)	6.44 (14.19)	NA	NA	3/week	24 hr. composite
Total Chromium	2.41 (5.31)	689 (15.18)	NA	NA	3/week	24 hr. composite
Hexavalent Chromium	0.20 (0.43)	0.44 (0.97)	NA	NA	3/week	24 hr. composite
Flow - m^3/day (MGD)	NA	NA	NA	NA	Continuous	Measurement

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored continuously and recorded.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

At Outfall 001.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall(s) serial number(s) 001, refinery wastewater treatment facility effluent.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day)		Other Units (Specify)			
			kg/1000 m^3 (lbs/1000 gal)		Measurement	Sample
	Daily Avg	Daily Max	Daily Avg	Daily Max	Frequency	Type
			of storm water flow			
During wet weather conditions, the following waste load allocations are authorized for contaminated storm water runoff passing through the wastewater treatment facility in addition to the dry weather effluent limitations and monitoring requirements for Outfall 001 shown on Page 1:						
BOD_5	NA	NA	NA	48 (0.40)	NA	NA
TSS	NA	NA	NA	33 (0.28)	NA	NA
Oil and Grease	NA	NA	NA	15 (0.13)	NA	NA
COD	NA	NA	NA	360 (3.0)	NA	NA
Phenolic Compounds	NA	NA	NA	0.35 (0.0029)	NA	NA
Total Chromium	NA	NA	NA	0.60 (0.005)	NA	NA
Hexavalent Chromium	NA	NA	NA	0.062 (0.00052)	NA	NA

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored continuously and recorded.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

At Outfall 001.

The storm water flow through the wastewater treatment facility is that portion of flow greater than the dry weather flow. The dry weather flow is considered to be the average flow through the wastewater treatment facility for the last three consecutive zero precipitation days, excluding any previously collected storm water runoff.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning effective date **and lasting through** expiration date,
the permittee is authorized to discharge from outfall(s) serial number(s) 002, once-through, non-contact cooling water.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day)		Other Units (Specify)			
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Total Organic Carbon	NA	NA	NA	5 mg/l (net)	3/week	24 hr. composite
Flow - m^3/day (MGD)	NA	NA	NA	NA	1/day	Estimate

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):
At Outfall 002.

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning effective date and lasting through expiration date, the permittee is authorized to discharge from outfall(s) serial number(s) 003, storm water runoff from tank farm.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day)		Other Units (Specify)			
	Daily Avg	Daily Max	Daily Avg	Daily Max	Measurement Frequency	Sample Type
Total Organic Carbon	NA	NA	NA	110 mg/l	1/day *	Grab
Oil and Grease	NA	NA	NA	35 mg/l	1/day *	Grab
Flow - m3/day (MGD)	NA	NA	NA	NA	1/day *	Estimate

* When flowing. A grab sample shall be collected immediately following the start of discharge and analyzed. Discharge shall be monitored once each day for the duration of flow.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/day when flowing.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

At Outfall 003.

APPENDIX C

FEDERAL REGISTER NOTICES

30 FR 16560, May 9, 1974, Final BPT

40 FR 21939, May 20, 1975, BPT Amendments

44 FR 75926, December 21, 1979, Proposed BAT, NSPS, PSES, PSNS

47 FR 46434, October 18, 1982, Final BAT, BSPS, PSES, PSNS

49 FR 34152, August 28, 1984, Proposed BAT Amendments, BCT, Storm Water Runoff Limitations

50 FR 28516, July 12, 1985, Final BAT Amendments, BCT, Storm Water Runoff Limitations

federal register

THURSDAY, MAY 9, 1974
WASHINGTON, D.C.
Volume 39 ■ Number 91

PART II

ENVIRONMENTAL PROTECTION AGENCY

■

PETROLEUM REFINING POINT SOURCE CATEGORY

Effluent Guidelines and Standards

No. 91—Pt. II——1

Title 40—Protection of the Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER N—EFFLUENT GUIDELINES AND STANDARDS

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

On December 14, 1973 notice was published in the FEDERAL REGISTER (38 FR 34542), that the Environmental Protection Agency (EPA or Agency) was proposing effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources within the topping subcategory, cracking subcategory, petrochemical subcategory, lube subcategory, and integrated subcategory of the petroleum refining category of point sources.

The purpose of this notice is to establish final effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources in the topping subcategory, cracking subcategory, petrochemical subcategory, lube subcategory, and integrated subcategory of the petroleum refining category of point sources, by amending 40 CFR Ch. I, Subchapter N, to add a new Part 419. This final rulemaking is promulgated pursuant to sections 301, 304 (b) and (c), 306 (b) and (c) and 307(c) of the Federal Water Pollution Control Act, as amended, (the Act): 33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316 (b) and (c) and 1317(c); 86 Stat. 816 et seq.; Pub. L. 92-500. Regulations regarding cooling water intake structures for all categories of point sources under section 316(b) of the Act will be promulgated in 40 CFR Part 402.

In addition, the EPA is simultaneously proposing a separate provision, which appears in the proposed rules section of the FEDERAL REGISTER, stating the application of the limitations and standards set forth below to users of publicly owned treatment works which are subject to pretreatment standards under section 307(b) of the Act. The basis of that proposed regulation is set forth in the associated notice of proposed rulemaking.

The legal basis, methodology and factual conclusions which support promulgation of this regulation were set forth in substantial detail in the notice of public review procedures published August 6, 1973 (38 FR 21202) and in the notice of proposed rulemaking for the topping subcategory, cracking subcategory, petrochemical subcategory, lube subcategory, and integrated subcategory. In addition, the regulations as proposed were supported by two other documents: (1) The document entitled "Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Segment of the Petroleum Refining Point Source Category" (December 1973) and (2) the document entitled "Economic Analysis of Proposed Effluent Guidelines, Petroleum Refining Industry" (September 1973). Both of these documents were made available to the public and circulated to interested persons at approximately the time of publication of the notice of proposed rulemaking.

Interested persons were invited to participate in the rulemaking by submitting written comments within 30 days from the date of publication. Prior public participation in the form of solicited comments and responses from the States, Federal agencies, and other interested parties were described in the preamble to the proposed regulation. The EPA has considered carefully all of the comments received and a discussion of these comments with the Agency's response thereto follows. The regulation as promulgated contains some significant departures from the proposed regulation. The following discussion outlines the reasons why these changes were made and why other suggested changes were not made.

(a) *Summary of major comments.* The following responded to the request for comments which was made in the preamble to the proposed regulation: Interstate Sanitation Commission; Shell Oil Company; Phillips Petroleum Company; Getty Oil Company; Union Oil Company of California; Exxon Company, USA; Larry D. Killion; American Petroleum Industry; Standard Oil Company of Ohio; UOP Process Division; Gulf Oil; City of Buffalo; Mobil Oil Corporation; Macario Independent Refinery; Texaco Incorporated; Standard Oil Company of Indiana; National Wildlife Federation; State of California; County of Erie, NY; State of Alaska; Los Angeles County; Buffalo (N.Y.) Area Chamber of Commerce; State of Colorado; State of Michigan; U.S. Water Resources Council; Sun Oil Company; Department of the Interior; The Honorable Henry P. Smith, III; State of North Carolina.

Each of the comments received was carefully reviewed and analyzed. The following is a summary of the significant comments and EPA's response to those comments.

(1) Clean rainfall limits should be set at the same level as treatment plant effluent to avoid having to treat marginally contaminated runoff.

The handling of storm runoff was reevaluated and the run-off from a refinery was broken down further to consider tankfield runoff, process area runoff and other noncontaminated runoff. This reevaluation also considered the treatment of marginally contaminated runoff. (See "Development Document," Section VIII).

As a result of this evaluation a limit of 35 mg/l TOC and 15 mg/l oil and grease (both maximums) was set for both tankfield runoff and other uncontaminated runoff. (This is changed from 15 mg/l of TOC and no visible sheen). The limits for contaminated runoff (process area runoff treated along with other process wastes) should remain the same.

(2) The definition of feedstocks should include imported catalytic cracker feed, reformer feed and petrochemical feeds.

Since these feeds do not receive full processing at the refinery and are free of some contaminants (removed during prior processing), no allocation based on throughput should be given. The additional waste loads caused by the processing required is taken into account by the higher process factor the refinery will receive. (See "Development Document," Section IX).

(3) Once-through cooling water should not be included in a production based allocation. The reasons for this statement and alternate approaches given are as follows:

(a) The March 7, 1973 guidance excluded once-through water from consideration; (b) the low concentrations contained have no environmental impact; (c) analytical techniques do not allow for accurate results at low concentrations; and (d) a separate limit of 5 mg/l of TOC (net) should be used.

An evaluation of water flow data from over one hundred refineries, both with recycle and once-through cooling water systems, showed that only 25 percent of the total flow from recycle refineries results from cooling tower blowdown. In addition, the once-through refineries showed higher process waste flows than the recycle refineries. Therefore, once-through cooling water is being excluded from the production based allotment and a separate limit of 5 mg/l of TOC is being set to prevent gross contamination of these waters. (See "Development Document"; section IX; Supplement B, "Refinery Water Use")

(4) Limits should be based on a monthly average rather than 30 day running average. (Running average—any thirty consecutive days).

The limits are set in terms of a running average to prevent slackening off at the end of any fixed period and therefore guarantee optimum performance at all times.

(5) There isn't enough variability allowed between the daily and monthly limits. Arguments given to justify higher values were as follows:

(a) Data were not random or normally distributed; (b) variability not being met by some refineries using BPCTCA end-of-pipe; and (c) high analytical errors.

The variability factors can not be compared as a ratio of daily and monthly (30 day average) values. Both the daily and 30 day average variabilities were based on the annual average. The daily variability predicts the maximum day over a period of a year and the 30 day average variability predicts the maximum 30 day average in any year.

These variabilities were computed from data taken from several plants (one year's or more data in each case). The variability factors therefore include all of the errors (resulting variability) that result from sampling and analytical technique and accuracy.

The date from the plants analyzed were found to be either normally or log normally distributed.

The fact that certain refineries, which already have the end-of-pipe treatment as defined by BPCTCA, are showing higher variabilities than those of the exemplary plants only points out that BPCTCA as defined should include factors other than end-of-pipe treatment (i.e. good water use practices, good housekeeping, etc.). (See "Development

Document," section IX, "Statistical Variability of a Properly Designed and Operated Waste Treatment Plant"; Supplement B, "Variability").

The daily maximum variability was increased to reflect a 99 percent probability of occurrence. This was done to reduce the number of technical violations.

TOC limit should be eliminated and set later as its ratio to BOD5 is determined at each refinery.

The limits set for TOC are necessary because of the many instances when BOD5 COD, or both are not practical limits (as a result of analytical errors, time limitations, etc.). (See "Development Document," section IX: "Procedure for Development of BPCTCA Effluent Limitations").

The ratio of TOC/BOD, proposed at 1.8 was raised to 2.2.

(7) A subcategorization should be made based on the age of the refinery because of non-segregated sewers and the inequitable financial burden.

Those refineries with non-segregated sewers will probably have to either segregate their once-through cooling water or go to recycle cooling. This has already been done by many older refineries and was considered as part of the economic evaluation.

(8) The American Petroleum Institute has proposed a method to further subcategorize the petroleum industry. This approach is based on a mathematical analysis of the 1972 EPA/API Raw Waste Load Survey Data. This analysis (not yet completed) proposes to determine the relative effect of various process types on the total refinery flow.

An intensive investigation of this approach has been carried out. As a result, it was found that both size (feedstock throughput) and process configuration weigh heavily in determining the final flows. Tables have been included in the regulation to allow variation within each subcategory based on both size and process configuration. (See "Development Document," section IV: Supplement B, "Refinery Configuration Analysis").

The size and process factors determined from the above investigation were used to further subcategorize the petroleum industry.

(9) Special consideration should be given for refineries charging California crudes because of the high nitrogen, sulfur and naphthenic acid content.

The heavy (10–20 API gravity) nature of the California crudes requires more intensive processing (cracking, etc.) than lighter grades of crude. From the data available, the process factor (based on severity of operations) adequately accounts for the higher raw waste loads seen in refineries running California crudes. (See "Development Document," Section IV; Supplement B, "California Crudes".)

(10) There is no allowance given in the guidelines for the contaminants present in the intake water (net vs. gross), which are said to be especially significant in once-through cooling water.

The effluent limitations guidelines have generally been developed on a gross or absolute basis. However, the Agency recognizes that in certain instances pollutants will be present in navigable waters which supply a plant's intake water, in significant concentrations, which may not be removed to the levels specified in the guidelines by the application of treatment technology contemplated by BPCTCA.

Accordingly, the Agency is currently developing amendments to its NPDES permit regulations (40 CFR Part 125) which will specify the situations in which the Regional Administrator may allow a credit for such pollutants. The regulations will be proposed for public comment in the near future.

(11) Some correspondents endorsed the proposal made to the Administrator by the Effluent Standards and Water Quality Information Advisory Committee. This proposal is for a significantly different approach to the development of effluent guidelines.

The above-mentioned proposals are under evaluation as a contribution toward future refinements on guidelines for some industries. The Committee has indicated that their proposed methodology could not be developed in sufficient time to be available for the current phase of guideline promulgation. Its present state of development does not provide enough evidence to warrant the Agency's delaying issuance of any standard in hopes that an alternative approach might be preferable.

(12) The BATEA limits were objected to because they are based on pilot plant data.

The Agency recognizes that the technology specified herein as best available technology economically achievable has not been demonstrated in day-to-day operations in this industrial category. However, in determining whether technology has been "demonstrated" for the purposes of standards which must be achieved by 1983, the Agency does not believe that the same high degree of confidence that the technology will work must exist as is the case for 1977 standards. In making the judgment as to whether or not the technology is "available," the Agency examined a wide range of information, including the use of the technology to treat similar wastes in other industrial categories, pilot plant and demonstration projects, and laboratory and other experimental data on various waste treatment processes. Based on such data and information, and the application of the Agency's best judgment, the technology specified herein was determined to constitute the best available technology economically achievable for the petroleum refinery category.

It is recognized that, in some cases, the industry must itself perform some of the pilot plant and other developmental work which will be necessary to bring the technology into full utilization. This does not however, alter the Agency's judgment that the technology is "available," is "economically achievable," and can be brought on line in time to achieve full compliance by 1983, as required by the Act.

(13) The flow basis, based on 97 percent recycle flow, is too restrictive to be met by older refineries with once-through cooling water and does not consider the varying process complexities within subcategories.

The flow basis is not a flow restriction. It was used to determine the expected pounds/day from a refinery with good water use and the specified end-of-pipe treatment scheme. The refinery with once-through cooling water may continue to discharge that water.

The guideline takes into consideration the difference in expected flow caused by varying process complexities by the use of a process factor that varies the limits within each subcategory based on process configuration. (See "Development Document": Section IX).

(14) EPA failed to adequately consider factors such as raw material used, products produced, processes, and waste water constituents.

The use of the process factors directly considers the processes used. The raw materials used, products produced and the waste water constituents are covered indirectly because each determines or is determined by the process configuration of each refinery. (See "Development Document": Section IV; Supplement B, "Refinery Configuration Analysis").

(15) No allowances have been made for malfunctions, breakdowns, and upsets of the treatment plant. Since it may take several weeks to recover from a severe upset, a procedure for reporting these circumstances and obtaining a temporary variance is necessary.

The guideline is based on normal operation. Any consideration of other than normal operation will be covered in the NPDES permits.

(16) The COD limits are too low because of test tolerances. EPA analytical methods state minimum reportable concentrations 200 mg/l in water with 1,000 mg/l of chloride.

Standard methods tolerance at 150 mg/l of COD is ±14 mg/l at 1,000 mg l of chloride. There will still be cases where extremely high chloride levels will negate the use of this test and that is one of the reasons for limits being set for three oxygen demanding parameters (BOD5, COD, and TOC)

(17) Data from pilot plant carbon systems indicate removal efficiencies (percent removal) less than those used for BATEA limits. (BOD, COD, oil and grease).

The pilot plant values used are referenced in Table 65 of the Development Document. Concentrations, not removal efficiencies were used to set BOD and oil and grease limits for BATEA.

(18) The oil and grease limits should be raised because the references in the Development Document showed 10 mg/l attainable from bio-treatment and 7 mg/l from activated carbon, yet the guideline is based on 5 mg/l.

The guideline limit (BPCTCA) is based on neither bio-treatment nor activated carbon, but on a polishing step after bio-treatment (i.e., polishing ponds, filters, etc.) (See "Development Document," sections VII and IX).

(19) Consideration should be given to refineries in northern climates because of the effect of temperature on biological treatment systems.

Of the many refineries currently meeting EPA's guidelines for BOD5, several are located in northern climates (e.g. Billings, Montana; Alma, Michigan). (See supplement B, refinery data).

(20) The Economic Impact Analysis states, "It is not expected that any significant economic impact would result from imposing the 1977 and 1983 effluent limitations." This is not true, especially in the light of the current and future unstable situation of crude oil supply.

An economic impact analysis of pollution controls on the refinery industry completed February, 1974 states "As a result of recent world developments there is a substantial differential between world cartel prices and U.S. domestic oil prices. If this continues, there is reason to suggest that a number of the projected small refinery closures might not occur. Certainly the ability to attract long-term financing for pollution abatement is greatly enhanced by the price differential that exists." (See supplement B, "Impact on Refineries of Pollution Control Regulations", February, 1974).

(21) Oil and grease limits should be based on a maximum effluent concentration of 1 mg/l and should be limited by concentration and not on pounds-production values.

There is neither a demonstrated treatment technology to guarantee 1 mg/l of oil and grease effluent concentration, nor an accepted analytical procedure to measure it.

(22) Effluent limits should be set as lbs/1000 gals of waste water flow based on a specified end-of-pipe treatment and a documented flow for each individual refinery.

This approach does not adequately consider the importance of the in-plant requirements of BPCTCA (good water use, housekeeping, etc.) (See "Development Document", sections VII and IX).

(23) Ammonia levels based on 80 percent removal from the median raw waste load (API separator effluent) and the BPCTCA removal step for ammonia is in-plant in the form of a stripper.

Even though the primary removal of ammonia in a refinery should be done during sour water stripping many refineries have not optimized toward ammonia removal (units designed for sulfide removal). The optimization of stripping for ammonia removal or the installation of two stage strippers is considered BPCTCA. In addition, ammonia will be removed in the treatment plant as it is needed to provide nutrient nitrogen for the biological system. (See "Development Document", section VII).

(24) The economic impact for the removal of chromium and zinc was not considered.

The zinc limit has been deleted as a result of an analysis of the zinc raw waste loads from over one hundred refineries. Only a small percentage of these refineries' raw waste loads exceeded the guideline zinc limit.

A similar analysis showed almost 50 percent of the refineries (using cooling towers, chromium appears in refinery wastes because of its use as a corrosion inhibitor in recycle cooling systems) meeting the total chromium limits with their raw waste. Since the solubility of Cr+3 is less than 0.1 mg/l between pH 6.0 to 9.0, the remaining refineries should meet the guidelines limits by removing the insoluble Cr+3 along with other suspended solids.

The reduction of Cr+6 to Cr+3 occurs naturally in a typical refinery waste because of the presence of reducing agents such as sulfides and sulfites.

The above factors will mean that no additional costs (for removal of chromium) should be involved for the majority of refineries above those required to meet the other parameter limits. (See supplemental B, "Raw Waste Load Survey—Zinc and Chromium").

(25) There is a need to monitor and control all identified pollutants such as TDS, cyanide and various other specific ions, in addition to the eleven parameters already being monitored and controlled.

The parameters limited in the guidelines are those which are fairly common to the industry and for which there is existing technology in use in the industry for their removal. The control and monitoring of any additional parameters might be called for on an individual basis to meet water quality standards.

(26) Promulgation is considered to be appropriate provided it is subject to realistic revision as new data becomes available.

The Act provides for periodic review and revisions as appropriate.

(b) Revision of the proposed regulation prior to promulgation.

As a result of public comment and continuing review and evaluation of the proposed regulation by EPA, the following changes have been made in the regulation.

(1) As a result of some changes in the subcategorization (low and high cracking combined to form the new cracking subcategory and the topping subcategory being defined as those refineries without cracking) a reevaluation of the median flows within each subcategory was made. The changes made are as follows: topping from 12 gal/bbl to 20 gal/bbl; cracking from (low) 17 gal/bbl, (high) 21 gal/bbl to 25 gal/bbl; petrochemical from 25 gal/bbl to 30 gal/bbl; lube from 37 gal/bbl to 45 gal/bbl; and integrated from 45 gal/bbl to 48 gal/bbl. The parameter limits which are flow based were adjusted accordingly.

(2) The limits on storm water runoff from tankfields and non-process areas were changed from 15 mg/l of TOC and no sheen to 35 mg/l of TOC and 15 mg/l of oil and grease (both maximums). These limits are set at those same maximum concentrations expected if the runoff were passed through the treatment plant.

(3) A further subcategorization of the industry was made based on process configuration and size.

(4) Zinc was eliminated as a parameter to be limited industry wide. Further evaluation of the API/EPA Raw Waste Load Survey showed only a small percentage of the industry over the zinc limits set.

(5) The ammonia limits were changed based on the changes in the subcategorization.

(6) The ratio of TOC/BOD5 was changed from 1.8 to 2.2.

(7) Once-through cooling water was excluded from the production based allocation and a maximum concentration of 5 mg/l of TOC was set.

(8) The daily maximum values were increased to reflect a 99 percent probability of occurrence. This was done to limit the number of technical violations of the permit.

(9) Section 304(b)(1)(B) of the Act provides for "guidelines" to implement the uniform national standards of section 301(b)(1)(A). Thus Congress recognized that some flexibility was necessary in order to take into account the complexity of the industrial world with respect to the practicability of pollution control technology. In conformity with the Congressional intent and in recognition of the possible failure of these regulations to account for all factors bearing on the practicability of control technology, it was concluded that some provision was needed to authorize flexibility in the strict application of the limitations contained in the regulation where required by special circumstances applicable to individual dischargers. Accordingly, a provision allowing flexibility in the application of the limitations representing best practicable control technology currently available has been added to each subpart, to account for special circumstances that may not have been adequately accounted for when these regulations were developed.

(c) *Economic impact.* The changes that were made to the proposed regulations for the petroleum refining category do not substantially affect the initial economic analysis. The changes detailed above reflects a reevaluation of the efficiency of various treatment systems and further subcategorization of the industry to more equitably distribute the economic burden. These revisions, however, do not effect the conclusions of the economic impact study.

(d) *Cost-benefit analysis.* The detrimental effects of the constituents of waste waters now discharged by point sources within the Petroleum Refining point source category are discussed in Section VI of the report entitled "Development Document for Effluent Limitations Guidelines for the Petroleum Refining Point Source Category"

It is not feasible to quantify in economic terms, particularly on a national basis, the costs resulting from the discharge of these pollutants to our Nation's waterways. Nevertheless, as indicated in Section VI, the pollutants discharged have substantial and damaging impacts

on the quality of water and therefore on its capacity to support healthy populations of wildlife, fish and other aquatic wildlife and on its suitability for industrial, recreational and drinking water supply uses.

The total cost of implementing the effluent limitations guidelines includes the direct capital and operating costs of the pollution control technology employed to achieve compliance and the indirect economic and environmental costs identified in Section VIII and in the supplementary report entitled "Economic Analysis of Proposed Effluent Guidelines Petroleum Refining Industry" (December 1973). Implementing the effluent limitations guidelines will substantially reduce the environmental harm which would otherwise be attributable to the continued discharge of polluted waste waters from existing and newly constructed plants in the petroleum refining industry. The Agency believes that the benefits of thus reducing the pollutants discharged justify the associated costs which, though substantial in absolute terms, represent a relatively small percentage of the total capital investment in the industry.

(e) *Solid waste control.* Solid waste control must be considered. The waterborne wastes from the petroleum refining industry may contain a considerable volume of metals in various forms as a part of the suspended solids pollutant. Best practicable control technology and best available control technology as they are known today require disposal of the pollutants removed from waste waters in this industry in the form of solid wastes and liquid concentrates. In some cases these are nonhazardous substances requiring only minimal custodial care. However, some constituents may be hazardous and may require special consideration. In order to ensure long term protection of the environment from these hazardous or harmful constituents, special consideration of disposal sites must be made. All landfill sites where such hazardous wastes are disposed should be selected so as to prevent horizontal and vertical migration of these contaminants to ground or surface waters. In cases where geologic conditions may not reasonably ensure this, adequate precautions (e.g., impervious liners) should be taken to ensure long term protection to the environment from hazardous materials. Where appropriate the location of solid hazardous materials disposal sites should be permanently recorded in the appropriate office of the legal jurisdiction in which the site is located.

(f) Publication of information on processes, procedures, or operating methods which results in the elimination or reduction of the discharge of pollutants.

In conformance with the requirements of section 304(c) of the Act, a manual entitled, "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category," is being published and will be available for purchase from the Government Printing Office, Washington, D.C. 20401 for a nominal fee.

(g) *Final rulemaking.* In consideration of the foregoing, 40 CFR Ch. I, Subchapter N is hereby amended by adding a new Part 419, Petroleum Refining Point Source Category, to read as set forth below. An order of the Federal District Court for the District of Columbia entered in "NRDC v. Train" (Civ. No. 1609–73) on November 26, 1973, required that the Administrator sign final effluent limitations guidelines for this industry category by March 15, 1974. That order was subsequently modified on March 15, 1974, and the date for signing extended until April 15, 1974. On the same date the District Court ordered that the effective date for effluent limitations guidelines established by its November 26 order remain applicable and not be affected by the extension in the publication date. The effective date for effluent limitations guidelines for this industry established by the Court's November 26 order is May 12, 1974. Accordingly, good cause is found for the final regulation promulgated as set forth below to be effective on May 12, 1974.

Dated: April 30, 1974.

JOHN QUARLES,
Acting Administrator.

Subpart A—Topping Subcategory

Subpart B—Cracking Subcategory

Subpart C—Petrochemical Subcategory

Subpart D—Lube Subcategory

Subpart E—Integrated Subcategory

AUTHORITY: Secs. 301, 304 (b) and (c), 306 (b) and (c) and 307(c) of the Federal Water Pollution Control Act, as amended (the Act); 33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316 (b) and (c), and 1317(c); 86 Stat. 816 et seq.; Pub. L. 92–500.

Subpart A—Topping Subcategory

§ 419.10 Applicability; description of the topping subcategory.

The provisions of this subpart are applicable to discharges from any facility which produces petroleum products by the use of topping and catalytic reforming whether or not the facility includes any other process in addition to topping and catalytic reforming. The provisions of this subpart are not applicable to facilities which include thermal processes (coking, visbreaking, etc.) or catalytic cracking.

§ 419.11 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, which is treated at the refinery.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate or finished product.

(f) The following abbreviations shall mean: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, raw materials, manufacturing processes, products produced, treatment technology available, energy requirements and costs) which can affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein, to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	22.7	12.0
TSS	13.9	8.2
COD*	117	60.3
Oil and grease	6.9	3.7
Phenolic compounds	.168	.078
Ammonia as N	2.81	1.27
Sulfide	.149	.068
Total chromium	.345	.20
Hexavalent chromium	.0071	.0031
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	4.9	2.9
COD*	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	.060	.027
Ammonia as N	.99	.45
Sulfide	.053	.024
Total chromium	.122	.071
Hexavalent chromium	.0025	.0011
pH	Within the range 6.0 to 9.0.	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 barrels feedstock per stream day	*Size factor*
0 to 49.9	1.02
50 to 99.9	1.21
100 to 149.9	1.44
150 or greater	1.57

(2) Process factor

Process configuration	*Process factor*
1.0 to 3.99	0.60
4.0 to 6.99	1.00
7.0 to 9.99	1.66
10.0 to 12.99	2.77
13.0 to 15.0 or greater	4.09

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to runoff and ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to the provisions of this subpart, in addition to the discharge allowed by paragraph (b) of this section:

(1) *Runoff.* The allocation allowed for storm runoff flow, as kg/cu m (lb/m gal), shall be based solely on that storm flow (process area runoff) which is treated in the main treatment system. All additional storm runoff (from tank fields and non-process areas), that has been segregated from the main waste stream for discharge, shall not exceed a concentration of 35 mg/l of TOC or 15 mg/l of oil and grease when discharged.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	.029	.017
COD*	.37	.19
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.24	.14
COD*	3.1	1.6
Oil and grease	.126	.067
pH	Within the range 6.0 to 9.0.	

(2) *Ballast.* The allocation allowed for ballast water flow, as kg/cu m (lb/Mgal), shall be based on those ballast waters treated at the refinery.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	.029	.017
COD*	.47	.24
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.24	.14
COD*	3.9	2.0
Oil and grease	.126	.067
pH	Within the range 6.0 to 9.0.	

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) The following limitations establish the quantity or quality of pollut-

* In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1000 mg/l (1000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

ants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	2.5	2.0
TSS	2.4	2.0
COD*	10.0	5.0
Oil and grease	.50	.40
Phenolic compounds	.012	.0090
Ammonia as N	.68	.51
Sulfide	.055	.035
Total chromium	.134	.100
Hexavalent chromium	.0028	.0017
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	0.22	0.73
TSS	.88	.73
COD*	3.5	2.8
Oil and grease	.18	.14
Phenolic compounds	.0042	.0031
Ammonia as N	.24	.18
Sulfide	.019	.013
Total chromium	.044	.037
Hexavalent caremrem	.00097	.00063
pH	Within the range 6.0 to 9.0.	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per steam day	Size factor
0 to 49.9	1.02
50 to 99.9	1.21
100 to 149.9	1.44
150 or greater	1.67

(2) Process factor

1.0 to 3.99	0.60
4.0 to 6.99	1.0
7.0 to 9.99	1.66
10.0 to 12.99	2.77
13.0 to 15.0 or greater	4.09

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to runoff and ballast, which may be discharged after the application of best available technology economically achievable by a point source subject to the provisions of this subpart. These allocations are in addition to the discharge allowed by paragraph (b) of this section:

(1) *Runoff.* The allocation allowed for storm runoff flow, as kg/cu m (lb/Mgal), shall be based solely on that storm flow (process area runoff) which is treated in the main treatment system. All additional storm runoff (from tankfields and non-process areas), that has been segregated from the main waste stream for discharge, shall not exceed a concentration of 35 mg/l of TOC or 15 mg/l of oil and grease when discharged.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.0105	0.0065
TSS	.010	.0065
COD*	.045	.024
Oil and grease	.0020	.0016
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.088	0.071
TSS	.084	.071
COD*	.24	.19
Oil and grease	.018	.014
pH	Within the range 6.0 to 9.0.	

(2) *Ballast.* The allocation allowed for ballast water flow, as kg/cu m (lb/Mgal), shall be based on those ballast waters treated at the refinery.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.0105	0.0065
TSS	.010	.0065
COD*	.038	.020
Oil and grease	.0020	.0017
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.088	0.071
TSS	.084	.071
COD*	.32	.20
Oil and grease	.018	.014
pH	Within the range 6.0 to 9.0.	

*In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.14 [Reserved]

§ 419.15 Standards of performance for new sources.

(a) The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	11.5	6.3
TSS	7.3	4.0
COD*	61	32
Oil and grease	3.6	1.9
Phenolic compounds	.088	.048
Ammonia as N	2.8	1.3
Sulfide	.078	.035
Total chromium	.18	.100
Hexavalent chromium	.0037	.0017
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	4.3	2.2
TSS	2.6	1.4
COD*	21.7	11.2
Oil and grease	1.3	.70
Phenolic compounds	.031	.019
Ammonia as N	1.0	.46
Sulfide	.027	.012
Total chromium	.064	.037
Hexavalent chromium	.0013	.00062
pH	Within the range 6.0 to 9.0.	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 bbl of feedstock per stream day	Size factor
0 to 49.9	1.02
50 to 99.9	1.21
100 to 149.9	1.44
150 or greater	1.57

(2) Process factor

Process configuration	Process factor
1.0 to 3.99	0.60
4.0 to 6.99	1.00
7.0 to 9.99	1.66
10.0 to 12.99	2.77
13.0 to 15.0 or greater	4.09

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to runoff and ballast, which may be discharged by a new source subject to the provisions of this subpart. These allocations are in addition to the discharge allowed by paragraph (b) of this section:

(1) *Runoff.* The allocation allowed for storm runoff flow, as kg/cu m (lb/Mgal), shall be based solely on that storm flow (process area runoff) which is treated in the main treatment system. All additional storm runoff (from tankfields and non-process areas), that has been segregated from the main waste stream for discharge, shall not exceed a concentration of 35mg/l of TOC or 15 mg/l of oil and grease when discharged.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	.029	.017
COD*	.37	.19
Oil and grease	.015	.0080
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.24	.14
COD*	3.1	1.6
Oil and grease	.125	.067
pH	Within the range 6.0 to 9.0.	

(2) *Ballast.* The allocation allowed for ballast water flow, as kg/cu m lb/Mgal), shall be based on those ballast waters treated at the refinery.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	.029	.017
COD [1]	.47	.24
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.24	.14
COD [1]	3.9	2.0
Oil and grease	.125	.067
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.16 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the topping subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter, except that, for the purpose of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in § 419.15; *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced in stringency for that pollutant."

Subpart B—Cracking Subcategory

§ 419.20 Applicability; description of the cracking subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking. The provisions of this subpart are not applicable however, to facilities which include the processes specified in Subparts C, D, or E of this part.

§ 419.21 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, which is to be treated at the refinery.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate or finished product.

(f) The following abbreviations shall mean: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, raw materials, manufacturing processes, products produced, treatment technology available, energy requirements and costs) which can affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	28.2	15.6
TSS	17.1	10.2
COD [1]	210	109
Oil and grease	8.4	4.5
Phenolic compounds	.71	.18
Ammonia as N	15.8	8.5
Sulfide	.18	.092
Total chromium	.48	.25
Hexavalent chromium	.0287	.0160
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	9.9	5.5
TSS	6.1	3.6
COD [1]	74	38.4
Oil and grease	3.0	1.6
Phenolic compounds	.074	.026
Ammonia as N	5.6	3.0
Sulfide	.065	.029
Total chromium	.15	.088
Hexavalent chromium	.0101	.0056
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
0 to 34.9	0.59
35 to 74.9	1.00
75 to 109.9	1.14
110 to 149.9	1.31
150 or greater	1.41

(2) Process factor

Process configuration	Process factor
1.5 to 3.49	0.58
3.50 to 5.49	0.81
5.50 to 7.49	1.13
7.50 to 9.49	1.60
9.50 to 10.50 or greater	1.87

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged a total organic carbon concentration not to exceed 5 mg/l.

§ 419.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	3.4	2.7
TSS	3.2	2.7
COD [1]	18.2	14.4
Oil and grease	.88	.54
Phenolic compounds	.016	.011
Ammonia as N	4.6	3.5
Sulfide	.075	.048
Total chromium	.16	.14
Hexavalent chromium	.0035	.0022
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	1.2	0.99
TSS	1.2	.79
COD [1]	6.5	5.4
Oil and grease	.34	.19
Phenolic compounds	.0055	.0039
Ammonia as N	1.6	1.2
Sulfide	.026	.017
Total chromium	.055	.044
Hexavalent chromium	.0013	.0008
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
0 to 34.9	0.59
35 to 74.9	1.00
75 to 109.9	1.14
110 to 149.9	1.31
150 or greater	1.41

(2) Process factor

Process configuration	Process factor
1.5 to 3.49	0.58
3.50 to 5.49	0.81
5.50 to 7.49	1.13
7.50 to 9.49	1.60
9.50 to 10.50 or greater	1.87

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.24 [Reserved]

§ 419.25 Standards of performance for new sources.

(a) The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	16.3	8.7
TSS	9.9	5.8
COD [1]	118	61
Oil and grease	4.9	2.6
Phenolic compounds	.119	.054
Ammonia as N	15.8	8.5
Sulfide	.105	.044
Total chromium	.34	.14
Hexavalent chromium	.0050	.0022
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	5.8	3.1
TSS	3.5	2.0
COD [1]	41.5	21
Oil and grease	1.7	.93
Phenolic compounds	.042	.019
Ammonia as N	5.6	3.0
Sulfide	.037	.015
Total chromium	.094	.049
Hexavalent chromium	.0018	.0008
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
0 to 34.9	0.89
35 to 74.9	1.00
75 to 109.9	1.14
110 to 149.9	1.31
150 or greater	1.41

(2) Process factor

Process configuration	Process factor
1.5 to 3.49	0.58
3.50 to 5.49	.81
5.50 to 7.49	1.13
7.50 to 9.49	1.60
9.50 to 10.50 or greater	1.87

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.15(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.26 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the cracking subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter, except that, for the purpose of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in § 419.25: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced in stringency for that pollutant."

Subpart C—Petrochemical Subcategory

§ 419.30 Applicability; description of the petrochemical subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping, cracking and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking and petrochemical operations. The provisions of this subpart shall not be applicable however, to facilities which include the processes specified in Subparts D or E of this part.

§ 419.31 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, which is to be treated at the refinery.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate or finished product.

(f) The term "petrochemical operations" shall mean the production of second generation petrochemicals (i.e. alcohols, ketones, cumene, styrene, etc.) or first generation petrochemicals and isomerization products (i.e. BTX, olefins, cyclohexane, etc.) when 15 percent or more of refinery production is as first generation petrochemicals and isomerization products.

(g) The following abbreviations shall mean: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, raw materials, manufacturing processes, products produced, treatment technology available, energy requirements and costs) which can affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein, to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed —
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	34.6	18.4
TSS	23.6	12.6
COD[1]	210	109
Oil and grease	11.1	5.9
Phenolic compounds	.23	.120
Ammonia as N	23.4	10.6
Sulfide	.12	.060
Total chromium	.52	.30
Hexavalent chromium	.0115	.0061
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.1	6.5
TSS	7.3	4.25
COD[1]	74	38.4
Oil and grease	3.9	2.1
Phenolic compounds	.098	.0425
Ammonia as N	8.25	3.8
Sulfide	.078	.035
Total chromium	.183	.107
Hexavalent chromium	.0040	.0018
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per steam day	Size factor
0 to 49.9	0.73
50 to 99.9	.87
100 to 149.9	1.04
150 or greater	1.13

(2) Process factor

Process configuration	Process factor
3.25 to 4.74	0.67
4.75 to 6.74	.91
6.75 to 8.74	1.27
8.75 to 10.25 or greater	1.64

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.33 *Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.*

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	4.8	2.7
TSS	4.4	2.7
COD[1]	32	17
Oil and grease	90	.72
Phenolic compounds	.022	.013
Ammonia as N	5.6	4.2
Sulfide	.009	.008
Total chromium	22	.19
Hexavalent chromium	.0048	.0031
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	1.7	1.0
TSS	1.6	1.0
COD[1]	7.6	6.1
Oil and grease	.32	.26
Phenolic compounds	.0077	.0064
Ammonia as N	2.0	1.5
Sulfide	.003	.002
Total chromium	.080	.068
Hexavalent chromium	.0017	.0011
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1 000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) o fthis section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 bbl of feedstock per stream day	Size factor
0 to 49.9	0.73
50 to 99.9	.87
100 to 149.9	1.04
150 or greater	1.13

(2) Process factor

Process configuration	Process factor
3.25 to 4.74	0.67
4.75 to 6.74	91
6.75 to 8.74	1.27
8.75 to 10.25 or greater	1.64

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provision of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.34 [Reserved]

§ 419.35 *Standards of performance for new sources.*

(a) The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	21.5	11.5
TSS	13.1	7.7
COD[1]	133	89
Oil and grease	6.8	3.5
Phenolic compounds	.158	.077
Ammonia as N	23.4	10.7
Sulfide	.140	.063
Total chromium	.32	.19
Hexavalent chromium	.0082	.0031
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	7.7	4.1
TSS	4.6	2.7
COD[1]	47	34
Oil and grease	2.4	1.3
Phenolic compounds	.056	.027
Ammonia as N	8.3	3.8
Sulfide	.050	.022
Total chromium	.116	.068
Hexavalent chromium	.0024	.0011
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1 000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
0 to 49.9	0.73
50 to 99.9	.87
100 to 149.9	1.04
150 or greater	1.13

(2) Process factor

Process configuration	Process factor
3.25 to 4.74	0.67
4.75 to 6.74	91
6.75 to 8.74	1.27
8.75 to 10.25 or greater	1.64

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.36 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the petrochemical subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter, except that, for the purpose of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in § 419.35. *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced in stringency for that pollutant."

Subpart D—Lube Subcategory

§ 419.40 Applicability; description of the lube subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping, cracking and lube oil manufacturing processes, whether or not the facility includes any process in addition to topping, cracking and lube oil manufacturing processes. The provisions

of this subpart are not applicable however, to facilities which include the processes specified in Subparts C and E of this part.

§ 419.41 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in part 401 of this Chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, which is to be treated at the refinery.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate or finished product.

(f) The following abbreviations shall mean: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, raw materials, manufacturing processes, products produced, treatment technology available, energy requirements and costs) which can affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein, to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	68.6	25.8
TSS	31.3	15.4
COD[1]	308	127
Oil and grease	16.2	5.6
Phenolic compounds	.38	.154
Ammonia as N	23.4	10.6
Sulfide	.33	.130
Total chromium	.77	.46
Hexavalent chromium	.017	.0078
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	17.9	9.1
TSS	11.0	4.5
COD[1]	127	46
Oil and grease	5.7	2.0
Phenolic compounds	.135	.055
Ammonia as N	8.3	3.8
Sulfide	.118	.058
Total chromium	.273	.160
Hexavalent chromium	.0060	.0027
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
30 to 69.9	0.71
70 to 109.9	.81
110 to 149.9	.93
150 to 199.9	1.00
200 or greater	1.19

(2) Process factor

Process configuration	Progress factor
6.0 or less to 8.0	0.59
8.0 to 9.99	1.23
10.0 to 11.99	1.74
12.0 to 14.0 or greater	2.44

(3) Example of the application of the above factors.

Calculation of the process configuration

Process category	Processes included	Weighting factor
Crude	Atm. crude distillation.	1
	Vacuum crude distillation.	
	Desalting.	
Cracking and coking.	Fluid cat. cracking.	6
	Vis-breaking.	
	Thermal cracking.	
	Moving bed cat. cracking.	
	Hydrocracking.	
	Fluid coking.	
	Delayed coking.	
Lube	Further defined in the development document.	13
Asphalt	Asphalt production.	12
	Asphalt oxidation.	
	Asphalt emulsifying.	

EXAMPLE.—*Lube refinery 125 1,000 bbl per stream day throughput*

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput		Weighting factor		Processing configuration
Crude:						
Atm.	125	1				
Vacuum	60	.48				
Desalting	125	1				
Total		2.48	×	1	=	2.48
Cracking—FCC	41	.328				
Hydrocracking	20	.160				
Total		.488	×	6	=	2.93
Lubes	5.5	.042				
	4.0	.032				
	4.9	.039				
Total		.113	×	12	=	1.47
Asphalt	4.9	0.032	×	13	=	.38
	Refinery process configuration				=	7.26

NOTES

See table § 419.42(b)(2) for process factor. Process factor=0.88.
See table § 419.42(b)(1) for size factor for 125 1,000 bbl per stream day lube refinery. Size factor=0.93.
To calculate the limits for each parameter, multiply the limit § 419.42(a) by both the process factor and size factor.
BOD5 limit (maximum for any 1 day)=11.5×0.88×0.93=9.7 lb. per 1,000 bbl of feedstock.

(c) The provisions of § 419.12(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	7.8	4.2
TSS	7.4	4.2
COD[1]	40	22
Oil and grease	1.4	1.1
Phenolic compounds	.034	.024
Ammonia as N	5.6	4.2
Sulfide	.16	.10
Total chromium	.36	.31
Hexavalent chromium	.0051	.0052
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	2.7	1.2
TSS	2.6	1.2
COD[1]	12.8	11.0
Oil and grease	.50	.40
Phenolic compounds	.012	.0087
Ammonia as N	2.0	1.5
Sulfide	.056	.035
Total chromium	.13	.11
Hexavalent chromium	.0029	.0018
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
30 to 69.9	0.71
70 to 109.9	.81
110 to 149.9	.93
150 to 199.9	1.09
200 or greater	1.19

(2) Process factor

Process configuration	Process factor
6.0 or less to 7.99	0.88
8.0 to 9.99	1.23
10.0 to 11.99	1.74
12.0 to 14.0 or greater	2.44

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.44 [Reserved]

§ 419.45 Standards of performance for new sources.

(a) The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	14.6	18.4
TSS	20.6	12.1
COD[1]	245	126
Oil and grease	10.5	5.6
Phenolic compounds	25	.12
Ammonia as N	23.4	10.7
Sulfide	.220	.10
Total chromium	.54	.31
Hexavalent chromium	.0115	.0062
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.2	6.5
TSS	7.3	4.3
COD[1]	87	45
Oil and grease	3.8	2.0
Phenolic compounds	.088	.043
Ammonia as N	8.3	3.8
Sulfide	.078	.036
Total chromium	.190	.105
Hexavalent chromium	.0056	.0018
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per steam day	Size factor
30 to 69.9	0.71
70 to 109.9	.81
110 to 149.9	.93
150 to 199.9	1.09
200 or greater	1.19

(2) Process factor

Process configuration	Process factor
6.0 or less to 7.99	0.88
8.0 to 9.99	1.23
10.0 to 11.99	1.74
12.0 or greater	2.44

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.15(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provision of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.46 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the lube subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter, except that, for the purpose of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in § 419.45: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced in stringency for that pollutant."

Subpart E—Integrated Subcategory

§ 419.50 Applicability; description of the integrated subcategory.

The provisions of this subpart are applicable to all discharges resulting from any facility which produces petroleum products by the use of topping, cracking, lube oil manufacturing processes, and petrochemical operations, whether or not

the facility includes any process in addition to topping, cracking, lube oil manufacturing processes and petrochemical operations.

§ 419.51 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, which is to be treated at the refinery.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate or finished product.

(f) The term "petrochemical operations" shall mean the production of second generation petrochemicals (i.e., alcohols, ketones, cumene, styrene, etc.) or first generation petrochemicals and isomerization products (i.e., BTX, olefins, cyclohexane, etc.) when 15% or more of refinery production is as first generation petrochemicals and isomerization products.

(g) The following abbreviations shall mean: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

In establishing the limitations set forth in this section, EPA took into account all information it was able to collect, develop and solicit with respect to factors (such as age and size of plant, raw materials, manufacturing processes, products produced, treatment technology available, energy requirements and costs) which can affect the industry subcategorization and effluent levels established. It is, however, possible that data which would affect these limitations have not been available and, as a result, these limitations should be adjusted for certain plants in this industry. An individual discharger or other interested person may submit evidence to the Regional Administrator (or to the State, if the State has the authority to issue NPDES permits) that factors relating to the equipment or facilities involved, the process applied, or other such factors related to such discharger are fundamentally different from the factors considered in the establishment of the guidelines. On the basis of such evidence or other available information, the Regional Administrator (or the State) will make a written finding that such factors are or are not fundamentally different for that facility compared to those specified in the Development Document. If such fundamentally different factors are found to exist, the Regional Administrator or the State shall establish for the discharger effluent limitations in the NPDES permit either more or less stringent than the limitations established herein, to the extent dictated by such fundamentally different factors. Such limitations must be approved by the Administrator of the Environmental Protection Agency. The Administrator may approve or disapprove such limitations, specify other limitations, or initiate proceedings to revise these regulations.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	14.4	7.2
TSS	23.8	10.2
COD[1]	238	128
Oil and grease	17.1	5.1
Phenolic compounds	.40	.192
Ammonia as N	22.4	10.6
Sulfide	.35	.156
Total chromium	.51	.46
Hexavalent chromium	.017	.0079
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	19.2	10.2
TSS	11.6	5.8
COD[1]	136	70
Oil and grease	6.0	2.2
Phenolic compounds	.14	.068
Ammonia as N	8.2	4.8
Sulfide	.124	.056
Total chromium	.20	.17
Hexavalent chromium	.0062	.0028
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.3 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and the maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
70 to 144.9	0.69
145 to 219.9	.89
220 or greater	1.02

(2) Process factor

Process configuration	Process factor
6.0 or less to 7.49	0.78
7.5 to 8.99	1.00
9.0 to 10.5 or greater	1.30

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.12(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic concentration not to exceed 5 mg/l.

§ 419.53 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	6.8	2.1
TSS	5.4	2.1
COD[1]	47	28
Oil and grease	1.7	1.4
Phenolic compounds	.041	.029
Ammonia as N	4.8	4.2
Sulfide	.10	.12
Total chromium	.44	.37
Hexavalent chromium	.0092	.0068
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	2.3	2.6
TSS	2.0	2.6
COD[1]	16.8	12.4
Oil and grease	.60	.48
Phenolic compounds	.015	.010
Ammonia as N	2.0	1.5
Sulfide	.036	.042
Total chromium	.15	.13
Hexavalent chromium	.0033	.0024
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgement of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.3 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
70 to 144.9	0.69
145 to 219.9	.89
220 or greater	1.02

(2) Process factor

Process configuration	Process factor
6.0 or less to 7.49	0.78
7.5 to 8.99	1.00
9.0 to 10.5 or greater	1.30

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.13(c) (1) and (2) apply to discharges of process waste water pollutants atttributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.54 [Reserved]

§ 419.55 Standards of performance for new sources.

(a) The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	41.6	22.1
TSS	24.7	14.5
COD[1]	236	132
Oil and grease	12.6	6.7
Phenolic compounds	.30	.14
Ammonia as N	23.4	10.7
Sulfide	.28	.12
Total chromium	.84	.37
Hexavalent chromium	.013	.0060
pH	Within the range 6.0 to 9.0.	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	14.7	7.8
TSS	8.7	5.1
COD[1]	104	54
Oil and grease	4.5	2.4
Phenolic compounds	.106	.051
Ammonia as N	8.3	3.8
Sulfide	.098	.042
Total chromium	.220	.13
Hexavalent chromium	.0047	.0021
pH	Within the range 6.0 to 9.0.	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor

1,000 barrels of feedstock per stream day	Size factor
70 to 144.9	0.69
145 to 219.9	.89
220 or greater	1.02

(2) Process factor

Process configuration	Process factor
6.0 or less to 7.49	0.78
7.5 to 8.99	1.00
9.0 to 10.5 or greater	1.30

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provision of § 419.15(c) (1) and (2) apply to discharges of process waste water pollutants attributable to storm water runoff and ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

§ 419.56 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act for a source within the integrated subcategory, which is a user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to the navigable waters), shall be the standard set forth in Part 128 of this chapter, except that, for the purpose of this section, § 128.133 of this chapter shall be amended to read as follows: "In addition to the prohibitions set forth in § 128.131 of this chapter, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works shall be the standard of performance for new sources specified in § 419.55: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced in stringency for that pollutant."

[FR Doc 74-10448 Filed 5-8-74;8:45 am]

Title 40—Protection of the Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER N—EFFLUENT GUIDELINES AND STANDARDS

[FRL 375-2]

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

Effluent Limitations, Guidelines and Pretreatment Standards; Amendments

On May 9, 1974, effluent limitations, guidelines, and standards of performance and pretreatment standards for new sources were published applicable to the topping subcategory, cracking subcategory, petrochemical subcategory, lube subcategory, and integrated subcategory of the petroleum refining category of point sources. Public participation procedures for those regulations were described in the preamble thereto, and are further discussed below.

Petitions for review of the regulations were filed by the American Petroleum Institute and others on August 28, 1974.

After the regulations were published, comments were received criticizing certain aspects of the regulations. As a result of these comments, the Agency concluded that the ranges used in preparing the size and process factors were too broad. Accordingly, a notice was published in the FEDERAL REGISTER (Thursday, October 17, 1974, 39 FR 37069) of the Agency's intention to reduce the range sizes.

In response to the October 17 notice, a variety of detailed comments were received concerning all aspects of the regulations. The commenters sought major modifications of the regulations as promulgated.

The Environmental Protection Agency has carefully evaluated all comments which were received. The data base and methodology have been reexamined, and, in some cases, new data have been gathered and reviewed.

Most commenters favored the changes outlined in the modifications proposed on October 17th. However, many more substantial changes were sought by commenters. The Agency has concluded that promulgation of the proposed modifications is appropriate. However, the record does not warrant, except in two instances, the additional modifications sought. The bases for the Agency's conclusions are set forth in detail below, with responses to all major comments received.

HISTORY OF THE REGULATIONS DEVELOPMENT

Background. With the enactment of the 1972 Amendments to the Federal Water Pollution Control Act (FWPCA), the Effluent Guidelines Division of the Environmental Protection Agency (EPA) assumed responsibility for the preparation of effluent guidelines and limitations under sections 301 and 304 of the Act.

The Petroleum Refining Industry in the United States and its territories is made up of 253 refineries. These refineries produce a wide range of petroleum and petrochemical products and intermediates from crude oil and natural gas liquids.

The size and type of hydrocarbon molecules and impurities contained in crude oils from around the world vary greatly, as do the products produced at each refinery. The configuration of a refinery is therefore a function of the type of feedstock used (crude oil and natural gas liquids) and the products which are to be produced. There are several hundred different processes used in this industry because of these variations in feedstocks and products. The general categories of processes used are: (1) Distillation, which separates hydrocarbon molecules by differences in their physical properties (boiling points); (2) cracking, which is the breaking down of high molecular weight hydrocarbons to lower weight hydrocarbons; (3) polymerization and alkylation, which rebuild the hydrocarbon molecules; (4) isomerization and reforming, which rearrange molecular structures; (5) solvent refining, which is the separation of different hydrocarbon molecules by differences in solubility in other compounds; (6) desalting and hydrotreating, which remove impurities occurring in the feedstock; (7) the removal of impurities from finished products by various treating and finishing operations; and (8) other processes.

Several years ago, the industry began classifying refineries into five categories: A, B, C, D, and E. Each category was defined as follows:

A—Refineries using distillation and any other processes except cracking.
B—Refineries using distillation, cracking, and any other process, but with no petrochemical or lube oil manufacturing.
C—Category B, with the addition of petrochemicals.
D—Category B, with the addition of lube oils.
E—Category B, with the addition of both petrochemicals and lube oils.

