



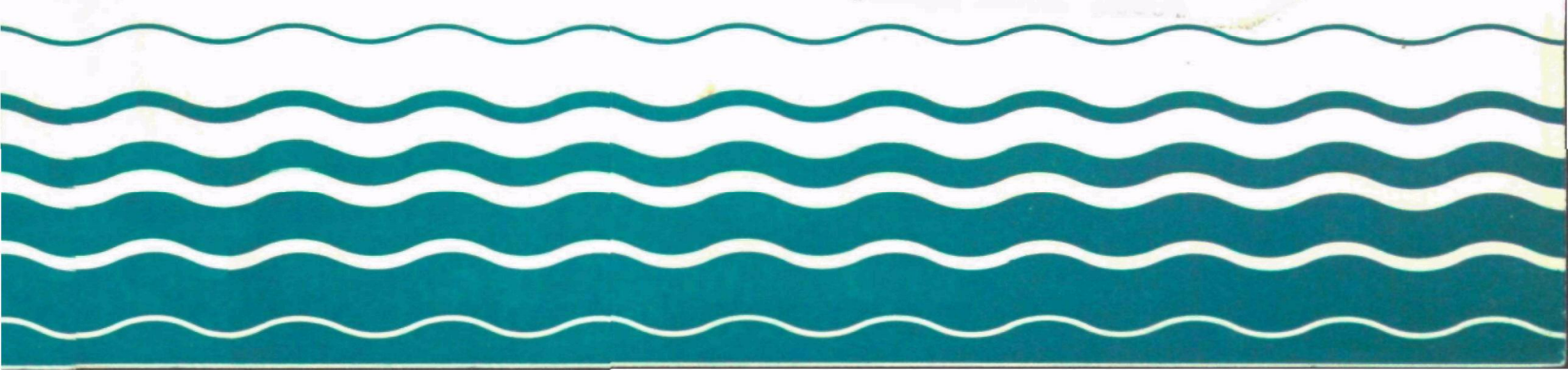
Office of Water
Regulations and Standards

United States
Environmental Protection
Agency

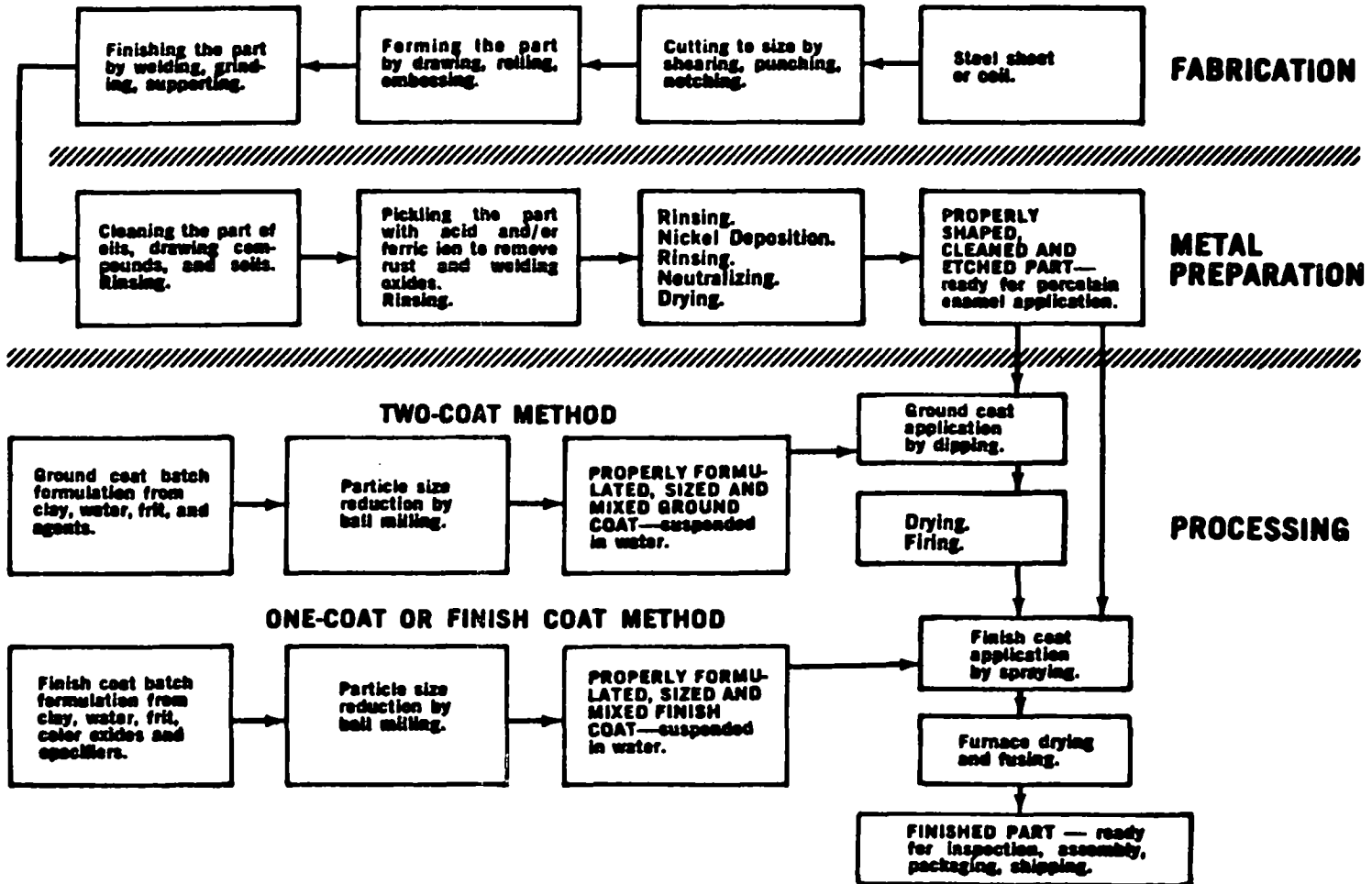
Technical Workshop for Permit Writers on Final Regulations

Porcelain Enameling Industry and Coil Coating Industry

March 2 and 3, 1983



PORCELAIN ENAMEL MANUFACTURING PROCESS



COIL COATING

PROMULGATED REGULATION FOR THE

COIL COATING

INDUSTRIAL POINT SOURCE CATEGORY

COIL COATING

THE COIL COATING CATEGORY

COIL COATING IS THE PROCESS OF CONVERTING BASIS
MATERIAL STRIP (OR COIL) INTO COATED STOCK.

