

Alternative 2

Replace the default Occupational Health standards with the specific calculated DHS values in Category 1, but create a new Category to accommodate beneficial uses that pose little risk of direct contact exposure.

- The new Category would partially re-create the existing Category 3 in the current version of Appendix I,
- The new Category would not have standards for totals analyses,
- The new Category would exclude unbonded surface course and winter road abrasives which would have to meet the new calculated totals standards,
- This alternative would require that safeguards be put in place to minimize potential exposures from materials that are left open for extended periods of time prior to placement of final cover.

Table 1**Coal Ash Industrial Byproduct Characterization**

Water Leach Test (ASTM D3987-12)	Category 1	Category 2	Category 3
Parameter	mg/L	mg/L	mg/L
Antimony	0.006	0.006	0.03
Arsenic	0.01	0.01	0.05
Barium	2	2	10
Beryllium	0.004	0.004	0.02
Boron	1	1	5
Cadmium	0.005	0.005	0.025
Chloride	1250	1250	2500
Chromium, Tot.	0.1	0.1	0.5
Cobalt	0.04	0.04	0.2
Fluoride	4	4	20
Lead	0.015	0.015	0.075
Mercury	0.002	0.002	0.01
Molybdenum	0.04	0.04	0.2
Selenium	0.05	0.05	0.25
Sulfate	1250	1250	2500
Thallium	0.002	0.002	0.01

Totals Analyses	Category 1
Parameter	mg/kg
Antimony	97.3
Arsenic	8
Barium	8600
Beryllium	122
Boron	43600
Cadmium	104
Chromium, Hex.	1.9
Lead	52
Mercury	13.7
Molybdenum	1220
Selenium	1210
Thallium	2.4
Vanadium	773

Table 2**Foundry System Sand Industrial Byproduct Characterization**

Water Leach Test (ASTM D3987-12)	Category 1	Category 2	Category 3
Parameter	mg/L	mg/L	mg/L
Antimony	0.006	0.006	0.03
Arsenic	0.01	0.01	0.05
Beryllium	0.004	0.004	0.02
Cadmium	0.005	0.005	0.025
Chromium, Tot.	0.1	0.1	0.5
Cobalt	0.04	0.04	0.2
Copper	1.3	1.3	6.5
Lead	0.015	0.015	0.075
Nickel	0.1	0.1	0.5

Totals Analyses	Category 1
Parameter	mg/kg
Antimony	97.3
Arsenic	8
Beryllium	122
Cadmium	104
Chromium, Hex.	1.9
Lead	52
Nickel	264
Acenaphthene	9420
Anthracene	47100
Benz(a)anthracene	19.9
Benzo(a)pyrene	2
Benzo(b)fluoranthene	20
Benzo(k)fluoranthene	200
Chrysene	2000
Dibenzo(ah)anthracene	2
Flouranthene	6280
Flourene	6280
Indeno(123-cd)pyrene	20
1-methyl naphthalene	75.8
2-methylnaphthalene	628
Naphthalene	25.1
Pyrene	4710

Table 3**Ferrous and Steel Slag Industrial Byproduct Characterization**

Water Leach Test (ASTM D3987-12)	Category 1	Category 2	Category 3
Parameter	mg/L	mg/L	mg/L
Antimony	0.006	0.006	0.03
Arsenic	0.01	0.01	0.05
Barium	2	2	10
Beryllium	0.004	0.004	0.02
Boron	1	1	5
Cadmium	0.005	0.005	0.025
Chromium, Tot.	0.1	0.1	0.5
Fluoride	4	4	20
Lead	0.015	0.015	0.075
Molybdenum	0.04	0.04	0.2
Thallium	0.002	0.002	0.01
Vanadium	0.03	0.03	0.15

Totals Analyses	Category 1
Parameter	mg/kg
Antimony	97.3
Arsenic	8
Barium	8600
Boron	43600
Cadmium	104
Chromium, Hex.	1.9
Lead	52
Manganese	2937
Molybdenum	1220
Thallium	2.4
Vanadium	773

Table 4

FGD Byproduct Industrial Byproduct Characterization

Water Leach Test¹ (ASTM D3987-12)	Category 1	Category 2	Category 3
Parameter	mg/L	mg/L	mg/L
Antimony	0.006	0.006	0.03
Arsenic	0.01	0.01	0.05
Boron	1	1	5
Fluoride	4	4	20
Manganese	0.30	0.30	1.5
Mercury	0.002	0.002	0.01
Selenium	0.05	0.05	0.25
Sulfate	1250	1250	2500
Thallium	0.002	0.002	0.01

Totals Analyses¹	Category 1
Parameter	mg/kg
Antimony	97.3
Arsenic	8
Beryllium	122
Chromium (Cr VI)	1.9
Mercury	13.7
Selenium	1210
Thallium	2.4

1 – Parameters for all other beneficial uses excluding use as a soil or plant additive.