Petrochemicals as used by the industry meant any amount of production in a group of compounds historically defined as "petrochemicals". These compounds included some produced through processes normally associated with refineries, such as isomerization or distillation, and will be referred to as first generation petrochemicals. The second group of compounds considered petrochemicals were those produced through more complex chemical reactions. These compounds will be referred to as second generation petrochemicals.

The Agency was given the task of establishing effluent limitations for this diverse group of refineries. The first step needed was a breakdown of the industry into smaller groups of refineries, since the flow per unit of production within the industry was too diverse to be fit by a single set of limitations. Refineries were subcategorized based upon process configurations, i.e., the process used on the feedstock.

Once the industry was subcategorized, it was necessary to determine how the effluent limitations would be derived and what limitations would be established for each subcategory. Since refinery performance data (effluent concentrations) seemed to be independent of subcate EPA concluded that a single set of ef concentrations could be achieved t subcategories. It was then necessary define a flow base and a method by which the amount of production at any given refinery could be taken into account. Since the industry produces many hundreds of products and those products produced are a function of process configuration and feedstock, it was decided to base the limits on the quantity of feedstock consumed. The flows were therefore based on a unit of flow per unit of feedstock consumed.

The resulting limits were therefore defined as a quantity of pollutant per unit of feedstock (mass allocation), derived by multiplying a predicted flow per unit of production times an achievable concentration.

A more detailed discussion is set forth below of how the subcategories, flows, achievable concentrations, and short-term limits were derived, beginning with the contractor's report and ending with EPA's reconsideration.

1. *Subcategorization.* The earliest subcategorization of the Petroleum Refining Industry for pollution control purposes was made by the Office of Permit Programs in the preparation of their Effluent Guidance for the issuance of discharge permits under the 1899 Refuse Act. This initial subcategorization, which was made prior to the enactment of the FWPCA, followed a classification of the industry made by the industry itself, as discussed above.

Roy F. Weston, Inc., which had viously assisted EPA in preparing Ef

Guidance for the Petroleum Refining Industry, was retained to prepare a Draft Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category. After an additional six-month study of the industry, Weston submitted a draft report in June, 1973, which proposed a somewhat different subcategorization approach than had been used previously. These modifications in subcategorization were in recognition of the wide range of industry complexities found within the original five subcategories and constituted division of the B subcategory (into B-1 and B-2) based on the amount of cracking, and the combining of the D and E subcategories.

Many comments on the draft report subcategorization argued that splitting B into B-1 and B-2 was a step in the right direction, but it was inappropriate to combine D and E. It was also argued that a further breakdown of the industry was warranted because of the wide range of sizes and complexities within each subcategory.

In response to these early comments, EPA, in its proposed regulation published December 14, 1973, 38 FR 34542, modified Weston's subcategorization by redefining the term petrochemicals, once again separating the D and E subcategories, and establishing a new specialty lube subcategory. The 18 specialty lube refineries in the U.S. were not covered by the proposed regulation, because of the lack of data available at the time.

As in the case of the draft report, many comments on the proposed regulation argued that the proposed subcategorization did not adequately consider the wide range of plants within each subcategory. Representatives of the American Petroleum Institute Environmental Committee (including both API personnel and employees of several member companies) met with EPA on several occasions in January, February, and March, 1974. At these meetings API presented a new subcategorization technique which had been developed by one of its subcommittees. Additional meetings were held with API through April for further discussion of the API proposed subcategorization technique and of EPA's response to their proposal.

API proposed a method of predicting raw waste loads for each refinery based on a regression analysis (best fit) performed on the data for various waste parameters drawn from the 1972 refinery survey carried out jointly by API and EPA. This approach would predict expected flows and raw waste load levels for such parameters as BOD, COD, etc. API proposed guidelines that were to be derived from the raw waste loads by assuming a removal efficiency for each parameter.

There were several major problems with the specific approach recommended by API: (1) After initially running their regressions, API discarded 20 percent of the data points in order to improve the correlation. Much of the discarded data pertained to large refineries. Thus, the validity of the analysis, particularly as applied to those refineries, is open to serious questions. (2) API adjusted the results of the mathematical analysis by making "engineering judgments." The Agency could find no defensible basis for these judgments. (3) The results of the regression on raw waste load showed little hope for a further subcategorization because of the poor correlations found. This might, in part, be explained by the fact that the regression data base included only a single day's sample for each refinery for each of the raw waste load parameters (BOD, COD, etc.).

A major drawback to API's proposal that EPA use these analyses was that a separate regression and set of criteria (achievable removal efficiency) would be required for each parameter (BOD, COD, suspended solids, oil and grease, phenolics, ammonia, sulfides, and chromium). Based on API's initial work, this approach did not appear to be workable. API expected to complete, by September 1974, a report embodying their recommended approach; this report has never been submitted to the Agency.

Nevertheless, it appeared that the regression analysis proposed by API might work well in predicting differences in flow volumes from refineries based on the configuration of each refinery, because the dry weather flows from refineries are relativley constant and the one day's data (taken during dry weather) gathered in the API/EPA survey would therefore be representative. A procedure for predicting flows based on refinery characteristics would also be usable in connection with the approach used in the proposed regulations, since the limitations were based on achievable concentrations for each parameter multiplied by a flow for each subcategory.

After several months of work, EPA arrived at a technique, utilizing regression analysis, for predicting flows. The promulgated regulations are based upon this technique. It was found that size as well as complexity (type of processing carried on in each refinery) had an effect on the expected flow volume. Using the results of a regression analysis would then allow the limits to vary up or down for each refinery based on the actual characteristics of the individual refinery.

EPA compared the median flows used in the proposed regulations and the flows predicted by the regression, to the actual refinery flows given in the API/EPA survey. It was found that the regression predicted flows for the individual refineries more accurately than did the median for the appropriate subcategory.

In the final regulations, EPA's regression analysis was used to develop factors by which the median flows are adjusted up or down, depending upon the complexity and size of the refinery. For example, a complex, very large refinery would be predicted to have a higher flow per unit of production than a simple, less complex refinery.

2. *Sources of data.* One of the difficulties encountered in developing these regulations has been, except for the data supplied by the API for flows, obtaining usable data. Few refineries either kept data on their effluent or reported it if kept. The data used and relied upon by EPA represents a significant fraction of all the pertinent data extant.

The draft contractor's report utilized, for its flow data, information from 94 of the refineries of the 1972 API/EPA Raw Waste Load Survey. The achievable concentrations in the report for Best Practicable Technology (BPT) (1977) were based upon data from 12 refineries, upon reference materials, and upon pilot plants. These 12 refineries, misnamed "exemplary" refineries, were selected because they had treatment in place and data available; they did not necessarily represent the best or even the better refineries. The achievable concentrations in the contractor's report for Best Available Technology (BAT) (1983) were based upon pilot plant and reference materials. The variabilities used in the report were derived from those of the 12 "exemplary" refineries for which long-term data were available.

The proposed regulations were issued using the same data as that in the contractor's report.

The flow basis of the final regulations was the same as that of the contractor's report. The BPT achievable concentrations used in the final regulations were the same as those in the contractor's report, except that three additional refineries were used to calculate the chemical oxidation demand (COD) concentrations. The BAT achievable concentrations for those regulations were the same as the contractor's. For variabilities, data from five additional refineries were added to those used in the contractor's report.

For EPA's reconsideration of the regulations, leading to promulgation of the amendments to the effluent limitations guidelines, the flow basis did not change from that utilized in the contractor's report. In reexamining the BPT achievable concentrations, however, additional refinery data were used, as well as the data from the above-cited 12 refineries used for the final regulations. In reexamining the BAT achievable concentrations, additional references and pilot plant data were used. Long-term data for 7 additional refineries were used in the reconsideration of the variabilities.

3. *Flow basis.* In the draft contractor's report the flows from the refineries were broken down into three categories: 1) process water, 2) storm runoff, and 3) once-through cooling water. The process waters included: waters which come into direct contact with a product, intermediate, or raw material; contaminated storm runoff; and cooling tower blowdown. Process waters were considered to require treatment, and were to be segregated and discharged separately from clean storm runoff and once-through cooling water which were presumed to be uncontaminated. If the clean storm runoff and once-through cooling water were contaminated, however, no additional allocations were made.

The process flows appropriate to each subcategory were derived from the 1972

API/EPA survey. This survey gave total flow data (process water plus once-through cooling water) for 136 refineries. Since Weston's proposed allocation was to be based on process flow, it was appropriate to restrict this data base to the 94 refineries having less than 3 percent removal of heat by once-through cooling water. Of the 94 refineries, 75 had no once-through cooling water.

EPA continued to use the 94-refinery data base, because it was believed that the inclusion of the 19 refineries with 1–3 percent of heat removal by once-through cooling would only cause a slight overestimate of the process water flows and that the disadvantage of the resultant over-allocation of process flow would be more than offset by the advantage of using a larger data base.

The proposed regulation differed from the contractor's report in several respects. The definition of process water remained the same, except that an added allocation was given for ballast water and contaminated storm water, over and above the basic allocation. In addition, concentration limits were set for both clean storm runoff and once-through cooling water. These changes meant that the basic pollutant allocation was now actually based on process water flows, and the contaminated storm runoff, ballast, clean storm runoff and once-through cooling water each received separate allocations.

In the promulgated regulation, the subcategory definitions were changed. This change altered the number of refineries in each subcategory, and consequently altered the median flows for each subcategory. However, these flows continued to be based upon the same 94 refineries, and the previous definitions of different types of waste streams (process water, ballast water, etc.) were retained. EPA has not modified the contractor's original approach to identifying flows used in the calculation of the BAT limitations. BAT flow is the average of the flows for those refineries in each subcategory having less flow than the BPT median flows. These flow values have changed as the subcategory definitions have changed.

4. *Achievable concentrations.* The effluent concentrations used to calculate the pound allocations (BPT and new source) were the same for both the contractor's draft report and the proposed regulations. The achievable concentrations were recommended by the contractor and were based upon actual performance within this and other industries, and in pilot plants.

When the effluent regulations were promulgated the achievable concentrations for chemical oxygen demand (COD) and ammonia were changed. The COD limitations were increased (for the cracking, petrochemical, lube, and integrated subcategories) to account for differences in treatability of raw waste associated with various feedstocks (specifically heavy crudes). The changes in the ammonia limitations were a consequence of the changes in subcategorization.

During the past several months EPA has obtained additional data, including data on refineries in cold climates. Analysis of these data shows that the pollutant parameter concentrations established for BPT are in fact practicably attainable. In fact, a number of refineries are achieving all of the regulations concentrations. As expected, refineries processing light crudes generally discharge COD concentrations 20–30 percent lower than the concentrations on which the final regulations are based. Only the ammonia limitations are occasionally being exceeded by a few of the refineries examined. However, most of these refineries are currently designing or installing additional stripping capacity or a second stage of sour water stripping which will allow them to achieve the ammonia limitations.

5. *Variability factor.* The flow basis and achievable concentrations discussed to this point are based on the limits refineries are designed to attain and expected to achieve over a long period of time (generally considered to be one year). For enforcement purposes, shorter term limits were set to allow determination to be made more quickly whether or not a given refinery is in compliance with its permit limitations.

In order to derive short-term limitations from long-term data, the dispersion of short-term values about a long-term mean must be taken into account. Some daily values will be higher than the mean, some will be lower. The daily variability is the magnitude of this dispersion of daily values about the long-term mean. The monthly averages will also show variability about the long-term mean, but to a lesser extent.

Variability occurs in both flow and concentration. Some of the factors which cause variability are listed below:

I. Flow volume variations—
A. Storm runoff in addition to dry weather flow
B. The varying throughput of the refinery, since it will not always operate at its rated capacity
C. Variations in pump capacity and pressure losses through the refinery
D. Variations in blowdown volume from the cooling towers because of the evaporation rate from the towers
E. Others
II. Variation in treatment system efficiency (effluent concentration)—
A. Flow variations result in varying retention times (since the biological treatment system for a given refinery are fixed in size, the retention time will vary with flow-volume and the removal efficiency varies with retention time)
B. System upsets
C. Raw waste variations
D. Amount of equalization, which controls the impact of system upsets or raw waste variations
E. Slugging of storm runoff
F. Start-up and shut downs
G. Spills
H. Extreme or unusual weather conditions
I. Temperature effects
III. Factors affecting both flow and concentrations—
A. Sampling techniques
B. Measurement error and variability

Many of the factors listed above can be minimized through proper design and operation of a given facility. Some techniques used to minimize variability are as follows:

1. *Storm-runoff.* Storm water holding facilities should be used. Their design capacity should be based on the rainfall history and area being drained at each refinery. They allow the runoff to be drawn off at a constant rate to the treatment system.

2. *Flow variations, system upsets and raw waste variations.* The solution to these problems is similar to that for storm runoff: leveling off the peaks through equalization. Equalization is simply a retention of the wastes in a holding system to average out the influent to the treatment system.

3. *Spills.* Spills which will cause a heavy loading on the system for a short period of time, can be most damaging. A spill may not only cause high effluent levels as it goes through the system, but may also kill or damage a biological treatment system and therefore have longer term effects. Equalization helps to lessen the effects of spills. However, long-term, reliable control can only be attained by an aggressive spill prevention and maintenance program including careful training of operating personnel.

4. *Start-up and shut-down.* These should be reduced to a minimum and their effect dampened through equalization or retention, as with storm runoff

5. *Temperature.* The design operation and choice of type of biological treatment system should in part be based the temperature range encountered at the refinery location so that this effect can be minimized. The data base utilized by the Agency includes refinery data from cold climates and very large summer-winter temperature differences.

6. *Sampling techniques and analytical error.* These can be minimized through utilization of trained personnel and careful procedures.

From the beginning it was realized that the causes of variability could not be quantified individually The variability (variation from average) must therefore be calculated from actual refinery data, representing the combined effect of all causes. The information sought from the data were the maximum daily and monthly average limits, which should not be exceeded if the refinery is meeting the prescribed long-term averages.

The contractor analyzed data from several refineries. To determine the daily variability (variations of single values from the average) he arranged the data from each refinery for each parameter in ascending order. The data point that was exceeded only 5 percent of the time, and the median point (50 percent above, 50 percent below) were identified. The ratio of these values (95 percent probability/50 percent probability) was called the daily variability. For the monthly variability, the daily values for each month's data were averaged and these monthly averages were analyzed as above. The resulting daily and monthly variabilities for each parameter were averaged with the variabilities for the same parameter for all of the refiner-

to yield the daily and monthly variabilities for the entire industry These industry variabilities were then multiplied by the long-term average limits to obtain the maximum daily and maximum monthly average limits.

For the proposed regulation, all of the variabilities were recalculated. The approach used by the contractor was rejected because it was inappropriate except for extremely large quantities of data, and it made no attempt to differentiate between preventable and unpreventable variability. EPA selected from the contractor's data those periods believed to represent proper operation. The data used by the contractor for some refineries contained unexplained periods of high values. Attempts were made to determine the causes of these values. In one case, one month of extremely high values occurred after a major hurricane hit the refinery in 1971. Not until a month later was the treatment system back in normal operation. In another case the treatment system operated with relatively low variability for over one year and then showed an unexplained large increase in variability the following year. Since the data for the first year of operation demonstrated that lower variability could be achieved over a long period of time, that year was selected for analysis.

The contractor determined daily variability by dividing the 95th percentile point by the 50th percentile point. EPA modified this approach by selecting the predicted 99th percentile divided by the mean. The change from 95th to 99th percentile was intended to minimize the chance that a refinery would be found in violation on the basis of random samples exceeding the limitations Similarly, EPA selected the 98th percentile for use in determining the maximum monthly average.

The upper percentiles were derived based on the assumption that the data were distributed according to a normal or bell shaped distribution. An average variability for each parameter was then calculated and that average multiplied by the long-term average to set the daily maximum and maximum monthly averages.

Between proposal and promulgation, data were given to EPA by the American Petroleum Institute for five additional refineries, which were said to have BPT end-of-pipe treatment or its equivalent. EPA did not know the names or locations of these refineries and therefore could not check potential causes of variability. The BOD5 data from these refineries were studied, and the data base used to calculate the proposed BOD5 limits was reexamined. It was found that for most refineries the data more nearly approximate a log-normal (where the logarithm of the data is normally distributed) rather than a normal distribution. The variabilities were then recalculated assuming either a normal or log-normal distribution, whichever was the better fit. This analysis yielded an average daily variability for BOD5 of 3.1, instead of the proposed value of 2.1. The final regulations were based on the recalculated BOD5 value of 3.1. The monthly average variabilities were not changed. For other parameters, the variabilities in the proposed regulations were multiplied by the ratio of the recalculated BOD5 variability (3.1/2.3=1.35). The daily maximum to the median BOD5 variability assuming normal distribution limits were determined by multiplying the long-term average by the recalculated variability

On reexamination following promulgation of the regulations, EPA has reviewed 1974 data from seven refineries on all parameters. With the exception of suspended solids, the variability factors derived from these data confirm the variability factors originally established. This additional data on suspended solids indicated that the daily variability of 2.9 and the monthly variability of 1.7 originally calculated may be too low. Accordingly, a daily variability of 3.3 and a monthly variability of 2.1 have been established, based on the addition of this new data.

No existing plant employs the treatment technology (biological treatment followed by activated carbon) specified for 1983. The variability used for 1983 was, however, based upon the lowest variability achieved by any plant for each parameter. The Agency believes that this low variability represents the best prediction that can be made at the present time of variabilities which will be achieved by 1983. These should be much lower than the average variabilities presently being attained for the following reasons: 1) the additional step of treatment should tend to dampen peaks in the data; 2) most of the effluent data were not from systems with a filter or polishing step after biological treatment and this should help dampen peaks; 3) the activated carbon is unaffected by several of the factors causing variability in biological systems; and 4) the industry will have 10–11 years of additional experience in the area of treatment plant operation and control from the time when data was taken.

Summary of Major Comments

The following responded to the request for comments which was made in the preamble to the proposed amendment: Shell Oil Company, The American Petroleum Institute, and Texaco Inc.

Each of the comments received was carefully reviewed and analyzed. The following is a summary of the significant comments and EPA's response to those comments.

(1) One commenter stated that the regulations and the Development Document fail to disclose or explain the criteria employed by the engineering contractor or EPA for selecting the thirty candidate refineries for "exemplary plant treatment," and that EPA had not explained or justified why and how the thirty candidate refineries were narrowed down to only twelve "exemplary" refineries.

The sources of information available to the contractor for the development of the subcategorization and the choice of well-operated refineries (in terms of pollution abatement) were as follows:

1. 1972 EPA/API Raw Waste Load Survey
2. Corps of Engineers (Refuse Act) Permit Applications
3. Self-reporting discharge data from Texas, Illinois, and Washington
4. Monitoring data from state agencies and/or regional EPA offices for individual refineries.

A preliminary analysis of these data indicated an obvious need for additional information. Although 136 refineries were surveyed during the 1972 EPA/API Raw Waste Load Survey, the survey did not include any effluent data.

Refuse Act Permit Application data were limited to identification of the treatment systems used, and reporting of final concentrations (which were diluted with cooling waters in many cases). Consequently, operating performance could not be established.

Self-reporting data was available from Texas, Illinois, and Washington. These reports show only the final effluent concentrations and in only some cases identify the treatment system in use; rarely is there production information available which would permit the establishment of unit waste loads.

Additional data in the following areas were required: (1) Currently practiced or potential in-process waste control techniques; (2) identity and effectiveness of end-of-pipe waste control techniques, and (3) long-term data to establish the variability of performance of the end-of-pipe waste control techniques. The best source of information was the petroleum refineries themselves. New information was obtained from direct interviews and inspection visits to petroleum refinery facilities. Verification of data relative to long-term performance of waste control techniques was obtained by the use of standard EPA reference samples to determine the reliability of data submitted by the petroleum refineries, and by comparison with monitoring data from the state agencies and/or regional EPA offices.

The selection of petroleum refineries as candidates to be visited was guided by the trial categorization, which was based on the 1972 EPA/API Raw Waste Load Survey. The final selection was developed from identifying information available in the 1972 EPA/API Raw Waste Load Survey, Corps of Engineers Permit Applications, State self-reporting discharge data, and contacts within regional EPA offices and the industry. Every effort was made to choose facilities where meaningful information on both treatment facilities and manufacturing processes could be obtained.

After development of a probability plot for the respective raw waste loads from the tentative refinery categorization, the tentative categorization was presented to API and EPA for review and comment. Three refineries in each category were then tentatively designated as "exemplary" refineries based

on low raw waste loads determined by the API/EPA survey. Simultaneously, tentative lists of additional refineries were collected from each of the Regional EPA offices. Several lists were then prepared and submitted to EPA. From the approximately 30 refineries on these lists, the refineries for further study were then selected.

During this screening process, arrangements were made to either visit the refineries or collect additional information relative to plant operations. In some cases, refineries declined to participate in the program. As a result of the screening program, twenty-three (23) refineries were then involved in plant visits. These refineries are listed in Table 1.

The purpose of the refinery visits was to collect sufficient data in the areas of wastewater plant operations to define raw waste loads, effluent treatment schematics, operating conditions, and effluent analyses. As a result of these plant visits, data from only twelve (12) refineries (designated by stars in Table 1) were found to be available for a sufficiently long-term period (one year or more) to provide an adequate data basis for further definitive projections. Consequently, operating data from these twelve (12) refineries were then used as one of the major data sources in development of the regulations.

TABLE 1

REFINERIES VISITED UNDER CONTRACT NO. 68-01-0866

Company:	Location
Union Oil	Lemont, Ill.
Amoco	Whiting, Ind.
Amoco [1]	Yorktown, Va.
Coastal States [1]	Corpus Christi, Tex.
Champlin [1]	Do.
Total Leonard [1]	Alma, Mich.
Union Oil [1]	Beaumont, Tex.
Exxon	Baton Rouge, La.
Marathon [1]	Texas City, Tex.
Shell [1]	Deer Park, Tex.
OKC Refining	Okmulgee, Okla.
Texaco [1]	Lockport, Ill.
Phillips [1]	Sweeney, Tex.
U.S. Oil & Refining [1]	Tacoma, Wash.
Shell [1]	Martinez, Calif.
BP	Philadelphia, Pa.
Gulf	Do.
Amerada Hess	Port Reading, N.J.
Arco	Philadelphia, Pa.
Gulf	Port Arthur, Tex.
Sun [1]	Duncan, Okla.
Kerr-McGee	Wynnwood, Okla.
Lakeside Refinery	Lakeside, Ind.

[1] Chosen as "exemplary" refineries.

As can be seen from the above, the selection of these twelve refineries was in large part dictated by the limited availability of information.

More complete or more recent data show some of the original twelve refineries to be less than "exemplary." See Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category, pp. 12–14; "Draft Development Document for Effluent Limitations Guidelines and Standards of Performance, Petroleum Refining Industry," pp. III–2–4.

(2) One commenter objected to the calculation of 1977 flow rates from only 94 refineries, 40 percent of the industry.

Of a total of 253 petroleum refineries, EPA holds permit applications for surface water discharge for 190–200 refineries. The remaining 50–60 refineries are either "zero discharge" operations or are currently discharging to municipal waste treatment ystems. EPA is aware of a number of zero discharge refineries in arid or semi-arid areas of Texas, New Mexico and Southern California, and several refineries in Los Angeles County are currently discharging to municipal waste treatment. Since none of these plants have direct surface discharge, they are excluded as potential sources of data.

Of the remaining 190–200 discharging refineries, 136 were included in the 1972 API/EPA survey, which is the only available comprehensive source of data on refinery water use. Since the survey does not show process water use as a separate discharge, but instead lists total flow volume, this limited the number of refineries for which data could be used to those for which process flow constituted most or all of the total wastewater discharged. Data from refineries removing more than 3 percent of heat by means of once-through cooling were not used, since cooling water would cause any estimate of process flow based on total plant flow to be greatly overstated for those refineries. Thus, EPA could use data from only 94 refineries. Since the API/EPA raw waste load survey was designed to be representative of the total industry, and since EPA used all of the refineries in the survey with 3 percent or less heat removal by once-through cooling water, the flows used are actually higher than the process water flows achieved by the industry. (See "Flow Basis" portion of the History of Guidelines Development in this Document).

(3) One commenter stated that, of the twelve "exemplary" refineries only one actually complies with the prescribed 1977 levels for every pollutant parameter.

EPA based the regulations not upon the overall performance of the so-called "exemplary" refineries, but on the effluent concentrations achieved by the emplary" refineries and plants in other industries, the variabilities achieved by the "exemplary" refineries, and flows achieved by the industry as a whole. EPA did not expect that these refineries would uniformly comply with all limitations, since they did not have all the recommended technology in place. For example, few of the "exemplary" refineries were expected to meet the degree of ammonia removal specified, since few were practicing adequate ammonia stripping.

EPA has obtained effluent data covering a full year for six of the twelve refineries. Four of these had no violations of the 1977 limitations, while another had only five data points, out of several hundred data points, above the limits.

In addition, EPA now has data on 10 additional refineries in the United States which had no violations of the regulation limits in 1974, and four others that only exceed the ammonia limits.

Included in this group of 18 refineries (14 with no violations and 4 exceeding the ammonia limits) are "sour" crude users and refineries that are not located in areas with water shortages. It should be noted that these 18 refineries do not necessarily represent all of the refineries in the country currently meeting the regulations. The available data cover only 12 of 33 States which have refineries. EPA has requested the American Petroleum Institute to supply additional effluent data.

(4) One commenter stated that failed to base the standards o average of the best existing performances by plants currently in place.

EPA has based its limitations upon the best existing performance of plants currently providing treatment except where the industry is uniformly providing inadequate treatment. In every case, the limitations for the Petroleum Refining Point Source Category reflect actual performance of plants currently in place.

The following table summarizes the approach followed by the Agency in developing the regulations.

EPA set the BPT, BAT and New Source limits as follows:

Level	Flow	Concentration	Variability
BPT (1977).....	Flow being met by 50 percent of the plants in place adjusted for process and complexity factors.	Average of the best plants for which data were available.	The average of those plants with treatment in place for which long-term data were available.
BAT (1983).....	Average of the best.....	Based on pilot plants.....	Best individual refinery.
BADT (new source).	.....do.....	Average of the best plants for which data were available.	The average of those plants with treatment in place for which long-term data were available.

(See Sections IV, V, IX, X, XI of the Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category, and Supplement B—"Probability Plots", refinery data and analysis files, "Variability Analysis.")

(5) One commenter objected to the Agency's reliance upon refineries in Texas and California, arguing that EPA's sample should be representative of the geographical distribution of the industry. The commenter noted that subcategories "C", "D", and "E" are represented solely by refineries in the coastal areas of Texas and California.

A. EPA's flow data base includes refineries from all areas of the country.

B. Of the four refineries selected by the contractor in the "A" and "B" subcategories, only one was located in Texas or California.

C. There is only one "E" refinery (F Kansas City) which is not located i California, or in a coastal area.

D. The data base for "D" refineries has been broadened by adding a refinery in Illinois. E. Of the 17 "C" refineries in the country, 9 are in Texas, California, or in a coastal area. The agency has broadened its data base to include a "C" refinery in Illinois.

(6) Several commenters stated that EPA has ignored the effect of crude oil feedstock characteristics on the treatability of refinery effluent. They claim that feedstocks containing heavy crudes, in particular crudes from California, have a substantial impact on effluent quality.

Subsequent to publication of the proposed regulations, the Shell Oil Company and the Phillips Petroleum Company submitted data for three refineries processing California crudes: Shell at Martinez, California; Shell at Wilmington, California; and Phillips at Avon, California. These data indicated that these refineries appeared to have experienced higher pollutant raw waste loads (the quantities of pollutants in the waste stream before treatment) than the median refineries of their subcategories. EPA considered this additional information in assessing whether an additional pollutant allocation should be allowed those refineries processing heavy crudes.

EPA was interested in determining whether the above-median raw waste loads of the three refineries could be clearly attributed to their California crude feedstocks, or whether their high waste loads reflected the complexities of their refinery processes. Each of the three refineries is well above-average in complexity for its subcategory.

The commenters provided raw waste loads for five parameters (BOD5, COD, TOC, phenols and ammonia) from each of the three refineries. Of these raw waste loads, 13 out of the 15 instances were above the applicable subcategory median. This is shown by the following table:

REFINERY RAW WASTE LOAD AS PERCENT ABOVE THE MEDIAN FOR THE APPROPRIATE SUBCATEGORY

	Phillips Avon	Shell Wilmington	Shell Martinez	3 refineries average
BOD5	20	116	29	81
COD	7	198	220	173
TOC	77	73	111	94
Ammonia	20	251	−47	95
Phenols	917	1,388	662	988

However, if refinery complexity is taken into account, by dividing each refinery's reported raw waste loads by that refinery's process factor, the resulting "complexity adjusted" raw waste loads exceed the appropriate subcategory median in only 7 of the 15 instances. This is demonstrated by the following table:

REFINERY RAW WASTE LOAD DIVIDED BY THE REFINERY PROCESS FACTOR AS PERCENT ABOVE THE MEDIAN FOR THE APPROPRIATE SUBCATEGORY

	Phillips Avon	Shell Wilmington	Shell Martinez	3 refineries average
BOD5	−4	−11	−12	−10
COD	−14	22	90	29
TOC	25	−11	−6	−1
Ammonia	−43	85	−77	−12
Phenols	621	509	237	456

The above table shows that the increased refinery complexity associated with those refineries processing California crudes might well be a cause of their higher raw waste loads. Since the process factor is a component of the allowed effluent limitations, it adequately compensates (with the possible exception of phenols) for the larger raw waste loads of those refineries. Existing treatment facilities have demonstrated that the phenol limits are achievable, even when raw waste loads are greatly in excess of the median.

Even if it were possible unequivocally to attribute an increased raw waste load to a feedstock type, this would not in itself justify an increased effluent limitation for refineries processing that feedstock. The long-term average quantity of a pollutant in a refinery effluent depends more upon the design and operation of the treatment system than upon the average raw waste load input to the system.

To determine whether there exists in practice a relationship between average effluent quality and raw waste load, EPA compared, for 14 refineries with both raw waste load and effluent data available, the average amount of pollutant in the effluent with the raw waste load of the pollutant. No meaningful correlation between average effluent and raw waste load was observed for the pollutants BOD5, TSS, oil and grease, phenols, and ammonia.

Thus, for these pollutants, differences in effluent quality between refineries are associated more with other factors (e.g., differences in treatment systems or in-plant controls) than with differences in raw waste load. However, EPA did find a significant correlation between the quantity of COD in the effluent of each of the refineries and the refineries' raw waste loads.

This finding merely supports EPA's action, when it promulgated the regulations, in increasing the COD limitations to avoid any possible inequity to processors of heavy crudes. (See "History of the Regulations", Part 4, "achievable concentrations".)

In addition, EPA examined data from one refinery which processed a mixture of crude types. In particular, it was claimed that the effluent quality for BOD5, phenols, and ammonia decreased as the percentage of Arabian crude in the feedstock increased. The Agency could find no significant correlation between effluent quality and the percent of Arabian crude used.

(7) One commenter stated that operating experience with the full-scale carbon adsorption system at BP's Marcus Hook refinery has been less than satisfactory, that Gulf Oil Company has found that carbon treatment is not feasible for their Port Arthur refinery wastewater, and that Texaco has apparently reached the same conclusion with regard to its Eagle Point refinery.

The best available technology economically achievable specified for the petroleum refining industry is the application of carbon adsorption to the effluent from a well operated biological/physical treatment plant of the type required to meet the 1977 limitations. In each case specified by the commenter, activated carbon treatment was applied to wastewaters of considerably poorer quality than is required for 1977, since activated carbon was being used in lieu of biological treatment.

(8) Comments were received which assert that special unproven techniques, such as biological nitrification—denitrification for ammonia removal, and some unspecified technology for phenols, would be required to meet the ammonia and phenol limitations.

The achievable ammonia limits are based on in-plant sour water stripping techniques which are currently in use in the refining industry. A number of plants in this industry are meeting the ammonia limits using this technology. (See "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category", pp. 95–97; 40 CFR Part 419, 39 FR 16562(23) May 9, 1974.)

The achievable phenol limits are based on the refinery effluent data and references cited in Tables 26 and 27 of the Development Document. In addition, EPA has recently acquired phenol effluent data from 11 refineries not cited in the Development Document, which data show an average phenol effluent concentration of 0.058 mg/l (0.10 mg/l was used as the achievable concentration in setting the BPT limits).

(9) Some commenters stated that neither the regulation nor the Development Document explains or assesses how refineries of widely varying age, process, geographic location, load availability, and other circumstances can further reduce flows to the 1983 volumes.

The methods currently being applied by the industry to achieve flow reductions are listed on page 169 of the Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Petroleum Refining Point Source Category.

Some other methods of reducing flows not listed on page 169 are:

1. Maximum reuse of treatment plant effluent, evaporation, and consumptive use.
2. Lime and lime soda softening to reduce hardness to allow further recycling.
3. Use of specially designed high dissolved solids cooling towers which would use the blowdown from other cooling towers as make-up water.

Of the 94 refineries used in determining the flow base for the 1977 limitations, 26 were doing as well or better than the 1983 flow base. These 26 refineries are located in 15 different states (Alaska, California, Colorado, Illinois, Kansas, Kentucky, Louisiana, Montana, North Dakota, New Mexico, Ohio, Oklahoma, Texas, Utah, and Wyoming).

(10) One commenter stated that the control efficiencies needed to meet the limitations are higher than those attained by municipal plants employing traditional secondary treatment, and are derived partially from EPA's inclusion of polishing steps, including granular filtration or polishing ponds. The commenter

argued that EPA's own publications concede that there is no carefully documented filter operating experience with wastewater, and that the operating experience of the two refineries using granular media filtration (Amoco, Yorktown; BP, Marcus Hook) shows that this technology will not achieve the limits.

Many dischargers will be able to meet the limitations without a polishing step. However, the cost of filters was included in the estimates since some refineries might need a polishing step to achieve the suspended solids and oil and grease limits.

The average effluent suspended solids for the 12 refineries for which EPA has 1974 suspended solids data is 15.1 mg/l (10 mg/l is the guideline basis). Only one of these plants (Marathon Oil, Robinson, Ill.) has a filter in operation. Several are achieving less than 10 mg/l of suspended solids without a polishing step. The ten refineries for which EPA has 1974 oil and grease data are averaging 5.0 mg/l (5.0 mg/l is the regulation basis).

Experience with granular media filters, as well as with other polishing steps, is extensive and well documented. EPA's "Process Design Manual for Suspended Solids Removal" gives the results of studies of filtration of effluent from secondary biological treatment for 32 facilities. These 32 show an average suspended solids effluent concentration of 6.6 mg/l, with only 3 of the 32 over 10 mg/l.

In addition, there are approximately 2500 granular media filters being used for suspended solids removal in the Water Supply industry. Many filters are in operation in other industries, such as steel, for oil and solids removal.

Within the petroleum industry many filters are being employed for oil removal from production water before its discharge from offshore oil platforms. Filters are also being used prior to secondary treatment (BP, Marcus Hook, Pa.; Exxon, Bayonne, N.J.; Amarada-Hess, Port Reading, N.J., etc.).

Two filters are currently being used as a polishing step for secondary treatment effluents (Amoco, Yorktown, Va. and Marathon, Robinson, Ill.) and several others are now in design or under construction.

It is true that the two installations with filters now in place do not achieve the 10 mg/l of suspended solids and 5 mg/l of oil and grease expected from these units. This is a result of the conditions under which these installations have been operated. EPA's 1977 treatment model assumes that the influent to a polishing step will be an effluent from a well designed, well operated secondary treatment plant, and that the average suspended solids and oil and grease influents to the filters will be 15–25 mg/l and 5–10 mg/l, respectively.

The following data from Amoco, Yorktown's filter operation show a distinct improvement in effluent quality when the influent is within the expected range:

Date	Suspended solids (mg/l)		Oil and grease (mg/l)	
	Influent	Effluent	Influent	Effluent
July 1971 to Aug. 1971	13	[1] 4.8	7	[1] 1.9
Sept. 1971 to Nov. 1971	43	[1] 12.6	18	5.3
Dec. 1971 to Feb. 1972	46	39	16	10
Mar. 1972 to May 1972	69	38	17	13
Sept. 1972 to Nov. 1972	99	42	9	[1] 6

[1] Lower than the monthly maximum limit of 17 mg/l for suspended solids, and of 5 mg/l for oil and grease, assuming median flow.

The above data indicates adequate performance of the filter when the secondary treatment effluent was within the ranges of expected operation, in spite of the following unusual (and correctable) difficulties encountered at the facility: 1) filter media losses and channeling eventually forced replacement of the entire filter bed; 2) an unexpected increase in flow volume was caused by refinery acceptance of ballast water; 3) untreated lagoon water (used for backwash) was left in the filter after backwashing; and 4) the filter was not properly designed for both summer and winter influent conditions.

Not as much information was available to EPA on the Marathon, Robinson filters as was available on Amoco, but the following is known: The data for the 9 months (8/72–4/73) of operation prior to the installation of the filters show a suspended solids effluent from the secondary treatment plant of 19 mg/l average. The secondary treatment plant effluent for the 12 months of 1974 showed an average suspended solids concentration of 48 mg/l. Thus, the filters were operating at a level well above their design limits and on 2.6 times higher influent suspended solids concentration than at their initial installation. It should be noted that in spite of this, the filter effluent averaged 12 mg/l of suspended solids for the first 18 months of operation.

Granular media filters are not a cure-all or a substitute for a well designed and well operated secondary treatment system, but rather, as EPA intended, a polishing step to further improve a good secondary treatment plant effluent. Thus employed, they can productively be part of a system to meet the 1977 limitations.

(11) In support of the previous comment opposing the use of granular media filtration, a discussion of the results from a pilot plant study carried out by Standard of Ohio at its Lima, Ohio Refinery was submitted. The pilot study was designed to determine the reductions achievable in BOD5, COD, and suspended solids when a granular media filter was used to treat the effluent from their biological treatment pond.

The commenter claimed that the growth of algae precluded attainment of the BPT suspended solids, BOD5, and COD limits.

As in the cases cited in response to comment no. 10, these filters were being used for more than the polishing step EPA intended. EPA did not base the regulations on the use of granular media filtration for BOD5 and COD removal. The treatment model assumes the influent to the filter be below 25 mg/l of suspended solids and 15 mg/l of BOD5. Thus, the biological treatment step preceding filtration should deliever an effluent of such quality to the filters. Such treatment can be accomplished by several techniques, either separately or in combination, including activated sludge, biological ponds, trickling filters, and aerated lagoons. The technique selected depends upon an engineering evaluation of the specific site and raw waste characteristics.

Where lagoons are employed, the effluent quality of a lagoon system can be affected adversely during certain periods of the year by the algae generated in the system. The algae can settle out in the bottom of a receiving stream or lake, undergo death and degradation, exert an oxygen demand in effluent samples and in the stream, and will be measured as part of the solids in the effluent.

There are, however, a variety of approaches which can be used to control the quantity of solids in the effluent. Most of these approaches either are in use or have been thoroughly demonstrated and can be used where needed. Under specific design and operational conditions, each approach can be economical. Applicable approaches include micro-straining, coagulation-flocculation, land disposal, granular media or intermittent sand filtration, and chemical control.

Micro-strainers have been used successfully in numerous applications for the removal of algae and other suspended material from water. In a series of nine investigations over a period of years, plankton removal averaged 89 percent. Micro-straining requires little maintenance and can be used for the removal of algae from stabilization ponds or lagoons.

Coagulation-flocculation, followed by sedimentation, has been applied extensively for the removal of suspended and colloidal material from water.

Land disposal (spray irrigation) for all or a portion of the lagoon effluent can reduce outflow to a stream during periods of high algae. This reduction can compensate for the increased solids concentrations and permit the limitations to be attained. Spray irrigation in a controlled manner onto adjacent land can be accomplished without additional environmental problems.

Although EPA did not contemplate using granular media filtration specifically to remove algae, filters have been shown to achieve the BPT limits even when influent quality was degraded due to algal growth. The Lima Refinery pilot project showed that the limits were obtained with certain media sizes and flow rates.

Chemical measures for the control of excessive algae growths in lagoons are also effective. Proper application depends upon the type, magnitude, and frequency of growth, the local conditions, and the degree of control that is necessary. For maximum effectiveness, algal control measures should be undertaken before the development of the algal bloom.

Thus, there are many alternatives that can be used for algae control and/or removal to assure that the lagoon effluent quality meets the described limitations. The alternative selected at a specific refinery will be a function of land availability, available operating personnel, degree of difficulty in meeting the limitations, and overall waste management economics.

(12) A commenter suggested that the BPT flow basis was based on flows experienced by refineries which apply good water conservation practices, and that only 50 (37 percent) of the 136 refineries in the 1972 API/EPA survey are meeting the EPA flow basis.

EPA based the BAT and BADT (1983 and New Source) flow bases on refineries employing good water conservation practices. The BPT flows were based on what one-half of the industry was achieving in 1972. In fact, 51 (54 percent) of the 94 refineries used from the 1972 API/EPA survey were at or below the BPT process water flows. No assessment of process water flows was made for the remaining 42 of the 136 refineries in the survey, since their flow volumes included large amounts of once-through cooling water, which was not included in the flow base definition. It must be recognized that the flow base is not a flow limitation, and that the pollutant allocations allowed by the regulations can be met with flows higher than predicted if the effluent concentrations are lower than those used by EPA. Since a number of refineries are achieving concentrations for each pollutant parameter that are considerably below the concentrations used by EPA, a refinery might be able to meet the effluent limits with a higher than predicted flow. The same result might be achieved by careful control and design and consequent lowered variability.

(13) Some commenters stated that EPA did not adequately consider the effects of climate on biological wastewater treatment and that substantially higher reductions can be achieved in southern states and for installations requiring summer operations only. Included were several examples of claimed summer-winter variations in refinery effluents.

EPA has collected data from ten refineries located in Illinois, Montana, North Dakota, Washington, and Utah. Effluent data from these ten refineries for the parameters which could be affected by cold climates are as follows: BOD5—13.2 mg/l average (the limitation basis is 15 mg/l), COD—75.5 mg/l average (the limitation basis for these refineries varies between 110–115 mg/l) and phenols—0.049 mg/l average (the limitation basis is 0.10 mg/l).

The commenters own data submitted with the comment provide little support for the position taken in the comment. These data tend to show, and EPA agrees, that temperature variations, with a host of other factors, do affect refinery variability. This effect is fully taken into account by the variability factors and does not appear to depend on refinery location.

(14) A commenter argued that EPA regulations would require in-plant modifications, and that EPA was not authorized under the law to require such modifications for 1977.

EPA's regulations do not require any particular form of treatment, nor do they require in-plant modifications. The regulations require the achievement of effluent limitations which are based upon the performance of good existing plants. Since the total effluent loading in pounds or kilograms is controlled by three variables, the total effluent flow, the concentration of pollutant in the effluent, and the variability, reduction of one or more of these components can be used to achieve the limitations. The limitations are based upon flow, concentration, and variability figures which are readily achievable. If a discharger's flow is higher than the flow upon which the regulations are based, the discharger has three options: he may reduce his flow to or below the predicted level, and maintain the appropriate effluent concentrations and variability; he may modify his treatment system so as to achieve lower effluent concentrations; or he may design and operate more carefully to achieve lower variability. EPA has data on dischargers which are achieving concentrations, flows, and variabilities well below those upon which the limitations are based.

EPA is aware, however, that for most such dischargers reduction of flow would be the most economical and, in the long run, the most effective means of meeting the regulations. Accordingly, our cost estimates are based upon the installation of treatment necessary to meet the regulations, and for any inplant modifications necessary to reduce process water flow commensurately.

It should be emphasized that, even for those dischargers who choose to reduce process water flow by in-plant modifications, such modifications amount to nothing more than modification and repiping of existing processes. To meet the 1983 guidelines, more extensive changes may be appropriate. For example, dischargers employing fluid catalytic cracking may change to hydro-cracking; or those acid treating may change to hydrotreating, to help in meeting the 1983 limitations. However, such changes will not be necessary for any discharger to meet the 1977 limitations.

(15) One commenter argued that EPA made many errors in its development of the median raw waste loads from the API/EPA survey used in the regression analysis.

The median raw waste loads (Tables 18–22 in the Development Document) were not used in the regression analysis. The regression analysis was based on the size, flow, and refining processes of each refinery used.

(16) A comment was received to the effect that EPA used median values rather than mean values to determine allowable effluent loadings and variability factors.

The commentor was incorrect. Mean values, not medians, were calculated from the "exemplary" refineries. These means were used to develop the achievable concentrations.

In calculating the variabilities for each refinery, the 99 percent probability limit was divided by the mean because the variabilities were used to predict 30-day and daily maximums from an annual average (mean).

(17) A commenter noted that the variability allowed in many of EPA's other industrial guidelines is greater than that used for the Petroleum Refining limitations. The commenter therefore requested higher variability factors, especially to cover upset conditions.

The variabilities used by EPA in setting the Petroleum Refining limitations are derived from extensive long-term data from refinery operations. These variabilities therefore reflect what is currently being achieved in this industry.

Comparison to variabilities in other industries is considered invalid for several reasons:

1. The data base used to calculate the variabilities in the Refining industry was at least 10 times larger than that available in any of the other industries mentioned by the commenter.

2. In other industries the Agency was often required to establish variabilities based upon relatively little long-term data. In such cases, variabilities were often conservatively set at a high level, in order to compensate for the lack of data. Because of the availability of good long-term data on petroleum refiners, the Agency is confident that these variabilities are readily achievable by all refiners over the long-term.

3. The technology specified as the best practicable control technology currently available has been in use in the petroleum refining industry for a long period of time. The experience accumulated over this period of time has enabled the industry to iron out many irregularities which contribute to variability. This has enabled the petroleum industry to achieve lower variabilities than many other industries with less experience in pollution abatement. The Agency believes that the industry as a whole should be required to maintain the level of control presently practiced by many refiners.

The commenter also requested higher variabilities to cover unset conditions. As has been stated previously, data taken during periods of spills, in-plant upset conditions, etc., were included in calculating the variabilities. However, a few data points, which reported either preventable upsets of catastrophic events (such as the effects of hurricane Agnes on a coastal refinery in Texas), were deleted from the variability data base, since they did not reflect the normal operation of a well run, carefully maintained operation.

(18) One comment shows that EPA used an incorrect equation in the calculation of sample variance.

A minor error was made in the calculations used in preparation of the proposed regulations. However, since the approach used for data analysis after publication of the proposed regulations corrected that error, it did not appear in the final regulation.

(19) A commenter complained of biased data selection on the part of EPA in determining the variabilities.

The commenter presented four charts showing the monthly average loading for BOD, TSS, oil and grease, and ammonia from January, 1970 through April, 1973 for Shell, Martinez. EPA selected one year's data, for each parameter, to calculate the variability. For BOD, TSS, and oil and grease, EPA chose the year after the installation of Shell's waste treatment plant in September, 1971. The data for these parameters prior to that date could not be used because it was representative of raw waste and not effluent variability. A period of one year was chosen for several reasons: 1) one year's data should adequately represent the unpreventable causes of variability; and 2) the quantity of data is sufficient for statistical analysis and prediction of both variability and long-term performance. For oil and grease, EPA did erroneously analyze data for a period before the installation of biological treatment. However, EPA has recomputed the variability using data from the same period (after installation of treatment) used for the other parameters, the difference is negligible.

EPA believes, as indicated previously, that low variability is concomitant with good plant operation. For this reason a year different from that used for the other parameters, a year in which low ammonia variability was attained, was selected for calculating ammonia variability. It is immaterial that this year preceded installation of the biological treatment system, since most ammonia removal is accomplished by a separate system.

The commenter also pointed to several data points that were deleted from the data analyzed from the Marathon, Texas City Refinery. Five data points were dropped during the analysis of the ammonia data as not being representative of the normal plant operation. The data points were all of the data from the period 10/11/72 through 12/6/72. The data prior to 10/11/72 ranged from 2.2 to 23.4 mg/l and the data after 12/6/72 ranged from 3.2 to 39.4. The points dropped were 0.6, 0, 0, 0, and 80 mg/l. These data points were dropped because: 1) they immediately followed a 23 day period for which no data were recorded; and 2) for whatever reason (EPA has been unable to determine the cause of these aberrant values), these five consecutive deleted data points are both startingly lower and higher than all the rest of the data. They thus may represent sampling or analytical errors. These data are clearly so atypical that EPA decided not to use them in the analysis.

Six data points are depicted as having been ignored by EPA in its analysis of Marathon's COD data. Two of these points are duplicates (1/12/72 and 1/15/73), and one point (1/31/73) was mistakenly deleted by EPA. However, the deletion of this single point (which was a low value) would have no significant effect on the regulations. The remaining four data points were deleted because Weston's trip report identified them as the result of operator mistakes.

(20) A commenter questioned the inclusion of three data points since they were preceded by the symbol meaning "less than the sensitivity at that level."

For all analytical techniques a limit of sensitivity exists below which the method does not yield reliable quantitative measurements. EPA, throughout its analysis of the Refinery Industry data, has used the level of analytical sensitivity as the data points where a "less than sensitivity" indicator appeared in the data. It is believed that elimination of these low data points might significantly bias the analysis of the total data base.

(21) A commenter questioned EPA's variability analysis on Amoco, Yorktown's BOD5 data, on the grounds that two analyses by EPA of the same data yielded strikingly different results (4.54 vs. 2.29).

This supposed inconsistency arose as a result of the progression followed by EPA in preparing the regulations (see "Variability" above). The 2.29 daily variability is the result of fitting Amoco's data to a normal distribution, while the 4.54 figure is based on a log-normal fit. The improved methodology now being used by EPA results in a 2.80 daily variability. The corrections made initially for the facts that the data fit only imperfectly to either a normal or log-normal distribution are no longer necessary.

(22) A commenter stated that EPA erred in using 2.3 as the BOD5 variability for three refineries in calculating variabilities for other parameters, since the mean of the three refineries' BOD5 variabilities is 2.14.

The mean of the three refineries' BOD5 variabilities is in fact 2.22; however, EPA used the median value, 2.3, instead of the mean.

(23) A commenter indicated that EPA did not avail itself of the data in the Brown and Root Variability study.

EPA did in fact utilize data from five of the refineries used in the Brown and Root Variability Study. However, the Brown and Root Variability Study itself could not be used in deriving the limitations. The study did not give any raw data, or identify the refineries used in the study. Thus, EPA had no knowledge of the operation of these refineries and no opportunity to determine the causes of suspect data. Moreover, the statistical approach used by Brown and Root was inconsistent with that selected by the Agency.

The data from five of the refineries used in the Brown and Root Variability Study were used, along with other refinery data, to make the adjustment to the original variabilities which had been based upon a normal distribution. Since EPA has been unable to obtain the names of the refineries used by Brown and Root, it has been unable to make further use of these data.

(24) One commenter stated that since there is enormous variation in the variability factors themselves, their statistical veracity must be challenged.

The validity of a variability factor increases as the number of data points and the length of time analyzed increase. The commenter has calculated daily variabilities within each month and a coefficient of variation (standard deviation divided by the mean) for each month. Thus, his calculations would be expected to show relatively wide fluctuations. EPA used longer term data (in most cases, a full year). Accordingly, the uncertainty observed by the commenter is minimized by EPA's method of analysis.

The commenter also compared the daily variabilities based on long-term data to show the wide range of values. EPA is perfectly aware of the wide range of variabilities, and one of the intentions of the limitations is to prevent these widely varying discharges. In defining BPT, operational control is considered extremely important.

The prevention of spills, operator education, limiting analytical error, and proper treatment plant design for the control of variability are just as important as flow minimization or designing to achieve a long-term concentration limit.

(25) One commenter stated that, since EPA based effluent limits (in pounds) on the product of flow times concentration times variability, and since the commenter found no consistent correlation between flow and any effluent parameter, EPA should reevaluate the basis of its effluent limits.

The commenter provided EPA with a list of ten refineries for which he examined the correlation of effluent load with flow, and a list of those effluent parameters which he found to be significantly correlated with flow. These lists, for which the commenter failed to provide either the data on which they are based or the regression model he used to analyze that data, constitute merely a summary of results obtained.

EPA determined which effluent parameters were reported by each of the ten refineries used by the commenter. None of the ten refineries reported all effluent parameters, although the commenter's lists might lead one to believe they did. Based upon the commenter's own submission, then, the following table can be constructed:

Effluent parameter	Number of refineries (with more than 75 data points) reporting the effluent parameter	Number of refineries with significant correlation between effluent parameter and flow
BOD5	8	5
COD	8	7
TOC	1	1
TSS	8	5
Phenol	8	6
Oil and grease	9	6

Thus, in most cases where the refineries recorded data on a specific parameter, the commenter actually reported a significant correlation between effluent loading and flow. There was no reason, therefore, for EPA to reevaluate the basis for its effluent limits.

(26) One commenter stated that, since data from Shell's Martinez refinery were not distributed either normally or log-normally, EPA's approach to variability was incorrect.

The commenter provided with his comment a table summarizing the statistical parameters he investigated at the Martinez refinery. He did not provide EPA with the data he used. From the number of data points he reported, however, he apparently used data taken over approximately a three-year period. Since the treatment plant at the Martinez refinery was not installed until late in 1971, it is likely that the commenter combined in his summary data taken both before and after the treatment facilities were installed. If two such disparate statistical populations were so combined, the results obtained would be meaningless.

In addition, the procedure now used by EPA to determine the variability factor does not require that the data be distributed either normally or log-normally over its entire range.

(27) A commenter analyzed BOD data from Exxon's Baytown refinery, and derived a variability factor of 3.06, not 2.03 as given by EPA.

The commenter's value of 3.06 is the ratio between the 99th percentile of the variability distribution and the 50th percentile of that distribution (C99/C50) for the Baytown refinery. EPA actually defines the variability factor as the ratio between the 99th percentile of the variability distribution and the mean (C99/A). The correct variability factor for the Baytown refinery therefore is 2.69. EPA originally gave the figure 2.03 as that factor. Upon reanalyzing the Baytown data, EPA discovered that it had made an error in transcribing the original figures from the work sheets. EPA then recomputed the overall variability factor using the 2.69 figure, and found it remained unchanged, to within the round-off limits.

