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Subject: Costs/Impacts of the Subpart MM Residual Risk and Technology Review
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I. Introduction

Section 112(f)(2) of the Clean Air Act (CAA) directs the U.S. Environmental Protection Agency (EPA) to conduct risk assessments on each source category subject to maximum achievable control technology (MACT) standards and determine if additional standards are needed to reduce residual risks from the remaining hazardous air pollutant (HAP) emissions from the category. Section 112(d)(6) of the CAA requires the EPA to review and revise the MACT standards, as necessary, taking into account developments in practices, processes, and control technologies. The section 112(f)(2) residual risk review and section 112(d)(6) technology review are to be done 8 years after promulgation. The national emissions standards for hazardous air pollutants (NESHAP) for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills (40 CFR part 63, subpart MM), originally promulgated on January 12, 2001, is due for residual risk and technology review (RTR) under CAA sections 112(f)(2) and 112(d)(6).

The purpose of this memorandum is to estimate the costs, emissions reductions, and environmental and energy impacts associated with the subpart MM RTR for existing process units. Separate memoranda document development of the inventory of process units and control equipment used in the subpart MM RTR (RTI 2016a) and project the number of new and reconstructed process units that may trigger new source MACT in the 5-year period following the applicability date for the subpart MM RTR (RTI 2016b).

II. Regulatory Options for the Subpart MM RTR

Table 1 summarizes the baseline NESHAP requirements in subpart MM and the regulatory options under consideration for the RTR. Separate memoranda document the data reviewed and technological basis for these regulatory options. (RTI 2016c, EPA 2016a) Table 1 also summarizes the basis for the costs estimated for each regulatory option which are described in the next section of this memo. No changes are under consideration as a result of the RTR for kraft or soda smelt dissolving tanks (SDTs) or sulfite or semichemical combustion units.

Table 1. Baseline Technologies, Regulatory Options, and Cost Basis for the Subpart MM RTR

Process unit type/pollutant	Baseline technology and subpart MM standard	Regulatory options for the RTR	Cost basis
Kraft and soda recovery furnace gaseous organic HAP	No limit (existing sources)	Option 1: No change (no existing source limit added for RTR); no change for new sources	No costs/impacts
	0.025 lb of gaseous organic HAP (as methanol) per ton of BLS (new sources)	Option 2: Develop single limit for existing recovery furnaces based on average of best-performing 12% of recovery furnaces (expected to be NDCE recovery furnace with dry ESP system based on available emissions data); no change for new sources	Assuming no DCE furnace systems (DCE+BLO) could meet the limit, the cost basis is: <ul style="list-style-type: none"> ○ Conversion of 12 DCE furnaces to NDCE furnaces, based on DCE furnace age < 40 years and/or furnace size > 2.5 million lb BLS/day. Furnace conversion includes removal of BLO unit, upgrade of ESP, conversion of ESP from wet to dry system, new concentrator, new economizer, etc. ○ Replacement of 22 DCE furnaces with NDCE furnaces, based on DCE furnace age > 40 years and/or furnace size < 2.5 MM lb BLS/day. Furnace replacement includes removal of BLO unit, replacement of SDT, replacement of ESP, new concentrator, new economizer, etc. ○ Shutdown of 2 DCE furnaces currently not operating; no cost estimated.
		Option 3: Develop separate limits for existing DCE recovery furnaces and existing NDCE recovery furnaces based on average of best-performing 12% of sources for each furnace type (expected to be DCE recovery furnace with BLO unit and NDCE recovery furnace with dry ESP system based on available emissions data); no change for new sources	For DCE furnaces unable to meet the limit, the cost basis is furnace conversion/replacement (as described above). For NDCE furnaces with wet-bottom ESP systems unable to meet the NDCE limit, the cost basis is a wet to dry ESP system conversion.
Kraft and soda recovery furnace opacity	35% opacity, 20% corrective action level, 6% monitoring allowance, quarterly reporting (existing sources)	Option 1: No change for new or existing sources	No cost/impacts
	20% opacity and corrective action level, 6% monitoring allowance, quarterly reporting (new sources)	Option 2: 35% opacity, 20% corrective action level, 2% monitoring allowance, semiannual reporting.	-ESP maintenance/testing for 1 existing sources; -No change for new sources ¹

Process unit type/pollutant	Baseline technology and subpart MM standard	Regulatory options for the RTR	Cost basis
<i>Kraft and soda recovery furnace opacity, cont'd</i>		Option 3: 20% opacity, 6% monitoring allowance, quarterly reporting.	-ESP maintenance/testing for 4 existing sources; -ESP upgrade for 4 existing recovery furnaces; -No change for new sources ¹
		Option 4: 20% opacity, 2% monitoring allowance, semiannual reporting. (Consistent with subpart BBa)	-ESP maintenance/testing for 8 existing sources; -ESP upgrade for 8 existing sources; -No change for new sources ¹
		Option 5: 20% opacity, 2% monitoring allowance, quarterly reporting.	-ESP maintenance/testing for 12 existing sources; -ESP upgrade for 13 existing sources; -No change for new sources ¹
Lime kilns with ESP controls - opacity	20% opacity and corrective action level with 6% allowance, quarterly reporting	Option 1: 20% opacity with a 6 percent monitoring allowance, quarterly reporting (no change).	No change for opacity monitoring.
		Option 2: 20% opacity with a 1 percent monitoring allowance, semiannual reporting. (Consistent with subpart BBa)	ESP maintenance/testing for 2 kilns
		Option 3: 20% opacity with a 1 percent monitoring allowance, quarterly reporting.	ESP maintenance/testing for 2 kilns
ESP-controlled recovery furnaces and lime kilns	No ESP parameter monitoring (opacity monitoring only)	Add ESP parameter monitoring (voltage and current) to indicate compliance during times when the opacity monitoring allowance is used for existing and new sources.	Added ESP parameter monitoring cost for all existing and new ESP-controlled recovery furnaces and lime kilns.
Wet-scrubber controlled emissions units	Scrubber pressure drop and liquid flow rate are required to be monitored continuously, except during SSM.	Add liquid flow rate monitoring during SSM.	No change in equipment cost

HAP = hazardous air pollutant, lb = pound, BLS = black liquor solids, NDCE = non-direct contact evaporator, ESP = electrostatic precipitator, DCE = direct contact evaporator, BLO = black liquor oxidation, SSM = startup, shutdown, and malfunction

1. No ESP upgrades would be required as a result of the opacity options for the two projected new NDCE recovery furnaces replacing 3 existing DCE furnaces because 20% opacity is already required under subpart MM, and subpart BBa requires 20% opacity and a 2% monitoring allowance.

III. Costs of the Subpart MM RTR Options

The costs associated with the subpart MM RTR regulatory options are incremental costs (i.e., the additional cost associated with complying with a more stringent limit or additional requirement beyond that required under the current subpart MM MACT). Appendix A at the end of this memorandum presents the mill-specific and nationwide costs and emissions reductions for each of the regulatory options.

A. Costs of Gaseous Organic HAP Regulatory Options for Kraft/Soda Furnaces

Costs were estimated for the three gaseous organic HAP regulatory options identified in Table 1. The basis for the cost estimates is discussed in the paragraphs below.

1. Regulatory Option 1

The first regulatory option includes no change from the original MACT (i.e., no existing source limit added for the RTR). Therefore, the cost for this option is zero.

2. Regulatory Option 2

For the second regulatory option--develop a single existing source limit for all recovery furnaces--all direct contact evaporator (DCE) recovery furnace systems were assumed impacted under the regulatory option because the existing source limit for recovery furnaces would be based on the much lower emissions for a non-direct contact evaporator (NDCE) recovery furnace with a dry electrostatic precipitator (ESP) system. (Note: A DCE recovery furnace system is defined as a DCE recovery furnace and its associated black liquor oxidation [BLO] unit. A dry ESP system is defined as a dry-bottom ESP with a dry particulate matter [PM] return system.)

Costs to reduce gaseous organic HAP emissions were applied to all 36 DCE recovery furnaces. Furnace conversion costs were applied to 12 DCE recovery furnaces with a furnace age less than 40 years and/or furnace size greater than 2.5 million pounds of black liquor solids per day (lb BLS/day), based on the assumption that mills would seek to convert, rather than replace, larger, recovery furnaces that have not far exceeded their useful life. Furnace replacement costs were applied to 22 DCE recovery furnaces with a furnace age greater than 40 years and/or furnace size less than 2.5 MM lb BLS/day, based on the assumption that mills would seek to replace older DCE recovery furnaces and replace 2 or more, smaller DCE recovery furnaces with 1 large NDCE recovery furnace. No costs were applied to the 2 DCE recovery furnaces that are currently not operating or the 3 DCE recovery furnaces that are already expected to be replaced with new NDCE recovery furnaces in the new source projections for the subpart MM RTR. (RTI 2016b) The costs for each DCE recovery furnace were then summed to determine nationwide costs. The cost estimates were developed in 2015 dollars. The documentation for the costs is presented in Appendix B1.

The DCE recovery furnace conversion and replacement costs were developed based on cost data from the following sources:

- 2001 base year cost estimates for DCE furnace conversions prepared by BE&K Engineering for the American Forest and Paper Association (AF&PA). (BE&K 2001)
- 2008 base year cost estimates for DCE furnace replacements prepared by Andover Technology Partners based on furnace replacement cost information from the PCA Valdosta, GA mill. (Andover 2010)
- Current base year cost estimates for DCE furnace conversions and replacements prepared by AECOM for AF&PA. (AECOM 2016)

These cost data are discussed separately in the paragraphs below. In each case, we added annual costs for property taxes, insurance, and administrative charges (estimated at 4 percent of total capital cost) and capital recovery (estimated as the product of a capital recovery factor [CRF] and total capital cost) to these cost data, based on guidance in the *EPA Air Pollution Control Cost Manual*. (EPA 2002) The capital recovery factor was calculated as follows, assuming a 7 percent interest rate and a 20-year remaining equipment life for DCE furnace conversions and 40-year equipment life for DCE furnace replacements:

Equation 1--Capital recovery factor:

$$\text{CRF} = [\text{interest rate} * (1 + \text{interest rate})^{\text{equip. life}}] / [(1 + \text{interest rate})^{\text{equip. life}} - 1]$$

BE&K. The BE&K capital costs for DCE furnace conversion were updated from 2001 to 2015 dollars using ratios of the Chemical Engineering Plant Cost Index (CEPCI) for those years, specifically 556.8 for the year 2015 and 394.3 for the year 2001. (CE 2016) We added pulp production losses to these costs based on a cost algorithm from the subpart MM technical support document (EPA 1996), updating the pulp market price from 1989 to 2015 dollars using ratios of the Consumer Price Index (CPI), specifically 237.07 for the year 2015 and 124.0 for the year 1989. (BLS 2016a) The downtime period associated with the DCE furnace conversion was assumed to be 20 days.

The BE&K annual costs for DCE furnace conversion included costs for maintenance and materials, energy, labor, testing, and utilities. The maintenance and materials cost was calculated as 3 percent of the updated capital cost (minus the pulp production losses). The energy cost was calculated based on 450 kilowatts (kW) of power, 70 percent power usage, and 350 days per year (BE&K 2001), but was updated using the latest electricity price (\$0.0647 per kilowatt-hour [kWh]) from the U.S. Energy Information Administration for the entire U.S (EIA 2016). The labor cost was calculated based on 3 hours per day and 350 days per year (BE&K 2001), but was updated using the latest labor rate (\$27.22/hr) from the U.S. Bureau of Labor Statistics for Plant and System Operators for the North American Industry Classification System (NAICS) code 322100 (Pulp, Paper, and Paperboard Mills) (BLS 2016b). The testing cost for each recovery furnace was updated to \$24,000 to encompass PM and gaseous organic HAP testing costs. The utilities cost was calculated based on 26,984 pounds per hour (lb/hr) of steam, a 50 percent recovered steam factor, 350 days per year, and a steam unit cost of \$0.005/lb steam. (BE&K 2001) This cost was not updated, following a recent web search that found similar unit costs for steam.

Andover. The Andover capital costs for DCE furnace replacement were updated from 2008 to 2015 dollars using ratios of the CEPCI for those years, specifically 556.8 for the year

2015 and 575.4 for the year 2008. The Andover annual costs for DCE furnace replacement included costs for maintenance, fuel, and power (a cost savings), based on 6.8 percent of capital cost. (Andover 2010) Costs for labor and testing were added from the BE&K cost estimate described above.

AECOM. AECOM provided DCE furnace conversion costs for two mills (A and B) and DCE furnace replacement costs for two other mills (C and D). (AECOM 2016) For Mills C and D, a single NDCE recovery furnace was installed to replace two and three DCE recovery furnaces, respectively. We revised the capital costs for Mill A to include costs for ESP upgrade and wet to dry ESP system conversion, based on costs developed by BE&K, and updated the costs to 2015 dollars using the aforementioned CEPCI. We revised the capital costs for all four mills to include pulp production losses, similar to how we revised the BE&K capital costs (except to include a longer, 45-day downtime period specifically mentioned for Mill B).

We added annual costs to the AECOM estimates for Mills A and B using the aforementioned cost data from BE&K, specifically their annual cost estimates for maintenance and materials, energy, labor, testing, and utilities. The annual cost estimate for Mill D included estimates for purchased electricity savings, energy savings, and chemical savings. We calculated labor savings based on (1) the mill's estimate that operating labor was reduced by three positions on each of four shift crews, (2) the BE&K estimate of 350 days operating time, and (3) the latest labor rate (\$27.22/hr) from the U.S. Bureau of Labor Statistics (BLS 2016b). We also added an annual testing cost (\$24,000 per recovery furnace) to this cost estimate. In the absence of annual cost data for Mill C, we applied the annual costs for Mill D, adjusted based on furnace size and assuming the elimination of two positions instead of three.

Applying costs to the inventory. Two sets of capital and annual costs were applied to the DCE recovery furnaces in the inventory--one based on BE&K/Andover estimates and another based on AECOM estimates. Based on a review of the cost estimates calculated from both sources, the BE&K/Andover estimates appear to be on the lower end on the range of cost estimates, while the AECOM estimates appear to be on the upper end. (A conversation with representatives from one mill suggests that the AECOM estimates may include a more complete set of the various costs associated with a DCE furnace conversion. [RTI 2016d])

The Mill A and B costs for DCE furnace conversion were averaged together to provide a single number in the inventory. The Mill C costs for DCE furnace replacement were used where one or two DCE recovery furnaces are projected to be replaced by a single NDCE recovery furnace. The Mill D costs for DCE furnace replacement were used where three DCE recovery furnaces are projected to be replaced by a single NDCE recovery furnace.

In all cases, the capital costs were scaled to apply to each DCE recovery furnace in the inventory using the six-tenths cost rule, shown below:

Equation 2--Six-tenths cost rule:

$C1/C2 = (Q1/Q2)^{0.6}$, where C is cost and Q is capacity parameter, such as black liquor solids firing rate

The capital and annual costs for a single NDCE recovery furnace replacing multiple DCE furnaces were based on the total throughput of the DCE furnaces. The total costs were apportioned to each DCE recovery furnace in the inventory by ratioing the black liquor solids

firing rate. This allowed for relation of costs of the replacement NDCE with the emissions reduction achieved by converting each DCE unit to NDCE technology.

Cost-effectiveness calculation. Once the costs were assigned to each DCE recovery furnace, the costs and emissions reductions associated with each recovery furnaces were summed to arrive at a nationwide total. The nationwide cost effectiveness of the regulatory option was then estimated by dividing the nationwide annualized cost by the associated nationwide emissions reduction. (The calculation of emissions reductions is discussed in Section V below.) Appendix A summarizes the nationwide and mill-specific costs and emissions reductions for the regulatory option.

3. Regulatory Option 3

For the third regulatory option—separate limits for existing DCE recovery furnaces and existing NDCE recovery furnaces—we evaluated the costs for all DCE recovery furnaces and all NDCE recovery furnaces with wet-bottom ESPs which are likely to be impacted under this regulatory option, and then evaluated the site-specific capital and annualized costs.¹ The costs for DCE furnace conversions and replacements have already been estimated under Regulatory Option 2. The costs for wet to dry ESP system conversions for the NDCE recovery furnaces were estimated using cost information from BE&K (BE&K 2001), updated from 2001 to 2015 dollars using the CEPCI, specifically 556.8 for the year 2015 and 394.3 for the year 2001. (CE 2016) Based on a previous analysis (EPA 1996), the ESP conversions are expected to occur during the annual maintenance shutdown, so no pulp production losses are expected to be incurred.

The BE&K annual costs for ESP conversion included costs for maintenance and materials, energy, labor, and testing, with the maintenance and materials cost calculated as 2 percent of the updated capital cost. (BE&K 2001) The energy cost was calculated based on 15 kW power, 70 percent power usage, and 350 days per year (BE&K 2001), but was updated using the latest electricity price (\$0.0647/kWh) from the U.S. Energy Information Administration for the entire U.S. (EIA 2016) The labor cost was calculated based on 1.5 hours per day and 350 days per year (BE&K 2001), but was updated using the latest labor rate (\$27.22/hr) from the U.S. Bureau of Labor Statistics for Plant and System Operators for NAICS code 322100 (Pulp, Paper, and Paperboard Mills) (BLS 2016b). The testing cost for each recovery furnace was updated to \$24,000 to include PM and gaseous organic HAP testing. We also added annual costs for property taxes, insurance, and administrative charges (estimated at 4 percent of total capital cost) and capital recovery (estimated as the product of a CRF and total capital cost) to these cost data (based on guidance in the *EPA Air Pollution Control Cost Manual*). (EPA 2002) The capital recovery factor was calculated using Equation 1 above, assuming a 7 percent interest rate and a 20-year remaining equipment life for the ESP conversions. Appendix B1 presents the cost equations.

¹ It is noted that the actual number of impacted DCE and NDCE recovery furnaces would be dependent on the specific methodology used to establish a gaseous organic HAP emission limit (e.g., some DCE furnaces would be able to meet a DCE-specific emission limit, while additional NDCE furnaces could be impacted due to process variability factors beyond use of a dry-bottom ESP).

The capital cost for ESP conversion was scaled to apply to the 14 NDCE recovery furnaces in the inventory with wet-bottom ESPs using the six-tenths cost rule, shown in Equation 2 above. Because the aforementioned annual cost for energy is a function of gas flow rate, and gas flow rate is proportional to a capacity parameter such as black liquor solids firing rate, these annual costs were adapted to apply to each NDCE recovery furnace in the inventory with a wet-bottom ESP by ratioing the black liquor solids firing rate.

Once the costs were assigned to each NDCE recovery furnace with a wet-bottom ESP, the costs were summed to arrive at a nationwide total, and the cost effectiveness of the regulatory option was estimated by dividing the nationwide annualized cost by the associated nationwide emissions reductions. (The calculation of emissions reductions is discussed in Section V below.) Appendix A summarizes the nationwide and mill-specific costs and emissions reductions for the regulatory option.

B. Costs of Opacity Options for Kraft/Soda Recovery Furnaces and Lime Kilns

The analysis of continuous opacity monitoring system (COMS) data for recovery furnaces and lime kilns used to determine the affected emission units is documented in a separate memorandum. (EPA 2016a) Recovery furnaces and ESP-controlled lime kilns that did not meet the regulatory options were assumed to require ESP maintenance and testing to improve opacity performance, or an ESP upgrade. The PM performance levels for emission units not meeting the opacity limits under consideration in at least one reporting period were reviewed. If the PM performance level achieved met the PM performance expected from an upgraded ESP--0.015 grain per dry standard cubic foot (gr/dscf) for recovery furnaces or 0.01 gr/dscf for lime kilns--then it was assumed that the ESP would only require improved annual maintenance and testing to achieve the opacity options. Otherwise, units were assumed to require an ESP upgrade to meet the opacity options. The ESP upgrade costs were estimated based on BE&K 2001 and scaled to 2015 dollars. The capital costs were scaled to apply to each affected unit in the inventory using the six-tenths cost rule. The capital and annualized cost equations for the recovery furnace and lime kiln ESP upgrades are documented in Appendix B2.

Recovery furnace ESP upgrade costs were estimated for adding two parallel fields to an existing ESP. For lime kilns, the costs of were based on adding one field to the existing ESP. The specific recovery furnaces or lime kilns estimated to be impacted by each regulatory option were identified in the analysis of COMS data documented in EPA 2016a. The capital and annualized costs were applied to each impacted unit and summed to arrive at nationwide costs.

The ESP maintenance and testing costs from Appendix B2 were applied for recovery furnaces and lime kilns already achieving a PM performance level associated with an upgraded ESP. No emissions reduction was associated with these emission units.

C. ESP Parameter Monitoring Costs for Kraft/Soda Furnaces and Lime Kilns

The proposed revisions to subpart MM would require monitoring of ESP secondary voltage and secondary current to indicate ongoing compliance at all times, including times when the opacity monitoring allowance is used. The capital cost for ESP parameter monitoring was estimated to be \$31,000. (RTI 2013) Annual costs associated with ESP parameter monitoring

were estimated to be \$3,400 for capital recovery (assuming a 15-year life and 7 percent interest rate) plus \$4,200 for operation and maintenance of the monitor, which includes 3.5 percent of capital for maintenance and materials, 6 percent for overhead, and 4 percent for taxes, insurance, and administration. Thus, total annualized costs for ESP parameter monitors was estimated to be \$7,600. These costs were applied to every existing and projected new ESP control system used on a recovery furnace or lime kiln.

D. Periodic Emissions Testing Costs for All Subpart MM Emission Units

Emissions compliance testing costs were treated as capital costs because mills will contract with a testing company to perform the testing. The capital costs were annualized at 7 percent interest over the 5-year testing period, assuming that mills would obtain a 5-year loan to finance the testing. Table 2 presents estimated emissions testing costs. The testing costs in Table 2 include costs associated with entering information into the EPA’s Electronic Reporting Tool (ERT) for the test methods currently supported in the ERT (Method 5 and Method 25A).

Table 2. Emissions Testing Costs by Mill Process

Process unit type	Subpart MM standard	Test method (surrogate pollutant)	Capital cost per test every 5 years	Annualized capital cost per test, \$/yr ¹
Kraft and soda recovery furnaces, lime kilns, and SDTs	Metal HAP	Method 5 (PM)	\$10,000	\$2,440
Sulfite mill chemical recovery combustion units	Metal HAP	Method 5 (PM)	\$10,000	\$2,440
Kraft and soda recovery furnaces (new sources)	Gaseous organic HAP	Method 308 (Methanol)	\$14,000	\$3,410
Semichemical mills	Gaseous organic HAP	Method 25A (THC)	\$14,000	\$3,410

SDT = smelt dissolving tank, HAP = hazardous air pollutant, PM = particulate matter, THC = total hydrocarbon
 1. Annualized over the 5 year testing period at 7% interest (CRF=0.244)

E. Labor-related Costs

The labor-related costs estimated include changes in operating labor associated with equipment changes or incremental reporting and recordkeeping (R&R) changes. Operating labor costs are included in the annual equipment operating costs. The annual pulp mill labor hours are summarized in Table 3.

Incremental reporting and recordkeeping (R&R) labor hours and costs were developed as part of the Paperwork Reduction Act supporting statement. Reporting and recordkeeping labor costs include data acquisition system adjustments to include startup and shutdown periods. Details on these cost estimates, as well as an accounting for the labor hours involved, can be found in Table 3 of this memorandum and in the supporting statement for subpart MM. (EPA 2016b)

Table 3. Incremental R&R Costs for Inclusion in the Cost Impact Analysis and Estimates of Labor Impacts¹

Labor cost item	Incremental costs, \$/mill	Incremental annual labor, hr/yr	Mills impacted
Initial labor costs			
R&R: Time to adjust existing data acquisition systems at existing sources to include startup and shutdown periods	\$4,700	40	All mills
Annual labor costs			
ESP upgrade operating labor (1.5 hr/day x 350 d/yr)	Included in equipment costs	525	Kraft and soda mills requiring ESP upgrades to meet the opacity options
Incremental operating labor for recovery furnaces converting from DCE to NDCE technology through low-odor conversion or replacement of a single recovery furnace (3 hr/day x 350 day/yr)	Included in equipment costs	1,050	Selected kraft mills with DCEs
Incremental operating labor when multiple DCE recovery furnaces are replaced with a single new NDCE recovery furnace	Included in equipment costs	-8,400 per position eliminated (1 position per DCE furnace)	Selected kraft mills with DCEs
Wet to dry ESP conversions (1.5 hr/d x 350 d/yr)	Included in equipment costs	525	Mills with WBESP-controlled NDCE furnaces
R&R: ESP parameter monitoring labor (0.25 hr/day x 350 day/yr at \$118.55 composite labor rate used in supporting statement)	\$10,400	88	All kraft and soda mills

R&R = reporting and recordkeeping, ESP = electrostatic precipitator, DCE = direct contact evaporator, NDCE = non-direct contact evaporator, WBESP = wet-bottom ESP

1. Totals may include some rounding error.

IV. Emissions Reductions

Emissions reductions were estimated for the regulatory options identified in Table 1. Appendix C at the end of this memorandum presents the mill-specific and nationwide emissions reductions for each of the regulatory options.

A. Gaseous Organic HAP Regulatory Options

There are no emissions reductions under Regulatory Option 1 for gaseous organic HAP because this option includes no change to the current MACT limit for gaseous organic HAP. To determine the emissions reductions that could be achieved under Regulatory Option 2 for gaseous organic HAP, the percent reductions in gaseous organic HAP and other pollutants expected from DCE furnace conversions/replacements were applied to the baseline emissions for DCE recovery furnaces in the subpart MM inventory. (RTI 2016a)

Based on a comparison of emission factors for DCE and NDCE recovery furnaces in NCASI Technical Bulletin 973 (NCASI 2010), we estimated the following percent reductions:

- 84 percent reduction in emissions of methanol--the predominant gaseous organic HAP emitted from recovery furnaces and surrogate pollutant for the new source limit;

- 58 percent reduction in emissions of total gaseous organic HAP, with the total including those pollutants that account for 99 percent of recovery furnace gaseous organic HAP in the emissions inventory used for residual risk modeling; and
- 73 percent reduction in emissions of total reduced sulfur (TRS) (as sulfur).

The emissions reduction associated with implementing Regulatory Option 2 was treated as 100 percent for BLO units, since BLO units would be removed in the event of a DCE furnace conversion or replacement. The emissions reduction was treated as 0 percent for DCE recovery furnaces already expected to be replaced with NDCE recovery furnaces under new source projections. (RTI 2016b) Emissions and emissions reductions were treated as zero for inactive DCE recovery furnaces and BLO units expected to be removed and for molecular oxygen BLO units that have no system vent (and, therefore, no emissions).

To determine the emissions reductions that could be achieved under Regulatory Option 3 for gaseous organic HAP, the percent reduction expected from wet to dry ESP system conversions was applied to the baseline emissions for NDCE recovery furnaces with wet-bottom ESPs in the subpart MM inventory. (RTI 2016a) (The emissions reductions expected from DCE furnace conversions and replacements were already determined under Regulatory Option 2, and need not be discussed further for this option.) The following percent reductions from EPA 1996 were used to estimate the effects of wet to dry ESP system conversions under Regulatory Option 3:

- 90 percent reduction in emissions of methanol and total gaseous organic HAP; and
- 55 percent reduction in TRS emissions.

