3.2. INCREMENTAL HG CONTROL ON A LIGNITE UNIT

As mentioned previously, S&L is not aware of anydocumented evidence of a lignite unit achieving 1.2 lb/TBtu or below. As such, the following sections describe issues that need to be resolved/tested to establish if it is feasible to achieve a 1.2 lb/TBtu Hg emission rate with sufficient operating margin on a lignite unit and if so, develop an overall Hg compliance approach that likely would consist of a suite of control approaches It should be noted that any achievable Hg emission should not be construed to represent an enforceable regulatory or proposed permit limit. Corresponding regulatory and/or permit limits must be evaluated on a control system-specific basis taking into consideration normal operating and coal variability (i.e., a minimum additional 20% margin or higher would likely be needed to account for coal fluctuations and operating margin).

3.2.1. Increased Oxidation of Elemental Hg

Recent 2011 Hg speciation data measured at the Unit 2 stack, with no control technologies, indicated the Hg emissions consisted of approximately 98.3% elemental Hg, 0.8% oxidized Hg, and 0.9% particulate Hg. Recent operating data from a retired Hg process monitor indicates that the Unit 2 Hg emissions, with the currently installed Hg control technologies, consisted of approximately 86% elemental Hg, and 14% oxidized Hg. Because the current Hg emissions are made up mostly of elemental Hg, the unit emissions would benefit from an increased amount of halogen in an attempt to oxidize the elemental Hg in the flue gas. The additional halogen (chlorine, iodine, and bromine) can be added to the PAC, to the coal, or both.

The current fuel additive injection could be increased and/or replaced with a different halogen-based additive. In addition, the current non-halogenated PAC would be replaced with a more expensive halogenated PAC. The increased amount of halogen present is expected to increase the amount of elemental Hg that is oxidized to be more easily captured on the surface area of the PAC and in downstream APC.[4]

3.2.2. Increased PAC

It is anticipated that additional halogenated PAC (i.e. more than the current capabilities of the existing equipment) will need to be injected for the increased amount of oxidized Hg to be efficiently captured. However, preliminary feedback received from PAC suppliers have indicated that demonstration testing would be required to determine a PAC dosage rate and the emissions rate that can be achieved when considering the Hg content variability of the lignite Therefore, additional modifications that may be required cannot be concluded at this time; however, it is likely that the existing lances and transport piping would need to be replaced to accommodate a higher injection rate. As the existing PAC storage silo is shared by Units 1 and 2, it is likely that a separate silo would be required for Unit 2 to ensure adequate supply, turndown flexibility and reliability is achieved to maintain compliance with a defined Hg emission limit.

The degree of increased PAC injection rates can have an impact on the ESP performance as the increased amount of carbon particles that have low resistivity will decrease the overall resistivity of the fly ash (can cause particles to rapidly lose their charge on arrival at the collecting plate and become re-entrained). If/when

[4] It should be noted that the existing PAC silo is not currently compatible to store halogenated PAC due to the material of construction of the fluidizing air nozzles and may also require an internal coating of the silo to prevent corrosion. Additional assessment will be required to determine modifications required to reuse the existing silo, and may be subject to the brominated PAC utilized.