USUALLY THREE PROCESS STEPS ARE INVOLVED --
CLEANING, COATING (CONVERSION COATING) AND PAINTING.
ANY TWO OF THESE THREE PROCESS STEPS QUALIFY AS COIL COATING

COIL COATING MAY BE CLASSIFIED IN SIC 3479,
COATING, ENGRAVING AND ALLIED SERVICES, NEC

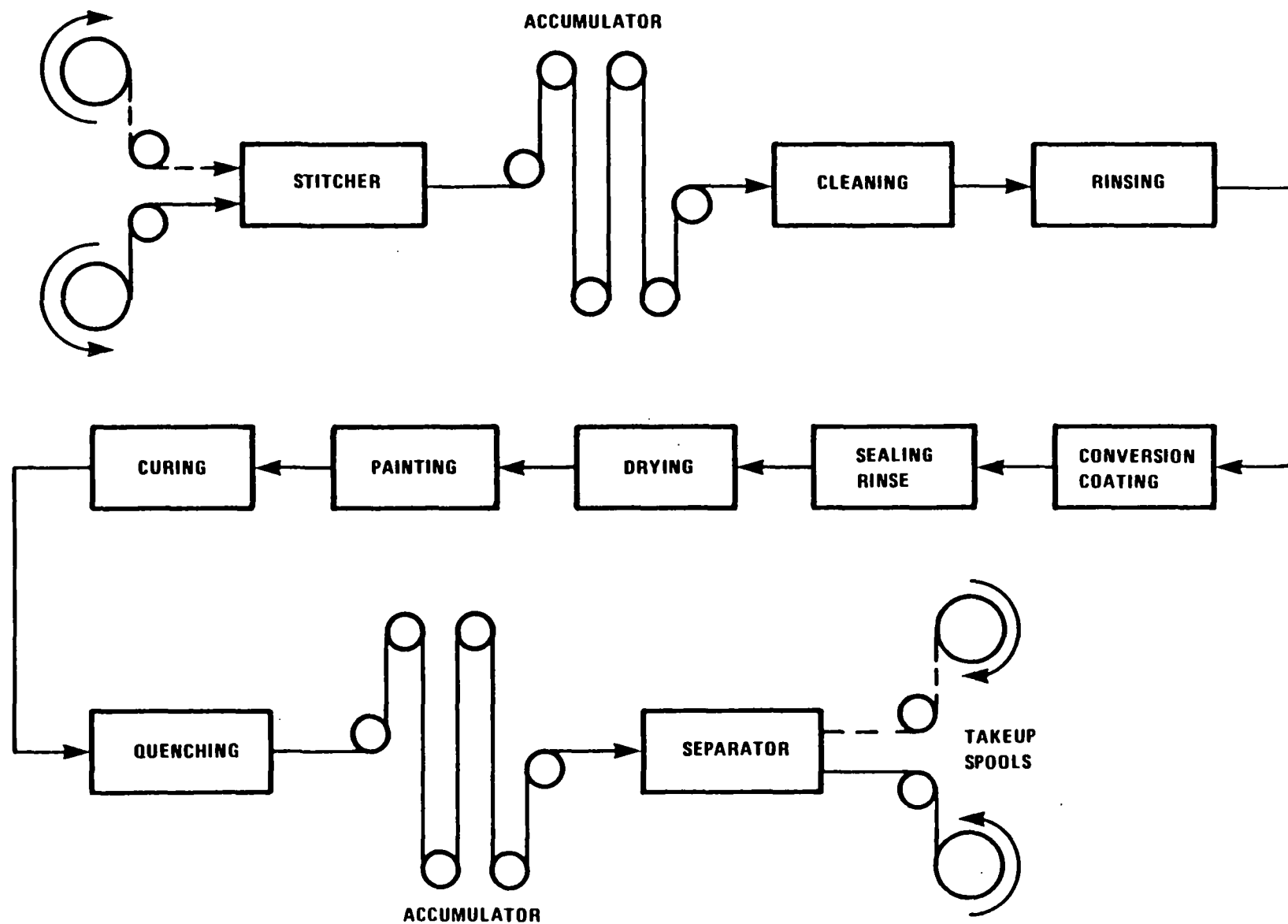


FIGURE III-1. GENERAL PROCESS SEQUENCE FOR A SINGLE COAT COIL COATING LINE

COIL COATING

THE COIL COATING CATEGORY (CONTINUED)

COIL COATING IS SUBCATEGORIZED INTO THREE SUBCATEGORIES

1. STEEL (INCLUDES CHROMIUM, NICKEL AND TIN - COATED STEELS)
2. GALVANIZED STEEL (INCLUDES GALVALUM, COPPER AND COPPER
ALLOYS SUCH AS BRASS)
3. ALUMINUM (INCLUDES ALUMINUM ALLOYS AND ALUMINUM COATED
STEEL)

COIL COATING

THE COIL COATING CATEGORY - (CONTINUED)

WASTEWATER IS GENERATED IN ALL THREE PROCESS STEPS

<u>PROCESS STEPS</u>	<u>PRINCIPAL POLLUTANTS</u>
CLEANING -	Cr, Pb, Ni, Zn, Al, F, Fe, Mn, P, O&G, TSS, TTO
COATING -	Cr, CN, Pb, Ni, Zn, Al, F, Fe, Mn, O&G, TSS
QUENCH -	Zn, Al, TTO

COIL COATING

THE COIL COATING CATEGORY - (CONTINUED)

EPA OBTAINED DATA ABOUT 69 COIL COATING PLANTS

(ABOUT 125 LINES)

29 ARE DIRECT DISCHARGERS

39 ARE INDIRECT DISCHARGERS

1 DOES NOT DISCHARGE

COIL COATING

THE COIL COATING CATEGORY - (CONTINUED)

DATA WAS COLLECTED FROM ALL KNOWN COIL COATERS
USING A DATA COLLECTION PORTFOLIO (DCP)

SAMPLING AND ANALYSIS VISITS WERE MADE TO 12 PLANTS:
ENGINEERING VISITS TO THREE ADDITIONAL PLANTS.

ENGINEERING STUDIES WERE MADE OF END-OF-PIPE
TREATMENT SYSTEMS.

