

TABLE 1 -- MODEL TREATMENT BY CATEGORY

Category	PSES Model Treatment	PSNS Model Treatment
409 Sugar Processing	-	ZERO
413 Electroplating	BMP-TTO P/S CR CN	
414 OCPSF	STRP ADS P/S CN	STRP ADS P/S CN
415A Aluminum Chloride	-	-
415B Aluminum Sulfate		ZERO
415C Calcium Carbide	-	ZERO
415D Calcium Chloride	-	ZERO
415E Calcium Oxide	-	ZERO
415F Cl-alkali Hg Cell Diaphragm Cell	EQUAL P/S FILT	OXID FE /S
415H Hydrofluoric Acid	-	PH P/S RECYL
415K Potassium Metal	-	ZERO
415L Potassium Cr2O7		ZERO
415M Potassium Sulfate	-	ZERO
415N Sodium Bicarbonate	-	ZERO
415P Sodium Chloride	-	ZERO
415Q Sodium Cr2O7 / SO4	-	CR-iron P/S
415T Sodium Sulfite	-	
415V Titanium Dioxide	-	EQUAL /S PH
415W Aluminum Fluoride	-	-
415AA Borax	-	ZERO
415AC Bromine	-	ZERO
415AE Calcium Hydroxide	-	ZERO
415AH Chrome Pigments	CR P/S FILT	CR P/S FILT
415AJ Copper Sulfate	P/S FILT	P/S FILT
415AL Ferric Chloride		ZERO
415AN Fluorine	-	ZERO
415AP Hydrogen Cyanide	-	CN /S
415AQ Iodine	-	ZERO
415AR Lead Monoxide		ZERO
415AU Nickel Sulfate	P/S FILT	P/S FILT
415AX Potassium Chloride	-	ZERO
415BB Sodium Bisulfate	-	OXID-batch P/S
415BC Sodium Fluoride		ZERO
415BH Stannic Oxide	-	ZERO
415BK Zinc Sulfate	-	ZERO
415BL Cd Pigments/Salts	P/S FILT PH	P/S FILT PH
415BM Cobalt Salts	P/S FILT PH	P/S FILT PH
415BN Sodium Chlorate	-	CR P/S FILT PH
415BO Zinc Chloride	P/S FILT	P/S FILT
418A Phosphate Fertilzr	-	ZERO
418B Ammonia	-	
418C Urea	-	
418D Ammonium Nitrate	-	
418E Nitric Acid	-	BMP
418F Ammonia Sulfate	-	
418G Mixed & Blended	-	
419 Petroleum Refining	O/W STRP	O/W STRP CR P/S RECYL
420A By-Prod Cokemaking	RECYL FLOT EQUAL PH	RECYL FLOT EQUAL PH
420B Sintering	FLOC /S RECYL FILT	FLOC /S RECYL FILT