(28) A commenter argued that EPA has not demonstrated the availability of carbon adsorption as a proper basis for establishing the 1983 limitations. The commenter cited several references, in addition to those used by EPA, in making this argument.

Carbon adsorption technology has been used by industry for many years for the removal of organic contamination in the Sugar and Liquor Industries. In 1960, the detailed evaluation of carbon adsorption as a possible wastewater treatment technology began as part of the mandate of Congress (Pub. L. 87-88) to investigate advanced waste treatment technology.

A 1974 article by Hager in Industrial Water Engineering cites sixteen examples of full-scale industry wastewater treatment installations using activated carbon. In addition, the article gives the results of 220 carbon isotherm tests, depicting the almost universal applicability of activated carbon as a viable treatment.

Much of the work done to date on activated carbon adsorption has been to show it is an alternative to biological treatment. However, carbon adsorption seems more universally applicable as a polishing step after biological treatment. A paper by Short and Myers states: "the best levels of reduction were obtained with biological treatment followed by carbon adsorption. Apparently, bio-treatment and activated carbon complement each other very well and those materials which are resistant to biological degradation are adsorbed fairly easily while those materials which are not adsorbed by carbon are biologically degradable." This statement is confirmed by: (1) A paper by Hale and Myers entitled "The Organics Removed by Carbon Treatment of Refinery Wastewater"; (2) A study carried out by Union Carbide Corporation on 93 organic compounds; (3) a paper by E. G. Paulson, "Adsorption as a Treatment of Refinery Effluent" in which carbon isotherm tests show higher BOD and COD percent removals from biological effluents than from raw wastes; and (4) the 1974 pilot plant study at the BP, Marcus Hook Refinery where a Bio-Disk was used to remove a portion of BOD_5 prior to carbon adsorption, resulting in substantially better effluent quality than provided by the carbon alone.

The Agency derived its achievable BAT effluent concentrations from the information available on the results of activated carbon polishing of biologically treated effluents. The sources used to confirm the probable achievability of these effluent concentrations are as follows: Short and Myers—"Pilot Plant Activated Carbon Treatment of Petroleum Refining Wastewater"; The BP, Marcus Hook 1974 pilot plant study of Filtration and Activated Carbon (Bio-Disk); EPA Process Design Manual for Carbon Adsorption, especially the South Lake Tahoe, California, and Orange, California, biological-activated carbon treatment plant studies.

An important factor in the EPA's choice of activated carbon adsorption as a treatment step on which to base the 1983 limitations was the fact that it would be an add-on to the 1977 treatment technology. In addition, the current interest in activated carbon adsorption should make available sufficient information for the Agency to determine, prior to the implementation of BAT technology not later than 1983, if the limitations will require modification.

The commenter also questioned the justification for lower ammonia concentrations for 1983, since activated carbon does not remove ammonia. While the commenter is correct, he misunderstood the BAT ammonia limitation. That limitation is not based upon use of carbon adsorption, but rather is based on improved control of the amount of ammonia released from the ammonia stripper to reach the amount just needed to satisfy the nutrient needs of the biological treatment plant. The Agency concluded that several additional years of experience and experimentation with both ammonia strippers and individual biological system should result in better control of stripper effluents and more complete knowledge of the nutrient needs of biological systems. Therefore, the Agency set the BAT ammonia limitations to reflect the expected reduction in "excess" ammonia (the difference between the amount discharged from strippers now and the amount of ammonia needed by biological systems).

(29) Several comments were received concerning the apparent anomaly in the final pound allocations (base limits times process factors times size factor) for certain subcategories. That is, hypothetically, in some instances, if sufficient petrochemical operations were added to either cracking refineries ("B") or lube refineries ("D") to change their classifications to, respectively, petrochemical refineries ("C") or integrated refineries ("E"), the final pound allocations for those refineries would decrease. The commenters suggested two solutions for this anomaly: either (1) add a weighting factor for the various petrochemical operations to increase the size of their process factors, or (2) eliminate the "C" and "E" subcategories, and add to the pound allocations for "B" and "D" refineries additional pounds based upon the regulations for the plastics, rubber, and organic chemical industries.

In calculating the flows, based upon the API/EPA survey (see "flow basis" above), EPA attempted to derive from the survey data the actual process wastewater flow which would require treatment. For the most part, the flows listed in the survey combined both process water and once-through cooling water. Since the once-through cooling water would ordinarily not require treatment, it was necessary to develop a means for deriving the process flow from the total flow listed in the survey.

The promulgated regulations were based upon the flows from 94 of the refineries in the API/EPA survey. Of these 94 refineries, 75 had no once-through cooling and 19 removed less than 3 percent of their heat by means of once-through cooling water. It was considered that total flow for these 94 refineries would correspond closely to process flow.

After promulgation of the regulations, EPA undertook to identify the cause of the apparent anomaly identified by the commenters. Upon careful examination of the flows in the API/EPA survey, it was found that the actual process flows for 108 of these 136 refineries (including all the original 94) could be calculated. When these process flows were compared to the total flows used, the reason for the anomaly became apparent: of the original 94 refineries, most of those with more than zero but less than 3 percent once-through heat removed by cooling water (13 of 19) were in the cracking ("B") or lube ("C") subcategories. This

cooling water appeared in the process flow allocations for the cracking and lube refineries, giving those refineries an extra "cushion" which will make the regulations easier to attain for such refineries.

EPA does not believe that the excess water allocations for the cracking and lube subcategories require modification of the regulations. Such modification would have the effect of decreasing the quantity of pollutants allowed to be discharged by refineries in these subcategories. Petrochemical and integrated refineries would be less affected, since the original flow data for these subcategories included a relatively lower proportion of once-through cooling water.

It is clear, in any event, that the solutions proposed by the commenters would be inappropriate. Since the regulations are based upon actual performance by refineries in each subcategory, it would be absurd to attempt to modify them on the basis of regulations designed for other industries. Moreover, no "weighting factor" is necessary to account for petrochemical operations, since the flows contributed by such operations are fully reflected in the flow data from petrochemical and integrated refineries used to develop the regulations.

(30) One commenter argued that the limitation for hexavalent chromium was unreasonable since technology to measure such low concentrations was unavailable.

The commenter was correct. Consequently, the achievable concentration for hexavalent chromium has been changed from 0.005 mg/l. to 0.02 mg/l in the amended regulations.

(31) Several commenters stated that EPA underestimated the costs of achieving compliance with the regulations.

EPA reexamined the economic impact analysis assuming that the cost of compliance would be 50 percent higher than the costs estimated when the regulations were originally analyzed. That is, the conclusions of the analysis were checked using cost estimates that were 50 percent higher than those shown in the economic impact report (EPA 230/2-74-020) for BAT treatment and for the "b" inplant cost extrapolation (see Table III on page II-30). The conclusion of this sensitivity analysis was that the impact of the regulations would not be appreciably changed even if the costs were assumed to be 50 percent higher. Thus, even if this assumption about costs were correct, the results of the impact study and the appropriateness of the regulations would be unchanged.

Specifically, using the higher cost assumption, the analysis indicates that a total of ten small refineries, representing a total of 33,000 barrels per day capacity, would be economically threatened by the regulations. Two of these refineries, representing 7,000 barrels per day capacity, would face a significant threat of closure. These essentially are the impacts projected under the original analysis using the lower cost estimates, and may be affected in any event by governmental policy.

This sensitivity analysis was conducted using a 50 percent increase in the cost estimates, whereas the industry has suggested that the costs actually are as much as 150 percent higher than originally estimated. This claim was believed to be totally unrealistic for several reasons. Specifically, the estimates should not include "sunk costs" (those costs that already have been increased in the past for pollution abatement). Neither should costs which would be incurred regardless of EPA regulations be included in the estimated costs of the guidelines. Therefore, an increase in the cost estimates of 50 percent is more than adequate to test for the possibility that the original costs were in error. This is particularly true because it is likely that any price increases which might have raised the costs since the original analysis was made would be offset by the conservative assumptions which were built into the original cost estimates.

The cost estimates are based upon a complete activated sludge treatment system including equalization, flotation cells, and polishing with mixed media filters. However, from the data before the Agency, it is clear that such an elaborate system will not be required in all cases. Of the plants which are achieving the limitations, a number use only aeration lagoons for treatment. Where adequate land is available at a reasonable cost, the costs of constructing a lagoon system can be considerably lower than the costs associated with installing an activated sludge system. Moreover, the operating costs of a lagoon system are minimal. Thus, if EPA cost estimates are in error, they are more likely to overstate, rather than to understate, the required capital and operating costs.

(c) As a result of the review undertaken by EPA in response to public comment upon the promulgated regulations, and upon the modifications thereto proposed on October 14, 1974, the following changes have been made in the regulations as promulgated:

Revision of the proposed amendment and promulgated regulation:

(1) The proposed amendments have been promulgated without change (See 39 FR 37069);

(2) The achievable concentration for hexavalent chromium has been changed from .005 mg/l to 02 mg/l; and

(3) The daily and monthly variabilities for suspended solids have been changed from 2.9 and 1.7 to 3.3 and 2.1 respectively.

40 CFR Chapter I, Subchapter N, Part 419 is hereby amended as set forth below to be effective June 19, 1975.

Dated: May 9, 1975.

RUSSELL E. TRAIN,
Administrator.

EFFLUENT LIMITATIONS GUIDELINES FOR EXISTING SOURCES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE PETROLEUM REFINING POINT SOURCE CATEGORY

(1) The tables in § 419.12 (a), (b) (1) and (2), and (c) (1) and (2) are revised to read as follows:

§ 419.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	22.7	12.0
TSS	15.8	10.1
COD [1]	117	60.3
Oil and grease	6.9	3.7
Phenolic compounds	168	.078
Ammonia as N	2.81	1.27
Sulfide	149	.068
Total chromium	345	.20
Hexavalent chromium	028	.012
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	8.0	4.25
TSS	5.6	3.4
COD [1]	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	060	027
Ammonia as N	99	45
Sulfide	053	.024
Total chromium	122	071
Hexavalent chromium	0.10	.0044
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100.0 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(c) • • •

(1) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per cubic meter of flow)		
[illegible]	0.019	0.008
[illegible]	.033	.021
[illegible]	.27	.19
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 gal of flow)		
BOD5	0.40	0.21
TSS	.28	.17
COD[1]	2.1	1.9
Oil and grease	.126	.067
pH	Within the range 6.0 to 9.0.	

(2) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per cubic meter of flow)		
BOD5	0.048	0.028
TSS	.033	.021
COD[1]	.67	.38
Oil and grease	.015	.008
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 gal of flow)		
BOD5	0.40	0.21
TSS	.28	.17
COD[1]	3.9	1.9
Oil and grease	1.26	.067
pH	Within the range 6.0 to 9.0.	

• • • • •

(2) The tables in § 419.13(b) (1) and (2) are revised to read as follows:

§ 419.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

• • • • •

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.28
100.0 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.96
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.96
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

• • • • •

(3) The tables in § 419.15(a), (b)(1) and (2), and (c)(1) and (2) are revised to read as follows:

§ 419.15 Standards of performance for new sources.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	11.9	6.3
TSS	8.3	4.9
COD[1]	61	33
Oil and grease	3.6	1.9
Phenolic compounds	.089	.043
Ammonia as N	2.8	1.3
Sulfide	.078	.035
Total chromium	.18	.105
Hexavalent chromium	.018	.0088
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	4.2	2.2
TSS	3.0	1.9
COD[1]	21.7	11.2
Oil and grease	1.3	.70
Phenolic compounds	.031	.016
Ammonia as N	1.0	.46
Sulfide	.027	.012
Total chromium	.064	.037
Hexavalent chromium	.0062	.0025
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.28
100.0 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.96
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.96
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(c) • • •

(1) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per cubic meter of flow)		
BOD5	0.048	0.028
TSS	.033	.021
COD[1]	.27	.19
Oil and grease	.015	.0090
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 gal of flow)		
BOD5	0.40	0.21
TSS	.27	.17
COD[1]	2.1	1.9
Oil and grease	1.26	.067
pH	Within the range 6.0 to 9.0.	

(2) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per cubic meter of flow)		
BOD5	0.068	0.028
TSS	.033	.021
COD[1]	.17	.19
Oil and grease	.015	.009
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 gal of flow)		
BOD5	0.40	0.21
TSS	.27	.17
COD[1]	1.9	1.9
Oil and grease	1.26	.067
pH	Within the range 6.0 to 9.0.	

• • • • •

(4) The tables in § 419.22 (a) and (b) (1) and (2) are revised to read as follows:

§ 419.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	28.2	18.6
TSS	19.4	12.8
COD [1]	210	100
Oil and grease	6.6	4.3
Phenolic compounds	.21	.10
Ammonia as N	18.6	8.8
Sulfide	.18	.082
Total chromium	.42	.25
Hexavalent chromium	.036	.016
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	9.9	6.5
TSS	6.9	4.4
COD [1]	74	35.4
Oil and grease	2.0	1.6
Phenolic compounds	.074	.036
Ammonia as N	6.6	3.0
Sulfide	.063	.029
Total chromium	.15	.088
Hexavalent chromium	.012	.0056
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

• • • • •

(5) The tables in § 419.23(b) (1) and (2) are revised to read as follows:

§ 419.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically available.

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

• • • • •

(6) The tables in § 419.25 (a) and (b) (1) and (2) are revised to read as follows:

§ 419.25 Standards of performance for new sources.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	16.2	8.7
TSS	11.3	7.2
COD [1]	119	61
Oil and grease	4.8	2.6
Phenolic compounds	.119	.058
Ammonia as N	18.6	8.6
Sulfide	.103	.044
Total chromium	.24	.14
Hexavalent chromium	.020	.0088
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	5.8	3.1
TSS	4.0	2.5
COD [1]	41.5	21
Oil and grease	1.7	.93
Phenolic compounds	.042	.020
Ammonia as N	6.6	3.0
Sulfide	.037	.017
Total chromium	.084	.049
Hexavalent chromium	.0072	.0033
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

• • • • •

(7) The tables in § 419.32(a) and (b) (1) and (2) are revised to read as follows:

§ 419.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	34.6	18.4
TSS	22.4	14.8
COD [1]	210	100
Oil and grease	11.1	5.9
Phenolic compounds	.23	.120
Ammonia as N	23.4	10.6
Sulfide	.22	.090
Total chromium	.42	.30
Hexavalent chromium	.046	.020
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	12.1	6.5
TSS	8.3	5.15
COD [1]	74	38.4
Oil and grease	3.9	2.1
Phenolic compounds	.080	.0425
Ammonia as N	8.25	3.8
Sulfide	.078	.035
Total chromium	.153	.107
Hexavalent chromium	.016	.0072
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream-day:	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration:	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

• • • • •

(8) The tables in § 419.33(b) (1) and (2) are revised to read as follows:

§ 419.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.78
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration:	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

• • • • • •

(9) The tables in § 419.35 (a) and (b) (1) and (2) are revised to read as follows:

§ 419.35 Standards of performance for new sources.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	21.8	11.6
TSS	14.9	8.5
COD¹	139	88
Oil and grease	9.8	3.5
Phenolic compounds	.158	.077
Ammonia as N	23.4	10.7
Sulfide	140	.063
Total chromium	22	19
Hexavalent chromium	.025	.012
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	7.7	4.1
TSS	5.3	3.0
COD¹	47	31
Oil and grease	3.4	1.3
Phenolic compounds	.056	.027
Ammonia as N	8.3	3.8
Sulfide	050	.022
Total chromium	.116	.098
Hexavalent chromium	.0088	.0044
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.78
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration:	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(10) The tables in § 419.42 (a) and (b) (1) and (2) are revised to read as follows:

§ 419.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000m³ of feedstock)		
BOD5	50.6	25.8
TSS	33.6	22.7
COD¹	360	197
Oil and grease	16.2	8.5
Phenolic compounds	.38	.194
Ammonia as N	23.4	10.6
Sulfide	.23	.150
Total chromium	77	.46
Hexavalent chromium	.038	.030
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	17.9	9.1
TSS	12.5	8.0
COD¹	127	66
Oil and grease	5.7	3.0
Phenolic compounds	.135	.068
Ammonia as N	8.3	3.8
Sulfide	118	.053
Total chromium	.273	.169
Hexavalent chromium	.024	.011
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

• • • • • •

(11) The tables in § 419.43(b) (1) and (2) are revised to read as follows:

§ 419.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

• • • • • •

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream-day:	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.97
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

• • • • • •

(12) The tables in § 419.45 (a) and (b) (1) and (2) are revised to read as follows:

§ 419.45 Standards of performance for new sources.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	34.6	18.4
TSS	22.4	14.9
COD[1]	245	129
Oil and grease	19.6	5.6
Phenolic compounds	.23	.13
Ammonia as N	23.4	10.7
Sulfide	.220	.10
Total chromium	.33	.31
Hexavalent chromium	.046	.023
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	12.2	6.5
TSS	7.9	5.3
COD[1]	87	46
Oil and grease	7.0	2.0
Phenolic compounds	.081	.048
Ammonia as N	8.3	3.8
Sulfide	.078	.035
Total chromium	.120	.109
Hexavalent chromium	.022	.0072
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

• • • • •

(13) The tables in § 419.52 (a) and (b)(1) and (2) are revised to read as follows:

§ 419.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	54.4	28.9
TSS	37.3	23.7
COD[1]	388	196
Oil and grease	17.1	9.1
Phenolic compounds	.40	.192
Ammonia as N	23.4	10.6
Sulfide	.35	.158
Total chromium	.82	.48
Hexavalent chromium	.068	.022
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	19.2	10.2
TSS	13.2	8.4
COD[1]	138	70
Oil and grease	6.0	3.2
Phenolic compounds	14	.068
Ammonia as N	8.3	3.8
Sulfide	.124	.056
Total chromium	.29	.17
Hexavalent chromium	.025	.011
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

• • • • •

(14) The tables in § 419.53(b) (1) and (2) are revised to read as follows:

§ 419.53 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

• • • • •

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.76
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.73
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

• • • • •

(15) The tables in 419.55 (a) and (b) (1) and (2) are amended to read as follows:

§ 419.55 Standards of performance for new sources.

(a) • • •

Effluent characteristic	Effluent limitations: Maximum for any one day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	41.6	22.1
TSS	28.1	17.9
COD[1]	294	148
Oil and grease	12.6	6.7
Phenolic compounds	.30	.14
Ammonia as N	23.4	10.7
Sulfide	.26	.1
Total chromium	.64	.37
Hexavalent chromium	.052	.023
pH	Within the range 6.0 to 9.0.	
English units (pounds per 1,000 bbl of feedstock)		
BOD5	14.7	7.8
TSS	9.9	6.3
COD[1]	104	54
Oil and grease	4.5	2.4
Phenolic compounds	.109	.051
Ammonia as N	8.3	3.8
Sulfide	.094	.04
Total chromium	.220	.13
Hexavalent chromium	.019	.0084
pH	Within the range 6.0 to 9.0.	

(b) • • •

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.78
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225 or greater	1.04

(2) Process factor.

Process configuration.	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

[FR Doc.75-12959 Filed 5-19-75;8:45 am]

Friday
December 21, 1979

Part IV

Environmental Protection Agency

Petroleum Refining Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

VIRONMENTAL PROTECTION NCY

40 CFR Part 419

[FRL 1312-1]

Petroleum Refining Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed regulation.

SUMMARY: EPA proposes regulations to limit effluent discharges to waters of the United States and the introduction of pollutants into publicly owned treatment works from facilities which are engaged in refining petroleum. These facilities are defined more specifically as those classed by the Bureau of the Census in Standard Industrial Classification (SIC) 2911. The purpose of this proposal is to provide effluent limitations guidelines for "best available technology," and "best conventional technology," and to establish new source performance standards and pretreatment standards under the Clean Water Act.

The effect of these regulations on the oleum refining industry would be to ire pretreatment of process wastewaters introduced into publicly owned treatment works (POTWs) and treatment of process wastewaters discharged to waters of the United States. After considering comments received in response to this proposal, EPA will promulgate a final rule.

The Supplementary Information section of this preamble describes the legal authority and background, the technical and economic bases, and other aspects of the proposed regulations. That section also summarizes comments on a draft technical document circulated on April 21, 1978, and solicits comments on specific areas of interest. The abbreviations, acronyms, and other terms used in the Supplementary Information section are defined in Appendix A to this notice.

These proposed regulations are supported by three major documents available from EPA. Analytical methods are discussed in *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants.* EPA's technical conclusions are detailed in the *Development Document for* *posed Effluent Limitations* *delines, New Source Performance* *dards and Pretreatment Standards* *the Petroleum Refining Point Source Category.* The Agency's economic analysis is found in *Economic Analysis of Proposed Revised Effluent Standards and Limitations for the Petroleum Refining Industry.*

DATE: Comments on this proposal must be submitted on or before February 19, 1980.

ADDRESS: Send comments to: Mr. William A. Telliard, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460. Attention: EGD Docket Clerk, Petroleum (WH-552). The supporting information and all comments on this proposal will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2404 (Rear) PM-213, (EPA Library), 401 M Street, S.W., Washington, D.C. 20460. The EPA information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Technical information and copies of technical documents may be obtained from Mr. William A. Telliard, (202) 755-7733 at the address listed above. The economic analysis may be obtained from Mr. Louis DuPuis, Water Economics Branch (WH-586), Environmental Protection Agency, 401 M St. S.W., Washington, D.C. 20460, (202) 755-7733.

SUPPLEMENTARY INFORMATION:

Organization of This Notice

I. Legal Authority

The regulations described in this notice are proposed under authority of sections 301, 304, 306, 307, 308, and 501

of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217) (the "Act"). These regulations are also proposed in response to the Settlement Agreement in *Natural Resources Defense Council, Inc.* v. *Train*, 8 ERC 2120 (D.D.C. 1976), modified March 9, 1979 and in response to the decision of the United States Court of Appeals in *American Petroleum Institute* v. *EPA* 540 F. 2d 1023 (10th Cir. 1976).

II. Background

(a) The Clean Water Act. The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological intergrity of the Nation's waters." Section 101(a). By July 1, 1977, existing industrial dischargers were required to achieve "effluent limitations requiring the application of the best practicable control technology currently available" (BPT), Section 301(b)(1)(A); and by July 1, 1983, these dischargers were required to achieve "effluent limitations requiring the application of the best available technology economically achievable . . . which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants" (BAT), section 301(b)(2)(A). New industrial direct dischargers were required to comply with section 306 new source performance standards (NSPS), based on best available demonstrated technology; and new and existing dischargers to publicly owned treatment works (POTWs) were subject to pretreatment standards under sections 307 (b) and (c) of the Act. While the requirements for direct dischargers were to be incorporated into National Pollutant Discharge Elimination System (NPDES) permits issued under section 402 of the Act, pretreatment standards were made enforceable directly against dischargers to POTWs (Indirect dischargers).

Although section 402(a)(1) of the 1972 Act authorized the setting of requirements for direct dischargers on a case-by-case basis, Congress intended that, for the most part, control requirements would be based on regulations promulgated by the Administrator of EPA. Section 304(b) of the Act required the Administrator to promulgate regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of BPT and BAT. Moreover, sections 304(c) and 306 of the Act required promulgation of regulations for NSPS, and sections 304(f), 307(b), and 307(c) required promulgation of regulations for pretreatment standards. In addition to these regulations for designated industry categories, Section 307(a) of the Act required the Administrator to promulgate effluent standards applicable to all dischargers of toxic pollutants. Finally, section 501(a) of the Act authorized the Administrator to prescribe any additional regulations "necessary to carry out his functions" under the Act.

EPA was unable to promulgate many of these regulations by the dates contained in the Act. In 1976, EPA was sued by several environmental groups, and in settlement of this lawsuit EPA and the plaintiffs executed a "Settlement Agreement" which was approved by the Court. This Agreement required EPA to develop a program and adhere to a schedule for promulgating for 21 major industries BAT effluent limitations guidelines, pretreatment standards, and new source performance standards for 65 "priority" pollutants and classes of pollutants. See *Natural Resources Defense Council, Inc.* v. *Train*, 8 ERC 2120 (D.D.C. 1976), modified March 9, 1979.

On December 27, 1977, the President signed into law the Clean Water Act of 1977. Although this law makes several important changes in the federal water pollution control program, its most significant feature is its incorporation into the Act of several of the basic elements of the Settlement Agreement program for toxic pollution control. Sections 301(b)(2)(A) and 301(b)(2)(C) of the Act now require the achievement by July 1, 1984, of effluent limitations requiring application of BAT for "toxic" pollutants, including the 65 "priority" pollutants and classes of pollutants which Congress declared "toxic" under Section 307(a) of the Act. Likewise, EPA's programs for new source performance standards and pretreatment standards are now aimed principally at toxic pollutant controls. Moreover, to strengthen the toxics control program, Congress added section 304(e) to the Act, authorizing the Administrator to prescribe "best management practices" (BMPs) to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage associated with, or ancillary to, the manufacturing or treatment process.

In keeping with its emphasis on toxic pollutants, the Clean Water Act of 1977 also revised the control program for non-toxic pollutants. Instead of BAT for "conventional" pollutants identified under section 304(a)(4) (including biological oxygen demand, suspended solids, fecal coliform and pH), the new section 301(b)(2)(E) requires achievement by July 1, 1984, of "effluent limitations requiring the application of the best conventional pollutant control technology" (BCT). The factors considered in assessing BCT for an industry include the costs of attaining a reduction in effluents and the effluent reduction benefits derived compared to the costs and effluent reduction benefits from the discharge of publicly owned treatment works (Section 304(b)(4)(B)). For non-toxic, nonconventional pollutants, sections 301(b)(2)(A) and (b)(2)(F) require achievement of BAT effluent limitations within three years after their establishment or July 1, 1984, whichever is later, but not later than July 1, 1987.

The purpose of these proposed regulations is to provide effluent limitations guidelines for BAT and BCT, and to establish NSPS, pretreatment standards for existing sources (PSES), and pretreatment standards for new sources (PSNS), under Sections 301, 304, 306, 307, and 501 of the Clean Water Act.

(b) Prior EPA Regulations. EPA promulgated BPT, BAT, NSPS, and PSN for the Petroleum Refining point source category on May 9, 1974 (39 FR 16560, Subparts A-E). The BPT, BAT, and NSPS regulations were challanged in the courts by the American Petroleum Institute and others. Both BPT and NSPS were upheld by the court, but BAT was remanded for further consideration. Interim final PSES were promulgated on March 23, 1977 (42 FR 15684) in response to the Settlement Agreement.

The regulations proposed in this notice will supersede existing NSPS, PSNS and PSES. These proposed regulations will also establish BAT and BCT.

(c) Overview of the Industry. The petroleum refining industry is defined by Bureau of the Census Standard Industrial Classification (SIC) 2911. The raw material of this industry is petroleum material (generally, but not always, crude oil). Petroleum refineries process this raw material into a wide variety of petroleum products, including gasoline, fuel oil, jet fuel, heating oils and gases and petrochemicals. Refining includes a wide variety of physical separation and chemical reaction processes. The Development Document lists over one hundred processes used in the petroleum refining industry. Because of the diversity and complexity of the processes used and the products

duced, petroleum refineries are ally characterized by the quantity w material processed, rather than by the quantity and types of products produced.

EPA has identified 285 petroleum refineries in the United States and its possessions. The smallest refinery can refine fifty barrels of oil per day (one barrel equal 42 gallons), while the largest can refine 665,000 barrels per day.

The U.S. refining industry processes a total of about 15 million barrels per day. However, industry growth has slowed in recent years due to a number of factors including efforts to conserve petroleum supplies and competition from foreign suppliers. Growth has averaged about five percent per year and has resulted largely from additions to existing refineries rather than by construction of new ones. Largely because of encouragement from the Department of Energy's crude oil allocation program, a limited number of small, new refineries have been constructed. The ratio of growth in U.S. refining capacity by additions to existing refineries to the growth by construction of new refineries has been approximately 3.5 to 1.

The major sources of process wastewater are cooling water, water to wash unwanted materials from a ss stream, water used as part of a action process, and boiler blowdowns. Current treatment systems used by refineries for this process wastewater include (a) in-plant controls of ammonia and water use, and (b) end-of-pipe treatment consisting of oil/water separators, biological treatment and, in some cases, mixed media filtration. Although significant concentrations of toxic and other pollutants are found in untreated waste, data show that application of BPT results in substantial reduction of pollutants. Toxic pollutants were reduced to near or below the concentrations which can be accurately measured using available measurement techniques.

III. Scope of This Rulemaking and Summary of Methodology

These proposed regulations open a new chapter in water pollution control requirements for the petroleum refining industry. In EPA's 1973–1976 round of rulemakings, emphasis was placed on the achievement of best practicable technology (BPT) by July 1, 1977. In general, this technology level represented the average of the best existing performances of well known ologies for control of pollutants of onal concern.

his round of rulemaking, in contrast, EPA's efforts are directed toward insuring the achievement by July 1, 1984, of the best available technology economically achieveable (BAT), which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants. In general, this technology level represents, at a minimum, the very best economically achievable performance in any industrial category or subcategory. Moreover, as a result of the Clean Water Act of 1977, the emphasis of EPA's program has shifted from "classical" pollutants to the control of a lengthy list of toxic substances.

In the 1977 legislation, Congress recognized that it was dealing with areas of scientific uncertainty when it declared the 65 "priority" pollutants and classes of pollutants "toxic" under section 307(a) of the Act. The "priority" pollutants have been relatively unknown outside of the scientific community, and those engaged in wastewater sampling and control have had little experience dealing with these pollutans. Additionally, these pollutants ofter appear and have toxic effects at concentrations which severly tax current analytical techniques. Even though Congress was aware of the state-of-the-art difficulties and expense of "toxics" control and detection, it directed EPA to act quickly and decisively to detect, measure and regulate these substances. Thus, with the passage of the 1977 legislation, the Nation's water pollution control program was thrust toward the frontiers of science.

EPA's implementation of the Act required a complex development program described in this section and succeding sections of this notice. Initially, because in many cases no public or private agency had done so, EPA and its laboratories and consultants had to develop analytical methods for toxic pollutant detection and measurement, which are discussed under Sampling and Analytical program. EPA then gathered technical and financial data about the industry, which are summarized under Data Gathering Efforts. With these data in hand, the Agency proceeded to develop these proposed regulations.

First, EPA studied the petroleum refining industry to determine whether differences in raw materials, final products, manufacturing processes, equipment, age and size of plants, water usage, wastewater constituents, or other factors required the development of separate effluent limitations and standards for different segments of the industry. This study included the identification of raw waste and treated effluent characteristics including: (1) the sources and volume of water used, the processes employed, and the sources of pollutants and wastewaters in the plant, and (2) the constituents of wastewaters, including toxic pollutants. EPA then identified the constitutents of wastewaters which should be considered for effluent limitations guidelines and standards of performance.

Next, EPA identified several distinct control and treatment technologies, including both in-plant and end-of-process technologies, which are in use or capable of being used in the petroleum refining industry. The Agency compiled and analyzed historical data and newly generated data on the effluent quality resulting from the application of these technologies. The long term performance and operational limitations of each of the treatment and control technologies were also identified. In addition, EPA considered the nonwater quality environmental impacts of these technologies, including impacts on air quality, solid waste generation, and energy requirements.

The Agency then estimated the costs of each control and treatment technology from unit cost curves developed by standard engineering analysis as applied to petroleum refining wastewater characteristics. EPA derived treatment process costs from plant characteristics (production and flow) applied to each treatment process unit cost curve (i.e., powdered activated carbon, metals precipitation, etc.). These unit process costs were added to yield total cost at each treatment level. The Agency evaluated the economic impacts of these costs. (Costs and economic impacts are discussed in detail under the various technology options, and in the section of this notice entitled Costs, Effluent Reduction Benefits and Economic Impacts).

Upon consideration of these factors EPA identified various control and treatment technologies as BCT, BAT, PSES, PSNS, and NSPS. The proposed regulations, however, do not require the installation of any particular technology. Rather, they require achievement of effluent limitations representative of the proper operation of these technologies or equivalent technologies.

The effluent limitations for BAT, BCT and NSPS are expressed as mass limitations (kg/1000 cubic meters raw material) and are calculated by multiplying three figures: (1) achievable long term effluent concentrations based on each control technology (2) achievable wastewater flow and (3) variability factors to account for short term variations in effluent

concentrations (daily and monthly variations). This basic calculation was performed for each regulated pollutant or pollutant parameter. Effluent limitations for PSES and PSNS are expressed as allowable concentrations in milligrams per liter (mg/l). For POTWs which may wish to impose mass limitations, the proposed regulations provide alternate equivalent mass limitations.

IV. Sampling and Analytical Program

As Congress recognized in enacting the Clean Water Act of 1977, the state-of-the-art ability to monitor and detect toxic pollutants is limited. Most of the toxic pollutants were relatively unknown until only a few years ago, and only on rare occasions has EPA regulated or has industry monitored or even developed methods to monitor for these pollutants. As a result, analytical methods for many toxic pollutants, under Section 304(h) of the Act, have not yet been promulgated. Moreover, state-of-the-art techniques involve the use of highly expensive, sophisticated equipment, with costs ranging as high as $200,000 per unit of equipment.

When faced with these problems, EPA scientists, including staff of the Environmental Research Laboratory in Athens, Georgia and staff of the Environmental Monitoring and Support Laboratory in Cincinnati, Ohio conducted a literature search and initiated a laboratory program to develop analytical protocols. The analytical techniques used in this rulemaking were developed concurrently with the development of general sampling and analytical protocols and were incorporated into the protocols ultimately adopted for the study of other industrial categories. See *Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants*, revised April 1977.

Because section 304(h) methods were available for most toxic metals, pesticides, cyanide and phenol, the analytical effort focused on developing methods for sampling and analyses of organic toxic pollutants. The three basic analytical approaches considered by EPA were infra-red spectroscopy, gas chromatography (GC) with multiple detectors, and gas chromatography/mass spectrometry (GC/MS). In selecting among these alternatives, EPA considered their sensitivity, laboratory availability, costs, applicability to diverse waste streams from numerous industries, and capability for implementation within the statutory and court-ordered time constraints of EPA's program. The Agency concluded that infra-red spectroscopy was not sufficiently sensitive or specific for application in water. GC with multiple detectors was rejected because it would require multiple runs and be incompatible with program time constraints. Moreover, because this method would use several detectors, each applicable to a narrow range of substances, GC with multiple detectors possibly would fail to detect certain toxic pollutants. EPA chose GC/MS because it was the only available technique that could identify a wide variety of pollutants in many different waste streams, in the presence of interfering compounds, and within the time constraints of the program. In EPA's judgment, GC/MS and the other analytical methods for toxics used in this rulemaking represent the best state-of-the-art methods for toxic pollutant analyses available when this study was begun.

As the state-of-the-art began to mature, EPA began to refine the sampling and analytical protocols, and intends to continue this refinement to keep pace with technology advancements. Resource constraints, however, prevent EPA from reworking completed sampling and analyses to keep up with the evolution of analytical methods. As a result, the analytical techniques used in some rulemakings may differ slightly from those used in other rulemaking efforts. In each case, however, the analytical methods used represent the best state-of-the-art available for a given industry study. One of the goals of EPA's analytical program is the promulgation of additional section 304(h) analytical methods for toxic pollutants, scheduled to be done within calendar year 1979.

Before proceeding to analyze petroleum refining wastes, EPA concluded that it had to define specific toxic pollutants for analyses. The list of 65 pollutants and classes of pollutants potentially includes thousands of specific pollutants; and the expenditure of resources in government and private laboratories would be overwhelming if analyses were attempted for all of these pollutants. Therefore, in order to make the task more manageable, EPA selected 129 specific toxic pollutants for study in this rulemaking and other industry rulemakings. The criteria for selection of these 129 pollutants included frequency of occurrence in water, chemical stability and structure, amount of chemical produced, availability of chemical standards for measurement; and other factors.

EPA ascertained the presence and magnitude of the 129 specific toxic pollutants in petroleum refining wastewaters in a sampling and analysis program involving 23 refineries and two POTWs. The plants were selected primarily to be representative of the manufacturing processes, the prevalent mix of production among plants, and the current treatment technology in the industry. Compliance with BPT requirement is also one of the site selection criteria. Seventeen of these plants were direct dischargers and six were indirect dischargers.

The primary objective of the field sampling program was to obtain composite samples of wastewater to determine presence, absence and relative concentrations of toxic pollutants. Sampling visits were made to correspond to three consecutive days of plant operation. Raw wastewater samples were taken prior to biological treatment. Treated effluent samples were taken subsequent to biological treatment; in some instances samples were taken after effluent polishing (i.e., polishing pond, sand filter). EPA also sampled intake water to determine the presence of toxic pollutants prior to contamination by refining processes.

In all instances, grab samples taken every two hours were combined into twenty-four hour composites. Samples for conventional and nonconventional pollutants were obtained from the 24-hour composite samples. Aliquots fro the remaining sample volumes were combined in equal portions at the laboratory to obtain the 72-hour composites for toxic pollutant analysis (acid and base-neutral extractable organics, pesticides, metals). Grab samples were taken in specially prepared vials for volatile (purgeable) organics, total phenols and cyanide. Prior to the plant visits, sample containers were carefully washed and prepared by specific methods, depending upon the type of sample to be taken. Samples were kept on ice prior to express shipment in insulated containers.

The analyses for toxic pollutants were performed according to groups of chemicals and associated analytical schemes. Organic toxic pollutants included volatile (purgeable), base-neutral and acid (extractable) pollutants, total phenols and pesticides. Inorganic toxic pollutants included heavy metals, cyanide and asbestos.

The primary method used in screening and verification of the volatiles, base-neutral, and acid organics was gas chromatography with confirmation and quantification of all priority pollutants by mass spectrometry (GC/MS). Total phenols were analyzed by the 4-AA method. GC was employed for analysis of pesticides with limited MS

'irmation. The Agency analyzed the heavy metals by atomic adsorption .trometry (AAS), with flame or graphite furnace atomization following appropriate digestion of the sample. Duplicate samples were analyzed using plasma emission spectrometry after appropriate digestion. Samples were analyzed for cyanides by a colorimetric method, with sulfide previously removed by distillation. Analysis for asbestos was accomplished by microscopy and fiber presence reported as chrysotile fiber count. Analyses for conventional pollutants (BOD5, TSS, pH, and Oil and Grease) and nonconventional pollutants (TOC and COD) were accomplished using "Methods for Chemical Analysis of Water and Wastes," (EPA 625/6-74-003) and amendments.

The high costs, slow pace and limited laboratory capability for toxic pollutant analyses posed difficulties unique to EPA's experience. The cost of each wastewater analysis for organic toxic pollutants ranges between $650 and $1,700, excluding sampling costs (based upon quotations recently obtained from a number of analytical laboratories). Even with unlimited resources, however, time and laboratory capability would have posed additional constraints.

ough efficiency has been improving, i this study was initiated a well-.ied technician using the most sophisticated equipment could perform only one complete organic analysis in an eight hour work day. Moreover, when this rulemaking study was begun there were only about 15 commercial laboratories in the United States with sufficient capability to perform these analyses. Today there are about 50 commercial laboratories known to EPA which have the capability to perform these analyses, and the number is increasing as the demand for such capability also increases.

In planning data generation for this rulemaking, EPA considered requiring dischargers to perform monitoring and analyses for toxic pollutants under Section 308 of the Act. The Agency refrained from using this authority in developing these regulations because it desired to keep direct control over sample analyses due to the developmental nature of the methodology and the need for close quality control. Additionally, EPA believed that the slow pace and limited laboratory capability for toxic pollutant analyses would have hampered a mandatory sampling and analytical . Although EPA believes that the able data support these regulations, Agency would have preferred a larger data base for some of the toxic pollutants and will continue to seek additional data. EPA will periodically review these regulations, as required by the Act, and make any revisions supported by new data. In developing these regulations, moreover, EPA has taken a number of steps to deal with the limits of science and available data.

V. Data Gathering Efforts

The data gathering effort is described in detail in Section IV of the Development Document. The effort consisted of two general phases—technical questionnaires sent to each of the refineries and sampling and analysis of wastewater streams at selected refineries.

(a) Technical Questionnaires. The purpose of the technical questionnaires was to characterize the industry and thus identify those factors which, pursuant to section 304 of the Act, must be considered in setting effluent limitations based on BAT, BCT, NSPS, PSES and PSNS. Questionnaires were sent to 299 facilities believed to be included in the petroleum refining point source category. Two hundred sixty completed questionnaires were returned; 25 did not return completed questionnaires and 14 claimed not to be operating refineries.

In addition to the engineering data needed to establish effluent limitations in accordance with the Act, the Agency also asked the refineries for any analytical data they may have collected measuring the presence and quantities of both traditional and toxic pollutants. It also asked the refineries to identify any raw materials used which could be a source of toxic pollutant discharge. The questions about raw materials were intended to form a basis for possible best management practices (BMP) regulations. BMP regulations might specify that alternate methods or raw materials be utilized to reduce or eliminate discharges of toxic pollutants (for example, in the refining industry, the use of organophosphate materials as biocides in cooling towers could be specified to replace the ones commonly used which contain chromium and zinc).

Although data existed on the presence and quantity of traditional pollutant parameters, very little data existed on either the presence or quantity of toxic pollutants. The major exceptions were the metallic toxic pollutants and phenol—many of which had been monitored as a result of previous water pollution abatement requirements.

(b) Sampling and Analysis. EPA selected seventeen direct discharging refineries to sample for the presence and concentration of toxic pollutants in untreated process wastewaters and to sample for the efficiency of current treatment methods in reducing the quantities of these pollutants. The seventeen refineries represent a range of the factors required for consideration by EPA in setting effluent limitations, including size, location and age of equipment and facilities. EPA also selected six of the seventeen refineries to determine the effectiveness of granular activated carbon in further reducing amounts of toxic pollutants after presently used treatment but before discharge to waters of the United States. In addition, the effluent from four of the six plants with activated sludge processes were tested to determine the effectiveness of powdered activated carbon. No refineries currently use either of these treatments; EPA therefore installed the equipment to treat a portion of these refineries' effluent. EPA also took samples of the intake water source from all of the direct discharging refineries. The samples were intended to determine what percentage, if any, of the toxic pollutants in a plant's untreated effluent was attributable to its presence in the intake water. In addition to the 17 refineries sampled by RSKERL, Effluent Guidelines Division and its contractors, 8 refineries were sampled by teams from Surveillance and Analysis Divisions in EPA regional offices. These teams sampled the refineries in the course of their checks of facilities for compliance with current wastewater treatment requiremens; the data collected was used to supplement other sources of information.

EPA also selected for sampling and analysis six indirect discharging refineries and the two POTWs into which they discharge. One POTW was a secondary plant (i.e., with biological treatment) and one was a primary plant (i.e., without biological treatment). The intent of this analysis was to determine the presence and concentration of toxic pollutants being discharged to POTWs by indirect discharging refineries and to measure the effectiveness of POTWs in removing these pollutants prior to their discharge into the waters of the United States. Additionally, the study involved sampling and analysis of the sludges produced by the POTWs.

During the above described sampling program, replicate samples at nine of the direct discharging refineries, three of the indirect discharging refineries, and one of the POTWs were given to representatives of the American Petroleum Institute and/or the company. These samples were analyzed separately by the industry and the results of the analyses at the nine direct discharging refineries have been made

available to EPA by the American Petroleum Institute. Analyses of the duplicate samples from the POTW sampling program have not yet been reported to EPA.

(c) Results.—(1) Analytical Results. The analytical data obtained on the concentration of toxic pollutants show significant concentrations of these pollutants in untreated refinery wastewaters. They include, among others, volatile and extractable organics, heavy metals, and cyanide. Results of analyses for traditional pollutant parameters also confirm the findings of the previous study that significant concentrations of traditional pollutant parameters are found in untreated refinery wastes.

During the sampling and analysis phase of the data gathering effort, EPA found that BPT treatment substantially reduces toxic pollutant concentrations. Most toxic pollutants are reduced to near or below the concentrations considered accurate for use in the Analytical Protocol developed by the Agency. Discharge of toxic pollutants into U.S. waters continues after BPT treatment, however, even though at much reduced concentrations from that of untreated effluent. Appendix D is a list of toxic pollutants which were found in treated effluents at more than one refinery in concentrations greater than nominal analytical detection limits and in concentrations greater than in the intake water source. Also included in Appendix D are those pollutants found in only one refinery but which could not be attributed to factors unique to that refinery (See discussion of POLLUTANTS NOT REGULATED below).

Analytical results were compared to those reported by the American Petroleum Institute (API) from the duplicate samples taken at nine of the 17 refineries sampled by EPA. While the quantitative concentrations measured by the industry generally differed from those reported by EPA contract laboratories (industry concentrations show a tendancy to be higher than EPA concentrations), the conclusion drawn from the industry data is the same as EPA's. Industry data confirm that substantial concentrations of toxic pollutants are discharged in untreated refinery wastes; that BPT treatment makes substantial reductions in priority pollutant concentrations; and that toxic pollutants are still being discharged to the waters of the United States after BPT treatment.

Results of the analyses of samples taken from the two POTWs show that secondary POTWs reduce the concentration of the toxic pollutants discharged by refineries to similar levels as that achieved by the BPT technology employed by direct discharges. This result is based on refineries operating at existing PSES levels. The analysis also shows that primary treatment (both the primary treatment phase of the secondary POTW and the primary POTW) does not significantly remove many of the toxics discharged by indirect discharging refineries. Analyses of POTW sludges shows that substantial concentrations of priority pollutants (heavy metals) accumulate in sludges of POTWs employing either primary or secondary treatment.

(2) Achievable Pollutant Concentrations (Existing Treatment). EPA reevaluated the final concentrations of regulated pollutants now achieved by existing technology. The results of the data gathering effort indicate that, with one exception, BPT technology is achieving concentrations comparable to those on which the original BPT limitations were based. The data also indicates, however, that plants are currently achieving concentrations of 4AAP phenol far lower than that assumed for BPT. Although BPT limitations for 4AAP-phenols were based on a concentration of 100 μg/l, the average 4AAP phenol concentration in the final effluent from the seventeen samples refineries was 19 μg/l. The results ranged from "no phenol detected" to 64 μg/l. Without consideration of any variability factors for short term fluctuations, all of the 17 refineries were meeting concentrations of 4AAP phenol less than the achievable concentrations assumed for BPT.

VI. Industry Subcategorization

In developing these regulations, EPA carefully evaluated characteristics of petroleum refineries to determine if subcategorization of the industry was appropriate. In most industries, factors which affect the ability of facilities to achieve technology-based limitations vary among groups of plants. In such cases, EPA will establish different effluent limitations or standards for the various groups (i.e., subcategories). Additionally, the establishment in the 1977 amendments to the Act of a "cost reasonableness" analysis for BCT limitations provides another basis for subcategorization. Where one group of plants has higher costs per pound of pollutant removal, different BCT limitations may be established. Essentially, subcategorization allows the Agency to more precisely fine tune the requirements of technology based limitations to the capacity of a diverse industry.

The study in support of the previous regulations (BPT, BAT, NSPS, and PSNS) concluded that only one factor of—the total effluent flow per unit of production—significantly affected the ability of the various plants in the industry to achieve effluent reductions. However, rather than establishing limitations for various groups of plants based on their flow, EPA developed five mathematical models which allowed the Agency to predict the total effluent flow of a petroleum refinery based on its size and process characteristics. The Agency, therefore, divided the industry into five subcategories—topping, cracking, petrochemical, lube and integrated. Each subcategory included the refineries whose flow was predicted by one of the five models.

In developing these regulations, EPA reviewed those factors, including BCT costs, which might warrant subcategorization of the industry. Again, the Agency concluded that total effluent flow per unit of production is the only factor which significantly affects a refinery's ability to achieve effluent limitations. After review of the previously developed mathematical models, EPA found that while these models adequately predicted effluent flows before application of BPT, they do not adequately predict current industry effluent flow rates. Thus, other models were considered.

In developing its flow model, EPA evaluated which of the petroleum refinery's production processes were most significant in predicting its total effluent flow. Over one hundred distinct processes were considered, as well as a considerable number of process groupings. Ultimately, the Agency's analysis identified four groups of process variables which form the basis of the proposed flow model. These are crude oil capacity, cracking capacity, asphalt capacity and lube capacity. Together, these four groups represent a total of 49 different processes. Although these processes do not necessarily represent the largest contributions to total flow, EPA found that their use in the mathematical model generated the most accurate predictions of that flow (See Summary of Public Participation section below).

This flow model represents the core of EPA regulations for the petroleum refining industry and it is used in two important ways. First, by comparing a plant's actual flow to its predicted flow, EPA is able to determine which plants have higher or lower flows than the average for comparable plants in the industry. EPA has used this information to determine the capacity of plants to

ce their level of flow to below that current industry average. (See Effluent Limitations section below).

Second, EPA is using the model to determine specific effluent limitations for each plant in the industry. As with the previous regulations, EPA is using the model to adjust a facility's effluent limitations to account for its total wastewater generated per unit of production. (See Appendix H for sample calculations).

This model does adequately predict the flows of all direct discharging refineries. Since this single model supplants the five models which formed the basis for the previous subcategorization, the Agency concludes that no subcategorization of the industry is necessary with respect to effluent limitations and standards applicable to direct discharges.

Additionally, it is the Agency's general policy on pretreatment standards that such standards be expressed as concentration rather than mass limitations. (See 40 CFR Part 128.43 FR 27736). Since EPA has concluded that achievable concentrations of pollutants do not vary among classes of plants within the petroleum refining industry, categorization for pretreatment standards is not necessary.

Available Waste Water Control and Treatment Technology

(a) *Status of In-Place Technology.* BPT regulations have been in effect since 1974 and there is significant uniformity in treatment performance among direct dischargers. Treatment is generally similar to the model BPT treatment. This includes in-plant control of ammonia and water use and end-of-pipe treatment consisting of oil/water separation, biological treatment, and a final polishing step (e.g. filtration). Many refineries have found that the polishing step is not necessary to meet BPT limitations, or that filtration is more effective before, rather than after, biological treatment. Types of biological treatment used in direct discharging refineries include activated sludge, aerated lagoons, oxidation ponds and trickling filters.

Current wastewater treatment practices by indirect dischargers generally are limited to physical oil/water separation and, in some cases, sour water stripping for ammonia and sulfide control. Substantial concentrations of organic toxic pollutants, metals, and cyanide were found in the refinery wastes being discharged to POTWs.

(b) *Control Technologies Considered for Use in This Industry.* EPA identifed specific control and treatment technologies appropriate to the pollutants discharged by the petroleum refining industry. Some are currently in use in the petroleum refining industry and others have been successfully applied in other industries. The control and treatment technologies considered in the EPA study are the following:

(1) *Reuse and Recycle of Waste Waters.* Total effluent flow can be reduced by both in-plant control and the use of treated and untreated waste waters as alternative water sources for processes which currently use outside water sources. This is a demonstrated technology in the petroleum refining industry (examples include using treated effluent as make-up to cooling towers, pump gland cooling systems, washdown waters, and fire water systems).

Flow reduction is not a single, discrete option, but represents a range of options from no reduction to complete reduction (zero discharge). EPA has evaluated three levels of flow now met by refineries. These levels represent reductions of 27 percent, 52 percent and 100 percent (zero discharge) throughout the industry. In evaluating this option, EPA has assumed that a reduction in total flow will result in a corresponding reduction in total mass discharge of pollutants: A fuller discussion of this issue can be found in the development document and below in the summary of public participation section of this preamble.

(2) *Powdered Activated Carbon Enhancement of Biological Treatment.* Addition of powdered activated carbon to aerated biological systems, significantly improves the removal capabilities of biological treatment, as reported both in the petroleum refining and other industries.

(3) *Granular Activated Carbon Treatment After BPT Treatment.* This treatment technology has not been demonstrated in the petroleum refining industry. It has been used on a limited basis in other industries and in treatment of municipal water supplies.

(4) *Metals Removal.* The removal of metals (such as chromium and zinc) by pH adjustment, precipitation, and clarification is a demonstrated technology in the petroleum refining industry as well as other industries.

(5) *Biological Treatment (Pretreatment).* Wastewaters discharged to POTWs were found to contain high concentrations of toxic pollutants. These concentrations are significantly reduced at direct discharging refineries which use biological treatment.

The costs of applying these technologies were developed through compilation of cost data supplied by equipment manufacturers and by application of standard engineering data and cost estimation techniques. The technical contractor which supported EPA in the development of these proposed regulations has extensive experience in the preparation of engineering cost estimates.

None of the in-plant control or end-of-pipe treatment technologies considered in the development of these regulations is considered to be innovative. All of the in-plant controls and process modifications, as described in this preamble and, more specifically in the Development Document, have either been used or investigated for use in this industry and do not represent major process changes. The end-of-pipe treatment technologies have been applied in this industry or other industries.

VIII. BAT Effluent Limitations

The factors considered in assessing best available technology economically achievable (BAT) include the age of equipment and facilities involved, the process employed, process changes, non-water quality environmental impacts (including energy requirements) and the costs of application of such technology (Section 304(b)(2)(B)). In general, the BAT technology level represents, at a minimum, the best economically achievable performance of plants of various ages, sizes, processes or other shared characteristics. Where existing performance is uniformly inadequate, BAT may be transferred from a different subcategory or category. BAT may include process changes or internal controls, even when not common industry practice.

The statutory assessment of BAT "considers" costs, but does not require a balancing of costs against effluent reduction benefits (see *Weyerhaeuser* v. *Costle, supra*). In developing the proposed BAT, however, EPA has given substantial weight to the reasonableness of costs. The Agency has considered the volume and nature of discharges, the volume and nature of discharges expected after application of BAT, the general environmental effects of the pollutants, and the costs and economic impacts of the required pollution control levels.

Despite this expanded consideration of costs, the primary determinant of BAT remains effluent reduction capability. Effluent limitations for the petroleum refining industry are expressed as mass limitations, i.e., restrictions on the total quantity of pollutants which may be discharged. Since the total mass of most pollutants in an effluent stream depends on both

the total effluent flow and the concentration of pollutants in that flow, the six options considered for BAT include various combinations of flow reduction and improved performance of waste treatment technology.