B. Recovery Furnace and Lime Kiln Opacity Options

Although no changes are under consideration as part of the RTR for the PM metal HAP limits, ESP upgrades to meet a tighter opacity monitoring limit would have the effect of reducing PM emissions. Recovery furnace upgrade costs were estimated for adding two parallel fields to an existing ESP resulting in a PM performance level of 0.015 gr/dscf at 8 percent oxygen (O₂). For lime kilns, the costs were based on adding one field to the existing ESP to achieve a PM performance level of 0.01 gr/dscf at 10 percent O₂. (BE&K 2001) The potential reduction in PM emissions for each emission unit expected to require an ESP upgrade was estimated by subtracting the PM limit expected to be achieved by the upgraded ESP from the lower of the current PM permit limit or the actual PM performance level for the emission unit. The difference in gr/dscf was converted to tons per year (tpy) using the gas flow rate for each affected unit, as noted in Equation 3a and 3b below.

Equation 3a – Potential PM reduction for recovery furnaces:

Potential recovery furnace PM reduction (tpy) = (the lower of permitted or actual gr/dscf - 0.015 gr/dscf @ 8% O₂) x gas flow rate (dscfm) x (60 min/hr) x (24 hr/d) x (350 d/yr) / (7000 gr/lb) / (2000 lb/ton)

Equation 3b – Potential PM reduction for lime kilns:

Potential lime kiln PM reduction (tpy) = (the lower of permitted or actual gr/dscf - 0.01 gr/dscf @ 10% O₂) x gas flow rate (dscfm) x (60 min/hr) x (24 hr/d) x (350 d/yr) / (7000 gr/lb) / (2000 lb/ton)

The estimated unit-specific PM reductions were summed to arrive at the potential nationwide PM emissions reduction associated with equipment upgrades to achieve the opacity regulatory options. The potential fine PM (PM_{2.5}) reductions were estimated from the PM reductions by applying the following percentages of PM_{2.5} to PM: 45 percent for NDCE recovery furnaces, 59 percent for DCE recovery furnaces, and 40 percent for lime kilns.

Emissions of HAP metals only comprise a small fraction of PM emissions. As documented in Appendix B2, less than half of a percent of the PM emissions are comprised of HAP metals (0.03 percent for recovery furnaces, and 0.48 percent for lime kilns).

No emissions reductions, labor, energy, or secondary air impacts were estimated for emission units already meeting actual PM performance levels expected to be achieved by upgraded ESPs. As mentioned previously, costs associated with additional ESP maintenance and testing were assigned to these units.

V. Energy and Other Environmental Impacts

Energy impacts and other environmental impacts (secondary air emissions, solid waste impacts) were estimated for the regulatory options identified in Table 1. Documentation of the impacts calculation methodology is presented in Appendices B and D. The mill-specific and nationwide impacts for each of the regulatory options are presented in Appendix C.

A. Energy Impacts

The energy impacts of the regulatory options for each affected emission unit were estimated by first dividing the electricity cost/savings of each option by the latest electricity price of \$0.0647/kWh (EIA 2016) and dividing the steam cost/savings (if applicable) by a steam cost of \$0.005/lb steam (BE&K 2001). The annual amount of energy, in million British thermal units per year (MMBtu/yr), needed to generate the electricity was determined by dividing the electricity (kWh/yr) by a nationwide average power plant efficiency of 36 percent and multiplying by a conversion factor of 3,415 Btu/kWh. The estimated amount of energy from the steam (in lb steam/yr) was converted to MMBtu/yr assuming a conversion factor of 1,200 Btu/lb steam (BE&K 2001).

The efficiency for each type of power plant was determined by dividing the heat content of electricity (3,415 Btu/kWh) by the heat rate for each type of plant--10,415 Btu/kWh for coal; 8,185 Btu/kWh for natural gas; 10,452 Btu/kWh for nuclear power; and 9,756 Btu/kWh for renewable energy. The nationwide average power plant efficiency was determined as a weighted average of these power plant efficiencies, based on the projected fuel mix for a 2020 reference case (MJB&A 2016) from Version 5.15 of EPA's Integrated Planning Model (IPM), which is a forecast model of the U.S. electric power sector. The projected fuel mix is 31 percent coal, 33 percent natural gas/other, 18 percent nuclear, and 18 percent renewable/hydroelectric (MJB&A 2016).

Because energy impacts are a function of gas flow rate, and gas flow rate is proportional to a capacity parameter such as black liquor solids firing rate, the energy impacts were adapted to

apply to each affected emission unit in the inventory by ratioing the black liquor solids firing rate. The algorithms in Appendices B1 and B2 include the energy impacts for each model unit.

B. Secondary Air Emissions

Once the energy impacts were determined, the associated secondary air emissions were estimated. Secondary emissions typically include the criteria air pollutant emissions—PM, carbon monoxide (CO), nitrogen oxides (NO_x), and sulfur dioxide (SO₂)—that result from the generation of electricity and steam associated with compliance with regulatory options. For purposes of this analysis, the electricity and steam were assumed to be derived from offsite utilities, rather than generated onsite. Secondary emissions estimates were also developed for mercury (Hg) and the greenhouse gases carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that are expected to be emitted from utilities. The secondary emissions were estimated as follows, by multiplying emission factors for the pollutants by the energy impacts, assuming a specific mix of fuels to generate the needed electricity.

Equation 4--Secondary emissions:

Secondary emissions (tpy) = energy impacts (MMBtu/yr) * [emission factor for solid fuel (lb/MMBtu) * (% of generation for solid fuel) + emission factor for natural gas (lb/MMBtu) * (% of generation for oil/natural gas and other fuel)] * 1 ton/2000 lb

Global warming potentials of 1 for CO₂, 25 for CH₄, and 298 for N₂O were used to estimate CO₂ equivalent (CO₂e) emissions. Appendix D of this memorandum provides the emission factors and other factors used in the energy and secondary impacts calculations and documents the sources of the factors.

Because secondary air emissions are based on energy impacts, and energy impacts are a function of gas flow rate, and gas flow rate is proportional to a capacity parameter such as black liquor solids firing rate, the secondary air emissions were adapted to apply to each affected emission unit in the inventory by ratioing the black liquor solids firing rate.

C. Solid Waste Impacts

An evaluation was also conducted regarding whether the opacity options would have any solid waste impacts. Opacity Options 2 through 4 would reduce opacity monitoring allowances, which could require increased PM control from ESP upgrades. As noted in the technical support document (TSD) for the subpart MM proposal (EPA 1996), the PM catch from the recovery furnace ESP is primarily sodium sulfate (i.e., salt cake) and sodium carbonate. These chemicals are subsequently added to the concentrated black liquor in a mix tank (i.e., recycled back into the process) in order to conserve chemicals. (EPA 1996) The recovery process is assumed to have sufficient capacity to absorb the additional PM resulting from the ESP upgrade. Thus, no solid waste disposal impacts are expected under Opacity Options 2 through 4.

D. Wastewater Impacts

There are no incremental wastewater impacts associated with the regulatory options under consideration for the subpart MM RTR.

VI. Nationwide Costs and Impacts for the Subpart MM RTR

The costs associated with the subpart MM RTR regulatory options are incremental costs (i.e., the additional cost associated with complying with a more stringent limit or additional requirement beyond that required under the current subpart MM rule). Appendix A presents the mill-specific and nationwide costs and emissions reductions for each of the regulatory options. Table 4 summarizes the nationwide incremental costs, emissions reductions, and cost effectiveness of each option. Table 5 presents a summary of nationwide incremental TRS, labor, energy, and secondary air impacts for the subpart MM RTR regulatory options.

Incorporation of new sources. As described in a separate memorandum (RTI 2016b), no new pulp mills are projected to be constructed during the 5-year time period from 2016 to 2021. The only new sources are replacement emission units projected to be installed at three existing kraft pulp mills. It is estimated that the three DCE recovery furnaces (and associated SDTs) will be replaced with NDCE recovery furnaces and new SDTs, one BLO system will be eliminated and another BLO system will reduce throughout, and one lime kiln will be replaced. Table A-6 in Appendix A summarizes the new sources projected to be constructed at existing mills and the characteristics of the new source replacement units. The gaseous organic HAP and opacity regulatory options under consideration for the RTR would result in few incremental costs for the mills with projected new sources. Costs associated with the gaseous organic HAP limit or a reduced (20 percent) opacity limit would have been incurred in the absence of the RTR regulatory action. Thus, the only incremental costs assessed for the new sources are the costs of the additional ESP parameter monitoring requirements for recovery furnaces and lime kilns, the periodic emissions testing costs, and incremental reporting and recordkeeping costs for all subpart MM mills. Because the new source impacts are incurred at existing facilities, they are included in the totals in Tables 4 and 5.

Kraft recovery furnace gaseous organic HAP. A high capital cost of \$1.3 to 3.7 billion is associated with the gaseous organic HAP Option 2, which would involve conversion of the remaining DCE recovery furnaces in the industry to NDCE systems. These costs would be borne by 21 facilities that continue to operate DCE recovery furnaces (and are not already projected to replace these systems in the absence of the RTR). A range of costs is presented based on two information sources: (1) BE&K 2001/Andover 2010, and (2) more recent information collected by AECOM from mills that recently underwent recovery furnace DCE-to-NDCE conversions or replacements. The annualized costs associated with gaseous organic HAP Option 2 are also high, resulting in a high cost effectiveness of \$44,000 to \$159,000 per ton of gaseous organic HAP reduced. Separate cost effectiveness values are presented for methanol because methanol is the predominant organic HAP and a surrogate for measurement of total gaseous organic HAP.

Gaseous organic HAP Option 3 adds to Option 2 costs associated with wet-to-dry bottom ESP conversions for NDCE recovery furnaces at 11 mills. Option 3 would add \$56.1 million to the high capital costs associated with Option 2. The cost effectiveness of converting the remaining wet bottom ESPs in the industry to dry bottom ESPs is \$54,000 per ton of gaseous organic HAP removed.

The total costs for gaseous organic HAP Option 3, including the Option 2 costs are \$1.4 to 3.7 billion in capital cost borne by 32 facilities, to achieve an estimated emissions reduction of 2,922 tpy of gaseous organic HAP at a cost effectiveness of \$45,000 to 153,000 per ton.

Although not HAP, TRS emissions would also be reduced by gaseous organic HAP options 2 and 3. TRS emissions would be reduced by 989 tpy under Option 2 as a result of DCE conversions/replacements with NDCE furnaces, at a cost effectiveness of \$123,000 to \$442,000 per ton. An additional 261 tpy TRS reduction was estimated to be associated with wet to dry bottom ESP conversions under Option 3. The overall cost effectiveness of TRS reductions of Option 3 (which includes the costs and reductions achieved under Option 2) ranges from \$104,000 to \$357,000 per ton of TRS reduced.

Opacity and associated PM reductions. More stringent opacity monitoring limits are under consideration for ESP-controlled recovery furnaces and lime kilns under the RTR based on analysis of COMS data. Potentially impacted units were identified through analysis of the COMS considering the different options for opacity limit (35 or 20 percent opacity), averaging period (quarterly or semiannual), and monitoring allowance (e.g., 6 percent or 2 percent of the opacity 6-minute averages for recovery furnaces). The options and costs of the opacity options are summarized in Table 4. Cost estimates were developed for ESP-controlled recovery furnaces and lime kilns not consistently meeting each opacity option in the year of opacity data provided in response to the 2011 pulp and paper ICR. (EPA 2016a)

While no specific PM HAP metals options are under consideration for the RTR, ESP upgrades estimated to be needed to meet a tighter opacity monitoring limit would have the effect of reducing PM and PM HAP metal emissions. Cost effectiveness values were developed in terms of dollars per ton of PM reduced. No emissions reductions were estimated for units already achieving a PM performance level associated with an upgraded ESP. Costs for these units to meet the opacity options were based on improved maintenance and testing of the ESP rather than an ESP upgrade. The estimated costs and emissions reductions for the opacity options are presented in Table 4. The cost effectiveness values for each opacity option are \$28,400 to \$41,000 per ton of filterable PM, and \$63,000 to \$88,000 per ton of PM_{2.5}. PM HAP metals are less than one half of a percent (0.5 percent) of the total PM emissions. Thus the cost effectiveness specifically for HAP metals is orders of magnitude greater than that shown for PM (>\$5.5 million per ton HAP metals).

Periodic testing, ESP parameter monitoring, and incremental R&R costs. All 108 facilities subject to subpart MM would be impacted by the periodic testing costs with the exception of one facility that closed in late 2015 (mill 128, NEI11461). The total costs for periodic testing range from \$2,440 to \$19,520 per facility, for a total of \$1.1 million from the 107 impacted facilities.

The incremental R&R costs associated with changes to the subpart MM RTR include time to adjust existing data acquisition systems at existing sources to include startup and shutdown periods, including the R&R associated with the added ESP parameter monitoring requirements. The nationwide incremental R&R costs are estimated to be \$0.50 million in initial (one-time) costs and \$1.9 million annually. All 108 facilities subject to subpart MM would be

impacted by the incremental R&R costs with the exception of the facility that closed in late 2015.

ESP parameter monitoring would be required to show continuous compliance with subpart MM while the opacity monitoring allowance is in use. A nationwide incremental \$5.7 million in capital and \$1.4 million in annualized costs are estimated for addition of ESP parameter monitoring to subpart MM, impacting 96 mills with ESP-controlled recovery furnace or lime kilns.

Labor impacts. As shown in Table 5, recovery furnace gaseous organic HAP Option 2 (conversion or replacement of DCE furnaces with NDCE furnaces) would result in recovery furnace operator job losses as a result of consolidating the throughput from multiple smaller DCE furnaces into one larger NDCE furnace at impacted mills currently operating multiple DCE furnaces. The net labor impact of options 2 plus 3 is a reduction in labor. The opacity Options 2 through 5 would increase labor hours. Labor costs are embedded in the equipment costs included in Table 4.

Energy and secondary air impacts. Table 5 presents the energy and secondary air emission impacts of the regulatory options. The energy impacts include increased electricity use associated with changes in technology. The net energy impacts for recovery furnace gaseous organic HAP Option 2 include positive impacts associated with additional electricity use and negative energy impacts due to steam savings (e.g., greater steam production per ton BLS achieved with NDCE technology). The MMBtu magnitude of the negative steam savings exceeds the increased electricity use. The steam savings energy generated by the NDCE furnace may be used for onsite electricity production and/or process heat. The secondary air impacts are associated with electric utility emissions. Reduced secondary air impacts are associated with the steam savings because the steam produced may be used for onsite electricity generation.

Table 4. Summary of Nationwide Incremental Costs and Emissions Reductions for the Subpart MM RTR

Option	No. of mills impacted	2015\$		Baseline HAP/HAP surrogate from impacted units, tpy ⁶	Incremental HAP/HAP surrogate emissions reduction, tpy	Cost effectiveness \$/ton
		Capital costs, \$million	Annualized costs, \$million/yr			
Recovery Furnace Gaseous Organic HAP Regulatory Options						
Option 1. No change	0	0	0		0	--
Option 2. Develop single limit for existing recovery furnaces ¹	21 mills with operating DCEs	\$1,356 - 3,683	\$121 - 437	MeOH: 2,608 GOH: 3,478	MeOH: 2,421 GOH: 2,754	MeOH: \$50,000 - 181,000 GOH: \$44,000 - 159,000
Option 3. Develop separate limits for existing DCE recovery furnaces and existing NDCE recovery furnaces ¹	DCEs: Same as Option 2					
	NDCEs: 11 mills with NDCEs with WBESPs	\$56.1	\$9.06	MeOH: 63.1 GOH: 187	MeOH: 56.8 GOH: 168	MeOH: \$159,000 GOH: \$54,000
Option 3 total:	32 mills	\$1,412 - 3,739	\$130 - 446	MeOH: 2,671 GOH: 3,665	MeOH: 2,477 GOH: 2,922	MeOH: \$53,000 - 180,000 GOH: \$45,000 - 153,000
Recovery Furnace (RF) Opacity Monitoring Limit Options						
Option 1: No change. 35% opacity, 20% corrective action level (CAL), 6% monitoring allowance (MA), quarterly reporting	0	0	0		0	
Option 2: 35% opacity, 20% CAL, 2% MA, semiannual reporting	1 mill (1 unit)	\$0	\$0.087	PM: 27	0	
Option 3: 20% opacity, 6% MA, quarterly reporting	7 mills (8 units)	\$27	\$5.4	PM: 982	PM: 188 PM _{2.5} : 85	PM: \$28,400 ⁴
Option 4: 20% opacity, 2% MA, semiannual reporting (Consistent with subpart BBa)	12 mills (16 units)	\$42	\$8.7	PM: 1,693	PM: 235 PM _{2.5} : 112	PM: \$36,800 ⁴
Option 5: 20% opacity, 2% MA, quarterly reporting	19 mills (25 units)	\$74	\$15	PM: 2,654	PM: 364 PM _{2.5} : 170	PM: \$41,000 ⁴
Lime Kiln (LK) Opacity Monitoring Limit Options						
Option 1: No change. 20% opacity, 6% MA, quarterly reporting	0	0	0		0	
Option 2: 20% opacity, 1% MA, semiannual reporting (Consistent with subpart BBa)	2 mills (2 units)	\$0	\$0.068	11	0	
Option 3: 20% opacity, 1% MA, quarterly reporting	Same as Option 2					

Option	No. of mills impacted	2015\$		Baseline HAP/HAP surrogate from impacted units, tpy ⁶	Incremental HAP/HAP surrogate emissions reduction, tpy	Cost effectiveness \$/ton
		Capital costs, \$million	Annualized costs, \$million/yr			
Other Options						
Add ESP parameter monitoring (voltage and current) to indicate compliance during the monitoring allowance.	96 mills ⁵	\$5.7	\$1.4			
5-year periodic testing costs	108 ³		\$1.1			
Incremental R&R costs ²	108 ³	\$0.50	\$1.9			

HAP = hazardous air pollutant, DCE = direct contact evaporator, NDCE = non-direct contact evaporator, MeOH = methanol, GOH = gaseous organic HAP, PM = particulate matter, PM_{2.5} = fine PM, R&R = reporting and recordkeeping

1. Costs and impacts for these two regulatory options conservatively assume all DCE furnaces are impacted in order to evaluate site-specific costs and emissions reductions. Cost ranges result from use of two different sources of cost data--BE&K 2001 and AECOM 2016.

2. Reporting and recordkeeping labor costs include data acquisition system adjustments to include startup and shutdown periods, compliance with revised opacity monitoring allowances, and ESP parameter monitoring.

3. One of the 108 mills closed in late 2015 but remains in the inventory (semichemical mill 128, NEI11461). This mill was assigned 0 costs.

4. As documented in Appendix B2, less than 0.5% of the PM emissions are comprised of HAP metals (0.03% for recovery furnaces or 0.48% for lime kilns). Thus the cost effectiveness specifically for HAP metals is orders of magnitude greater than that shown for PM (>\$5.5 million per ton HAP metals).

5. All mills with ESP-controlled recovery furnaces and lime kilns.

6. The baseline emissions value provided in the table is the baseline for the emission units impacted by the regulatory options. Total baseline emissions for all remaining DCE+BLO units (which would be converted or replaced with NDCE technology) are 2,707 tpy methanol and 3,615 tpy total gaseous organic HAP. Total baseline emissions for the current population of NDCE recovery furnaces in the industry is 762 tpy methanol and 1,659 tpy of total gaseous organic HAP.

Table 5. Summary of Nationwide Incremental TRS, Labor, Energy, and Secondary Air Impacts for the Subpart MM RTR

Option	TRS, tpy		Labor, hr/yr	Energy impacts, MMBtu/yr	Secondary air impacts, tpy					
	Baseline from impacted units	TRS reduction			PM and PM _{2.5}	CO	NOx	SO ₂	CO _{2e}	Hg
Recovery Furnace Gaseous Organic HAP Regulatory Options										
Option 1	No change									
Option 2 ³	1,273	989	-90,300 ¹	-5,586,000 to 17,404,000 ²	PM: -27 to -86 PM _{2.5} : -10 to -31	-92 to -286	-410 to -1,277	-1029 to -3,208	-285,000 to -887,000	-3.4 to -10.7
Option 3	Same as Option 2 for DCE									
NDCE	474	261	7,350	9,500	PM: 0.047 PM _{2.5} : 0.017	0.16	0.69	1.7	480	0.0058
Recovery Furnace (RF) Opacity Monitoring Limit Options										
Option 1	No change									
Option 2	No change in TRS		0	0	0	0	0	0	0	0
Option 3			2,100	76,700	PM: 0.38 PM _{2.5} : 0.14	1.2	5.6	14	3,900	0.047
Option 4			4,200	106,000	PM: 0.52 PM _{2.5} : 0.19	1.7	7.7	19	5,400	0.065
Option 5			6,800	195,000	PM: 0.96 PM _{2.5} : 0.35	3.1	14	35	9,900	0.12
Lime Kiln (LK) Opacity Monitoring Limit Options										
Option 1	No change									
Option 2			0	0	0	0	0	0	0	0
Option 3	Same as Option 2									
Other										
Incremental R&R (including ESP parameter monitoring)			12,464							

Note: Negative numbers represent reductions.

TRS = total reduced sulfur, PM = particulate matter, PM_{2.5} = fine PM, CO – carbon monoxide, NOx = nitrogen oxides, SO₂ = sulfur dioxide, CO_{2e} = carbon dioxide equivalent, Hg = mercury, NDCE = non-direct contact evaporator, R&R = reporting and recordkeeping, ESP = electrostatic precipitator

1. Represents recovery furnace operating labor (job) losses.

2. The net energy impacts for recovery furnace Option 2 include positive impacts associated with additional electricity use and negative energy impacts due to steam savings (e.g., greater steam production per ton BLS achieved with NDCE technology). The MMBtu magnitude of the negative steam savings exceeds the increased electricity use. The steam savings energy generated by the NDCE furnace may be used for onsite electricity production and/or process heat.

3. A range is presented for the energy and secondary impacts because of the two methods used to calculate costs and impacts (BE&K 2001 and AECOM 2016).

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Appendix A

Mill-specific Costs for the Mills Impacted by Subpart MM RTR Regulatory Options

Table A-1. Summary of Projected New or Reconstructed Process Units for Inclusion in the NESHAP RTR Economic Impacts Analysis

Table A-2. Total Cost of Subpart MM RTR Regulatory Options by Facility

Table A-3. Mill Total Costs and Emissions Reductions for Opacity Options

Table A-4. Mill Total Costs and Emissions Reductions for Gaseous Organic HAP Option 2

Table A-5. Mill Total Costs and Emissions Reductions for Gaseous Organic HAP Option 3

Table A-6. Unit-specific Costs and Impacts

Table A-1. Summary of Projected New or Reconstructed Process Units for Inclusion in the NESHAP RTR Economic Impacts Analysis (RTI 2016b)

RTI code	Small business	Projected changes to process units	Characteristics of replacement unit
130	No	Replace two small DCEs and associated SDTs with a single larger NDCE and SDT. Remove BLO.	New NDCE furnaces are assumed to be equipped with a dry bottom ESP with a dry PM return system to meet the current subpart MM gaseous organic HAP and PM limits, and the NSPS TRS limit. SDTs are assumed to operate with an upgraded wet scrubber to meet the subpart MM and NSPS new source limits.
145	No	Replace DCE with NDCE. Replace SDT. Reduce BLO throughput as BLO would only serve one remaining DCE.	
206	No	Replace one lime kiln	The new kiln is assumed to operate an ESP to comply with the current subpart MM and NSPS PM limit for new sources.

Table A-2. Total Cost of Subpart MM RTR Regulatory Options by Facility

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business
100	NEI40686	Domtar Paper Company LLC	Johnsonburg	PA	Kraft	No
102	NEI42341A	Weyerhaeuser NR Company	Longview	WA	Kraft	No
103	NEI9201	Domtar Paper Company	Plymouth	NC	Kraft	No
104	NEI11251	International Paper	Valliant	OK	Kraft, SemiChem	No
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No
107	NEI47074	Domtar Paper Company LLC	Bennettsville	SC	Kraft	No
108	NEI33025	International Paper	Campti	LA	Kraft	No
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No
111	NEI45206	Weyerhaeuser NR Company	Vanceboro	NC	Kraft	No
112	NEI34064	Weyerhaeuser NR Company	Columbus	MS	Kraft	No
114	NEI26506	Weyerhaeuser NR Company	Oglethorpe	GA	Kraft	No
115	NEI26476	Weyerhaeuser NR Company	Port Wentworth	GA	Kraft	No
116	NEI8619	International Paper Company	Pine Hill	AL	Kraft, Secondary, SemiChem	No
117	NEI42689	Wausau Paper Mills, LLC.	Mosinee	WI	Kraft	No
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No
120	NEI26495	TIN Inc. dba Temple-Inland	Rome	GA	Kraft	No
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No
126	NEI42317	WestRock - Hopewell Mill	Hopewell	VA	Kraft	No
127	NEI7933	WestRock - Florence Mill	Florence	SC	Kraft, Secondary	No
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No
132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No
135	NEI33118	S.D. Warren Company - Somerset Operations	Skowhegan	ME	Kraft	No
136	NEI12368	Sappi Cloquet LLC	Cloquet	MN	Kraft	No
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No
138	NEI18652	Clearwater Paper Corporation	Arkansas City	AR	Kraft	No
139	NEI42357	PORT TOWNSEND PAPER CORP	Port Townsend	WA	Kraft, Secondary	No
140	NEI13340	Cascade Pacific Pulp, LLC	Halsey	OR	Kraft	Yes
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No
143	NEI26504	Packaging Corporation of America	Clyattville	GA	Kraft	No
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No
149	NEI40488	P.H. Glatfelter Company - Chillicothe Facility	Chillicothe	OH	Kraft	No
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No
151	NEI41252	KapStone	North Charleston	SC	Kraft	No
152	NEI11338	Wickliffe Paper Company	Wickliffe	KY	Kraft	No
153	NEI33043	Hood Container of Louisiana LLC	St. Francisville	LA	Kraft	No
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No
155	NEI33883	Escanaba Paper Company	Escanaba	MI	Kraft, Mechanical	No
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No
159	NEI8177	Interstate Paper, LLC	Riceboro	GA	Kraft	No
162	NEI46760	International Paper	Eastover	SC	Kraft	No
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No
164	NEI42710	Thilmany, LLC	Kaukauna	WI	Kraft	No
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No
166	NEI41314	International Paper	Georgetown	SC	Kraft	No
167	NEI34070	International Paper Co. - Vicksburg Mill	Redwood	MS	Kraft, Secondary	No
169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No
173	NEI35908	International Paper Company	Ticonderoga	NY	Kraft	No
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No
176	NEI47104	KapStone Kraft Paper Corporation	Roanoke Rapids	NC	Kraft	No
177	NEI33887	Verso Quinnesec LLC	Quinnesec	MI	Kraft	No
178	NEI26309	International Paper	Cantonment	FL	Kraft	No
179	NEI45474	Rock-Tenn Mill Company, LLC	Demopolis	AL	Kraft	No
180	NEI26471	Graphic Packaging International, Inc.	Macon	GA	Kraft, Secondary	No
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No
182	NEI7181	PH Glatfelter	Spring Grove	PA	Kraft	No
183	NEI33103	Expera Old Town LLC	Old Town	ME	Kraft	No
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No
185	NEI46599	Georgia Pacific Consumer Products (Camas), LLC	CAMAS	WA	Kraft	No
186	NEI18334	Georgia-Pacific Consumer Products LP (Naheola Mill)	Pennington	AL	Kraft	No
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business
189	NEI54342	Georgia-Pacific LLC Crossett Paper Operations	Crossett	AR	Kraft	No
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No
195	NEI46835	Woodland Pulp LLC	Baileyville	ME	Kraft	Yes
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No
197	NEI18657	Mondi Bags USA, LLC	Pine Bluff	AR	Kraft	No
198	NEI41565	AbiBow US Inc	Calhoun	TN	Kraft, Mechanical, Secondary	No
199	NEI18390	Resolute Forest Products - Coosa Pines Operation	Coosa Pines	AL	Kraft	No
200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No
201	NEI7559	Boise Packaging and Newsprint, LLC	DeRidder	LA	Kraft, Mechanical, Secondary	No
202	NEI12411	Boise White Paper, LLC	International Falls	MN	Kraft	No
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No
205	NEI8601	BOISE WHITE PAPER LLC	Jackson	AL	Kraft, Secondary	No
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No
207	NEI7104	Appleton Papers, Inc.	Roaring Spring	PA	Kraft	No
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No
242	NEI34066	Leaf River Cellulose, LLC	New Augusta	MS	Kraft	No
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No
340	NEI46852	Green Bay Packaging Inc.	Morrilton	AR	Kraft, Secondary	No
525	NEI8265	Georgia Pacific Consumer Operations LLC	Palatka	FL	Kraft	No
531	NEI8186	International Paper Company	Savannah	GA	Kraft, Secondary	No
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No
615	NEI40554	Georgia-Pacific Consumer Products, LP	Clatskanie	OR	Kraft	No
617	NEI42695	Domtar A.W. LLC	Nekoosa	WI	Kraft	No
161	NEI7621	International Paper – Franklin, VA	Franklin	VA	Kraft	No
700	NEI42351	Gores Group, LLC	Cosmopolis	WA	Sulfite-Mg	No
106	NEI41599	Domtar Paper Company, LLC	Kingsport	TN	Soda	No
128	NEI11461	WestRock - Coshocton Mill <i>[Mill closed in Nov 2015]</i>	Coshocton	OH	Secondary, Semichem	No
141	NEI46750	PACKAGING CORPORATION OF AMERICA-Tomahawk	Tomahawk	WI	SemiChem	No
187	NEI42211	GP Big Island, LLC	Big Island	VA	Secondary, Semichem	No
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes
241	NEI26382	Rayonier Fernandina Mill	Fernandina Beach	FL	Sulfite-NH3	No