Table 5

FGD Byproduct Industrial Byproduct Characterization

Soil or Plant Additive

Totals Analyses	
Parameter	mg/kg
Antimony	1.5
Arsenic	13.1
Barium	1000
Beryllium	2.5
Boron	200
Cadmium	1.0
Chromium (Total)	100
Copper	95
Lead	30
Manganese	1500
Mercury	2.5
Molybdenum	10
Nickel	100
Selenium	50
Thallium	1.0
Vanadium	136
Zinc	125

Note: Values are derived from the NRCS Conservation Practice Standard Code 333, June, 2015

Table 6**Other Industrial Byproduct Characterization**

Water Leach Test (ASTM D3987-12)	Category 1	Category 2	Category 3
Parameter	mg/L	mg/L	mg/L
Aluminum	0.2	0.2	1
Antimony	0.006	0.006	0.03
Arsenic	0.01	0.01	0.05
Beryllium	0.004	0.004	0.02
Barium	2	2	10
Boron	1.0	1.0	5.0
Cadmium	0.005	0.005	0.025
Chloride	1250	1250	2500
Chromium, Tot.	0.1	0.1	0.5
Cobalt	0.04	0.04	0.2
Copper	1.3	1.3	6.5
Fluoride	4.0	4.0	20
Iron	1.5	1.5	3.0
Lead	0.015	0.015	0.075
Manganese	0.3	0.3	1.5
Mercury	0.002	0.002	0.01
Molybdenum	0.04	0.04	0.2
Nickel	0.1	0.1	0.5
Nitrite + Nitrate (as N)	10	10	50
Phenol	2.0	2.0	10
Selenium	0.05	0.05	0.25
Sulfate	1250	1250	2500
Thallium	0.002	0.002	0.01
Vanadium	0.03	0.03	0.15
Zinc	25	25	50

Other Industrial Byproduct Characterization

Totals Analyses	Category 1
Parameter	mg/kg
Aluminum	73100
Antimony	97.3
Arsenic	8
Barium	8600
Beryllium	122
Boron	43600
Cadmium	104
Chromium, Hex.	1.9
Cobalt	32.5
Copper	9730
Lead	52
Manganese	2937
Mercury	13.7
Molybdenum	1220
Nickel	264
Selenium	1210
Silver	1220
Strontium	146000
Thallium	2.4
Vanadium	773
Zinc	73000
Acenaphthene	9420
Anthracene	47100
Benz(a)anthracene	19.9
Benzo(a)pyrene	2
Benzo(b)fluoranthene	20
Benzo(k)fluoranthene	200
Chrysene	2000
Dibenzo(ah)anthracene	2
Flouranthene	6280
Flourene	6280
Indeno(123-cd)pyrene	20
1-methyl naphthalene	75.8
2-methylnaphthalene	628
Naphthalene	25.1
Pyrene	4710

Beneficial Use Methods		Industrial Byproduct Category			
		4	3	2	1
NR 538.10		4	3	2	1
(1)	Encapsulated Uses	x	x	x	x
(2)	Waste Stabilization / Solidification	x	x	x	x
(3)	Supplemental Fuel Source / Energy Recovery	x	x	x	x
(4)	Landfill Daily Cover / Internal Structures at landfills having a leachate collection system	x	x	x	x
(5)	Confined Geotechnical Fill (a) commercial, industrial or institutional building subgrade fill (b) paved lot subgrade fill (c) paved roadway subgrade fill (d) base aggregates (f) tank, vault or tunnel abandonment (g) slabjacking material (h) soil and pavement base stabilization for structural improvements listed in (5)(a) - (c) (i) controlled low strength material (flowable fill) for structural improvements listed in (5)(a), (d), (e) and (f)		x	x	x
(6)	Feed and Manure Storage Structures			x	x
(7)	Transportation Facility Embankment			x	x
(8)	Unconfined Geotechnical Fill			x	x
(9)	Nonmetallic Mine Reclamation			x	x
(10)	Unbonded Surface Course				x
(11)	Bonded Surface Course			x	x
(12)	Cold Weather Abrasive				x
(13)	Blasting Grit/Abrasive	x	x	x	x
(14)	Soil or Plant Additives ¹				

1- Soil and plant additives must be tested in accordance with s. NR 538.10(15)