(a) BAT options considered. (1) *Option One*—Require effluent limitations based on an average flow reduction of 27 percent achieved through greater reuse and recycle of wastewater. This option would not require additional end-of-pipe treatment since limitations would be based upon the performance of BPT end-of-pipe technology; phenol (4AAP) limitations, however, would be based on a long term achievable concentration of 19 μg/l (See discussion under BAT Selection and Decision Criteria below). Effluent limitations on ammonia, sulfide, COD and pH would be set at BPT levels.

The level of flow for this option is now achieved by 50 percent of the facilities in the industry. The Development Document contains a fuller discussion of the manner in which figures were derived. Since treatment of pH, ammonia, and sulfide is based on process changes or in-plant controls, no further reduction from BPT levels would be achieved by a reduction in final effluent flow. EPA does not have sufficient data to conclude that the concentration of COD in treated effluent remains constant as flow is reduced. Consequently, COD, pH, ammonia, and sulfide limitations are being maintained at BPT levels. (See Summary of Public Participation).

For the 165 direct discharging refineries affected by this regulation, $19.3 million additional investment would be required with an annual cost of $7.7 million including interest and depreciation. This amounts to $.00005 per gallon of product. No closures would be expected. Refining capacity and consumption would remain unaffected.

(2) Option Two—Require effluent limitations based on an average 52 percent flow reduction achieved through greater reuse and recycle of wastewater. This option would not require additional end-of-pipe treatment since limitations would be based on the performance of BPT end-of-pipe technology. In-plant side stream treatment may be required in a small number of facilities to remove corrosive or scale forming constituents. Mass limitations on 4AAP phenol would be based on the 19 μg/l currently achieved by industry. Effluent limitations on ammonia, sulfide, COD and pH would be set at BPT levels.

The level of flow for this option is now achieved by 34 percent of the industry; an average reduction of 52 percent would be required throughout the industry.

Although precise costs have not yet been calculated for this option, EPA has concluded, based on its technological evaluation of the industry, that the costs for Option Two approximate those projected for Option three below. For the 165 direct discharging refineries affected by this regulation, $113.0 million additional investment would be required with an annual cost of $48.7 million including interest and depreciation. This amounts to $.0002 per gallon of product. No closures would be expected. Refining capacity and consumption would remain unaffected.

In order to confirm its assessment of costs EPA intends to conduct an engineering field survey of the costs associated with Option Two. This survey will be completed and a report prepared prior to final promulgation of these regulations. EPA will publish a notice in the Federal Register when the report is available to the public. Comments on the cost approximation for Option Two are requested (see solicitation of Comments section below).

(3) Option Three—Require effluent limitations based on a combination of OPTION ONE flow reduction and improved end-of-pipe treatment. Improved end-of-pipe treatment was evaluated with the use of powdered activated carbon (PAC). Several pilot studies have demonstrated this technology; it has been used at full scale by one plant in the industry. This combination of treatment produces mass limitations equivalent to those produced by flow reduction alone under Option Two.

For the 165 direct discharging refineries affected by this regulation, $113.0 million additional investment would be required with an annual cost of $48.7 million including interest and depreciation. This amounts to $.0002 per gallon of product. No closures would be expected. Refining capacity, and consumption would remain unaffected.

(4) *Option Four.*—Require mass limitations based on Option Two plus segregation and separate treatment of cooling tower blowdown. Cooling tower blowdown would be treated for metals (reduction of hexavalent chromium to trivalent chromium, pH adjustment, precipitation and clarification). Limitations for other process streams would be based on treatment in existing BPT treatment systems.

Treatment of segregated streams may result in the removal of more toxics than would use of biological treatment on a combined, more dilute, waste stream. Potential contamination of biological sludges by cooling tower biocides (generally containing chromium and zinc) would be reduced. Removal of organic toxic pollutants in the biologica treatment system may be increased since the wastewater would not be diluted with cooling tower water prior to treatment.

EPA has not made a detailed cost analysis for this option. While the cost of metals treatment can be estimated, the cost of segregating cooling tower blowdown from other process streams cannot be estimated with available data. The engineering survey, described above (See Option 2) will also be used to collect data on the technical requirements and cost of cooling water segregation.

(5) *Option Five*—Require effluent limitations based on Option One flow reductions plus the addition of granular activated carbon (GAC) to control residual toxic organic pollutants dissolved in the wastewater discharged from Option 1 technology.

While GAC is not a demonstrated technology in the petroleum refining industry, it has been used in other industries and in treating municipal water supplies. EPA conducted pilot "treatability" tests at six refineries during the data gathering effort. Several technical articles have been published comparing GAC with other technologies in treating refinery wastes. Although results of the Agency study were inconclusive, it can be generally stated that toxic pollutant removal increases with the use of GAC. This removal, however, appears to be only marginally better than with PAC (Option Two) and the cost of GAC is much greater than PAC.

EPA evaluated the economic impact of this option during the previous round of guidelines (See Prior EPA Regulations discussion above). While EPA did not reevaluate the economic impact of this option, the earlier economic impact analysis predicted that some refineries could be expected to close if this option were adopted.

(6) *Option Six*—Require zero discharge from existing refineries. This could be achieved by further reuse and recycle, evaporation, and/or subsurface reinjection of wastewaters. Fifty-five existing refineries are now at zero discharge.

This is a demonstrated technology, but costs were not calculated for this option. While additional costs for building a new refinery to achieve zero discharge can be calculated (See New Source Performance Standards below), the costs of retrofitting an existing refinery are highly site specific. Costs, however, would be significantly higher

than costs for applying any of the other options.

(b) BAT selection and decision criteria—EPA has selected Option Two as the basis for proposed effluent limitations. This option was selected because it was best supported by available data and because it affords further reduction in total pollutant discharges through the use of proven technology. It provides reasonable further progress towards the Clean Water Act's goal of the elimination of the discharge of pollutants. Further, these limitations are also technologically and economically achievable through the use of Option Three. Thus, all facilities have several ways to achieve this limitation. They may meet it totally through flow reduction or through a combination of flow reduction and improved treatment.

Available data show that existing treatment is reducing the concentration of 4AAP phenols to 19 μg/l (See data gathering effort section above). Consequently mass limitations on phenols will be based on that achievable concentration. In order to validate this decision, EPA is presently requesting, under section 308 of the Act, that 37 refineries believed to have installed BPT model technology send [illegible] to EPA for further evaluation of [illegible] constitutes a proper achievable concentration of 4AAP phenols based on BPT treatment technology. That data will also allow EPA to make a determination of whether the variability factors used to determine daily and monthly fluctuations should be changed as a result of the lower concentrations. Mass limitations on all other pollutants are based on those final concentrations already part of the BPT limitations.

EPA does not have complete data on the cost of achieving these limitations solely through the use of flow reduction and requests comments on this matter. Further, EPA specifically requests comments and data regarding the proposed change in the achievable concentration of 4AAP phenol (see Solicitation of Comments section below).

Option Four still remains a serious candidate for the basis of final regulations. EPA has data establishing that greater quantities of metals and toxic organics can be removed when introduced into separate treatment systems at higher concentrations. EPA has only limited data on the costs required to segregate flows from cooling towers. This matter is presently under study and comments are requested.

Option Five was not selected because GAC allows only slightly better pollutant removal than PAC (Option Three) and because the cost of GAC is considerably higher than the cost of PAC.

Option Six was not selected because, in the Agency's judgment, the costs of retrofitting for zero discharge on a uniform national basis would be significantly higher than the selected option and may result in a substantial number of plant closures. Nevertheless, this option still remains a serious candidate for any subsequent revisions of BAT limitations, especially for certain sizes and/or types of plants.

IX. BCT Effluent Limitations

The 1977 amendments added section 301(b)(4)(E) to the Act, establishing "best conventional pollutant control technology" (BCT) for discharges of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in section 304(b)(4)—BOD, TSS, fecal coliform and pH—and any additional pollutants defined by the Administrator as "conventional." On July 30, 1978, EPA designated oil and grease as a conventional pollutant (44 FR 44501).

BCT is not an additional limitation; rather it replaces BAT for the control of conventional pollutants. BCT requires that limitations for conventional pollutants be assessed in light of a new "cost-reasonableness" test which involves a comparison of the cost and level of reduction of conventional pollutants from the discharge of publicly owned treatment works (POTW) to the cost and level of reduction of such pollutants from a class or category of industrial sources. As a part of its review of BAT for certain "secondary" industries, the Agency has promulgated a methodology for this cost test. (See 44 FR 50732, Aug. 29, 1979). The Agency compares industry costs with that of an "average" POTW with a flow of 2 mgd and costs (1977 dollars) of $1.18 per pound of pollutant removal (BOD and TSS).

EPA applied this methodology to the costs for removing conventional pollutants in the petroleum refining industry and concluded that BCT limitations based on a 52 percent reduction in total effluent flow by greater recycle and reuse of wastewaters (Option Two) or a 52 percent reduction in pollutants discharged by a combination of flow reduction and powdered activated carbon enhancement of activated sludges (Option Three) are reasonable. At this level, the total annualized cost for BCT technology is $48.7 million and EPA projects that 48.7 million pounds of BOD and TSS will be removed throughout the industry by Option Two technology. Based on these figures, the cost to pollutant reduction ratio for Option Two is $1.00 per pound of BOD and TSS removed (compared to a POTW cost of $1.18 per pound of BOD and TSS). Therefore, EPA proposes, BCT effluent limitations at the proposed BAT (Option Two) level. BCT investment, annualized costs, and economic impact are included in the BAT analyses.

X. New Source Performance Standards (NSPS)

The basis for new source performance standards (NSPS) under section 306 of the Act is the best available demonstrated technology. New plants have the opportunity to design the best and most efficient petroleum refining processes and wastewater treatment technologies; Congress, therefore, directed EPA to consider the best demonstrated process changes, in-plant controls, and end-of-pipe treatment technologies capable of reducing pollution to the maximum extent feasible.

(a) NSPS Options Considered. (1) *Option One*—Require performance standards based on the same technology proposed for BAT, including wastewater flow control by recycle and reuse of wastewaters after BPT treatment. As discussed under BAT Option Two, application of this technology will ensure a high degree of removal of toxic pollutants. Similar reductions in pollutant mass discharge can be achieved by BAT Option Three. This level of treatment is similar to current NSPS, and no additional expenditures are required due to these revised standards.

(2) *Option Two*—Require performance standards based on grandular activated carbon (BAT Option Five). As discussed under BAT Option Five, GAC allows somewhat better pollutant removals than NSPS Option One, but is considerably more expensive.

(3) *Option Three*—Require a performance standard of zero discharge. Unlike BAT Option Six, there is no cost of retrofitting to come into compliance with a zero discharge requirement. Zero discharge of refinery wastes is a demonstrated technology; fifty-five refineries have been identified by EPA which are currently achieving no discharge of wastewaters to U.S. waters. The American Petroleum Institute (API) has published a technical report which makes a detailed evaluation of the technologies capable of achieving no discharge of refinery wastes. The report also calculates the costs to be expected if those technologies were designed into a new refinery (i.e., without the need to retrofit existing equipment). This option

would require new source of the size and configuration likely to be built in the 1980's to incur additional investment of $9.5 million with an annual cost of $3.5 million including interest and depreciation. If a level of price protection is instituted that maintains industry capacity at current levels, these regulations will essentially have no effect, since new refineries will not be entering the industry in the foreseeable future. If a level of price protection is instituted that allows for growth in refinery capacity proportional to growth in consumption, the cost of compliance of $.001 a gallon will be reflected in higher product prices of the same amount.

(b) NSPS Selection and Decision Criteria—EPA has selected Option Three as the basis for proposed new source performance standards. Zero discharge is a demonstrated technology in the petroleum refining industry and, based on available data, can be economically achieved. Consequently, EPA believes that the Act requires that Option Three be the basis for NSPS. EPA, however, solicits other data which would support or refute the assumption that zero discharge is an achievable technology for new sources on a nationwide basis. Additionally, EPA solicits comments on the other options suggested. (See solicitation of comments section below.)

XI. Pretreatment Standards

Section 307(b) of the Act requires EPA to promulgate pretreatment standards for both existing sources (PSES) and new sources (PSNS) of pollution which discharge their wastes into publicly owned treatment works (POTWs). These pretreatment standards are designed to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the operation of POTWs. In addition, the Clean Water Act of 1977 adds a new dimension to these standards by requiring pretreatment of pollutants, such as heavy metals, that limit POTW sludge management alternatives. The legislative history of the Act indicates that pretreatment standards are to be technology based and, with respect to toxic pollutants, analogous to BAT. The Agency has promulgated general pretreatment regulations which establish a framework for the implementation of these statutory requirements: (See 43 FR 27736, June 26, 1978).

A determination of which pollutants may pass through or be incompatible with POTW operations, and thus be subject to pretreatment standards, depends on the level of treatment employed by the POTW. In general, more pollutants will pass through or interfere with a POTW employing primary treatment (usually physical separation by settling) than one which has installed secondary treatment (settling plus biological stabilization).

Section 301(b)(1)(B) of the Act requires most POTWs to have installed secondary treatment by July 1, 1977. There are, however, two groups of POTWs which have not yet met this requirement. One group remains subject to the obligation and contains POTWs which are scheduled to install secondary treatment within the next few years. A second group of POTWs will be exempt from the requirement to install secondary treatment. Under Section 301(h) of the Act, POTWs which discharge into marine waters may, under certain circumstances, receive a waiver from this requirement. EPA has promulgated regulations dealing with the issuance of section 301(h) waivers. (44 FR 34784, June 15, 1979).

(a) Pretreatment Options Considered. (1) *Option One*—Establish pretreatment for all refineries which requires metals (chromium) removal (pH adjustment, precipitation and clarification) and existing PSES controls of ammonia and oil and grease. Metals removal would be required only for cooling tower blowdown, since that is the major source of the heavy metals of concern—chromium and zinc. Under this option, organic priority pollutants would pass through primary POTWs which have not yet complied with Section 301(b)(1)(B) of the Act and those POTWs which are granted waivers under Section 301(h).

For the 53 indirect discharging refineries affected by this regulation $9.6 million additional investment would be required with annual costs of $5.2 million including interest and depreciation. No closures would be expected. A new indirect discharging refinery of the size and configuration likely to be built in the 1980's would incur additional investment of $0.3 million with annual costs of $0.2 million including interest and depreciation. Refining capacity and domestic consumption would be unaffected by this regulation.

(2) *Option Two*—Establish two pretreatment standards. Pretreatment for those refineries discharging into POTWs which have been granted waivers under Section 301(h) would be based on concentrations achievable after application of BPT technology. Pretreatment for other indirect discharging refineries would contain the limitations identified in Option One.

At this time the economic effects for this option are the same as for Option One, since there are no POTWs which have been granted waivers under Section 301(h). Costs were developed, however, for seven indirect discharging refineries to install biological treatment. These costs are presented in the Development Document.

(b) Selection of pretreatment technology and decision criteria—EPA has selected Option Two as the basis for pretreatment standards. Based on its sampling and analysis program, EPA has determined that pollutants found in petroleum refining wastes after present PSES treatment do not pass through secondary POTWs and that only metals limit the POTW sludge management alternatives. Consequently, for metals only, EPA is proposing additional pretreatment standards for indirect dischargers whose wastes go to POTWs employing secondary treatment.

The Agency additionally proposes that this limitation apply to those indirect dischargers whose wastes go to a primary POTW which is scheduled to install secondary treatment. Although EPA has determined that petroleum refining wastes pass through primary POTWs, the Agency believes that it woud be improper to require industrial sources discharging into such POTWs to install treatment systems which will be unnecessary when the POTWs come into compliance with the requirement of secondary treatment.

EPA is, however, proposing specific pretreatment standards based on application of BAT technology for those indirect dischargers whose wastes go to POTWs with 301(h) waivers. Since POTWs with 301(h) waivers will remain at primary treatment, only specific limitations on indirect dischargers will ensure that their wastes do not pass through into waters of the United States. Such standards, however, will apply only where a valid 301(h) waiver has been granted. Those sources discharging into a POTW which has a pending application for a 301(h) waiver will be subject to the generally less stringent pretreatment standards based on secondary treatment in the POTW until such time as the waiver is finally approved. The Agency requests comments on the approach it has adopted for determining which pollutants must be regulated through pretreatment standards. (See Solicitation of comments section below.).

XII. Regulated Pollutants

The basis upon which the controlled pollutants were selected is set out in Section VI of the Development Document.

(a) *BAT.* EPA has selected two toxic pollutants for control of toxic discharges

in the petroleum refining industry.

·ific effluent limitations are being ılished for total phenol (4AAP) and ɔmium (both total chromium and hexavalent chromium). These pollutants are subject to limitations expressed in kilograms per 1000 cubic meters of raw material.

Pollutants which have the same requirement under BPT and BAT include COD, ammonia and sulfide.

(b) *BCT.* The pollutants selected for control by BCT technology are those pollutants limited by BPT which have been classified as conventional pollutants—BOD5, TSS, and oil and grease. These pollutants are subject to limitations expressed in kilograms per 1000 cubic meters of raw material. Additionally, a BCT limitation for pH is set at BPT levels.

(c) *Pretreatment Standards.* In establishing existing PSES, EPA found that ammonia and oil and grease interfere with the operation of POTWs at levels which may be discharged by indirect dischargers in the petroleum refining industry. Although the existing PSES also contain a technology based limitation for chromium, this limitation was included only as guidance to those POTWs which found it necessary or desirable to limit chromium. The Agency ·oses that the chromium limitation be adopted as a mandatory .eatment standard since EPA has found that chromium accumulates in POTW sludges and will limit the sludge management alternatives of the POTW. The same pollutants (chromium, oil and grease, and ammonia) are also selected for control in PSNS. The pretreatment standards are expressed as maximum daily concentrations (milligrams per liter). Informational mass limitations are also provided for those POTWs which find it necessary or desirable to limit total mass discharge of pollutants.

(d) *NSPS.* Since the new source performance standard is zero discharges all pollutants are regulated.

XIII. Pollutants Not Regulated

The Settlement Agreement contained provisions authorizing the exclusion from regulation, in certain instances, of toxic pollutants and industry subcategories. These provisions have been re-written in a Revised Settlement Agreement which was approved by the District Court for the District of Columbia on March 9, 1979.

It should be noted that the limitations in this regulation has been developed to cover the general case for this industry ·:ategory. In specific cases, it may be ısary for the NPDES permitting ɔrity to establish permit limits on toxic pollutants which are not subject to limitations in this regulation. (See relationship to NPDES permits section).

(a) *BAT Limitations.* Paragraph 8(a)(iii) of the Revised Settlement Agreement allows the Administrator to exclude from regulation toxic pollutants not detectable by Section 304(h) analytical methods or other state-of-the-art methods. Data collected by EPA, the American Petroleum Institute, and individual companies were used in making decisions not to regulate specific toxic pollutants. Eighty-five toxic pollutants were not found at any of the seventeen refineries sampled. These pollutants are excluded, therefore, from regulation and are listed in Appendix B to this notice.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic pollutants detected in the effluent from a small number of sources and uniquely related to those sources. Appendix C lists the 7 toxic pollutants which satisfy this criterion. Although certain other pollutants were found in the treated effluent at only one refinery, their presence in the untreated effluent of a number of facilities indicate that they are not uniquely related to that source.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic materials which were detected but for which no treatment technology is known to the Administrator that will reduce discharges of the pollutant. Cyanide is discharged in significant amounts by the petroleum refining industry (see Section VI of the Development Document) but EPA is not aware of any end-of-pipe technology which will reduce cyanide discharges beyond those presently discharged by the petroleum refining industry. Based on the available data, EPA is not able to determine which processes generate cyanide found in the untreated waste. EPA, however, plans to continue study of this problem to determine whether cyanide discharges can be reduced by in-plant control.

Paragraph 8(a)(iii) of the Revised Settlement Agreement also allows the Administrator to exclude from regulation toxic pollutants which will be effectively controlled by the technology upon which are based other effluent limitations. The Agency believes that the technology upon which BAT effluent limitations for phenol (4AAP) and chromium are based will effectively control the organic and metallic toxic pollutants listed in Appendix D. The toxic pollutants listed in Appendix D are, therefore, excluded from regulation.

(b) *Pretreatment Standards.* On the basis of sampling at six refineries which practice indirect discharge and two POTWs, the Agency concludes that the organic priority pollutants listed in Appendix F discharged by refineries in compliance with existing PSES do not pass through or interfere with a secondary POTW. The Agency proposes in this notice to require pretreatment standards which limit the same pollutants at the same concentrations as interim final PSES. The pollutants limited under PSES include oil and grease and ammonia. Additionally, EPA establishes a standard for total chromium based on interim final PSES guidance. As with BAT, EPA will continue to study methods for reducing the discharge of cyanides.

This standard, however, only applies to those refineries which discharge into a POTW which is required by the Act to achieve effluent limitations based on secondary treatment. Appendix G is a list of those priority pollutants which were found to pass through POTWs which only apply primary treatment. Therefore, the Agency concludes that existing regulations cannot be used to exclude these pollutants from regulation when a POTW has been granted an exemption under section 301(h) of the Act from the requirement to achieve effluent limitations based on secondary treatment. As discussed above (Regulated pollutants section) the Agency proposes to limit the toxic pollutant total phenol (4AAP). As in the case of BAT, the Agency believes that the technology upon which pretreatment standards for phenol (4AAP) and chromium are based will effectively control the other organics and metals listed in Appendix F.

XIV. Non-Water Quality Aspects of Pollution Control

The elimination or reduction of one form of pollution may aggravate other environmental problems. Therefore, sections 304(b) and 306 of the Act require EPA to consider the non-water quality environmental impacts (including energy requirements) of certain regulations. In compliance with these provisions, EPA has considered the effect of these regulations on air pollution, solid waste generation, and energy consumption. This proposal was circulated to and reviewed by EPA personnel responsible for non-water quality environmental programs. While it is difficult to balance pollution problems against each other and against energy utilization, EPA is proposing regulations which it believes best serve often competing national goals.

The following are the non-water quality environmental impacts (including energy requirements) associated with the proposed regulations:

Air Pollution—Imposition of BAT, BCT, NSPS, and pretreatment standards will not create any additional air pollution problems.

Solid Waste—A study by EPA's Office of Air Quality and Standards shows that considerable amounts of solid wastes are already being generated by the petroleum refining industry. Some of this solid waste is generated by current wastewater treatment equipment, but the majority is generated by other sources such as process sources, storage tank bottoms, etc. Proposed BAT and PSES will increase these wastes by as much as 15,000 metric tons per year beyond BPT levels. Most of this amount will be additional sludge from the use of powdered activated carbon, if used [BAT OPTION THREE] as an alternative to some of the flow reduction in BAT OPTION TWO. These sludges will contain additional organic toxic pollutants and some additional metals.

On the other hand, EPA estimates that implementation of proposed pretreatment standards will result in POTW sludges having lesser quantities and concentrations of toxic pollutants. POTW sludges will become more amenable to a wider range of disposal alternatives, possibly including beneficial use on agricultural lands.

Energy Requirements—EPA estimates that the achievement of proposed BAT and BCT effluent limitations will result in a net increase in electrical energy consumption of approximately 28.4 million kilowatt-hours per year. Proposed pretreatment standards are projected to add another 1.9 million kilowatt-hours to electrical energy consumption for existing indirect dischargers.

XV. Costs, Effluent Reduction Benefits, and Economic Impact

Executive Order 12044 requires EPA and other agencies to perform Regulatory Analysis of certain regulations. 43 FR 12661 (March 23, 1978). EPA's proposed regulations for implementing Executive Order 12044 require a Regulatory Analysis for major significant regulations involving annual compliance costs of $100 million or meeting other specified criteria. 43 FR 29891 (July 11, 1978). Where these criteria are met, the proposed regulations require EPA to prepare a formal Regulatory Analysis, including an economic impact analysis and an evaluation of regulatory alternatives. The proposed regulations for the petroleum refining industry do not meet the proposed criteria for a formal Regulatory Analysis. Nonetheless, this proposed rulemaking satisfies the formal Regulatory Analysis requirements.

EPA's economic impact assessment is set forth in *Economic Analysis of Proposed Revised Effluent Standards and Limitations for the Petroleum Refining Industry* November 1979, EPA 440/2-79-027. This report details the investment and annual costs for the industry as a whole and for individual plants covered by the proposed petroleum refining regulations. The data underlying the analysis were obtained from the "Estimation of Costs Associated with the Application of BAT Limitations for the Petroleum Refining Point Source Category on a Plant-by-Plant Basis", March, 1979 and supplements, publicly available economic information, and data from the Agency survey of the industry. The report assesses the impact of compliance costs in terms of plant closures, production changes, price changes, employment changes, local community impacts, and balance of trade effects.

Refined petroleum products hold such economic importance in our society that price fluctuations tend to have serious consequence; as a result, the U.S. government stringently controls the industry. Some of the major economic controls on the industry are crude oil price controls, product price controls, and price protection from imported refined products. The economic analysis assumes that crude oil and product price controls will be essentially eliminated by the time these regulations require compliance, but considers two scenarios of price protection. The first scenario assumes a level of price protection for domestic refineries that maintains the current capacity. The second scenario assumes a level of price protection such that capacity increases parallel to the increase in total domestic consumption. The economic impacts of the regulations, including refinery closings, are discussed separately for each of these scenarios. A more complete discussion of possible future scenarios and the selection of these two is presented in the Economic Analysis.

Refinery closures are evaluated on an individual refinery basis. Refineries with costs of more than $.001 per gallon are analyzed in detail including a comparison of the estimated cash flow per unit of production with unit costs of complying with the regulations. If the refinery generates a cash flow greater than the unit costs of compliance, it is not considered a potential closure.

For new sources, EPA considers the impact of the regulations on the costs production of new capacity. The Department of Energy has predicted that during the period form 1985 to 2000 most of the growth of petroleum product consumption will be in gasoline, distillate fuels, and petrochemical feedstocks. In keeping with this prediction, the economic analysis for new sources was based on a 190,000 barrel a day refinery with a configuration appropriate for emphasizing production of these products.

Of the 285 domestic refineries; 218 are expected to incur additional costs to comply with these regulations. The investment required would be $132.2 million with an annual cost of $53.9 million including interest and depreciation. No refinery closures would be expected due to these regulations and the equivalent of 610 jobs to operate pollution control equipment would be added to current industry employment of 160,000. Other economic effects would depend on the course of public policy regarding refineries and are discussed below.

Scenario One—The first economic scenario assumes tariffs on imported goods are set in a manner that gives the industry a relatively low level of protection from imported products. As a result, current refining capacity is maintained and no new sources enter the industry. Price leves are unaffected by these proposed regulations, and the average pollution control cost of $.0002 a gallon is absorbed by the refineries. The proposed regulations would not affect refining capacity, domestic consumption, or the balance of trade.

1. BAT/BCT—EPA estimates that 165 directly discharging refineries would incur additional costs to meet these requirements. Additional investment would be $113.0 million with annual costs of $48.7 million including interest and depreciation. These costs would be absorbed by the refineries rather than passed on as price increases. None of the refineries would be expected to close due to these regulations and refinery capacity would remain unchanged.

2. PSES—Approximately 53 indirect discharging refineries would incur additional costs to meet these requirements. Additional investment would be $9.6 million with annual costs of $5.2 million including interest and depreciation. These costs would be absorbed by the refineries rather that passed on as price increases. None of these refineries would have compliance

costs of $.001 or more per gallon of product. None of the refineries would be expected to close due to the regulation. Refinery capacity would remain unchanged. Since prices would be unaffected, domestic consumption and the balance of trade would also remain unchanged by these regulations.

3. NSPS/PSNS—Since refinery capacity is held at current levels for this scenario, no major new capacity is constructed. These new source requirements then have no economic effects.

Scenario Two—The second economic scenario allows for a level of industry price protection such that refining capacity grows at the same rate as domestic consumption. In other words, domestic refineries retain the same share of the domestic market as they do now. In this scenario the price level is set high enough to attract new refineries, with new source pollution control equipment, into the industry. These proposed regulations increase the cost of production at new refineries by $.0001 to $.001 a gallon of product, and raise the industry-wide price level by the same amount.

1. BAT/BCT—EPA estimates 165 direct discharging refineries would incur additional costs to meet these requirements. Additional investment would be $113.0 million with an annual cost of $48.7 million including interest and depreciation. None of this cost is absorbed by the refineries, however, since the price level is set high enough to attract new refineries. Existing refineries would be in a much more favorable financial situation compared to Scenario One because of the elevated price levels necessary to attract new refineries to the industry. No closures would be expected, and capacity, domestic consumption, and the balance of trade would be unchanged by these BAT/BCT regulations.

2. PSES—Approximately 53 indirect discharging refineries would incur additional costs to meet these requirements. Additional investment would be $9.6 million with annual costs of $5.2 million including interest and depreciation. As with direct dischargers, none of this cost is absorbed by the refineries. No closures would be expected, and capacity, domestic consumption, and the balance of trade would remain unchanged by these PSES.

3. New Sources—In economic Scenario Two, refinery capacity grows at the same rate as domestic consumption, encouraged by price increases due to higher tariffs. New capacity brought on stream is either a zero discharge facility (since NSPS allows no discharge) or a facility subject to PSNS. The additional costs and resulting price increases are based on a 190,000 barrel a day refinery configured to emphasize products for which additional capacity is most needed. If this new refinery would discharge to a municipal treatment system, an additional $0.3 million investment would be required with annual costs of $0.2 million including interest and depreciation. This would amount to $.0001 per gallon. Price increases would be no more than $.0001 a gallon due to PSNS. If this refinery is at an acceptable site from which it could not discharge to a municipal treatment system, the refinery would have to achieve zero discharge to be in compliance with NSPS. Additional investment of $9.5 million with annual costs of $3.5 million including interest and depreciation would be required as compared to the costs of meeting current NSPS. This would amount to $.001 per gallon, causing price increases of up to $0.001 a gallon. Depending on sites available for new refineries, prices would increase from $.0001 to $.001 per gallon.

Effluent Reduction Benefits

EPA estimates that achievement of BAT effluent limitations will remove approximately 123,300 pounds per year of chromium, 86,180 pounds per year of phenols (total-4AAP), and substantial quantities of other toxic pollutants. EPA estimates that achievement of BCT effluent limitations will remove approximately 48.7 million pounds per year of conventional pollutants.

XVI. Best Management Practices

Section 304(e) of the Clean Water Act authorizes the Administrator to prescribe "best management practices" ("BMPs"), described under Authority and Background. EPA intends to develop BMPs which are: (1) applicable to all industrial sites; (2) applicable to an designated industrial category; and (3) capable of guiding permit authorities in establishing BMPs required by unique circumstances at a given plant.

EPA is considering promulgating BMPs specific to the petroleum refining industry at some time in the future. One area of concern is the potential for leaks and spills of toxic pollutants stored in on-site facilities and not subject to controls under section 311(j)(1)(c) of the Act. Another process which might be controlled by BMPs is cooling tower blowdown. It is possible that refineries could be required to monitor for chromium and zinc in both cooling tower blowdown and in effluent discharge. In the event of persistently high discharges of these compounds, the permitting authority may require that certain refineries cease using corrosion inhibitors which contain zinc and chromium and use alternate organophosphate corrosion inhibitors or other alternates. Additionally, EPA may promulgate BMPs requiring dikes, curbs, or other measures to contain leaks and spills of toxic pollutants not controlled under section 311(j)(1)(c) of the Act.

XVII. Upset and Bypass Provisions

An issue of recurrent concern has been whether industry guidelines should include provisions authorizing noncompliance with effluent limitations during periods of "upset" or "bypass." An upset, sometimes called an "excursion," is unintentional noncompliance occurring for reasons beyond the reasonable control of the permittee. It has been argued that an upset provision in EPA's effluent limitations guidelines is necessary because such upsets will inevitably occur due to limitations in even properly operated control equipment. Because technology-based limitations are to require only what technology can achieve, it is claimed that liability for such situations is improper. When confronted with this issue, courts have divided on the question of whether an explicit upset or excursion exemption is necessary or whether upset or excursion exemption is necessary or whether upset or excursion incidents may be handled through EPA's exercise of enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F. 2d 1253 (9th Cir. 1977) with *Weyerhaeuser* v. *Costle, supra*, and *Corn Refiners Association, et al.* v. *Costle*, No. 78-1069 (8th Cir., April 2, 1979). See also *American Petroleum Institute* v. *EPA*, 540 F. 2d 1023 (10th Cir. 1976); *CPC International, Inc.* v. *Train*, 540 F. 2d 1320 (8th Cir. 1976); *FMC Corp.* v. *Train*, 539 F. 2d 973 (4th Cir. 1976).

While an upset is an unintentional episode during which effluent limits are exceeded, a bypass is an act of intentional noncompliance during which waste treatment facilities are circumvented in emergency situations. Bypass provisions have, in the past, been included in NPDES permits.

EPA has determined that both upset and bypass provisions should be included in NPDES permits and has recently promulgated NPDES regulations which include upset and bypass permit provisions 44 FR 3285, (June 7, 1979). The upset provision establishes an upset as an affirmative defense to presecution for violation of technology-based effluent limitation. The bypass provision authorizes bypassing to prevent loss of life, personal injury or severe property damage. Consequently, although

permittees in the petroleum refining industry will be entitled to upset and bypass provisions in NPDES permits, these proposed regulations do not address these issues.

XVIII. Variances and Modifications

Both BAT and BCT effluent limitations are subject to EPA's "fundamentally different factors" variance. See *E. I. du Pont de Nemours and Co.* v. *Train*, 430 U.S. 112 (1977); *Weyerhaeuser Co.* v. *Costle, supra*. This variance recognizes factors concerning a particular discharger which are fundamentally different from the factors considered in this rulemaking. Although this variance clause was set forth in EPA's 1973–1976 industry regulations and will not be included in the petroleum refining or other industry regulations. See the final NPDES regulations at 44 FR 32854, 32950 (June 7, 1979), for the text and explanation of the "Fundamentally different factors" variance. Final NPDES regulations will be promulgated shortly.

Pretreatment standards for existing sources are subject to the "fundamentally different factors" variance and credits for pollutants removed by POTW's. See 40 CFR 403.7, 403.13; 43 FR 27736 (June 26, 1978). Pretreatment standards for new sources are subject only to the credits provision in 40 CFR 403.7. New source performance standards are not subject to modification through EPA's "fundamentally different factors" variance or any statutory or regulatory modifications. See *duPont* v. *Train, supra*.

XIX. Relationship to NPDES Permits

The BAT, BCT, and NSPS limitations in these regulations will be applied to individual petroleum refining plants through NPDES permits issued by EPA or approved state agencies, under section 402 of the Act. Upon the promulgation of final regulations, the numerical effluent limitations must be applied in all federal NPDES permits thereafter issued to petroleum refining direct dischargers. Permits issued by States with NPDES authority may contain more stringent limitations than those proposed here. In addition, on promulgation, the pretreatment limitations are directly applicable to indirect dischargers.

The previous section discussed the availability of variances and modifications from national limitations, but there are other issues relating to the interaction of these regulations and NPDES permits. One matter which has been subject to different judicial views is the scope of NPDES permit proceedings in the absence of effluent limitations guidelines and standards. Under currently applicable EPA regulations, states and EPA Regions issuing NPDES permits prior to promulgation of these regulations must include a "re-opener clause," providing for permits to be modified to incorporate "toxics" regulations when they are promulgated. See 43 FR 22159 (May 23, 1978). To avoid cumbersome modification procedures, EPA has adopted a policy of issuing short-term permits, with a view toward issuing long-term permits only after promulgation of these and other BAT regulations. The Agency has published rules designed to encourage states to do the same. See 43 FR 58060 (Dec. 11, 1978). However, in the event that EPA finds it necessary to issue long term permits prior to promulgation of BAT regulations, EPA and states will follow essentially the same procedures utilized in many cases of initial permit issuance. The appropriate technology levels and limitations will be assessed by the permit issuer on a case-by-case basis, on consideration of the statutory factors. See *U.S. Steel Corp.* v. *Train*, 556 F. 2d 822, 844, 854 (7th Cir. 1977). In these situations, EPA documents and draft documents (including these proposed regulations and supporting documents) are relevant evidence, but not binding, in NPDES permit proceedings. See 44 FR 32854 (June 7, 1979).

Another noteworthy topic is the effect of these regulations on the power of NPDES permit issuing authorities. The promulgation of these regulations does not restrict the power of any permit-issuing authority to act in any manner not inconsistent with law or these or any other EPA regulations, guidelines or policy. For example, the fact that these regulations do not control a particular pollutant does not preclude the permit issuer from limiting such pollutant on a case-by-case basis, when necessary to carry out the purposes of the Act. In addition, to the extent that state water quality standards or other provisions of state or Federal law require limitation of pollutants not covered by these regulations (or require more stringent limitations on covered pollutants), such limitations *must* be applied by the permit-issuing authority.

With respect to monitoring requirements, the Agency intends to establish a regulation requiring permittees to conduct additional monitoring when they violate permit limitations. The provisions of such monitoring requirements will be specific for each permittee and may include analysis for some or all of the toxic pollutants or the use of biomonitoring techniques. The additional monitoring is designed to determine the cause of the violation, necessary corrective measures, and the identity and quantity of toxic pollutants discharged. Each violation will be evaluated on a case-by-case basis by the permitting monitoring contained in the permit is necessary. A more lengthy discussion of this requirement appears at 44 FR 34407, (June 14, 1979).

One additional topic that warrants discussion is the operation of EPA's NPDES enforcement program, many aspects of which have been considered in developing these regulations. The Agency wishes to emphasize that, although the Clean Water Act is a strict liability statute, the initiation of enforcement proceedings by EPA is discretionary. EPA has exercised and intends to exercise that discretion in a manner which recognizes and promotes good faith compliance efforts and conserves enforcement resources for those who fail to make good faith efforts to comply with the Act.

XX. Summary of Public Participation

On April 21, 1978, EPA circulated a draft technical development document to interested parties, including the American Petroleum Institute (API), the Natural Resources Defense Council (NRDC), and affected state and local authorities. That document did not include recommendations for specific effluent limitations and pretreatment standards. Instead it presented the technical basis for these proposed regulations. A public meeting was held on June 1, 1978 for presentation and discussion of comments by interested parties. A brief summary of major comments is presented below. The Agency received a number of comments relating to specific technical information in the Development Document. These have not been summarized here but have been considered in revising the Development Document.

(1) Comment—A number of ·ipants expressed concern about nited amount of data available to Agency for establishing BAT limitations and pretreatment standards, especially for toxic pollutants.

Response—EPA recognizes that the data base for toxic pollutants is limited. Data limitations result from a history of infrequent monitoring or regulation, and the high costs, sophistication, time delays, and limited laboratory availability for toxic pollutant analyses. The Agency has sought and utilized all available data, except to the extent that it has not required mandatory sampling and analyses under Section 308 of the Act. EPA solicits additional voluntary data submissions.

(2) Comment—Reductions in flow have not been documented to result in reductions in pollutant discharge, particularly for Chemical Oxygen Demand.

Response—As stated in the section Available Waste Water Control and Treatment Technology, the Agency has concluded that effluent concentraton from a given size treatment system will not change as effluent flow is decreased. EPA has recognized that Chemical Oxygen Demand may be an exception and is not regulating COD until ·ient information is available to lish the relationship between .ent COD concentration and flow reduction. A technical paper is referenced in the Development Document describing measurements made at one refinery which significantly decreased effluent flow (increased reuse/recycle of wastewaters). That refinery reported that effluent concentrations of all pollutants remained constant after the flow reductions except COD. Total COD discharged was reduced but not in direct proportion to the flow reduction.

(3) Comment—Wastewater reduction and reuse may require extensive additional treatment before it can be used for some applications. In areas where there is a scarcity of suitable raw water, extensive treatment of wastewater for reuse may be economically justified. However, there is a point considerably short of total recycle where it becomes uneconomical to treat wastewater for reuse.

Response—EPA recognizes that the establishment of BAT and NSPS considers factors such as cost and that zero discharge while technically feasible (some refineries have already achieved it) may require very high costs ·icularly retrofit costs for existing ·ries). EPA has carefully considered , of technology options in selecting BAT and NSPS technologies. Thus, EPA is proposing a stepwise approach toward higher recycle rates for existing refineries and zero discharge of pollutants only for new sources (see discussion under Option Two of Best Available Technology Economically Achievable and Option Three of New Source Performance Standards).

(4) Comment—Numerous comments were received stating that the flow model presented in the Draft Development Document was invalid for a number of statistical and technical reasons. The comments also stated that some of the data used in the model were not correct.

Response—EPA has mailed to each refinery which responded to the original questionnaires a printout of important information which EPA used to characterize their refinery and has asked them to verify or correct the information. Considerable additional flow modeling effort has also been expended with the result that a much improved flow model represents the basis for these proposed regulations. EPA will continue its flow modeling efforts, and any improvement will be reflected in the final regulations.

(5) Comment—All major sources of wastewater are not represented as variables in the flow model.

Response—The intent of the flow model is not to identify and quantify each source, or even major source, of wastewater in the refinery. The variables contained in the model are not necessarily the major contributors of wastewater (cooling tower blowdown, for example, although generally one of the largest contributors to wastewater flow is not a variable). The intent is to determine, if possible, the total refinery effluent flow by using a number of process or other variables. By considering the variables in the model (49 processes in 4 groups), the model does predict the effluent flow within statistical acceptability.

(6) Comment—Effluent limitations are obtained by multiplying achievable values of three parameters—(1) wastewater flow, (2) pollutant concentration, and (3) a variability factor to account for short term fluctuations in pollutant concentration. Wastewater flow rates also vary and an additional variability factor should be used to account for fluctuations in wastewater flow.

Response—Pollutant concentrations in final wastewater flow will vary somewhat even with good operation of the treatment system. Additional variability will occur in poorly operated treatment systems. The variability factors used to establish these proposed regulations are intended to account only for uncontrollable variations in pollutant concentrations. The Agency believes that where variations can be controlled with available technology, these sources of variation should be controlled. A large part of the variation in effluent flow (about 75% of the variation) is attributable to variations in amount of crude oil processed. This variation will be considered by the establishment of limitations based on the mass pollutant discharged per unit of crude oil processed (kg of pollutant/1,000 cubic meters of crude throughput).

Technology is available to control the remaining variation in effluent flow. That technology is equalization—providing a large storage volume for the effluent and controlling the rate of discharge. Equalization was considered as a part of BPT technology, and costs and economic impacts for equalization were calculated when BPT was promulgated. Based on the use of equalization, no variability factors were used for flow variations in establishing BPT limitations, and the Agency believes that none are necessary in these regulations if available BPT technology is used.

XXI. Solicitation of Comments

EPA invites and encourages public participation in this rulemaking. The Agency asks that any deficiencies in the record of this proposal be pointed to with specificity and that suggested revisions or corrections be supported by data.

EPA is particularly interested in receiving additional comments and data on the following issues:

(1) The Agency is reviewing the sampling and analytical methods used to determine the presence and magnitude of toxic pollutants, and solicits comments on the data produced by these methods, and the methods themselves.

(2) The Agency is considering the possibility of establishing numerical effluent limitations for toxic pollutants other than phenol and chromium. The Agency is considering mass limitations for the following additional toxic pollutants: ethylbenzene, 50 μg/l; naphtalene, 50 μg/l; 2,4 dimethylphenol, 50 μg/l; benzene, 50 μg/l; toluene, 50 μg/l. The concentrations being considered are thirty day average concentrations. Mass limitations would be calculated by multiplying the concentrations by the achievable flow for the selected option. Daily maximum limitations would be calculated by multiplying the thirty day limitation by a variability factor to account for daily fluctuations in pollutant concentration. The technical bases for these limitations

are presented in the development document. EPA requests comments on these limitations and their bases.

(3) In recognition of the limits of available data and the expense of monitoring for the toxic pollutants listed in solicitation of comment (2) above, EPA is also considering the possibility of regulating those toxic pollutants with limitations on "indicator" pollutants rather than or as an alternative to limitations on the specific toxic pollutants discussed above. The sampling and analysis data (see Data Gathering Efforts section above) show that when concentrations of certain traditional pollutants are reduced, concentrations of toxic pollutants are also reduced. While relationships between "indicator" pollutants and toxic pollutants may not be quantifiable on a one-to-one basis, control of the "indicator" would reasonably assure control of toxics with similar physical and chemical properties responsive to similar treatment mechanisms (e.g.: 2,4 dimethyl phenol is treated by biodegradation and could be controlled with BOD5 as an "indicator" of biodegradation performance). This method of toxics regulation could obviate the difficulties, high costs, and delays of monitoring and analysis that could result from limitations solely on the toxic pollutants. Specifically, EPA is considering limitations on oil and grease, total suspended solids, biochemical oxygen demand, and total organic carbon as "indicator" pollutants. Limitations would be based on "indicator" pollutant concentrations and flows achievable with technologies identified as BAT and BADT (See Best Available Technology Economically Achievable and New Source Performance Standards sections above). It is the Agency's position that when used as "indicator" pollutants, BAT limitations may be established for conventional pollutants without regard to the BCT cost test. Moreover, when non-toxic, non-conventional pollutants (such as total organic carbon) are used as "indicator" pollutants, it is the Agency's position that such limitations are not subject to Section 301(c) or Section 301(g) modifications. EPA requests comments on the use of specific limitations on the discharge of "indicator" pollutants as an alternative to limitations on the toxic pollutants described above in this section.

(4) A study by an industry trade association (the American Petroleum Institute) (API) concludes that for new refineries total recycle (no discharge) is not only technically feasible, but may be economically more favorable than treatment for discharge to U.S. waters; fifty-five existing refineries already practice zero discharge. EPA specifically solicits comments and data which would support or refute the achievability of no discharge on a nationwide basis for new refineries. Comments on the other options identified for new source standards are also solicited.

(5) As stated in the section Data Gathering Efforts, EPA found that the seventeen refineries sampled during the data gathering effort were achieving a significantly lower effluent concentration of total phenol (4AAP) than that assumed in establishing BPT limitations. Other technical studies have reached the same conclusion. Therefore, the Agency is proposing to use 19 μg/l as the achievable long term concentration for total phenol (4AAP). EPA requests comments and data which would either verify or refute the assumption that a lower concentration of total phenol (4AAP) is achievable in petroleum refineries.

(6) EPA assumes that POTWs have installed secondary treatment in deciding whether pollutants pass through or are incompatible with POTWs. EPA makes this assumption regardless of whether a refinery is actually discharging into a POTW with secondary treatment. The only exception to this assumption would be if a refinery discharges into a POTW which is not required by the Clean Water Act to achieve effluent limitations based on secondary treatment. These are refineries discharging into a POTW which has received a waiver under section 301(h) of the Act. (See discussion under Pretreatment Standards above). EPA solicits comments on this approach to selecting pollutants for control by pretreatment standards.

(7) Possible underestimation of control technology costs was an issue raised during the public comment meeting and in written comments. In order to perform a meaningful comparison of EPA cost data and industry cost data, EPA requests detailed information on salient design and operating characteristics; actual installed cost (not estimates of replacement costs) for each unit treatment operation or piece of equipment, the date of installation and the amount of installation labor provided by plant personnel; and the actual cost for operation and maintenance, broken down into units of usage and cost for energy (kilowatt hours or equivalent), chemicals, and labor (work-years or equivalent).

(8) The Agency is considering best management practices (BMPs) for specific application in this industry (see Best Management Practices). EPA requests comments on the clarity, specificity, and practicability of these BMPs, as well as information and suggestions concerning additional BMPs which may be appropriate.

(9) EPA has obtained from the industry a substantial data base for the control and treatment technologies which serve as the basis for the proposed regulations. Plants which have not submitted data, or which have compiled data more recent than that already submitted, are requested to forward these data to EPA. These data should be individual data points, not averages or other summary data, including flow, production, and all pollutant parameters for which analyses were run. Please submit any qualifications to the data, such as descriptions of facility design, operating procedures, and upset problems during specified periods.

(10) EPA requests that POTWs which receive wastewaters from petroleum refining plants submit data which would document the occurrence of interference with collection system and treatment plant operations, permit violations, sludge disposal difficulties, or other incidents attributable to the pollutants contained in POTW influent.

Dated: November 27, 1979.

Douglas M. Costle,

Administrator.

Appendix A [1]—Abbreviations, Acronyms and Other Terms Used in this Notice

Act—The Clean Water Act.

Agency—The U.S. Environmental Protection Agency.

BAT—The best available technology economically achievable, under Section 304(b)(2)(B) of the Act.

BCT—The best conventional pollutant control technology, under Section 304(b)(4), of the Act.

BMP—Best management practices under Section 304(e) of the Act.

BPT—The best practicable control technology currently available, under Section 304(b)(1) of the Act.

Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*), as amended by the Clean Water Act of 1977 (Pub. L. 95-217).

Direct discharger—A facility which discharges or may discharge pollutants into waters of the United States.

Indirect discharger—A facility which discharges or may discharge pollutants into a publicly owned treatment works.

NPDES permit—A National Pollutant Discharge Elimination System permit issued under section 402 of the Act.

NSPS—New source performance standards, under section 306 of the Act.

POTW—Publicly owned treatment works.

[1] Appendix A through H will not appear in the Code of Federal Regulations.

PSES—Pretreatment standards for existing sources of indirect discharges, under section 307(b) of the Act.
PSNS—Pretreatment standards for new sources of direct discharges, under section 307(b) and (c) of the Act.
RCRA—Resource Conservation and Recovery Act (PL 94–580) of 1976, Amendments to Solid Waste Disposal Act.

Appendix B—Toxic Pollutants Not Detected In Treated Effluents (Direct Discharge)

Organics

acrolein
acrylonitrile
chlorobenzene
1,1,1-trichloroethane
1,1-dichloroethane
1,1,2-trichloroethane
chloroethane
2-chloroethylvinyl ether
chloroform
methyl chloride
methyl bromide
bromoform
trichlorofluoromethane
dichlorodifluoromethane
chlorodibromomethane
vinyl chloride
acenaphthene
benzidine
1,2,4-trichlorobenzene
hexachlorobenzene
hexachloroethane
bis(chloromethyl) ether
bis(2-chloroethyl) ether
2-chloronaphthalene
2,4,6-trichlorophenol
parachlorometa cresol
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
bis(2-chloroisopropyl) ether
bis(2-chloroethoxy) methane
hexachlorobutadiene
hexachlorocyclopentadiene
isophorone
nitrobenzene
2-nitrophenol
2,4-nitrophenol
4,6-dinitro-o-cresol
N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
pentachlorophenol
butyl benzyl phthalate
di-n-octyl phthalate
3,4-benzofluoranthene
benzo(k) fluoranthane
acenaphthylene
dibenzo(a,h)anthracene
ideno(1,2,3-cd)pyrene
2,3,7,8-tetrochlorodibenzo-p-dioxin (TCDD)

Pesticides

[illegible]in
rin
dane
[illegible]DDT
4,4'-DDE
4,4'-DDD
a-endosulfan-Alpha
b-endosulfan-Beta
endosulfan sulfate
endrin
endrin aldehyde
heptachlor
heptachlor epoxide
a-BHC-Alpha
b-BHC-Beta
r-BHC-Gamma
g-BHC-Delta
PCB-1242
PCB-1254

Others

asbestos (fibrous)

Appendix C—Toxic Pollutants Found in Only One Refinery Effluent (at Concentrations Higher Than Those Found in the Intake Water) and Which Are Uniquely Related to the Refinery at Which it Was Detected (Direct Discharge)

1. Organics

Carbon tetrachloride
1,1-dichloroethylene
1,2-dichloropropane
1,2-dichloropropylene
2,4-dichlorophenol
di-n-butyl phthalate
dimethyl phthalate

2. Pesticides

None

3. Metals

None

4. Others

None

Appendix D—Toxic Pollutants Detected in Treated Effluents of More Than One Refinery or Detected in the Treated Effluents of One Refinery But Not Uniquely Related to the Refinery at Which it Was Detected (Direct Discharge)

1. Organics

Benzene
1,2-dichloroethane
1,1,2,2-tetrachloroethane
parachlorometa cresol
1,2-trans-dichloroethylene
2,4-dimethylphenol
ethylbenzene
fluoranthene
methylene chloride
dichlorobromomethane
naphthalene
4-nitrophenol
N-nitrosodi-n-propylamine
bis(2-ethylhexyl) phthalate
diethyl phthalate
benzo(a)anthracene
benzo(a)pyrene
chrysene
anthracene
benzo(ghi)perylene
fluorene
phenanthrene
pyrene
tetrachloroethylene
toluene
trichloroethylene

2. Metals

antimony (total)
arsenic (total)
beryllium (total)
cadmium (total)
copper (total)
cyanide (total)
lead (total)
mercury (total)
nickel (total)
selenium (total)
silver
thallium (total)
zinc (total)

Appendix E—Toxic Pollutants Not Detected in Discharges to POTWs (Indirect Discharge)

1. Organics

acrolein
acrylonitrile
carbon tetrachloride
1,1-dichloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
chloroethane
2-chloroethylvinyl ether
1,1-dichloroethylene
1,2-trans-dichloroethylene
1,2-dichloropropane
1,2-dichloropropylene
methyl chloride
methyl bromide
bromoform
dichlorobromomethane
trichlorofluoromethane
dichlorodifluoromethane
chlorodibromomethane
trichloroethylene
vinyl chloride
benzidine
1,2,4-trichlorobenzene
hexachlorobenzene
hexachloroethane
bis(chloromethyl) ether
bis(2-chloroethyl) ether
2-chloronaphthalene
2,4,6-trichlorophenol
parachlorometa cresol
2-chlorophenol
1,2-dichlorophenol
parachlorometa cresol
2-chlorophenol
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
2,4-dichlorophenol
2,6-dinitrotoluene
fluoranthene
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
bis(2-chloroisopropyl) ether
bis(2-chloroethoxy) methane
hexachlorobutadiene
hexachlorocyclopentadiene
nitrobenzene
2-nitrophenol
4-nitrophenol
2,4-dinitrophenol
4,6-dinitro-o-cresol
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
bis(2-ethylhexyl) phthalate
dimethyl phthalate
benzo(a)pyrene

3,4-benzofluoranthene
benzo(k)fluoranthene
acenaphthylene
benzo(ghi)perylene
dibenzo(a,h)anthracene
ideno(1,2,3-cd)pyrene
2,3,7,8-tetrachloro-dibenzo-p-dioxin(TCDD)

2. Pesticides

dieldrin	g-BHC-Delta
chlordane	PCB-1242
4,4'-DDD	PCB-1254
a-endosulfan-Alpha	PCB-1221
b-endosulfan-Beta	PCB-1232
endosulfan sulfate	PCB-1248
endrin	PCB-1260
endrin aldehyde	PCB-1016
heptachlor	toxaphene
4-BHC-Gamma	

3. Metals

antimony (total)	silver (total)
beryllium (total)	thallium (total)
cadmium (total)	

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix F—Toxic Pollutants Detected in Discharges to POTW (Indirect Discharge)

1. Organics

benzene
chlorobenzene
1,2-dichloroethane
1,1,1-trichloroethane
chloroform
ethylbenzene
methylene chlroide
tetrachloroethylene
toluene
acenaphthene
2,4-dimethylphenol
2,4-dinitortoluene
1,2-diphenylhydrazine
isophorone
naphthalene
N-nitrosodiphenylamine
pentachlorophenol
phenol
butyl benzyl phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
benzo(a)anthracene
chrysene
anthracene
fluorene
phenanthrene
pyrene

2. Pesticides

aldrin	hepatachlor epoxide
4,4'-DDT	a-BHC-Alpha
4,4'-DDE	b-BHC-Beta

3. Metals

arsenic (total)	mercury (total)
chromium (total)	nickel (total)
copper (total)	selenium (total)
lead (total)	zinc (total)

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix G—Toxic Pollutants Found to Pass Through POTW with Only Primary Treatement (Indirect Discharge)

1. Organics

benzene
1,2-dichloroethane
1,1,1-trichloroethane
chloroform
ethylbenzene
methylene chloride
tetrachloroethylene
toluene
2,4-dimethylphenol
naphthalene
phenol
butyl benzyl phthalate
di-n-butyl-phthalate
di-n-octyl phthalate
diethyl phthalate

2. Pesticides

4,4'-DDT	a-BHC-Alpha
4,4'-DDE	b-BHC-Beta

3. Metals

arsenic (total)	mercury (total)
chromium (total)	nickel (total)
copper (total)	selenium (total)
lead (total)	zinc (total)

4. Others (Asbestos, 4AAP Phenol)

Not analyzed

Appendix H

The following derivation presents the development of mass limitations for phenol, based upon Option 2, from the flow model discussed in Section V.