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business
244	NEI43472	Sonoco Products Company	Hartsville	SC	SemiChem	No
245	NEI18347	WestRock - Stevenson Mill	Stevenson	AL	Secondary, Semichem	No
247	NEI33945	Packaging Corporation of America	Filer City	MI	Secondary, Semichem	No
304	NEIVA00022	Greif Packaging LLC	Riverville	VA	Secondary, Semichem	No

RTI Code	Final NEISiteID	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	RF and ESP-controlled LK	
					ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
100	NEI40686	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
102	NEI42341A	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
103	NEI9201	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
104	NEI11251	\$ 10,730	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
105	NEI45182	\$ 7,320	\$ 4,700	\$ 10,400	\$ 62,000	\$ 15,200
107	NEI47074	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
108	NEI33025	\$ 10,730	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
109	NEI32869A	\$ 12,200	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
111	NEI45206	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
112	NEI34064	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
114	NEI26506	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
115	NEI26476	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
116	NEI8619	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
117	NEI42689	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
119	NEI46814	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
120	NEI26495	\$ 9,760	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
121	NEI12492	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
124	NEI8278	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
126	NEI42317	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
127	NEI7933	\$ 9,760	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
130	NEI18338	\$ 18,050	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
131	NEI42254	\$ 14,640	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
132	NEI8261	\$ 12,200	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
133	NEI13363	\$ 12,200	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
135	NEI33118	\$ 9,760	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
136	NEI12368	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
137	NEI26581	\$ 14,640	\$ 4,700	\$ 41,600	\$ 124,000	\$ 30,400
138	NEI18652	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
139	NEI42357	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
140	NEI13340	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
142	NEI41552	\$ 17,080	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
143	NEI26504	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
145	NEI33135	\$ 15,610	\$ 4,700	\$ 10,400	\$ 62,000	\$ 15,200
146	NEI759	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800

RTI Code	Final NEISiteID	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	RF and ESP-controlled LK	
					ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
147	NEI6450	\$ 17,080	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
148	NEI46931	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
149	NEI40488	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
150	NEI6273	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
151	NEI41252	\$ 17,080	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
152	NEI11338	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
153	NEI33043	\$ 7,320	\$ 4,700			
154	NEI46739	\$ 17,080	\$ 4,700	\$ 41,600	\$ 124,000	\$ 30,400
155	NEI33883	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
156	NEI42338	\$ 17,080	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
159	NEI8177	\$ 7,320	\$ 4,700			
162	NEI46760	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
163	NEI8560	\$ 17,080	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
164	NEI42710	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
165	NEI41628	\$ 14,640	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
166	NEI41314	\$ 14,640	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
167	NEI34070	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
169	NEI33013	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
171	NEI18658	\$ 19,520	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
172	NEI18335	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
173	NEI35908	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
174	NEI40247	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
175	NEI26514	\$ 14,640	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
176	NEI47104	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
177	NEI33887	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
178	NEI26309	\$ 12,200	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
179	NEI45474	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
180	NEI26471	\$ 9,760	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
181	NEI6057	\$ 14,640	\$ 9,400	\$ 20,800	\$ 62,000	\$ 15,200
182	NEI7181	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
183	NEI33103	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
184	NEI46817	\$ 17,080	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
185	NEI46599	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
186	NEI18334	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
188	NEI40600	\$ 17,080	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200

RTI Code	Final NEISiteID	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	RF and ESP-controlled LK	
					ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
189	NEI54342	\$ 9,760	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
190	NEI26491	\$ 19,520	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
195	NEI46835	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
196	NEI18660	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
197	NEI18657	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
198	NEI41565	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
199	NEI18390	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
200	NEI47077	\$ 12,200	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
201	NEI7559	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
202	NEI12411	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
203	NEI42410	\$ 12,200	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
205	NEI8601	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
206	NEI40282	\$ 14,640	\$ 4,700	\$ 20,800	\$ 93,000	\$ 22,800
207	NEI7104	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
208228535	NEI18373	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
226	NEI33023	\$ 17,080	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
240	NEI26526	\$ 14,640	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
242	NEI34066	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
243	NEI8196	\$ 12,200	\$ 4,700	\$ 31,200	\$ 93,000	\$ 22,800
340	NEI46852	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
525	NEI8265	\$ 9,760	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
531	NEI8186	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
606	NEI47091	\$ 17,080	\$ 4,700	\$ 41,600	\$ 124,000	\$ 30,400
610	NEI6261	\$ 14,640	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
613	NEI11172	\$ 17,080	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
615	NEI40554	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
617	NEI42695	\$ 7,320	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
161	NEI7621	\$ 7,320	\$ 4,700	\$ 10,400	\$ 31,000	\$ 7,600
700	NEI42351	\$ 7,320	\$ 4,700			
106	NEI41599	\$ 10,730	\$ 4,700	\$ 20,800	\$ 62,000	\$ 15,200
128	NEI11461					
141	NEI46750	\$ 3,410	\$ 4,700			
187	NEI42211	\$ 3,410	\$ 4,700			
193	NEI39968	\$ 9,760	\$ 4,700			
241	NEI26382	\$ 2,440	\$ 4,700			

RTI Code	Final NEISiteID	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	RF and ESP-controlled LK	
					ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
244	NEI43472	\$ 3,410	\$ 4,700			
245	NEI18347	\$ 3,410				
247	NEI33945	\$ 3,410	\$ 4,700			
304	NEIVA00022	\$ 3,410	\$ 4,700			
		\$ 1,106,230	\$ 502,900	\$ 1,872,000	\$ 5,673,000	\$ 1,390,800

Table A-3. Mill Total Costs and Emissions Reductions for Opacity Options

RTI Code	Final NEISiteID	Opacity Opt 2		Opacity Opt 3		Opacity Opt 4	
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)
100	NEI40686						
102	NEI42341A						
103	NEI9201						
104	NEI11251						
105	NEI45182						
107	NEI47074						
108	NEI33025						
109	NEI32869A		\$ 31,712	\$ 4,757,613	\$ 862,418	\$ 4,757,613	\$ 830,707
111	NEI45206						
112	NEI34064						
114	NEI26506						
115	NEI26476						
116	NEI8619						
117	NEI42689						
119	NEI46814			\$ 6,181,490	\$ 1,089,854	\$ 6,181,490	\$ 1,089,854
120	NEI26495						\$ 189,144
121	NEI12492						
124	NEI8278						
126	NEI42317						
127	NEI7933				\$ 160,001		\$ 160,001
130	NEI18338						
131	NEI42254						
132	NEI8261						
133	NEI13363						
135	NEI33118						
136	NEI12368						
137	NEI26581						
138	NEI18652						
139	NEI42357					\$ 4,757,613	\$ 830,707
140	NEI13340						\$ 131,074
142	NEI41552						
143	NEI26504						

		Opacity Opt 2		Opacity Opt 3		Opacity Opt 4	
RTI Code	Final NEISiteID	Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)
145	NEI33135		\$ 87,207		\$ 87,207		\$ 87,207
146	NEI759						
147	NEI6450						
148	NEI46931				\$ 135,594		\$ 316,232
149	NEI40488						
150	NEI6273						
151	NEI41252						
152	NEI11338						
153	NEI33043						
154	NEI46739						
155	NEI33883						
156	NEI42338						
159	NEI8177						
162	NEI46760						
163	NEI8560						
164	NEI42710						
165	NEI41628						
166	NEI41314						
167	NEI34070						
169	NEI33013						
171	NEI18658					\$ 10,064,409	\$ 1,755,580
172	NEI18335						
173	NEI35908						
174	NEI40247						\$ 218,738
175	NEI26514						
176	NEI47104						
177	NEI33887						
178	NEI26309						
179	NEI45474						
180	NEI26471						
181	NEI6057						
182	NEI7181						
183	NEI33103						

		Opacity Opt 2		Opacity Opt 3		Opacity Opt 4	
RTI Code	Final NEISiteID	Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)
184	NEI46817						
185	NEI46599						
186	NEI18334						
188	NEI40600						
189	NEI54342						
190	NEI26491						
195	NEI46835						
196	NEI18660						
197	NEI18657						
198	NEI41565						
199	NEI18390						
200	NEI47077		\$ 36,760		\$ 36,760		
201	NEI7559						
202	NEI12411						
203	NEI42410						
205	NEI8601						
206	NEI40282						
207	NEI7104						
208228535	NEI18373			\$ 8,902,009	\$ 1,811,577	\$ 8,902,009	\$ 1,811,577
226	NEI33023						
240	NEI26526						
242	NEI34066						
243	NEI8196						
340	NEI46852						
525	NEI8265						
531	NEI8186						
606	NEI47091			\$ 6,968,193	\$ 1,235,882	\$ 6,968,193	\$ 1,235,882
610	NEI6261						
613	NEI11172						
615	NEI40554						
617	NEI42695						
161	NEI7621						
700	NEI42351						

		Opacity Opt 2		Opacity Opt 3		Opacity Opt 4	
RTI Code	Final NEISiteID	Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)
106	NEI41599						
128	NEI11461						
141	NEI46750						
187	NEI42211						
193	NEI39968						
241	NEI26382						
244	NEI43472						
245	NEI18347						
247	NEI33945						
304	NEIVA00022						
		\$ -	\$ 155,679	\$ 26,809,306	\$ 5,419,294	\$ 41,631,328	\$ 8,656,704

		Opacity Opt 5		Potential Emission Reduction - RF and LK Opacity Options		
RTI Code	Final NEISiteID	Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Baseline PM, tpy	Potential PM reduction, tpy	Potential PM2.5 reduction, tpy
100	NEI40686					
102	NEI42341A					
103	NEI9201					
104	NEI11251					
105	NEI45182					
107	NEI47074					
108	NEI33025					
109	NEI32869A	\$ 4,757,613	\$ 830,707	120	40	18
111	NEI45206					
112	NEI34064					
114	NEI26506					
115	NEI26476					
116	NEI8619					
117	NEI42689					
119	NEI46814	\$ 6,181,490	\$ 1,089,854	152	58	26
120	NEI26495		\$ 189,144	99		
121	NEI12492					
124	NEI8278					
126	NEI42317					
127	NEI7933		\$ 160,001	53		
130	NEI18338					
131	NEI42254					
132	NEI8261					
133	NEI13363					
135	NEI33118					
136	NEI12368					
137	NEI26581					
138	NEI18652					
139	NEI42357	\$ 4,757,613	\$ 830,707	99	1	1
140	NEI13340		\$ 131,074	53		
142	NEI41552					
143	NEI26504					

		Opacity Opt 5		Potential Emission Reduction - RF and LK Opacity Options		
RTI Code	Final NEISiteID	Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Baseline PM, tpy	Potential PM reduction, tpy	Potential PM2.5 reduction, tpy
145	NEI33135		\$ 87,207	27		
146	NEI759					
147	NEI6450					
148	NEI46931		\$ 316,232	158		
149	NEI40488					
150	NEI6273					
151	NEI41252					
152	NEI11338					
153	NEI33043					
154	NEI46739					
155	NEI33883					
156	NEI42338					
159	NEI8177					
162	NEI46760					
163	NEI8560					
164	NEI42710					
165	NEI41628					
166	NEI41314					
167	NEI34070					
169	NEI33013		\$ 135,455	66		
171	NEI18658	\$ 10,064,409	\$ 1,755,580	302	46	27
172	NEI18335	\$ 10,431,597	\$ 1,827,834	155	20	9
173	NEI35908					
174	NEI40247		\$ 218,738	67		
175	NEI26514					
176	NEI47104					
177	NEI33887					
178	NEI26309					
179	NEI45474					
180	NEI26471					
181	NEI6057					
182	NEI7181					
183	NEI33103					

		Opacity Opt 5		Potential Emission Reduction - RF and LK Opacity Options		
RTI Code	Final NEISiteID	Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Baseline PM, tpy	Potential PM reduction, tpy	Potential PM2.5 reduction, tpy
184	NEI46817					
185	NEI46599					
186	NEI18334					
188	NEI40600					
189	NEI54342					
190	NEI26491					
195	NEI46835	\$ 6,473,077	\$ 1,143,750	138	33	15
196	NEI18660					
197	NEI18657					
198	NEI41565					
199	NEI18390					
200	NEI47077	\$ 8,044,811	\$ 1,438,827	175	43	20
201	NEI7559					
202	NEI12411					
203	NEI42410					
205	NEI8601					
206	NEI40282		\$ 141,204	91		
207	NEI7104					
208228535	NEI18373	\$ 8,902,009	\$ 1,811,577	415	29	13
226	NEI33023		\$ 158,758	52		
240	NEI26526					
242	NEI34066					
243	NEI8196					
340	NEI46852					
525	NEI8265					
531	NEI8186					
606	NEI47091	\$ 6,968,193	\$ 1,235,882	153	62	28
610	NEI6261	\$ 7,261,976	\$ 1,420,838	290	32	14
613	NEI11172					
615	NEI40554					
617	NEI42695					
161	NEI7621					
700	NEI42351					

		Opacity Opt 5		Potential Emission Reduction - RF and LK Opacity Options		
RTI Code	Final NEISiteID	Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Baseline PM, tpy	Potential PM reduction, tpy	Potential PM2.5 reduction, tpy
106	NEI41599					
128	NEI11461					
141	NEI46750					
187	NEI42211					
193	NEI39968					
241	NEI26382					
244	NEI43472					
245	NEI18347					
247	NEI33945					
304	NEIVA00022					
				2,665	364	170

Table A-4. Mill Total Costs and Emissions Reductions for Gaseous Organic HAP Option 2

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Methanol emissions, tpy	Methanol emission reduction, tpy
100	NEI40686						
102	NEI42341A						
103	NEI9201						
104	NEI11251						
105	NEI45182						
107	NEI47074						
108	NEI33025						
109	NEI32869A						
111	NEI45206						
112	NEI34064						
114	NEI26506						
115	NEI26476						
116	NEI8619						
117	NEI42689						
119	NEI46814	\$ 56,485,694	\$ 2,707,409	\$ 187,523,217	\$ 20,232,899	106	100
120	NEI26495						
121	NEI12492	\$ 92,628,136	\$ 4,458,684	\$ 307,633,690	\$ 29,594,386	31	26
124	NEI8278	\$ 105,494,169	\$ 5,063,388	\$ 350,223,295	\$ 38,959,593	79	67
126	NEI42317						
127	NEI7933						
130	NEI18338					27	
131	NEI42254	\$ 36,877,559	\$ 1,785,826	\$ 122,427,431	\$ 14,029,863	34	29
132	NEI8261						
133	NEI13363						
135	NEI33118						
136	NEI12368						
137	NEI26581						
138	NEI18652						

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Methanol emissions, tpy	Methanol emission reduction, tpy
139	NEI42357						
140	NEI13340						
142	NEI41552						
143	NEI26504						
145	NEI33135	\$ 34,372,218	\$ 1,668,075	\$ 150,569,195	\$ 16,817,259	35	35
146	NEI759	\$ 59,778,831	\$ 8,670,701	\$ 127,931,651	\$ 18,276,674	124	117
147	NEI6450						
148	NEI46931						
149	NEI40488						
150	NEI6273						
151	NEI41252	\$ 48,895,757	\$ 7,225,771	\$ 104,640,971	\$ 15,082,923	111	105
152	NEI11338	\$ 47,139,637	\$ 6,988,237	\$ 100,882,730	\$ 14,563,195	210	204
153	NEI33043						
154	NEI46739	\$ 97,542,050	\$ 4,742,219	\$ 220,648,574	\$ 10,012,768	378	364
155	NEI33883						
156	NEI42338	\$ 49,836,111	\$ 7,352,454	\$ 106,653,407	\$ 15,360,713	60	57
159	NEI8177						
162	NEI46760						
163	NEI8560	\$ 66,891,115	\$ 3,196,463	\$ 222,067,503	\$ 23,190,618	153	148
164	NEI42710						
165	NEI41628						
166	NEI41314	\$ 91,660,476	\$ 13,615,014	\$ 196,161,013	\$ 28,344,110	168	153
167	NEI34070	\$ 44,672,000	\$ 6,652,338	\$ 95,601,781	\$ 13,830,766	107	101
169	NEI33013						
171	NEI18658	\$ 79,329,420	\$ 3,886,226	\$ 256,519,006	\$ 20,084,199	184	177
172	NEI18335						
173	NEI35908						
174	NEI40247	\$ 61,285,101	\$ 2,932,981	\$ 203,456,459	\$ 21,624,491	240	231
175	NEI26514	\$ 55,704,997	\$ 2,670,716	\$ 184,931,430	\$ 20,002,011	16	14

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Methanol emissions, tpy	Methanol emission reduction, tpy
176	NEI47104						
177	NEI33887						
178	NEI26309						
179	NEI45474						
180	NEI26471						
181	NEI6057						
182	NEI7181						
183	NEI33103						
184	NEI46817						
185	NEI46599						
186	NEI18334						
188	NEI40600	\$ 76,050,454	\$ 3,679,533	\$ 166,571,382	\$ 36,658,716	83	78
189	NEI54342						
190	NEI26491						
195	NEI46835						
196	NEI18660						
197	NEI18657	\$ 34,318,920	\$ 1,665,570	\$ 113,933,172	\$ 13,155,017	33	31
198	NEI41565						
199	NEI18390						
200	NEI47077						
201	NEI7559						
202	NEI12411						
203	NEI42410						
205	NEI8601	\$ 38,522,052	\$ 5,804,106	\$ 82,440,383	\$ 11,994,288	79	74
206	NEI40282	\$ 84,289,480	\$ 12,611,412	\$ 180,386,470	\$ 26,156,048	156	132
207	NEI7104						
208228535	NEI18373						
226	NEI33023						
240	NEI26526						

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Methanol emissions, tpy	Methanol emission reduction, tpy
242	NEI34066						
243	NEI8196						
340	NEI46852						
525	NEI8265						
531	NEI8186						
606	NEI47091						
610	NEI6261						
613	NEI11172	\$ 94,279,275	\$ 13,976,475	\$ 201,765,459	\$ 29,126,390	191	180
615	NEI40554						
617	NEI42695						
161	NEI7621						
700	NEI42351						
106	NEI41599						
128	NEI11461						
141	NEI46750						
187	NEI42211						
193	NEI39968						
241	NEI26382						
244	NEI43472						
245	NEI18347						
247	NEI33945						
304	NEIVA00022						
		\$ 1,356,053,449	\$ 121,353,599	\$ 3,682,968,219	\$ 437,096,925	2,608	2,421

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
100	NEI40686				
102	NEI42341A				
103	NEI9201				
104	NEI11251				
105	NEI45182				
107	NEI47074				
108	NEI33025				
109	NEI32869A				
111	NEI45206				
112	NEI34064				
114	NEI26506				
115	NEI26476				
116	NEI8619				
117	NEI42689				
119	NEI46814	134	111	32	26
120	NEI26495				
121	NEI12492	45	26	53	38
124	NEI8278	138	81	94	76
126	NEI42317				
127	NEI7933				
130	NEI18338	49		40	
131	NEI42254	60	35	12	9
132	NEI8261				
133	NEI13363				
135	NEI33118				
136	NEI12368				
137	NEI26581				
138	NEI18652				

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
139	NEI42357				
140	NEI13340				
142	NEI41552				
143	NEI26504				
145	NEI33135	59	52	23	18
146	NEI759	152	127	95	76
147	NEI6450				
148	NEI46931				
149	NEI40488				
150	NEI6273				
151	NEI41252	133	111	48	39
152	NEI11338	257	222	62	50
153	NEI33043				
154	NEI46739	414	365	81	65
155	NEI33883				
156	NEI42338	76	63	40	32
159	NEI8177				
162	NEI46760				
163	NEI8560	213	186	43	35
164	NEI42710				
165	NEI41628				
166	NEI41314	268	193	130	105
167	NEI34070	158	127	60	48
169	NEI33013				
171	NEI18658	264	224	58	47
172	NEI18335				
173	NEI35908				
174	NEI40247	334	289	36	29
175	NEI26514	31	18	17	12

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
176	NEI47104				
177	NEI33887				
178	NEI26309				
179	NEI45474				
180	NEI26471				
181	NEI6057				
182	NEI7181				
183	NEI33103				
184	NEI46817				
185	NEI46599				
186	NEI18334				
188	NEI40600	105	87	52	43
189	NEI54342				
190	NEI26491				
195	NEI46835				
196	NEI18660				
197	NEI18657	40	33	14	11
198	NEI41565				
199	NEI18390				
200	NEI47077				
201	NEI7559				
202	NEI12411				
203	NEI42410				
205	NEI8601	100	81	45	37
206	NEI40282	182	108	112	91
207	NEI7104				
208228535	NEI18373				
226	NEI33023				
240	NEI26526				

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
242	NEI34066				
243	NEI8196				
340	NEI46852				
525	NEI8265				
531	NEI8186				
606	NEI47091				
610	NEI6261				
613	NEI11172	266	215	128	103
615	NEI40554				
617	NEI42695				
161	NEI7621				
700	NEI42351				
106	NEI41599				
128	NEI11461				
141	NEI46750				
187	NEI42211				
193	NEI39968				
241	NEI26382				
244	NEI43472				
245	NEI18347				
247	NEI33945				
304	NEIVA00022				
		3,478	2,754	1,273	989

Table A-5. Mill Total Costs and Emissions Reductions for Gaseous Organic HAP Option 3

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)									
RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
100	NEI40686								
102	NEI42341A								
103	NEI9201								
104	NEI11251								
105	NEI45182								
107	NEI47074								
108	NEI33025								
109	NEI32869A								
111	NEI45206								
112	NEI34064								
114	NEI26506								
115	NEI26476								
116	NEI8619	\$ 4,760,431	\$ 765,316	6.1	5.5	13.8	12.4	44	24
117	NEI42689								
119	NEI46814								
120	NEI26495								
121	NEI12492								
124	NEI8278								
126	NEI42317	\$ 3,711,929	\$ 601,386	0.0040	0.0036	0.0368	0.0331	30	17
127	NEI7933	\$ 4,559,859	\$ 733,931	5.6	5.1	17.3	15.6	43	23
130	NEI18338								
131	NEI42254								
132	NEI8261								
133	NEI13363								
135	NEI33118								
136	NEI12368								
137	NEI26581								
138	NEI18652								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)

RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
139	NEI42357								
140	NEI13340								
142	NEI41552	\$ 3,217,400	\$ 524,188	1.4	1.3	3.7	3.33	16	8.8
143	NEI26504								
145	NEI33135								
146	NEI759								
147	NEI6450								
148	NEI46931								
149	NEI40488								
150	NEI6273								
151	NEI41252								
152	NEI11338								
153	NEI33043								
154	NEI46739								
155	NEI33883								
156	NEI42338								
159	NEI8177								
162	NEI46760								
163	NEI8560	\$ 4,069,636	\$ 657,274	4.8	4.3	10.9	9.81	32	17
164	NEI42710								
165	NEI41628								
166	NEI41314								
167	NEI34070								
169	NEI33013	\$ 7,730,471	\$ 1,250,668	9.7	8.7	22.4	20.2	65	36
171	NEI18658								
172	NEI18335	\$ 6,342,180	\$ 1,033,967	6.2	5.6	14.3	12.9	46	25
173	NEI35908								
174	NEI40247								
175	NEI26514								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)

RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
176	NEI47104								
177	NEI33887								
178	NEI26309								
179	NEI45474								
180	NEI26471								
181	NEI6057	\$ 3,732,428	\$ 604,587	2.7	2.4	11.1	9.99	30	16
182	NEI7181								
183	NEI33103								
184	NEI46817								
185	NEI46599								
186	NEI18334								
188	NEI40600								
189	NEI54342	\$ 6,286,986	\$ 1,004,563	7.9	7.1	24.3	21.9	72	40
190	NEI26491								
195	NEI46835								
196	NEI18660								
197	NEI18657								
198	NEI41565								
199	NEI18390								
200	NEI47077								
201	NEI7559								
202	NEI12411								
203	NEI42410								
205	NEI8601								
206	NEI40282								
207	NEI7104								
208228535	NEI18373								
226	NEI33023	\$ 7,584,827	\$ 1,228,084	7.8	7.0	24.1	21.7	61	34
240	NEI26526								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)

RTI Code	Final NEISiteID	Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy
242	NEI34066								
243	NEI8196								
340	NEI46852								
525	NEI8265								
531	NEI8186								
606	NEI47091								
610	NEI6261								
613	NEI11172								
615	NEI40554								
617	NEI42695								
161	NEI7621								
700	NEI42351								
106	NEI41599	\$ 4,067,057	\$ 656,871	10.9	9.8	44.7	40.3	35	19
128	NEI11461								
141	NEI46750								
187	NEI42211								
193	NEI39968								
241	NEI26382								
244	NEI43472								
245	NEI18347								
247	NEI33945								
304	NEIVA00022								
		\$ 56,063,204	\$ 9,060,836	63	57	187	168	474	261

