

### **Alternative 3**

Eliminate all potential beneficial uses that have the potential for significant inhalation/ingestion exposure.

- This alternative would no longer require sampling byproduct materials for totals. The only applicable exposure pathway would be through groundwater (water leach test),
- However, it would mean elimination of unbonded surface course and winter road abrasives as acceptable beneficial uses under s. NR 538.10 Wis. Adm. Code,
- As with Alternative 2, this alternative will require measures to limit potential exposures to byproduct material prior to the establishment of a final cover.

**Table 1**

**Coal Ash Industrial Byproduct Characterization**

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

**Table 2**

**Foundry System Sand Industrial Byproduct Characterization**

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

**Table 3**

**Ferrous and Steel Slag Industrial Byproduct Characterization**

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

**Table 4**

**FGD Byproduct Industrial Byproduct Characterization**

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

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**

<b>Totals Analyses</b>	
<b>Parameter</b>	<b>mg/kg</b>
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**

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

Beneficial Use Methods		Industrial Byproduct Category		
		3	2	1
<b>NR 538.10</b>		<b>3</b>	<b>2</b>	<b>1</b>
(1)	Encapsulated Uses	x	x	x
(2)	Waste Stabilization / Solidification	x	x	x
(3)	Supplemental Fuel Source / Energy Recovery	x	x	x
(4)	Landfill Daily Cover / Internal Structures at landfills having a leachate collection system	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
(6)	Feed and Manure Storage Structures			x
(7)	Transportation Facility Embankment			x
(8)	Unconfined Geotechnical Fill			x
(9)	Nonmetallic Mine Reclamation			x
<del>(10)</del>	<del>Unbonded Surface Course</del>			*
(11)	Bonded Surface Course			x
<del>(12)</del>	<del>Cold Weather Abrasive</del>			*
(13)	Blasting Grit/Abrasive	x	x	x
(14)	Soil or Plant Additives <sup>1</sup>			

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