(1) Mass = Flow x concentration x variability (equation 1)

BAT Mass = .48 x Mass (based on average 1976 industry flow)

(2) Flow Model (See Section IV of the Development Document) = 0.004C + 0.048K + 0.48(A + L) (equation 2)

Where:

Flow = million gallons per day/1000 barrels of petroleum liquid and natural gas liquids

C = summation of the crude oil and fed natural gas liquids to the atmospheric distillation, vacuum distillation, crude desalting (in units of 1,000 bbls/day)

K = summation of the petroleum liquids fed to the catalytic cracking processes (in unit of 1,000 bbls/day)

A = summation of the petroleum liquids fed to the asphalt processes (in units of 1,000 bbls/day)

L = summation of the petroleum liquids fed to the lube processes (in units of 1,000 bbls/day)

(3) Concentration and variability factor
Phenol = 19 μg/l (concentration)
1.7 (variability factor for 30 day averages)

(4) Sample Calculation
Mass = Flow x concentration x variability factor x .48 = (.004C + 046 K + .048 (A + L)) x .019 mg/l x 1.7 x 8.34 x .48
Mass (lbs of Phenol) = 0.0005C + 0.0060K + 0.0062(A + L)

Part 419 is revised to read as set forth below:

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

General Provisions

Sec.
419.10 Applicability.
419.11 General Definitions.

BPT Limitations

Subpart A—Topping Subcategory

419.20 Applicability; description of the topping subcategory.
419.21 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart B—Cracking Subcategory

419.30 Applicability; description of the cracking subcategory.
419.31 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart C—Petrochemical Subcategory

419.40 Applicability; description of the petrochemical subcategory.
419.41 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart D—Lube Subcategory

419.50 Applicability; description of the lube subcategory.
419.51 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

Subpart E—Integrated Subcategory

419.60 Applicability; description of the integrated subcategory.
419.61 Effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

BAT, BCT Limitations and New Source and Pretreatment Standards

Subpart F—Petroleum Refining Point Source Category

419.70 Applicability; description of the petroleum refining subcategory.
419.71 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).
419.72 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).
419.73 New source performance standards (NSPS).
419.74 Pretreatment standards for new and existing sources.

419.75 Pretreatment standards for facilities discharging into certain publicly owned treatment works with only primary treatment.

Appendix—Sample calculation of phenol effluent limitations for a typical refinery.

Authority: Sections 301, 304(b), (c), (e), and (g), 306(b) and (c), 307(b) and (c), and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, as amended by the Clean Water Act of 1977), (the "Act"); 33 United States. 1311, 1314(b), (c), (e), and (g), 1316(b) and (c), 1317(b) and (c), and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

General Provisions

§ 419.10 Applicability.

This part applies to any petroleum refinery which discharges or may discharge pollutants to waters of the United States or which introduces or may introduce pollutants into a publicly owned treatment works.

§ 419.11 General definitions.

In addition to the definitions set forth in 40 CFR Part 401, the following definitions apply to this part:

(a) The term "ballast" means the flow of waters, from a ship, which is treated at the refinery.

(b) The term "feedstock" means the crude oil and natural gas liquids fed to the topping units.

(c) The term "once-through cooling water" means those waters discharged that are used for the purpose of heat removal and do not come into direct contact with any raw material, intermediate, or finished product.

(d) The term "crude throughput" or "C" means the summation of the crude oil and natural gas liquids fed to the crude processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(e) The term "crude processes" means atmospheric distillation, vacuum distillation and crude desalting processes.

(f) The term "cracking throughput" or "K" means the summation of the petroleum liquids fed to the cracking processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(g) The term "cracking processes" means hydrocracking, visbreaking, thermal cracking, fluid catalytic cracking and moving bed catalytic cracking processes.

(h) The term "asphalt and lube throughput" or "AL" means the summation of the petroleum liquids fed to the asphalt and lube processes in unit of 1,000 bbl/day (when using the English unit tables) or 1,000 cubic meters/day (when using the metric unit tables).

(i) The term "asphalt and lube processes" means asphalt production, asphalt oxidizing, asphalt emulsifying, hydrofining, hydrofinishing, lube hydrofining, white oil manufacturing, propane dewaxing, propane deasphalting, propane fractioning, propane deresining, Duo Sol solvent treating, solvent extraction, duotreating, solvent dewaxing, solvent deasphalting, lube vacuum tower, oil fractionation, batch still (naphta strip), bright stack treating, centrifuge and chilling MEK dewaxing, butane dewaxing, MEK-Toluene dewaxing, deoiling (wax), naphthenic lube production, SO_2 extraction, wax pressing, wax plant (with neutral separation), furfural extracting, clay contacting-percolation, wax sweating, acid treat, phenol extraction, lube and fuel additives, sulfanate plant, MIBK, wax slabbing, rust preventives, petrolatum oxidation, grease manufacture processes. These processes are described in more detail in Sections IV and V of the development document.

(j) The term "process wastewater" means all the wastewater from the refinery with exception to storm water, ballast water, sanitary wastewater, and noncontact once through cooling water.

(k) The following abbreviations shall mean: (1) "bbl" means barrel (one barrel equals 42 gallons), and (2) "R" means the ratio of cooling tower blowdown flow to total effluent flow.

BPT Limitations

Subpart A—Topping Subcategory

§ 419.20 Applicability; Description of the topping subcategory.

The provisions of this subpart are applicable to discharges from any facility which produces petroleum products by the use of topping and catalytic reforming whether or not the facility includes any other process in addition to topping and catalytic reforming. The provisions of this subpart are not applicable to facilities which include thermal processes (coking, visbreaking, etc.) or catalytic cracking.

§ 419.21 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	22.7	12.0
TSS	15.6	10.1
COD [1]	117	60.3
Oil and grease	6.9	3.7
Phenolic compounds	.168	.076
Ammonia as N	2.81	1.27
Sulfide	.149	.065
Total chromium	.345	.20
Hexavalent chromium	.028	.012
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	5.6	3.6
COD [1]	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	.060	.027
Ammonia as N	.99	.45
Sulfide	.053	.024
Total chromium	.122	.071
Hexavalent chromium	0.10	.0044
pH	Within the range 6.0 to 9.0	

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD5.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.00 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125 to 149.9	1.50
150 or greater	1.57

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73

Process configuration:	Process factor
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.00 or greater	4.36

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to the provisions of this subpart, in addition to the discharge allowed by paragraph (b) of this section:

(1) *Ballast.* The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.026
TSS	033	021
CAOD	47	.24
Oil and grease	015	008
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	.26	17
COD	3.9	2.0
Oil and grease	126	.067
pH	Within the range 6.0 to 9.0	

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

Subpart B—Cracking Subcategory

§ 419.30 Applicability; description of the cracking subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking. The provisions of this subpart are not applicable however, to facilities which include the processes specified in Subparts C, D, or E of this part.

§ 419.31 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currency available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	28.2	15.6
TSS	19.5	12.6
COD	210	109
Oil and grease	8.4	4.5
Phenolic compounds	.21	10
Ammonia as N	18.6	8.5
Sulfide	18	.082
Total chromium	.43	.25
Hexavalent chromium	035	.016
Ph	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	9.9	5.5
TSS	6.9	4.4
COD	74	38.4
Oil and grease	3.0	1.6
Phenolic compounds	074	038
Ammonia as N	6.6	3.6
Sulfide	065	029
Total chromium	.15	088
Hexavalent chromium	012	0056
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day:	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration:	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example Subpart D § 419.51(b)(3)

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged a total organic carbon concentration not to exceed 5 mg/1.

Subpart C—Petrochemical Subcategory

§ 419.40 Applicability; description of the petrochemical subcategory.

The provisions of this subpart are applicable to all discharges from any facility which produces petroleum products by the use of topping, cracking and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking and petrochemical operations. The provisions of this subpart shall not be applicable however, to facilities which include the processes specified in Subparts D or E of this part.

§ 419.41 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) The following limitations establish the quantity or quality of pollutant or pollutants properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for thirty consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	34.6	18.4
TSS	23.4	14.8
COD	210	109
Oil and grease	11.1	5.9
Phenolic compounds	25	120
Ammonia as N	23.4	10.6
Sulfide	.22	.099
Total chromium	.52	.3[illegible]
Hexavalent chromium	048	02[illegible]
pH	Within the range 6.0 to 9.0	

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	12.1	6.5
TSS	8.3	5.25
COD	74	38.4
Oil and grease	3.9	2.1
Phenolic compounds	.089	.0425
Ammonia as N	8.25	3.8
Sulfide	.078	.035
Total chromium	.183	.107
Hexavalent chromium	.016	.0072
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feeds per stream-day:	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor:

...ss configuration:	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the disclosure allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not be exceed 5 mg/1.

Subpart D—Lube Subcategory

§ 419.50 Applicability; description of the lube subcategory.

The provisions of this subpart are ...icable to all discharges from any ...ility which produces petroleum products by the use of topping, cracking and lube oil manufacturing processes, whether or not the facility includes any process in addition to topping, cracking and lube oil manufacturing processes. The provisions of this subpart are not applicable however, to facilities which include the processes specified in Subparts C and E of this part.

§ 419.51 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000m ³ of feedstock)	
BOD5	50.6	25.8
TSS	35.6	22.7
COD	360	187
Oil and grease	16.2	8.5
Phenolic compounds	.38	.184
Ammonia as N	23.4	10.56
Sulfide	.33	1.0
Total chromium	.77	.45
Hexavalent chromium	.068	.030
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.9	9.1
TSS	12.5	8.0
COD	127	66
Oil and grease	5.7	3.0
Phenolic compounds	.133	.065
Ammonia as N	8.3	3.8
Sulfide	.118	.053
Total chromium	.273	.160
Hexavalent chromium	.024	.011
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feedstock per stream day:	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration:	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) Example of the application of the above factors.

Calculation of the Process Configuration

Process category	Processes included	Weighting factor
Crude	Atm. crude distillation	1
	Vacuum crude distillation	
	Desalting	
Cracking and coking	Fluid cat. cracking	6
	Vis-breaking	
	Thermal cracking	
	Moving bed cat. cracking	
	Hydrocracking	
	Fluid coking	
	Delayed coking	
Lube	Further defined in the development document.	13
Asphalt	Asphalt production	12
	Asphalt oxidation	
	Asphalt emulsifying	

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to point source subject to the provisions of ballast water by this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

Example.—*Lube Refinery 125,000 bbl per Stream Day Throughput*

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput	Weighting factor	Processing configuration
Crude:				
Atm	125	1		
Vacuum	60	.48		
Desalting	125	1		
Total		2.48	× 1 =	2.48

Example.—Lube Refinery 125,000 bbl per Stream Day Throughput—Continued

Process	Capacity (1,000 bbl per stream day)	Capacity relative to throughput	Weighting factor	Processing configuration
Cracking—FCC	41	.328		
Hydrocracking	20	.160		
Total		488	× 6 =	2.93
Lubes	5 3	042		
	4 0	032		
	4.9	.039		
Total		.113	× 13 =	1.47
Asphalt	4.0	.032	× 12 =	.39
	Refinery process configuration		=	7.26

NOTES

See table § 419.42(b)(2) for process factor. Process factor = 0 58.
See table § 419.42(b)(1) for size factor for 125,000 bbl per stream day lube refinery Size factor = 0 93.
To calculate the limits for each parameter, multiply the limit § 419.42(a) by both the process factor and size factor
BOD5 limit (maximum for any 1 day) = 17.9 × 0.58 × 0.93 = 14.6 lb. per 1,000 bbl of feedstock.

Subpart E—Integrated Subcategory

§ 419.60 Applicability; description of the integrated subcategory.

The provisions of this subpart are applicable to all discharges resulting from any facility which produces petroleum products by the use of topping, cracking, lube oil manufacturing processes, and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking, lube oil manufacturing processes and petrochemical operations.

§ 419.61 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) The following limitations establish the quantity or quality of pollutants or pollutant properties, controlled by this paragraph, which may be discharged by a point source subject to the provisions of this subpart after application of the best practicable control technology currently available:

Effluent characteristic	Effluent limitations: Maximum for any 1 day	Effluent limitations: Average of daily values for 30 consecutive days shall not exceed—
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	54 4	28 9
TSS	37 3	23.7
COD	388	198
Oil and grease	17.1	9.1
Phenolic compounds	.40	192
Ammonia as N	23.4	10.6
Sulfide	.35	.158
Total chromium	.82	.48
Hexavalent chromium	068	032
pH	Within the range 6.0 to 9.0	
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	19.2	10 2
TSS	13.2	8.4
COD	138	70
Oil and grease	6.0	3.2
Phenolic compounds	14	068
Ammonia as N	8.3	3.8
Sulfide	124	056
Total chromium	.29	.17
Hexavalent chromium	025	.011
pH	Within the range 6.0 to 9.0	

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and the maximum average of daily values for thirty consecutive days.

(1) Size factor:

1,000 bbl of feedstock per stream day:	Size factor
Less than 124 9	0.73
125.0 to 149.9	0.78
150 0 to 174 9	0 83
175.0 to 199.9	0 91
200.0 to 224.9	0.99
225 or greater	1 04

(2) Process factor:

Process configuration:	Process factor
Less than 6.49	0.75
6.5 to 7 49	0 82
7 5 to 7 99	0.92
8 0 to 8.49	1 00
8 5 to 8 99	1.10
9 0 to 9.49	1 20
9 5 to 9.99	1 30
10 0 to 10.49	1 42
10.5 to 10.99	1 54
11 0 to 11 49	1 68
11.5 to 11 99	1.83
12.0 to 12.49	1 99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example Subpart D § 419.51(b)(3).

(c) The provisions of § 419.21(c)(1) apply to discharges of process waste water pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants of pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic concentration not to exceed 5 mg/l.

BAT, BCT Limitations and New Source and Pretreatment Standards

Subpart F—Petroleum Refining Point Source Subcategory

§ 419.70 Applicability; description of the petroleum refining subcategory.

This subpart applies to discharges to waters of the United States, and introductions of pollutants into publicly owned treatment works from any petroleum refinery.

§ 419.71 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in 40 CFR 125.30 125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

(a) The quantity of pollutants discharged from process wastewater shall not exceed the sum of the allocations specified below (3C means 3 multiplied by C):

(1)

Subpart F

Pollutant or pollutant property	BAT crude allocation: Maximum for any 1 day	BAT crude allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0 0031C	0 0015C
Total chromium	0.0332C	0.0194C
Hexavalent chromium	0.0028C	0.0013C
	English units (pounds per day)	
Phenol	0.0011C	0.00058C
Total chromium	0.0116C	0.0068C
Hexavalent chromium	0.0010C	0.0

(2)

Subpart F

Pollutant or Pollutant property	BAT cracking allocation: Maximum for any 1 day	BAT cracking allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0351K	0.0170K
Total chromium	0.3812K	0.2234K
Hexavalent chromium	0.0326K	0.0147K
	English units (pounds per day)	
Phenol	0.0123K	0.0060K
Total chromium	0.1336K	0.0785K
Hexavalent chromium	0.0114K	0.0052K

(3)

Subpart F

Pollutant or pollutant property	BAT asphalt and lube allocation: Maximum for any 1 day	BAT asphalt and lube allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0365AL	0.0177AL
Total chromium	0.3975AL	0.2332AL
Hexavalent chromium	0.0340AL	0.0154AL
	English units (pounds per day)	
Phenol	0.0128AL	0.0062AL
Total chromium	0.1393AL	0.0817AL
Hexavalent chromium	0.0119AL	0.0054AL

(b) The limitations for COD, ammonia (as N), sulfide and TOC are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

(c) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

Note.—See Appendix to this regulation for sample calculation of a BAT effluent limitation.

§ 419.72 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in 40 CFR 125.30–125.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

(a) The quantity of pollutants discharged from process wastewater shall not exceed the sum of the allocations specified below (3C means 3 multiplied by C):

(1)

Subpart F

Pollutant or pollutant property	BAT crude allocation: Maximum for any 1 day	BAT crude allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
sCOD	2.195C	1.166C
TSS	1.509C	0.9601C
Oil and grease	0.666C	0.366C
	English units (pounds per day)	
BOD5	0.7691C	0.4086C
TSS	0.5288C	0.3365C
Oil and grease	0.240C	0.128C

(2)

Subpart F

Pollutant or pollutant property	BCT cracking allocation: Maximum for any 1 day	BCT cracking allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
BOD5	25.24K	13.41K
TSS	17.35K	11.04K
Oil and grease	7.89K	4.21K
	English units (pounds per day)	
BOD5	8.845K	4.699K
TSS	6.081K	3.870K
Oil and grease	2.76K	1.47K

(3)

Subpart F

Pollutant or pollutant property	BCT asphalt and lube allocation: Maximum for any 1 day	BCT asphalt and lube allocation: Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
BOD5	26.33AL	13.99AL
TSS	18.10AL	11.52AL
Oil and grease	8.23AL	4.39AL
	English units (pounds per day)	
BOD5	9.229AL	4.903AL
TSS	6.346AL	4.036AL
Oil and grease	2.88AL	1.54AL

(b) the pH shall be within the range of 6 to 9.

(c) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

§ 419.73 New source performance standards (NSPS).

Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

(a) There shall be no discharge of pollutants from process wastewaters to the waters of the United States.

(b) The limitations for ballast water and once through cooling water are the same as those specified in §§ 419.21, 419.31, 419.41, 419.51, and 419.61.

§ 419.74 Pretreatment standards for new and existing sources.

Any point source subject to this subpart which introduces pollutants into a publicly owned treatment works which has not been granted a waiver from achieving effluent limitations based on secondary treatment under section 301(h) of the Act must achieve the following pretreatment standards (in addition to complying with 40 CFR Part 403 in the case of new sources and except as provided in 40 CFR Part 403.13 in the case of existing sources):

(a) The following standards apply to the total refinery flow contribution to the POTW.

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Milligrams per liter (mg/1)
Oil and grease	100
Ammonia	100

(b) The following standard is applied to the cooling tower blowdown portion of the refinery flow to the POTW or may be applied to the total refinery flow by multiplying the standard by the ratio of the cooling tower blowndown flow to the total refinery flow to the POTW.

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Milligrams per liter (mg/1)
Total chromium	

(c) Informational mass limitations are as follows:

Subpart F

Pollutant or pollutant property	Pretreatment standards—Maximum for any 1 day
	Metric units (kilograms per day)
Oil and grease	9.57C+109.52K+114.30AL
Ammonia	9.57C+109.52K+114.30AL
Total chromium	R x (0.0957C+1.0952K+1.1430AL)
	English units (pounds per day)
Oil and grease	3.35C+38.35K+40.02AL
Ammonia	3.35C+38.35K+40.02AL
Total chromium	R x (0.0335C+0.3835K+0.4002AL)

§ 419.75 Pretreatment standards for facilities discharging into certain publicly owned treatment works with only primary treatment.

Any point source subject to this subpart which introduces pollutants into a publicly owned treatment works which has been granted a waiver from achieving effluent limitations based on secondary treatment under section 301(h) of the Act must achieve the following pretreatment standards (in addition to complying with 40 CFR Part 403 in the case of new sources and except as provided in 40 CFR 403.13 for Existing Sources):

Subpart F

Pollutant or pollutant property	Pretreatment standards—301(h) Waivers	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter (mg/1)	
Phenol	0.087	0.032
Total chromium	0.725	0.425
Hexavalent chromium	0.06	0.03

(b) Information mass limitations are as follows:

(1)

Pollutant or pollutant property	Crude allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0031C	0.0015C
Total chromium	0.0332C	0.0194C
Hexavalent chromium	0.0028C	0.0013C
	English units (pounds per day)	
Phenol	0.0011C	0.00052C
Total chromium	0.0116C	0.00688C
Hexavalent chromium	0.0010C	0.0005C

(2)

Pollutant or pollutant property	Cracking allocation	
	Mmaximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0351K	0.0170K
Total chromium	0.3812K	0.2234K
Hexavalent chromium	0.0326K	0.0147K
	English units (pounds per day)	
Phenol	0.0123K	0.0060K
Total chromium	0.1336K	0.0783K
Hexavalent chromium	0.0114K	0.0052K

(3)

Pollutant or pollutant property	Asphalt and lube allocation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Metric units (kilograms per day)	
Phenol	0.0365AL	0.0177AL
Total chromium	0.3975AL	0.2332AL
Hexavalent chromium	0.0340AL	0.0154AL
	English units (pounds per day)	
Phenol	0.0128AL	0.0062AL
Total chromium	0.1393AL	0.0817AL
Hexavalent chromium	0.0119AL	0.0054AL

Appendix—Sample Calculation

The following example presents the derivation of a BAT phenol effluent limitation for a typical refinery

Refinery X Y Z

Refinery processes	Refinery throughput 1000 bbl/day
Atmospheric crude distillation	100
Vacuum crude distillation	75
Desalting	50
Total crude processes (C)	225
FCC	25
Hydrocracking	20
Total cracking processes(K)	45
Asphalt production	5
Hydrofining	3
Wax processing	1
Total asphalt and lube processes (AL)	9

Monthly average phenol discharge (lbs/day) = $0.0005(225) + 0.0060(45) + 6.2 \times 10^{-7}(9) = 0.44$.

[FR Doc. 79-38613 Filed 12-20-79; 8:45 am]

BILLING CODE 6560-01-M

Federal Register

Monday
October 18, 1982

Part II

Environmental Protection Agency

Petroleum Refining Point Source Category Effluent Limitations Guidelines, Pretreatment Standards and New Source Performance Standards; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 419

[WH-FRL 2203-3]

Petroleum Refining Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: These regulations limit the discharge of pollutants into navigable waters and into publicly owned treatment works (POTW) by existing and new sources in the petroleum refining industry. The Clean Water Act and a consent decree require EPA to issue these regulations. These regulations provide final effluent limitations guidelines for "best available technology economically achievable" (BAT), and establishes final pretreatment standards for existing sources (PSES) and for new sources (PSNS). The Agency has decided to retain its previously promulgated "new source performance standards" (NSPS) for this industry. Effluent limitations guidelines for "best practicable control technology currently available" (BPT) were not modified by EPA in this rulemaking. The Agency is reserving coverage of "best conventional pollutant control technology" (BCT) effluent limitations guidelines because the methodology to assess the cost reasonableness of BCT has not yet been established. The Agency is withdrawing storm water runoff limitations promulgated on May 9, 1974 (39 FR 16560) for BPT, BAT, and NSPS, because these limitations were remanded by the court in *American Petroleum Institute* v. *EPA*, 540 F. 2d 1023 (10th Cir. 1976).

DATES: In accordance with 40 CFR 100.01 (45 FR 26048), the regulations developed in this rulemaking shall be considered issued for purposes of judicial review at 1.00 p.m. Eastern time on November 1, 1982.

These regulations shall become effective December 1, 1982.

The compliance date for the newly issued PSNS regulation is the date that the new source commences discharge. The compliance date for PSES is the same as the compliance date for the interim final PSES for this industry promulgated on March 23, 1977. (See 42 FR 15684). The PSES promulgated today is no more stringent than the interim final PSES.

Under Section 509(b)(1) of the Clean Water Act judicial review of these regulations is available only by filing a petition for review in the United States Court of Appeals within ninety days after these regulations are considered issued for purpose of judicial review. Under Section 509(b)(2) of the Clean Water Act, these requirements of the regulations may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

Those portions of the existing petroleum refining effluent guidelines limitations and standards that are not substantively amended by this notice are not subject to judicial review nor is their effectiveness altered by this notice. These regulations are BPT and NSPS.

ADDRESSES: The record for this rulemaking will be available for public review within four weeks after the date of publication in EPA's Public Information Reference Unit, Room 2004 (Rear) (EPA Library), 401 M Street, S.W., Washington, D.C. The EPA information regulation (40 CFR Part 2) provides that a reasonable fee may be charged for copying.

Technical information may be obtained by writing to William A. Telliard, Effluent Guidelines Division (WH-552), EPA, 401 M Street, S.W., Washington, D.C. 20460, or by calling (202) 426-4617. Copies of the technical development and economic documents can be obtained from the National Technical Information Service, Springfield, Virginia 22161 (703/487-6000).

FOR FURTHER INFORMATION CONTACT: Dennis Ruddy, (202) 382-7165.

SUPPLEMENTARY INFORMATION:

Organization of this Notice

I. Legal Authority

These regulations are being promulgated under the authority of Sections 301, 304, 306, 307, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 *et seq.*, as amended by the Clean Water Act of 1977, Pub. L. 95-217) also called the "Act". These regulations are also being promulgated in response to the Settlement Agreement in *Natural Resources Defense Council, Inc. v. Train*, 8 ERC 2120 (D.D.C. 1976), *modified*, 12 ERC 1833 (D.D.C. 1979).

II. Scope of this Rulemaking

The petroleum refining industry is included within the U.S. Department of Commerce, Bureau of the Census, Standard Industrial Classification (SIC) 2911. A detailed overview of the petroleum refining industry can be found in the proposed regulations of December 21, 1979 for this industry (44 FR 75926).

The most important pollutants or pollutant parameters in petroleum refinery wastewaters are: (a) toxic pollutants (chromium); (b) conventional pollutants (TSS, Oil and Grease, BOD5, and pH); and (c) nonconventional pollutants (phenolic compounds (4-AAP), COD, sulfide and ammonia). EPA's 1973 to 1976 rulemaking efforts emphasized the achievement of best practicable control technology currently available (BPT) by July 1, 1977. In general, BPT represents the average of the best existing performances of well-known technologies for control of traditional (i.e., "classical") pollutants.

In contrast, this round of rulemaking aims for the achievement by July 1, 1984, of the best available technology economically achievable (BAT) that will result in reasonable further progress toward the national goal of eliminating

the discharge of all pollutants. At a minimum, BAT represents the best economically achievable performance in any industrial category or subcategory. Moreover, as a result of the Clean Water Act of 1977, the emphasis of EPA's program has shifted from "classical" pollutants to the control of a lengthy list of toxic pollutants.

EPA is promulgating BAT, PSES, and PSNS for each of the five subcategories established for this industry. BPT, BAT and NSPS effluent limitations for storm water runoff for all direct dischargers and all BCT requirements, including storm water runoff, are being reserved for future rulemaking.

III. Summary of Legal Background

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Section 101(a)). To implement the Act, EPA was to issue effluent standards, pretreatment standards, and new source performance standards for industry dischargers.

The Act included a timetable for issuing these standards. However, EPA was unable to meet many of the deadlines and, as a result, in 1976, it was sued by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a court-approved "Settlement Agreement". This Agreement required EPA to develop a program and adhere to a schedule in promulgating effluent limitations guidelines and standards for 65 "priority" pollutants and classes of pollutants for 21 major industries. See *Natural Resources Defense Council, Inc.* v. *Train*, 8 ERC 2120 (D.D.C. 1976), modified, 12 ERC 1833 (D.D.C. 1979). See also: 43 FR 4108; 46 FR 2266; 46 FR 10723.

Many of the basic elements of this Settlement Agreement program were incorporated into the Clean Water Act of 1977. Like the Agreement, the Act stressed control of toxic pollutants including the 65 "priority" pollutants. In addition, to strengthen the toxic control program, Section 304(e) of the Act authorizes the Administrator to prescribe "best management practices" (BMPs) to prevent the release of toxic and hazardous pollutants from plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage associated with, or ancillary to, the manufacturing of treatment process.

Under the Act, the EPA program is to set a number of different kinds of effluent limitations. These are discussed in detail in the Development Document supporting these regulations. The following is a brief summary:

1. *Best Practicable Control Technology (BPT).* BPT limitations are generally based on the average of the best existing performance by plants of various sizes, ages, and unit processes within the industry or subcategory.

In establishing BPT limitations, EPA considers the total cost of applying the technology in relation to the effluent reduction derived, the age of equipment and facilities involved, the process employed, the engineering aspects of control technologies, process changes, and non-water-quality environmental impacts (including energy requirements). The total cost of applying the technology is balanced against the effluent reduction. EPA promulgated BPT for the petroleum refining point source category on May 9, 1974 (39 FR 16560) and amended the regulations on May 20, 1975 (40 FR 21939). BPT is printed in this final rule for the sake of completeness to the reader.

2. *Best Available Technology (BAT).* BAT limitations, in general, represent the best existing performance of technology in the industrial subcategory or category. The Act establishes BAT as the principal national means of controlling the direct discharge of toxic and nonconventional pollutants to navigable waters.

In arriving at BAT, the Agency considers the age of the equipment and facilities involved, the process employed, the engineering aspects of control technologies, process changes, the cost of achieving such effluent reduction, and non-water quality environmental impacts. The Administrator retains considerable discretion in assigning the weight to be accorded these factors.

3. *Best Conventional Pollutant Control Technology (BCT).* The 1977 Amendments added Section 301(b)(2)(E) to the Act establishing "best conventional pollutant control technology" (BCT) for discharge of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in Section 304(a)(4) [biochemical oxygen demanding pollutants (BOD5), total suspended solids (TSS), fecal coliform and pH], and any additional pollutants defined by the Administrator as "conventional" [oil and grease, 44 FR 44501, July 30, 1979].

BCT is not an additonal limitation but replaces BAT for the control of conventional pollutants. In additon to other factors specified in section 304(b)(4)(B), the Act requires the BCT limitations be assessed in light of a two part "cost-reasonableness" test. *American Paper Institute* v. *EPA*, 660 F2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT. EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA published its methodology for carrying out the BCT analysis on August 29, 1979 (44 FR 50732). In the case mentioned above, the Court of Appeals ordered EPA to correct data errors underlying EPA's calculation of the first test, and to apply the second cost test. (EPA had argued that a second cost test was not required). The Agency is reserving BCT effluent limitations guidelines because the methodology to assess the cost reasonableness of BCT has not yet been established.

4. *New Source Performance Standards (NSPS).* NSPS are based on the best available demonstrated technology. New plants have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. EPA promulgated NSPS for the petroleum refining point source category on May 9, 1974 (39 FR 16560) and amended the regulation on May 20, 1975 (40 FR 21939). NSPS is printed in this final rule for the sake of completeness to the reader.

5. *Pretreatment Standards for Existing Sources (PSES).* PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of a publicly owned treatment works (POTW). They must be achieved within three years of promulgation. The Clean Water Act of 1977 requires pretreatment for toxic pollutants that pass through the POTW in amounts that would violate direct discharger effluent limitations or interfere with the POTW's treatment process or chosen sludge disposal method. The legislative history of the 1977 Act indicates that pretreatment standards are to be technology-based, analogous to the best available technology for removal of toxic pollutants. EPA has generally determined that there is pass through of pollutants if the percent of pollutants removed by a well-operated POTW achieving secondary treatment is less than the percent removed by the BAT model treatment system. The general pretreatment regulations, which served as the framework for the categorical

pretreatment regulations are found at 40 CFR Part 403 (43 FR 27736, June 26, 1978; 46 FR 9462 January 28, 1981).

6. *Pretreatment Standards for New Sources (PSNS).* Like PSES, PSNS are to prevent the discharge of pollutants which pass through, interfere with, or are otherwise incompatible with the operation of the POTW. PSNS are to be issued at the same time as NSPS. New indirect dischargers, like new direct dischargers, have the opportunity to incorporate the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating PSES.

IV. Prior Regulations and Methodology and Data Gathering Efforts

A. Prior Petroleum Refining Regulations

EPA promulgated BPT, BAT, NSPS, and PSNS for the petroleum refining point source category on May 9, 1974 (39 FR 16560). The BPT, BAT, and NSPS regulations were challenged by the American Petroleum Institute (API) and others in the United States Court of Appeals for the Tenth Circuit. Both BPT and NSPS were upheld by the Court, with the exception of limitations for storm water runoff which were remanded for further consideration. BAT, including limitations for storm water runoff, was remanded for further consideration. *American Petroleum Institute v. EPA*, 540 F.2d 1023 (10th Cir. 1976). Interim final PSES was promulgated on March 23, 1977 (42 FR 15684) in response to the Settlement Agreement.

BAT and BCT were proposed on December 21, 1979 (44 FR 75926). At the same time, the Agency proposed to revise NSPS, PSNS, and PSES.

B. Methodology and Data Gathering Efforts

The methodology and data gathering efforts used in developing the proposed regulations were summarized in the preamble to the proposed petroleum refining regulations published on December 21, 1979 (44 FR 75926).

EPA has prepared the following reports concerning data it has acquired on this industry since the December 1979 proposed regulations were published: (1) a report entitled *Petroleum Refining Industry, Refinements to 1979 Proposed Flow Model;* and (2) a report entitled *Petroleum Refining Industry, Surrogate Sampling Program.* The Agency has rejected the options which utilized the data and conclusions from these reports in this rulemaking; therefore, the results were not used by EPA as bases for the Agency's regulations in today's rulemaking.

V. Control Treatment Options and Technology Basis for Regulations

A. Final BAT Limitations

EPA is promulgating BAT limitations which are equivalent to the BPT level of control (Option 9 discussed below). These limitations are based on both in-plant and end-of-pipe technologies, including sour water stripping to control ammonia and sulfide, water use management, sewer segregation, wastewater, flow equalization, initial oil and solids removal (API separators or baffle plate separators), advanced oil and solids removal (clarifiers, dissolved air flotation, or filters), biological treatment, and filtration or other "polishing" steps. The flow model and subcategorization scheme upon which these limitations are based are the same as those used for developing the BPT effluent limitations. BPT removes 96 percent of the toxic pollutants from raw wastewaters discharged by the petroleum refining industry.

1. *Control Treatment Options for BAT.* The control and treatment technology options that EPA investigated for use in this industry for BAT are presented below. Options 1 through 6 were considered in formulating the proposed rule. Option 7, a modification of Option 2, and Option 8, a modification of Option 1, were developed on the basis of information available at the time of the 1979 proposal, modified as a result of information collected by EPA after the proposed rule was published, as well as from public comments received on the proposed rule. Option 9, the BPT level of control, was reconsidered after publication of the proposed rule, as a result of public comments received.

Option 1—Discharge flow reduction of 27 percent from the proposed model flow, achieved through greater reuse and recycle of wastewaters, in addition to BPT treatment.

Option 2—Discharge flow reduction of 52 percent from the proposed model flow, achieved through greater reuse and recycle of wastewaters, in addition to BPT treatment. This was the control treatment option selected in the 1979 proposal.

Option 3—Discharge flow reduction of 27 percent from the proposed model flow per Option 1, plus enhanced BPT treatment with powdered activated carbon to reduce residual toxic organic pollutants.

Option 4—Discharge flow reduction of 52 percent from the proposed model flow per Option 2, in addition to BPT treatment plus segregation and separate treatment of cooling tower blowdown. Cooling tower blowdown treatment for metals removal includes reduction of hexavalent chromium to trivalent chromium, pH adjustment, precipitation, and settling or clarification.

Option 5—Discharge flow reduction of 27 percent from the proposed model flow per Option 1, in addition to BPT treatment plus granular activated carbon treatment to reduce residual toxic organic pollutants.

Option 6—A "no discharge of wastewater pollutants" (i.e., zero discharge) standard based upon reuse, recycle, evaporation, or reinjection of wastewaters.

Option 7—Discharge flow reduction of 37.5 percent from revised model flow achieved through greater reuse and recycle of wastewaters, in addition to BPT treatment.

Option 8—Discharge flow reduction of approximately 20 percent from revised model flow achieved through greater reuse and recycle of wastewaters, in addition to BPT treatment.

Option 9—Flow equalization, initial oil and solids removal, advanced oil and solids removal, biological treatment, and filtration or other final "polishing" steps. This option is the basis of the existing regulations.

2. *Technology Basis for the Final BAT Regulation.* (a) Final BAT Limits: EPA is promulgating BAT limitations based on Option 9 which is equivalent to the BPT level of control. Regulated pollutants for BAT are (1) nonconventional pollutants: Chemical oxygen demand (COD), total phenols (4AAP), ammonia(N), and sulfides; and (2) toxic pollutants: total chromium, and hexavalent chromium.

(b) Changes From Proposal: The options considered in formulating the proposed rules were based on various combinations of wastewater flow reduction and improved performance of wastewater treatment technology. A flow modeling approach was used for regulatory purposes to define the industry's current wastewater generation and to correlate effluent flow with process variables. The proposed 1979 flow model was developed to establish the average wastewater flow that can be expected from refineries with similar process configurations. The proposed flow model was also used to determine specific effluent limitations for the prescribed levels of flow reduction in Options 1 through 5.

The proposed regulation was based on the Option 2 level of control. This option proposed to regulate chemical oxygen demand (COD), total phenols (4AAP), ammonia(N), sulfide, total chromium, and hexavalent chromium.

The Agency determined that, regardless of the amount of flow reduction, the levels of ammonia, sulfide, and COD would not measurably change compared to the BPT level of control. The control of ammonia and sulfide is achieved through steam stripping, an in-plant control technique. No technologically feasible process changes or in-plant controls beyond those presently in use in this industry were identified to further reduce ammonia and sulfide. The Agency's attempts to quantify or predict changes in COD levels with implementation of flow reduction/water reuse technologies were inconclusive.

The proposed regulation would have limited total phenols at a mass equivalent of 19 μg/1. The Agency received a number of comments on this issue stating that the proposal to limit total phenols at 19μg/1 was too stringent because technology is not available to consistently achieve such a level. Additional information on phenol was collected by EPA in the "Long Term Data Collection Survey" and the "Surrogate Sampling Program" (See Sections IV and XVI) subsequent to the December 1979 proposal. Information collected included effluent data from 37 refineries for calendar year 1979. Analysis of the data collected during these two studies concluded that existing BPT treatment systems are not achieving the proposed 19 μg/1 level on a long term basis. However, the results do show that such systems are capable of achieving the 100 μg/1 level of control previously established for determining BPT mass limitations.

The preamble to the 1979 proposal (44 FR 75938) stated that implementation of Option 2 would result in the removal of approximately 123,000 pounds of chromium per year, at an incremental (beyond BPT) annual cost of $62 million and a capital cost of $138 million (1979 dollars). This 123, 000 pounds of chromium per year represents the incremental removal from the BPT level to the BAT Option 2 level. However, based upon reevaluation of the effluent data base, the Agency has found this figure was overstated because the observed chromium discharge of refineries with BPT level treatment was considerably less than that allowable by the BPT chromium limitations. The actual amount of chromium which would have been removed under this option is approximately 32,000 pounds per year. The capital costs, to a considerable extent, represent retrofit costs.

BAT Option 2 was developed using the proposed 1979 flow model. However, based upon data submitted by commenters and the "Flow Model" study performed by EPA after the proposal (See Section IV), the proposed 1979 flow model was modified. The technical points raised by some of the commenters were of considerable assistance in the flow model refinement process. The main emphasis of the comments concerned the statistical deficiencies of the proposed model, the choice of model variables, and aspects of the resulting model fit. The structure of the model and the process variables to be included were reexamined and modified accordingly. This refinement process resulted in the revised 1979 flow model which was more representative of the current wastewater generation in the industry. Thus, Option 2 has been rejected because it was based on the proposed flow model that has been modified. (See discussion of Option 7 below).

Other Options Considered

Because BAT Option 1 relies on the same technology as BAT Option 2, ammonia, sulfide, and COD levels would not be measurably changed by implementing Option 1. The total phenols limitation for this option was based upon the same 19 μg/1 concentration level as was used for Option 2. However, as previously discussed, BPT end-of-pipe treatment has not been shown to be capable of achieving this concentration level on a long term basis.

The Agency's analysis of available data shows that implementation of Option 1 would remove an additional 1 percent beyond BPT treatment levels of toxic pollutants that are present in raw wastewaters. This translates into an additional removal beyond BPT of approximately 1.3 pounds of toxi pollutants per day, per direct discharge refinery. The proposed 1979 regulation would require $23 5 million additional capital investment at an annual cost of $9.3 million (1979 dollars) to implement Option 1 for this industry. The capital costs, to a considerable extent, represent retrofit costs. This option was rejected because it was based on the proposed 1979 flow model, which, as discussed above, has been modified. (See discussion of Option 8 below).

The Agency's analysis of available data shows that implementation of Option 3 would remove an additional 1.5 percent (beyond BPT treatment) levels of beyond BPT treatment levels. This translates into an additional removal beyond BPT of approximately two pounds of toxic pollutants per day, per direct discharge refinery. The two end-of-pipe treatment technologies that were used to establish Option 3 are rotating biological contactors (RBC) and powdered activated carbon (PAC) treatment. At the time of the Agency's data collection efforts in 1976–1979, there were seven facilities using these technologies. The Agency determined that, upon analysis of available data, there are significant operational (mechanical) problems with RBC technology. The Agency also found that full-scale experience with PAC technology was mixed, i.e., some facilities experienced consistently measurable pollutant reductions as intended, while others experienced inconsistent or no measurable effluent reductions. Because of these operational problems observed in full-scale facilities, there was limited performance information available. While both of these technologies appear promising, the Agency believes there is not enough performance information available at this time upon which to base national regulation for this industry.

Option 4 was predicated on industrywide ability to segregate, collect, and separately treat cooling tower blowdown, the major source of chromium for this industry. The wastewater recycle/reuse study (See Section IV), completed after the publication of the proposed regulation, concluded that, for existing sources, it is extremely difficult in many instances to segregate cooling tower blowdown for chromium treatment. Cooling tower recirculation and blowdown is typically practiced at numerous locations throughout a refinery. Extensive collection systems would be necessary at many refineries to collect all blowdown streams for separate treatment. In addition, not all cooling tower blowdown streams are collectible. For instance, cooling water when used as makeup for refinery processing commingles with process water and cannot be traced or segregated, especially in older refineries. Therefore, the Agency has determined that it would not be proper to base BAT effluent limitations guidelines on this technology option.

The alternative for additional chromium removal beyond BPT is to treat the combined final effluent. However, further end-of-pipe treatment for chromium in combined final effluent after BPT treatment would result in limited, if any, measurable effluent reduction benefits. This is because the chromium level in combined final effluent (115 μg/l observed average) approximates the level achievable by any further treatment of this type of wastewater. For the foregoing reasons,

the Agency rejected Option 4 for this industry.

BAT Option 5 was predicated on industry's ability to install and operate granular activated carbon (GAC) treatment as an end-of-pipe technology. In the preamble to the 1979 proposal (44 FR 75933), the Agency stated that granular activated carbon (GAC) treatment is not a demonstrated technology in this industry. The Agency also stated that toxic pollutant removal generally increases with the use of GAC. However, because the levels of toxic pollutants after BPT treatment are so low, additional pollutant reduction across GAC treatment would be minimal. Difficulties in quantifying pollutant reductions were experienced when the Agency conducted six pilot plant treatability studies using GAC on BPT-treated wastewaters in this industry. See 44 FR 75930. EPA is not aware of any petroleum refinery presently using this technology. Although this technology is used in other industries, EPA has no adequate data to indicate that this technology is capable of being transferred to the petroleum refining industry. For the foregoing reasons the Agency rejected Option 5 for this industry.

The Agency rejected BAT Option 6, a zero discharge requirement: (1) Because of its high capital and operating costs, including significant retrofit expenditures; and (2) because analysis of the zero discharge technologies revealed that significant non-water quality impacts would result from their use. These non-water quality impacts include generation of large amounts of solid waste and very high energy consumption.

BAT Option 7 is the revision of regulatory Option 2, and is based upon a discharge flow reduction of 37.5 percent from the revised 1979 model flow. The Agency revised the costs to implement Option 7 recycle and reuse technologies. An estimated capital cost of $112 million dollars and $37 million dollars annually would be required for refiners to comply with Option 7 (1979 dollars). The Agency's analysis of available data shows that implementation of Option 7 would remove 110,000 pounds of toxic pollutants annually beyond BPT treatment levels, which is equivalent to an additional 1.5 percent (beyond BPT treatment levels) of toxic pollutants from raw wastewaters. This translates into an additional removal beyond BPT of approximately two pounds of toxic pollutants per day, per direct discharge refinery. The Agency believes, that given all of these factors, the costs involved do not warrant selection of Option 7 for this industry.

BAT Option 8 is a revised version of Option 1 reduction of 20 percent from the revised 1979 model flow. The Agency has not performed a detailed cost analysis for Option 8 but rather has estimated such costs based upon the costing procedure developed for Option 7. (Option 7 is the revision of the regulatory Option 2 selected in the 1979 proposal). The Agency's analysis of available data shows that implementation of Option 8 would remove an additional 80,000 pounds of toxic pollutants annually beyond BPT treatment levels, which would be an additional one percent (beyond BPT treatment levels) of toxic pollutants from raw wastewaters at a capital cost of $77 million dollars and an annual cost of $25 million (1979 dollars). This translates into an additional removal beyond BPT of 1.3 pounds of toxic pollutants per day, per direct discharge refinery. The Agency believes that given all these factors, the costs involved do not warrant selection of Option 8 for this industry.

Option 9 is based upon the same flow model and subcategorization scheme that were used for developing the BPT regulations promulgated by the Agency in 1974. A process classification system was used to divide the industry into five subcategories. A procedure was developed to establish effluent limitations for each subcategory. The resulting limits were defined in terms of a quantity of pollutant per unit of feedstock (mass allocation), and were derived by multiplying a predicted wastewater flow per unit of production times an achievable effluent concentration for each pollutant. A flow modeling approach, based on process configuration, was used to predict expected wastewater flow for an individual refinery, and is referred to as the "BPT flow model".

Option 9 was selected by the Agency as the basis for the final BAT regulations. Considering the limited pollutant reduction benefits associated with Options 1 through 8, the inability to quantify nonconventional pollutant reduction via Options 1 through 8, the costs involved of going beyond the BPT level of control, and the 96 percent reduction in toxic pollutant loadings achieved by BPT, the Agency has determined that the BAT should be equivalent to the BPT level of control for this industry.

B. New Source Performance Standards (NSPS)

NSPS were promulgated by EPA on May 9, 1974 (29 FR 16560) and are currently in effect. The Agency is retaining the existing NSPS.

1. *Control Treatment Options for NSPS.* The control and treatment technology options that EPA investigated for use in this industry for NSPS are presented below. Options 1 through 3 were considered in formulating the proposed rule and were based upon the 1979 flow model. Option 4, the existing NSPS level of control, was reconsidered after publication of the proposed rule as a result of the public comments and is based upon the 1974 flow model.

Option 1—Discharge flow reduction of 52 percent from model flow, achieved through greater reuse and recycle of wastewaters, in addition to BPT treatment. This option is equivalent to BAT Option 2.

Option 2—Discharge flow reduction of 27 percent from model flow, achieved through greater reuse and recycle of wastewaters in addition to BPT treatment, plus use of granular activated carbon to reduce residual organic toxic pollutants. This option is equivalent to BAT Option 5.

Option 3—Zero discharge of wastewater pollutants.

Option 4—Discharge flow reduction of from 25 percent to 50 percent of average BPT flow, depending upon subcategory, achieved through greater reuse and recycle of wastewaters in addition to BPT treatment. This option, which is based upon the 1974 flow model and 1974 subcategorization scheme, is the existing NSPS.

2. *Technology Basis for the NSPS Regulation.* (a) NSPS Limits: EPA is retaining the existing NSPS which are based on recycle and reuse technology resulting in pollutant reductions that range from 25 to 50 percent beyond BPT removals, depending upon the subcategory. Regulated pollutants for NSPS are BOD5, total suspended solids, chemical oxygen demand, oil and grease, total phenols (4AAP), ammonia (N), sulfide, total chromium, hexavalent chromium, and pH.

(b) Changes from Proposal: The proposed NSPS regulation was based on Option 3. Upon reevaluation of the existing data base and evaluation of comments received on the proposed regulation, EPA has decided not to revise the existing NSPS.

Option 3, zero discharge, was rejected for the following reasons. First, it generates significant adverse non-water quality environmental impacts, including the production of large amounts of solid waste and high energy consumption. Second, EPA estimates that the annual costs of achieving zero

discharge are extremely high, especially in geographical areas of low evapotranspiration which requires energy intensive forced evaporation techniques. It would cost an estimated $4.6 million (1979 dollars) annually for a 150,000 barrels per day new source of refinery in the cracking subcategory to comply with a zero discharge requirement. Third, only marginal additional water pollution reduction benefits would be achieved beyond the existing NSPS requirement. The quantities of pollutants that would be removed daily are 2.46 pounds of total phenols (4AAP), 3.9 pounds of hexavalent chromium, 6 pounds of total chromium, 308 pounds of total suspended solids, and 381 pounds of BOD5. EPA believes that the high costs of implementing such requirements would raise serious barriers to any decision involving construction of a new source refinery.

Other Options Considered

NSPS Option 1 is equivalent to proposed BAT Option 2. The technology for this option is the same as that for the existing NSPS regulations—wastewater recycle and reuse technologies, in addition to BPT end-of-pipe treatment. The Agency compared effluent reductions achievable by existing NSPS and this option. The analysis was performed on a model greenfield new source refinery (190,000 bbl/day), which is classified as a "Subcategory B" refinery as defined by the existing regulation ("cracking"). This model refinery was configured to correspond with demand growth forecasts published by the Department of Energy (See the Economic Analysis document.) This comparison concluded that effluent reductions resulting from existing NSPS and this option are comparable. The costs to implement this option are comparable to the existing NSPS. Non-water quality environmental impacts and energy requirements are also comparable to existing NSPS. Accordingly, there would be no benefit in revising the existing NSPS option.

NSPS Option 2 is equivalent to proposed BAT Option 5, which is based on granular activated carbon (GAC) treatment as an end-of-pipe technology. For the reasons stated in the above discussion on BAT Option 5, the Agency believes that GAC treatment is not a demonstrated technology for this industry. Accordingly, the Agency rejected Option 2 for this industry.

NSPS Option 4, is the existing NSPS level of control. It consists of recycle and reuse technologies to achieve flow reduction of from 25 to 50 percent of average BPT flow, depending upon the subcategory. For the reasons discussed above, after careful consideration of the options proposed in 1979, together with the public comments received, the Agency finds no reason for revising current NSPS. Accordingly, the existing level of NSPS, Option 4, is retained.

C. Final Pretreatment Standards for Existing Sources (PSES)

Interim final PSES was promulgated by the Agency on March 23, 1977 (42 FR 15684) and is currently in effect. Regulated pollutants are oil and grease (100 mg/l) and ammonia-N (100 mg/l) each on a daily maximum basis. EPA is retaining the existing PSES regulation, with one modification. An alternative mass limitation for ammonia(N) is provided for those indirect dischargers whose discharge to the POTW consists solely of sour waters.

1. *Control Treatment Options Considered.* The control and treatment options that EPA investigated for PSES in this industry are presented below. Options 1 and 2 were considered in formulating the proposed rule. Option 3, the existing PSES level of control, was reconsidered after publication of the proposed rule as a result of public comments received on it. As a result of public comments, Option 3 also contains an alternative mass limitation for ammonia(N).

Option 1—Chromium reduction by pH adjustment, precipitation and clarification technologies applied to segregated cooling tower blowdown, plus control of oil and grease and ammonia at the existing PSES level of control.

Option 2—Establish two sets of pretreatment standards. The first would be Option 1 control for refineries discharging to POTW with existing or planned secondary treatment. The second would be Option 1 control plus treatment for total phenols based on biological treatment for those refineries discharging to a POTW that has been granted a waiver from secondary treatment requirements under Section 301(h) of the Act. EPA's proposed pretreatment standards for existing sources were based on this option. For a further discussion see the 1979 proposed petroleum refining regulation at 44 FR 75935.

Option 3—Reduction of oil and grease and ammonia based on oil/water separation and steam stripping technologies. This option is the basis for the existing interim final PSES regulation. An alternative mass limitation for ammonia(N) is included for those indirect dischargers whose discharge to the POTW consists solely of "sour" waters. Sour waters generally result from water brought into direct contact with a hydrocarbon stream, and contain sulfides, ammonia and phenols. The Agency developed an alternative mass limitation for ammonia in response to public comments received on the proposed regulation. Several commenters indicated that, when the refinery discharge to the POTW consists solely of sour waters, the achievement of the 100 mg/l ammonia concentration limitation is often not possible. This is because steam stripping technology, the basis for the limitations, cannot consistently reduce ammonia in sour water streams to the 100 mg/l level. Thus, an equivalent mass limitation for ammonia was developed by the Agency.