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420C Ironmaking	CN COAG /S RECYL	CN COAG /S RECYL
420D Steelmaking	COAG P/S RECYL	COAG P/S RECYL
420E Vacuum Degassing	P/S RECYL	P/S RECYL
420F Continuous Casting	SCRN RECYL P/S-blowdown	SCRN RECYL P/S-blowdown
420G Hot Forming	-	-
420H Salt Bath Secaling	CR O/W FLOC P/S PH	CR O/W FLOC P/S PH
420I Acid Pickling	P/S RECYL	EQUAL O/W FLOC OXID P/S PH RECYL
420J Cold Forming	EQUAL EMUL O/W FLOC FLOT	EQUAL EMUL O/W FLOC FLOT
420K Alkaline Cleaning	-	-
420L Hot Dip Coating	CR FLOC P/S RECYL	CR FLOC P/S RECYL
421A Bauxite Refining	-	-
421B Primary Aluminum	-	O/W P/S FILT RECYL
421C Secondary Aluminum	O/W STRP-dross wash P/S ADS-delacq FILT RECYL	O/W STRP-dross was P/S ADS-delacq FILT RECYL
421D Primary Copper	-	ZERO
421E Primary E-lytic Cu	-	P/S FILT RECYL
421F Secondary Copper	ZERO	ZERO
421G Primary Lead	P-S ⁻ /S FILT RECYL	P-S ⁻ /S FILT RECYL/BMP
421H Primary Zinc	P-S ⁻ /S FILT RECYL	P-S ⁻ /S FILT RECYL
421I Metallurgical Acid	P-S ⁻ /S FE FILT RECYL	P-S ⁻ /S FE FILT RECY
421L Secondary Silver	P/S FILT RECYL	P/S FILT RECYL
421M Secondary Lead	P/S FILT RECYL	P/S FILT RECYL/BMP
421N Primary Antimony	-	P-S ⁻ /S FILT
421O Primary Beryllium	-	STRP CNP P/S FILT RECYL
421P 1° & 2° Ga/Ge	P/S	P/S
421Q Secondary Indium	P/S	P/S
421R Secondary Mercury	-	P/S FILT
421T Secondary Mo/V	-	STRP P/S FE FILT
421U Primary Ni/Co	-	STRP P/S FILT
421V Secondary Nickel	P/S	P/S
421W 1° Precious/Hg	-	O/W P/S FILT IX RECYL
421X 2° Precious Metals	CNP STRP P/S FILT IX RCYL	CNP STRP P/S FILT IX RCYL
421Y 1° Rare Earth	P/S FILT ADS RECYL	P/S FILT ADS RECYL
421Z Secondary Tantalum	-	P/S FILT
421AA Secondary Tin	CNP P/S FILT	CNP P/S FILT
421AB 1° & 2° Titanium	O/W P/S FILT RECYL	O/W P/S FILT RECYL/BMP
421AC Secondary W/Co	STRP P/S FILT RECYL	STRP P/S FILT RECYL
421AD Secondary Uranium	-	P/S FILT RECYL
421AE Primary Zr/Hf	-	STRP CNP P/S FILT
423 Steam Electric	O/W P/S	O/W P/S
425 Leather Tanning (small sources)	EQUAL COAG /S -	EQUAL COAG /S -
426H Glass Containers	-	BMP
426K TV Tube Envelope	-	COAG P/S PH
426L Incandescent Lamp	-	STRP P/S RCARB
426M Hand/Blown Glass	-	P/S-batch RCARB
428E Small Rubber	-	EQUAL O/W
428F Medium Rubber	-	EQUAL O/W
428G Large Rubber	-	EQUAL O/W

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Category	PSSES Model Treatment	PSNS Model Treatment
428H Reclaim Rubber-wet	-	EQUAL O/W
428I Reclaim Rubber-dry	-	EQUAL O/W
428J Latex Products	-	COAG P/S
428K Latex Foam	-	COAG P/S
429F Wood (inorg salts)	ZERO	ZERO
429G Wood (steam impng)	O/W BIOL or OXID or EVAP	ZERO
429H Wood (Boulton)	BMP EVAP	ZERO
430 Pulp Paper P-board	BMP P/S	BMP
433 Metal Finishing	BMP-TTO CN CR P/S	BMP-TTO ZERO-Cd CN CR P/S
439 Pharmaceutical	CN	CN
446 Oil-based Paint	-	ZERO
447 Oil-based Ink	-	ZERO
461A Battery Cadmium	O/W P/S RECYL	O/W P/S FILT RECYL
461B Battery Calcium	CR P/S	CR P/S
461C Battery Lead	O/W P-CO ₃ /S RECYL	O/W P-CO ₃ /S FILT RECYL
461D Leclanche Battery (non-foliar)	P/S FILT RECYL/BMP ZERO	P/S FILT RECYL/BMP ZERO
461E Battery Lithium	-	BMP O/W P/S FILT
461F Battery Magnesium	P/S RECYL	P/S FILT RECYL/BMP
461G Battery Zinc	O/W P/S RECYL	O/W P-S ⁻ /S FILT RECYL
464 Metal Mold/Cast	O/W P/S FILT RECYL	O/W P/S FILT RECYL
465 Coil Coating	CR CN O/W P/S RECYL	CR CN O/W P/S FILT RECYL
465D Canmaking	CR O/W EMUL FLOT P/S RCYL	CR O/W EMUL FLOT P/S RCYL
466 Porcelain Enamel	CR P/S EQUAL RECYL	CR P/S EQUAL RECYL
467 Aluminum Forming	CR CN O/W EMUL P/S RECYL	CR CN O/W EMUL P/S FILT RECYL
468 Copper Forming	CR O/W EMUL P/S RECYL	CR O/W EMUL P/S RECYL
469A Semiconductor Mfg	BMP-TTO	BMP-TTO
469B E-tronic Crystals (GaAs or InAs)	BMP-TTO BMP-TTO P/S PH	BMP-TTO BMP-TTO P/S PH
469C Cathode Ray Tube	P-CO ₃ /S CR FLOC P/S BMP-TTO	P-CO ₃ /S CR FLOC P/S FILT BMP-TTO
469D Luminescent Matrls	-	P/S PH
471 Non-Ferrous Metals Forming	CN CR STRP O/W EMUL P/S FE PH RECYL	CN CR STRP O/W EMUL P/S FE PH RECYL
471A Pb/Sn/Bi Forming	471	471
471B Magnesium Forming	471	471 + FILT
471C Ni/Co Forming	471 + FILT	471 + FILT
471D Precious Metals	471	471
471E Refractory Metals	471	471 + FILT
471F Titanium Forming	471	471
471G Uranium Forming	-	471 + FILT
471H Zinc Forming	-	471 + FILT
471I Zr/Hf Forming	471	471
471J Metal Powders	471	471