Table A-6. Unit-specific Costs and Impacts

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business	RTI&EUID	EmissionProcessGroup	RTI_APCD_Type	Install/upgrade year for determining NESHAP impact
100	NEI40686	Domtar Paper Company LLC	Johnsonburg	PA	Kraft	No	100.037A	NDCE	DBESP	1993
100	NEI40686	Domtar Paper Company LLC	Johnsonburg	PA	Kraft	No	100.109	SDT (Kraft)	SCBR	1993
100	NEI40686	Domtar Paper Company LLC	Johnsonburg	PA	Kraft	No	100.115	Lime Kiln	ESP	1993
102	NEI42341A	Weyerhaeuser NR Company	Longview	WA	Kraft	No	102.LK	Lime Kiln	ESP	1985
102	NEI42341A	Weyerhaeuser NR Company	Longview	WA	Kraft	No	102.RB10	NDCE	DBESP-WPR	2002
102	NEI42341A	Weyerhaeuser NR Company	Longview	WA	Kraft	No	102.SDTV10	SDT (Kraft)	SCBR	2002
103	NEI9201	Domtar Paper Company	Plymouth	NC	Kraft	No	103.G-158	NDCE	DBESP	2000
103	NEI9201	Domtar Paper Company	Plymouth	NC	Kraft	No	103.G-165	Lime Kiln	SCBR	1987
103	NEI9201	Domtar Paper Company	Plymouth	NC	Kraft	No	103.G-225	SDT (Kraft) (2)	SCBR	2000
104	NEI11251	International Paper	Valliant	OK	Kraft, SemiChem	No	104.EUG D6	NDCE	DBESP	2006
104	NEI11251	International Paper	Valliant	OK	Kraft, SemiChem	No	104.EUG E4b	SDT (Kraft)	INC_RF	2006
104	NEI11251	International Paper	Valliant	OK	Kraft, SemiChem	No	104.EUG E7	Lime Kiln	ESP	2005
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU440BLO	BLO		1964
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445A	DCE	WBESP	1964
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445BWest		SCBR	1964
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445BWest	SDT (Kraft)	SCBR	1964
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445C	NDCE	DBESP-WPR	2007
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445D	SDT (Kraft)	SCBR	2007
105	NEI45182	International Paper Company	Springfield	OR	Kraft, Secondary	No	105.EU445E	Lime Kilns (2)	ESP	1955
107	NEI47074	Domtar Paper Company LLC	Bennettsville	SC	Kraft	No	107.08-P1	NDCE	DBESP	1996
107	NEI47074	Domtar Paper Company LLC	Bennettsville	SC	Kraft	No	107.09-P2	SDT (Kraft)	SCBR	1996
107	NEI47074	Domtar Paper Company LLC	Bennettsville	SC	Kraft	No	107.11-P14	Lime Kiln	ESP	1996
108	NEI33025	International Paper	Campti	LA	Kraft	No	108.LK1	Lime Kiln	SCBR	1974
108	NEI33025	International Paper	Campti	LA	Kraft	No	108.RB3	NDCE	DBESP	2009
108	NEI33025	International Paper	Campti	LA	Kraft	No	108.SDT3	SDT (Kraft)	PBSCBR/INC_RF	2009
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No	109.LK1	Lime Kiln	ESP	1997
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No	109.RB3	NDCE	DBESP	1985
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No	109.RB4	NDCE	DBESP	1997
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No	109.SDT3	SDT (Kraft)	SCBR	1985
109	NEI32869A	Domtar Paper Company, LLC.	Hawesville	KY	Kraft	No	109.SDT4	SDT (Kraft)	SCBR	1997
111	NEI45206	Weyerhaeuser NR Company	Vanceboro	NC	Kraft	No	111.G-127	SDT (Kraft)	SCBR/INC_RF	2009
111	NEI45206	Weyerhaeuser NR Company	Vanceboro	NC	Kraft	No	111.G-35	Lime Kiln	ESP	1996
111	NEI45206	Weyerhaeuser NR Company	Vanceboro	NC	Kraft	No	111.G-44	NDCE	DBESP-WPR	2009
112	NEI34064	Weyerhaeuser NR Company	Columbus	MS	Kraft	No	112.AA-100	NDCE	DBESP	1989
112	NEI34064	Weyerhaeuser NR Company	Columbus	MS	Kraft	No	112.AA-101a	SDT (Kraft)	SCBR	1989
112	NEI34064	Weyerhaeuser NR Company	Columbus	MS	Kraft	No	112.AA-110	Lime Kiln	ESP	1990
114	NEI26506	Weyerhaeuser NR Company	Oglethorpe	GA	Kraft	No	114.U500	NDCE	DBESP	1994
114	NEI26506	Weyerhaeuser NR Company	Oglethorpe	GA	Kraft	No	114.U508	SDT (Kraft)	SCBR	1994
114	NEI26506	Weyerhaeuser NR Company	Oglethorpe	GA	Kraft	No	114.U800	Lime Kiln	ESP	2003

RTI Code	Final NEISiteID	Operator (2015)	City	St	Pulp Processes	Small_business	RTI&EUID	EmissionProcessGroup	RTI_APCD_Type	Install/upgrade year for determining NESHAP impact
115	NEI26476	Weyerhaeuser NR Company	Port Wentworth	GA	Kraft	No	115.LK01	Lime Kiln	ESP	1990
115	NEI26476	Weyerhaeuser NR Company	Port Wentworth	GA	Kraft	No	115.RE01	NDCE	DBESP	2000
115	NEI26476	Weyerhaeuser NR Company	Port Wentworth	GA	Kraft	No	115.SM01	SDT (Kraft)	SCBR	2000
116	NEI8619	International Paper Company	Pine Hill	AL	Kraft, Secondary, SemiChem	No	116.001	Lime Kiln	SCBR	1968
116	NEI8619	International Paper Company	Pine Hill	AL	Kraft, Secondary, SemiChem	No	116.003	NDCE	WBESP	1982
116	NEI8619	International Paper Company	Pine Hill	AL	Kraft, Secondary, SemiChem	No	116.004	SDT (Kraft)	SCBR	1982
117	NEI42689	Wausau Paper Mills, LLC.	Mosinee	WI	Kraft	No	117.B21	NDCE	DBESP	1995
117	NEI42689	Wausau Paper Mills, LLC.	Mosinee	WI	Kraft	No	117.P30	SDT (Kraft)	SCBR	1995
117	NEI42689	Wausau Paper Mills, LLC.	Mosinee	WI	Kraft	No	117.P36	Lime Kiln	SCBR	1960
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT005	SDT (Kraft)	SCBR	1964
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT006	Lime Kiln	SCBR	1963
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT008	DCE	DBESP	1964
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT010	NDCE	DBESP	1989
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT011	SDT (Kraft)	SCBR	1989
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT013	BLO		1964
119	NEI46814	International Paper - Bogalusa Mill	BOGALUSA	LA	Kraft, Secondary	No	119.EQT014	BLO		1964
120	NEI26495	TIN Inc. dba Temple-Inland	Rome	GA	Kraft	No	120.F7	NDCE	DBESP	1988
120	NEI26495	TIN Inc. dba Temple-Inland	Rome	GA	Kraft	No	120.M18	Lime Kiln	SCBR	1979
120	NEI26495	TIN Inc. dba Temple-Inland	Rome	GA	Kraft	No	120.M19	Lime Kiln	SCBR	1976
120	NEI26495	TIN Inc. dba Temple-Inland	Rome	GA	Kraft	No	120.M3	SDT (Kraft)	SCBR	1989
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.000009	SDT (Kraft)	SCBR	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.000010	SDT (Kraft)	SCBR	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.000011	Lime Kiln	SCBR	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.000013	DCE	DBESP	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.000014	DCE	DBESP	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.BLOX01			1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.BLOX02		INC	1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.BLOX03			1967
121	NEI12492	International Paper - Orange Mill	Orange	TX	Kraft, Secondary	No	121.BLOX01-03	BLO	INC	1967
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.001	DCE	DBESP	1971
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.004-1	Lime Kiln	MC/SCBR	2007

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124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.019	DCE	WBESP	1972
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.020	SDT (Kraft)	SCBR	1972
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.021	SDT (Kraft)	SCBR	1971
124	NEI8278	WestRock Company - Panama City Mill	Panama City	FL	Kraft	No	124.037-8	BLO		1972
126	NEI42317	WestRock - Hopewell Mill	Hopewell	VA	Kraft	No	126.LK	Lime Kiln	ESP/SCBR	1972
126	NEI42317	WestRock - Hopewell Mill	Hopewell	VA	Kraft	No	126.RECOV	NDCE	WBESP	1995
126	NEI42317	WestRock - Hopewell Mill	Hopewell	VA	Kraft	No	126.SDT	SDT (Kraft)	SCBR	1995
127	NEI7933	WestRock - Florence Mill	Florence	SC	Kraft, Secondary	No	127.LK1	Lime Kiln	ESP	1963
127	NEI7933	WestRock - Florence Mill	Florence	SC	Kraft, Secondary	No	127.LK2	Lime Kiln	ESP	1973
127	NEI7933	WestRock - Florence Mill	Florence	SC	Kraft, Secondary	No	127.REC1	NDCE	WBESP	1991
127	NEI7933	WestRock - Florence Mill	Florence	SC	Kraft, Secondary	No	127.SDT1	SDT (Kraft)	SCBR	1991
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.1	DCE	WBESP	1957
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.11	SDT (Kraft)	SCBR	2002
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.2	DCE	WBESP	1964
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.23	BLO		1964
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.3	NDCE	DBESP	2002
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.4	Lime Kiln	SCBR	1957
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.5	Lime Kiln	SCBR	1964
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.6	SDT (Kraft)	SCBR	1957
130	NEI18338	Georgia-Pacific Brewton LLC	Brewton	AL	Kraft	No	130.7	SDT (Kraft)	SCBR	1964
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.16	Lime Kiln	CYC/SCBR	1982
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.18	Lime Kiln	SCBR	1956
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.5	DCE	DBESP	1975
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.6	NDCE	DBESP	1991
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.BLO	BLO	DBESP	1975
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.SDT4N		SCBR	1975
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.SDT4S		SCBR	1975
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.SDT4N/4S	SDT (Kraft)	SCBR	1975
131	NEI42254	WestRock Company - West Point Mill	West Point	VA	Kraft, Secondary	No	131.SDT5	SDT (Kraft)	SCBR	1991

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132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No	132.21LK4	Lime Kiln	ESP	1989
132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No	132.4RB	NDCE	DBESP-WPR	1970
132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No	132.4SDT	SDT (Kraft)	SCBR	2003
132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No	132.5RB	NDCE	DBESP-WPR	1977
132	NEI8261	WestRock - Fernandina Beach Mill	Fernandina Beach	FL	Kraft, Secondary	No	132.5SDT	SDT (Kraft)	SCBR	1977
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No	133.10	NDCE	DBESP	2002
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No	133.12a	SDT (Kraft)	SCBR	2001
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No	133.12b	SDT (Kraft)	SCBR	2001
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No	133.14	Lime Kiln	SCBR	1960
133	NEI13363	WestRock - Tacoma Mill	Tacoma	WA	Kraft	No	133.15	Lime Kiln	SCBR	1973
135	NEI33118	S.D. Warren Company - Somerset Operations	Skowhegan	ME	Kraft	No	135.003-1	NDCE	DBESP	2010
135	NEI33118	S.D. Warren Company - Somerset Operations	Skowhegan	ME	Kraft	No	135.004-1	Lime Kiln	CYC/SCBR	1976
135	NEI33118	S.D. Warren Company - Somerset Operations	Skowhegan	ME	Kraft	No	135.007-1	SDT (Kraft)	SCBR	2010
135	NEI33118	S.D. Warren Company - Somerset Operations	Skowhegan	ME	Kraft	No	135.007-2	SDT (Kraft)	SCBR	2010
136	NEI12368	Sappi Cloquet LLC	Cloquet	MN	Kraft	No	136.EU 005	NDCE	DBESP	1998
136	NEI12368	Sappi Cloquet LLC	Cloquet	MN	Kraft	No	136.EU 031	SDT (Kraft)	SCBR	1998
136	NEI12368	Sappi Cloquet LLC	Cloquet	MN	Kraft	No	136.EU 033	Lime Kiln	ESP	1999
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.157	SDT (Kraft)	SCBR	1990
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.189	NDCE	DBESP-WPR	1990
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.204	SDT (Kraft)	SCBR	1987
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.511	Lime Kiln	ESP	1958
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.512	Lime Kiln	ESP/PBSCBR	1975
137	NEI26581	Clearwater Paper Corp - PPD & CPD, Idaho	Lewiston	ID	Kraft	No	137.721	NDCE	DBESP-WPR	1987
138	NEI18652	Clearwater Paper Corporation	Arkansas City	AR	Kraft	No	138.001	Lime Kiln	SCBR	1976
138	NEI18652	Clearwater Paper Corporation	Arkansas City	AR	Kraft	No	138.002	NDCE	DBESP-WPR	1991
138	NEI18652	Clearwater Paper Corporation	Arkansas City	AR	Kraft	No	138.003	SDT (Kraft)	PBSCBR	1991
139	NEI42357	PORT TOWNSEND PAPER CORP	Port Townsend	WA	Kraft, Secondary	No	139.02	NDCE	DBESP-WPR/DBESP/DBESP	1969
139	NEI42357	PORT TOWNSEND PAPER CORP	Port Townsend	WA	Kraft, Secondary	No	139.03	SDT (Kraft)	SCBR	1969
139	NEI42357	PORT TOWNSEND PAPER CORP	Port Townsend	WA	Kraft, Secondary	No	139.04	Lime Kiln	SCBR	1975
140	NEI13340	Cascade Pacific Pulp, LLC	Halsey	OR	Kraft	Yes	140.32	Lime Kiln	SCBR	1968
140	NEI13340	Cascade Pacific Pulp, LLC	Halsey	OR	Kraft	Yes	140.55	NDCE	DBESP	1968

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140	NEI13340	Cascade Pacific Pulp, LLC	Halsey	OR	Kraft	Yes	140.57	SDT (Kraft)	PBSCBR	1968
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.CU7214	NDCE	DBESP	2011
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.CU7215	NDCE	DBESP	1999
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.CU7216	NDCE	WBESP	2011
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.P6009	Lime Kiln	SCBR	1975
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.P6025	Lime Kiln	SCBR	1960
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.P7236	SDT (Kraft)	SCBR	1999
142	NEI41552	Packaging Corporation of America	Counce	TN	Kraft, Secondary	No	142.P7413	SDT (Kraft) (2)	SCBR	1985
143	NEI26504	Packaging Corporation of America	Clyattville	GA	Kraft	No	143.6063	Lime Kiln	ESP	1992
143	NEI26504	Packaging Corporation of America	Clyattville	GA	Kraft	No	143.704	NDCE	DBESP	2009
143	NEI26504	Packaging Corporation of America	Clyattville	GA	Kraft	No	143.7045	SDT (Kraft)	INC_RF	2009
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No	145.31	BLO		1986
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No	145.54	DCE	WBESP	1959
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No	145.55	DCE	WBESP	1986
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No	145.56	SDT (Kraft)	OTH	1959
145	NEI33135	Luke Paper Company	Luke	MD	Kraft	No	145.57	SDT (Kraft)	SCBR	1986
145	NEI706	Luke Paper Company	Luke	MD	Kraft	No	145.001	Lime Kiln	SCBR	1966
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.10	SDT (Kraft)	SCBR	1996
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.16	NDCE	DBESP-WPR	1991
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.17	SDT (Kraft)	SCBR	1991
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.23	BLO		1996
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.30	Lime Kiln	ESP/SCBR	1998
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.6	Lime Kiln	SCBR	1950
146	NEI759	WestRock Company – Covington Mill	Covington	VA	Kraft	No	146.8	DCE	WBESP	1996
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.14	NDCE	DBESP	2003
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.161	SDT (Kraft)	SCBR	2003
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.243	SDT (Kraft)	SCBR	2003
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.244	SDT (Kraft)	SCBR	2003
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.3	Lime Kiln	SCBR	1980
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.5	NDCE	DBESP	2003
147	NEI6450	WESTVACO TEXAS LP	EVADALE	TX	Kraft	No	147.55	Lime Kiln	CYC/ESP	2010
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.001	NDCE	DBESP	1996
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.002	SDT (Kraft)	SCBR	1996
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.003	Lime Kiln	SCBR	1966

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148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.007	NDCE	DBESP	1990
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.008	SDT (Kraft)	SCBR	1990
148	NEI46931	WestRock Company	Cottonton	AL	Kraft, Secondary	No	148.009	Lime Kiln	ESP	1990
149	NEI40488	P.H. Glatfelter Company - Chillicothe Facility	Chillicothe	OH	Kraft	No	149.B011	NDCE	DBESP	1999
149	NEI40488	P.H. Glatfelter Company - Chillicothe Facility	Chillicothe	OH	Kraft	No	149.P001	Lime Kiln	CYC/SCBR	1961
149	NEI40488	P.H. Glatfelter Company - Chillicothe Facility	Chillicothe	OH	Kraft	No	149.P005	SDT (Kraft)	SCBR	1999
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No	150.CAU-12	Lime Kiln	SCBR	1989
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No	150.CREC-1	NDCE	DBESP	1992
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No	150.CREC-2a		SCBR	1992
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No	150.CREC-2b		SCBR	1992
150	NEI6273	Catalyst Paper Operations Inc. Rumford Division	RUMFORD	ME	Kraft, Mechanical	No	150.CREC-2a/2b	SDT (Kraft)	SCBR	1992
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.CP001	Lime Kiln	SCBR (NCG scrubbers pre-kiln + LK SCBR)	1990
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.CP002	Lime Kiln	ESP (NCG scrubbers pre-kiln + LK ESP)	1990
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC001	BLO		1983
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC004	NDCE	DBESP	1984
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC005		SCBR/STRIP	1984
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC006		SCBR/STRIP	1984
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC005/006	SDT (Kraft)	SCBR/STRIP	1984
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC007	DCE	DBESP	1983
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC008	SDT (Kraft)	SCBR/STRIP	1983
151	NEI41252	KapStone	North Charleston	SC	Kraft	No	151.REC009	SDT (Kraft)	SCBR/STRIP	1983
152	NEI11338	Wickliffe Paper Company	Wickliffe	KY	Kraft	No	152.03	DCE	WBESP/SCBR	1969
152	NEI11338	Wickliffe Paper Company	Wickliffe	KY	Kraft	No	152.04	SDT (Kraft)	SCBR	1969
152	NEI11338	Wickliffe Paper Company	Wickliffe	KY	Kraft	No	152.07	BLO		1969
152	NEI11338	Wickliffe Paper Company	Wickliffe	KY	Kraft	No	152.08	Lime Kiln	SCBR	1969
153	NEI33043	Hood Container of Louisiana LLC	St. Francisville	LA	Kraft	No	153.EQT 0053	Lime Kiln	SCBR	1988
153	NEI33043	Hood Container of Louisiana LLC	St. Francisville	LA	Kraft	No	153.EQT 0065	NDCE	SCBR	1998
153	NEI33043	Hood Container of Louisiana LLC	St. Francisville	LA	Kraft	No	153.EQT 0066	SDT (Kraft)	SCBR	1998

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154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P30	Lime Kiln	ESP/SCBR	1989
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P32	SDT (Kraft)	SCBR	1995
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P35	SDT (Kraft)	SCBR	1987
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P36	DCE	WBESP	1987
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P37	DCE	WBESP	1989
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P38	SDT (Kraft)	PBSCBR	1989
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P39	DCE	WBESP	1995
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P40			1995
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P41			1995
154	NEI46739	Verso Corporation - Wisconsin Rapids Mill	Wisconsin Rapids	WI	Kraft	No	154.P40/41	BLO		1995
155	NEI33883	Escanaba Paper Company	Escanaba	MI	Kraft, Mechanical	No	155.LIME KILN	Lime Kiln	SCBR	1972
155	NEI33883	Escanaba Paper Company	Escanaba	MI	Kraft, Mechanical	No	155.RECOVERY FURNACE	NDCE	DBESP	1994
155	NEI33883	Escanaba Paper Company	Escanaba	MI	Kraft, Mechanical	No	155.SDT	SDT (Kraft)	PBSCBR	1994
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.143100	Lime Kiln	SCBR	1992
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.145000	Lime Kiln	SCBR	1992
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.BLOXID	BLO		2001
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.LK5	Lime Kiln	ESP	1982
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.RF18	DCE	WBESP	1965
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.RF19	DCE	WBESP	2001
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.RF22	NDCE	DBESP	1992
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.SMEL18	SDT (Kraft)	PBSCBR	1965
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.SMEL19	SDT (Kraft)	PBSCBR	2001
156	NEI42338	Longview Fibre Paper & Packaging, Inc.	Longview	WA	Kraft, SemiChem	No	156.SMEL22	SDT (Kraft)	PBSCBR	1992
159	NEI8177	Interstate Paper, LLC	Riceboro	GA	Kraft	No	159.PW04	SDT (Kraft)	SCBR	1991
159	NEI8177	Interstate Paper, LLC	Riceboro	GA	Kraft	No	159.F3	NDCE	SCBR	1991
159	NEI8177	Interstate Paper, LLC	Riceboro	GA	Kraft	No	159.F4	Lime Kiln	SCBR	1968
162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.371A	Lime Kiln	SCBR	1982

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162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.372A	Lime Kiln	ESP	1989
162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.381A	NDCE	DBESP	1982
162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.381C	SDT (Kraft)	SCBR	1982
162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.382A	NDCE	DBESP	1989
162	NEI46760	International Paper	Eastover	SC	Kraft	No	162.382B	SDT (Kraft)	SCBR	1989
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.BLO404			2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.BLO405			2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.BLO404/BLO405	BLO		2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.LK1501	Lime Kiln	SCBR	1967
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.LK2502	Lime Kiln	SCBR	1980
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.RF1901	DCE	WBESP	2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.RF2904	NDCE	WBESP	1980
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.SD1902	SDT (Kraft)	SCBR	2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.SD1903	SDT (Kraft)	SCBR	2007
163	NEI8560	International Paper Company	Prattville	AL	Kraft, Secondary	No	163.SD2906	SDT (Kraft)	SCBR	1980
164	NEI42710	Thilmany,LLC	Kaukauna	WI	Kraft	No	164.B08	NDCE	DBESP	1996
164	NEI42710	Thilmany,LLC	Kaukauna	WI	Kraft	No	164.B10	NDCE	DBESP	1995
164	NEI42710	Thilmany,LLC	Kaukauna	WI	Kraft	No	164.P08	SDT (Kraft)	SCBR	1996
164	NEI42710	Thilmany,LLC	Kaukauna	WI	Kraft	No	164.P10	SDT (Kraft)	SCBR	1995
164	NEI42710	Thilmany,LLC	Kaukauna	WI	Kraft	No	164.P12	Lime Kiln	SCBR	1986
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000002	Lime Kiln	SCBR	1975
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000006	NDCE	DBESP	1991
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000008	SDT (Kraft)	SCBR	1991
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000013	NDCE	DBESP	1990
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000014	SDT (Kraft)	SCBR	1990
165	NEI41628	International Paper Company	Queen City	TX	Kraft	No	165.000019	Lime Kiln	SCBR	1972
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.BLOX1			1989
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.BLOX2		COND/RTO	1989
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.BLOX1/2	BLO	COND/RTO	1989
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.LK01	Lime Kiln	SCBR	1963
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.LK02	Lime Kiln	SCBR	1979
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.RB01	DCE	WBESP	1983
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.RB02	DCE	WBESP/SCBR	1989
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.ST01	SDT (Kraft)	SCBR	1983
166	NEI41314	International Paper	Georgetown	SC	Kraft	No	166.ST02	SDT (Kraft)	SCBR	1989
167	NEI34070	International Paper Co. - Vicksburg Mill	Redwood	MS	Kraft, Secondary	No	167.004LK	Lime Kiln	SCBR	1967
167	NEI34070	International Paper Co. - Vicksburg Mill	Redwood	MS	Kraft, Secondary	No	167.005RB	DCE	WBESP	1967
167	NEI34070	International Paper Co. - Vicksburg Mill	Redwood	MS	Kraft, Secondary	No	167.007SDT	SDT (Kraft)	SCBR	1967
167	NEI34070	International Paper Co. - Vicksburg Mill	Redwood	MS	Kraft, Secondary	No	167.TK0217	BLO		1967
169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No	169.03	Lime Kiln	SCBR	1981
169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No	169.04	NDCE	WBESP	1994

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169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No	169.05	NDCE	WBESP	1995
169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No	169.06	SDT (Kraft)	PBSCBR	1994
169	NEI33013	International Paper	Mansfield	LA	Kraft, SemiChem	No	169.07	SDT (Kraft)	PBSCBR	1995
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.002	DCE	DBESP-WPR	1990
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.003	DCE	DBESP-WPR	1990
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.004	DCE	DBESP-WPR	1991
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.006	SDT (Kraft)	OTH	1990
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.007	SDT (Kraft)	SCBR	1990
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.008	SDT (Kraft)	SCBR	1991
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.009	Lime Kiln	SCBR	1958
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.010	Lime Kiln	SCBR	1964
171	NEI18658	Evergreen Packaging Inc	Pine Bluff	AR	Kraft	No	171.021	BLO		1991
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No	172.LK03	Lime Kiln	SCBR	1986
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No	172.RB01	NDCE	WBESP	1982
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No	172.RB02	NDCE	WBESP	1987
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No	172.ST01	SDT (Kraft)	SCBR	1982
172	NEI18335	International Paper Company	Selma	AL	Kraft, Secondary	No	172.ST02	SDT (Kraft)	SCBR	1987
173	NEI35908	International Paper Company	Ticonderoga	NY	Kraft	No	173.LK1	Lime Kiln	SCBR	1970
173	NEI35908	International Paper Company	Ticonderoga	NY	Kraft	No	173.RECOVB	NDCE	DBESP	1970
173	NEI35908	International Paper Company	Ticonderoga	NY	Kraft	No	173.SDT	SDT (Kraft)	SCBR	1970
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-18	Lime Kiln	ESP/SCBR	1998
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-32	NDCE	DBESP	1982
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-60	BLO		1974
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-63B	SDT (Kraft)	SCBR	1974
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-63C	SDT (Kraft)	SCBR	1982
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-92	DCE	WBESP	1974
174	NEI40247	International Paper, Inc	Riegelwood	NC	Kraft	No	174.G-95	Lime Kiln	CYC/SCBR	1976
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.APRX	BLO [See Notes]		1989
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.LK1A	Lime Kiln	SCBR	1960
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.LK2A	Lime Kiln	SCBR	1987
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.RB2A	DCE	WBESP	1989
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.RB3A	NDCE	DBESP	1988
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.ST2A	SDT (Kraft)	SCBR	1989
175	NEI26514	International Paper Company	AUGUSTA	GA	Kraft	No	175.ST3A	SDT (Kraft)	SCBR	1988
176	NEI47104	KapStone Kraft Paper Corporation	Roanoke Rapids	NC	Kraft	No	176.G-37	SDT (Kraft)	SCBR	1997
176	NEI47104	KapStone Kraft Paper Corporation	Roanoke Rapids	NC	Kraft	No	176.G-5	Lime Kiln	SCBR	1961
176	NEI47104	KapStone Kraft Paper Corporation	Roanoke Rapids	NC	Kraft	No	176.RB7	NDCE	DBESP	1997
177	NEI33887	Verso Quinnesec LLC	Quinnesec	MI	Kraft	No	177.EU0804	NDCE	DBESP	1981
177	NEI33887	Verso Quinnesec LLC	Quinnesec	MI	Kraft	No	177.EU0805	SDT (Kraft)	SCBR	1981
177	NEI33887	Verso Quinnesec LLC	Quinnesec	MI	Kraft	No	177.EU0905	Lime Kiln	SCBR	1981
178	NEI26309	International Paper	Cantonment	FL	Kraft	No	178.08P012	NDCE	DBESP	1989
178	NEI26309	International Paper	Cantonment	FL	Kraft	No	178.08P013	NDCE	DBESP	1989
178	NEI26309	International Paper	Cantonment	FL	Kraft	No	178.08T014	SDT (Kraft)	SCBR	1989
178	NEI26309	International Paper	Cantonment	FL	Kraft	No	178.08T015	SDT (Kraft)	SCBR	1989