COIL COATING

THE COIL COATING CATEGORY - (CONTINUED)

DATA TO SUPPORT TREATMENT EFFECTIVENESS OF LIME & SETTLE (L&S)

TREATMENT COLLECTED DURING SAMPLING

DATA FROM COIL COATING, ALUMINUM FORMING, BATTERY MANUFACTURING

COPPER FORMING & PORCELAIN ENAMELING USED AS BASIS FOR L&S

DATA FROM ELECTROPLATING NOT USABLE AS BASIS FOR L&S

COIL COATING

THE REGULATION

THERE IS NO PREVIOUS REGULATION OF COIL COATING

THIS REGULATION PROPOSED JANUARY 12, 1981;
PROMULGATED DECEMBER 1, 1982.

REGULATION INCLUDES BPT, BAT, NSPS, PSES AND
PSNS. BCT IS DEFERRED.

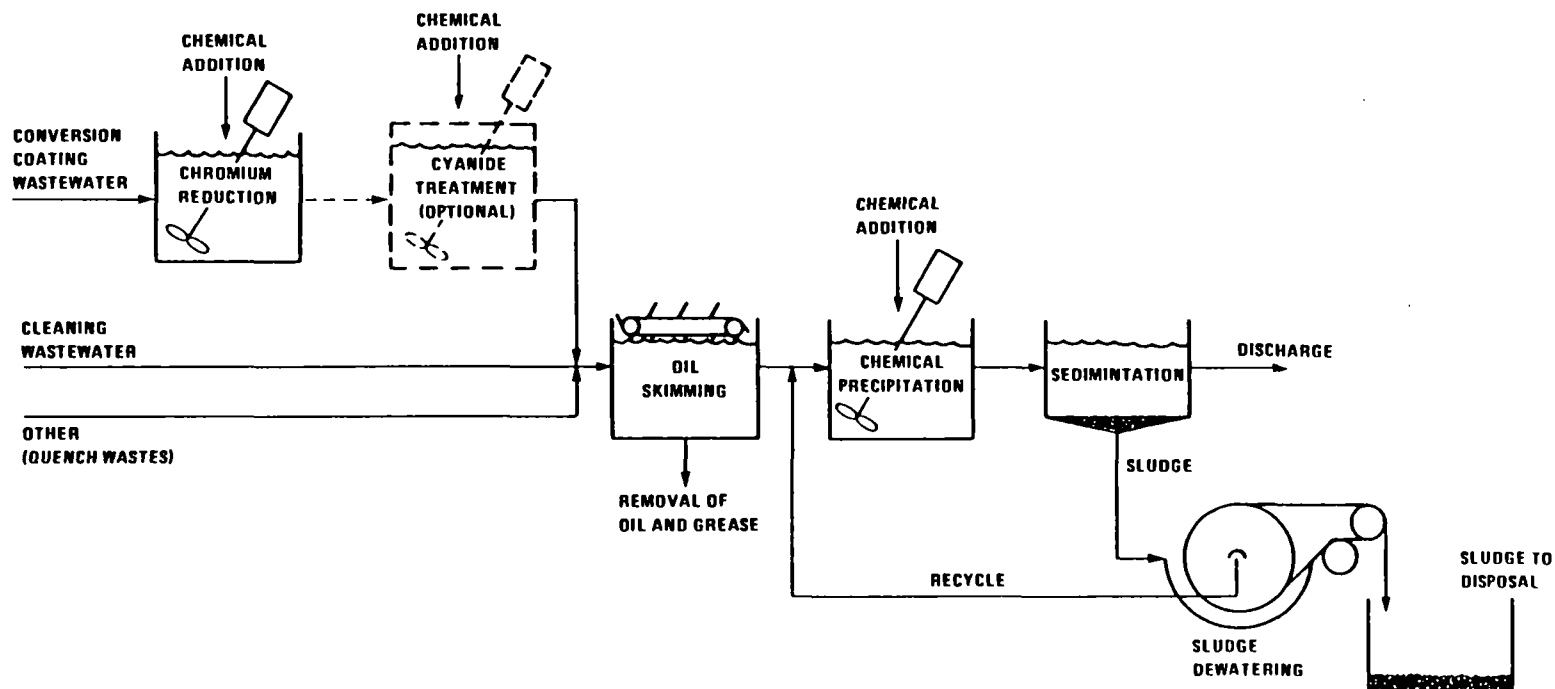


FIGURE IX-1. BPT WASTEWATER TREATMENT SYSTEM

COIL COATING

THE REGULATION - (CONTINUED)