2. *Technology Basis for the Final PSES Options.* (a) Final PSES Limits: EPA is retaining the existing PSES regulation. Regulated pollutants are oil and grease and ammonia(N), each limited at 100 mg/l on a daily maximum basis. An alternative mass limitation for ammonia-N is also provided as described above.

(b) Changes from Proposal: The proposed regulation was based on Option 2 for the PSES control level. EPA has rejected Option 2 because it now believes that it is not feasible and that it would be inappropriate to establish national pretreatment standards that take into account whether a discharger uses a POTW which has received a 301(h) waiver. Rather, the need for more rigorous pretreatment controls should be resolved on a case-by-case basis during the Section 301(h) waiver process. This is because the level of treatment proposed by Section 301(h) applicants varies considerably, and the Section 301 (h) process entails the consideration of site-specific toxic pollutant problems.

Options 1 and 2 as proposed also would have established a chromium limitation for PSES. This limitation was proposed to avoid concentration of chromium in POTW sludge. At the time of proposal, the Agency believed such concentrations would limit a POTW's use or management alternatives of the sludge. Based upon review of existing information and analysis of public comments on the proposal, EPA has determined that this rationale is not valid on a nationwide basis. For this industry, chromium levels in sludge from POTW receiving petroluem refinery wastes generally do not impact on sludge disposition or alternatives for use. There are no Section 405 sludge standards directed at concentrations of chromium in the sludge. Accordingly, EPA has determined that the better approach is to leave it to the POTW to establish chromium pretreatment

standards for existing sources if refinery waste would limit their sludge disposal alternatives. The general pretreatment regulations specifically provide POTW's with this authority. (See 40 CFR 403.5).

EPA has investigated whether toxic pollutants "pass through" a POTW. The Agency generally considers that there is pass through of a pollutant if the percent of the pollutant removal by a well-operated POTW achieving secondary treatment is less than the percent removed by the BAT model treatment technology. Under this approach, chromium passes through a POTW. The Agency's BAT model treatment system removes 86 percent of the chromium while a well-operated POTW achieving secondary treatment removes 65 percent of the chromium. In addition, under this approach the toxic pollutants identified in Appendix D—Parts II/III of this Federal Register notice may pass through a POTW.

As discussed under BAT Option 4 above, the Agency found it infeasible in many instances to segregate cooling tower blowdown for chromium treatment on an industrywide basis. Accordingly, EPA has determined that implementation of Option 1 for PSES is not achievable on an industry-wide basis. As an alternative, treatment of the combined refinery waste stream for chromium removal would require installation of most if not all of the BPT treatment train. Installation of such treatment for all indirect dischargers would cost an estimated $110 million in capital costs, with a total annual cost of $42 million in (1979 dollars). The Agency did not propose requiring installation of BPT-type treatment on an industry-wide basis for indirect dischargers. EPA did not receive any comments during the public comment period suggesting such a requirement. For the foregoing combination of reasons, and given the costs involved, EPA does not believe installation of the BPT treatment train for chromium removal for indirect dischargers is warranted.

The toxic pollutants listed in Appendix D of this preamble were detected in petroleum refinery waste streams that are discharged to POTWs. The Agency has decided not to establish PSES for these toxic pollutants in this industry for the following reasons:

The pollutants listed in Part I and Part II of Appendix D are excluded from national regulation in accordance with Paragraph 8 of the Settlement Agreement because either they were found to be susceptible to treatment by the POTW and do not interfere with, pass through, or are not otherwise incompatible with the POTW, or the toxicity and amount of incompatible pollutants are insignificant.

The pollutants listed in Part III of Appendix D are excluded for several reasons in accordance with Paragraph 8 of the Settlement Agreement. First, there is significant removal of some of these pollutants by the existing oil/water separation technology used to comply with the pretreatment standard for oil and grease. Second, there is significant removal of these pollutants by the POTW treatment processes by air stripping and biodegredation. Third, the amount and toxicity of these pollutants does not justify developing national pretreatment standards.

D. Final Pretreatment Standards for New Sources (PSNS)

PSNS was promulgated by the Agency on May 9, 1974 (39 FR 16560) and is currently in effect. Pretreatment Standards for incompatible pollutants are equivalent to NSPS.

1. *Control Treatment Options Considered.* The control and treatment options that EPA investigated for PSNS in this industry are the same as those presented for PSES, as described above. Option 1 was selected as the basis for PSNS. As a result of public comment, the final PSNS contains an alternative mass limitation for ammonia(N).

Option 1—Chromium reduction by pH adjustment, precipitation and clarification technologies applied to segregated cooling tower blowdown, plus control of oil and grease and ammonia to 100 mg/1 each.

Option 2—Establish two sets of pretreatment standards as for PSES Option 2.

2. *Technology Basis for the Final PSNS.* (a) Final PSNS Limits: EPA is promulgating PSNS equivalent to Option 1. Regulated pollutants are oil and grease and ammonia(N), each limited at 100 mg/1, on a daily maximum basis, and total chromium at the equivalent of 1 mg/1 for the cooling tower discharge part of the total refinery flow to the POTW. An alternative mass limitation for ammonia(N) is also provided, as described above for PSES.

(b) Changes from Proposal: The final PSNS limits are equal to Option 1, the option selected at proposal. Chromium was selected for regulation for PSNS because: (1) It was determined to "pass through" POTWs as described above; (2) treatment technology is available and demonstrated; and (3) there are no retrofit problems or retrofit costs involved with implementing Option 1.

Alternative mass limitations for ammonia(N) are also provided, as discussed previously

Pretreatment costs for a typical new source refinery are estimated to be $260,000 in capital costs and $190,000 in annual costs (1979 dollars).

VI. Costs and Economic Impacts

Executive Order 12291 requires EPA and other agencies to provide regulatory impact analyses for rules that result in an annual cost to the economy of 100 million dollars or more or that meet other economic impact criteria. In addition, the Clean Water Act specifies that the Agency should consider the costs and economic impacts in establishing effluent limitations and standards. The Agency does not consider this final regulation to be a major rule. This rulemaking satisfies the requirements of the Executive Order for a non-major rule.

The economic impact assessment is presented in *Economic Impact Analysis of Proposed Revised Effluent Limitations for the Petroleum Refining Industry* (EPA). Copies of the analysis can be obtained by contacting the National Technical Information Service, 5282 Port Royal Road, Springfield, VA 22161 (703/487–4600).

BAT/PSES

EPA is making substantial changes to the regulations that were proposed in December 1979. The limitations promulgated today for existing sources do not reflect any treatment requirements beyond BPT for existing direct dischargers. For indirect dischargers the PSES promulgated today is no more stringent than existing pretreatment standards already in effect. Accordingly, EPA expects no incremental costs or impacts for existing plants from this rulemaking.

NSPS

EPA is not imposing any more stringent NSPS by today's action. Accordingly, today's action will not affect the rate of entry of new refineries into the industry. Moreover, EPA does not expect the NSPS promulgated in 1974 to change the rate of entry or growth of the industry. The Agency expects that if a firm decides to bring a new refinery on line, the control costs that will be required to meet these standards are relatively small compared to the total cost required to start a greenfield operation. The current economic analysis was based on a 190,000 barrel per day refinery with a configuration appropriate for production of gasoline, distillate fuels and petrochemical feedstocks. There would essentially be no additional investment required for meeting the current

standard beyond the BPT level of control. This is because the "add-on" recycle technology for the existing NSPS can be incorporated in the water supply, use, and treatment systems during planning and construction of the new source. Therefore, this regulation is expected to have negligible economic effects on the industry.

Due to significant changes in the world market for refined petroleum products, however, the Agency does not anticipate any new sources within the petroleum refining category through 1990. A refinery can be a new source if it is a "greenfield site" or if modification of an existing plant is extensive enough to be "substantially independent" of an existing source. (See 45 FR 59343, September 9, 1980.) The Agency expects that in the latter case the control costs that would be required to meet these standards would be less than the cost in the case of a greenfield operation.

PSNS

EPA believes that for indirect dischargers the PSNS promulgated today is no more stringent than existing PSNS. Under the existing PSNS chromium was subject to regulation on a case-by-case basis along with other pollutants. The Agency expects that if a firm decides to bring a new indirect discharger on line, the control cost that will be required to meet these standards are relatively minor compared to the total investment cost for a new refinery and would not pose a barrier to entry. The Agency believes that where an existing refinery is modified so that it is considered a new source, the costs for chromium treatment would not be greater than the costs for a greenfield refinery and the cost of chromium treatment would not be a significant factor in the decision to modify that refinery.

Public Law 96-354 requires that a Regulatory Flexibility Analysis (RFA) be prepared for regulations proposed after January 1, 1981 that have a significant effect on a substantial number of small entities. This regulation was proposed on December 21, 1979. Therefore, a Regulatory Flexibility Analysis is not required. The Agency does not believe that this regulation will have a significant impact on a substantial number of small entities

VII. Non-Water Quality Environmental Impacts

Eliminating or reducing one form of pollution may cause other environmental problems. Sections 304(b) and 306 of the Act require EPA to consider the non-water quality environmental impacts (including energy requirements) of certain regulations. In compliance with these provisions, we considered the effect of this regulation on air pollution, solid waste generation, water scarcity, and energy consumption. This regulation was circulated to and reviewed by EPA personnel responsible for non-water quality programs. While it is difficult to balance pollution problems against each other and against energy use, we believe that this regulation will best serve often competing national goals.

The following non-water quality environmental impacts (including energy requirements) are associated with the final regulation. The Administrator has determined that the impacts identified below are justified by the benefits associated with compliance with the limitations and standards.

A. *Air Pollution*

The petroleum refining regulations will not result in any additional air quality impacts beyond those from compliance with existing regulations.

B. *Solid Waste*

The petroleum refining regulations will not result in any additional solid waste impacts beyond those from compliance with existing regulations.

C. *Consumptive Water Loss*

The petroleum refining regulations will not result in any additional water consumption beyond that from compliance with existing regulations.

D. *Energy Requirements*

The petroleum refining regulations will not result in any additional energy requirements beyond those for compliance with existing regulations.

VIII. Pollutants and Subcategories Not Regulated

The Settlement Agreement contains provisions authorizing the exclusion from regulation, in certain circumstances, of toxic pollutants and industry categories and subcategories.

A. *Exclusion of Pollutants*

Paragraph 8(a)(iii) of the Settlement Agreement authorizes the Administrator to exclude the following toxic pollutants from regulation: (a) Those not detectable by Section 304(h) analytical methods or other state-of-the-art methods; (b) those present in amounts too small to be effectively reduced by available technologies; (c) those present only in trace amounts and neither causing nor likely to cause toxic effects; (d) those detected in the effluent from only a small number of sources within a subcategory and uniquely related to those sources; and (e) those that will be effectively controlled by the technologies on which other effluent limitations and standards are based.

The toxic pollutants excluded from regulation in all subcategories because they were not detectable by Section 304(h) analytical methods or other state-of-the-art methods are listed in Appendix A for direct dischargers and Appendix B for indirect dischargers

The toxic pollutants that will be effectively controlled by the technologies on which other effluent limitations and standards are based are listed in Appendix C for direct dischargers.

B. *Exclusion of Subcategories*

Paragraph 8(b) of the Settlement Agreement authorizes the Administrator to exclude from regulation a category if: (i) 95 percent or more of all point sources in the subcategory introduce into POTWs only pollutants which are susceptible to treatment by the POTW and which do not interfere with, do not pass through, or are not otherwise incompatible with such treatment works; or (ii) the toxicity and amount of the incompatible pollutants introduced by such point sources into POTWs is so insignificant as not to justify developing a pretreatment regulation. The pollutants excluded under Paragraphs 8(b)(i), 8(b)(ii), and 8(a) are listed in Appendix D for indirect dischargers.

IX. Responses to Major Comments

This section contains responses to those issues raised in a large number of the comments received and which affect all subcategories. The original comments and a summary of the comments received and our detailed responses to all comments are included in a report "Responses to Public Comments, Proposed Petroleum Refining Effluent Guidelines and Standards", which is included in the public record for this regulation.

Most of the commenters criticized the need for further control beyond existing BPT and NSPS and the alleged technical inadequacy of data to support the proposed regulations. Since the Agency has decided to promulgate BAT equivalent to BPT retain the existing NSPS and retain the existing PSES regulation (with an alternative mass limitation provided for ammonia (N)), EPA believes it unnecessary to address in detail many of the comments in this preamble. A brief summary of significant comments received by the Agency, together with the Agency's responses, is set forth below:

A. *Regulation Beyond the BPT Level*

Many of the commenters indicated

that further control beyond BPT is unwarranted since BPT technology already reduces significant quantities of toxics.

The Agency agrees with the commenters that BPT technology already removes significant quantities of toxic and other pollutants and is thus promulgating BAT equal to BPT. One of the many factors considered in formulating the final rule are the very low pollutant levels in BPT effluents and the overall effectiveness and efficiency of the treatment systems already in place in removing toxic and other pollutants.

Other commenters argued for BAT to be promulgated at the proposed BAT *level or a more stringent level, including* zero discharge or separate treatment of cooling water discharges. The reasons for not adopting levels of treatment are discussed in Section V above.

The proposed requirement for separate treatment of cooling tower blowdown for existing dischargers was not adopted as a result of public comments received. In addition, the Agency performed a study which evaluated the cost and feasibility of implementing recycle and reuse technologies. The study (Recycle/Reuse Study referenced in Section IV) indicated that the collection of all the cooling tower water is infeasible in many existing refineries because of leaks and auxiliary uses and thus *supports the Agency's decision not to* impose this requirement.

Several commenters argued that the proposed zero discharge requirement for new sources has questionable effluent reduction benefits and the Agency did not consider the benefit/cost ratio of zero discharge. The factors that led to the Agency's decision to retain the existing NSPS are discussed in Section V.

B. *Pretreatment Standards for POTW with § 301(h) Waivers*

Some commenters argued that EPA has no authority to establish more stringent pretreatment standards for refineries that discharge to POTW with Section 301(h) waivers.

Although the Agency does not agree with these commenters, we have decided to change the proposed approach and establish one set of pretreatment standards for all indirect dischargers in this industry. This industrial category is the only one for which EPA proposed separate pretreatment standards for indirect dischargers whose wastes go to POTWs with § 301(h) waivers. The Agency would like to gain more experience with § 301(h) applicants before considering a two-tier pretreatment requirement. Added experience will enable the Agency to decide whether control of toxics should be effectuated through requirements imposed on POTW during the § 301(h) waiver process or by revised pretreatment standards.

C. *Pretreatment Standards for Hydrogen Sulfide and Mercaptans*

A few commenters indicated that hydrogen sulfide and mercaptans can cause damage to the wastewater collection systems and can cause significant odor problems at the treatment plant if not removed. Pretreatment standards were recommended.

Pretreatment standards adopted today limit ammonia to 100 mg/l. The technology for control of ammonia is steam stripping, the same technology required for sulfide removal. The Agency therefore believes that the *technology for control of ammonia will* also control sulfide and therefore that it is not necessary to establish separate pretreatment standards for sulfide. Mercaptans were not found to be a problem warranting national regulation. Any POTW experiencing problems caused by mercaptans should impose the appropriate pretreatment standards on a case-by-case basis.

D. *Total Phenol (4AAP)*

Several commenters indicated that EPA has incorrectly assumed that total phenols as determined by the 4-aminoantipyrine method (4AAP) is a toxic pollutant in this industry.

The Agency agrees. Total phenols (4AAP) measures many compounds, including the phenolic compounds that are on the Agency's list of priority pollutants. Because the 4AAP method measures more compounds than just the GC/MS compounds, it does not provide *an accurate quantification of the toxic* pollutant phenol (GC/MS). Thus, total phenols (4AAP) is considered a non-conventional pollutant for this industry.

E. *Regulation of Toxic Organics*

It was argued that EPA should promulgate effluent limitations guidelines for specific toxic pollutants such as methylene chloride, carbon *tetrachloride, mercury, ethylbenzene,* naphthalene, 2–4 dimethylphenol, benzene, and toluene.

The Agency has concluded that the levels of these pollutants detected in this industry do not warrant industry-wide regulation. Mercury was found in effluents from BPT treatment systems during the Agency's sampling programs at an average concentration of less than 1 ppb. Methylene chloride was detected in BPT effluents, but is a contaminant inherent in the analyses of organic compounds. Thus, *it is difficult to* determine the amounts discharged by refinery operations. Ethylbenzene, naphthalene, 2,4-dimethylphenol, benzene, toluene, and carbon tetrachloride were either not detected in BPT treated wastewaters or were present at average concentrations that were at or less than the level of *quantification, which is nominally* 10 ppb.

F. *Indicator and Surrogate Pollutants.*

Comments were received from industry and private citizens on the possible use of indicator or surrogate pollutant limitations. Most of the comments were not favorable. The industry commenters argued that *indicator limitations, if necessary,* should be developed on a case-by-case basis. Industry also questioned the use of total organic carbon (TOC), chemical oxygen demand (COD), and BPT-limited pollutant parameters as indicators for toxic pollutants because the concentration of toxics are several orders of magnitude smaller than that of such traditional pollutants. The private citizens felt that the Agency should limit the toxics directly instead of relying on indicators. Additionally, many commenters pointed out the difficulty in *using the BPT pollutant parameters as* indicators of toxic pollutants.

In the Solicitation of Comments section of the preamble to the 1979 proposal (40 FR 45941), the Agency requested comments on the possibility of regulating toxic pollutants with limitations on indicator pollutants. While EPA recognizes that the relationship between "indicator" and toxic pollutants may not be quantifiable on a one-to-one basis, we believe control of the "indicator" pollutants would reasonably assure control of *toxic pollutants with similar physical* and chemical properties.

Subsequent to the 1979 proposal, the Agency conducted a sampling program at two refineries for a period of sixty days to determine whether an indicator/surrogate relationship existed between the BPT pollutant parameters and the toxics. The results of the study confirm the difficulties of using such parameters and indicates that a statistically significant correlation between candidate surrogate/indicator parameters and toxic pollutant *parameters does not exist for this* industry. The Agency, therefore, decided not to issue limitations for indicator or surrogate pollutants in this rule.

Specific toxic pollutants other than chromium are not regulated by today's rule for reasons presented in Sections V and VIII of this preamble.

G. New Source Construction

It was argued that there is no basis for EPA's statements that no new refineries will be entering the industry. Commenters stated that new refineries are currently being planned, such as the one in Portsmouth, Virginia.

The U.S. refining industry has experienced a dramatic reversal of historical growth trends as a result of the reduction in consumption of petroleum products that has taken place since 1978. U.S. crude oil runs peaked at 14.7 million barrels per day in the calendar year 1978. Runs have decreased each year since then reaching 12.5 million barrels per day for the calendar year 1981. In early 1982 runs dropped to below 11.5 million barrels per day—representing percentage capacity utilizations in the low 60's. The 1981 DOE Annual Report to Congress predicts production to regain strength to 14.4 million barrels per day in 1985 and 13.4 million barrels per day by 1990. The Agency believes that these forecasts of U.S. refinery activity indicate that it is unlikely that any new refinery facilities will be built at *undeveloped* sites over the next decade, including the Portsmouth, Virginia site which has become uneconomical and is not expected to be built. However, it will be necessary for U.S. refiners to modernize and expand downstream facilities at existing refinery sites to allow increasingly heavier and higher sulfur crude oils to be processed into a product mix which emphasizes production of the lighter and higher quality products that will be demanded by the marketplace. This modernization process is not expected to be sufficiently independent to be considered a new source.

X. Best Management Practices

Section 304(e) of the Clean Water Act gives the Administrator authority to prescribe "best management practices" (BMPs).

Although EPA is not establishing BMPs at this time, we are considering development of BMPs specific to the petroleum refining industry. Numerous problem areas are known exist, including leaks and spills, storm water contamination, groundwater infiltration from storage areas and on-site solid waste disposal. Section VII of the development document describes possible BMP's for this industry. This information can guide the permitting agency in developing case-by-case BMPs for NPDES permits.

XI. Upset and Bypass Provisions

A recurring issue of concern has been whether industry guidelines should include provisions authorizing noncompliance with effluent limitations during periods of "upset" or "bypass." An upset, sometimes called an "excursion", is an unintentional noncompliance occurring for reasons beyond the reasonable control of the permittee. It has been argued that an upset provision is necessary in EPA's effluent limitations because such upsets will inevitably occur even in properly operated control equipment. Because technology based limitations require only what technology can achieve, it is claimed that liability for such situations is improper. When confronted with this issue, courts have disagreed on whether an explicit upset or excursion exemption is necessary, or whether upset or excursion incidents may be handled through EPA's exercise of enforcement discretion. Compare *Marathon Oil Co.* v. *EPA*, 564 F. 2d 1253 (9th Cir. 1977) with *Weyerhaeuser* v. *Costle*, 590 F. 2d 1011 (D.C. Cir., 1978), and *Corn Refiners Association, et al.* v. *Costle*, 594 F. 2d 1223 (8th Cir., 1979). *See also American Petroleum Institute* v. *EPA*, 540 F. 2d 1023 (10th Cir. 1976); *CPC International, Inc.* v. *Train*, 540 F. 2d 1320 (8th Cir. 1976); and *FMC Corp.* v. *Train*, 539 F. 2d 973 (4th Cir. 1976).

A bypass is an act of intentional noncompliance during which waste treatment facilities are circumvented because of an emergency situation. EPA has in the past included bypass provisions in NPDES permits.

The Agency has determined that both upset and bypass provisions should be included in NPDES permits and has promulgated Consolidated Permit Regulations which include upset and bypass permit provisions [see 40 CFR 122.60, 45 FR 33290, May 19, 1980]. The upset provision establishes an upset as an affirmative defense to prosecution for violation of technology-based effluent limitations. The bypass provision authorizes bypassing to prevent loss of life, personal injury, or severe property damage. Consequently, although permittees in the petroleum refining industry will be entitled to upset and bypass provisions in NPDES permits, the final petroleum refining regulations do not address these issues.

XII. Variances and Modifications

Upon the promulgation of the regulations the effluent limitations for the appropriate subcategory must be applied in all Federal and State NPDES permits thereafter issued to direct dischargers in the petroleum refining industry. In addition, upon promulgation, the pretreatment limitations are applicable to any indirect dischargers.

For the BPT effluent limitations, the only exception to the binding limitations is EPA's "fundamentally different factors" variance. See *E. I. du Pont de Nemours & Co.* v. *Train*, 430 U.S. 112 (1977); *Weyerhaeuser Co.* v. *Costle, supra*. This variance recognizes factors concerning a particular discharger that are fundamentally different from the factors considered in this rulemaking. Although this variance clause was set forth in EPA's 1973–1976 industry regulations, it is now included in the NPDES regulations and is referenced by citation in the petroleum refining or other industry regulations. See the NPDES regulations at 40 CFR Part 125, Subpart D.

The BAT limitations in this regulation are also subject to EPA's "fundamentally different factors" variance. BAT limitations for nonconventional pollutants are subject to modifications under Sections 301(c) and 301(g) of the Act. These statutory modifications do not apply to toxic or conventional pollutants. According to Section 301(j)(1)(B), applications for these modifications must be filed within 270 days after promulgation of final effluent limitations guidelines. See 43 FR 40895, September 13, 1978.

Pretreatment standards for existing sources are subject to the "fundamentally different factors" variance and credits for pollutants removed by POTW. (See 40 CFR 403.7, 403.13; 43 FR 27736 (June 26, 1978)).

Pretreatment standards for new sources are subject only to the credits provision in 40 CFR 403.7. NSPS are not subject to EPA's "fundamentally different factors" variance or any statutory or regulatory modifications. See *E. I. duPont de Nemours and Co* v. *Train, supra*.

XIII. Relationship to NPDES Permits

The BAT limitations in this regulation will be applied to individual petroleum refineries through NPDES permits issued by EPA or approved state agencies, under Section 402 of the Act. As discussed in the preceding section of this preamble, these limitations must be applied in all Federal and State NPDES permits except to extent that variances and modifications are expressly authorized. Other aspects of the interaction between these limitations and NPDES permits are discussed below.

One issue that warrants consideration is the effect of this regulation on the powers of NPDES permit-issuing authorities. The promulgation of this regulation does not restrict the power of any permitting authority to act in any manner consistent with law or these or any other EPA regulations, guidelines, or

policy. For example, even if this regulation does not control a particular pollutant, the permit issuer may still limit such pollutant on a case-by-case basis when limitations are necessary to carry out the purposes of the Act. In addition, to the extent that State water quality standards or other provisions of State or Federal law require limitation of pollutants not covered by this regulation (or require more stringent limitations on covered pollutants), such limitations must be applied by the permit-issuing authority.

A second topic that warrants discussion is the operation of EPA's NPDES enforcement program, many aspects of which were considered in developing this regulation. Although the Clean Water Act is a strict liability statute, the initiation of enforcement proceedings by EPA is discretionary. EPA has exercised and intends to exercise that discretion in a manner that recognizes and promotes good-faith compliance efforts and conserves enforcement resources for those who fail to make good-faith efforts to comply with the Act.

XIV. Public Participation

Numerous agencies and groups have participated during the development of these effluent limitations guidelines and standards. Following the publication of the proposed rules on December 21, 1979, in the Federal Register, EPA provided the development document supporting the proposed rules to industry, Government agencies, and the public sector for comments. Five technical workshops were held on the proposed rulemaking. On April 9, 1980, in Washington, D.C., a public hearing was held on the proposed pretreatment standards.

The individuals and organizations that submitted written comments during the comment period on the proposed regulation are listed in Appendix A of this preamble.

All comments received have been carefully considered, and appropriate changes in the regulations have been made whenever available data and information supported those changes. Major issues raised by commenters are addressed in Section IX of this preamble. A summary of all the comments received and our detailed responses to all comments are included in a report "Responses to Public Comments, Proposed Petroleum Refining Effluent Guidelines and Standards," which is a part of the public record for this regulation. This report, along with the rest of the public record, will be available for public review four weeks after the effective date in EPA's Public Information Reference Unit, Room 2004 (Rear), (EPA Library), 401 M Street, S.W., Washington, D.C.

XV. Small Business Administration (SBA) Financial Assistance

The Agency is continuing to encourage small manufacturers to use Small Business Administration (SBA) financing as needed for pollution control equipment. Three basic programs are in effect: the Guaranteed Pollution Control Bond Program, the Section 503 Program, and the Regular Guarantee Program. All the SBA loan programs are open only to businesses with net assets less than $6 million, with an average annual after-tax income of less than $2 million, and with fewer than 250 employees.

The guaranteed pollution control bond is a full faith and credit instrument with a tax free feature, making this program the most favorable. The program applies to projects that cost from $150,000 to $2,000,000.

The Section 503 Program, as amended in July 1980, allows for long-term loans to small- and medium-sized businesses. These loans are made by SBA-approved local development companies, which for the first time are authorized to issue Government-backed debentures that are bought by the Federal Financing Bank, an arm of the U.S. Treasury.

Through SBA's Regular Guarantee Program, loans are made available by commercial banks and are guaranteed by the SBA. This program has interest rates equivalent to market rates.

For additional information on the Regular Guarantee and Section 503 Programs contact your district or local SBA Office. The coordinator at EPA headquarters is Ms. Frances Desselle who may be reached at (202) 426-7874.

For further information and specifics on the Guaranteed Pollution Control Bond Program contact: U.S. Small Business Administration, Office of Pollution Control Financing, 4040 North Fairfax Drive, Rosslyn, Virginia 22203, (703) 235-2902.

XVI. Availability of Technical Assistance

The major documents upon which these regulations are based are: (1) The *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining* Point Source Category (EPA 440/1-82/014; (2) a report entitled *Long Term Monitoring Data Collection Survey for the Petroleum Refining Industry* (public record); (3) a report entitled *Wastewater Recycle Study, Petroleum Refining Industry* (public record); (4) *Economic Analysis of Promulgated Effluent Standards and Limitations for the Petroleum Refining Industry* (EPA 440/2-82/007); (5) public comments received by the Agency on the studies upon which the proposed regulations were based; and (6) the development document supporting the proposed regulations. A summary of the public comments received on the proposed regulation is presented in a report "Responses to Public Comments Proposed Petroleum Refining Effluent Guidelines and Standards", which is a part of the public record for this regulation.

The regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

List of Subjects in 40 CFR Part 419

Petroleum, Water pollution control, Waste treatment and disposal.

Dated: September 30, 1982.

John W. Hernandez,

Acting Administrator

XVII. Appendices

Appendix A.—Priority Pollutants Not Detected in Treated Effluents Discharged Directly, and Excluded From Regulation

Pursuant to Paragraph 8(a)(iii) of the Settlement Agreement, the following 98 priority pollutants are excluded from national regulation because they were not detected in effluents from BPT treatment systems by Section 304(h) analytical methods or other state-of-the-art methods:

EPA No.	Priority pollutant
2	acrolein
3	acrylonitrile
5	benzidine
6	carbon tetrachloride
7	chlorobenzene
8	1 2,4-trichlorobenzene
9	hexachlorobenzene
10	1 2-dichloroethane
11	1 1 1-trichloroethane
12	hexachloroethane
13	1,1-dichloroethane
14	1,1 2-trichloroethane
15	1,1,2,2-tetrachloroethane
16	chloroethane
18	bis(2-chloroethyl) ether
19	2-chloroethylvinyl ether
20	2-chloronaphthalene
21	2 4 6-trichlorophenol
24	2-chlorophenol
25	1,2-dichlorobenzene
26	1,3-dichlorobenzene
27	1,4-dichlorobenzene
28	3,3'-dichlorobenzidine
29	1,1-dichloroethylene
30	1,2-trans-dichloroethylene
32	1 2-dichloropropane
33	1 3-dichloropropylene
34	2,4-dimethylphenol
35	2 4-dinitrotoluene
36	2 6-dinitrotoluene
37	1,2-diphenylhydrazine
38	ethylbenzene
39	fluoranthene
40	4-chlorophenyl phenyl ether
41	4-bromophenyl phenyl ether
42	bis(2-chloroisopropyl) ether
43	bis(2-chloroethoxy) methane

EPA No.	Priority pollutant
45	methyl chloride
46	methyl bromide
47	bromoform
48	dichlorobromomethane
51	chlorodibromomethane
52	hexachlorobutadiene
53	hexachlorocyclopentadiene
54	isophorone
55	naphthalene
56	nitrobenzene
57	2-nitrophenol
58	4-nitrophenol
59	2,4-dinitrophenol
60	4,6-dinitro-o-cresol
61	N-nitrosodimethylamine
62	N-nitrosodiphenylamine
63	N-nitrosodi-n-propylamine
64	pentachlorophenol
65	phenol
67	butyl benzyl phthalate
69	di-n-octyl phthalate
72	benzo(a)anthracene
74	3,4-benzofluoranthene
75	benzo(k)fluoranthane
77	acenaphthylene
78	anthracene
79	benzo(ghi)perylene
80	fluorene
82	dibenzo(a,h)anthracene
83	indeno(1,2,3-cd)pyrene
85	tetrachloroethylene
87	trichloroethylene
88	vinyl chloride
89	aldrin
90	dieldrin
91	chlordane
92	4,4'-DDT
93	4,4'-DDE
94	4,4'-DDD
95	alpha-endosulfan
96	beta-endosulfan
97	endosulfan sulfate
98	endrin
99	endrin aldehyde
100	heptachlor
101	heptachlor epoxide
102	alpha-BHC
103	beta-BHC
104	gamma-BHC
105	delta-BHC
106	PCB-1242
107	PCB-1254
108	PCB-1221
109	PCB-1232
110	PCB-1248
111	PCB-1260
112	PCB-1016
113	toxaphene
114	antimony (total)
116	asbestos
129	2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

Appendix B.—Priority Pollutants not Detected in Effluents Discharged To POTWs, and Excluded From Regulation

Pursuant to Paragraph 8(a)(iii) of the Settlement Agreement, the following 75 priority pollutants are excluded from national regulation because they were not detected by Section 304(h) analytical methods or other state-of-the-art methods in effluents discharged to POTWs:

EPA No.	Priority pollutant
3	acrylonitrile
5	benzidine
6	carbon tetrachloride
8	1,2,4-trichlorobenzene
9	hexachlorobenzene
12	hexachloroethane
13	1,1-dichloroethane
14	1,1,2-trichloroethane
15	1,1,2,2-tetrachloroethane
16	chloroethane
18	bis(2-chloroethyl) ether
19	2-chloroethylvinyl ether
20	2-chloronaphthalene
21	2,4,6-trichlorophenol
22	parachlorometa cresol
25	1,2-dichlorobenzene
26	1,3-dichlorobenzene
27	1,4-dichlorobenzene
28	3,3'-dichlorobenzidine
29	1,1-dichloroethylene
31	2,4-dichlorophenol
32	1,2-dichloropropane
33	1,3-dichloropropylene
35	2,4-dinitrotoluene
36	2,6-dinitrotoluene
37	1,2-diphenylhydrazine
41	4-bromophenyl phenyl ether
42	bis(2-chloroisopropyl) ether
43	bis(2-chloroethoxy) methane
44	methylene chloride
45	methyl chloride
46	methyl bromide
47	bromoform
51	chlorodibromomethane
52	hexachlorobutadiene
53	hexachlorocyclopentadie
56	nitrobenzene
61	N-nitrosodimethylamine
62	N-nitrosodiphenylamine
63	N-nitrosodi-n-propylami
66	bis(2-ethylhexyl) phtha
69	di-n-octyl phthalate
71	dimethyl phthalate
74	3,4-benzofluoranthene
75	benzo (k) fluoranthane
79	benzo (ghi) perylene
82	dibenzo (a,h) anthracene
83	indeno (1,2,3-C D) pyrene
87	trichloroethylene
88	vinyl chloride
90	dieldrin
91	chlordane
94	4 4 -DDD
95	alpha-endosulfan
97	endosulfan sulfate
98	endrin
99	endrin aldehyde
100	heptachlor
101	heptachlor epoxide
102	alpha-BHC
103	beta-BHC
104	gamma-BHC (lindane)
106	PCB-1242
107	PCP-1254
108	PCB-1221
109	PCB-1232
110	PCB-1248
111	PCB-1260
112	PCB-1016
113	toxaphene
114	antimony (total)
116	asbestos
126	silver (total)
127	thallium (total)
129	2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

Appendix C.—Priority Pollutants Detected in Treated Effluents Discharged Directly, but Excluded From Regulation

I. Pursuant to Paragraph 8(a)(iii) of the Settlement Agreement, the following 25 priority pollutants are excluded from national regulation because they are already effectively controlled by technologies upon which other effluent limitations and guidelines are based:

EPA No.	Priority pollutant
1	acenaphthene
4	benzene
22	parachlorometacresol
23	chloroform
31	2,4-dichlorophenol
68	di-n-butyl phthalate
70	diethyl phthalate
71	dimethyl phthalate
73	benzo(a)pyrene
76	chrysene
81	phenanthrene
84	pyrene
86	toluene
115	arsenic
117	beryllium
118	cadmium
120	copper
121	cyanide
122	lead
123	mercury
124	nickel
125	selenium
126	silver
127	thallium
128	zinc

II. Pursuant to Paragraph 8(a)(iii) of the Settlement Agreement, the following two priority pollutants are excluded from national regulation because their detection is believed to be attributed to laboratory analysis and sample contamination:

Epa No.	Priority pollutant
44	methylene chloride
66	bis(2-ethylhexyl) phthalate

Appendix D.—Priority Pollutants Detected in Effluents Discharged to POTWs, but Excluded From Regulation -

I. Pursuant to Paragraph 8(b)(i) of the Settlement Agreement, the following 5 priority pollutants are excluded from regulation because 95 percent or more of all point sources in the subcategory introduce into POTWs only pollutants which are susceptible to treatment by the POTW and which do not interfere with, do not pass through, or are not otherwise incompatible with such treatment works:

EPA No	Priority pollutant
24	2-chlorophenol
57	2-nitrophenol
77	acenaphthylene
80	fluorene
125	selenium

II Pursuant to paragraph 8(b)(ii) of the Settlement Agreement, the following 33 priority pollutants are excluded from regulation because the amount and toxicity of each pollutant does not justify developing national regulations:

EPA No.	Priority pollutant
2	acrolein
7	chlorobenzene
10	1 2-dichloroethane
11	1 1,1-trichloroethane
23	chloroform
30	1,2-trans-dichloroethylene
39	fluoranthene
40	4-chlorophenyl phenyl ether
48	dichlorobromomethane
60	4 6, dinitro-o-cresol
64	pentachlorophenol
67	butyl benzyl phthalate
68	di-n-butyl phthalate

EPA No.	Priority pollutant
70	diethyl phthalate
72	benzo(a)anthracene
73	benzo(a)pyrene
76	chrysene
84	pyrene
85	tetrachloroethylene
89	aldrin
92	4,4'-DDT
93	4,4'-DDE
96	beta endosulfan
105	delta BHC
115	arsenic
117	beryllium
118	cadmium
120	copper
121	cyanide
122	lead
123	mercury
124	nickel
128	zinc

III. Pursuant to Paragraphs 8(a)(iii), 8(a)(iv), and 8(b) of the Settlement Agreement, the following 12 priority pollutants are excluded from regulation for a combination of reasons. First, there is significant removal of some of these pollutants by the existing pretreatment standards for oil and grease; second, there is significant removal of all these pollutants by the POTW treatment system; and thirdly, the amount and toxicity of the pollutants does not justify developing national pretreatment standards.

EPA No.	Priority pollutant
1	acenaphthene
4	benzene
34	2,4-dimethylphenol
38	ethylbenzene
54	isophorone
55	naphthalene
58	4-nitrophenol
59	2,4-dinitrophenol
65	phenol
78	anthracene
81	phenanthrene
86	toluene

Appendix E.—Abbreviations, Acronyms and Other Terms Used in This Notice

Act—The Clean Water Act
Agency—The U.S. Environmental Protection Agency
BAT—The best available technology economically achievable, under Section 304(b)(2)(B) of the Act
BCT—The best conventional pollutant control technology, under Section 304(b)(4) of the Act
BMP—Best management practices under Section 304(e) of the Act
BOD5—Five day biochemical oxygen demand
BPT—The best practicable control technology currently available, under Section 304(b)(1) of the Act
COD—Chemical oxygen demand
Clean Water Act—The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 et seq.), as amended by the Clean Water Act of 1977 (Pub. L. 95-217)
Direct discharger—A facility which discharges or may discharge pollutants into waters of the United States
Indirect discharger—A facility which discharges or may discharge pollutants into a publicly owned treatment works
kg/m ^{3}—Kilograms per cubic meter
lb/bbl—Pounds per barrel (one barrel equals 42 gallons)
mg/l—Milligrams per liter
NPDES permit—A national pollutant discharge elimination system permit issued under section 402 of the Act
NSPS—New source performance standards, under section 304 of the Act
ppb—Parts per billion
POTW—Publicly owned treatment works
PSES—Pretreatment standards for existing sources of indirect discharges, under section 307(b) of the Act
PSNS—Pretreatment standards for new sources of direct discharges, under section 307 (b) and (c) of the Act
RCRA—Resource Conservation and Recovery Act (Pub. L. 94-580) of 1976, Amendments to Solid Waste Disposal Act
TOC—Total organic carbon
TSS—Total suspended solids
μg/l—Micrograms per liter

40 CFR Part 419 is revised to read as follows:

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

Subpart A—Topping Subcategory

Sec.
419.10 Applicability; description of the topping subcategory.
419.11 Specialized definitions.
419.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
419.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.
419.14 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology. [Reserved]
419.15 Pretreatment standards for existing sources.
419.16 Standards of performance for new sources.
419.17 Pretreatment standards for new sources.

Subpart B—Cracking Subcategory

419.20 Applicability; description of the cracking subcategory.
419.21 Specialized definitions.
419.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
419.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.
419.24 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology. [Reserved]
419.25 Pretreatment standards for existing sources.
419.26 Standards of performance for new sources.
419.27 Pretreatment standards for new sources.

Subpart C—Petrochemical Subcategory

419.30 Applicability; description of the petrochemical subcategory.
419.31 Specialized definitions.
419.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
419.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.
419.34 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology. [Reserved]
419.35 Pretreatment standards for existing sources.
419.36 Standards of performance for new sources.
419.37 Pretreatment standards for new sources.

Subpart D—Lube Subcategory

419.40 Applicability; description of the lube subcategory.
419.41 Specialized definitions.
419.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
419.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.
419.44 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology. [Reserved]
419.45 Pretreatment standards for existing sources.
419.46 Standards of performance for new sources.
419.47 Pretreatment standards for new sources.

Subpart E—Integrated Subcategory

419.50 Applicability; description of the integrated subcategory
419.51 Specialized definitions.
419.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.
419.53 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

Sec.

Authority: Secs. 301, 304 (b), (c), (e), and (g), 306 (b) and (c), 307 (b) and (c), and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977) (the "Act"); 33 U.S.C. 1311, 1314 (b), (c), (e), and (g), 1316 (b) and (c), 1317 (b) and (c), and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

Subpart A—Topping Subcategory

§ 419.10 Applicability; description of the topping subcategory.

The provisions of this subpart apply to discharges from any facility that produces petroleum products by the use of topping and catalytic reforming, whether or not the facility includes any other process in addition to topping and catalytic reforming. The provisions of this subpart do not apply to facilities that include thermal processes (coking, vis-breaking, etc.) or catalytic cracking.

§ 419.11 Specialized definitions.

For the purpose of this subpart:

(a) Except as provided below, the general definitions, abbreviations, and methods of analysis set forth in Part 401 of this chapter shall apply to this subpart.

(b) The term "runoff" shall mean the flow of storm water.

(c) The term "ballast" shall mean the flow of waters, from a ship, that is treated along with refinery wastewaters in the main treatment system.

(d) The term "feedstock" shall mean the crude oil and natural gas liquids fed to the topping units.

(e) The term "once-through cooling water" shall mean those waters discharged that are used for the purpose of heat removal and that do not come into direct contact with any raw material, intermediate, or finished product.

(f) The following abbreviations shall be used: (1) Mgal means one thousand gallons; (2) Mbbl means one thousand barrels (one barrel is equivalent to 42 gallons).

§ 419.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30-32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT Effluent Limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD5	22.7	12.0
TSS	15.8	10.1
COD [1]	117.0	60.3
Oil and grease	6.9	3.7
Phenolic compounds	0.168	0.076
Ammonia as N	2.81	1.27
Sulfide	0.149	0.068
Total chromium	0.345	0.20
Hexavalent chromium	0.028	0.012
pH	[2]	[2]
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	8.0	4.25
TSS	5.6	3.6
COD [1]	41.2	21.3
Oil and grease	2.5	1.3
Phenolic compounds	0.060	0.027
Ammonia as N	0.99	0.45
Sulfide	0.53	0.24
Total chromium	0.122	0.071
Hexavalent chromium	0.10	0.0044
pH	[2]	[2]

[1] See footnote following Table in § 419.13(c)
[2] Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.96
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BPT effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD5	0.048	0.028
TSS	0.033	0.021
COD [1]	0.47	0.24
Oil and grease	0.015	0.008
pH	[2]	[2]
	English units (pounds per 1,000 gal of flow)	
BOD5	0.40	0.21
TSS	0.26	0.17
COD [1]	3.9	2.0
Oil and grease	0.126	0.067
pH	[2]	[2]

[1] See footnote following table in § 419.13(c)
[2] Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for Runoff—[Reserved].

§ 419.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30–32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations: Maximum for any 1 day	BAT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
COD[1]	117	60.3
Phenolic compounds	0.168	0.076
Ammonia as N	2.81	1.27
Sulfide	0.149	0.068
Total chromium	0.345	0.20
Hexavalent chromium	0.028	0.012
	English units (pounds per 1,000 bbl of feedstock)	
COD[1]	41.2	21.3
Phenolic compounds	0.060	0.027
Ammonia as N	0.99	0.45
Sulfide	0.053	0.024
Total chromium	0.122	0.071
Hexavalent chromium	0.10	0.0044

[1] See footnote following Table in § 419.13(c).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 9.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to ballast, which may be discharged after the application of best available technology economically achievable by a point source subject to the provisions of this subpart. These allocations are in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/M gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BAT effluent limitations for ballast water: Maximum for any 1 day	BAT effluent limitations for ballast water: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
COD[1]	0.47	0.24
	English units (pounds per 1,000 gal of flow)	
COD[1]	3.9	2.0

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1,000 ppm), the Regional Administrator may substitute TOC as a parameter in lieu of COD. Effluent limitations for TOC shall be based on effluent data from the plant correlating TOC to BOD_5.

If in the judgment of the Regional Administrator, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations on BOD_5.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for Runoff—[Reserved].

§ 419.14 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT). [Reserved]

§ 419.15 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and Grease	100
Ammonia (as N)	[1]100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.13 (a) and (b).

§ 419.16 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations: Maximum for any 1 day	NSPS effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per cubic meter of flow)	
BOD_5	11.8	6.3
TSS	8.3	4.9
COD[1]	61.0	32
Oil and grease	3.6	1.9
Phenolic compounds	0.088	0.043
Ammonia as N	2.8	1.3
Sulfide	0.078	0.035
Total chromium	0.16	0.105
Hexavalent chromium	0.015	0.0068
pH	[2]	[2]
	English units (pounds per 1,000 gal of flow)	
BOD_5	4.2	2.2

Pollutant or pollutant property	NSPS effluent limitations: Maximum for any 1 day	NSPS effluent limitations: Average of daily values for 30 consecutive days shall not exceed
TSS	3.0	1.9
COD [1]	21.7	11.2
Oil and grease	1.3	0.70
Phenolic compounds	0.031	0.016
Ammonia as N	1.0	0.45
Sulfide	0.027	0.012
Total chromium	0.084	0.037
Hexavalent chromium	0.0052	0.0025
pH	(2)	(2)

[1] See footnote following table in § 419.13(c).
[2] Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.06
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best practicable control technology currently available, by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/Mgal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	NSPS Effluent Limitations for Ballast Water: Maximum for any 1 day	NSPS Effluent Limitations for Ballast Water: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per cubic meter of flow)		
BOD5	0.048	0.026
TSS	0.033	0.021
COD [1]	0.47	0.24
Oil and grease	0.015	0.008
pH	(2)	(2)
English units (pounds per 1,000 gal of flow)		
BOD5	0.40	0.21
TSS	0.27	0.17
COD [1]	3.9	2.0
Oil and grease	0.126	0.067
pH	(2)	(2)

[1] See footnote following table in § 419.13(c)
[2] Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.17 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS): (a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day: Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1] 100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.16 (a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard; (2) by the total refinery flow to the POTW, and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day: Milligrams per liter (mg/l)
Total chromium	1

Subpart B—Cracking Subcategory

§ 419.20 Applicability; description of the cracking subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping and cracking, whether or not the facility includes any process in addition to topping and cracking. The provisions of this subpart are not applicable, however, to facilities that include the processes specified in Subparts C, D, or E of this part.

§ 419.21 Specialized definitions.

The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in § 419.11 shall apply to this subpart.

§ 419.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30–32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available:

Pollutant or pollutant property	BPT effluent limitations: Maximum for any 1 day	BPT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
BOD5	28.2	15.6
TSS	19.5	12.6
COD[1]	210.0	109
Oil and grease	8.4	4.5
Phenolic compounds	0.21	0.10
Ammonia as N	18.8	8.5
Sulfide	0.18	0.082
Total chromium	0.43	0.25
Hexavalent chromium	0.035	0.016
pH	([2])	([2])
English units (pounds per 1,000 bbl feedstock)		
BOD5	9.9	5.5
TSS	6.9	4.4
COD[1]	74.0	38.4
Oil and grease	3.0	1.6
Phenolic compounds	0.074	0.036
Ammonia as N	6.6	3.0
Sulfide	0.065	0.029
Total chromium	0.15	0.088
Hexavalent chromium	0.012	0.0056
pH	([2])	([2])

[1] See footnote following table in § 419.13(c).
[2] Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example Subpart D § 419.42(b)(3).

(c) The provisions of § 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable:

Pollutant or pollutant property	BAT Effluent limitations: Maximum for any 1 day	BAT Effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
COD[1]	210	109
Phenolic compounds	0.21	0.10
Ammonia as N	18.8	8.5
Sulfide	0.18	0.082
Total chromium	0.43	0.25
Hexavalent chromium	0.035	0.016
English units (pounds per 1,000 bbl of feedstock)		
COD[1]	74.0	38.4
Phenolic compounds	0.074	0.036
Ammonia as N	6.6	3.0
Sulfide	0.065	0.029
Total chromium	0.15	0.088
Hexavalent chromium	0.012	0.0056

[1] See footnote following table in § 419.13(c)(2).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.13(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for Runoff—[Reserved]

§ 419.24 Effluent limitation guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT). [Reserved]

§ 419.25 Pretreatment Standards for Existing Sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia	[1] 100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.23 (a) and (b).

§ 419.26 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	16 3	8.7
TSS	11 3	7 2
COD [1]	116 0	61
oil and grease	4 8	2 6
Phenolic compounds	0.119	0 058
Ammonia (as N)	18 8	8 6
Sulfide	0 105	0 048
Total chromium	0 24	0 14
Hexavalent chromium	0 020	0 0088
pH	[2]	[2]
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	5.8	3.1
TSS	4 0	2.5
COD [1]	41 5	21
Oil and grease	1 7	0 93
Phenolic compounds	0 042	0.020
Ammonia (as N)	6 6	3 0
Sulfide	0 037	0 017
Total chromium	0 084	0 049
Hexavalent chromium	0 0072	0 0032
pH	[2]	[2]

[1] See footnote following table in § 419.13(c).
[2] Within the range 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any 1 day and maximum average of daily values for 30 consecutive days.

(1) Size Factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24 9	0 91
25.0 to 49 9	0 95
50 0 to 74 9	1 04
75 0 to 99 9	1.13
100 0 to 124 9	1 23
125.0 to 149 9	1 35
150 0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0 58
2.5 to 3 49	0 63
3 5 to 4 49	0 74
4 5 to 5.49	0 88
5 5 to 5 99	1 00
6 0 to 6 49	1 09
6 5 to 6 99	1.19
7 0 to 7 49	1 29
7 5 to 7 99	1 41
8 0 to 8 49	1 53
8 5 to 8 99	1 67
9 0 to 9 49	1 82
9 5 or greater	1 89

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for Runoff—[Reserved]

§ 419.27 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW.

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1] 100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.26(a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard: (2) by the total refinery flow to the POTW: and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Total chromium	1

Subpart C—Petrochemical Subcategory

§ 419.30 Applicability; description of the petrochemical subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping, cracking, and petrochemical operations whether or not the facility includes any process in addition to topping, cracking, and petrochemical operations. The provisions of this subpart shall not be applicable, however, to facilities that include the processes specified in Subparts D or E of this part.

§ 419.31 Specialized definitions.

For the purpose of this subpart:

(a) The general definitions, abbreviations, and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in § 419.11 shall apply.

(b) The term "petrochemical operations" shall mean the production of second-generation petrochemicals (i.e., alcohols, ketones, cumene, styrene, etc.) or first generation petrochemicals and isomerization products (i.e. BTX, olefins, cyclohexane, etc.) when 15 percent or more of refinery production is as first-generation petrochemicals and isomerization products.

§ 419.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT Effluent limitations: Maximum for any 1 day	BPT Effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
BOD5	34.6	18.4
TSS	23.4	14.8
COD[1]	210.0	109.0
Oil and grease	11.1	5.9
Phenolic compound	0.25	0.120
Ammonia as N	23.4	10.6
Sulfide	0.52	0.099
Total chromium	0.52	0.30
Hexavalent chromium	0.046	0.020
pH	(2)	(2)
English units (pounds per 1,000 bbl of feedstock)		
BOD5	12.1	6.5
TSS	8.3	5.25
COD[1]	74.0	38.4
Oil and grease	3.9	2.1
Phenolic compounds	0.088	0.0425
Ammonia as N	8.25	3.8
Sulfide	0.078	0.035
Total chromium	0.183	0.107
Hexavalent chromium	0.016	0.0072
pH	(2)	(2)

[1] See footnote following table in § 419.13(c).
[2] Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1 000 barrels of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for runoff - [Reserved].

§ 419.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available techology economically achievable (BAT):

Pollutant or pollutant property	BAT Effluent Limitations: Maximum for any 1 day	BAT Effluent Limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1 000 m^3 of feedstock)		
COD[1]	210.0	109.0
Phenolic compounds	0.25	0.120
Ammonia as N	23.4	10.6
Sulfide	0.22	0.099
Total chromium	0.52	0.30
Hexavalent chromium	0.046	0.020
English units (pounds per 1 000 bbl of feedstock)		
COD[1]	74.0	38.4
Phenolic compounds	0.088	0.0425
Ammonia as N	8.25	3.8
Sulfide	0.078	0.035
Total chromium	0.183	0.107
Hexavalent chromium	0.016	0.0072

[1] See footnote following table in § 419.13(c)

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1 000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.73
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.91
100.0 to 124.9	0.99
125.0 to 149.9	1.08
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.28
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.13(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e)Effluent Limitation for Runoff—[Reserved].

§ 419.34 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best conventional pollutant control technology (BCT)—[Reserved]

§ 419.35 Pretreatment Standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES) The following standards apply to the

total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards maximum for any 1 day
	(Milligrams per liter (mg/l))
Oil and grease	100
Ammonia (as N)	[1] 100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with the limit or the daily maximum mass limitation for ammonia set forth in § 419.33 (a) and (b).

§ 419.36 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS Effluent Limitations: Maximum for any 1 day	NSPS Effluent Limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD5	21 8	11 6
TSS	14 9	9 5
COD[1]	133 0	69 0
Oil and grease	6 6	3.5
Phenolic compounds	0 156	077
Ammonia as N	23 4	10 7
Sulfide	0 140	0 063
Total chromium	0 32	0 19
Hexavalent chromium	0 025	0 012
pH	([2])	([2])
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	7 7	4 1
TSS	5 2	3.3
COD[1]	47 0	24 0
Oil and grease	2.4	1 3
Phenolic compounds	0 056	0 027
Ammonia as N	8 3	3 8
Sulfide	0 050	0 022
Total chromium	0 116	0 068
Hexavalent chromium	0 0096	0 0044
pH	([2])	([2])

[1] See footnote following table in § 419.13(c)(2).
[2] Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1 000 bbl of feedstock per stream day	Size factor
Less than 24 9	0 73
25 0 to 49 9	0 76
50 0 to 74 9	0 83
75 0 to 99 0	0 91
100 0 to 124 9	0 99
125 0 to 149 9	1 08
150 0 or greater	1 13

(2) Process factor.