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178	NEI26309	International Paper	Cantonment	FL	Kraft	No	178.09P037	Lime Kiln	ESP/SCBR	1995
179	NEI45474	Rock-Tenn Mill Company, LLC	Demopolis	AL	Kraft	No	179.LK3	Lime Kiln	ESP	1995
179	NEI45474	Rock-Tenn Mill Company, LLC	Demopolis	AL	Kraft	No	179.RF3	NDCE	DBESP	1992
179	NEI45474	Rock-Tenn Mill Company, LLC	Demopolis	AL	Kraft	No	179.SDT	SDT (Kraft)	SCBR	1992
180	NEI26471	Graphic Packaging International, Inc.	Macon	GA	Kraft, Secondary	No	180.D001	NDCE	DBESP	1992
180	NEI26471	Graphic Packaging International, Inc.	Macon	GA	Kraft, Secondary	No	180.D002	SDT (Kraft)	SCBR	1992
180	NEI26471	Graphic Packaging International, Inc.	Macon	GA	Kraft, Secondary	No	180.L001	Lime Kiln	SCBR	1996
180	NEI26471	Graphic Packaging International, Inc.	Macon	GA	Kraft, Secondary	No	180.L002	Lime Kiln	SCBR	1996
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.01	Lime Kiln	SCBR	1964
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.09		WBESP	1993
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.10		WBESP	1993
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.09/10	NDCE	WBESP	1993
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.11	SDT (Kraft)	SCBR	1993
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.14	Lime Kiln	SCBR	1976
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.49		DBESP	1990
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.50		DBESP	1990
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.49/50	NDCE	DBESP	1990
181	NEI6057	Graphic Packaging International Inc.	West Monroe	LA	Kraft, Secondary, SemiChem	No	181.51	SDT (Kraft)	SCBR	1990
182	NEI7181	PH Glatfelter	Spring Grove	PA	Kraft	No	182.037	NDCE	DBESP	1993
182	NEI7181	PH Glatfelter	Spring Grove	PA	Kraft	No	182.103	Calciner	SCBR	1966
182	NEI7181	PH Glatfelter	Spring Grove	PA	Kraft	No	182.110	SDT (Kraft)	SCBR	1993
183	NEI33103	Expera Old Town LLC	Old Town	ME	Kraft	No	183.002	NDCE	DBESP	1987
183	NEI33103	Expera Old Town LLC	Old Town	ME	Kraft	No	183.003	SDT (Kraft)	SCBR	1987
183	NEI33103	Expera Old Town LLC	Old Town	ME	Kraft	No	183.004	Lime Kiln	SCBR	1974
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.72	NDCE	DBESP-WPR	2000
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.73	NDCE	DBESP-WPR	2001
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.LK1	Lime Kiln	SCBR	2000

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184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.LK2	Lime Kiln	ESP/SCBR	2000
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.SDT1	SDT (Kraft)	SCBR	2000
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.SDT2a	SDT (Kraft)	SCBR	2001
184	NEI46817	Georgia-Pacific Consumer Operations LLC Port Hudson Operations	Zachary	LA	Kraft	No	184.SDT2b	SDT (Kraft)	SCBR	2001
185	NEI46599	Georgia Pacific Consumer Products (Camas), LLC	CAMAS	WA	Kraft	No	185.02	NDCE	DBESP/SCBR	2007
185	NEI46599	Georgia Pacific Consumer Products (Camas), LLC	CAMAS	WA	Kraft	No	185.05	SDT (Kraft)	PBSCBR	2007
185	NEI46599	Georgia Pacific Consumer Products (Camas), LLC	CAMAS	WA	Kraft	No	185.07	Lime Kiln	SCBR	2002
186	NEI18334	Georgia-Pacific Consumer Products LP (Naheola Mill)	Pennington	AL	Kraft	No	186.LK	Lime Kiln	ESP/SCBR	1992
186	NEI18334	Georgia-Pacific Consumer Products LP (Naheola Mill)	Pennington	AL	Kraft	No	186.RB15	NDCE	DBESP	1992
186	NEI18334	Georgia-Pacific Consumer Products LP (Naheola Mill)	Pennington	AL	Kraft	No	186.RB17	SDT (Kraft)	SCBR	1992
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.001LK1	Lime Kiln	SCBR	1956
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.002LK2	Lime Kiln	SCBR	1959
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.003LK3	Lime Kiln	SCBR	1963
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.014RB1	DCE	WBESP	1996
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.015SD1	SDT (Kraft)	SCBR	1996
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.016RB2	DCE	WBESP	1996
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.017SD2	SDT (Kraft)	SCBR	1996
188	NEI40600	Georgia-Pacific Toledo LLC	Toledo	OR	Kraft, Secondary, SemiChem	No	188.HBLBLO	BLO		1996
189	NEI54342	Georgia-Pacific LLC Crossett Paper Operations	Crossett	AR	Kraft	No	189.SN25	Lime Kiln	SCBR	1981
189	NEI54342	Georgia-Pacific LLC Crossett Paper Operations	Crossett	AR	Kraft	No	189.SN26	NDCE	WBESP	1981
189	NEI54342	Georgia-Pacific LLC Crossett Paper Operations	Crossett	AR	Kraft	No	189.SN27	SDT (Kraft)	SCBR	1981
189	NEI54342	Georgia-Pacific LLC Crossett Paper Operations	Crossett	AR	Kraft	No	189.SN28	SDT (Kraft)	SCBR	1981
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.L600	Lime Kiln	SCBR	1963

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190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.L601	Lime Kiln	SCBR	1967
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R400	NDCE	DBESP	1990
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R401	NDCE	DBESP	1991
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R402	NDCE	DBESP	1983
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R404	SDT (Kraft)	SCBR	1990
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R405	SDT (Kraft)	SCBR	1991
190	NEI26491	Georgia-Pacific Cedar Springs, LLC	Cedar Springs	GA	Kraft, Secondary, SemiChem	No	190.R406	SDT (Kraft)	SCBR	1983
195	NEI46835	Woodland Pulp LLC	Baileyville	ME	Kraft	Yes	195.002	Lime Kiln	SCBR	1965
195	NEI46835	Woodland Pulp LLC	Baileyville	ME	Kraft	Yes	195.003	NDCE	DBESP	1988
195	NEI46835	Woodland Pulp LLC	Baileyville	ME	Kraft	Yes	195.007	SDT (Kraft)	SCBR	1988
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-02	Lime Kiln	ESP	1991
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-06	NDCE	DBESP	1989
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-08North		SCBR	1989
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-08South		SCBR	1989
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-08North/South	SDT (Kraft)	SCBR	1989
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-09	Lime Kiln	SCBR	1979
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-14	NDCE	DBESP	1989
196	NEI18660	Domtar A.W. LLC	Ashdown	AR	Kraft	No	196.SN-15	SDT (Kraft)	SCBR	1989
197	NEI18657	Mondi Bags USA, LLC	Pine Bluff	AR	Kraft	No	197.1	Lime Kiln	SCBR	1957
197	NEI18657	Mondi Bags USA, LLC	Pine Bluff	AR	Kraft	No	197.12	BLO		1986
197	NEI18657	Mondi Bags USA, LLC	Pine Bluff	AR	Kraft	No	197.2	DCE	DBESP/SCBR	1986
197	NEI18657	Mondi Bags USA, LLC	Pine Bluff	AR	Kraft	No	197.4	SDT (Kraft)	SCBR	1986
198	NEI41565	AbiBow US Inc	Calhoun	TN	Kraft, Mechanical, Secondary	No	198.004	Lime Kiln	SCBR	1989
198	NEI41565	AbiBow US Inc	Calhoun	TN	Kraft, Mechanical, Secondary	No	198.019	NDCE	DBESP	1994
198	NEI41565	AbiBow US Inc	Calhoun	TN	Kraft, Mechanical, Secondary	No	198.020	SDT (Kraft)	SCBR	1994
199	NEI18390	Resolute Forest Products - Coosa Pines Operation	Coosa Pines	AL	Kraft	No	199.002	NDCE	DBESP	1997
199	NEI18390	Resolute Forest Products - Coosa Pines Operation	Coosa Pines	AL	Kraft	No	199.004	SDT (Kraft)	SCBR	1997
199	NEI18390	Resolute Forest Products - Coosa Pines Operation	Coosa Pines	AL	Kraft	No	199.011	Lime Kiln	SCBR	1975
200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No	200.007_10	Lime Kiln	ESP	1994
200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No	200.007_8	SDT (Kraft)	SCBR	1984
200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No	200.007_9	SDT (Kraft)	SCBR	2007
200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No	200.007RF2	NDCE	DBESP	1984

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200	NEI47077	Resolute Forest Products - Catawba Operations	Catawba	SC	Kraft, Mechanical	No	200.007RF3	NDCE	DB-WBESP [2-sided dry and wet]	2007
201	NEI7559	Boise Packaging and Newsprint, LLC	DeRidder	LA	Kraft, Mechanical, Secondary	No	201.SR0001	NDCE	DBESP	2001
201	NEI7559	Boise Packaging and Newsprint, LLC	DeRidder	LA	Kraft, Mechanical, Secondary	No	201.SR0003	Lime Kiln	SCBR	1969
201	NEI7559	Boise Packaging and Newsprint, LLC	DeRidder	LA	Kraft, Mechanical, Secondary	No	201.SR0034	SDT (Kraft)	SCBR	2001
202	NEI12411	Boise White Paper, LLC	International Falls	MN	Kraft	No	202.Lime Kiln EU340	Lime Kiln	CYC/SCBR	1990
202	NEI12411	Boise White Paper, LLC	International Falls	MN	Kraft	No	202.Recovery Furnace EU320	NDCE	DBESP	2001
202	NEI12411	Boise White Paper, LLC	International Falls	MN	Kraft	No	202.Smelt Dissolving Tank EU322	SDT (Kraft)	SCBR	2001
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No	203.2DTSr	SDT (Kraft)	SCBR	2000
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No	203.3DTSr	SDT (Kraft)	SCBR	2010
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No	203.LKScr	Lime Kiln	SCBR	1979
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No	203.RF#2	NDCE	DBESP	2000
203	NEI42410	Boise White Paper LLC	Wallula	WA	Kraft, Semichem	No	203.RF#3	NDCE	DBESP	2010
205	NEI8601	BOISE WHITE PAPER LLC	Jackson	AL	Kraft, Secondary	No	205.008	Lime Kiln	SCBR	1964
205	NEI8601	BOISE WHITE PAPER LLC	Jackson	AL	Kraft, Secondary	No	205.009	DCE	WBESP	1973
205	NEI8601	BOISE WHITE PAPER LLC	Jackson	AL	Kraft, Secondary	No	205.010	SDT (Kraft)	SCBR	1973
205	NEI8601	BOISE WHITE PAPER LLC	Jackson	AL	Kraft, Secondary	No	205.025	BLO		1973
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-31	DCE	WBESP	1991
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-32	DCE	WBESP	1992
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-34	BLO	TO/SCBR	1992
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-35	SDT (Kraft)	OTH	1991
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-36	SDT (Kraft)	OTH	1992
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-37	Lime Kiln	SCBR	1947
206	NEI40282	Blue Ridge Holding Company	Canton	NC	Kraft	No	206.G-38	Lime Kiln	SCBR	1954
207	NEI7104	Appleton Papers, Inc.	Roaring Spring	PA	Kraft	No	207.038	NDCE	DBESP	1983
207	NEI7104	Appleton Papers, Inc.	Roaring Spring	PA	Kraft	No	207.103A	Lime Kiln	SCBR	1966
207	NEI7104	Appleton Papers, Inc.	Roaring Spring	PA	Kraft	No	207.108	SDT (Kraft)	PBSCBR	1983
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.001	NDCE	DBESP	1978
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.002	SDT (Kraft)	SCBR	1978
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.003	Lime Kiln	SCBR	1978
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.007	NDCE	DBESP	1991
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.008	SDT (Kraft)	SCBR	1991
208228535	NEI18373	Alabama River Cellulose, LLC	Perdue Hill	AL	Kraft	No	208228535.009	Lime Kiln	ESP	1991
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.LK1	Lime Kiln	SCBR	1971
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.LK2	Lime Kiln	SCBR	1972
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.RECB1	NDCE	WBESP	1996
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.RECB2	NDCE	WBESP	1992

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226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.SDT1N	SDT (Kraft)	SCBR	1996
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.SDT1S	SDT (Kraft)	SCBR	1996
226	NEI33023	WestRock - Hodge Mill	Hodge	LA	Kraft, Secondary, SemiChem	No	226.SDT2	SDT (Kraft)	SCBR	1992
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.CA81	Lime Kiln	ESP	1989
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.RF01	NDCE	DBESP	1973
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.RF02	SDT (Kraft)	SCBR	1973
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.RF04	NDCE	DBESP	1982
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.RF05	SDT (Kraft)	SCBR	1982
240	NEI26526	Rayonier Performance Fibers, LLC	JESUP	GA	Kraft	No	240.RF06	SDT (Kraft)	SCBR	1982
242	NEI34066	Leaf River Cellulose, LLC	New Augusta	MS	Kraft	No	242.AA-011	NDCE	DBESP	1984
242	NEI34066	Leaf River Cellulose, LLC	New Augusta	MS	Kraft	No	242.AA-012	SDT (Kraft)	SCBR	1984
242	NEI34066	Leaf River Cellulose, LLC	New Augusta	MS	Kraft	No	242.AA-013	Lime Kiln	ESP/SCBR	1984
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No	243.LG07	Lime Kiln	ESP/SCBR	1986
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No	243.R401	NDCE	DBESP	1996
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No	243.R403	SDT (Kraft)	SCBR	1996
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No	243.R407	NDCE	DBESP	1990
243	NEI8196	GP Cellulose, LLC.	Brunswick	GA	Kraft	No	243.R408	SDT (Kraft)	SCBR	1990
340	NEI46852	Green Bay Packaging Inc.	Morrilton	AR	Kraft, Secondary	No	340.005	NDCE	DBESP	1975
340	NEI46852	Green Bay Packaging Inc.	Morrilton	AR	Kraft, Secondary	No	340.007	SDT (Kraft)	SCBR	1975
340	NEI46852	Green Bay Packaging Inc.	Morrilton	AR	Kraft, Secondary	No	340.008	Lime Kiln	SCBR	1975
525	NEI8265	Georgia Pacific Consumer Operations LLC	Palatka	FL	Kraft	No	525.EU17	Lime Kiln	SCBR	1976
525	NEI8265	Georgia Pacific Consumer Operations LLC	Palatka	FL	Kraft	No	525.EU18	NDCE	DBESP-WPR	2007
525	NEI8265	Georgia Pacific Consumer Operations LLC	Palatka	FL	Kraft	No	525.EU19North	SDT (Kraft)	SCBR	2007
525	NEI8265	Georgia Pacific Consumer Operations LLC	Palatka	FL	Kraft	No	525.EU19South	SDT (Kraft)	SCBR	2007
531	NEI8186	International Paper Company	Savannah	GA	Kraft, Secondary	No	531.LK7	Lime Kiln	ESP	1990
531	NEI8186	International Paper Company	Savannah	GA	Kraft, Secondary	No	531.RF10	SDT (Kraft)	SCBR	1995
531	NEI8186	International Paper Company	Savannah	GA	Kraft, Secondary	No	531.RF15	NDCE	DBESP	1995
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.LK4	Lime Kiln	ESP	1986
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.RB2	NDCE	DBESP	2010
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.RB3	NDCE	DBESP	2014
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.RB4	NDCE	DBESP	1975
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.SDT2	SDT (Kraft)	SCBR	2010

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606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.SDT3	SDT (Kraft)	SCBR	2014
606	NEI47091	Foley Cellulose LLC, Foley Mill	Perry	FL	Kraft	No	606.SDT4	SDT (Kraft)	SCBR	1975
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.10	SDT (Kraft)	SCBR	1975
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.4	NDCE	DBESP	1987
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.5	NDCE	DBESP	1975
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.7	Lime Kiln	SCBR	1965
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.8	Lime Kiln	SCBR	1975
610	NEI6261	Verso Androscoggin LLC	Jay	ME	Kraft, Mechanical	No	610.9	SDT (Kraft)	SCBR	1987
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.001L		DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.001R		DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.001L/001R	DCE	DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.002L		DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.002R		DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.002L/002R	DCE	DBESP	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.005	SDT (Kraft)	SCBR	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.006	SDT (Kraft)	SCBR	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.007	SDT (Kraft)	SCBR	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.008	SDT (Kraft)	SCBR	1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.009	Lime Kiln	SCBR	1968
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.UT-7	BLO		1991
613	NEI11172	Georgia Pacific Monticello LLC	Monticello	MS	Kraft, Secondary	No	613.UT-8	BLO		1991
615	NEI40554	Georgia-Pacific Consumer Products, LP	Clatskanie	OR	Kraft	No	615.21	Lime Kiln	SCBR	1966
615	NEI40554	Georgia-Pacific Consumer Products, LP	Clatskanie	OR	Kraft	No	615.24	NDCE	DBESP	2005
615	NEI40554	Georgia-Pacific Consumer Products, LP	Clatskanie	OR	Kraft	No	615.25	SDT (Kraft)	SCBR	2005
617	NEI42695	Domtar A.W. LLC	Nekoosa	WI	Kraft	No	617.B14	NDCE	DBESP	1991
617	NEI42695	Domtar A.W. LLC	Nekoosa	WI	Kraft	No	617.P21	SDT (Kraft)	PBSCBR	1991
617	NEI42695	Domtar A.W. LLC	Nekoosa	WI	Kraft	No	617.P22	Lime Kiln	ESP	1995
161	NEI7621	International Paper – Franklin, VA	Franklin	VA	Kraft	No	161.8	NDCE	DBESP-WPR	1977
161	NEI7621	International Paper – Franklin, VA	Franklin	VA	Kraft	No	161.11	SDT (Kraft)	SCBR	1977
161	NEI7621	International Paper – Franklin, VA	Franklin	VA	Kraft	No	161.12	Lime Kiln	SCBR	1977
700	NEI42351	Gores Group, LLC	Cosmopolis	WA	Sulfite-Mg	No	700.RB1	Sulfite Recovery: Sulfite Combustion Unit	SCBR	1957
700	NEI42351	Gores Group, LLC	Cosmopolis	WA	Sulfite-Mg	No	700.RB2	Sulfite Recovery: Sulfite Combustion Unit	SCBR	1957
700	NEI42351	Gores Group, LLC	Cosmopolis	WA	Sulfite-Mg	No	700.RB3	Sulfite Recovery: Sulfite Combustion Unit	SCBR	1966
106	NEI41599	Domtar Paper Company, LLC	Kingsport	TN	Soda	No	106.RF	NDCE (Soda)	WBESP	2002
106	NEI41599	Domtar Paper Company, LLC	Kingsport	TN	Soda	No	106.SDT	SDT (Soda)	SCBR/INC_RF	2002

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106	NEI41599	Domtar Paper Company, LLC	Kingsport	TN	Soda	No	106.LK	Lime Kiln (Soda)	ESP	2002
128	NEI11461	WestRock - Coshocton Mill	Coshocton	OH	Secondary, Semichem	No	128.N001	Semichem Recovery: Semichemical Combustion Unit	SCBR/PBSCBR/RT O	1966
128	NEI11461	WestRock - Coshocton Mill	Coshocton	OH	Secondary, Semichem	No	128.P005	SDT (Semichem)	None	1966
141	NEI46750	PACKAGING CORPORATION OF AMERICA-Tomahawk	Tomahawk	WI	SemiChem	No	141.B25	Semichem Recovery: Semichemical Combustion Unit	ESP	1990
141	NEI46750	PACKAGING CORPORATION OF AMERICA-Tomahawk	Tomahawk	WI	SemiChem	No	141.P32	SDT (Semichem)	SCBR	1990
187	NEI42211	GP Big Island, LLC	Big Island	VA	Secondary, Semichem	No	187.24	Semichem Recovery: Semichemical Combustion Unit	ESP	2009
187	NEI42211	GP Big Island, LLC	Big Island	VA	Secondary, Semichem	No	187.63	SDT (Semichem)	SCBR	2009
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes	193.320000-00312	Sulfite Recovery: Sulfite Combustion Unit	OTH	1987
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes	193.320000-00309	Sulfite Recovery: Sulfite Combustion Unit	OTH	1969
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes	193.320000-00310	Sulfite Recovery: Sulfite Combustion Unit	OTH	1969
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes	193.320000-00311	Sulfite Recovery: Sulfite Combustion Unit	OTH	1977
193	NEI39968	Finch Paper LLC	Glens Falls	NY	Sulfite-NH3	Yes	193.400000-00401	Sulfite Pulping (NH3) [NonMM]	OTH	
241	NEI26382	Rayonier Fernandina Mill	Fernandina Beach	FL	Sulfite-NH3	No	241.MSHA	Sulfite Pulping (NH3) [NonMM]	PBSCBR/COND	
241	NEI26382	Rayonier Fernandina Mill	Fernandina Beach	FL	Sulfite-NH3	No	241.RF06	Sulfite Recovery: Sulfite Combustion Unit	SCBR	1990
244	NEI43472	Sonoco Products Company	Hartsville	SC	SemiChem	No	244.R7330	Semichem Recovery: Semichemical Combustion Unit	TO/BH	1971
244	NEI43472	Sonoco Products Company	Hartsville	SC	SemiChem	No	244.DT	SDT (Semichem)	INC_RF	1971
245	NEI18347	WestRock - Stevenson Mill	Stevenson	AL	Secondary, Semichem	No	245.SB	NSSC Pulping [NonMM]	INC_RF	
245	NEI18347	WestRock - Stevenson Mill	Stevenson	AL	Secondary, Semichem	No	245.X014	NSSC Recovery: Semichemical Combustion Unit	DBESP/SCBR/ABS ORBER	2001
245	NEI18347	WestRock - Stevenson Mill	Stevenson	AL	Secondary, Semichem	No	245.DT	SDT (Semichem)	INC_RF	1997

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247	NEI33945	Packaging Corporation of America	Filer City	MI	Secondary, Semichem	No	247.CPLND	Semichem Recovery: Semichemical Combustion Unit	SCBR/WESP/RTO	1990
247	NEI33945	Packaging Corporation of America	Filer City	MI	Secondary, Semichem	No	247.DISTANK	SDT (Semichem)	SCBR	1990
304	NEIVA00022	Greif Packaging LLC	Riverville	VA	Secondary, Semichem	No	304.CR05	Semichem Recovery: Semichemical Combustion Unit	ESP	1975
304	NEIVA00022	Greif Packaging LLC	Riverville	VA	Secondary, Semichem	No	304.CR06	SDT (Semichem)	None	1975

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
100	NEI40686	23	0.027 gr/dscf				2440	4700	10400	128	31000	7600
100	NEI40686	23	0.2 lb/ton BLS				2440					
100	NEI40686	23	0.016 gr/dscf				2440		10400		31000	7600
102	NEI42341A	31	0.03 gr/dscf				2440	4700	10400	128	31000	7600
102	NEI42341A	14	0.027 gr/dscf (1-hour) and 0.02 gr/dscf (annual)				2440		10400		31000	7600
102	NEI42341A	14	0.12 lb/ton BLS				2440					
103	NEI9201	16	0.044 gr/dscf				2440	4700	10400	128	31000	7600
103	NEI9201	29	0.13 gr/dscf				2440					
103	NEI9201	16	0.2 lb/ton BLS (each)				2440					
104	NEI11251	10	0.015 gr/dscf	0.025 lb/ton BLS as methanol			5850	4700	10400	128	31000	7600
104	NEI11251	10	0.015 gr/dscf				2440					
104	NEI11251	11	0.064 gr/dscf				2440		10400		31000	7600
105	NEI45182	52			Not in operation							
105	NEI45182	52	0.044 gr/dscf		NA: Not in operation		0				0	0
105	NEI45182				Not in operation							
105	NEI45182				Not in operation							
105	NEI45182	52	0.2 lb/ton BLS		Not in operation		0					
105	NEI45182	9	0.044 gr/dscf				2440	4700	10400	128	31000	7600
105	NEI45182	9	0.2 lb/ton BLS				2440					
105	NEI45182	61	0.064 gr/dscf		NA: newer kiln constructed in 1964 is used; older kiln is backup		2440				31000	7600
107	NEI47074	20	0.021 gr/dscf				2440	4700	10400	128	31000	7600
107	NEI47074	20	0.199 lb/ton BLS				2440					
107	NEI47074	20	0.064 gr/dscf				2440		10400		31000	7600
108	NEI33025	42	0.064 gr/dscf				2440					
108	NEI33025	7	0.015 gr/dscf	0.025 lb/ton BLS as methanol			5850	4700	10400	128	31000	7600
108	NEI33025	7	0.12 lb/ton BLS				2440					
109	NEI32869A	19	0.064 gr/dscf				2440	4700	10400	128	31000	7600
109	NEI32869A	31	0.025 gr/dscf				2440		10400		31000	7600
109	NEI32869A	19	0.044 gr/dscf				2440		10400		31000	7600
109	NEI32869A	31	0.12 lb/ton BLS				2440					
109	NEI32869A	19	0.2 lb/ton BLS				2440					
111	NEI45206	7	0.2 lb/ton BLS				2440					
111	NEI45206	20	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440	4700	10400	128	31000	7600
111	NEI45206	7	0.044 gr/dscf				2440		10400		31000	7600
112	NEI34064	27	0.023 gr/dscf				2440	4700	10400	128	31000	7600
112	NEI34064	27	0.12 lb/ton BLS				2440					
112	NEI34064	26	0.033 gr/dscf				2440		10400		31000	7600
114	NEI26506	22	0.021 gr/dscf and 0.0298 gr/dscf				2440	4700	10400	128	31000	7600
114	NEI26506	22	0.2 lb/ton BLS				2440					
114	NEI26506	13	0.01 gr/dscf				2440		10400		31000	7600