BPT

FLOW BASIS IS THE AVERAGE FLOW OF ALL PROCESS
STEPS IN THE SUBCATEGORY

FLOW

STEEL	2.752 l/m ²
GALVANIZED	2.610 l/m ²
ALUMINUM	3.363 l/m ²

END-OF-PIPE TREATMENT CHROMIUM REDUCTION, CYANIDE
PRECIPITATION, OIL SKIMMING AND L&S

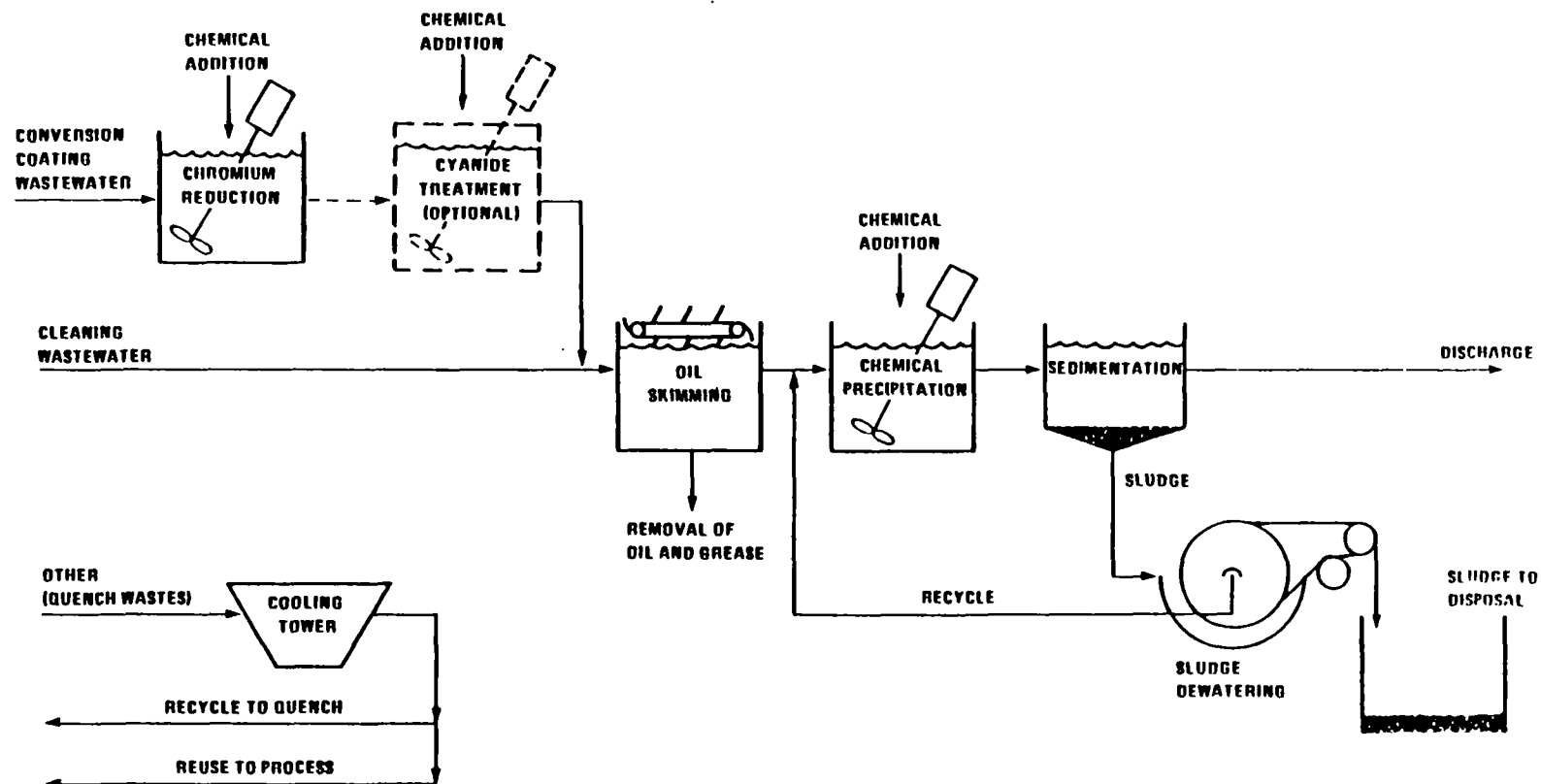


FIGURE X-1. BAT LEVEL 1 WASTEWATER TREATMENT SYSTEM

COIL COATING

THE REGULATION - (CONTINUED)

BAT-PSES

FLOW REDUCED BY REUSING QUENCH WATER FOR
CLEANING RINSE & COATING RINSE

FLOW

STEEL	1.173 l/m ²
GALVANIZED	0.896 l/m ²
ALUMINUM	0.987 l/m ²

END-OF-PIPE TREATMENT IS THE SAME AS BPT

COIL COATING

THE REGULATION - (CONTINUED)

PRETREATMENT

COMPLIANCE DATE

FOR EXISTING SOURCES DECEMBER 1, 1985

FOR NEW SOURCES DECEMBER 1, 1982

COIL COATING

THE REGULATION - (CONTINUED)

PRETREATMENT

PSES AND PSNS FOR THIS CATEGORY ARE EXPRESSED AS
MASS STANDARDS - MILLIGRAMS OF POLLUTANT PER SQUARE
METER OF PRODUCT

CONCENTRATION STANDARDS ARE NOT APPROPRIATE FOR THIS
CATEGORY BECAUSE SUBSTANTIAL POLLUTANT REDUCTION IS
ACHIEVED THROUGH FLOW REDUCTION

COIL COATING

THE REGULATION - (CONTINUED)

PRETREATMENT

DATA NEEDED TO DETERMINE COMPLIANCE

- MEASURED WASTEWATER FLOW
- POLLUTANT CONCENTRATION

POSSIBLE ALTERNATES -

- WATER USE RATE OR WATER METER
- POLLUTANT CONCENTRATION

COIL COATING

THE REGULATION - (CONTINUED)

PRETREATMENT

FOR MASS BASED PRETREATMENT STANDARDS

1. PRODUCTION RATE - BASED ON
 - A) PREVIOUS HISTORY - e.g. 5 YEAR AVERAGE
 - B) MAX MONTH PRODUCTION
 - C) NAME PLATE RATING
2. DISCHARGE STANDARD FROM REGULATIONS
3. DETERMINES DAILY MAX & MONTHLY AVERAGE DISCHARGE

