

TABLE 6.4 FINE COAL REFUSE CHARACTERIZATION – SUMMARY OF AVERAGE/RANGE OF VALUES

Reference	Location	Grain Size		Atterberg Limits			Specific Gravity G_s (gm/cm ³)	Effective Shear Strength	
		Passing No. 40 Sieve (%)	Passing No. 200 Sieve (%)	LL (%)	PL (%)	PI (%)		ϕ' (degrees)	c' (psf)
Almes and Butail (1976)	PA, WV, KY, VA	64-100	36-47	20-40	NR ⁽¹⁾	<10	1.55-1.65	29-34	0
McCutcheon (1983)	OH	81	46	29	22	7	1.85	36	0
Qiu and Sego (2001)	Western Canada	90	66	40	24	16	1.94	32	200
Hegazy et al. (2004)	PA	65-100	58	31	20	11	1.52	33	230
Genes et al. (2000)	WV	NR	16-90	NR	NR	<12	1.44-2.37	23-36	0
Cowherd and Corda (1998)	NR	NR	24-91	23-39	NR	0-9	1.4-2.1	NR	NR
Huang et al. (1987)	KY, OH, PA, TN, VA, WV	NR	27-95	22-44	NR	0-12	1.52-2.14	NR	NR
Busch et al. (1974,1975)	WV	50-98	10-60	34-51	NR	0-13	1.45-2.07	NR	NR
Backer et al. (1977)	UT, NM	60-100	16-98	NR	NR	NR	1.33-2.07	NR	NR
Ullrich et al. (1991)	KY, TN, OH	45-95	25-85	31-44	NR	0-31	1.8-2.5	NR	NR
Zeng and Goble (2008)	Appalachian Region	75-85	40-62	27-36	21-26	3-11	2.02-2.16	NR	NR

Note: 1. NR = not reported

6.2.3.4 Borrow Materials

Borrow materials are those soil and rock materials used in an embankment to meet specific design criteria. Borrow materials are used principally for:

- Starter dam construction
- Filters and drainage zones
- Impervious zones
- Sedimentation pond embankments
- Erosion protection
- Buttresses
- Reclamation cover

For economical designs, most borrow materials are obtained at the site or from suitable nearby mine spoil. Materials for filters, drains, and erosion protection are typically obtained from commercial sources.