TABLE 1 -- MODEL TREATMENT BY CATEGORY

LEGEND -- TREATMENT UNIT PROCESSES	
ADS	carbon adsorption
BIOL	biological treatment
BMP	source control
CEM	metals cementation
CN	cyanide destruction
CNP	cyanide precipitation
COAG	coagulation
CR	chromium reduction
DCHEL	dechelation
DH2O	sludge dewatering
EMUL	chemical emulsion breaking
EQUAL	equalization
EVAP	evaporation
EW	electrowinning/e-dialysis
FE	iron coprecipitation
FILT	media filtration
FLOC	flocculation
FLOT	dissolved air flotation
IX	ion exchange
O/W	oil/water separation
OXID	oxidation
P/S	metals precip/settling
-BH ⁻	with borohydride
-MgO	with magnesium oxide
-S ⁼	with sulfide
-CO3	carbonate augmentation
/S	settling
PH	pH adjustment
RBC	rotating biol contactor
RCARB	recarbonation
REC	precious metals recovery
RECYL	flow reduction/recycle (See Table 2 for detail)
REDN	metals reduction
RO	reverse osmosis
SAND	sand filtration
SCRN	screening (cartridge)
STRP	steam stripping
UF	ultrafiltration (membrane)
ZERO	zero discharge