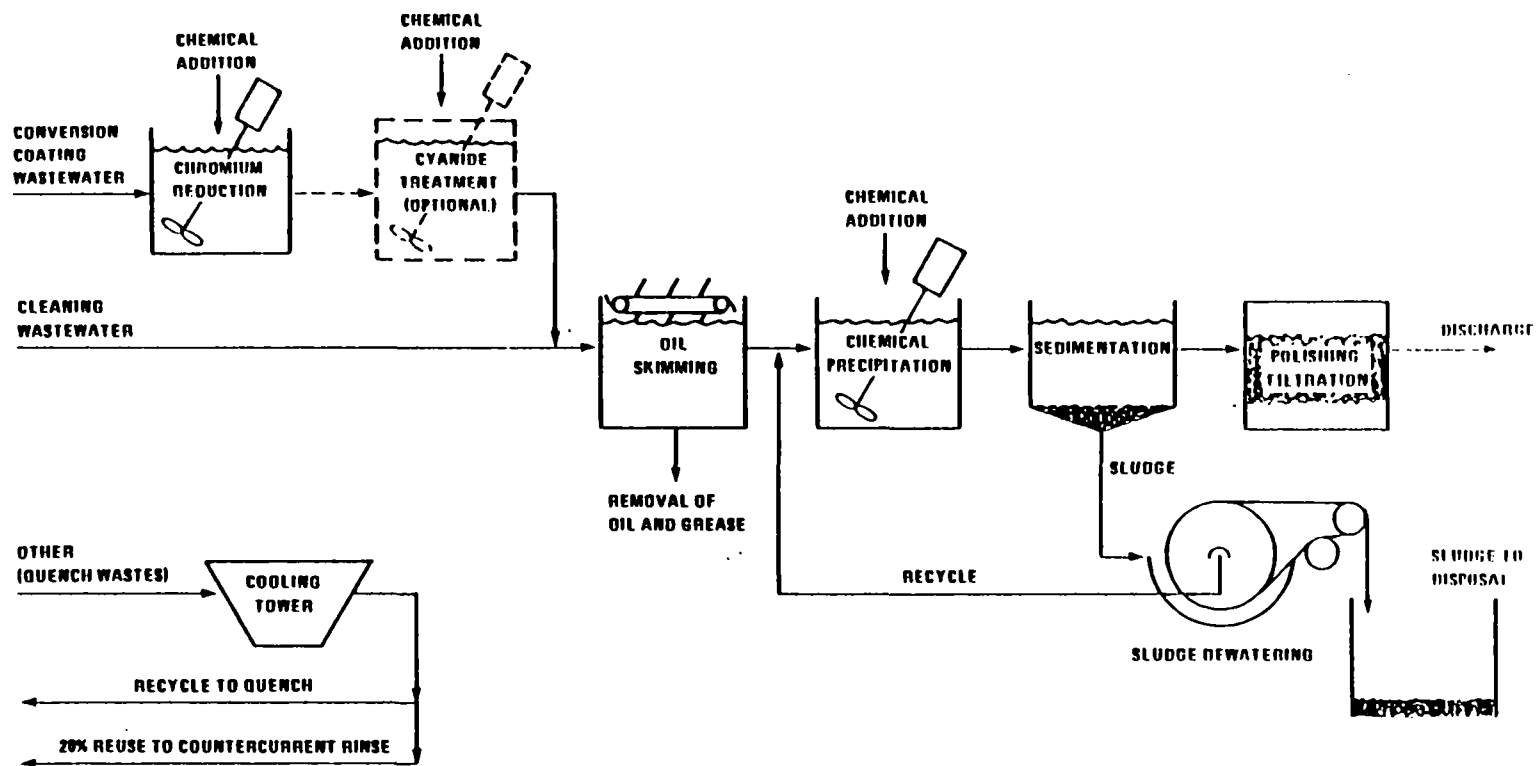


FIGURE XI-1. BDT LEVEL 1 WASTEWATER TREATMENT SYSTEM

COIL COATING

THE REGULATION - (CONTINUED)

NSPS - PSNS

FLOW FURTHER REDUCED BY REQUIRING COUNTERCURRENT

CASCADE RINSE IN BOTH CLEANING AND COATING

FLOW

STEEL	0.316 l/m ²
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GALVANIZED	0.343 l/m ²
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ALUMINUM	0.475 l/m ²
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END-OF-PIPE TREATMENT IS THE SAME AS BPT-BAT

PLUS POLISHING FILTRATION

COIL COATING

THE REGULATION - (CONTINUED)

POLLUTANTS REGULATED

<u>BPT</u>	<u>BAT</u>	<u>PSES</u>	<u>NSPS</u>	<u>PSNS</u>
Cr	Cr	Cr	Cr	Cr
Cu	Cu	Cu	Cu	Cu
CN	CN	CN	CN	CN
Zn	Zn	Zn	Zn	Zn
Al	Al		Al	
Fe	Fe		Fe	
O&G			O&G	
TSS			TSS	
pH			pH	

COIL COATING

THE REGULATION - (CONTINUED)

- ONE DAY MAXIMUM AND MONTHLY AVERAGE
VALUES ARE PUBLISHED FOR EACH POLLUTANT
- MONTHLY AVERAGE VALUE MUST BE USED FOR BOTH
DIRECT AND INDIRECT DISCHARGERS.
- COMPLIANCE WITH MONTHLY VALUES IS REQUIRED
REGARDLESS OF NUMBER OF SAMPLES ANALYZED AND
AVERAGED.

COIL COATING

THE REGULATION - (CONTINUED)

PERIODIC ANALYSIS FOR CYANIDE MAY BE REDUCED TO
ONCE ANNUALLY PROVIDING TWO CONDITIONS ARE MET.

1. FIRST SAMPLE TAKEN IN CALENDAR YEAR IS ANALYZED
AND CN FOUND TO BE LESS THAN 0.07 mg/l.
2. THE OWNER OR OPERATOR CERTIFIES TO THE POTW OR
PERMIT ISSUING AUTHORITY THAT CYANIDE IS NOT USED
IN THE COATING PROCESS.

COIL COATING

POST PROMULGATION ISSUES

REGULATION HAS NOT BEEN LITIGATED

INDUSTRY HAS PETITIONED ADMINISTRATOR TO:

1. USE CONCENTRATION RATHER THAN MASS LIMITATIONS
2. SPECIFY SPECIFIC CHEMICAL ANALYSIS OPTION TO BE USED FOR ANALYZING FOR OIL & GREASE

COIL COATING

DEVELOPMENT DOCUMENT ORGANIZATION

THERE ARE 17 SECTIONS IN THE DOCUMENT.

SECTIONS I & II ARE A SUMMARY OF THE DOCUMENT

SECTIONS III & IV EXPLAIN THE TECHNOLOGY AND SUBCATEGORIZATION

SECTION V PRESENTS DATA COLLECTED

SECTION VI DISCUSSES POLLUTANTS

SECTION VII PRESENTS TECHNOLOGY AND PERFORMANCE

SECTION VIII PRESENTS COSTING METHODOLOGY

SECTION IX - XIII REGULATORY DEVELOPMENT

SECTION XIV - XVII - REFERENCE INFORMATION

PROMULGATED REGULATION FOR THE
PORCELAIN ENAMELING
INDUSTRIAL POINT SOURCE CATEGORY

PORCELAIN ENAMELING

THE PORCELAIN ENAMELING CATEGORY

PORCELAIN ENAMELING IS THE PROCESS OF APPLYING A FUSED
VITRIOUS ENAMEL COATING TO A BASIS METAL.

