Sector and Wastestream	Recycling Status	Bevill Special 20 Processing Unit/ Beneficiation Unit/ Processing Unit/ Both/Neither	Notes
Alumina & Aluminum			
Casthouse Dust	Y?	Process unit	Close to final unit
Electrolysis	Y?	Process unit	Appears to be mainly recycled to unit generating it
Antimony			
Autoclave Filtrate	Y?	Process unit	Water reuse (may require treatment)
Stripped Analytic Solids	Y	Process unit	Goes back to leach circuit (may be in-process material)
Beryllium			
Chip treatment wastewater	YS?	Process unit	Water reuse (may require treatment; generated at facilities without beneficiation Unit)
Bismuth			
Spent Caustic Soda	Y?	Process unit	Generated near end of processing, may require treatment
Electrolyte Slimes	Y?	Process unit	Recoverable products
Spent Soda Solution	Y?	Process unit	Generated new and of processing may require treatment
Waste Acids	YS?	Process Unit	Acid reuse, many parts of process used acid (may require treatment)
Cadmium			
Caustic Wastewater	Y?	Process Unit	Reuse for caustic value; may require treatment
Copper and land sulfate filter cakes	Y?	Process Unit	These would likely be sent to processing operations in copper and lead sectors for metal recovery
Copper removal filter cake	Y?	Process Unit	Would likely be sent to processing operations in copper and lead sectors for recovery
Spent leach solution	Y?	Both	Reuse for acid value, may require treatment
Lead sulfate waste	Y?	Process Unit	Would likely be sent to processing operations in lead sector
Scrubber wastewater	Y?	Both	Reuse for water/acid value, may require treatment
Zinc Precipitates	Y?	Process Unit	Would likely be sent to processing operations in zinc sector
Calcium			
Dust with quicklime	Y	Beneficiation Unit	Dust may be recycled to mixer and briquettes, prior to retorting

Sector and Wastestream	Recycling Status	Bevill Special 20 Processing Unit/ Beneficiation Unit/ Processing Unit/ Both/Neither	Notes
Copper			
Acid Plant Blowdown	YS	Both	Usually separated - liquids to beneficiation processes, solids to smelter (may be treated before separation)
WWTP Sludge	YS	Process unit	Appears to go to flush furnace or filter plant
Coal Gas			
MEE concentrate	YS	Process unit (gasifier)	Either recycled to gasifier or sent to incinerator
Elemental Phosphorous			
AFM Rinsate	Y	Both	Water is usually recycled in process after furnace, but sometimes to calcining unit (special waste unit)
Furnace Scrubber Blowdown	Y	Both	
Furnace Building Washdown	Y	Both	
Fluorspar			
Off-spec fluosilicic acid	YS	Off-site	Water fluoridation
Germanium			
Waste acid wash and rinse water	YS?	Process unit	Recycled for acid and/or water reuse within processing steps
Chlorinator wet air pollution control sludge	YS?	Process unit	Recycled to chlorinator for further removal of Ge
Spent acid/leachate	YS?	Process unit	Recycled to leaching unit for reuse as leaching agent to remove Ge from zinc sintering fumes
Lead			
Acid plant sludge	Y?	Beneficiation Unit	Recycled to sintering machine
Slurried APC dust	Y	Beneficiation Unit	Recycled to sintering machine (sinter feed preposition step)
Solid residues	Y?	Beneficiation Unit	Recycled to sintering machine
Spent furnace brick	Y	Bevill Proc. Unit	Recycled to blast furnace
Stockpiled miscellaneous plant waste	YS?	Bevill Proc. Unit	Recycled to blast furnace
WWTP liquid effluent	Y	Beneficiation Unit	Recycled to sintering machine
WWTP sludges/solids	Y	Beneficiation Unit	Recycled to sintering machine
Magnesium			
Cast House Dust	Y	Process unit	Close to final unit
Smut	N	Not recycled	Low grade Na/Ca/Mg sludge
Mercury			
Dust	N	Not recycled	Dust usually recycled for metal value - because of Hg low boiling point likely will not contain metal
Quench Water	Y?	Beneficiation Unit	Recycled to CIL circuit
Molybdenum			
Flue Dust/gases	N	Neither	No evidence that it could be recycled, text states it is not recycled and appendix says not recyclable
Platinum Group Metals			
Slag	Y?	Process Unit	Recycled to electric furnace