TABLE 2 -- DESCRIPTION OF MODEL FLOW REDUCTIONS BY CATEGORY

Category	New/Existing	Source	RECYCL in Table 1 Means the Following
415H	Hydrofluoric Acid	PSNS	65% REUSE IN KILN RESIDUE SLURRY • IN-HOUSE RECYCLE OF DRIP ACID
419	Petroleum Refining	PSNS	SEGREGATE COOLING BLOWDOWN • 20% FLOW REDXN
420A	By-Prod Cokemaking	BOTH	RECYCLE COOLER & BAROMETRIC CONDENSER FLOWS BENZOL PLANT & COOLING BLOWDOWN • FREE AND FIXED NH3 STILLs
420B	Sintering	BOTH	92% RECYCLE • FILTER BLOWDOWN
420C	Ironmaking	BOTH	98% RECYCLE THROUGH COOLING TOWER
420D	Steelmaking	BOTH	RECYCLE THROUGH COOLING TOWER • P/S BLOWDOWN
420E	Vacuum Degassing	BOTH	98% RECYCLE (BLOWDOWN = 25 gal/ton)
420F	Continuous Casting	BOTH	RECYCLE THROUGH COOLING TOWER • P/S BLOWDOWN
420I	Acid Pickling	PSNS	90+% FLOW REDXN • RECYCLE FUME SCRUBBER BLOWDOWN • CASCADE RINSES
420L	Hot Dip Coating	PSES	RECYCLE FUME SCRUBBER
420L	Hot Dip Coating	PSNS	RECYCLE FUME SCRUBBER • CASCADE RINSES
421B	Primary Aluminum	PSNS	CASTING CONTACT COOLING THROUGH TOWER • DRY ALUMINA SCRUBBING OF GAS EMISSIONS FROM ANODE PASTE/ANODE BAKE/POTLINES/POTROOMS • ALTERNATE IN-LINE FLUXING AND FILTERING
421C	Secondary Aluminum	BOTH	RECYCLE FUME SCRUBBER • CASTING CONTACT COOLING THROUGH TOWER
421E	Primary E-lytic Cu	PSNS	IN-PROCESS FLOW REDXN
421G	Primary Lead	PSES	RECYCLE EFF IN PLANT WASHDOWN • IN-PROCESS FLOW REDXN
421G	Primary Lead	PSNS	RECYCLE EFF IN PLANT WASHDOWN • IN-PROCESS FLOW REDX • FUME SCRUB ZERO DISCHARGE FROM SINTER PLANT/DROSS REVERB SLAG GRANULATION
421H	Primary Zinc	BOTH	RECYCLE FUME SCRUBBER • CASTING CONTACT COOLING THROUGH TOWER
421I	Metallurgical Acid	BOTH	IN-PROCESS FLOW REDXN
421L	Secondary Silver	BOTH	23% FLOW REDX OF FUME SCRUBBER • RECYCLE EFF IN FLOOR/EQUIPMENT WASHDOWN
421M	Secondary Lead	PSES	IN-PROCESS FLOW REDXN • RECYCLE EFF IN PLANT WASHDOWN/BATTERY CASE CLASSIFICATION
421M	Secondary Lead	PSNS	IN-PROCESS FLOW REDXN • RECYCLE EFF IN PLANT WASHDOWN/BATTERY CASE CLASSIFICATION • DRY FUME SCRUBBING OF KETTLE
421O	Primary Beryllium	PSNS	IN-PROCESS FLOW REDXN
421W	1° Precious/Hg	PSNS	FLOW REDXN OF E-LYTIC CELLS/CALCINER SCRUB
421X	2° Precious Metals	BOTH	FLOW REDXN OF FURNACE/REFINERY FUME SCRUB/RAW MATERIAL GRANULATION
421Y	1° Rare Earth	BOTH	IN-PROCESS FLOW REDXN
421AB	1° & 2° Titanium	PSES	IN-PROCESS FLOW REDXN
421AB	1° & 2° Titanium	PSNS	90% RECYCLE • FLOW REDXN FOR CHIP CRUSHING/SPONGE CRUSHING AND SCREENING • DRY FUME SCRUB FOR SCRAP MILLING • RECOVERY OF SCRUBBER BLOWDOWN FROM CHLORINE LIQUIFACTION AS HOCl ACID
421AC	Secondary W/Co	BOTH	IN-PROCESS FLOW REDXN
421AD	Secondary Uranium	PSNS	IN-PROCESS FLOW REDXN