USUALLY TWO PROCESS STEPS ARE INVOLVED -- METAL
PREPARATION AND COATING

PORCELAIN ENAMELING MAY BE INCLUDED AS SOME PART OF
SIC CODES 3431 3631 3632 3633 3639 3911

THE PORCELAIN ENAMELING CATEGORY - (CONTINUED)

EPA OBTAINED DATA ABOUT 119 PORCELAIN ENAMELING PLANTS

28 ARE DIRECT DISCHARGERS

88 ARE INDIRECT DISCHARGERS

3 DO NOT DISCHARGE

THE PORCELAIN ENAMELING CATEGORY - (CONTINUED)

PORCELAIN ENAMELING IS SUBCATEGORIZED INTO FOUR SUBCATEGORIES

1. STEEL (SOMETIMES CALLED ENAMELING IRON)
2. CAST IRON
3. ALUMINUM
4. COPPER
5. PRECIOUS METALS - A POSSIBLE SUBCATEGORY IS NOT REGULATED

THE PORCELAIN ENAMELING CATEGORY - (CONTINUED)

DATA WAS COLLECTED FROM ALL KNOWN PORCELAIN ENAMELERS
USING A DATA COLLECTION PORTFOLIO (DCP)

SAMPLING AND ANALYSIS VISITS WERE MADE TO 17 PLANTS:
ENGINEERING VISITS TO MANY ADDITIONAL PLANTS.

ENGINEERING STUDIES WERE MADE OF END-OF-PIPE
TREATMENT SYSTEMS.

THE PORCELAIN ENAMELING CATEGORY - (CONTINUED)

DATA TO SUPPORT TREATMENT EFFECTIVENESS OF LIME & SETTLE (L&S)
TREATMENT COLLECTED DURING SAMPLING

DATA FROM COIL COATING, ALUMINUM FORMING, BATTERY MANUFACTURING
COPPER FORMING & PORCELAIN ENAMELING USED AS BASIS FOR L&S

DATA FROM ELECTROPLATING NOT USABLE AS BASIS FOR L&S

PORCELAIN ENAMELING

THE REGULATION

THERE IS NO PREVIOUS REGULATION OF PORCELAIN ENAMELING

THIS REGULATION PROPOSED JANUARY 12, 1981;

PROMULGATED NOVEMBER 24, 1982.

REGULATION INCLUDES BPT, BAT, NSPS, PSES AND

PSNS. BCT IS DEFERRED.

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

ALL LIMITATIONS AND STANDARDS ARE MASS BASED

(FLOW * CONCENTRATION = MASS)

CONCENTRATIONS DERIVED FROM "COMBINED METALS

DATA BASE" FOR L&S

FLOW FOR EACH REGULATORY LEVEL DEVELOPED FOR

EACH SUBCATEGORY

FLOW IS NORMALIZED AGAINST AREA OF METAL PROCESSED

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

BPT

FLOW BASIS IS THE AVERAGE FLOW OF ALL PROCESS

STEPS IN THE SUBCATEGORY

FLOW	<u>METAL PREP</u>	<u>COATING</u>
STEEL	40.042 l/m ²	8.102 l/m ²
CAST IRON		0.693 l/m ²
ALUMINUM	38.896 l/m ²	15.041 l/m ²