Sector and Wastestream	Recycling Status	Bevill Special 20 Processing Unit/ Beneficiation Unit/ Processing Unit/ Both/Neither	Notes
Pyrobitumens, et al.			
Waste catalysts	Y?	Process/Off-site	Either reused in cracking operation or sent off-site for reclamation
Rare Earths			
Electrolytic cell caustic wet APC sludge	Y	Process Unit	Aqueous streams can be used in numerous leaching, washing, and other operations
Process wastewater	YS?	Beneficiation Unit	
Spent scrubber liquor	YS?	Beneficiation Unit	
Solvent extraction crud	N	Not Recycled	
Wastewater from caustic cost APC	YS?	Beneficiation Unit	
Rhenium			
Spent barren scrubber liquor	Y?	Both	Water-reuse, both beneficiation. and Processing units on-site
Scandium			
Spent solvents from solvent extraction	Y?	Process Unit	Probably recycled directly to process (may require treatment) or sent off-site to solvent recovery
Selenium			
Spent filter cake	Y?	Process Unit	Recovery of other precious metals
Plant Process wastewater	YS?	Both	Water/acid reuse (may require treatment)
Slag	YS?	Process Unit	Copper Smelting
Tellurium slime wastes	Y?	Process Unit	Tellurium Recovery
Synthetic Rutile			
Spent Iron Oxide Slurry	YS?	Process Unit/off-site	Would be recycled for iron value, possibly at iron facilities
APC dust/sludge	Y	Process Unit	Recycled to process, pass roaster
Spent acid solution	Y	Process Unit	Recycled to digester
Tellurium			
Slag	YS?	Process Unit	May be returned to copper anode for further processing
Wastewater	Y	Process Unit	Sent to selenium recovery (which is processing operation)
Titanium and TiO2			
Pickle liquor washwater	YS?	Process Unit	Recycled to acid pickling step
Scrap milling scrubber water	YS?	Process Unit	Recycled to Ti scrap washing step after treatment to remove oil and grease and suspended solids
Smut from Mg recovery	Y	Process Unit	Recycled to reduction reactor in Knoll process
Leach liquor and sponge wash	YS?	Process Unit	Either reused after treatment as dust suppressant on needs, or recycled to acid leaching step
Spent furnace impoundment liquids	Y?	Process Unit	May be recycled to the finishing step in the chloride-ilmenite process

Sector and Wastestream	Recycling Status	Bevill Special 20 Processing Unit/ Beneficiation Unit/ Processing Unit/ Both/Neither	Notes
Tantalum, Columbium, FeCb			
Process Wastewater	Y?	Process Unit	Water Reuse - may require treatment - only processing on-site
Tungsten			
Spent acid and rinsewater	YS?	Both	Water and acid reuse - may require (to be getting) treatment - some facilities
Process wastewater	YS?	Both	Water reuse, see above
Uranium			
Waste nitric acid rinse from UOs prod	YS?	Process Unit	May require treatment, possible reuse in yellowcake and dissolution other acid uses
Slag	Y	Process Unit	Recycled to process
Uranium chips from ingot prod	Y?	Process Unit	May be recycled to reduction furnaces
Zinc			
Acid plant blowdown	Y	Process Unit	Recycled to hot tower
Waste ferrosilicon	Y?	Process Unit	Sold off-site
Process wastewater	Y?	Process Unit	Recycled to process units (e.g., casting)
Spent cloths, bags, and filters	Y	Neither/off-site	Bags/filters recycled to manufacturer
Spent goethite and leach cake residues	N	Process Unit	Not recycled in our opinion
Spent surface impoundment liquids	YS?	Process Unit	To various process units
WWTP solids	YS	Bevill process	Recycled to zinc ore roaster
TCA tower blowdown	YS	Process Unit	Recycled to zinc acid plant
WWTP liquid effluent	YS?	Process Unit	To various process units
Zirconium and Hafnium			
Leaching rinsewater from Zr alloy prod.	YS?	Process Unit	Water reuse
Leaching rinsewater from Zr metal prod	YS?	Process Unit	Water reuse