Process configuration	Process factor
Less than 4 49	0 73
4 5 to 5 49	0 80
5 5 to 5.99	0 91
6 0 to 6 49	0 99
6.5 to 6.99	1 08
7 0 to 7 49	1 17
7 5 to 7 99	1 28
8 0 to 8 49	1 39
8 5 to 8 99	1 51
9 0 to 9.49	1 65
9 5 or greater	1 72

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.16(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.37 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1] 100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with the limit or the daily maximum mass limitation for ammonia set forth in § 419 36 (a) and (b).

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard: (2) by the total refinery flow to the POTW; and (3) by the ratio of the cooling tower discharge flow to the total refinery flow.

Pollutant or pollutant property	Pretreatment standards for new sources maximum for any 1 day
	Milligrams per liter (mg/l)
Total chromium	1

Subpart D—Lube Subcategory

§ 419.40 Applicability; description of the lube subcategory.

The provisions of this subpart are applicable to all discharges from any facility that produces petroleum products by the use of topping, cracking, and lube oil manufacturing processes, whether or not the facility includes any process in addition to topping, cracking, and lube oil manufacturing processes. The provisions of this subpart are not applicable, however, to facilities that include the processes specified in Subparts C and E of this part.

§ 419.41 Specialized definitions.

The general definitions, abbreviations and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in § 419.11 shall apply to this subpart.

§ 419.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT effluent limitations: Maximum for any 1 day	BPT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD[5]	50 6	25 8
TSS	35 6	22.7
COD[1]	360 0	187 0
Oil and grease	16 2	8 5
Phenolic compounds	0 38	0 184
Ammonia as N	23.4	10 6
Sulfide	0 33	0 150
Total chromium	0 77	0 45
Hexavalent chromium	0 068	0 030
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD5	17 9	9 1
TSS	12 5	8 0
COD[1]	127 0	66 0
Oil and grease	5 7	3 0
Phenolic compounds	0 133	0 065
Ammonia as N	8 3	3 8
Sulfide	0 118	0 053
Total chromium	0.273	0 160
Hexavalent chromium	0 024	0 011
pH	(2)	(2)

[1] See footnote following table in § 419 13(c)(2).
[2] Within the range of 6 0 to 9 0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49 9	0 71
50 0 to 74 9	0 74
75 0 to 99 9	0 81
100 0 to 124 9	0 88
125 0 to 149 9	0 97
150 0 to 174 9	1 05
175.0 to 199.9	1 14
200.0 or greater	1 19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0 81
6.5 to 7 49	0 88
7 5 to 7 99	1 00
8 0 to 8 49	1 09
8 5 to 8 99	1 19
9 0 to 9 49	1 29
9 5 to 9 99	1 41
10 0 to 10 49	1 53
10 5 to 10 99	1 67
11 0 to 11 49	1 82
11 5 to 11 99	1 98
12 0 to 12.49	2.15
12.5 to 12.99	2.34
13 0 or greater	2.44

(3) Example of the application of the above factors. Example—Lube refinery 125, 000 bbl per stream day throughput.

CALCULATION OF THE PROCESS CONFIGURATION

Process category	Process included	Weighting factor
Crude	Atm crude distillation	1
	Vacuum, crude distillation	
	Desalting	
Cracking and coking.	Fluid cat. cracking	6
	Vis-breaking	
	Thermal cracking	
	Moving bed cat. cracking	
	Hydrocracking	
	Fluid coking.	
	Delayed coking	
Lube	Further defined in the development document.	13
Asphalt	Asphalt production	12
	Asphalt oxidation	
	Asphalt emulsifying	

Process	Capacity (1 000 bbl per stream day)	Capacity relative to throughput	Weighting Factor	Processing configuration
Crude				
Atm	125 0	1 0		
Vacuum	50.0	0 48		
Desalting	125.0	1 0		
Total		2.48	< 1	= 2.48
Cracking-FCC	41 0	0 328		
Hydrocracking	20 0	0.160		
Total		0 488	< 6	= 2.93
Lubes	5 3	0 042		
	4 0	0 032		
	4 9	0 039		
Total		0 113	< 13	= 1 47
Asphalt	4 0	0 032	< 12	= 38
Refinery process configuration				= 7 26

Notes:
See Table § 419 42(b)(2) for process factor Process factor = 0 88
See Table § 419 42(b)(1) for size factor for 125 000 bbl per stream day lube refinery Size factor = 0 97
To calculate the limits for each parameter, multiply the limit § 419 42(a) by both the process factor and size factor BOD5 limit (maximum for any 1 day) = 17 9 × 0 88 × 0 97 = 15 3 lb per 1,000 bbl of feedstock.

(c) The provisions of § 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/1.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT effluent limitations: Maximum for any 1 day	BAT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per	
COD[1]	360 0	187 0
Phenolic compounds	0 38	0 184
Ammonia as N	23 4	10 6
Sulfide	0 33	0 150
Total chromium	0 77	0 45
Hexavalent chromium	0 068	0.030
	English units (pounds per 1,000 bbl of feedstock)	
COD[1]	127 0	66 0
Phenolic compounds	0 133	0 065
Ammonia as N	8 3	3 8
Sulfide	0 118	0 053
Total chromium	0 273	0 160
Hexavalent chromium	0 024	0 011

[1] See footnote following table in § 419 13(c)(2)

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1 000 bbl of feedstock per stream day	Size factor
Less than 49 9	0 71
50 0 to 74 9	0 74
75 0 to 99 9	0 81
100 0 to 124 9	0 88
125 0 to 149 9	0 97
150 0 to 174 9	1 05
175 0 to 199 9	1 14
200 0 or greater	1 19

(2) Process factor.

Process configuration	Process factor
Less than 6 49	0 81
6 5 to 7 49	0 88
7 5 to 7 99	1 00
8 0 to 8 49	1 09
8 5 to 8 99	1 19
9 0 to 9 49	1 29
9 5 to 9 99	1 41
10 0 to 10 49	1 53
10 5 to 10 99	1 67
11 0 to 11 49	1 82
11 5 to 11 99	1 98
12 0 to 12.49	2.15
12 5 to 12 99	2.34

Process configuration	Process factor
13.0 or greater	2.44

(3) See the comprehensive example in Subpart D. § 419.42(b)(3).

(c) The provisions of § 419.13(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitation for Runoff—[Reserved]

§ 419.44 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT)—[Reserved]

§ 419.45 Pretreatment standards for existing sources (PSES).

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for existing sources (PSES) The following standards apply to the total refinery flow contribution to the POTW.

Pollutant or pollutant property	Pretreatment standards for existing sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1]100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.43 (a) and (b)

§ 419.46 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitations: Maximum for any 1 a day	NSPS effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
BOD5	34.6	18.4
TSS	23.4	14.9
COD [1]	245.0	126.0
Oil and grease	10.5	5.6
Phenolic compounds	0.25	0.12
Ammonia as N	23.4	10.7
Sulfide	0.220	0.10
Total chromium	0.52	0.31
Hexavalent chromium	0.046	0.021
pH	(2)	(2)
English units (pounds per 1,000 bbl of feedstock)		
BOD	12.2	6.5
TSS	8.3	5.3
COD [1]	87.0	45.0
Oil and grease	3.8	2.0
Phenolic compounds	0.088	0.043
Ammonia as N	8.3	3.8
Sulfide	0.078	0.035
Total chromium	0.180	0.105
Hexavalent chromium	0.022	0.0072
pH	(2)	(2)

[1] See footnote following table in § 419.13(c)
[2] Within the range 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.81
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(3) See the comprehensive example in Subpart D. § 419.42(b)(3).

(c) The provisions of § 419.15(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provision of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.47 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW

Pollutant or pollutant property	Pretreatment standards for new sources maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1]100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419.46 (a) and (b)

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standard: (2) by the total refinery flow to the POTW: and (3) by the ratio of the cooling tower discharge flow to the total refinery flow

Pollutant or pollutant property	Pretreatment standards for new sources maximum for any 1 day
	Milligrams per liter (mg/l)
Total chromium	1

Subpart E—Integrated Subcategory

§ 419.50 Applicability; description of the integrated subcategory.

The provisions of this subpart are applicable to all discharges resulting from any facility that produces petroleum products by the use of topping, cracking, lube oil manufacturing processes, and petrochemical operations, whether or not the facility includes any process in addition to topping, cracking, lube oil manufacturing processes, and petrochemical operations.

§ 419.51 Specialized definitions.

The general definitions, abbreviations, and methods of analysis set forth in Part 401 of this chapter and the specialized definitions set forth in § 419.31 shall apply to this subpart.

§ 419.52 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

(a) Except as provided in 40 CFR 125.30–.32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

Pollutant or pollutant property	BPT Effluent Limitations: Maximum for any 1 day	BPT Effluent Limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD [1]	54 4	28 9
TSS	37 3	23 7
COD [1]	388 0	198.0
Oil and grease	17 1	9 1
Phenolic compounds	0 40	0.192
Ammonia as N	23 4	10 6
Sulfide	0 35	0 158
Total Chromium	0 82	0 48
Hexavalent chromium	0 068	0 032
pH	(2)	(2)
	English units (pounds per 1,000 bbl of feedstock)	
BOD [1]	19.2	10 2
TSS	13 2	8 4
COD [1]	138 0	70 0
Oil and grease	6 0	3 2
Phenolic compounds	0 14	0 068
Ammonia as N	8.3	3 8
Sulfide	0 124	0 056
Total chromium	0 29	0.17
Hexavalent chromium	0 025	0 011
pH	(2)	(2)

[1] See footnote following table in § 419.13(c).
[2] Within the range 6 0 to 9 0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124 9	0 73
125 0 to 124 9	0 76
150 0 to 174 9	0 83
175 0 to 199 9	0 91
200 to 244 9	0.99
225 or greater	1 04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0 75
6 5 to 7 49	0 82
7 5 to 7 99	0 92
8 0 to 8 49	1 00
8 5 to 8 99	1 10
9 0 to 9 49	1 20
9 5 to 9 99	1 30
10.0 to 10 49	1 42
10.5 to 10 99	1 54
11 0 to 11 49	1 68
11 5 to 11 99	1 83
12.0 to 12 49	1 99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.12(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provision of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section. Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l.

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.53 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

(a) Except as provided in 40 CFR 125.30–32, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

Pollutant or pollutant property	BAT Effluent Limitations: Maximum for any 1 day	BAT Effluent Limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
COD [1]	388 0	198 0
Phenolic compounds	0 40	0 192
Ammonia as N	23 4	10 6
Sulfide	0 35	0 158
Total chromium	0 068	0 032
Hexavalent chromium	0 068	0 032
	English units (pounds per 1,000 bbl of feedstock)	
COD [1]	138 0	70 0
Phenolic compounds	0 14	0 068
Ammonia as N	8 3	3 8
Sulfide	0 124	0 056
Total chromium	0 29	0 17
Hexavalent chromium	0 025	0.011

[1] See footnote following table in § 419 13(C).

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124 9	0 73
125 0 to 149 9	0 76
150 0 to 174 9	0 83
175 0 to 199 9	0 91
200 to 224 9	0 99
225 or greater	1 04

2) Process factor.

Process configuration	Process factor
Less than 6 49	0 75
6 5 to 7 49	0 82
7 5 to 7 99	0 92
8 0 to 8 49	1 00
8 5 to 8 99	1 10
9 0 to 9 49	1 20
9 5 to 9 99	1 30
10 0 to 10 49	1 42
10 5 to 10 99	1 54
11 0 to 11 49	1 68
11 5 to 11 99	1 83
12.0 to 12 49	1 99
12 5 to 12.99	2 17
13 0 or greater	2 26

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.13(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l

(e) Effluent Limitations for Runoff—[Reserved]

§ 419.54 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT)—[Reserved]

§ 419.55 Pretreatment standards for existing sources (PSES)

Except as provided in 40 CFR 403.7 and 403.13 any existing source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR 403 and achieve the following pretreatment standards for existing sources (PSES). The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for existing sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1]100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with the limit or the daily maximum mass limitation for ammonia set forth in § 419.53 (a) and (b)

§ 419.56 Standards of performance for new sources (NSPS).

(a) Any new source subject to this subpart must achieve the following new source performance standards (NSPS):

Pollutant or pollutant property	NSPS effluent limitation	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1 000 m^3 of feedstock)	
BOD5	41 6	22 1
TSS	28 1	17 9
COD [1]	295 0	152 0
Oil and grease	12 6	6 7
Phenolic compounds	0 30	0 14
Ammonia as N	23 4	10 7
Sulfide	0.26	0 12
Total chromium	0 64	0 37
Hexavalent chromium	0 052	0 024
pH	(2)	(2)
	English units (pounds per 1 000 bbl of feedstock)	
BOD5	14 7	7 8
TSS	9 9	6 3
COD [1]	104 0	54 0
Oil and grease	4 5	2 4
Phenolic compounds	0.105	0 051
Ammonia as N	8 3	3 8
Sulfide	0 093	0 042
Total chromium	0 220	0 13
Hexavalent chromium	0 019	0 0084
pH	(2)	(2)

[1] See footnote following table in § 419 13(c)
[2] Within the range 6 0 to 9 0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1 000 bbl of feedstock per stream day	Size factor
Less than 124 9	0 73
125 0 to 149 9	0 76
150 0 to 174 9	0.83
175 0 to 199 9	0 91
200 to 224 9	0 99
225 or greater	1 04

(2) Process factor.

Process configuration	Process factor
Less than 6 49	0 75
6 5 to 7 49	0 82
7 5 to 7 99	0 92
8 0 to 8.49	1 00
8 5 to 8 99	1 10
9 0 to 9 49	1.20
9 5 to 9 99	1 30
10 0 to 10 49	1 42
10 5 to 10 99	1 54
11 0 to 11 49	1 68
11 5 to 11 99	1 83
12 0 to 12 49	1 99
12 5 to 12 99	2.17
13 0 or greater	2.26

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.15(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provision of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section Once-through cooling water may be discharged with a total organic carbon concentration not to exceed 5 mg/l

(e) Effluent Limitations for Runoff—[Reserved].

§ 419.57 Pretreatment standards for new sources (PSNS).

Except as provided in 40 CFR 403.7, any new source subject to this subpart which introduces pollutants into a publicly owned treatment works must comply with 40 CFR Part 403 and achieve the following pretreatment standards for new sources (PSNS).

(a) The following standards apply to the total refinery flow contribution to the POTW:

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day
	Milligrams per liter (mg/l)
Oil and grease	100
Ammonia (as N)	[1]100

[1] Where the discharge to the POTW consists solely of sour waters, the owner or operator has the option of complying with this limit or the daily maximum mass limitation for ammonia set forth in § 419 56 (a) and (b)

(b) The following standard is applied to the cooling tower discharge part of the total refinery flow to the POTW by multiplying: (1) The standards, (2) by the total refinery flow to the POTW: and (3) by the ratio of the cooling tower discharge flow to the total refinery flow

Pollutant or pollutant property	Pretreatment standards for new sources—maximum for any 1 day
	Milligrams per liter (mg/1)
Total chromium	1

[FR Doc. 82-28,am Filed 10-15-82, 8 45 am]
BILLING CODE 6560-50-M

Federal Register

Tuesday
August 28, 1984

Part III

Environmental Protection Agency

40 CFR Part 419

Petroleum Refining Point Source Category; Effluent Limitations Guidelines and Pretreatment Standards; Proposed Regulation

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 419

[OW-FRL-2606-1]

Petroleum Refining Point Source Category; Effluent Limitations Guidelines and Pretreatment Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed regulation.

SUMMARY: EPA proposes modifications to the regulation which limits effluent discharges to waters of the United States from facilities engaged in the refining and processing of petroleum. EPA agreed to propose these modifications in a settlement agreement which resolved the lawsuit brought against EPA by the Natural Resources Defense Council, Inc., challenging the final petroleum refining regulation promulgated by EPA on October 18, 1982.

The proposed modifications include: (1) Amendments to the "best available technology" (BAT) effluent limitations for process wastewater for the pollutants phenolic compounds, total chromium, and hexavalent chromium; (2) "best conventional pollutant technology" (BCT) effluent limitations for process wastewater; and (3) "best practicable technology" (BPT), BCT, and BAT effluent limitations for contaminated storm water runoff.

DATE: Comments on this proposal must be submitted on or before September 27, 1984.

ADDRESSES: Send comments to: Mr. Dennis Ruddy, Effluent Guidelines Division (WH-552), Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. Attention: EGD Docket Clerk, Proposed Petroleum Refining Rules (WH-552).

The supporting information and all comments on this proposal will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library). The EPA information regulation provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Dennis Ruddy, Effluent Guidelines Division, at (202) 382-7131.

SUPPLEMENTARY INFORMATION:

I. Legal Authority

The amendments to the regulation described in this notice are proposed under the authority of sections 301, 304, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251, et seq., as amended by the Clean Water Act of 1977, Pub. L. 92517). These changes are also proposed in response to the Settlement Agreement in *Natural Resources Defense Council, Inc.* v. *Environmental Protection Agency*, No. 83-1122 (D.C. Cir.).

II. Background

A. Prior Regulation

On October 18, 1982, EPA published final effluent limitations guidelines and standards for the petroleum refining point source category. That regulation provided final effluent limitations for "best available technology economically achievable" (BAT) and established final pretreatment standards for existing sources (PSES) and for new sources (PSNS). The Agency retained its previously promulgated "new source performance standards" (NSPS) and also did not modify its effluent limitations guidelines for "best practicable control technology currently available" (BPT). The Agency reserved coverage of "best conventional pollutant control technology" (BCT) effluent limitations guidelines. The preamble to the final regulation describes the history of the rulemaking. 47 FR 46434.

B. Challenges to the Prior Regulation

The Natural Resources Defense Council, Inc. ("NRDC") filed a petition to review the final petroleum refining regulation. *Natural Resources Defense Council, Inc.* v. *Environmental Protection Agency*, No. 83-1122 (D.C. Cir.). The American Petroleum Institute ("API") and seven individual oil companies (hereinafter referred to as "Interveners") intervened in the litigation.

C. Settlement Agreement

On April 17, 1984, EPA, NRDC, API and all other interveners to the litigation entered into a comprehensive Settlement Agreement which resolved all of the issues raised by the petitioner and all interveners. In the Settlement Agreement, EPA agreed to publish a notice of proposed rulemaking and to solicit comments regarding certain modifications to the final petroleum refining BAT effluent limitations guidelines. In addition, EPA agreed to propose BCT effluent limitations guidelines for four conventional pollutants and BPT, BAT and BCT effluent limitations guidelines for contaminated storm water runoff. Petitioner NRDC agreed that if EPA takes final action pursuant to and consistent with the Settlement Agreement that it will dismiss its lawsuit challenging the final petroleum refining regulation.

As part of the Settlement Agreement, the parties agreed to seek a judicial stay of the regulatory provisions to be modified. On July 24, 1984 the Court entered a stay of the effluent limitations for phenolic compounds, total chromium and hexavalent chromium for the following portions of the regulation pending the rulemaking: 40 CFR 419.13(a), 419.23(a), 419.33(a), 419.43(a), and 419.53(a).

III. Proposed Amendments to the Petroleum Refining Point Source Category Regulation

The following are the changes to the petroleum industry regulation that EPA is proposing:

A. Best Available Technology Effluent Limitations Guidelines

On October 18, 1982 EPA published final effluent limitations guidelines for best available technology economically achievable (BAT) and final pretreatment standards for existing sources (PSES) and for new sources (PSNS) for the petroleum refining industry. 47 FR 46434. The Natural Resources Defense Council ("NDRC") filed a petition to review the October 18, 1982 regulation in the United States Court of Appeals for the District of Columbia Circuit. The American Petroleum Institute (API) and seven companies which own and operate petroleum refineries intervened in that proceeding. A number of issues were raised in settlement discussions among the parties in the lawsuit pertaining to the BAT effluent limitations guidelines. After extensive discussions, the petitioner, interveners and EPA entered a Settlement Agreement, which provides for specified revisions to the BAT

effluent limitations guidelines. Those revisions are set forth in today's proposal.

In October 1982 EPA promulgated BAT effluent limitations for the following pollutants: (1) Non-conventional pollutants: chemical oxygen demand (COD). phenolic compounds (4AAP). ammonia (as N) and sulfide: and (2) toxic pollutants: total chromium and hexavalent chromium. The model technology for these regulations was flow equalization. initial oil and solids removal. advanced oil and solids removal. biological treatment and filtration or other final "polishing steps."

The Agency is now proposing to amend the BAT effluent limitations guidelines for total chromium, hexavalent chromium and phenolic compounds (4AAP). EPA is proposing to add flow reduction to the model treatment technology for the BAT effluent limitations guidelines and to base the effluent limitations for each of these three pollutants on a more recent data base. rather than the one it relied upon in the October 18. 1982 BAT promulgation. That rulemaking utilized the same data base used by the Agency when it established best practicable control technology currently available (BPT) effluent limitation guidelines for the petroleum refining point source category. BPT level of control for this industry was promulgated on May 9. 1974 (39 FR 16560) and subsequently amended on May 20. 1975 (40 FR 21939). The BAT effluent limitation guidelines for other pollutants would remain unchanged.

The BAT effluent limitations guidelines for total chromium being proposed today are based upon the revised 1979 flow model developed by the Agency to predict refinery flows. rather than the BPT 1974 flow model used in the October 1982 BAT promulgation. The effluent limitations for total chromium proposed today were derived by applying this updated flow model to concentrations for total chromium observed from plant sampling in 1976–1977.

BAT effluent limitations guidelines for hexavalent chromium and phenolic compounds being proposed today were derived using the 1982 Development Document concentrations and the revised 1979 flow model to more accurately represent effluent reductions for these pollutants which the industry was generally achieving in 1979 or could technologically was generally achieving in 1979 or could technologically achieve by the final BAT compliance date. BAT for hexavalent chromium being proposed today is based upon Option 7 (discharge flow reduction of 37.5 percent from the revised 1979 model flow). BAT for phenolic compounds (4AAP) being proposed today is based upon option 8 (a reduction of 20 percent from the revised 1979 model flow).

Under today's proposal the BAT effluent limitations guidelines for each of these there pollutants would be substantially more stringent than the BAT effluent limitations guidelines promulgated in 1982. The total allowable discharge of total chromium to the nation's navigable waters would be reduced by approximately 288.000 pounds per year. a 66% annual reduction beyond discharge levels allowable under the existing BAT effluent limitations guidelines: the total allowable discharge of hexavalent chromium would be reduced by approximately 19.300 pounds per year. a 56% annual reduction beyond discharge levels allowable under existing BAT: the total allowable discharge of phenolic compounds (4AAP). would be reduced by approximately 75.000 pounds per year. a 43% annual reduction beyond discharge levels allowable under existing BAT. These reductions are based on data in the Agency's refined BAT model. The refined flow model is included in the record for this rulemaking proposal in a report entitled "Petroleum Refining Industry, Refinements to 1979 Proposed Flow Model."

EPA believes that approximately one half of refineries which directly discharge pollutants to navigable waters already are complying with the effluent limitations being proposed today. Further. EPA believes that these effluent limitations are economically achievable for the industry.

In the preamble to the October 18. 1982 promulgated regulations for this industry. EPA estimated that capital costs of $112 million and $37 million (1979 dollars) in annualized costs would be required in order for petroleum refiners to comply with option 7. one of the BAT control treatment options considered by the Agency (47 FR 46438). Likewise. EPA estimated that capital costs of $77 million and annualized costs of $25 million (1979) dollars would be required in order for petroleum refiners to comply with option 8. another of the BAT control treatment options considered by the Agency (47 FR 46438).

The revised limitations being proposed today for phenolic compounds. hexavalent chromium and total chromium are not based on either option 7 or option 8 alone. The effluent limitations for phenolic compounds are based upon option 8. The effluent limitations for hexavalent chromium are based upon option 7 The effluent limitations for total chromium, while somewhat more stringent than the BPT effluent limitations for total chromium. are less stringent than those based upon option 8.

The Agency has reevaluated the costs of compliance for today's proposed changes to the BAT effluent limitations and estimates that the total industry costs of compliance would not exceed those previously calculated for option 8. EPA estimates that no more than 61 petroleum refineries will have to incur aggregate capital costs no greater than $77 million and annualized costs no greater than $25 million (1979 dollars). These costs translate to an average increase of no greater than one half cent per gallon of refinery product. No refinery closures are anticipated by the Agency. Refinery capacity and consumption would remain unaffected. Given these factors. the Agency believes that its earlier heavy reliance on costs as the basis for rejecting more stringent effluent controls in this industry was inappropriate. and that the effluent limitations guidelines for total chromium. hexavalent chromium and phenolic compounds (4AAP) being proposed today. rather than the effluent limitations guidelines promulgated in 1982. are appropriate for this industry as the BAT level of control. The revised proposed BAT numerical limitations are contained in the proposed regulation.

B. Best Conventional Pollutant Technology Effluent Limitations Guidelines

As part of the Settlement Agreement EPA agreed to propose best conventional pollutant control technology ("BCT") effluent limitations guidelines for the petroleum refining industry. The 1977 Amendments to the Clean Water Act ("CWA") added section 301(b)(2)(E) of the Act establishing BCT for discharge of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in Section 304(a)(4) (biochemical oxygen demanding pollutants (BOD_5) total suspended solids (TSS). fecal coliform and pH). and any additional pollutants defined by the Administrator as "conventional". The Administrator designated oil and grease as a conventional pollutant on July 30. 1979. 44 FR 44501.

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. In addition to other factors specified in section 304(b)(4)(B) the Act requires the BCT limitations be assessed in light of a two part "cost reasonableness" test.

American Paper Institute v. *EPA*, 660 F2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond best practicable control technology currently available (BPT). EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA published a proposed BCT methodology on October 29, 1982. (47 FR 49176). This proposed BCT methodology explains the details of the two part cost-reasonableness test, i.e., the "POTW test" and the "industry cost test". Today's proposed BCT effluent limitations guidelines for the petroleum refining industry are based on the proposed BCT methodology. EPA is proposing that BCT be set equal to BPT for the petroleum refining industry.

EPA considered two levels of technology for incremental control beyond BPT of total suspended solids (TSS) and oil and grease. These technology levels are recycle/reuse and recycle/reuse followed by granular media filtration. These technologies are already in use at certain sites in the petroleum refining industry. These technologies were selected as candidate BCT technologies because the Agency believes they represent the first levels of control beyond BPT which could effect reductions in conventional pollutant loadings in this industry. Filtration alone was not selected as a candidate BCT technology because it is one of the existing BPT treatment technologies. However, the Agency decided to consider the combination of recycle/reuse plus filtration as a candidate BCT technology. This is because the decreased hydraulic loading resulting from recycle/reuse results in the need for smaller and less costly filtration equipment than that included in the BPT *treatment model. The BCT cost test was* then performed on the combination of recycle/reuse and filtration as a double-check on the effects of the less costly filtration step.

In order to determine whether these candidate technologies are "cost-reasonable", EPA developed one model plant representative of a typical plant in each of the five BPT subcategories. The five BPT subcategories are:

A—Topping
B—Cracking
C—Petrochemical
D—Lube
E—Integrated

Then EPA calculated the incremental (beyond BPT) conventional pollutant removals and the incremental costs associated with these technologies for each model plant. Based on this information, cost-per-pound ratios were calculated for each of the five BPT subcategories.

EPA evaluated reductions in total *suspended solids (TSS), biochemical* oxygen demand (BOD_5), and oil and grease for each of these technology levels. However, oil and grease was not considered for the BCT calculations for recycle/reuse for this industry. Additionally, BOD_5 was not considered for the BCT calculations for filtration for this industry. This is in accordance with the proposed BCT methodology in order to avoid "double counting" of the amount of pollutants removed by a candidate BCT technology.

The recycle/reuse technology option identified for BCT was evaluated in the range of from 20 to 40 percent reduction in discharge flow. The cost per pound ranges from $41.00 to $0.77 (1977 dollars) in the first part of the proposed BCT cost *reasonableness test (the "POTW test").* Accordingly, the Agency found that the addition of recycle/reuse technology fails the first part of the proposed BCT cost reasonableness test in all five subcategories ($0.30 per pound in 1977 dollars).

The Agency also found that the addition of recycle/reuse plus filtration fails the first part of the proposed BCT cost reasonableness test in all five subcategories. The recycle/reuse portion of this option was evaluated in the range of from 20 to 40 percent reduction in discharge flow. The cost per pound (1977 dollars) ranges from $21.00 to $0.58, compared to the benchmark of $0.30 per pound (1977 dollars).

Therefore, the Agency is proposing that BCT be set equal to BPT for the five subcategories in this industry.

A more complete discussion of the selection of the candidate BCT technologies, the details of the first part of the proposed BCT cost reasonableness test ("POTW test"), and the basis for decision on this proposal are contained in the administrative record of this rulemaking.

C. Effluent Limitations Guidelines for Contaminated Storm Water Runoff

In the October 18, 1982 rulemaking the Agency withdrew storm water effluent limitations guidelines for BPT, BAT and NSPS, because they were remanded by the U.S. Court of Appeals in *American Petroleum Institute* v. *EPA*, 540 F.2d 1023 (10th Cir. 1976).

Since that remand there has been *some confusion on the part of permit* writers and others as to whether storm water runoff ("runoff") effluent limitations should be contained in permits. There are two kinds of such runoff, i.e., contaminated and uncontaminated. The purpose of this rulemaking is to establish BPT, BCT and BAT effluent limitations guidelines for contaminated storm water runoff. These proposed contaminated runoff effluent limitations would be included in petroleum refinery permits in addition to process wastewater effluent limitations. *NSPS for contaminated runoff is being* reserved for future rulemaking.

In today's proposal EPA is defining contaminated runoff, for purposes of these regulations only, to be runoff which comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property. Any other storm water runoff at a refinery is considered uncontaminated. In today's proposal, EPA also is proposing to amend the definition of the term "runoff" currently found in 40 CFR 419.11(b) *to clearly that it means the* flow of storm water resulting from precipitation coming into contact with petroleum refinery property. Contaminated runoff constitutes an additional source of pollution which must be managed during periods of precipitation along with process wastewater from refinery operations. The regulations being proposed today do not establish numerical effluent limitations for uncontaminated runoff. Effluent limitations, including but not limited to allocations, for uncontaminated runoff may be established by the permit writer based on his/her best professional judgment.

The Agency believes that the best practicable control technology currently available, the best conventional pollutant control technology and the best available technology economically achievable for treatment of contaminated runoff are the same as the *technologies identified for treatment of* process wastewater. The Agency has not identified any feasible technologies capable of achieving pollutant reductions for contaminated runoff from refineries to any greater degree than those which are achievable by the process wastewater treatment facility.

The Agency believes that the conventional pollutant oil and grease and the nonconventional pollutant parameter total organic carbon (TOC) are appropriate measures to determine whether pollutant loadings in contaminated runoff would be

measurably reduced by the model treatment technologies used to develop these proposed regulations. Under today's proposal for BPT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment if it does not exceed 15 mg/l oil and grease and 110 mg/l TOC, based upon an analysis of any single grab or composite sample. Under today's proposal for BCT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment, if it does not exceed 15 mg/l oil and grease and under today's proposal for BAT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment if it does not exceed 110 mg/l TOC. If contaminated runoff (whether or not it exceeds 15 mg/l oil and grease or 110 mg/l TOC) is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, then such runoff would be subject to the alternative BPT/BCT/BAT effluent limitations guidelines for contaminated runoff being proposed today, as appropriate. These oil and grease and TOC numerical effluent limitations are based on the concentrations expected from the properly designed and operated model treatment facilities.

The effluent limitations guidelines in today's BPT proposal for contaminated runoff are based on the same concentrations and variability factors used to develop the Agency's existing BPT process wastewater effluent limitations guidelines.

Today's BAT proposal for contaminated runoff is based upon the same concentrations and variability factors used to develop the Agency's existing BAT process wastewater effluent limitations guidelines, except those for total chromium, which are based upon the same concentrations and variability factors used for today's proposed BAT effluent limitations guidelines for process wastewater.

Today's proposed BAT effluent guidelines for phenolic compounds (4AAP) for contaminated runoff are based on the same concentrations used for today's existing BAT effluent limitations guidelines for process wastewater and the same variability factors used for the Agency's existing BAT effluent limitations guidelines. EPA has determined that this approach is appropriate in this proposal because of the specifics of each data base available to the Agency. If EPA used the variability factors from today's proposed BAT effluent limitations guidelines, less stringent BAT contaminated runoff numerical effluent limitations for phenolic compounds (4AAP) would be derived than under today's proposed BPT contaminated runoff numerical effluent limitations for phenolic compounds (4AAP). The more stringent effluent limitations clearly are achievable and as a matter of law BAT cannot be less stringent than BPT.

Today's BCT proposal for contaminated runoff is based on the same concentrations and variability factors used for today's proposed BCT process wastewater effluent limitations guidelines.

The Agency believes that the costs attributable to today's proposal will be minimal, while providing for reductions in refinery pollutant discharges. This is because the Agency believes the industry as a whole already is (a) treating contaminated runoff with process wastewater or (b) is discharging contaminated runoff below today's proposed threshold for treatment. This proposal does not cover contaminated runoff which is commingled with non-process wastewater streams. EPA believes that such instances are infrequent, and accordingly, they are left to the permit writer's discretion.

Unlike the effluent limitations guidelines for process wastewater for this industry which are mass-based, today's proposed effluent limitations guidelines for contaminated runoff are concentration-based. This is because storm water volumes are not related to any measurement of refinery production. However, under today's proposal permit effluent limitations for contaminated runoff are to be established on a mass basis. The mass-based effluent limitations for each regulated pollutant for contaminated runoff in a petroleum refining permit are the product of (1) the respective effluent guideline concentration for that pollutant; and (2) the measured or calculated contaminated runoff volume.

Under today's proposal permit writers are given flexibility in determining refinery storm water volumes on a case by case basis. The following factors are among those appropriate for permit writers to consider in determining what contaminated runoff volume to use in calculating mass-based effluent limitations for refinery permits: (a) Measured difference between dry weather and wet weather discharge flow from the treatment facility where contaminated runoff is the only runoff present in the treatment facility; and (b) volume of contaminated runoff water calculated from the product of (1) measurement of land area where precipitation would become contaminated, and (2) an historical measure of precipitation for the particular refinery location.

Once the mass based effluent limitation is derived, it may be incorporated into a refinery permit in one of three ways. The proper choice depends on site-specific factors, such as local rainfall patterns and the design of runoff holding facilities.

The first method is a continuous allocation. This presents the problem of providing an allocation when no runoff is present and is appropriate only where precipitation patterns are relatively constant through the year or when holding facilities are used to bleed runoff into the treatment facility over most or all of the year. The second method is a variable allocation based on measurement or calculation of actual contaminated runoff volume. While this is the most ideal method, it may present compliance measurement and enforcement complexities. The third method is dual wet weather/dry weather limitations triggered by either time of year, precipitation events, or actual contaminated runoff volume. The method of determining contaminated runoff volume used to calculate the effluent limitations will vary dependin on the method used and the design of any runoff holding facilities. Therefore, it is left to the permit writer to select an appropriate method under today's proposal.

These proposed regulations do not address uncontaminated runoff which is discharged through the process wastewater treatment facility. This is because the Agency believes that introducing uncontaminated runoff to the process wastewater treatment system may result in the discharge of an increased mass of pollutants to the environment compared to the mass of pollutants discharged if no uncontaminated runoff were present in the process wastewater treatment system. Therefore, the Agency does not want to encourage this practice on a national basis.

In the case of BPT, the effluent limitations guidelines being proposed today are for the following pollutants: (1) conventional pollutants total suspended solids (TSS), oil and grease, five-day biochemical oxygen demand (BOD_5) and pH; (2) nonconventional pollutants phenolic compounds (4AAP), chemical oxygen demand (COD) and total organic carbon (TOC); and (3) to- pollutants total chromium and hexavalent chromium. In the case of BAT, the effluent limitations guidelines

being proposed today are for (1) Nonconventional pollutants phenolic compounds (4AAP), chemical oxygen demand (COD) and total organic carbon (TOC); and (2) toxic pollutants total chromium and hexavalent chromium. In the case of BCT, the effluent limitations guidelines being proposed today are for the conventional pollutants TSS, oil and grease, BOD_5 and pH. In the case of COD, there may be instances where extremely high chloride levels (greater than 1,000 mg/l) will interfere with the COD analytical method. In this event, the Agency believes that TOC is an acceptable substitute parameter for COD. A TOC limitation shall be based upon effluent data from the particular refinery which correlates TOC to BOD_5. Where adequate correlation data are not available, the permitting authority may establish a TOC limitation on a ratio of 2.2 to 1 to the applicable BPT/BCT effluent limitations for BOD_5. This ratio is based upon effluent data analyzed by the Agency.

No effluent limitations guidelines for contaminated runoff are being proposed for the nonconventional pollutants ammonia (as N) and sulfide regulated under existing BPT and BAT levels of control.

IV. Environmental Impact of the Proposed Modifications to the Petroleum Refining Industry Regulation

EPA's estimates of the reduction in industry-wide direct discharges of phenolic compounds, hexavalent chromium, and total chromium for process wastewater from those allowed under the final petroleum industry regulation to those allowed by this proposed modification are presented below.

REDUCTIONS IN ALLOWABLE DISCHARGE

(Pounds per year)

Pollutant	Reduction
Total chromium	288 000
Hexavalent chromium	19 300
Phenolic compounds	75 000

V. Solicitation of Comments

EPA invites public participation in this rulemaking and requests comments on the proposals discussed or set out in this notice. The Agency asks that any deficiencies in the record of this proposal be pointed to with specificity and that suggested revisions or corrections be supported by data.

VI. Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This proposed regulation is not major because it does not fall within the criteria for major regulations established in Executive Order 12291.

VII. Regulatory Flexibility Analysis

Under the Regulatory Flexibility Act, 5 U.S.C. 601 et seq., EPA must prepare a Regulatory Flexibility Analysis for all proposed regulations that have a significant impact on a substantial number of small entities. The Agency does not believe that today's proposed amendments will have a significant impact on any segment of the petroleum refining industry, large or small. The Agency is not, therefore, preparing a formal analysis for this regulation.

VIII. OMB Review

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

IX. List of Subjects in 40 CFR Part 419

Petroleum, Water pollution control, Wastewater treatment and disposal.

Dated: August 13, 1984.

William D. Ruckelshaus,

Administrator.

For the reasons set out in the preamble, EPA is proposing to amend 40 CFR Part 419 as follows:

PART 419—[AMENDED]

1. The authority citation for Part 419 continues to read as follows:

Authority: Secs. 301, 304 (b), (c), (e), and (g), 306 (b) and (c), 307 (b) and (c), 308, and 501, Federal Water Pollution Control Act as amended (the Act), 33 U.S.C. 1311, 1314 (b), (c), (e), and (g), 1316 (b) and (c), 1317 (b) and (c), 1318, and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

2. Section 419.11 is amended by revising paragraph (b) and adding paragraph (g) to read as follows:

§ 419.11 Specialized definitions.

* * * * *

(b) The term "runoff" shall mean the flow of storm water resulting from precipitation coming into contact with petroleum refinery property.

* * * * *

(g) The term "contaminated runoff" shall mean runoff which comes into contact with any raw material, intermediate product, finished product, by product or waste product located on petroleum refinery property.

3. Sections 419.12, 419.22, 419.32, 419.42, and 419.52 are amended by removing the paragraph heading and the word "reserved" in paragraph (e) and adding the following text:

§ 419.— Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

* * * * *

(e) Effluent Limitations for Contaminated Runoff.

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease and 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations: Maximum for any 1 day	BPT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1 000 cubic meters of flow)		
BOD_5	48	26
TSS	33	21
COD[2]	360	190
Oil and grease	15	8
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(1)	(1)
English units (pounds per 1 000 gallons of flow)		
BOD_5	0.40	0.22
TSS	0.28	0.18
COD[2]	3.0	1.9
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(1)	(1)

[1] Within the range 6.0 to 9.0.

[2] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/L (1,000 ppm), the permitting authority may substitute TOC as a parameter in lieu of COD. A TOC effluent limitation

shall be based on effluent data from the particular refinery which correlates TOC to BOD5. If in the judgment of the permitting authority adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations for BOD5.

4. Sections 419.13, 419.23, 419.33, 419.43, and 419.53 are amended by removing the entries and effluent limitations for phenolic compounds, total chromium, and hexavalent chromium from the tables in paragraph (a).

5. Sections 419.13, 419.23, 419.33, 419.43, and 419.53 are amended by redesignating paragraph (e) as (f), redesignating paragraph (d) as (e), redesignating paragraph (c) as (d), and revising the redesignated paragraph (f) to read as follows:

§ 419.— Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

• • • • •

(f) Effluent Limitations for Contaminated Runoff. The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceed 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations: Maximum for any 1 day	BAT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.80	0.21
Hexavalent chromium	0.062	0.026
COD[1]	360	180
	English units (pounds per 1,000 gallons of flow)	
Phenolic compounds (4AAP)	0.029	0.014
Total chromium	0.050	0.018
Hexavalent chromium	0.0052	0.0023
COD[1]	3.0	1.5

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1000 mg/l (1000 ppm), the permitting authority may substitute TOC as a parameter in lieu of COD. A TOC effluent limitation shall be based on effluent data from the particular refinery which correlates TOC to BOD5. If in the judgment of the permitting authority, adequate correlation data are not available the effluent limitations for TOC shall be established at a value of 2.2 to 1 to the applicable effluent limitations for BOD5.

6. Sections 419.13, 419.23, 419.33, and 419.53 are amended by adding a new paragraph (c) to read as follows:

§ 419.— Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

• • • • •

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factor times the applicable refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category* (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor: Maximum for any 1 day	BAT effluent limitation factor: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m³ of feedstock)	
Phenolic compounds (4AAP)		
Crude	0.027	0.009
Cracking and coking	0.419	0.162
Asphalt	0.228	0.055
Lube	1.956	0.257
Reforming and alkylation	0.377	0.092
Total chromium		
Crude	0.030	0.011
Cracking and coking	0.340	0.116
Asphalt	0.193	0.064
Lube	0.856	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0096
Asphalt	0.0117	0.0053
Lube	0.0549	0.0248
Reforming and alkylation	0.0196	0.0088
	English units (pounds per 1,000 bbl of feedstock)	
Phenolic compounds (4AAP)		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.388	0.090
Reforming and alkylation	0.132	0.032
Total chromium		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.003
Asphalt	0.0041	0.00
Lube	0.0192	0.008
Reforming and alkylation	0.0068	0.0031

(2) See the comprehensive example in Subpart D, § 419.43(c)(2).

7. Section 419.43 is amended by adding a new paragraph (c) to read as follows:

§ 419.43 Effluent limitation guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

• • • • •

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factor times the applicable

refinery process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross referenced in the *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category* (EPA 440/1–82/014), Table III–7, pp. 49–54.

Pollutant or pollutant property and process type	BAT effluent limitation factor: Maximum for any 1 day	BAT effluent limitation factor: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.116
Asphalt	0.183	0.064
Lube	0.856	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0098
Asphalt	0.0117	0.0053
Lube	0.0548	0.0248
Reforming and alkylation	0.0196	0.0088
English units (pounds per 1,000 bbl of feedstock)		
Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.368	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) Example Application of Effluent Limitations Guidelines as Applicable to Phenolic Compounds, Hexavalent Chromium, and Total Chromium.

The following example presents the derivation of a BAT phenolic compounds (4AAP) effluent limitation (30 day average) for a petroleum refinery permit. This methodology is also applicable to hexavalent chromium and total chromium.

Refinery process	Process feedstock rate 1,000 bbl/day
1 Atmospheric crude distillation	100
2 Crude desalting	50
3 Vacuum crude distillation	75
Total crude processes (C)	225
6 Fluid catalytic cracking	25
10 Hydrocracking	20
Total cracking and coking processes (R)	45
18 Asphalt production: Total asphalt processes (A)	5
21 Hydrotreating: Total lube processes (L)	3
8 Catalytic reforming: Total reforming and alkylation processes (R)	10

Note.—30-day average phenolic compounds (4AAP) discharge, lb/day: (0.003)(225) + (0.036)(45) + (0.019)(5) + (0.090)(3) + (0.032)(10) = 2.96 lb/day.

8. Section 419.14 is revised to read as follows:

§ 419.14 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

BCT effluent limitations	Pollutant or pollutant property: Maximum for any 1 day	Pollutant or pollutant property: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m^3 of feedstock)		
BOD	22.7	12.0
TSS	15.8	10.1
Oil and grease	6.9	3.7
pH	(1)	(1)
English units (pounds per 1,000 bbl of feedstock)		
BOD	8.0	4.25
TSS	5.6	3.6
Oil and grease	2.5	1.3
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.08
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.36
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67
3.5 to 4.49	0.80
4.5 to 5.49	0.95
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.94
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best conventional pollutant control technology by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/1000 gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BCT effluent limitations for ballast water: Maximum for any 1 day	BCT effluent limitations for ballast water: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per cubic meter of flow)		
BOD	0.048	0.026
TSS	0.033	0.021
Oil and grease	0.015	0.008
pH	(1)	(1)
English units (pounds per 1,000 gal of flow)		
BOD	0.40	0.21
TSS	0.28	0.17
Oil and grease	0.126	0.067
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff. The following effluent limitations constitute the quantity and quality of pollutants or

pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD-5	46.	28.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD-5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

(1) Within the range 6.0 to 9.0.

9. Section 419.24 is revised to read as follows:

§ 419.24 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m³ of feedstock)	
BOD	23.2	15.6
TSS	19.5	12.8
Oil and grease	6.4	4.5
pH	(1)	(1)
	English units (pounds per 1,000 bbl feedstock)	
BOD	9.9	5.5
TSS	6.9	4.4
Oil and grease	2.8	1.6
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 barrels of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.98
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.08
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.99

(3) See the comprehensive example in Subpart D. § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff.

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for consecutive days not ex.
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD-5	46.	28.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD-5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

(1) Within the range 6.0 to 9.0.

10. Section 419.34 is revised to read as follows:

§ 419.34 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD	38.6	18.4
TSS	23.4	14.8
Oil and grease	11.1	5.8
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD	12.1	6.5
TSS	8.3	5.25
Oil and grease	3.9	2.1
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 barrels of feedstock per stream day	Size factor
Less than 24.9	0.72
25.0 to 49.9	0.76
50.0 to 74.9	0.83
75.0 to 99.9	0.99
100.0 to 124.9	0.99
125.0 to 149.9	1.06
150.0 or greater	1.13

(2) Process factor.

Process configuration	Process factor
Less than 4.49	0.73
4.5 to 5.49	0.80
5.5 to 5.99	0.91
6.0 to 6.49	0.99
6.5 to 6.99	1.08
7.0 to 7.49	1.17
7.5 to 7.99	1.26
8.0 to 8.49	1.39
8.5 to 8.99	1.51
9.0 to 9.49	1.65
9.5 or greater	1.72

(3) See the comprehensive example in Subpart D. § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff.

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 cubic meters of flow)	
BOD	48.	28.
TSS	33.	21.
Oil and grease	15.	8.
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.12	0.067
pH	(1)	(1)

(1) Within the range 6.0 to 9.0.

11. Section 419.44 is revised to read as follows:

§ 419.44 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD	58.6	25.8
TSS	35.6	22.7
Oil and grease	16.2	8.9
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD	17.9	9.1
TSS	12.5	8.0
Oil and grease	5.7	3.0
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 barrels of feedstock per stream day	Size factor
Less than 49.9	0.71
50.0 to 74.9	0.74
75.0 to 99.9	0.91
100.0 to 124.9	0.88
125.0 to 149.9	0.97
150.0 to 174.9	1.05
175.0 to 199.9	1.14
200.0 or greater	1.19

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.81
6.5 to 7.49	0.88
7.5 to 7.99	1.00
8.0 to 8.49	1.09
8.5 to 8.99	1.19
9.0 to 9.49	1.29
9.5 to 9.99	1.41
10.0 to 10.49	1.53
10.5 to 10.99	1.67
11.0 to 11.49	1.82
11.5 to 11.99	1.98
12.0 to 12.49	2.15
12.5 to 12.99	2.34
13.0 or greater	2.44

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff.

The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 cubic meters of flow)		
BOD5	48	26
TSS	33	21
Oil and grease	15	8
pH	(1)	(1)
English units (pounds per 1,000 gallons of flow)		
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

(1) Within the range 6.0 to 9.0

12. Section 419.54 is revised to read as follows:

§ 419.54 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m³ of feedstock)		
BOD5	54.4	28.9
TSS	37.3	23.7
Oil and grease	17.1	9.1
pH	(1)	(1)
English units (pounds per 1,000 bbl of feedstock)		
BOD5	19.2	10.2
TSS	13.2	8.4
Oil and grease	6.0	3.2
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 barrels of feedstock per stream day	Size factor
Less than 124.9	0.73
125.0 to 149.9	0.78
150.0 to 174.9	0.83
175.0 to 199.9	0.91
200.0 to 224.9	0.99
225.0 or greater	1.04

(2) Process factor.

Process configuration	Process factor
Less than 6.49	0.75
6.5 to 7.49	0.82
7.5 to 7.99	0.92
8.0 to 8.49	1.00
8.5 to 8.99	1.10
9.0 to 9.49	1.20
9.5 to 9.99	1.30
10.0 to 10.49	1.42
10.5 to 10.99	1.54
11.0 to 11.49	1.68
11.5 to 11.99	1.83
12.0 to 12.49	1.99
12.5 to 12.99	2.17
13.0 or greater	2.26

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) Effluent Limitations for Contaminated Runoff. The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 cubic meters of flow)		
BOD5	48	26
TSS	33	21
Oil and grease	15	8
pH	(1)	(1)
English units (pounds per 1,000 gallons of flow)		
BOD5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

(1) Within the range 6.0 to 9.0

13. 40 CFR Part 419 is amended by adding the following appendix:

* * * * *

Appendix A—Processes Included in the Determination of BAT Effluent Limitations for Total Chromium, Hexavalent Chromium, and Phenolic Compounds (4AAP)

Crude Processes:

1. Atmospheric Crude Distillation
2. Crude Desalting
3. Vacuum Crude Distillation

Cracking and Coking Processes:

4. Visbreaking
5. Thermal Cracking
6. Fluid Catalytic Cracking
7. Moving Bed Catalytic Cracking
10. Hydrocracking
15. Delayed Coking
16. Fluid Coking
54. Hydrotreating

Asphalt Processes:
18. Asphalt Production
32. 200 F Softening Point Unfluxed Asphalt
43. Asphalt Oxidizing
89. Asphalt Emulsifying

Lube Processes:
21. Hydrofining, Hydrofinishing, Lube Hydrofining
22. White Oil Manufacture
23. Propane Dewaxing, Propane Deasphalting, Propane Fractioning, Propane Deresining
24. Duo Sol, Solvent Treating, Solvent Extraction, Duotreating, Solvent Dewaxing, Solvent Deasphalting
25. Lube Vac Twr, Oil Fractionation, Batch Still (Naphtha Strip), Bright Stock Treating
26. Centrifuge & Chilling
27. MEK Dewaxing, Ketone Dewaxing, MEK-Toluene Dewaxing
28. Deoiling (wax)
29. Naphthenic Lubes Production
30. SO_2 Extraction
34. Wax Pressing
35. Wax Plant (with Neutral Separation)
36. Furfural Extraction
37. Clay Contracting—Percolation
38. Wax Sweating
39. Acid Treating
40. Phenol Extraction

Reforming and Alkylation Processes:
8. H_2SO_4 Alkylation
12. Catalytic Reforming

[FR Doc. 84-22553 Filed 8-27-84, 8:45 am]
BILLING CODE 6560-50-M

-12-85
Vol. 50 No. 134

federal register

Friday
July 12, 1985

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 419

[OW-FRL-2815-5]

Petroleum Refining Point Source Category; Effluent Limitations Guidelines

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA is amending the regulation which limits effluent discharges to waters of the United States from facilities engaged in the refining and processing of petroleum. EPA proposed these modifications on August 28, 1984, (49 FR 34152) in accordance with a settlement agreement which resolved a lawsuit brought against EPA by the Natural Resources Defense Council, Inc. The lawsuit challenged the final petroleum refining regulation promulgated on October 18, 1982 (47 FR 46434).

Today's final rule incorporates the proposed amendments which are: (1) Modifications to the "best available technology economically achievable" (BAT) effluent limitations for process wastewater for the pollutants phenolic compounds, total chromium, and hexavalent chromium; (2) "best conventional pollutant control technology" (BCT) effluent limitations for process wastewater; and (3) "best practicable control technology currently available" (BPT), BCT, and BAT effluent limitations for contaminated storm water runoff. Amendments are also made in this final rule, which will correct errors identified in the October 28, 1984 rule, the August 28, 1984 Proposed Rule, as well as errors contained in 40 CFR Part 419, revised as of July 1, 1984.

DATES: In accordance with 40 CFR 100.01, the regulations developed in this rulemaking shall be considered issued for purposes of judicial review at 1:00 p.m. Eastern time on July 29, 1985. These regulations shall become effective August 28, 1985.

Under Section 509(b)(1) of the Clean Water Act, judicial review of these regulations is available only by filing a petition for review in the United States Court of Appeals within ninety days after these regulations are considered issued for purpose of judicial review. Under section 509(b)(2) of the Clean Water Act, these requirements of the regulations may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

Those portions of the existing petroleum refining effluent limitations guidelines and standards that are not substantively amended by this notice are not subject to judicial review nor is their effectiveness altered by this notice.

ADDRESSES: The record for this rulemaking will be available for inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. The EPA information regulation provides that a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Dennis Ruddy, Industrial Technology Division, at (202) 382-7131.