TABLE 2 -- DESCRIPTION OF MODEL FLOW REDUCTIONS BY CATEGORY

Category	New/Existing	Source	RECYCL in Table 1 Means the Following
430	Pulp Paper P-board	BOTH	CHEMICAL SUBSTITUTIONS
461A	Battery Cadmium	BOTH	IN-PROCESS FLOW REDXN
461C	Battery Lead	BOTH	IN-PROCESS FLOW REDXN • ZERO DISCHARGE LEAD OXIDE/PASTE PREP • CLOSED-FORM CURING
461D	Leclanche (foliar)	BOTH	SEGREGATED FLOWS • IN-PROCESS RECYCLE • DRY PLANT WASHDOWN
461E	Battery Lithium	PSNS	RECYCLE HEAT PAPER STREAM
461F	Battery Magnesium	PSES	SEGREGATED FLOWS • RECYCLE HEAT PAPER STREAM AND FUME SCRUBBER • IN-PROCESS FLOW REDXN
461F	Battery Magnesium	PSNS	SEGREGATED FLOWS • RECYCLE HEAT PAPER STREAM • DRY FUME SCRUBBER • IN-PROCESS FLOW REDXN
461G	Battery Zinc	BOTH	IN-PROCESS FLOW REDXN
464	Metal Mold/Cast	BOTH	HIGH RECYCLE RATE
465	Coil Coating	BOTH	RECYCLE QUENCH THROUGH COOLING TOWER • RECYCLE COOLING BLOWDOWN IN RINSES • ON-DEMAND RINSES
465D	Canmaking	PSES	FLOW REDXN 22.2 gal/1000 cans • COUNTERCURRENT
465D	Canmaking	PSNS	FLOW REDXN 16.8 gal/1000 cans • COUNTERCURRENT
466	Porcelain Enamel	PSES	COATING WATER REUSE EXCEPT BALL MILL WASHOUT
466	Porcelain Enamel	PSNS	COATING WATER REUSE EXCEPT BALL MILL WASHOUT • COUNTERCURRENT RINSING
467	Aluminum Forming	BOTH	COUNTERCURRENT RINSING • RECYCLE HEAT TREAT COOLING WATER/FUME SCRUBBER • REUSE EXTRUSION DIE CLEAN RINSE AS MAKE-UP
468	Copper Forming	PSES	RECYCLE HEAT TREAT/ANNEALING CONTACT COOLING WATER/FORGED PARTS AND PICKLING RINSE • SPRAY RINSES • RECYCLE HOT ROLLING SPENT LUBRICANT
468	Copper Forming	PSNS	PSES + COUNTERCURRENT RINSES FOR PICKLING
471A	Pb/Sn/Bi Forming	BOTH	RECYCLE EXTRUSION PRESS & HEAT TREAT CONTACT COOLING/SEMI-CONTINUOUS INGOT CASTING COOLING/ SHOT FORMING FUME SCRUB • SPRAY RINSES FOR ALK CLEANING • COUNTERCURRENT RINSING
471B	Magnesium Forming	BOTH	RECYCLE FORGING CONTACT COOLING/FORGE EQUIP- MENT CLEANING • COUNTERCURRENT RINSING
471C	Ni/Co Forming	BOTH	RECYCLE COOLING WATER FROM ROLLING/FORGING/ CASTING • RECYCLE SAWING/GRINDING RINSES • COUNTERCURRENT RINSES FOR SURFACE TREAT/ALK CLEANING/MOLTEN SALT
471D	Precious Metals	BOTH	RECYCLE COOLING WATER FROM DIRECT CHILL CAST- ING/SHOT CASTING/SEMI-CONTINUOUS/CONTINUOUS CASTING/HEAT TREAT • RECYCLE TUMBLING/BURNING WASH • COUNTERCURRENT RINSES FOR PREBOND/ALK CLEAN/SURFACE TREAT
471E	Refractory Metals	BOTH	RECYCLE CONTACT COOLING/FUME SCRUB/EQUIPMENT CLEANING/TUMBLING/BURNISHING • COUNTERCURRENT
471F	Titanium Forming	BOTH	RECYCLE CONTACT COOLING FROM ROLLING/FORGING • RECYCLE FUME SCRUB/TUMBLING/SAWING/GRINDING • COUNTERCURRENT RINSES FOR SURFACE TREAT/ALK CLEANING

TABLE 2 -- DESCRIPTION OF MODEL FLOW REDUCTIONS BY CATEGORY

Category	New/Existing	Source	RECYCL in Table 1 Means the Following
471G	Uranium Forming	PSNS	RECYCLE COOLING WATER FROM EXTRUTION/SAWING/ GRINDING/HEAT TREAT • RECYCLE LAUNDRY WASH
471H	Zinc Forming	PSNS	RECYCLE COOLING WATER FROM ROLLING/ANNEALING/ DIRECT CHILL CASTING • COUNTERCURRENT RINSES FOR SURFACE TREAT/ELECTROCOATING
471I	Zr/Hf Forming	BOTH	RECYCLE HEAT TREAT COOLING/SAWING/GRINDING WASH • COUNTERCURRENT RINSES FOR ALK CLEAN/ SURFACE TREAT • BATCH DISCHARGE MOLTEN SALT
471J	Metal Powders	PSES	99% RECYCLE OF CONTACT COOLING WATER FROM SAWING/GRINDING
471J	Metal Powders	PSNS	PSES + RECYCLE WASH FROM TUMBLING/BURNISHING/ CLEANING • RECYCLE FUME SCRUBBER/HOT PRESSING CONTACT COOLING WATER