## Kingston Fossil Plant - Summary of Gypsum Disposal Options

| | DESCRIPTION | POTENTIAL VOLUME[1] (million cy) | SITE PREP COSTS[6,7] (1000S) | COSTS PER CUBIC YARD | PERMITTING ISSUES | ADVANTAGES | DISADVANTAGES |
|---|---|---|---|---|---|---|---|
| 1A | New facility located in greenfield site at the peninsula area | 3:1 Slope: 9.3<br>4:1 slope: 7.5 | $9,400[2,4] | ▪ $ 1.01 For 3:1<br>▪ $ 1.25 For 4:1 | ▪ Karst geology makes permitting complex but not impossible. Will require individual 404 permit | ▪ Adds additional disposal capacity to plant.<br>▪ Can be permitted now but may not be permit able in the future. | ▪ Unknown extent of soft soil layer may reduce stack height and volume; foundation drain beneath liner may be required.<br>▪ May have major opposition from lakefront home owners |
| 1B | New facility located in greenfield site at the peninsula area – reduced footprint | 3:1 Slope: 7.0<br>4:1 slope: Not computed | $7,400[2,4] | ▪ $ 1.06 for 3:1 | ▪ Avoids 404 permitting issue. | ▪ Adds additional disposal capacity to plant<br>▪ Smaller footprint may offset disadvantages associated with underlying soft soils.<br>▪ Avoids 404 Permit. | ▪ Unknown extent of soft soil layer may reduce stack height and volume; foundation drain beneath liner may be required.<br>▪ Smaller footprint sacrifices about 30% volume compared with 1A. |
| 2A | Gypsum stack segregated from ash stack; gypsum co-located with ash disposal in existing ash pond – conversion to dry ash | 3:1 Slope: 12.1<br>4:1 slope: 9.8 | $25,000[3,5] | ▪ $ 2.07 for 3:1<br>▪ $ 2.55 for 4:1 | ▪ Will require a major permit modification with full permit package but will not require a full HydroGeo report. | ▪ Site is favorable for wet stacking.<br>▪ Disposal volume is greater than either Option 1A or 1B. .<br>▪ Should be easy to permit. | ▪ Does not add disposal capacity to plant.<br>▪ Additional costs required for dry stacking ash. |
| 2B | Gypsum stack and ash stack combined; gypsum co-located with ash disposal in existing ash pond – conversion to dry ash | 3:1 Slope: 18.7<br>4:1 slope: 15.2 | $23,000[3,5] | ▪ $ 1.23 for 3:1<br>▪ $ 1.51 for 4:1 | ▪ Same as 2A. | ▪ Offers the largest potential for disposal volume.<br>▪ Site is favorable for wet stacking.<br>▪ Should be easy to permit. | ▪ Does not add disposal capacity to plant.<br>▪ Additional costs required for dry stacking ash. |
| 3A | Gypsum stack segregated from ash stack; gypsum co-located with ash disposal in existing ash pond – continue wet ash stacking | 3:1 Slope: 12.1<br>4:1 slope: 9.8 | $25,000[3,5] | ▪ $ 2.07 for 3:1<br>▪ $ 2.55 for 4:1 | ▪ Same as 2A. | ▪ Site is favorable for wet stacking.<br>▪ Disposal volume is greater than either Option 1A or 1B.<br>▪ Should be easy to permit. | ▪ Does not add disposal capacity to plant.<br>▪ Labor intensive. |
| 3B | Gypsum stack and ash stack combined; gypsum co-located with ash disposal in existing ash pond – continue wet ash stacking | 3:1 Slope: 18.7<br>4:1 slope: 15.2 | $23,000[3,5] | ▪ $ 1.23 for 3:1<br>▪ $ 1.51 for 4:1 | ▪ Same as 2A. | ▪ Offers the largest potential for disposal volume.<br>▪ Site is favorable for wet stacking.<br>▪ Should be easy to permit. | ▪ Does not add disposal capacity to plant.<br>▪ Labor intensive |

Footnotes: (see next page)

**Footnotes**

1. Volume is measured in cubic yards. Gypsum production estimates are measured in tons. A density of 1 ton/cy (approx 75 lb/cf) is assumed for the study.
2. Costs for Options 1A and 1B do not include a foundation drain beneath the facility liner.
3. Costs for Options 2A,2B, 3A,3B include costs for a 4 foot thick underdrain installed beneath the gypsum (installed at CUF). This represents a significant cost difference (about 20% of the total). Detailed design can address the appropriate size of the underdrain.
4. Additional costs for addressing karst issues are unknown.
5. Due to similarity between Options 2 and 3, costs developed for Option 2 are essentially the same for Option 3.
6. Costs don't include drainage features built into the stack as it develops. Closure costs are also excluded. The cost of dry flash conversion is not included with the costs of 2A& 2B.
7. **IT IS HIGHLY PROBABLE THAT THE COSTS FOR THE POND OPTIONS CAN BE REDUCED CONSIDERABLELY.**