SUPPLEMENTARY INFORMATION:

I. Legal Authority

The amendments to the regulation described in this notice are promulgated under the authority of sections 301, 304, 307, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251, et seq., as amended by the Clean Water Act of 1977, Pub. L. 92-517). These changes are also promulgated in response to the Settlement Agreement in *Natural Resources Defense Council, Inc. v. Environmental Protection Agency*, No. 83-1122 (D.C. Cir.).

II. Background

A. Prior Regulation

On October 18, 1982, EPA published final effluent limitations guidelines and standards for the petroleum refining point source category. That regulation provided final effluent limitations for "best available technology economically achievable" (BAT) and established final pretreatment standards for existing sources (PSES) and for new sources (PSNS). The Agency retained its previously promulgated "new source performance standards" (NSPS) and also did not modify its effluent limitations guidelines for "best practicable control technology currently available" (BPT). The Agency reserved coverage of "best conventional pollutant control technology" (BCT) effluent limitations guidelines. The preamble of the 1982 final regulations describes the history of the rulemaking. (47 FR 46343)

B. Challenges to the Prior Regulation

On January 27, 1983, the Natural Resources Defense Council, Inc. ("NRDC") filed a petition to review the final petroleum refining regulation. *Natural Resources Defense Council, Inc. v. Environmental Protection Agency*, No. 83-1122 (D.C. Cir.). The American Petroleum Institute ("API") and seven individual oil companies intervened in the litigation.

C. Settlement Agreement

On April 17, 1984, EPA, NRDC, API and all other interveners to the litigation entered into a comprehensive Settlement Agreement. In the Settlement Agreement, EPA agreed to publish a notice of proposed rulemaking and to solicit comments regarding certain modifications to the 1982 final petroleum refining BAT effluent limitations guidelines. In addition, EPA agreed to propose BCT effluent limitations guidelines for four conventional pollutants and BPT, BAT and BCT effluent limitations guidelines for contaminated storm water runoff. Petitioner NRDC agreed that if EPA took final action pursuant to and consistent with the Settlement Agreement that it will dismiss its lawsuit challenging the 1982 final petroleum refining regulation.

As part of the Settlement Agreement, the parties agreed to seek a judicial stay of the regulatory provisions to be modified. On July 24, 1984, the Court entered a stay of the effluent limitations for phenolic compounds, total chromium and hexavalent chromium for the following portions of the regulation pending the rulemaking: 40 CFR 419.13(a), 419.23(a), 419.33(a), 419.43(a), and 419.53(a). On August 28, 1984, EPA published the proposed amendments to the 1982 effluent limitations guidelines in accordance with the Settlement Agreement (49 FR 34152). Public comments were received and considered in issuing this final rule.

III. Changes From Proposal

Today's final rule amends the effluent limitations guidelines for the petroleum refining point source category; it is the same as the August 28, 1984 proposed amendments. However, certain cost determinations used to develop the BCT

effluent limitations guidelines have been revised since the proposal but do not affect the Agency's original conclusion that BCT should be set equal to BPT for this industry.

EPA published a proposed BCT methodology (47 FR 49176) which set forth a procedure for evaluating the cost reasonableness of BCT effluent limitations guidelines. The proposed BCT limitations for the petroleum refining industry were based upon that published methodology, which includes the "POTW test" and the "industry cost test." The Agency selected and evaluated two levels of technology for the control of conventional pollutants from petroleum refineries (i.e., recycle/reuse and recycle/reuse plus granular media filtration following BPT). Incremental (beyond BPT) conventional pollutant removals and costs associated with the candidate BCT technologies were calculated for model plants representative of each of the five petroleum refining subcategories. The resulting "cost per pound removed" ratios failed the BCT cost test. The Agency therefore proposed that BCT be set equal to BPT for all five petroleum refining subcategories.

Subsequently, EPA published a notice of data availability concerning the BCT methodology on September 20, 1984 (49 FR 37046). The Agency has revised its BCT cost evaluation for petroleum refining to incorporate the updated information referenced in the notice of data availability. The revised cost ratios for the recycle/reuse technology options with 20 to 40 percent reductions in discharge flow range from $50.48 to $1.36 (1977 dollars). The revised cost ratios for the recycle/reuse plus filtrations options range from $27.05 to $1.11 (1977 dollars). The benchmark in 1977 dollars for the POTW cost test based on the Agency's reproposed BCT methodology is approximately $.78 per pound of pollutant removed. The Agency is presently revising the BCT methodology and expects the benchmark to change. Based on preliminary analysis, the Agency expects that the candidate technologies will fail under future BCT cost tests. Thus, the Agency has decided to establish BCT effluent limitations guidelines equal to BPT effluent limitations guidelines for the Petroleum Refining Industry in this rulemaking.

Several typographical and transcription errors appeared in 419.43(c)(2), 419.14(a), 419.34(b)(1) and in Appendix A, in the proposed rule published on August 28, 1984, 49 FR 34152. Those errors have been corrected in the amendments set forth below.

In addition, today's notice amends the BPT effluent limitations guidelines for sulfide in Subparts A and C and for hexavalent chromium in Subpart A, which appeared in the Federal Register notice of October 18, 1982 (47 FR 46434) and were reprinted in 40 CFR Part 419 dated July 1, 1984 to correct typographical errors. Because these limitations appeared in both metric and English units, the typographical errors have been obvious. Also, amendments are made to correct typographical errors in a paragraph reference that appeared in Subparts D and E for NSPS, and in a refinery capacity range in a size factor table that appeared in Subpart E for BPT. These amendments appear in the amended regulation that follows this preamble.

IV. Amendments to the Petroleum Refining Point Source Category Regulation

The following are the changes to the petroleum industry regulation that EPA proposed on August 28, 1984:

A. Best Available Technology Effluent Limitations Guidelines

On October 18, 1982 EPA published final effluent limitations guidelines for best available technology economically achievable (BAT) and final pretreatment standards for existing sources (PSES) and for new sources (PSNS) for the petroleum refining industry. 47 FR 46434. The Natural Resources Defense Council ("NRDC") filed a petition to review the October 18, 1982 regulation in the United States Court of Appeals for the District of Columbia Circuit. The American Petroleum Institute (API) and seven companies which own and operate petroleum refineries intervened in that proceeding. A number of issues were raised in settlement discussions among the parties in the lawsuit pertaining to the BAT effluent limitations guidelines. After extensive discussions, the petitioner, interveners and EPA entered a Settlement Agreement, which provides for specified revisions to the BAT effluent limitations guidelines. Those revisions are set forth in today's amended regulation.

In October 1982 EPA promulgated BAT effluent limitations for the following pollutants: (1) Nonconventional pollutants: chemical oxygen demand (COD), phenolic compounds (4AAP), ammonia (as N) and sulfide; and (2) toxic pollutants: total chromium and hexavalent chromium. The model technology for these regulations was flow equalization, initial oil and solids removal, advanced oil and solids removal, biological treatment and filtration or other final "polishing steps."

The Agency is now amending the BAT effluent limitations guidelines for total chromium, hexavalent chromium and phenolic compounds (4AAP). EPA is adding flow reduction to the model treatment technology for the BAT effluent limitations guidelines and is basing the effluent limitations for each of these three pollutants on a more recent data base, rather than the one it relied upon in the October 18, 1982 BAT promulgation. That rulemaking utilized the same data based used by the Agency when it established best practicable control technology currently available (BPT) effluent limitations guidelines for the petroleum refining point source category. The BPT level of control for this industry was promulgated on May 9, 1974 (39 FR 18560) and subsequently amended on May 20, 1975 (40 FR 21939). The BAT effluent limitations guidelines for other pollutants remain unchanged.

The BAT effluent limitations guidelines for total chromium being promulgated today are based upon the revised 1979 flow model developed by the Agency to predict refinery flows, rather than the BPT 1974 flow model used in the October 1982 BAT promulgation. The effluent limitations for total chromium being promulgated today were derived by applying this updated flow model to concentrations for total chromium observed from plant sampling in 1976–1977.

BAT effluent limitations guidelines for hexavalent chromium and phenolic compounds being promulgated today were derived using the 1982 Development Document concentrations and the revised 1979 flow model to more accurately represent effluent reductions for these pollutants which the industry was generally achieving in 1979 or could technologically achieve by the final BAT compliance date. BAT for hexavalent chromium being promulgated today is based upon option 7 (discharge flow reduction of 37.5 percent from the revised 1979 model flow). BAT for phenolic compounds (4AAP) being promulgated today is based upon option 8 (a reduction of 20 percent from the revised 1979 model flow).

Under today's rulemaking, the BAT effluent limitations guidelines for each of these three pollutants are substantially more stringent than the BAT effluent limitations guidelines promulgated in 1982. The total allowable discharge of total chromium to the nation's navigable waters is reduced by approximately 286,000 pounds per year, a 66 percent annual reduction beyond discharge levels allowable under the existing BAT effluent limitations guidelines; the total allowable discharge of hexavalent chromium is reduced by

approximately 19,300 pounds per year, a 58 percent annual reduction beyond discharge levels allowable under existing BAT; the total allowable discharge of phenolic compounds (4AAP), is reduced by approximately 73,000 pounds per year, a 43 percent annual reduction beyond discharge levels allowable under existing BAT. These reductions are based on data in the Agency's refined BAT flow model. The refined flow model is included in the record for this rulemaking in a report entitled "Petroleum Refining Industry, Refinements to 1979 Proposed Flow Model."

EPA believes that approximately one half of the refineries which directly discharge pollutants to navigable waters already are complying with the effluent limitations being promulgated today. Further, EPA believes that the effluent limitations are economically achievable for the industry.

In the preamble to the October 18, 1982 promulgated regulations for this industry, EPA estimated that capital costs of $112 million and $37 million (1979 dollars) in annualized costs would be required in order for petroleum refiners to comply with option 7, one of the BAT control treatment options considered by the Agency (47 FR 46438). Likewise, EPA estimated that capital costs of $77 million and annualized costs of $25 million (1979 dollars) would be required in order for petroleum refiners to comply with option 8, another of the BAT control treatment options considered by the Agency (47 FR 46438).

The revised limitations being promulgated today for phenolic compounds, hexavalent chromium and total chromium are not based on either option 7 or option 8 alone. The effluent limitations for phenolic compounds are based upon option 8. The effluent limitations for hexavalent chromium are based upon option 8. The effluent limitations for hexavalent chromium are based upon option 7. The effluent limitations for total chromium, while somewhat more stringent than the BAT effluent limitations for total chromium, are less stringent than those based upon option 8.

The Agency has reevaluated the costs of compliance for today's changes to the BAT effluent limitations and estimates that the total industry costs of compliance would not exceed those previously calculated for option 8. EPA estimates that no more than 61 petroleum refineries will have to incur aggregate capital costs no greater than $77 million and annualized costs no greater than $25 million (1979 dollars). These costs translate to an average increase of no greater than one half cent per gallon of refinery product. No refinery closures are anticipated by the Agency. Refinery capacity and consumption would remain unaffected. Given these factors, the Agency believes that its earlier heavy reliance on costs as the basis for rejecting more stringent effluent controls in this industry was inappropriate, and that the effluent limitations guidelines for total chromium, hexavalent chromium and phenolic compounds (4AAP) being promulgated today, rather than the effluent limitations guidelines promulgated in 1982, are appropriate for this industry as the BAT level of control. The revised Bat numerical limitations and contained in the final regulation.

B. Best Conventional Pollutant Control Technology Effluent Limitations Guidelines

As part of the Settlement Agreement EPA agreed to propose best conventional pollutant control technology ("BCT") effluent limitations guidelines for the petroleum refining industry. The 1977 Amendments to the Clear Water Act ("CWA") added section 301(b)(2)(E) of the Act establishing BCT for discharge of conventional pollutants from existing industrial point sources. Conventional pollutants are those defined in section 304(a)(4) [biochemical oxygen demanding pollutants (BOD_5), total suspended solids (TSS), fecal coliform and pH], and any additional pollutants defined by the Administrator as "conventional". The Administrator designated oil and grease as a conventional pollutant on July 30, 1979, 44 FR 44501.

BCT is not an additional limitation but replaces BAT for the control of conventional pollutants. In addition to other specified in Section 304(b)(4)(B) the Act requires the BCT limitations be assessed in light of a two-part "cost reasonableness" test. *American Paper Institute* v. *EPA*, 660 F2d 954 (4th Cir. 1981). The first test compares the cost for private industry to reduce its conventional pollutants with the costs to publicly owned treatment works for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond best practicable control technology currently available (BPT). EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA published a proposed BCT methodology on October 29, 1982. (47 FR 49176). This proposed BCT methodology explains the details of the two part cost-reasonableness test, i.e., the "POTW test" and the "industry cost test." In addition, the Agency published a "notice of data availability" concerning the proposed BCT methodology on September 20, 1984 (49 FR 37048).

Today's promulgated BCT effluent limitations guidelines for the petroleum refining industry are based on the proposed BCT methodology. Today's final regulations establish BCT equal to BPT for the petroleum refining industry.

EPA considered two levels of technology for incremental control beyond BPT of total suspended solids (TSS) and oil and grease. These technology levels are recycle/reuse and recycle/reuse followed by granular media filtration. These technologies are already in use at certain sites in the petroleum refining industry. These technologies were selected as candidate BCT technonogies because the Agency believes they represent the first levels of control beyond BPT which could effect reduction in conventional pollutant loadings in this industry. Filtration alone was not selected as a candidate BCT technology because it is one of the existing BPT treatment technologies. However, the Agency decided to consider the combination of recycly/reuse plus filtration as a candidate BCT technology. This is because the decreased hydraulic loading resulting from recycle/reuse results in the need for smaller and less costly filtration equipment than that included in the BPT treatment model. The BCT cost test was then performed on the combination of recycle/reuse and filtration as a double-check on the effects of the less costly filtration step.

In order to determine whether these candidate technologies are "cost-reasonable", EPA developed one model plant representative of a typical plant in each of the five BPT subcategories. The five BPT subcategories are:

A—Topping
B—Cracking
C—Petrochemical
D—Lube
E—Integrated

Then EPA calculated the incremental (beyond BPT) conventional pollutant removals and the incremental costs associated with these technologies for each model plant. Based on this information, cost-per-pound ratios were calcualted for each of the five BPT subcategories.

EPA evaluated reductions in total suspended solids (TSS), biochemical oxygen demand (BOD_5), and oil and grease for each of these technology levels. However; oil and grease was not considered for the BCT calculations for

recycle/reuse for this industry. Additionally, BOD_5 was not considered for the BCT calculations for filtration for this industry. This is in accordance with the proposed BCT methodology in order to avoid "double counting" of the amount of pollutants removed by a candidate BCT technology.

The recycle/reuse technology option identified for BCT was evaluated in the range of from 20 to 40 percent reduction in discharge flow. The cost per pound ranges from $41.00 to $0.77 (1977 dollars) [$50.48 to $1.36 (1977 dollars) based upon the September 20, 1984 notice of data availability] in the first part of the proposed BCT cost reasonableness test (the "POTW test"). Accordingly, the Agency found that the addition of recycle/reuse technology fails the first part of the proposed BCT cost reasonableness test in all five subcategories ($0.30 per pound in 1977 dollars) [approximately $0.76 per pound in 1977 dollars based upon the September 20, 1984 notice of data availability.]

The Agency also found that the addition of recycle/reuse plus filtration fails the first part of the proposed BCT cost reasonableness test in all five subcategories. The recycle/reuse portion of this option was evaluated in the range of from 20 to 40 percent reduction in discharge flow. The cost per pound (1977 dollars) ranges from $21.00 to $0.58, compared to the benchmark of $0.30 per pound (1977 dollars) [$27.05 to $1.11, compared to the benchmark of approximately $0.76 per pound (1977 dollars) based upon the September 20, 1984 notice of data availability].

Therefore, the Agency is promulgating BCT equal to BPT for the five subcategories in this industry.

A more complete discussion of the selection of the candidate BCT technologies, the details of the first part of the proposed BCT cost reasonableness test ("POTW test"), and the basis for decision are contained in the administrative record of this rulemaking.

C. Effluent Limitations Guidelines for Contaminated Storm Water Runoff

In the October 18, 1982 rulemaking the Agency withdrew storm water effluent limitations guidelines for BPT, BAT and NSPS, because they were remanded by the U.S. Court of Appeals in *American Petroleum Institute* v. *EPA*, 540 F.2d 1023 (10th Cir. 1976).

Since that remand there has been some confusion on the part of permit writers and others as to whether storm water runoff ("runoff") effluent limitations should be contained in permits. There are two kinds of such runoff, i.e., contaminated and uncontaminated.

The purpose of this rulemaking is to establish BPT, BCT and BAT effluent limitations guidelines for contaminated storm water runoff. Today's promulgated contaminated runoff effluent limitations are to be included in petroleum refinery permits in addition to process wastewater effluent limitations. NSPS for contaminated runoff is being reserved for future rulemaking.

In today's final regulations EPA is defining contaminated runoff, for purposes of these regulations only, to be runoff which comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property. Any other storm water runoff at a refinery is considered uncontaminated. Today's final regulations also amend the definition of the term "runoff" currently found in 40 CFR 419.11(b) to clarify that it means the flow of storm water resulting from precipitation coming into contact with petroleum refinery property. Contaminated runoff constitutes an additional source of pollution which must be managed during periods of precipitation along with process wastewater from refinery operations. Today's final regulations do not establish numerical effluent limitations for uncontaminated runoff. Effluent limitations, including but not limited to allocations for uncontaminated runoff may be established by the permit writer based on his/her best professional judgment.

The Agency believes that the best practicable control technology currently available, the best conventional pollutant control technology and the best available technology economically achievable for treatment of contaminated runoff are the same as the technologies identified for treatment of process wastewater. The Agency has not identified any feasible technologies capable of achieving pollutant reductions for contaminated runoff from refineries to any greater degree than those which are achievable by the process wastewater treatment facility.

The Agency believes that the conventional pollutant oil and grease and the nonconventional pollutant parameter total organic carbon (TOC) are appropriate measures to determine whether pollutant loadings in contaminated runoff would be measurably reduced by the model treatment technologies used to develop these final regulations. Under today's final regulations for BPT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment if it does not exceed 15 mg/l oil and grease and 110 mg/l TOC, based upon an analysis of any single grab composite sample. Under today's final regulations for BCT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment, if it does not exceed 15 mg/l oil and grease and under the final regulations for BAT, wastewater consisting solely of contaminated runoff may be discharged directly without treatment if it does not exceed 110 mg/l TOC. If contaminated runoff (whether or not it exceeds 15 mg/l oil and grease or 110 mg/l TOC) is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, then such runoff would be subject to the alternative BPT/BCT/BAT effluent limitations guidelines for contaminated runoff being promulgated today, as appropriate. These oil and grease and TOC numerical effluent limitations are based on the concentrations expected from the properly designed and operated model treatment facilities.

The effluent limitations guidelines in today's BPT regulation for contaminated runoff are based on the same concentrations and variability factors used to develop the Agency's existing BPT process wastewater effluent limitations guidelines.

Today's BAT regulation for contaminated runoff is based upon the same concentrations and variability factors used to develop the Agency's existing BAT process wastewater effluent limitations guidelines, except those for total chromium, which are based upon the same concentrations and variability factors used for today's promulgated BAT effluent limitations guidelines for process wastewater.

Today's promulgated BAT effluent guidelines for phenolic compounds (4AAP) for contaminated runoff are based on the same concentrations used for the existing BAT effluent limitations guidelines for process wastewater and the same variability factors used for the Agency's existing BAT effluent limitations guidelines. EPA has determined that this approach is appropriate because of the specifics of each data base available to the Agency. If EPA used the variability factors from today's promulgated BAT effluent limitations guidelines, less stringent BAT contaminated runoff numerical effluent limitations for phenolic compounds (4AAP) would be derived than under today's promulgated BPT

contaminated runoff numerical effluent limitations for phenolic compounds (4AAP). The more stringent effluent limitations clearly are achievable and as a matter of law BAT cannot be less stringent than BPT.

Today's BCT regulation for contaminated runoff is based on the same concentrations and variability factors used for today's promulgated BCT process wastewater effluent limitations guidelines.

The Agency believes that the costs attributable to today's regulations will be minimal, while providing for reductions in refinery pollutant discharges. This is because the Agency believes the industry as a whole already is (a) treating contaminated runoff with process wastewater or (b) is discharging contaminated runoff below today's promulgated threshold for treatment. Today's final regulations do not cover contaminated runoff which is commingled with nonprocess wastewater streams. EPA believes that such instances are infrequent, and accordingly, they are left to the permit writer's discretion.

Unlike the effluent limitations guidelines for process wastewater for this industry which are mass-based, today's promulgated effluent limitations guidelines for contaminated runoff are concentration-based. This is because storm water volumes are not related to any measurement of refinery production. However, under today's regulations permit effluent limitations for contaminated runoff are to be established on a mass basis. The mass-based effluent limitations for each regulated pollutant for contaminated runoff in a petroleum refining permit are the product of (1) the respective effluent guideline concentration for that pollutant; and (2) the measured or calculated contaminated runoff volume.

Under today's regulations permit writers are given flexibility in determining refinery storm water volumes on a case-by-case basis. The following factors are among those appropriate for permit writers to consider in determining what contaminated runoff volume to use in calculating mass-based effluent limitations for refinery permits: (a) Measured difference between dry weather and wet weather discharge flow from the treatment facility where contaminated runoff is the only runoff present in the treatment facility; and (b) volume of contaminated runoff water calculated from the product of (1) measurement of land area where precipitation would become contaminated, and (2) an historical measure of precipitation for the particular refinery location.

Once the mass based effluent limitation is derived, it may be incorporated into a refinery permit in one of three ways. The proper choice depends on site-specific factors, such as local rainfall patterns and the design of runoff holding facilities.

The first method is a continuous allocation. This presents the problem of providing an allocation when no runoff is present and is appropriate only where precipitation patterns are relatively constant through the year or when holding facilities are used to bleed runoff into the treatment facility over most or all of the year. The second method is a variable allocation based on measurement or calculation of actual contaminated runoff volume. While this is the most ideal method, it may present compliance measurement and enforcement complexities. The third method is dual wet weather/dry weather limitations triggered by either time of year, precipitation events, or actual contaminated runoff volume. The method of determining contaminated runoff volume used to calculate the effluent limitations will vary depending on the method used and the design of any runoff holding facilities. Therefore, it is left to the permit writer to select an appropriate method under today's rulemaking.

These regulations do not address uncontaminated runoff which is discharged through the process wastewater treatment facility. This is because the Agency believes that introducing uncontaminated runoff to the process wastewater treatment system may result in the discharge of an increased mass of pollutants to the environment compared to the mass of pollutants discharged if no uncontaminated runoff were present in the process wastewater treatment system. Therefore, the Agency does not want to encourage this practice on a national basis.

In the case of BPT, the effluent limitations guidelines promulgated today are for the following pollutants (1) conventional pollutants: total suspended solids (TSS), oil and grease, five-day biochemical oxygen demand (BOD_5) and pH; (2) nonconventional pollutants: phenolic compounds (4AAP), chemical oxygen demand (COD) and total organic carbon (TOC); and (3) toxic pollutants: total chromium and hexavalent chromium. In the case of BAT, the effluent limitations guidelines being promulgated today are for (1) nonconventional pollutants: Phenolic compounds (4AAP), chemical oxygen demand (COD) and total organic carbon (TOC); and (2) toxic pollutants: total chromium and hexavalent chromium. In the case of BCT, the effluent limitations guidelines being promulgated today are for the conventional pollutants TSS, oil and grease, BOD, and pH. In the case of COD, there may be instances where extremely high chloride levels (greater than 1,000 mg/l) will interfere with the COD analytical method. In this event, the Agency believes that TOC is an acceptable substitute parameter for COD. A TOC limitation shall be based upon effluent data from the particular refinery which correlated TOC to BOD_5. Where adequate correlation data are not available, the permitting authority may establish a TOC limitation on a ratio of 2.2 to 1 to the applicable BPT/BCT effluent limitations for BOD_5. This ratio is based upon effluent data analyzed by the Agency.

No effluent limitations guidelines for contaminated runoff are being promulgated for the nonconventional pollutants ammonia (as N) and sulfide regulated under existing BPT and BAT levels of control.

V. Environmental Impact of the Amendments

EPA's estimates of the reduction in industry-wide direct discharges of phenolic compounds, hexavalent chromium, and total chromium for process wastewater from those allowed under the 1982 final petroleum industry regulation to those allowed by today's amendments are presented below.

REDUCTIONS IN ALLOWABLE DISCHARGE

(Pounds per year)

Pollutant	Reduction
Total chromium	288,000
Hexavalent chromium	19,300
Phenolic compounds	15,000

VI. Responses to Major Comments

The Agency encourages public participation in the rulemaking process and solicited comments on the proposed amendments. Public comments were received and considered in issuing this final rule. A summary of all the comments received and the Agency's responses to those comments are included in a report titled: "Responses to Public Comments on the Proposed Amendments to the Effluent Limitations Guidelines for the Petroleum Refining Point Source Category", which is included in the public record for this regulation.

Most of the commenters expressed full support for the promulgation of the

amended regulations as proposed. Although none of the commenters disagreed with the Agency's action, some believed it necessary to comment on the background and development of the proposal and to seek clarification on the Agency's intended procedures for applying the effluent limitations guidelines. The major comments are addressed below.

A. Best Available Technology Effluent Limitations Guidelines (BAT)

Some of the commenters argued that wastewater flow reduction is not an appropriate basis upon which to base effluent limitations guidelines for this industry. It was claimed that other pollutant specific control techniques will be used, if necessary, to achieve the proposed discharge limits for process wastewater.

The Agency has documentation that flow reduction is an achievable technology for this industry. Industry and Agency studies that confirm this fact are included in the rulemaking record for this regulation. These investigations conclusively demonstrated that refineries have numerous methods available to reduce process wastewater generation or discharge volumes. These studies also demonstrated that the costs and specific methods available are heavily dependent on site-specific factors at each individual refinery. The Agency has also noted that there is a substantial downward trend in historical water usage/discharge rates industry-wide regardless of environmental regulatory requirements.

There may be some refineries which have already achieved a low flow condition or cannot implement flow reduction due to site-specific factors. In these cases, improvements to the existing treatment system design or operation, or in refinery operating practices, may be necessary to meet today's amended BAT effluent limitations. It should be further clarified that the regulation does not preclude the implementation of other control options such as pollutant specific control techniques or other techniques which a refinery considers the most cost-effective method to achieve its permit conditions.

Clarification was sought by commenters on the method that should be followed to determine the appropriate refinery production rates for calculating mass effluent limits. Questions were also raised about the possibility of BAT pollutant limits being less stringent than BPT levels due to differences in the procedures for calculating BAT and BPT permit limits.

The effluent limitations guidelines developed for the petroleum refining industry are production based. Although previous permits may have been issued on the basis of process capacities, permit limits based on the revised BAT regulations should be calculated on the basis of actual production rates. For this reason, the permit writer should undertake a thorough review of a refinery's historical process utilization rates and process groupings to determine a reasonable measure of actual production projected for the period the permit would be in effect. This method of determining appropriate process feedstock rates for use in calculating mass effluent limits is in accordance with 40 CFR 122.45(b). The individual process feedstock rates established should be based on data from the same time period, i.e., all production data for the same time period. Generally, this time period (e.g., calendar year) could be that for which the sum of the crude process feedstock rates is the greatest, but is still representative of anticipated feedstock rates for the duration of the NPDES permit.

The next step in this method is to calculate a daily average feedstock rate for each refinery process included in the determination of effluent limitations. These values may be calculated by dividing an historical annual feedstock rate for each process by the number of days the process was in operation. These same average daily process feedstock rates should be used in the calculation of both daily maximum and 30-day average BAT effluent limitations. This method is consistent with the procedure the Agency used to develop the effluent limitation factors for the amended regulations and with 40 CFR 122.45. Additionally, the daily maximum and 30-day average variability factors, which are components of the effluent limitation factors used to derive permit effluent limitations, reflect short-term (i.e., monthly and daily) deviations from long-term (annual average) performance.

The amended BAT limits for phenolic compounds, total chromium and hexavalent chromium are based on a flow model and daily maximum variability factors which are different than those used to establish the BPT regulations. Some BAT permit limitations could be less stringent than the BPT limitations for a given refinery, even though the BAT and BPT limitations are calculated using the same process feedstock rates determined in accordance with the provisions of 40 CFR 122.45. These occurrences can be caused by the inclusion of additional processes and a new process grouping in the BAT flow model. In such instances, the result permit limitations would be the most stringent of either the calculated BPT limitations or calculated BAT limitations. This is because BAT permit limitations may not be less stringent than BPT. In order to make a proper comparison, the BPT limitations should be recalculated using: (1) Production data from the same time period that are used to calculate the BAT limitations; and (2) the BPT process groupings and subcategorization.

In an effort to provide guidance on the application of the proposed amendments to the BAT effluent limitations guidelines, the Agency held workshops in San Francisco and Dallas for permit writers during November and December 1984.

B. Best Conventional Pollutant Control Technology Effluent Limitations Guidelines (BCT)

Commenters agreed with the approach that was followed by the Agency in its BCT cost evaluation and that the two candidate technologies selected are the most cost effective beyond BPT. Even though the Agency found that none of the four regulatory options that were considered passed BCT cost test for any of the five subcategories, commenters argued that the actual cost per pound of pollutant removed would be greater than those estimated by EPA. It was argued that the removal cost ratios presented in the Agency's original BCT cost evaluation report were underestimated because filtration costs were understated and removal efficiencies were overstated. It was also pointed out that the BCT evaluation should incorporate available updated information.

As discussed in Section III of this preamble, the Agency has revised its BCT cost evaluation to incorporate the updated information referenced in the notice of data availability published on September 20, 1984 (49 FR 37046). The Agency also believes that the filtration costs and removal efficiencies used in its original evaluation are realistic. Nonetheless, if costs were understated and pollutant removals were overstated as argued, then removal cost ratios would fail the BCT cost test by an even wider margin, which would not change the Agency's original conclusion that BCT should be set equal to BPT for this industry.

C. Effluent Limitations Guidelines for Contaminated Storm Water Runoff

Commenters supported the reinstitution of allocations for the

discharge of contaminated storm water runoff commingled with process wastewater and treated in a refiner's effluent treatment system. Commenters recognized that storm water runoff can have a significant impact on a wastewater treatment system and argued that allocations are appropriate for both contaminated and uncontaminated runoff. In addition, clarifications were requested on the Agency's definition of contaminated runoff and its intentions to include only water which comes into direct contact with raw materials or petroleum products (i.e., exposed or spilled oil) or to extend its coverage to runoff from storage areas or tank farms where, ideally, no direct contact occurs.

The Agency's intent in promulgating storm water runoff limitations is to provide a mechanism for the control of storm water when this waste stream is, or is very likely to be, contaminated by direct contact with raw, intermediate or final products. The collection and treatment of storm water runoff that is uncontaminated can be costly and burden the refinery's wastewater treatment system. For this reason, the Agency wishes to encourage refineries which segregate uncontaminated storm water runoff from contaminated wastewater streams to continue this practice. The regulation, however, does not require such segregation.

One commenter argued that the total organic carbon (TOC) and oil and grease discharge criteria for the control of contaminated runoff effectively sets storm water runoff limitations.

The 110 mg/l TOC and 15 mg/l oil and grease applicability criteria for BAT/BCT effluent limitations apply only to contaminated runoff as defined at § 419.11(g). These values are intended to serve as threshold criteria for including contaminated runoff effluent limitations (e.g., phenolic compounds, total chromium, total suspended solids) in NPDES permits. These criteria or other limitations may be applied to such discharges on a case-by-case basis at the permitting authority's discretion. For example, a particular stormwater runoff discharge that normally meets the threshold criteria may be of a nature where it could become very contaminated by an accidental spill. In such situations it may be appropriate to impose the TOC, oil and grease and/or other values as effluent limitations or to at least require periodic sampling and analysis for such pollutants to monitor the nature of such discharges.

VII. Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This regulation is not major because it does not fall within the criteria for major regulations established in Executive Order 12291.

VIII. Regulatory Flexibility Analysis

Under the Regulatory Flexibility Act, 5 U.S.C. 601 et seq., EPA must prepare a Regulatory Flexibility Analysis for all regulations that have a significant impact on a substantial number of small entities. The Agency does not believe that today's rulemaking will have a significant impact on any segment of the petroleum refining industry, large or small. The Agency has not, therefore, prepared a formal analysis for this regulation.

IX. OMB Review

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291. Any comments from OMB to EPA and any EPA responses to those comments are available for public inspection at Room M2404, U.S. EPA, 401 M Street, SW., Washington, D.C. from 9:00 a.m. to 4:00 p.m. Monday through Friday, excluding Federal holidays.

X. List of Subjects in 40 CFR Part 419

Petroleum, water pollution control, Wastewater treatment and disposal.

Dated: July 1, 1985.

A. James Barnes,
Acting Administrator.

For the reasons set out in the preamble, EPA is amending 40 CFR Part 419 as follow:

PART 419—PETROLEUM REFINING POINT SOURCE CATEGORY

1. The authority citation for Part 419 continues to read as follows:

Authority: Secs. 301, 304 (b), (c), (e), and (g), 306 (b) and (c), 307 (b) and (c), and 501, Federal Water Pollution Control Act as amended (the Act); 33 U.S.C. 1311, 1314 (b), (c), (e), and (g), 1316 (b) and (c), 1317 (b) and (c), and 1361; 86 Stat. 816, Pub. L. 92-500; 91 Stat. 1567, Pub. L. 95-217.

2. Section 419.11 is amended by revising paragraph (b) and adding paragraph (g) to read as follows:

§ 419.11 Specialized definitions.

* * * * *

(b) The term "runoff" shall mean the flow of storm water resulting from precipitation coming into contact with petroleum refinery property.

* * * * *

(g) The term "contammated runoff" shall mean runoff which comes into contact with any raw material, intermediate product, finished product, by-product or waste product located on petroleum refinery property.

§ 419.12 [Amended]

3. In § 419.12(a), the table is amended as follows:

A. Under the heading "English units (pounds per 1,000 bbl of feedstock)", in the first column opposite "sulfide", "0.53" is revised to read "0.053".

B. Under the heading "English units (pounds per 1,000 bbl of feedstock)", opposite "sulfide" in the second column, "0.24" is revised to read "0.024".

C. Under the heading "English units (pounds per 1,000 bbl of feedstock)", opposite "hexavalent chromium", in the first column "0.10" is revised to read "0.01".

§ 419.32 [Amended]

4–6. In § 419.32(a), in the second column of the table, under "Metric units (Kilograms per 1,000m^3 of feedstock)", opposite "sulfide", "0.52" is revised to read "0.22".

§ 419.52 [Amended]

7. The table in § 419.52(b)(1), under the column "1,000 barrels of feedstock per stream day," the figures "125.0 to 124.9" and "200 to 244.9" are revised to read "125.0 to 149.9" and "200.0 to 224.9," respectively.

§§ 419.12, 419.22, 419.32, 419.42, and 419.52 [Amended]

8. Sections 419.12(e), 419.22(e), 419.32(e), 419.42(e), and 419.52(e) are amended by removing the paragraph heading and the word "reserved" and by adding the following text:

§ 419 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT).

* * * * *

(e) *Effluent Limitations for Contammated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best practicable control technology currently available by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process

wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease and 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease or 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multuplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BPT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of flow)	
BOD$_5$	48	26
TSS	33	21
COD [1]	360	180
Oil and grease	15	8
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.73	0.43
Hexavalent chromium	0.062	0.028
pH	(2)	(2)
	English units (pounds per 1,000 gallons of flow)	
BOD$_5$	0.40	0.22
TSS	0.28	0.18
COD [1]	3.0	1.5
Oil and grease	0.13	0.067
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0060	0.0035
Hexavalent chromium	0.00052	0.00023
pH	(2)	(2)

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1 000 mg/l (1 000 ppm), the permitting authority may substitute TOC as a parameter in lieu of COD. A TOC effluent limitation shall be based on effluent data from the particular refinery which correlates TOC to BOD$_5$. If in the judgment of the permitting authority, adequate correlation data are not available, the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations for BOD$_5$.

[2] Within the range of 6.0 to 9.0

§§ 419.13, 419.23, 419.33, 419.43, and 419.53 [Amended]

9. Sections 419.13, 419.23, 419.33, 419.43, and 419.53 are amended by removing the entries and effluent limitations for phenolic compounds, total chromium, and hexavalent chromium from the tables in paragraph (a).

10. Sections 419.13, 419.23, 419.33, 419.43, and 419.53 are further amended by redesignating paragraph (e) as (f), redesignating paragraph (d) as (e), redesignating paragraph (c) as (d), and revising the redesignated paragraph (f) to read as follows:

§ 419.—Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

* * * * *

(f) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff, which may be discharged after the application of the best available technology economically achievable by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 110 mg/l total organic carbon (TOC) based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 110 mg/l TOC is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BAT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of flow)	
Phenolic compounds (4AAP)	0.35	0.17
Total chromium	0.60	0.21
Hexavalent chromium	0.062	0.028
COD [1]	360	180
	English units (pounds per 1,000 gallons of flow)	
Phenolic compounds (4AAP)	0.0029	0.0014
Total chromium	0.0050	0.0018
Hexavalent chromium	0.00052	0.00023
COD [1]	3.0	1.5

[1] In any case in which the applicant can demonstrate that the chloride ion concentration in the effluent exceeds 1,000 mg/l (1 000 ppm) the permitting authority may substitute TOC as a parameter in lieu of COD. A TOC effluent limitation shall be based on effluent data from the particular refinery which correlates TOC to BOD$_5$. If in the judgement of the permitting authority adequate correlation data are not available the effluent limitations for TOC shall be established at a ratio of 2.2 to 1 to the applicable effluent limitations for BOD$_5$.

11. Sections 419.23, 419.33, 419.43, and 419.53 are amended in newly designated paragraph (d) by changing "419.13(c)" to read "419.13(d)".

12. Sections 419.12 (a) and (c), 419.13 (a), 419.16 (a) and (c), 419.22(a), 419.23(a), 419.26(a), 419.32(a), 419.33(a), 419.36(a), 419.42(a), 419.43(a), 419.46(a), 419.52(a), 419.53(a), and 419.56(a) are amended by revising footnote (1) to the table to read "[1] See footnote following table in § 419.13(d)".

§§ 419.13, 419.23, 419.33, and 419.53 [Amended]

13. Sections 419.13, 419.23, 419.33, and 419.53 are amended by adding a new paragraph (c) to read as follows:

§ 419.—Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

* * * * *

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

(i) For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factor times the applicable process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category* (EPA 440/1–82/014), Table III–7, pp. 49–54.

Pollutant or pollutant property and process type	BAT effluent limitation factor	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1 000 cubic meters of feedstock)	
Phenolic compounds (4AAP)		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium		
Crude	0.0019	0.0007
Cracking and coking	0.0218	0.0094

Pollutant or pollutant property and process type	BAT effluent limitation factor: Maximum for any 1 day	BAT effluent limitation factor: Average of daily values for 30 consecutive days shall not exceed
Asphalt	0.0117	0.0053
Lube	0.0549	0.0246
Reforming and alkylation	0.0196	0.0088
English units (pounds per 1,000 bbl of feedstock)		
Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) See the comprehensive example in Subpart D, § 419.43(c)(2).

14. Section 419.43 is amended by adding a new paragraph (c) to read as follows:

§ 419.43 Effluent limitation guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

* * * * *

(c)(1) In addition to the provisions contained above pertaining to COD, ammonia and sulfide, any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

(i) For each of the regulated pollutant parameters listed below, the effluent limitation for a given refinery is the sum of the products of each effluent limitation factor times the applicable process feedstock rate, calculated as provided in 40 CFR 122.45(b). Applicable production processes are presented in Appendix A, by process type. The process identification numbers presented in this Appendix A are for the convenience of the reader. They can be cross-referenced in the *Development Document for Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Petroleum Refining Point Source Category* (EPA 440/1-82/014), Table III-7, pp. 49-54.

Pollutant or pollutant property and process type	BAT effluent limitation factor: Maximum for any 1 day	BAT effluent limitation factor: Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 m³ of feedstock)		
Phenolic compounds (4AAP):		
Crude	0.037	0.009
Cracking and coking	0.419	0.102
Asphalt	0.226	0.055
Lube	1.055	0.257
Reforming and alkylation	0.377	0.092
Total chromium:		
Crude	0.030	0.011
Cracking and coking	0.340	0.118
Asphalt	0.183	0.064
Lube	0.855	0.297
Reforming and alkylation	0.305	0.106
Hexavalent chromium:		
Crude	0.0019	0.0009
Cracking and coking	0.0218	0.0096
Asphalt	0.0117	0.0053
Lube	0.0549	0.0246
Reforming and alkylation	0.0196	0.0088
English units (pounds per 1,000 bbl of feedstock)		
Phenolic compounds (4AAP):		
Crude	0.013	0.003
Cracking and coking	0.147	0.036
Asphalt	0.079	0.019
Lube	0.369	0.090
Reforming and alkylation	0.132	0.032
Total chromium:		
Crude	0.011	0.004
Cracking and coking	0.119	0.041
Asphalt	0.064	0.022
Lube	0.299	0.104
Reforming and alkylation	0.107	0.037
Hexavalent chromium:		
Crude	0.0007	0.0003
Cracking and coking	0.0076	0.0034
Asphalt	0.0041	0.0019
Lube	0.0192	0.0087
Reforming and alkylation	0.0069	0.0031

(2) Example Application of Effluent Limitations Guidelines as Applicable to Phenolic Compounds, Hexavalent Chromium, and Total Chromium.

The following example presents the derivation of a BAT phenolic compound (4AAP) effluent limitation (30-day average) for a petroleum refinery permit. The methodology is also applicable to hexavalent chromium and total chromium.

Refinery process	Process feedstock rate 1,000 bbl/day
1. Atmospheric crude distillation	100
2. Crude desalting	60
3. Vacuum crude distillation	75
Total crude processes (C)	225
6. Fluid catalytic cracking	25
10. Hydrocracking	20
Total cracking and coking processes (K)	45
18. Asphalt production	5
Total asphalt processes (A)	5
21. Hydrofining	3
Total lube processes (L)	3
8. Catalytic reforming	10
Total reforming and alkylation processes (R)	10

Note: 30 day average effluent limitation for phenolic compounds (4AAP), lb/day = (0.003) (225) + (0.036) (45) + (0.019) (5) + (0.090) (3) + (0.032) (10) = 2.98 lb/day

* * * * *

15. Section 419.14 is revised to read as follows:

§419.14 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Metric units (Kilograms per 1,000 m³ of feedstock)		
BOD_5	22.7	12.0
TSS	15.8	10.1
Oil and Grease	8.9	3.7
pH	(1)	(1)
English units (pounds per 1,000 bbl of feedstock)		
BOD_5	8.0	4.25
TSS	5.6	3.6
Oil and Grease	2.5	1.3
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	1.02
25.0 to 49.9	1.08
50.0 to 74.9	1.16
75.0 to 99.9	1.26
100 to 124.9	1.38
125.0 to 149.9	1.50
150.0 or greater	1.57

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.62
2.5 to 3.49	0.67

Process configuration	Process factor
3.5 to 4.49	0.80
4.5 to 5.49	0.96
5.5 to 5.99	1.07
6.0 to 6.49	1.17
6.5 to 6.99	1.27
7.0 to 7.49	1.39
7.5 to 7.99	1.51
8.0 to 8.49	1.64
8.5 to 8.99	1.79
9.0 to 9.49	1.95
9.5 to 9.99	2.12
10.0 to 10.49	2.31
10.5 to 10.99	2.51
11.0 to 11.49	2.73
11.5 to 11.99	2.98
12.0 to 12.49	3.24
12.5 to 12.99	3.53
13.0 to 13.49	3.84
13.5 to 13.99	4.18
14.0 or greater	4.36

(3) See the comprehensive example in Subpart D, § 419.43(b)(3).

(c) The following allocations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to ballast, which may be discharged after the application of best conventional pollutant control technology by a point source subject to this subpart, in addition to the discharge allowed by paragraph (b) of this section. The allocation allowed for ballast water flow, as kg/cu m (lb/1000 gal), shall be based on those ballast waters treated at the refinery.

Pollutant or pollutant property	BCT Effluent limitations for ballast water	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per m^3 of flow)		
BOD_5	0.048	0.026
TSS	0.033	0.021
Oil and grease	0.015	0.008
pH	(1)	(1)
English units (pounds per 1,000 gallons of flow)		
BOD_5	0.40	0.21
TSS	0.26	0.17
Oil and grease	0.126	0.067
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 (m^3 of flow)		
BOD_5	48.	26.
TSS	33	21
Oil and grease	15.	8.
pH	(1)	(1)
English units (pounds per 1,000 gallons of flow)		
BOD_5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

16. Section 419.24 is revised to read as follows:

§ 419.24 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
Metric units (kilograms per 1,000 (m^3 of feedstock)		
BOD_5	28.2	15.6
TSS	19.5	12.6
Oil and grease	8.4	4.5
pH	(1)	(1)
English units (pounds per 1,000 bbl of feedstock)		
BOD_5	9.9	5.5
TSS	6.9	4.4
Oil and grease	3.0	1.6
pH	(1)	(1)

[1] Within the range of 6.0 to 9.0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24.9	0.91
25.0 to 49.9	0.95
50.0 to 74.9	1.04
75.0 to 99.9	1.13
100.0 to 124.9	1.23
125.0 to 149.9	1.35
150.0 or greater	1.41

(2) Process factor.

Process configuration	Process factor
Less than 2.49	0.58
2.5 to 3.49	0.63
3.5 to 4.49	0.74
4.5 to 5.49	0.88
5.5 to 5.99	1.00
6.0 to 6.49	1.09
6.5 to 6.99	1.19
7.0 to 7.49	1.29
7.5 to 7.99	1.41
8.0 to 8.49	1.53
8.5 to 8.99	1.67
9.0 to 9.49	1.82
9.5 or greater	1.89

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharge of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section

(e) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the

best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of flow)	
BOD_5	46	26
TSS	33	21
Oil and grease	15	8
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD_5	0 40	0 22
TSS	0.28	0 18
Oil and grease	0 13	0 067
pH	(1)	(1)

[1] Within the range of 6 0 to 9 0

17. Section 419.34 is revised to read as follows:

§ 419.34 Effluent Limitations Guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD_5	34 6	18 4
TSS	23 4	14.8
Oil and grease	11 1	5 9
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD_5	12 1	6 5
TSS	8 3	5.25
Oil and grease	3 9	2.1
pH	(1)	(1)

[1] Within the range of 6.0 to 9 0.

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 24 9	0.73
25 0 to 49 9	0 76
50 0 to 74 9	0 83
75 0 to 99 9	0 91
100 0 to 124 9	0 99
125 0 to 149 9	1 08
150 0 or greater	1 13

(2) Process factor.

Process configuration	Process factor
Less than 4 49	0 73
4 5 to 5 49	0 80
5.5 to 5 99	0 91
6 0 to 6 49	0 99
6.5 to 6 99	1 08
7 0 to 7 49	1 17
7.5 to 7 99	1 28
8 0 to 8 49	1 39
8 5 to 8 99	1 51
9 0 to 9 49	1.65
9 5 or greater	1 72

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of flow)	
BOD_5	46	26
TSS	33	21
Oil and grease	15	8
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD_5	0 40	0.22
TSS	0.28	0 18
Oil and grease	0 13	0 067
pH	(1)	(1)

[1] Within the range of 6 0 to 9 0

18. Section 419.44 is revised to read as follows:

§ 419.44 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point source subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock	
BOD_5	50 6	25 8
TSS	35 6	22 7

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Oil and Grease	16.2	6.5
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD_5	17 9	9.1
TSS	12.5	8 0
Oil and Grease	5.7	3.0
pH	(1)	(1)

[1] Within the range of 6 0 to 9 0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 49 9	0 71
50 0 to 74 9	0 74
75.0 to 99 9	0 81
100 0 to 124 9	0 88
125 0 to 149 9	0 97
150 0 to 174 9	1 05
175 0 to 199 9	1.14
200.0 or greater	1 19

(2) Process factor.

Process configuration	Process factor
Less than 6 49	0 81
6.5 to 7 49	0 88
7 5 to 7 99	1.00
8 0 to 8 49	1 09
8 5 to 8 99	1 19
9 0 to 9 49	1.29
9.5 to 9 99	1 41
10 0 to 10 49	1 53
10 5 to 10 99	1 67
11 0 to 11 49	1 82
11 5 to 11 99	1 98
12 0 to 12 49	2.15
12 5 to 12 99	2.34
13 0 or greater	2.44

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff: Maximum for any 1 day	BCT effluent limitations for contaminated runoff: Average of daily values for 30 consecutive days shall not exceed
	Metric unit (kilograms per 1,000 m^3 of flow)	
BOD_5	48	26.
TSS	33	21
Oil and grease	15	8
pH	(1)	(1)
	English units (pounds per 1,000 gallons of flow)	
BOD_5	0 40	0 22
TSS	0 28	0 18
Oil and grease	0 13	0 067
pH	(1)	(1)

[1] Within the range of 6 0 to 9 0

19. Section 419.54 is revised to read as follows:

§ 419.54 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

(a) Any existing point subject to this subpart must achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT):

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD_5	54 4	28 9
TSS	37.3	23.7

Pollutant or pollutant property	BCT effluent limitations: Maximum for any 1 day	BCT effluent limitations: Average of daily values for 30 consecutive days shall not exceed
Oil and grease	17 1	9 1
pH	(1)	(1)
	English units (pounds per 1,000 bbl of feedstock)	
BOD_5	19 2	10.2
TSS	13 2	8 4
Oil and grease	6.0	3.2
ph	(1)	(1)

[1] Within the range of 6 0 to 9 0

(b) The limits set forth in paragraph (a) of this section are to be multiplied by the following factors to calculate the maximum for any one day and maximum average of daily values for thirty consecutive days.

(1) Size factor.

1,000 bbl of feedstock per stream day	Size factor
Less than 124 9	0 73
125 0 to 149 9	0 76
150 0 to 174 9	0 83
175 to 199 9	0 91
200 0 to 224 9	0 99
225 0 or greater	1 04

(2) Process factor.

Process configuration	Process factor
Less than 6 49	0 75
6 5 to 7 49	0 82
7.5 to 7 99	0 92
8 0 to 8 49	1 00
8 5 to 8 99	1 10
9 0 to 9 49	1 20
9 5 to 9 99	1 30
10 0 to 10 49	1 42
10 5 to 10 99	1 54
11 0 to 11 49	1 68
11 5 to 11 99	1 83
12.0 to 12.49	1 99
12 5 to 12.99	2 17
13 0 or greater	2 26

(3) See the comprehensive example in Subpart D, § 419.42(b)(3).

(c) The provisions of § 419.14(c) apply to discharges of process wastewater pollutants attributable to ballast water by a point source subject to the provisions of this subpart.

(d) The quantity and quality of pollutants or pollutant properties controlled by this paragraph, attributable to once-through cooling water, are excluded from the discharge allowed by paragraph (b) of this section.

(e) *Effluent Limitations for Contaminated Runoff.* The following effluent limitations constitute the quantity and quality of pollutants or pollutant properties controlled by this paragraph and attributable to contaminated runoff which may be

discharged after the application of the best conventional pollutant control technology by a point source subject to this subpart.

(1) If wastewater consists solely of contaminated runoff and is not commingled or treated with process wastewater, it may be discharged if it does not exceed 15 mg/l oil and grease based upon an analysis of any single grab or composite sample.

(2) If contaminated runoff is commingled or treated with process wastewater, or if wastewater consisting solely of contaminated runoff which exceeds 15 mg/l oil and grease is not commingled or treated with any other type of wastewater, the quantity of pollutants discharged shall not exceed the quantity determined by multiplying the flow of contaminated runoff as determined by the permit writer times the concentrations listed in the following table:

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	Metric units (kilograms per 1,000 m^3 of feedstock)	
BOD_5	48	26.
TSS	33	21
Oil and grease	15	8.
pH	(1)	(1)

Pollutant or pollutant property	BCT effluent limitations for contaminated runoff	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed
	English units (pounds per 1,000 gallons of flow)	
BOD_5	0.40	0.22
TSS	0.28	0.18
Oil and grease	0.13	0.067
pH	(1)	(1)

(1) Within the range of 6.0 to 9.0

§ 419.46 and 419.56 [Amended]

20. In §§ 419.46(c) and 419.56(c), "419.15(c)", is revised to read "419.16(c)."

21. 40 CFR Part 419 is amended by adding the following Appendix A:

Appendix A.—Processes Included in the Determination of BAT Effluent Limitations for Total Chromium, Hexavalent Chromium, and Phenolic Compounds (4AAP)

Crude Processes

1. Atmospheric Crude Distillation
2. Crude Desalting
3. Vacuum Crude Distillation

Cracking and Coking Processes

4. Visbreaking
5. Thermal Cracking
6. Fluid Catalytic Cracking
7. Moving Bed Catalytic Cracking
10. Hydrocracking
15. Delayed Coking
16. Fluid Coking
54. Hydrotreating

Asphalt Processes

18. Asphalt Production
32. 200°F Softening Point Unfluxed Asphalt
43. Asphalt Oxidizing
89. Asphalt Emulsifying

Lube Processes

21. Hydrofining, Hydrofinishing, Lube Hydrofining
22. White Oil Manufacture
23. Propane Dewaxing, Propane Deasphalting, Propane Fractioning, Propane Deresining
24. Duo Sol, Solvent Treating Solvent Extraction, Duotreating, Solvent Dewaxing, Solvent Deasphalting
25. Lube Vac Twr. Oil Fractionation, Batch Still (Naphtha Strip), Bright Stock Treating
26. Centrifuge and Chilling
27. MEK Dewaxing, Ketone Dewaxing, MEK-Toluene Dewaxing
28. Deoiling (wax)
29. Naphthenic Lubes Production
30. SO_2 Extraction
34. Wax Pressing
35. Wax Plant (with Neutral Separation)
36. Furfural Extraction
37. Clay Contacting—Percolation
38. Wax Sweating
39. Acid Treating
40. Phenol Extraction

Reforming and Alkylation Processes

8. H_2SO_4 Alkylation
12. Catalytic Reforming

[FR Doc. 85-16383 Filed 7-11-85, 8:45 am]
BILLING CODE 6560-50-M