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
115	NEI26476	26	0.064 gr/dscf				2440	4700	10400	128	31000	7600
115	NEI26476	16	0.044 gr/dscf				2440		10400		31000	7600
115	NEI26476	16	0.2 lb/ton BLS				2440					
116	NEI8619	48	0.064 gr/dscf				2440					
116	NEI8619	34	0.044 gr/dscf				2440	4700	10400	128	31000	7600
116	NEI8619	34	0.2 lb/ton BLS				2440					
117	NEI42689	21	0.027 gr/dscf and 0.034 gr/dscf				2440	4700	10400	128	31000	7600
117	NEI42689	21	0.18 lb/ton BLS				2440					
117	NEI42689	56	0.064 gr/dscf				2440					
119	NEI46814	52	0.2 lb/ton BLS				2440					
119	NEI46814	53	0.24 gr/dscf				2440					
119	NEI46814	52	0.02 gr/dscf				2440	4700	10400	128	31000	7600
119	NEI46814	27	0.029 gr/dscf (annual)				2440		10400		31000	7600
119	NEI46814	27	0.2 lb/ton BLS				2440					
119	NEI46814	52										
119	NEI46814	52										
120	NEI26495	28	0.021 gr/dscf and 0.0238 gr/dscf				2440	4700	10400	128	31000	7600
120	NEI26495	37	0.067 gr/dscf (NG), 0.106 gr/dscf (fuel oil)				2440					
120	NEI26495	40	0.067 gr/dscf (NG), 0.106 gr/dscf (fuel oil)				2440					
120	NEI26495	27	0.14 lb/ton BLS				2440					
121	NEI12492	49	0.2 lb/ton BLS				2440	4700		40		
121	NEI12492	49	0.2 lb/ton BLS				2440					
121	NEI12492	49	0.064 gr/dscf				2440					
121	NEI12492	49	0.044 gr/dscf				2440		10400		31000	7600
121	NEI12492	49	0.044 gr/dscf				2440		10400		31000	7600
121	NEI12492											
121	NEI12492											
121	NEI12492	49										
124	NEI8278	45	0.044 gr/dscf				2440	4700	10400	128	31000	7600
124	NEI8278	9	0.064 gr/dscf				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
124	NEI8278	44	0.044 gr/dscf				2440		10400		31000	7600
124	NEI8278	44	0.2 lb/ton BLS				2440					
124	NEI8278	45	0.2 lb/ton BLS				2440					
124	NEI8278	44										
126	NEI42317	44	0.064 gr/dscf				2440	4700	10400	128	31000	7600
126	NEI42317	21	0.044 gr/dscf				2440		10400		31000	7600
126	NEI42317	21	0.2 lb/ton BLS				2440					
127	NEI7933	53	0.064 gr/dscf				2440	4700	10400	128	31000	7600
127	NEI7933	43	0.064 gr/dscf				2440		10400		31000	7600
127	NEI7933	25	0.044 gr/dscf				2440		10400		31000	7600
127	NEI7933	25	0.2 lb/ton BLS				2440					
130	NEI18338	59	0.044 gr/dscf			replace 2 small DCEs w/ single larger NDCE	5850	4700	10400	128	31000	7600
130	NEI18338	14	0.2 lb/ton BLS				2440					
130	NEI18338	52	0.044 gr/dscf			replace 2 small DCEs w/ single larger NDCE						
130	NEI18338	52				remove						
130	NEI18338	14	0.025 gr/dscf				2440		10400		31000	7600
130	NEI18338	59	0.064 gr/dscf				2440					
130	NEI18338	52	0.064 gr/dscf				2440					
130	NEI18338	59	0.2 lb/ton BLS			replace with single SDT serving new NDCE	2440					
130	NEI18338	52	0.2 lb/ton BLS			replace with single SDT serving new NDCE						
131	NEI42254	34	0.064 gr/dscf (NG), 0.2 gr/dscf (fuel oil)				2440					
131	NEI42254	60	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
131	NEI42254	41	0.035 gr/dscf				2440	4700	10400	128	31000	7600
131	NEI42254	25	0.03 gr/dscf				2440		10400		31000	7600
131	NEI42254	41										
131	NEI42254											
131	NEI42254											
131	NEI42254	41	0.2 lb/ton BLS				2440					
131	NEI42254	25	0.2 lb/ton BLS				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
132	NEI8261	27	0.064 gr/dscf				2440	4700	10400	128	31000	7600
132	NEI8261	46	0.044 gr/dscf				2440		10400		31000	7600
132	NEI8261	13	0.2 lb/ton BLS				2440					
132	NEI8261	39	0.044 gr/dscf				2440		10400		31000	7600
132	NEI8261	39	0.2 lb/ton BLS				2440					
133	NEI13363	14	0.044 gr/dscf				2440	4700	10400	128	31000	7600
133	NEI13363	15	0.3 lb/ton BLS				2440					
133	NEI13363	15	0.3 lb/ton BLS				2440					
133	NEI13363	56	0.13 gr/dscf				2440					
133	NEI13363	43	0.13 gr/dscf				2440					
135	NEI33118	6	0.038 gr/dscf				2440	4700	10400	128	31000	7600
135	NEI33118	40	0.064 gr/dscf				2440					
135	NEI33118	6	0.2 lb/ton BLS		assume rebuilt with NDCE		2440					
135	NEI33118	6	0.2 lb/ton BLS		assume rebuilt with NDCE		2440					
136	NEI12368	18	0.025 gr/dscf				2440	4700	10400	128	31000	7600
136	NEI12368	18	0.12 lb/ton BLS				2440					
136	NEI12368	17	0.035 gr/dscf				2440		10400		31000	7600
137	NEI26581	26	0.2 lb/ton BLS				2440					
137	NEI26581	26	0.04 gr/dscf				2440	4700	10400	128	31000	7600
137	NEI26581	29	0.2 lb/ton BLS				2440					
137	NEI26581	58	0.064 gr/dscf				2440		10400		31000	7600
137	NEI26581	41	0.064 gr/dscf				2440		10400		31000	7600
137	NEI26581	29	0.044 gr/dscf				2440		10400		31000	7600
138	NEI18652	40	0.064 gr/dscf				2440					
138	NEI18652	25	0.0294 gr/dscf				2440	4700	10400	128	31000	7600
138	NEI18652	25	0.2 lb/ton BLS				2440					
139	NEI42357	47	0.044 gr/dscf (3-hour) and 0.05 gr/dscf (1-hour)				2440	4700	10400	128	31000	7600
139	NEI42357	47	0.2 lb/ton BLS (3-hour) and 0.3 lb/ton BLS (1-hour)				2440					
139	NEI42357	41	0.064 gr/dscf				2440					
140	NEI13340	48	0.064 gr/dscf				2440					
140	NEI13340	48	0.044 gr/dscf				2440	4700	10400	128	31000	7600

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
140	NEI13340	48	0.2 lb/ton BLS				2440					
142	NEI41552	5	0.044 gr/dscf				2440	4700	10400	128	31000	7600
142	NEI41552	17	0.044 gr/dscf				2440		10400		31000	7600
142	NEI41552	5	0.044 gr/dscf				2440		10400		31000	7600
142	NEI41552	41	0.064 gr/dscf				2440					
142	NEI41552	56	0.064 gr/dscf				2440					
142	NEI41552	17	0.2 lb/ton BLS				2440					
142	NEI41552	31	0.2 lb/ton BLS (each)				2440					
143	NEI26504	24	0.064 gr/dscf				2440	4700	10400	128	31000	7600
143	NEI26504	7	0.015 gr/dscf	0.025 lb/ton BLS as methanol			2440		10400		31000	7600
143	NEI26504	7	0.015 gr/dscf				2440					
145	NEI33135	30				reduce throughput because would only serve 1 DCE						
145	NEI33135	57	0.044 gr/dscf			replace w/ NDCE	5850				31000	7600
145	NEI33135	30	0.044 gr/dscf				2440	4700	10400	128	31000	7600
145	NEI33135	57	0.2 lb/ton BLS			replace SDT	2440					
145	NEI33135	30	0.2 lb/ton BLS				2440					
145	NEI706	50	0.064 gr/dscf				2440					
146	NEI759	20	0.2 lb/ton BLS				2440					
146	NEI759	25	0.027 gr/dscf				2440	4700	10400	128	31000	7600
146	NEI759	25	0.15 lb/ton BLS (monthly)				2440					
146	NEI759	20										
146	NEI759	18	0.02 gr/dscf (3-hour), 0.015 gr/dscf (annual) and 0.018 gr/dscf (3-hour), and 0.013 gr/dscf (annual)				2440		10400		31000	7600
146	NEI759	66	0.064 gr/dscf				2440					
146	NEI759	20	0.044 gr/dscf				2440		10400		31000	7600
147	NEI6450	13	0.044 gr/dscf				2440	4700	10400	128	31000	7600
147	NEI6450	13	0.2 lb/ton BLS				2440					
147	NEI6450	13	0.2 lb/ton BLS				2440					
147	NEI6450	13	0.2 lb/ton BLS				2440					
147	NEI6450	36	0.064 gr/dscf				2440					
147	NEI6450	13	0.044 gr/dscf				2440		10400		31000	7600
147	NEI6450	6	0.064 gr/dscf				2440		10400		31000	7600
148	NEI46931	20	0.036 gr/dscf				2440	4700	10400	128	31000	7600
148	NEI46931	20	0.2 lb/ton BLS				2440					
148	NEI46931	50	0.192 gr/dscf				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
148	NEI46931	26	0.028 gr/dscf				2440		10400		31000	7600
148	NEI46931	26	0.2 lb/ton BLS				2440					
148	NEI46931	26	0.035 gr/dscf (NG), 0.064 gr/dscf (fuel oil)				2440		10400		31000	7600
149	NEI40488	17	0.021 gr/dscf				2440	4700	10400	128	31000	7600
149	NEI40488	55	0.064 gr/dscf				2440					
149	NEI40488	17	0.2 lb/ton BLS				2440					
150	NEI6273	27	0.064 gr/dscf				2440					
150	NEI6273	24	0.044 gr/dscf				2440	4700	10400	128	31000	7600
150	NEI6273											
150	NEI6273											
150	NEI6273	24	0.192 lb/ton BLS and 0.19 lb/ton BLS				2440					
151	NEI41252	26	0.064 gr/dscf				2440					
151	NEI41252	26	0.0125 gr/dscf				2440	4700	10400	128	31000	7600
151	NEI41252	33										
151	NEI41252	32	0.027 gr/dscf				2440		10400		31000	7600
151	NEI41252											
151	NEI41252											
151	NEI41252	32	0.2 lb/ton BLS				2440					
151	NEI41252	33	0.057 gr/dscf				2440		10400		31000	7600
151	NEI41252	33	0.2 lb/ton BLS				2440					
151	NEI41252	33	0.2 lb/ton BLS				2440					
152	NEI11338	47	0.044 gr/dscf				2440	4700	10400	128	31000	7600
152	NEI11338	47	0.2 lb/ton BLS				2440					
152	NEI11338	47										
152	NEI11338	47	0.064 gr/dscf				2440					
153	NEI33043	28	0.064 gr/dscf				2440	4700		40		
153	NEI33043	18	0.044 gr/dscf	0.054 lb/ton BLS as methanol			2440					
153	NEI33043	18	0.2 lb/ton BLS				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
154	NEI46739	27	0.04 gr/dscf (NG), 0.064 gr/dscf (fuel oil)				2440	4700	10400	128	31000	7600
154	NEI46739	21	0.46 lb/ton BLS				2440					
154	NEI46739	29	0.46 lb/ton BLS				2440					
154	NEI46739	29	0.039 gr/dscf and 0.0287 gr/dscf				2440		10400		31000	7600
154	NEI46739	27	0.033 gr/dscf and 0.0257 gr/dscf				2440		10400		31000	7600
154	NEI46739	27	0.12 lb/ton BLS				2440					
154	NEI46739	21	0.0303 gr/dscf				2440		10400		31000	7600
154	NEI46739											
154	NEI46739											
154	NEI46739	21										
155	NEI33883	44	0.064 gr/dscf				2440					
155	NEI33883	22	0.033 gr/dscf (1-hour)				2440	4700	10400	128	31000	7600
155	NEI33883	22	0.2 lb/ton BLS				2440					
156	NEI42338	24	0.03 gr/dscf				2440	4700		40		
156	NEI42338	24	0.03 gr/dscf				2440					
156	NEI42338	15										
156	NEI42338	34	0.035 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440		10400		31000	7600
156	NEI42338	51	0.044 gr/dscf (1-hour)		NA: Not in operation		0		0		0	0
156	NEI42338	15	0.04 gr/dscf (1-hour)				2440		10400		31000	7600
156	NEI42338	24	0.027 gr/dscf				2440		10400		31000	7600
156	NEI42338	51	0.12 lb/ton BLS (1-hour)		Not in operation		0					
156	NEI42338	15	0.12 lb/ton BLS (1-hour)				2440					
156	NEI42338	24	0.12 lb/ton BLS (1-hour)				2440					
159	NEI8177	25	0.2 lb/ton BLS				2440	4700		40		
159	NEI8177	25	0.044 gr/dscf				2440					
159	NEI8177	48	0.064 gr/dscf				2440					
162	NEI46760	34	0.13 gr/dscf				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
162	NEI46760	27	0.1 gr/dscf				2440	4700	10400	128	31000	7600
162	NEI46760	34	0.044 gr/dscf				2440		10400		31000	7600
162	NEI46760	34	0.2 lb/ton BLS				2440					
162	NEI46760	27	0.03 gr/dscf				2440		10400		31000	7600
162	NEI46760	27	0.2 lb/ton BLS				2440					
163	NEI8560											
163	NEI8560											
163	NEI8560	9										
163	NEI8560	49	0.067 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440	4700		40		
163	NEI8560	36	0.067 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
163	NEI8560	9	0.023 gr/dscf				2440		10400		31000	7600
163	NEI8560	36	0.024 gr/dscf				2440		10400		31000	7600
163	NEI8560	9	0.25 lb/ton BLS				2440					
163	NEI8560	9	0.25 lb/ton BLS				2440					
163	NEI8560	36	0.19 lb/ton BLS				2440					
164	NEI42710	20	0.036 gr/dscf				2440	4700	10400	128	31000	7600
164	NEI42710	21	0.036 gr/dscf				2440		10400		31000	7600
164	NEI42710	20	0.246 lb/ton BLS				2440					
164	NEI42710	21	0.246 lb/ton BLS				2440					
164	NEI42710	30	0.067 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
165	NEI41628	41	0.064 gr/dscf				2440					
165	NEI41628	25	0.044 gr/dscf				2440	4700	10400	128	31000	7600
165	NEI41628	25	0.2 lb/ton BLS				2440					
165	NEI41628	26	0.044 gr/dscf				2440		10400		31000	7600
165	NEI41628	26	0.2 lb/ton BLS				2440					
165	NEI41628	44	0.064 gr/dscf				2440					
166	NEI41314											
166	NEI41314											
166	NEI41314	27										
166	NEI41314	53	0.064 gr/dscf				2440					
166	NEI41314	37	0.13 gr/dscf				2440					
166	NEI41314	33	0.044 gr/dscf				2440	4700	10400	128	31000	7600
166	NEI41314	27	0.043 gr/dscf				2440		10400		31000	7600
166	NEI41314	33	0.2 lb/ton BLS				2440					
166	NEI41314	27	0.2 lb/ton BLS				2440					
167	NEI34070	49	0.064 gr/dscf				2440					
167	NEI34070	49	0.041 gr/dscf				2440	4700	10400	128	31000	7600
167	NEI34070	49	0.364 lb/ton BLS				2440					
167	NEI34070	49										
169	NEI33013	35	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
169	NEI33013	22	0.02 gr/dscf (annual) and 0.044 gr/dscf (3-hour)				2440	4700	10400	128	31000	7600

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
169	NEI33013	21	0.02 gr/dscf (annual) and 0.044 gr/dscf (3-hour)				2440		10400		31000	7600
169	NEI33013	22	0.2 lb/ton BLS				2440					
169	NEI33013	21	0.2 lb/ton BLS				2440					
171	NEI18658	26	0.044 gr/dscf	0.514 lb/ton BLS as methanol			2440		10400		31000	7600
171	NEI18658	26	0.044 gr/dscf	0.546 lb/ton BLS as methanol			2440		10400		31000	7600
171	NEI18658	25	0.044 gr/dscf	0.447 lb/ton BLS as methanol			2440	4700	10400	128	31000	7600
171	NEI18658	26	0.2 lb/ton BLS				2440					
171	NEI18658	26	0.2 lb/ton BLS				2440					
171	NEI18658	25	0.2 lb/ton BLS				2440					
171	NEI18658	58	0.064 gr/dscf				2440					
171	NEI18658	52	0.064 gr/dscf				2440					
171	NEI18658	25										
172	NEI18335	30	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
172	NEI18335	34	0.024 gr/dscf				2440	4700	10400	128	31000	7600
172	NEI18335	29	0.044 gr/dscf				2440		10400		31000	7600
172	NEI18335	34	0.2 lb/ton BLS				2440					
172	NEI18335	29	0.2 lb/ton BLS				2440					
173	NEI35908	46	0.15 gr/dscf				2440					
173	NEI35908	46	0.03 gr/dscf				2440	4700	10400	128	31000	7600
173	NEI35908	46	0.2 lb/ton BLS				2440					
174	NEI40247	18	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440	4700	10400	128	31000	7600
174	NEI40247	34	0.043 gr/dscf				2440		10400		31000	7600
174	NEI40247	42										
174	NEI40247	42	0.2 lb/ton BLS				2440					
174	NEI40247	34	0.2 lb/ton BLS				2440					
174	NEI40247	42	0.051 gr/dscf				2440		10400		31000	7600
174	NEI40247	40	0.064 gr/dscf				2440					
175	NEI26514	27										
175	NEI26514	56	0.176 gr/dscf				2440					
175	NEI26514	29	0.064 gr/dscf				2440					
175	NEI26514	27	0.055 gr/dscf				2440	4700	10400	128	31000	7600
175	NEI26514	28	0.021 gr/dscf				2440		10400		31000	7600
175	NEI26514	27	0.585 lb/ton BLS				2440					
175	NEI26514	28	0.2 lb/ton BLS				2440					
176	NEI47104	19	0.2 lb/ton BLS				2440					
176	NEI47104	55	0.064 gr/dscf				2440					
176	NEI47104	19	0.021 gr/dscf				2440	4700	10400	128	31000	7600
177	NEI33887	35	0.027 gr/dscf				2440	4700	10400	128	31000	7600
177	NEI33887	35	0.2 lb/ton BLS				2440					
177	NEI33887	35	0.064 gr/dscf				2440					
178	NEI26309	27	0.042 gr/dscf				2440	4700	10400	128	31000	7600
178	NEI26309	27	0.042 gr/dscf				2440		10400		31000	7600
178	NEI26309	27	0.2 lb/ton BLS				2440					
178	NEI26309	27	0.2 lb/ton BLS				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
178	NEI26309	21	0.03 gr/dscf				2440		10400		31000	7600
179	NEI45474	21	0.035 gr/dscf (NG), 0.064 gr/dscf (fuel oil)				2440	4700	10400	128	31000	7600
179	NEI45474	24	0.021 gr/dscf				2440		10400		31000	7600
179	NEI45474	24	0.12 lb/ton BLS				2440					
180	NEI26471	24	0.027 gr/dscf				2440	4700	10400	128	31000	7600
180	NEI26471	24	0.12 lb/ton BLS				2440					
180	NEI26471	20	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
180	NEI26471	20	0.064 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
181	NEI6057	52	0.064 gr/dscf				2440	4700		40		
181	NEI6057											
181	NEI6057											
181	NEI6057	23	0.044 gr/dscf				2440	4700	10400	128	31000	7600
181	NEI6057	23	0.2 lb/ton BLS				2440					
181	NEI6057	40	0.064 gr/dscf				2440					
181	NEI6057											
181	NEI6057											
181	NEI6057	26	0.044 gr/dscf				2440		10400		31000	7600
181	NEI6057	26	0.2 lb/ton BLS				2440					
182	NEI7181	23	0.027 gr/dscf				2440	4700	10400	128	31000	7600
182	NEI7181	50	0.064 gr/dscf				2440					
182	NEI7181	23	0.2 lb/ton BLS				2440					
183	NEI33103	29	0.028 gr/dscf				2440	4700	10400	128	31000	7600
183	NEI33103	29	0.12 lb/ton BLS				2440					
183	NEI33103	42	0.13 gr/dscf				2440					
184	NEI46817	16	0.044 gr/dscf				2440		10400		31000	7600
184	NEI46817	15	0.044 gr/dscf				2440	4700	10400	128	31000	7600
184	NEI46817	16	0.064 gr/dscf				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
184	NEI46817	16	0.064 gr/dscf				2440		10400		31000	7600
184	NEI46817	16	0.2 lb/ton BLS				2440					
184	NEI46817	15	0.2 lb/ton BLS				2440					
184	NEI46817	15	0.2 lb/ton BLS				2440					
185	NEI46599	9	0.033 gr/dscf				2440	4700	10400	128	31000	7600
185	NEI46599	9	0.12 lb/ton BLS				2440					
185	NEI46599	14	0.067 gr/dscf (NG), 0.13 gr/dscf (fuel oil)				2440					
186	NEI18334	24	0.065 gr/dscf				2440	4700	10400	128	31000	7600
186	NEI18334	24	0.024 gr/dscf				2440		10400		31000	7600
186	NEI18334	24	0.2 lb/ton BLS				2440					
188	NEI40600	60	0.12 gr/dscf				2440					
188	NEI40600	57	0.12 gr/dscf				2440					
188	NEI40600	53	0.12 gr/dscf				2440					
188	NEI40600	20	0.044 gr/dscf (daily) and 0.033 gr/dscf (1-hour)				2440	4700	10400	128	31000	7600
188	NEI40600	20	0.23 lb/ton BLS				2440					
188	NEI40600	20	0.044 gr/dscf (daily) and 0.033 gr/dscf (1-hour)				2440		10400		31000	7600
188	NEI40600	20	0.26 lb/ton BLS				2440					
188	NEI40600	20										
189	NEI54342	35	0.064 gr/dscf				2440					
189	NEI54342	35	0.02 gr/dscf	0.007 lb/ton BLS as methanol			2440	4700	10400	128	31000	7600
189	NEI54342	35	0.2 lb/ton BLS				2440					
189	NEI54342	35	0.2 lb/ton BLS				2440					
190	NEI26491	53	0.064 gr/dscf				2440					

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											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
190	NEI26491	49	0.056 gr/dscf				2440					
190	NEI26491	26	0.03 gr/dscf				2440	4700	10400	128	31000	7600
190	NEI26491	25	0.03 gr/dscf				2440		10400		31000	7600
190	NEI26491	33	0.024 gr/dscf				2440		10400		31000	7600
190	NEI26491	26	0.12 lb/ton BLS				2440					
190	NEI26491	25	0.2 lb/ton BLS				2440					
190	NEI26491	33	0.53 lb/ton BLS				2440					
195	NEI46835	51	0.064 gr/dscf				2440					
195	NEI46835	28	0.021 gr/dscf				2440	4700	10400	128	31000	7600
195	NEI46835	28	0.127 lb/ton BLS				2440					
196	NEI18660	25	0.034 gr/dscf				2440		10400		31000	7600
196	NEI18660	27	0.044 gr/dscf				2440	4700	10400	128	31000	7600
196	NEI18660											
196	NEI18660											
196	NEI18660	27	0.2 lb/ton BLS				2440					
196	NEI18660	37	0.064 gr/dscf				2440					
196	NEI18660	27	0.044 gr/dscf				2440		10400		31000	7600
196	NEI18660	27	0.2 lb/ton BLS				2440					
197	NEI18657	59	0.064 gr/dscf				2440					
197	NEI18657	30										
197	NEI18657	30	0.044 gr/dscf	0.24 lb/ton BLS as methanol			2440	4700	10400	128	31000	7600
197	NEI18657	30	0.2 lb/ton BLS				2440					
198	NEI41565	27	0.064 gr/dscf				2440					
198	NEI41565	22	0.027 gr/dscf				2440	4700	10400	128	31000	7600
198	NEI41565	22	0.12 lb/ton BLS				2440					
199	NEI18390	19	0.044 gr/dscf				2440	4700	10400	128	31000	7600
199	NEI18390	19	0.2 lb/ton BLS				2440					
199	NEI18390	41	0.064 gr/dscf				2440					
200	NEI47077	22	0.03 gr/dscf				2440	4700	10400	128	31000	7600
200	NEI47077	32	0.2 lb/ton BLS				2440					
200	NEI47077	9	0.2 lb/ton BLS				2440					
200	NEI47077	32	0.044 gr/dscf				2440		10400		31000	7600

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
200	NEI47077	9	0.025 gr/dscf				2440		10400		31000	7600
201	NEI7559	15	0.044 gr/dscf				2440	4700	10400	128	31000	7600
201	NEI7559	47	0.064 gr/dscf				2440					
201	NEI7559	15	0.2 lb/ton BLS				2440					
202	NEI12411	26	0.066 gr/dscf				2440					
202	NEI12411	15	0.044 gr/dscf				2440	4700	10400	128	31000	7600
202	NEI12411	15	0.12 lb/ton BLS				2440					
203	NEI42410	16	0.2 lb/ton BLS				2440					
203	NEI42410	6	0.2 lb/ton BLS				2440					
203	NEI42410	37	0.064 gr/dscf				2440					
203	NEI42410	16	0.044 gr/dscf				2440	4700	10400	128	31000	7600
203	NEI42410	6	0.027 gr/dscf (1-hour) and 0.021 gr/dscf (rolling annual)				2440		10400		31000	7600
205	NEI8601	52	0.064 gr/dscf				2440					
205	NEI8601	43	0.044 gr/dscf				2440	4700	10400	128	31000	7600
205	NEI8601	43	0.2 lb/ton BLS				2440					
205	NEI8601	43										
206	NEI40282	25	0.032 gr/dscf				2440	4700	10400	128	31000	7600
206	NEI40282	24	0.032 gr/dscf				2440		10400		31000	7600
206	NEI40282	24										
206	NEI40282	25	0.2 lb/ton BLS				2440					
206	NEI40282	24	0.2 lb/ton BLS				2440					
206	NEI40282	69	0.1 gr/dscf			replace LK	2440				31000	7600
206	NEI40282	62	0.1 gr/dscf				2440					
207	NEI7104	33	0.044 gr/dscf				2440	4700	10400	128	31000	7600
207	NEI7104	50	0.066 gr/dscf				2440					
207	NEI7104	33	0.2 lb/ton BLS				2440					
208228535	NEI18373	38	0.025 gr/dscf				2440	4700	10400	128	31000	7600
208228535	NEI18373	38	0.2 lb/ton BLS				2440					
208228535	NEI18373	38	0.064 gr/dscf				2440					
208228535	NEI18373	25	0.025 gr/dscf				2440		10400		31000	7600
208228535	NEI18373	25	0.2 lb/ton BLS				2440					
208228535	NEI18373	25	0.064 gr/dscf				2440		10400		31000	7600
226	NEI33023	45	0.064 gr/dscf				2440					
226	NEI33023	44	0.064 gr/dscf				2440					
226	NEI33023	20	0.044 gr/dscf				2440	4700	10400	128	31000	7600
226	NEI33023	24	0.044 gr/dscf				2440		10400		31000	7600

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
226	NEI33023	20	0.2 lb/ton BLS				2440					
226	NEI33023	20	0.2 lb/ton BLS				2440					
226	NEI33023	24	0.2 lb/ton BLS				2440					
240	NEI26526	27	0.064 gr/dscf				2440	4700	10400	128	31000	7600
240	NEI26526	43	0.044 gr/dscf				2440		10400		31000	7600
240	NEI26526	43	0.2 lb/ton BLS				2440					
240	NEI26526	34	0.044 gr/dscf				2440		10400		31000	7600
240	NEI26526	34	0.2 lb/ton BLS				2440					
240	NEI26526	34	0.2 lb/ton BLS				2440					
242	NEI34066	32	0.044 gr/dscf				2440	4700	10400	128	31000	7600
242	NEI34066	32	0.2 lb/ton BLS				2440					
242	NEI34066	32	0.064 gr/dscf				2440		10400		31000	7600
243	NEI8196	30	0.01 gr/dscf				2440	4700	10400	128	31000	7600
243	NEI8196	20	0.021 gr/dscf				2440		10400		31000	7600
243	NEI8196	20	0.2 lb/ton BLS				2440					
243	NEI8196	26	0.021 gr/dscf				2440		10400		31000	7600
243	NEI8196	26	0.2 lb/ton BLS				2440					
340	NEI46852	41	0.044 gr/dscf	0.058 lb/ton BLS as methanol			2440	4700	10400	128	31000	7600
340	NEI46852	41	0.2 lb/ton BLS				2440					
340	NEI46852	41	0.064 gr/dscf				2440					
525	NEI8265	40	0.064 gr/dscf				2440					
525	NEI8265	9	0.03 gr/dscf				2440	4700	10400	128	31000	7600
525	NEI8265	9	0.12 lb/ton BLS				2440					
525	NEI8265	9	0.12 lb/ton BLS				2440					
531	NEI8186	26	0.064 gr/dscf				2440	4700	10400	128	31000	7600
531	NEI8186	21	0.15 lb/ton BLS				2440					
531	NEI8186	21	0.044 gr/dscf				2440		10400		31000	7600
606	NEI47091	30	0.0451 gr/dscf				2440	4700	10400	128	31000	7600
606	NEI47091	6	0.03 gr/dscf		NA: Low-odor conversion in 2010		2440		10400		31000	7600
606	NEI47091	2	0.03 gr/dscf		NA: RF conversion commenced in 2010/completed in 2014		2440		10400		31000	7600
606	NEI47091	41	0.044 gr/dscf				2440		10400		31000	7600
606	NEI47091	6	0.2 lb/ton BLS		NA: Low-odor conversion in 2010		2440					