END-OF-PIPE TREATMENT CHROMIUM REDUCTION,

OIL SKIMMING AND L&S

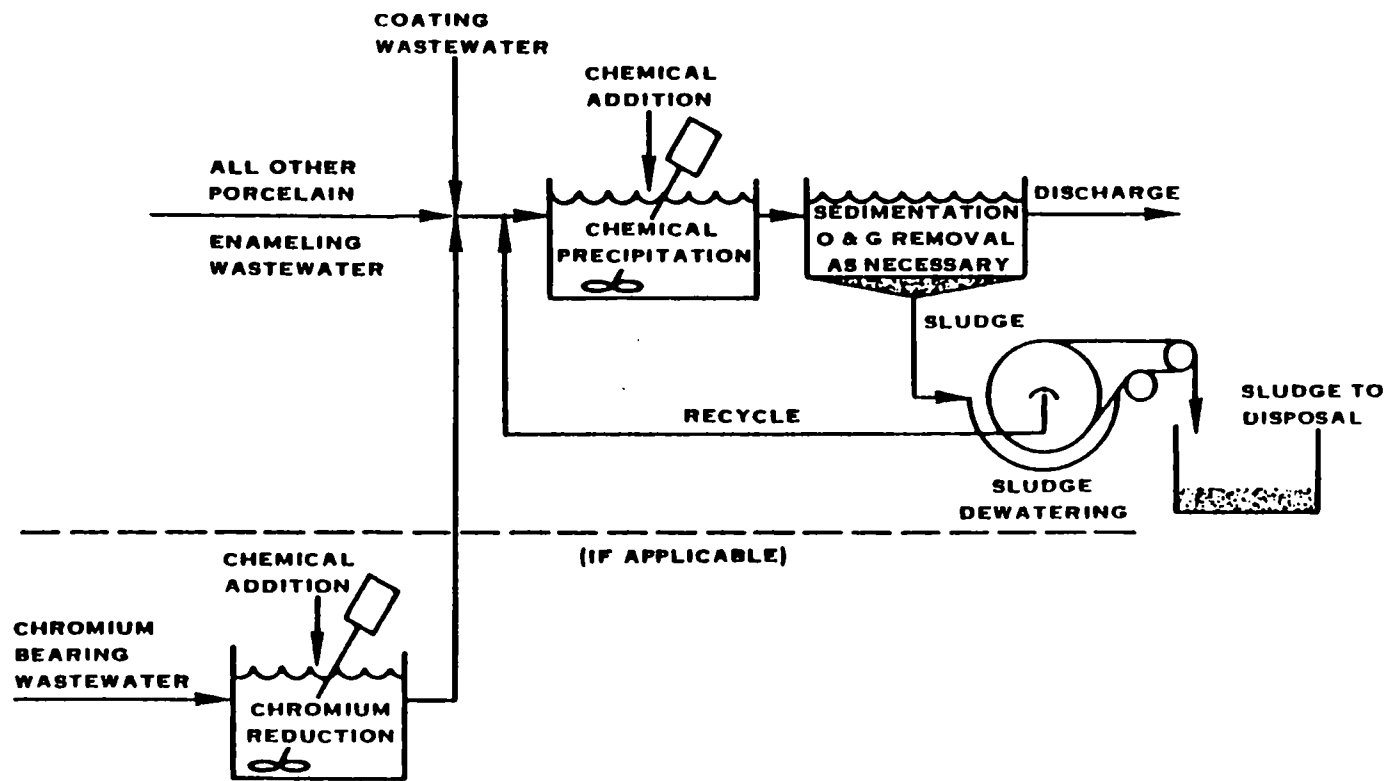


FIGURE IX-1. BPT TREATMENT SYSTEM FOR STEEL AND ALUMINUM SUBCATEGORIES

PORCELAIN ENAMELING

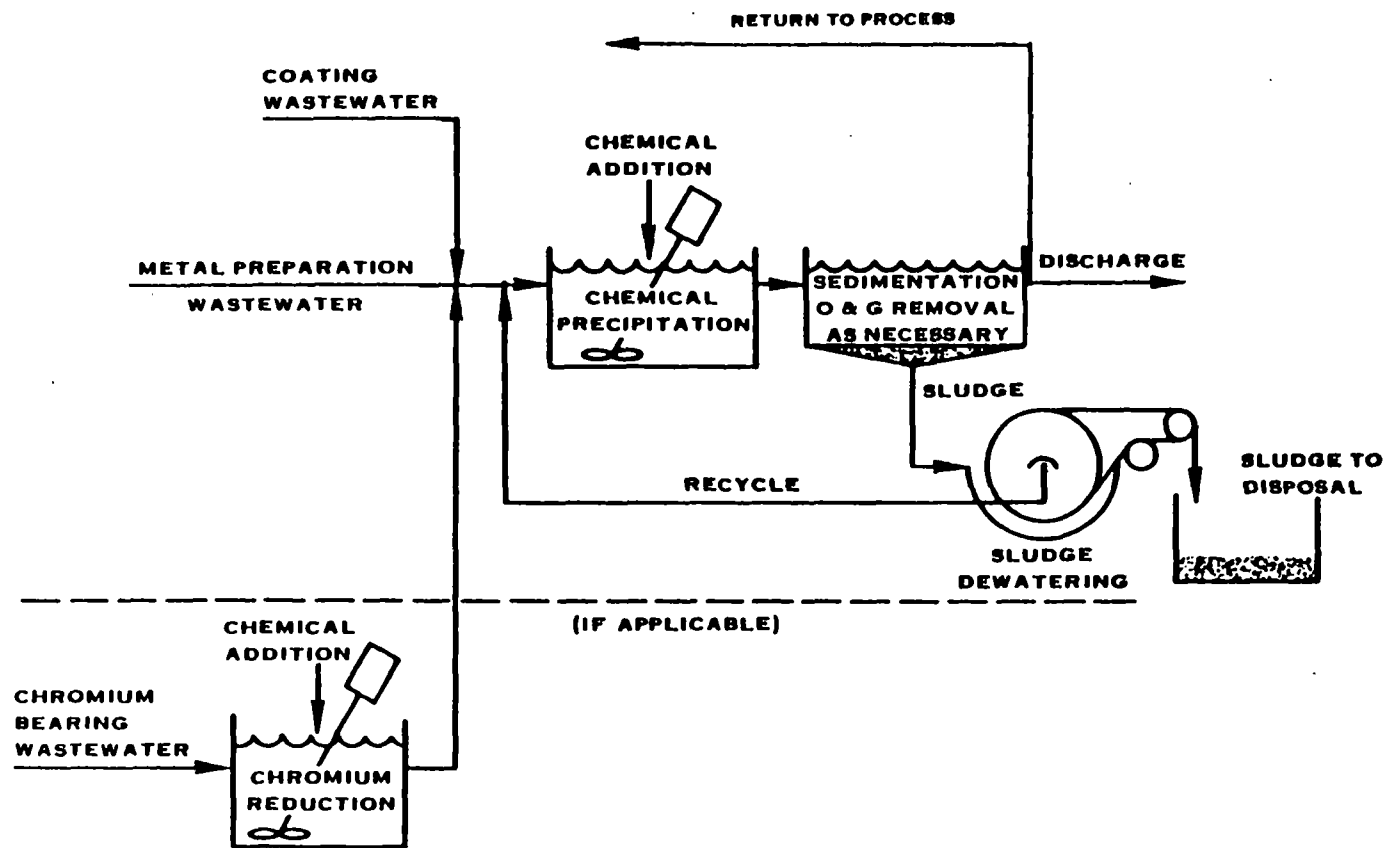
THE REGULATION - (CONTINUED)

BAT-PSES

FLOW REDUCED BY REUSING TREATED WATER FOR
MOST COATING OPERATIONS

FLOW	<u>METAL PREP</u>	<u>COATING</u>
STEEL	40.042 l/m ²	0.636 l/m ²
CAST IRON		0.636 l/m ²
ALUMINUM	38.896 l/m ²	0.636 l/m ²

END-OF-PIPE TREATMENT IS THE SAME AS BPT



NOTE: CAST IRON SUBCATEGORY GENERATES NO METAL PREPARATION WASTEWATER

FIGURE X-1. EXISTING SOURCES BAT OPTION A

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

PRETREATMENT

COMPLIANCE DATE

FOR EXISTING SOURCES NOVEMBER 25, 1985

FOR NEW SOURCES NOVEMBER 25, 1982

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

PRETREATMENT

PSES FOR THIS CATEGORY IS EXPRESSED AS A CONCENTRATION STANDARD - WITH AN ALTERNATE MASS STANDARD

CONCENTRATION STANDARDS ARE USED BECAUSE THE BAT-PSES FLOW IS ONLY SLIGHTLY REDUCED FROM BPT. (ABOUT 12%)

NSPS IS A MASS STANDARDS

CONCENTRATION STANDARDS ARE NOT APPROPRIATE FOR NEW SOURCES BECAUSE SUBSTANTIAL POLLUTANT REDUCTION IS ACHIEVED THROUGH FLOW REDUCTION

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

PRETREATMENT

DATA NEEDED TO DETERMINE COMPLIANCE WITH MASS STANDARDS

- MEASURED WASTEWATER FLOW
- POLLUTANT CONCENTRATION

POSSIBLE ALTERNATES -

- WATER USE RATE OR WATER METER
- POLLUTANT CONCENTRATION

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

PRETREATMENT

FOR MASS BASED PRETREATMENT STANDARDS

1. PRODUCTION RATE - BASED ON
 - A) PREVIOUS HISTORY - e.g. 5 YEAR AVERAGE
 - B) MAX MONTH PRODUCTION
 - C) NAME PLATE RATING
2. DISCHARGE STANDARD FROM REGULATION
3. DETERMINES DAILY MAX & MONTHLY AVERAGE DISCHARGE