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
606	NEI47091	2	0.2 lb/ton BLS		NA: RF conversion commended in 2014/completed in 2014		2440					
606	NEI47091	41	0.2 lb/ton BLS				2440					
610	NEI6261	41	0.13 lb/ton BLS				2440					
610	NEI6261	29	0.035 gr/dscf				2440				shares ESP with unit 610.5	shares ESP with unit 610.5
610	NEI6261	41	0.035 gr/dscf				2440	4700	10400	128	31000	7600
610	NEI6261	51	0.13 gr/dscf				2440					
610	NEI6261	41	0.064 gr/dscf				2440					
610	NEI6261	29	0.31 lb/ton BLS				2440					
613	NEI11172											
613	NEI11172											
613	NEI11172	25	0.044 gr/dscf				2440	4700	10400	128	31000	7600
613	NEI11172											
613	NEI11172											
613	NEI11172	25	0.044 gr/dscf				2440		10400		31000	7600
613	NEI11172	25	0.2 lb/ton BLS				2440					
613	NEI11172	25	0.2 lb/ton BLS				2440					
613	NEI11172	25	0.2 lb/ton BLS				2440					
613	NEI11172	25	0.2 lb/ton BLS				2440					
613	NEI11172	48	0.064 gr/dscf				2440					
613	NEI11172	25										
613	NEI11172	25										
615	NEI40554	50	0.2 gr/dscf (24-hour)				2440					
615	NEI40554	11	0.044 gr/dscf (daily as determined by opacity correlation)				2440	4700	10400	128	31000	7600
615	NEI40554	11	0.2 lb/ton BLS				2440					
617	NEI42695	25	0.03 gr/dscf				2440		10400		31000	7600
617	NEI42695	25	0.13 lb/ton BLS				2440					
617	NEI42695	21	0.05 gr/dscf				2440	4700	10400	128	31000	7600
161	NEI7621	39	0.075 gr/dscf				2440	4700	10400	128	31000	7600
161	NEI7621	39	0.46875 lb/ton BLS				2440					
161	NEI7621	39	0.021 gr/dscf				2440					
700	NEI42351	59	0.1 gr/dscf (all 3 units)				2440	4700		40		
700	NEI42351	59	0.1 gr/dscf (all 3 units)				2440					
700	NEI42351	50	0.1 gr/dscf (all 3 units)				2440					
106	NEI41599	14	0.015 gr/dscf	0.025 lb/ton BLS as methanol			5850	4700	10400	128	31000	7600
106	NEI41599	14	0.015 gr/dscf				2440					

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
106	NEI41599	14	0.01 gr/dscf				2440		10400		31000	7600
128	NEI11461	50		2.97 lb/ton BLS as THC	Mill closed November 2015		0	0		0		
128	NEI11461	50			Mill closed November 2015							
141	NEI46750	26		2.97 lb/ton BLS as THC			3410	4700		40		
141	NEI46750	26										
187	NEI42211	7		2.97 lb/ton BLS as THC			3410	4700		40		
187	NEI42211	7										
193	NEI39968	29	0.05 gr/dscf (all 4 units)				2440	4700		40		
193	NEI39968	47	0.05 gr/dscf (all 4 units)				2440					
193	NEI39968	47	0.05 gr/dscf (all 4 units)				2440					
193	NEI39968	39	0.05 gr/dscf (all 4 units)				2440					
193	NEI39968											
241	NEI26382											
241	NEI26382	26	0.04 gr/dscf				2440	4700		40		
244	NEI43472	45		2.97 lb/ton BLS as THC			3410	4700		40		
244	NEI43472	45										
245	NEI18347											
245	NEI18347	15		2.97 lb/ton BLS as THC			3410					
245	NEI18347	19										

RTI Code	Final NEISiteID	Effective age for determining impact (2016 - yr)	PM permit limit (subpart MM)	Gaseous organic HAP permit limit (subpart MM)	Operating Status Note	Projection	Additional 5-yr periodic testing costs, annualized \$2015/yr	Incremental R&R costs, initial (\$2015)	Incremental R&R costs, annual (\$2015)	Incremental R&R labor hours, hr/yr	RF and ESP-controlled LK	
											ESP parameter monitoring, capital (\$2015)	ESP parameter monitoring, annualized (\$2015)
247	NEI33945	26		2.97 lb/ton BLS as THC			3410	4700		40		
247	NEI33945	26										
304	NEIVA00022	41		2.97 lb/ton BLS as THC			3410	4700		40		
304	NEIVA00022	41										
							\$ 1,106,230	\$ 502,900	\$ 1,872,000	12,464	\$ 5,673,000	\$ 1,390,800

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
100	NEI40686												
100	NEI40686												
100	NEI40686												
102	NEI42341A												
102	NEI42341A												
102	NEI42341A												
103	NEI9201												
103	NEI9201												
103	NEI9201												
104	NEI11251												
104	NEI11251												
104	NEI11251												
105	NEI45182												
105	NEI45182												
105	NEI45182												
105	NEI45182												
105	NEI45182												
105	NEI45182												
105	NEI45182												
107	NEI47074												
107	NEI47074												
107	NEI47074												
108	NEI33025												
108	NEI33025												
108	NEI33025												
109	NEI32869A	\$ -	\$ 31,712	0	No reduction	\$ -	\$ 31,712	0	No reduction				
109	NEI32869A					\$ 4,757,613	\$ 830,707	525	\$ 20,711	\$ 4,757,613	\$ 830,707	525	\$ 20,711
109	NEI32869A												
109	NEI32869A												
109	NEI32869A												
111	NEI45206												
111	NEI45206												
111	NEI45206												
112	NEI34064												
112	NEI34064												
112	NEI34064												
114	NEI26506												
114	NEI26506												
114	NEI26506												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
115	NEI26476												
115	NEI26476												
115	NEI26476												
116	NEI8619												
116	NEI8619												
116	NEI8619												
117	NEI42689												
117	NEI42689												
117	NEI42689												
119	NEI46814												
119	NEI46814												
119	NEI46814												
119	NEI46814												
119	NEI46814					\$ 6,181,490	\$ 1,089,854	525	\$ 18,946	\$ 6,181,490	\$ 1,089,854	525	\$ 18,946
119	NEI46814												
119	NEI46814												
119	NEI46814												
120	NEI26495									\$ -	\$ 189,144	0	No reduction
120	NEI26495												
120	NEI26495												
120	NEI26495												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
121	NEI12492												
124	NEI8278												
124	NEI8278												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
124	NEI8278												
124	NEI8278												
124	NEI8278												
124	NEI8278												
126	NEI42317												
126	NEI42317												
126	NEI42317												
127	NEI7933												
127	NEI7933												
127	NEI7933					\$ -	\$ 160,001	0	No reduction	\$ -	\$ 160,001	0	No reduction
127	NEI7933												
130	NEI18338												
130	NEI18338												
130	NEI18338												
130	NEI18338												
130	NEI18338												
130	NEI18338												
130	NEI18338												
130	NEI18338												
131	NEI42254												
131	NEI42254												
131	NEI42254												
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131	NEI42254												
131	NEI42254												
131	NEI42254												
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131	NEI42254												

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RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
132	NEI8261												
132	NEI8261												
132	NEI8261												
132	NEI8261												
132	NEI8261												
133	NEI13363												
133	NEI13363												
133	NEI13363												
133	NEI13363												
133	NEI13363												
135	NEI33118												
135	NEI33118												
135	NEI33118												
135	NEI33118												
136	NEI12368												
136	NEI12368												
136	NEI12368												
137	NEI26581												
137	NEI26581												
137	NEI26581												
137	NEI26581												
137	NEI26581												
138	NEI18652												
138	NEI18652												
138	NEI18652												
139	NEI42357									\$ 4,757,613	\$ 830,707	525	\$ 704,622
139	NEI42357												
139	NEI42357												
140	NEI13340												
140	NEI13340									\$ -	\$ 131,074	0	No reduction

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
140	NEI13340												
142	NEI41552												
142	NEI41552												
142	NEI41552												
142	NEI41552												
142	NEI41552												
142	NEI41552												
142	NEI41552												
143	NEI26504												
143	NEI26504												
143	NEI26504												
145	NEI33135												
145	NEI33135												
145	NEI33135	\$ -	\$ 87,207	0	No reduction	\$ -	\$ 87,207	0	No reduction	\$ -	\$ 87,207	0	No reduction
145	NEI33135												
145	NEI33135												
145	NEI706												
146	NEI759												
146	NEI759												
146	NEI759												
146	NEI759												
146	NEI759												
146	NEI759												
146	NEI759												
146	NEI759												
147	NEI6450												
147	NEI6450												
147	NEI6450												
147	NEI6450												
147	NEI6450												
147	NEI6450												
147	NEI6450												
148	NEI46931					\$ -	\$ 135,594	0	No reduction	\$ -	\$ 135,594	0	No reduction
148	NEI46931												
148	NEI46931												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
148	NEI46931									\$ -	\$ 180,639	0	No reduction
148	NEI46931												
148	NEI46931												
149	NEI40488												
149	NEI40488												
149	NEI40488												
150	NEI6273												
150	NEI6273												
150	NEI6273												
150	NEI6273												
150	NEI6273												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
151	NEI41252												
152	NEI11338												
152	NEI11338												
152	NEI11338												
152	NEI11338												
153	NEI33043												
153	NEI33043												
153	NEI33043												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
154	NEI46739												
155	NEI33883												
155	NEI33883												
155	NEI33883												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
156	NEI42338												
159	NEI8177												
159	NEI8177												
159	NEI8177												
162	NEI46760												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
162	NEI46760												
162	NEI46760												
162	NEI46760												
162	NEI46760												
162	NEI46760												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
163	NEI8560												
164	NEI42710												
164	NEI42710												
164	NEI42710												
164	NEI42710												
164	NEI42710												
165	NEI41628												
165	NEI41628												
165	NEI41628												
165	NEI41628												
165	NEI41628												
165	NEI41628												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
166	NEI41314												
167	NEI34070												
167	NEI34070												
167	NEI34070												
167	NEI34070												
169	NEI33013												
169	NEI33013												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
169	NEI33013												
169	NEI33013												
169	NEI33013												
171	NEI18658									\$ 2,551,982	\$ 443,757	525	\$ 20,238
171	NEI18658									\$ 2,461,895	\$ 428,368	525	\$ 41,282
171	NEI18658									\$ 5,050,532	\$ 883,455	525	\$ 66,339
171	NEI18658												
171	NEI18658												
171	NEI18658												
171	NEI18658												
171	NEI18658												
171	NEI18658												
172	NEI18335												
172	NEI18335												
172	NEI18335												
172	NEI18335												
173	NEI35908												
173	NEI35908												
173	NEI35908												
174	NEI40247												
174	NEI40247									\$ -	\$ 218,738	0	No reduction
174	NEI40247												
174	NEI40247												
174	NEI40247												
174	NEI40247												
175	NEI26514												
175	NEI26514												
175	NEI26514												
175	NEI26514												
175	NEI26514												
175	NEI26514												
175	NEI26514												
176	NEI47104												
176	NEI47104												
176	NEI47104												
177	NEI33887												
177	NEI33887												
177	NEI33887												
178	NEI26309												
178	NEI26309												
178	NEI26309												
178	NEI26309												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
178	NEI26309												
179	NEI45474												
179	NEI45474												
179	NEI45474												
180	NEI26471												
180	NEI26471												
180	NEI26471												
180	NEI26471												
180	NEI26471												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
181	NEI6057												
182	NEI7181												
182	NEI7181												
182	NEI7181												
183	NEI33103												
183	NEI33103												
183	NEI33103												
184	NEI46817												
184	NEI46817												
184	NEI46817												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
184	NEI46817												
184	NEI46817												
184	NEI46817												
184	NEI46817												
185	NEI46599												
185	NEI46599												
185	NEI46599												
186	NEI18334												
186	NEI18334												
186	NEI18334												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
188	NEI40600												
189	NEI54342												
189	NEI54342												
189	NEI54342												
189	NEI54342												
190	NEI26491												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
190	NEI26491												
190	NEI26491												
190	NEI26491												
190	NEI26491												
190	NEI26491												
190	NEI26491												
190	NEI26491												
195	NEI46835												
195	NEI46835												
195	NEI46835												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
196	NEI18660												
197	NEI18657												
197	NEI18657												
197	NEI18657												
197	NEI18657												
198	NEI41565												
198	NEI41565												
198	NEI41565												
199	NEI18390												
199	NEI18390												
199	NEI18390												
200	NEI47077	\$ -	\$ 36,760	0	No reduction	\$ -	\$ 36,760	0	No reduction				
200	NEI47077												
200	NEI47077												
200	NEI47077												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
200	NEI47077												
201	NEI7559												
201	NEI7559												
201	NEI7559												
202	NEI12411												
202	NEI12411												
202	NEI12411												
203	NEI42410												
203	NEI42410												
203	NEI42410												
203	NEI42410												
203	NEI42410												
205	NEI8601												
205	NEI8601												
205	NEI8601												
205	NEI8601												
206	NEI40282												
206	NEI40282												
206	NEI40282												
206	NEI40282												
206	NEI40282												
206	NEI40282												
206	NEI40282												
206	NEI40282												
207	NEI7104												
207	NEI7104												
207	NEI7104												
208228535	NEI18373					\$ 8,902,009	\$ 1,602,873	525	\$ 54,921	\$ 8,902,009	\$ 1,602,873	525	\$ 54,921
208228535	NEI18373												
208228535	NEI18373												
208228535	NEI18373					\$ -	\$ 208,704	0	No reduction	\$ -	\$ 208,704	0	No reduction
208228535	NEI18373												
208228535	NEI18373												
226	NEI33023												
226	NEI33023												
226	NEI33023												
226	NEI33023												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
226	NEI33023												
226	NEI33023												
226	NEI33023												
240	NEI26526												
240	NEI26526												
240	NEI26526												
240	NEI26526												
240	NEI26526												
240	NEI26526												
242	NEI34066												
242	NEI34066												
242	NEI34066												
243	NEI8196												
243	NEI8196												
243	NEI8196												
243	NEI8196												
243	NEI8196												
340	NEI46852												
340	NEI46852												
340	NEI46852												
525	NEI8265												
525	NEI8265												
525	NEI8265												
525	NEI8265												
525	NEI8265												
531	NEI8186												
531	NEI8186												
531	NEI8186												
606	NEI47091												
606	NEI47091												
606	NEI47091												
606	NEI47091												
606	NEI47091												
606	NEI47091					\$ 6,968,193	\$ 1,235,882	525	\$ 20,068	\$ 6,968,193	\$ 1,235,882	525	\$ 20,068
606	NEI47091												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
606	NEI47091												
606	NEI47091												
610	NEI6261												
610	NEI6261												
610	NEI6261												
610	NEI6261												
610	NEI6261												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
613	NEI11172												
615	NEI40554												
615	NEI40554												
615	NEI40554												
617	NEI42695												
617	NEI42695												
617	NEI42695												
161	NEI7621												
161	NEI7621												
161	NEI7621												
700	NEI42351												
700	NEI42351												
700	NEI42351												
106	NEI41599												
106	NEI41599												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
106	NEI41599												
128	NEI11461												
128	NEI11461												
141	NEI46750												
141	NEI46750												
187	NEI42211												
187	NEI42211												
193	NEI39968												
193	NEI39968												
193	NEI39968												
193	NEI39968												
193	NEI39968												
241	NEI26382												
241	NEI26382												
244	NEI43472												
244	NEI43472												
245	NEI18347												
245	NEI18347												
245	NEI18347												
245	NEI18347												

RTI Code	Final NEISiteID	Opacity Opt 2, RF=35%, 2%, SA; LK = 20%, 1%, SA				Opacity Opt 3, RF=35%, 6%, Q; LK = 20%, 1%, Q				Opacity Opt 4, RF=20%, 2%, SA			
		Opacity Opt 2 ESP upgrade, capital (\$2015)	Opacity Opt 2 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 2 labor, hr/yr	Opacity Opt 2 potential cost effectiveness, \$/ton PM	Opacity Opt 3 ESP upgrade, capital (\$2015)	Opacity Opt 3 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 3 labor, hr/yr	Opacity Opt 3 potential cost effectiveness, \$/ton PM	Opacity Opt 4 ESP upgrade, capital (\$2015)	Opacity Opt 4 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 4 labor, hr/yr	Opacity Opt 4 potential cost effectiveness, \$/ton PM
247	NEI33945												
247	NEI33945												
304	NEIVA00022												
304	NEIVA00022												
		\$ -	\$ 155,679	-		\$ 26,809,306	\$ 5,419,294	2,100		\$ 41,631,328	\$ 8,656,704	4,200	

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RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
100	NEI40686													
100	NEI40686													
100	NEI40686													
102	NEI42341A													
102	NEI42341A													
102	NEI42341A													
103	NEI9201													
103	NEI9201													
103	NEI9201													
104	NEI11251													
104	NEI11251													
104	NEI11251													
105	NEI45182													
105	NEI45182													
105	NEI45182													
105	NEI45182													
105	NEI45182													
105	NEI45182													
105	NEI45182													
107	NEI47074													
107	NEI47074													
107	NEI47074													
108	NEI33025													
108	NEI33025													
108	NEI33025													
109	NEI32869A					0.064	5	0	0	-	0.000	0.000	0.000	0.0
109	NEI32869A	\$ 4,757,613	\$ 830,707	525	\$ 20,711	0.025	114	40	18	10,534	0.052	0.019	0.169	0.8
109	NEI32869A													
109	NEI32869A													
109	NEI32869A													
111	NEI45206													
111	NEI45206													
111	NEI45206													
112	NEI34064													
112	NEI34064													
112	NEI34064													
114	NEI26506													
114	NEI26506													
114	NEI26506													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy	
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy							
115	NEI26476															
115	NEI26476															
115	NEI26476															
116	NEI8619															
116	NEI8619															
116	NEI8619															
117	NEI42689															
117	NEI42689															
117	NEI42689															
119	NEI46814															
119	NEI46814															
119	NEI46814															
119	NEI46814	\$ 6,181,490	\$ 1,089,854	525	\$ 18,946	0.029	152	58	26	16,296	0.080	0.029	0.261	1.2		
119	NEI46814															
119	NEI46814															
119	NEI46814															
120	NEI26495	\$ -	\$ 189,144	-	No reduction	0.021	99	0	0	-	0.000	0.000	0.000	0.0		
120	NEI26495															
120	NEI26495															
120	NEI26495															
121	NEI12492															
121	NEI12492															
121	NEI12492															
121	NEI12492															
121	NEI12492															
121	NEI12492															
121	NEI12492															
121	NEI12492															
124	NEI8278															
124	NEI8278															

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
124	NEI8278													
124	NEI8278													
124	NEI8278													
124	NEI8278													
126	NEI42317													
126	NEI42317													
126	NEI42317													
127	NEI7933													
127	NEI7933													
127	NEI7933	\$ -	\$ 160,001	-	No reduction	0.044	53	0	0	-	0.000	0.000	0.000	0.0
127	NEI7933													
130	NEI18338													
130	NEI18338													
130	NEI18338													
130	NEI18338													
130	NEI18338													
130	NEI18338													
130	NEI18338													
130	NEI18338													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													
131	NEI42254													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy	
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy							
132	NEI8261															
132	NEI8261															
132	NEI8261															
132	NEI8261															
132	NEI8261															
133	NEI13363															
133	NEI13363															
133	NEI13363															
133	NEI13363															
133	NEI13363															
135	NEI33118															
135	NEI33118															
135	NEI33118															
135	NEI33118															
136	NEI12368															
136	NEI12368															
136	NEI12368															
137	NEI26581															
137	NEI26581															
137	NEI26581															
137	NEI26581															
137	NEI26581															
138	NEI18652															
138	NEI18652															
138	NEI18652															
139	NEI42357	\$ 4,757,613	\$ 830,707	525	\$ 704,622	0.044	99	1	1	10,534	0.052	0.019	0.169	0.8		
139	NEI42357															
139	NEI42357															
140	NEI13340															
140	NEI13340	\$ -	\$ 131,074	-	No reduction	0.044	53	0	0	-	0.000	0.000	0.000	0.0		

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
140	NEI13340													
142	NEI41552													
142	NEI41552													
142	NEI41552													
142	NEI41552													
142	NEI41552													
142	NEI41552													
142	NEI41552													
143	NEI26504													
143	NEI26504													
143	NEI26504													
145	NEI33135													
145	NEI33135													
145	NEI33135	\$ -	\$ 87,207	-	No reduction	0.044	27	0	0	-	0.000	0.000	0.000	0.0
145	NEI33135													
145	NEI33135													
145	NEI706													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
146	NEI759													
147	NEI6450													
147	NEI6450													
147	NEI6450													
147	NEI6450													
147	NEI6450													
147	NEI6450													
147	NEI6450													
148	NEI46931	\$ -	\$ 135,594	-	No reduction	0.036	67	0	0	-	0.000	0.000	0.000	0.0
148	NEI46931													
148	NEI46931													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
148	NEI46931	\$ -	\$ 180,639	-	No reduction	0.028	91	0	0	-	0.000	0.000	0.000	0.0
148	NEI46931													
148	NEI46931													
149	NEI40488													
149	NEI40488													
149	NEI40488													
150	NEI6273													
150	NEI6273													
150	NEI6273													
150	NEI6273													
150	NEI6273													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
151	NEI41252													
152	NEI11338													
152	NEI11338													
152	NEI11338													
152	NEI11338													
153	NEI33043													
153	NEI33043													
153	NEI33043													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
154	NEI46739													
155	NEI33883													
155	NEI33883													
155	NEI33883													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
156	NEI42338													
159	NEI8177													
159	NEI8177													
159	NEI8177													
162	NEI46760													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
162	NEI46760													
162	NEI46760													
162	NEI46760													
162	NEI46760													
162	NEI46760													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
163	NEI8560													
164	NEI42710													
164	NEI42710													
164	NEI42710													
164	NEI42710													
164	NEI42710													
165	NEI41628													
165	NEI41628													
165	NEI41628													
165	NEI41628													
165	NEI41628													
165	NEI41628													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
166	NEI41314													
167	NEI34070													
167	NEI34070													
167	NEI34070													
167	NEI34070													
169	NEI33013													
169	NEI33013													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy						
169	NEI33013	\$ -	\$ 135,455	-	No reduction	0.02	66	0	0	-	0.000	0.000	0.000	0.0	
169	NEI33013														
169	NEI33013														
171	NEI18658	\$ 2,551,982	\$ 443,757	525	\$ 20,238	0.044	91	22	13	3,730	0.018	0.007	0.060	0.3	
171	NEI18658	\$ 2,461,895	\$ 428,368	525	\$ 41,282	0.044	75	10	6	3,513	0.017	0.006	0.056	0.3	
171	NEI18658	\$ 5,050,532	\$ 883,455	525	\$ 66,339	0.044	136	13	8	11,636	0.057	0.021	0.186	0.8	
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
172	NEI18335														
172	NEI18335	\$ 4,639,085	\$ 809,448	525	\$ 54,800	0.024	72	15	7	10,100	0.049	0.018	0.162	0.7	
172	NEI18335	\$ 5,792,512	\$ 1,018,386	525	\$ 184,606	0.044	83	6	2	14,623	0.072	0.026	0.234	1.1	
172	NEI18335														
172	NEI18335														
173	NEI35908														
173	NEI35908														
173	NEI35908														
174	NEI40247														
174	NEI40247	\$ -	\$ 218,738	-	No reduction	0.043	67	0	0	-	0.000	0.000	0.000	0.0	
174	NEI40247														
174	NEI40247														
174	NEI40247														
174	NEI40247														
175	NEI26514														
175	NEI26514														
175	NEI26514														
175	NEI26514														
175	NEI26514														
175	NEI26514														
175	NEI26514														
176	NEI47104														
176	NEI47104														
176	NEI47104														
177	NEI33887														
177	NEI33887														
177	NEI33887														
178	NEI26309														
178	NEI26309														
178	NEI26309														
178	NEI26309														

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
178	NEI26309													
179	NEI45474													
179	NEI45474													
179	NEI45474													
180	NEI26471													
180	NEI26471													
180	NEI26471													
180	NEI26471													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
181	NEI6057													
182	NEI7181													
182	NEI7181													
182	NEI7181													
183	NEI33103													
183	NEI33103													
183	NEI33103													
184	NEI46817													
184	NEI46817													
184	NEI46817													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
184	NEI46817													
184	NEI46817													
184	NEI46817													
184	NEI46817													
185	NEI46599													
185	NEI46599													
185	NEI46599													
186	NEI18334													
186	NEI18334													
186	NEI18334													
188	NEI40600													
188	NEI40600													
188	NEI40600													
188	NEI40600													
188	NEI40600													
188	NEI40600													
188	NEI40600													
188	NEI40600													
189	NEI54342													
189	NEI54342													
189	NEI54342													
189	NEI54342													
190	NEI26491													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy	
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy							
190	NEI26491															
190	NEI26491															
190	NEI26491															
190	NEI26491															
190	NEI26491															
190	NEI26491															
190	NEI26491															
195	NEI46835															
195	NEI46835	\$ 6,473,077	\$ 1,143,750	525	\$ 34,358	0.021	138	33	15	17,597	0.086	0.032	0.282	1.3		
195	NEI46835															
196	NEI18660															
196	NEI18660															
196	NEI18660															
196	NEI18660															
196	NEI18660															
196	NEI18660															
196	NEI18660															
196	NEI18660															
197	NEI18657															
197	NEI18657															
197	NEI18657															
197	NEI18657															
198	NEI41565															
198	NEI41565															
198	NEI41565															
199	NEI18390															
199	NEI18390															
199	NEI18390															
200	NEI47077					0.03	6	0	0	-	0.000	0.000	0.000	0.0		
200	NEI47077															
200	NEI47077															
200	NEI47077															

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy						
200	NEI47077	\$ 8,044,811	\$ 1,438,827	525	\$ 33,188	0.025	169	43	20	25,281	0.124	0.046	0.404	1.8	
201	NEI7559														
201	NEI7559														
201	NEI7559														
202	NEI12411														
202	NEI12411														
202	NEI12411														
203	NEI42410														
203	NEI42410														
203	NEI42410														
203	NEI42410														
203	NEI42410														
205	NEI8601														
205	NEI8601														
205	NEI8601														
205	NEI8601														
206	NEI40282														
206	NEI40282	\$ -	\$ 141,204	-	No reduction	0.032	91	0	0	-	0.000	0.000	0.000	0.0	
206	NEI40282														
206	NEI40282														
206	NEI40282														
206	NEI40282														
206	NEI40282														
207	NEI7104														
207	NEI7104														
207	NEI7104														
208228535	NEI18373	\$ 8,902,009	\$ 1,602,873	525	\$ 54,921	0.025	241	29	13	29,928	0.147	0.054	0.479	2.2	
208228535	NEI18373														
208228535	NEI18373														
208228535	NEI18373	\$ -	\$ 208,704	-	No reduction	0.035	174	0	0	-	0.000	0.000	0.000	0.0	
208228535	NEI18373														
208228535	NEI18373														
226	NEI33023														
226	NEI33023														
226	NEI33023	\$ -	\$ 158,758	-	No reduction	0.044	52	0	0	-	0.000	0.000	0.000	0.0	
226	NEI33023														