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

NSPS - PSNS

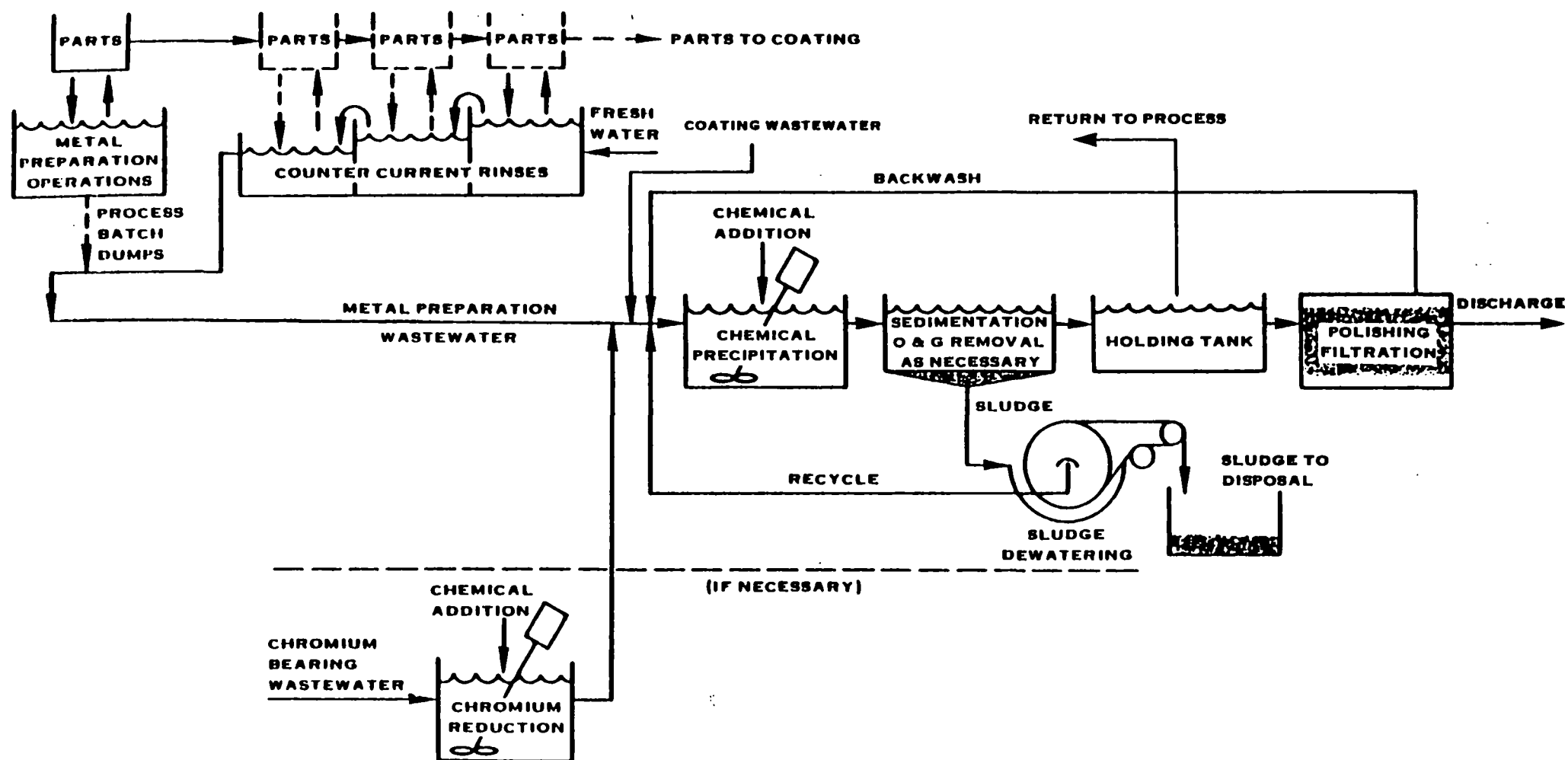
FLOW FURTHER REDUCED BY REQUIRING COUNTERCURRENT

CASCADE RINSE IN CLEANING

FLOW	<u>METAL PREP</u>	<u>COATING</u>
STEEL	3.564 l/m ²	0.636 l/m ²
CAST IRON		0.636 l/m ²
ALUMINUM	3.473 l/m ²	0.636 l/m ²

END-OF-PIPE TREATMENT IS THE SAME AS BPT-BAT

PLUS POLISHING FILTRATION



NOTE: CAST IRON SUBCATEGORY GENERATES NO METAL PREPARATION WASTEWATER.

FIGURE XI-1. NEW SOURCES SELECTED OPTION

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

POLLUTANTS REGULATED

<u>BPT</u>	<u>BAT</u>	<u>PSES</u>	<u>NSPS</u>	<u>PSNS</u>
Cr	Cr	Cr	Cr	Cr
Pb	Pb	Pb	Pb	Pb
Ni	Ni	Ni	Ni	Ni
Zn	Zn	Zn	Zn	Zn
Al	Al		Al	
Fe	Fe		Fe	
O&G			O&G	
TSS			TSS	
pH			pH	

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

- ONE DAY MAXIMUM AND MONTHLY AVERAGE
VALUES ARE PUBLISHED FOR EACH POLLUTANT
- MONTHLY AVERAGE VALUE MUST BE USED FOR BOTH
DIRECT AND INDIRECT DISCHARGERS.
- COMPLIANCE WITH MONTHLY VALUES IS REQUIRED
REGARDLESS OF NUMBER OF SAMPLES ANALYZED
AND AVERAGED.

PORCELAIN ENAMELING

THE REGULATION - (CONTINUED)

PERIODIC ANALYSIS FOR CHROMIUM MAY BE REDUCED TO ONCE ANNUALLY PROVIDING TWO CONDITIONS ARE MET.

1. FIRST SAMPLE TAKEN IN CALENDAR YEAR IS ANALYZED AND CHROMIUM FOUND TO BE LESS THAN 0.08 mg/l.
2. THE OWNER OR OPERATOR CERTIFIES TO THE POTW OR PERMIT ISSUING AUTHORITY THAT CHROMIUM IS NOT USED IN THE PROCESS.

PORCELAIN ENAMELING

POST PROMULGATION ISSUES

THE REGULATION IS BEING LITIGATED

INDUSTRY'S SPECIFIC COMPLAINTS ARE
NOT YET AVAILABLE

BRIEF DUE _____

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