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
226	NEI33023													
226	NEI33023													
226	NEI33023													
240	NEI26526													
240	NEI26526													
240	NEI26526													
240	NEI26526													
240	NEI26526													
240	NEI26526													
242	NEI34066													
242	NEI34066													
242	NEI34066													
243	NEI8196													
243	NEI8196													
243	NEI8196													
243	NEI8196													
243	NEI8196													
340	NEI46852													
340	NEI46852													
340	NEI46852													
525	NEI8265													
525	NEI8265													
525	NEI8265													
525	NEI8265													
531	NEI8186													
531	NEI8186													
531	NEI8186													
606	NEI47091													
606	NEI47091													
606	NEI47091													
606	NEI47091	\$ 6,968,193	\$ 1,235,882	525	\$ 20,068	0.044	153	62	28	19,897	0.097	0.036	0.318	1.5
606	NEI47091													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options					Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy	
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy							
606	NEI47091															
606	NEI47091															
610	NEI6261															
610	NEI6261	\$ -	\$ 129,926	-	No reduction	0.035	127.4270833	0	0	0	0	0	0	0	0	0
610	NEI6261	\$ 7,261,976	\$ 1,290,911	525	\$ 40,113	0.035	163	32	14	21,315	0.104	0.038	0.341	1.6		
610	NEI6261															
610	NEI6261															
610	NEI6261															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
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613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
615	NEI40554															
615	NEI40554															
615	NEI40554															
617	NEI42695															
617	NEI42695															
617	NEI42695															
161	NEI7621															
161	NEI7621															
161	NEI7621															
700	NEI42351															
700	NEI42351															
700	NEI42351															
106	NEI41599															
106	NEI41599															

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options				Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy					
106	NEI41599													
128	NEI11461													
128	NEI11461													
141	NEI46750													
141	NEI46750													
187	NEI42211													
187	NEI42211													
193	NEI39968													
193	NEI39968													
193	NEI39968													
193	NEI39968													
193	NEI39968													
241	NEI26382													
241	NEI26382													
244	NEI43472													
244	NEI43472													
245	NEI18347													
245	NEI18347													
245	NEI18347													

RTI Code	Final NEISiteID	Opacity Opt 5, RF=20%,2%,Q				Potential Emission Reduction from RF and LK Opacity Options								
		Opacity Opt 5 ESP upgrade, capital (\$2015)	Opacity Opt 5 ESP upgrade, annualized (\$2015/yr)	Opacity Opt 5 labor, hr/yr	Opacity Opt 5 potential cost effectiveness, \$/ton PM	PM permit limit, gr/dscf (numeric)	Potential PM allowed by permit, tpy	Potential PM reduction, tpy	Potential PM _{2.5} reduction, tpy	Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NOx, tpy
247	NEI33945													
247	NEI33945													
304	NEIVA00022													
304	NEIVA00022													

\$ 73,842,789 \$ 14,923,369 6,825

1

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
100	NEI40686											
100	NEI40686											
100	NEI40686											
102	NEI42341A											
102	NEI42341A											
102	NEI42341A											
103	NEI9201											
103	NEI9201											
103	NEI9201											
104	NEI11251											
104	NEI11251											
104	NEI11251											
105	NEI45182				shut down							
105	NEI45182				shut down							
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
107	NEI47074											
107	NEI47074											
107	NEI47074											
108	NEI33025											
108	NEI33025											
108	NEI33025											
109	NEI32869A	0.0	0	0.0000								
109	NEI32869A	1.9	537	0.0065								
109	NEI32869A											
109	NEI32869A											
109	NEI32869A											
111	NEI45206											
111	NEI45206											
111	NEI45206											
112	NEI34064											
112	NEI34064											
112	NEI34064											
114	NEI26506											
114	NEI26506											
114	NEI26506											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
115	NEI26476											
115	NEI26476											
115	NEI26476											
116	NEI8619											
116	NEI8619				Convert from wet to dry							
116	NEI8619											
117	NEI42689											
117	NEI42689											
117	NEI42689											
119	NEI46814											
119	NEI46814											
119	NEI46814				replace	\$ 56,485,694	\$ 2,707,409	\$ 187,523,217	\$ 20,232,899	1,050	38.4	32.3
119	NEI46814	2.9	831	0.0100								
119	NEI46814											
119	NEI46814				remove	\$ -	\$ -	\$ -	\$ -		33.9	33.9
119	NEI46814				remove	\$ -	\$ -	\$ -	\$ -		33.9	33.9
120	NEI26495	0.0	0	0.0000								
120	NEI26495											
120	NEI26495											
120	NEI26495											
121	NEI12492											
121	NEI12492											
121	NEI12492											
121	NEI12492				replace 2 small DCEs w/ single larger NDCE	\$ 46,295,467	\$ 2,228,468	\$ 153,816,845	\$ 14,797,193	(8,400)	15.1	12.7
121	NEI12492				replace 2 small DCEs w/ single larger NDCE	\$ 46,332,669	\$ 2,230,216	\$ 153,816,845	\$ 14,797,193	(8,400)	15.7	13.1
121	NEI12492											
121	NEI12492											
121	NEI12492				remove	\$ -	\$ -	\$ -	\$ -		0.0	0.0
124	NEI8278				replace 2 small DCEs w/ single larger NDCE	\$ 52,747,084	\$ 2,531,694	\$ 175,111,648	\$ 19,479,797	(8,400)	38.8	32.6
124	NEI8278											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
124	NEI8278				replace 2 small DCEs w/ single larger NDCE	\$ 52,747,084	\$ 2,531,694	\$ 175,111,648	\$ 19,479,797	(8,400)	39.2	32.9
124	NEI8278											
124	NEI8278											
124	NEI8278				remove	\$ -	\$ -	\$ -	\$ -		1.2	1.2
126	NEI42317											
126	NEI42317				Convert from wet to dry							
126	NEI42317											
127	NEI7933											
127	NEI7933											
127	NEI7933	0.0	0	0.0000	Convert from wet to dry							
127	NEI7933											
130	NEI18338				replace 2 small DCEs w/ single larger NDCE [new source projection]	\$ -	\$ -	\$ -	\$ -		14.3	0.0
130	NEI18338											
130	NEI18338				replace 2 small DCEs w/ single larger NDCE [new source projection]	\$ -	\$ -	\$ -	\$ -		13.2	0.0
130	NEI18338				remove	\$ -	\$ -	\$ -	\$ -		0.0	0.0
130	NEI18338											
130	NEI18338											
130	NEI18338											
130	NEI18338											
131	NEI42254											
131	NEI42254											
131	NEI42254				replace	\$ 36,877,559	\$ 1,785,826	\$ 122,427,431	\$ 14,029,863	1,050	34.4	28.9
131	NEI42254											
131	NEI42254				remove	\$ -	\$ -	\$ -	\$ -		0.0	0.0
131	NEI42254											
131	NEI42254											
131	NEI42254											
131	NEI42254											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
132	NEI8261											
132	NEI8261											
132	NEI8261											
132	NEI8261											
132	NEI8261											
133	NEI13363											
133	NEI13363											
133	NEI13363											
133	NEI13363											
133	NEI13363											
135	NEI33118											
135	NEI33118											
135	NEI33118											
135	NEI33118											
136	NEI12368											
136	NEI12368											
136	NEI12368											
137	NEI26581											
137	NEI26581											
137	NEI26581											
137	NEI26581											
137	NEI26581											
138	NEI18652											
138	NEI18652											
138	NEI18652											
139	NEI42357	1.9	537	0.0065								
139	NEI42357											
139	NEI42357											
140	NEI13340											
140	NEI13340	0.0	0	0.0000								

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
140	NEI13340											
142	NEI41552											
142	NEI41552											
142	NEI41552				Convert from wet to dry							
142	NEI41552											
142	NEI41552											
142	NEI41552											
142	NEI41552											
143	NEI26504											
143	NEI26504											
143	NEI26504											
145	NEI33135				remove	\$ -	\$ -	\$ -	\$ -		35.3	35.3
145	NEI33135				replace 2 small DCEs w/ single larger NDCE [new source projection was to replace one DCE with an NDCE]	\$ -	\$ -	\$ -	\$ -		0.0	0.0
145	NEI33135	0.0	0	0.0000	replace 2 small DCEs w/ single larger NDCE	\$ 34,372,218	\$ 1,668,075	\$ 150,569,195	\$ 16,817,259	(8,400)	0.0	0.0
145	NEI33135											
145	NEI33135											
145	NEI706											
146	NEI759											
146	NEI759											
146	NEI759											
146	NEI759				remove	\$ -	\$ -	\$ -	\$ -		79.1	79.1
146	NEI759											
146	NEI759											
146	NEI759				convert	\$ 59,778,831	\$ 8,670,701	\$ 127,931,651	\$ 18,276,674	1,050	44.8	37.6
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
148	NEI46931	0.0	0	0.0000								
148	NEI46931											
148	NEI46931											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
148	NEI46931	0.0	0	0.0000								
148	NEI46931											
148	NEI46931											
149	NEI40488											
149	NEI40488											
149	NEI40488											
150	NEI6273											
150	NEI6273											
150	NEI6273											
150	NEI6273											
150	NEI6273											
151	NEI41252											
151	NEI41252											
151	NEI41252				remove	\$ -	\$ -	\$ -	\$ -		70.6	70.6
151	NEI41252											
151	NEI41252											
151	NEI41252											
151	NEI41252				convert	\$ 48,895,757	\$ 7,225,771	\$ 104,640,971	\$ 15,082,923	1,050	40.4	33.9
151	NEI41252											
151	NEI41252											
152	NEI11338				convert	\$ 47,139,637	\$ 6,988,237	\$ 100,882,730	\$ 14,563,195	1,050	42.1	35.3
152	NEI11338											
152	NEI11338				remove	\$ -	\$ -	\$ -	\$ -		168.3	168.3
152	NEI11338											
153	NEI33043											
153	NEI33043											
153	NEI33043											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
154	NEI46739											
154	NEI46739											
154	NEI46739											
154	NEI46739				replace 3 small DCEs w/ single larger NDCE	\$ 31,304,193	\$ 1,523,878	\$ 70,812,798	\$ 2,423,324	(8,400)	42.1	35.3
154	NEI46739				replace 3 small DCEs w/ single larger NDCE	\$ 33,572,613	\$ 1,630,494	\$ 75,944,160	\$ 4,990,291	(8,400)	32.0	26.8
154	NEI46739											
154	NEI46739				replace 3 small DCEs w/ single larger NDCE	\$ 32,665,245	\$ 1,587,848	\$ 73,891,615	\$ 2,599,153	(8,400)	16.9	14.2
154	NEI46739											
154	NEI46739											
154	NEI46739				remove	\$ -	\$ -	\$ -	\$ -		287.4	287.4
155	NEI33883											
155	NEI33883											
155	NEI33883											
156	NEI42338											
156	NEI42338											
156	NEI42338				remove	\$ -	\$ -	\$ -	\$ -		38.2	38.2
156	NEI42338											
156	NEI42338				shut down							
156	NEI42338				convert	\$ 49,836,111	\$ 7,352,454	\$ 106,653,407	\$ 15,360,713	1,050	21.8	18.3
156	NEI42338											
156	NEI42338											
156	NEI42338											
156	NEI42338											
159	NEI8177											
159	NEI8177											
159	NEI8177											
162	NEI46760											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
162	NEI46760											
162	NEI46760											
162	NEI46760											
162	NEI46760											
162	NEI46760											
163	NEI8560											
163	NEI8560											
163	NEI8560				remove	\$ -	\$ -	\$ -	\$ -		119.2	119.2
163	NEI8560											
163	NEI8560											
163	NEI8560				replace	\$ 66,891,115	\$ 3,196,463	\$ 222,067,503	\$ 23,190,618	1,050	34.1	28.6
163	NEI8560				Convert from wet to dry							
163	NEI8560											
163	NEI8560											
163	NEI8560											
164	NEI42710											
164	NEI42710											
164	NEI42710											
164	NEI42710											
164	NEI42710											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
166	NEI41314											
166	NEI41314											
166	NEI41314				remove	\$ -	\$ -	\$ -	\$ -		72.4	72.4
166	NEI41314											
166	NEI41314				convert	\$ 42,136,588	\$ 6,304,583	\$ 90,175,789	\$ 13,075,591	1,050	41.4	34.8
166	NEI41314				convert	\$ 49,523,888	\$ 7,310,431	\$ 105,985,224	\$ 15,268,518	1,050	54.0	45.3
166	NEI41314											
166	NEI41314											
167	NEI34070											
167	NEI34070				convert	\$ 44,672,000	\$ 6,652,338	\$ 95,601,781	\$ 13,830,766	1,050	38.9	32.7
167	NEI34070											
167	NEI34070				remove	\$ -	\$ -	\$ -	\$ -		68.0	68.0
169	NEI33013											
169	NEI33013				Convert from wet to dry							

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
169	NEI33013	0.0	0	0.0000	Convert from wet to dry							
169	NEI33013											
169	NEI33013											
171	NEI18658	0.7	190	0.0023	replace 3 small DCEs w/ single larger NDCE	\$ 15,673,223	\$ 789,222	\$ 35,454,189	\$ 2,775,892	(8,400)	15.5	13.0
171	NEI18658	0.6	179	0.0022	replace 3 small DCEs w/ single larger NDCE	\$ 14,761,989	\$ 746,394	\$ 41,614,791	\$ 3,258,237	(8,400)	15.6	13.1
171	NEI18658	2.1	593	0.0071	replace 3 small DCEs w/ single larger NDCE	\$ 48,894,208	\$ 2,350,609	\$ 179,450,025	\$ 14,050,070	(8,400)	11.4	9.6
171	NEI18658											
171	NEI18658											
171	NEI18658											
171	NEI18658											
171	NEI18658				remove	\$ -	\$ -	\$ -	\$ -		141.8	141.8
172	NEI18335											
172	NEI18335	1.8	515	0.0062	Convert from wet to dry							
172	NEI18335	2.6	746	0.0090	Convert from wet to dry							
172	NEI18335											
172	NEI18335											
173	NEI35908											
173	NEI35908											
173	NEI35908											
174	NEI40247											
174	NEI40247	0.0	0	0.0000								
174	NEI40247				remove	\$ -	\$ -	\$ -	\$ -		182.3	182.3
174	NEI40247											
174	NEI40247				replace	\$ 61,285,101	\$ 2,932,981	\$ 203,456,459	\$ 21,624,491	1,050	57.5	48.3
174	NEI40247											
175	NEI26514				remove	\$ -	\$ -	\$ -	\$ -		0.0	0.0
175	NEI26514											
175	NEI26514											
175	NEI26514				replace	\$ 55,704,997	\$ 2,670,716	\$ 184,931,430	\$ 20,002,011	1,050	16.4	13.8
175	NEI26514											
175	NEI26514											
175	NEI26514											
176	NEI47104											
176	NEI47104											
176	NEI47104											
177	NEI33887											
177	NEI33887											
177	NEI33887											
178	NEI26309											
178	NEI26309											
178	NEI26309											
178	NEI26309											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
178	NEI26309											
179	NEI45474											
179	NEI45474											
179	NEI45474											
180	NEI26471											
180	NEI26471											
180	NEI26471											
180	NEI26471											
180	NEI26471											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057				Convert from wet to dry							
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
182	NEI7181											
182	NEI7181											
182	NEI7181											
183	NEI33103											
183	NEI33103											
183	NEI33103											
184	NEI46817											
184	NEI46817											
184	NEI46817											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
184	NEI46817											
184	NEI46817											
184	NEI46817											
184	NEI46817											
185	NEI46599											
185	NEI46599											
185	NEI46599											
186	NEI18334											
186	NEI18334											
186	NEI18334											
188	NEI40600											
188	NEI40600											
188	NEI40600											
188	NEI40600				replace 2 small DCEs w/ single larger NDCE	\$ 38,025,227	\$ 1,839,767	\$ 83,285,691	\$ 18,329,358	(8,400)	15.8	13.2
188	NEI40600											
188	NEI40600				replace 2 small DCEs w/ single larger NDCE	\$ 38,025,227	\$ 1,839,767	\$ 83,285,691	\$ 18,329,358	(8,400)	14.5	12.2
188	NEI40600											
188	NEI40600				remove	\$ -	\$ -	\$ -	\$ -		52.9	52.9
189	NEI54342											
189	NEI54342				Convert from wet to dry							
189	NEI54342											
189	NEI54342											
190	NEI26491											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
195	NEI46835											
195	NEI46835	3.2	897	0.0108								
195	NEI46835											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
197	NEI18657											
197	NEI18657				remove	\$ -	\$ -	\$ -	\$ -		20.9	20.9
197	NEI18657				replace	\$ 34,318,920	\$ 1,665,570	\$ 113,933,172	\$ 13,155,017	1,050	12.5	10.5
197	NEI18657											
198	NEI41565											
198	NEI41565											
198	NEI41565											
199	NEI18390											
199	NEI18390											
199	NEI18390											
200	NEI47077	0.0	0	0.0000								
200	NEI47077											
200	NEI47077											
200	NEI47077											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
200	NEI47077	4.6	1289	0.0155								
201	NEI7559											
201	NEI7559											
201	NEI7559											
202	NEI12411											
202	NEI12411											
202	NEI12411											
203	NEI42410											
203	NEI42410											
203	NEI42410											
203	NEI42410											
203	NEI42410											
205	NEI8601											
205	NEI8601				convert	\$ 38,522,052	\$ 5,804,106	\$ 82,440,383	\$ 11,994,288	1,050	30.1	25.3
205	NEI8601											
205	NEI8601				remove	\$ -	\$ -	\$ -	\$ -		48.9	48.9
206	NEI40282				convert	\$ 42,144,740	\$ 6,305,706	\$ 90,193,235	\$ 13,078,024	1,050	73.7	61.9
206	NEI40282	0.0	0	0.0000	convert	\$ 42,144,740	\$ 6,305,706	\$ 90,193,235	\$ 13,078,024	1,050	76.5	64.3
206	NEI40282				remove	\$ -	\$ -	\$ -	\$ -		6.1	6.1
206	NEI40282											
206	NEI40282											
206	NEI40282											
206	NEI40282											
207	NEI7104											
207	NEI7104											
207	NEI7104											
208228535	NEI18373	5.4	1526	0.0184								
208228535	NEI18373											
208228535	NEI18373											
208228535	NEI18373	0.0	0	0.0000								
208228535	NEI18373											
208228535	NEI18373											
226	NEI33023											
226	NEI33023											
226	NEI33023	0.0	0	0.0000	Convert from wet to dry							
226	NEI33023				Convert from wet to dry							

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
226	NEI33023											
226	NEI33023											
226	NEI33023											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
242	NEI34066											
242	NEI34066											
242	NEI34066											
243	NEI8196											
243	NEI8196											
243	NEI8196											
243	NEI8196											
243	NEI8196											
340	NEI46852											
340	NEI46852											
340	NEI46852											
525	NEI8265											
525	NEI8265											
525	NEI8265											
525	NEI8265											
531	NEI8186											
531	NEI8186											
531	NEI8186											
606	NEI47091											
606	NEI47091											
606	NEI47091											
606	NEI47091	3.6	1015	0.0122								
606	NEI47091											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)			Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy								
606	NEI47091											
606	NEI47091											
610	NEI6261											
610	NEI6261	0	0	0								
610	NEI6261	3.8	1087	0.0131								
610	NEI6261											
610	NEI6261											
610	NEI6261											
613	NEI11172											
613	NEI11172											
613	NEI11172				convert	\$ 47,139,637	\$ 6,988,237	\$ 100,882,730	\$ 14,563,195	1,050	34.7	29.2
613	NEI11172											
613	NEI11172											
613	NEI11172				convert	\$ 47,139,637	\$ 6,988,237	\$ 100,882,730	\$ 14,563,195	1,050	34.7	29.2
613	NEI11172											
613	NEI11172											
613	NEI11172											
613	NEI11172				remove	\$ -	\$ -	\$ -	\$ -		60.6	60.6
613	NEI11172				remove	\$ -	\$ -	\$ -	\$ -		60.6	60.6
615	NEI40554											
615	NEI40554											
615	NEI40554											
617	NEI42695											
617	NEI42695											
617	NEI42695											
161	NEI7621											
161	NEI7621											
161	NEI7621											
700	NEI42351											
700	NEI42351											
700	NEI42351											
106	NEI41599				Convert from wet to dry							
106	NEI41599											

RTI Code	Final NEISiteID	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)										
		Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy	Projection for costs of GOH options	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
106	NEI41599											
128	NEI11461											
128	NEI11461											
141	NEI46750											
141	NEI46750											
187	NEI42211											
187	NEI42211											
193	NEI39968											
193	NEI39968											
193	NEI39968											
193	NEI39968											
193	NEI39968											
241	NEI26382											
241	NEI26382											
244	NEI43472											
244	NEI43472											
245	NEI18347											
245	NEI18347											
245	NEI18347											

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RTI Code	Final NEISiteID	Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy	Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)	Capital cost, \$2015 BE&K/Andover	Annualized cost, \$2015/yr BE&K/Andover	Capital cost, \$2015 AECOM	Annualized cost, \$2015/yr AECOM	Labor impacts, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy
					Projection for costs of GOH options							
247	NEI33945											
247	NEI33945											
304	NEIVA00022											
304	NEIVA00022											
						\$ 1,356,053,449	\$ 121,353,599	\$ 3,682,968,219	\$ 437,096,925	(90,300)	2,608	2,421

RTI Code	Final NEISiteID											
		GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
100	NEI40686											
100	NEI40686											
100	NEI40686											
102	NEI42341A											
102	NEI42341A											
102	NEI42341A											
103	NEI9201											
103	NEI9201											
103	NEI9201											
104	NEI11251											
104	NEI11251											
104	NEI11251											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
105	NEI45182											
107	NEI47074											
107	NEI47074											
107	NEI47074											
108	NEI33025											
108	NEI33025											
108	NEI33025											
109	NEI32869A											
109	NEI32869A											
109	NEI32869A											
109	NEI32869A											
109	NEI32869A											
111	NEI45206											
111	NEI45206											
111	NEI45206											
112	NEI34064											
112	NEI34064											
112	NEI34064											
114	NEI26506											
114	NEI26506											
114	NEI26506											

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RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
115	NEI26476											
115	NEI26476											
115	NEI26476											
116	NEI8619											
116	NEI8619											
116	NEI8619											
117	NEI42689											
117	NEI42689											
117	NEI42689											
119	NEI46814											
119	NEI46814											
119	NEI46814	56.6	32.8	22.8	16.7	-168,787 to -861,093	-.83 to -4.2	-.3 to -1.5	-2.8 to -14.1	-12 to -63	-31 to -159	-8,604 to -43,894
119	NEI46814											
119	NEI46814											
119	NEI46814	38.9	38.9	4.6	4.6							
119	NEI46814	38.9	38.9	4.6	4.6							
120	NEI26495											
120	NEI26495											
120	NEI26495											
120	NEI26495											
121	NEI12492											
121	NEI12492											
121	NEI12492											
121	NEI12492	22.3	12.9	25.8	18.8	-192,372 to -981,416	-.94 to -4.8	-.341 to -1.7	-3.2 to -16.1	-14 to -72	-35 to -181	-9,806 to -50,027
121	NEI12492	23.1	13.4	26.7	19.5	-192,526 to -982,205	-.94 to -4.8	-.342 to -1.7	-3.2 to -16.1	-14 to -72	-35 to -181	-9,814 to -50,068
121	NEI12492											
121	NEI12492											
121	NEI12492	0.0	0.0	0.0	0.0							
124	NEI8278	67.9	39.4	33.7	24.6	-239,033 to -1,219,468	-1.17 to -6.	-.424 to -2.2	-3.9 to -20.	-18 to -89	-44 to -225	-12,185 to -62,162
124	NEI8278											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
124	NEI8278	68.7	39.8	33.3	24.3	-239,033 to -1,219,468	-1.17 to -6.	-.424 to -2.2	-3.9 to -20.	-18 to -89	-44 to -225	-12,185 to -62,162
124	NEI8278											
124	NEI8278											
124	NEI8278	1.4	1.4	26.9	26.9							
126	NEI42317											
126	NEI42317											
126	NEI42317											
127	NEI7933											
127	NEI7933											
127	NEI7933											
127	NEI7933											
130	NEI18338	25.3	0.0	20.0	0.0	0	0	0	0	0	0	0
130	NEI18338											
130	NEI18338	23.4	0.0	19.9	0.0	0	0	0	0	0	0	0
130	NEI18338	0.0	0.0	0.0	0.0							
130	NEI18338											
130	NEI18338											
130	NEI18338											
130	NEI18338											
131	NEI42254											
131	NEI42254											
131	NEI42254	60.3	35.0	11.8	8.6	-82,930 to -423,081	-.41 to -2.1	-.147 to -.7	-1.4 to -6.9	-6 to -31	-15 to -78	-4,227 to -21,566
131	NEI42254											
131	NEI42254	0.0	0.0	0.0	0.0							
131	NEI42254											
131	NEI42254											
131	NEI42254											
131	NEI42254											
131	NEI42254											

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RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
132	NEI8261											
132	NEI8261											
132	NEI8261											
132	NEI8261											
132	NEI8261											
133	NEI13363											
133	NEI13363											
133	NEI13363											
133	NEI13363											
133	NEI13363											
135	NEI33118											
135	NEI33118											
135	NEI33118											
135	NEI33118											
136	NEI12368											
136	NEI12368											
136	NEI12368											
137	NEI26581											
137	NEI26581											
137	NEI26581											
137	NEI26581											
137	NEI26581											
138	NEI18652											
138	NEI18652											
138	NEI18652											
139	NEI42357											
139	NEI42357											
139	NEI42357											
140	NEI13340											
140	NEI13340											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
140	NEI13340											
142	NEI41552											
142	NEI41552											
142	NEI41552											
142	NEI41552											
142	NEI41552											
142	NEI41552											
142	NEI41552											
143	NEI26504											
143	NEI26504											
143	NEI26504											
145	NEI33135	43.0	43.0	6.4	6.4							
145	NEI33135	0.7	0.0	0.5	0.0	0	0	0	0	0	0	0
145	NEI33135	15.5	9.0	15.7	11.5	-117,078 to -597,290	-.57 to -2.9	-.208 to -1.1	-1.9 to -9.8	-9 to -44	-22 to -110	-5,968 to -30,447
145	NEI33135											
145	NEI33135											
145	NEI706											
146	NEI759											
146	NEI759											
146	NEI759											
146	NEI759	92.2	92.2	27.0	27.0							
146	NEI759											
146	NEI759	59.6	34.6	67.6	49.4	-339,217 to -339,217	-1.66 to -1.7	-.603 to -.6	-5.6 to -5.6	-25 to -25	-62 to -63	-17,293 to -17,291
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
147	NEI6450											
148	NEI46931											
148	NEI46931											
148	NEI46931											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
148	NEI46931											
148	NEI46931											
148	NEI46931											
149	NEI40488											
149	NEI40488											
149	NEI40488											
150	NEI6273											
150	NEI6273											
150	NEI6273											
150	NEI6273											
150	NEI6273											
151	NEI41252											
151	NEI41252											
151	NEI41252	81.5	81.5	13.8	13.8							
151	NEI41252											
151	NEI41252											
151	NEI41252											
151	NEI41252											
151	NEI41252	51.7	30.0	34.4	25.1	-242,671 to -242,671	-1.19 to -1.2	-.431 to -.4	-4. to -4.	-18 to -18	-45 to -45	-12,371 to -12,370
151	NEI41252											
151	NEI41252											
152	NEI11338	83.0	48.2	43.9	32.0	-228,319 to -228,319	-1.12 to -1.1	-.406 to -.4	-3.7 to -3.8	-17 to -17	-42 to -42	-11,639 to -11,639
152	NEI11338											
152	NEI11338	173.7	173.7	18.2	18.2							
152	NEI11338											
153	NEI33043											
153	NEI33043											
153	NEI33043											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
154	NEI46739											
154	NEI46739											
154	NEI46739											
154	NEI46739	53.9	31.2	18.5	13.5	-134,639 to -686,884	-.66 to -3.4	-.239 to -1.2	-2.2 to -11.3	-10 to -50	-25 to -127	-6,863 to -35,014
154	NEI46739	38.4	22.2	20.0	14.6	-144,396 to -736,658	-.71 to -3.6	-.256 to -1.3	-2.4 to -12.1	-11 to -54	-27 to -136	-7,361 to -37,552
154	NEI46739											
154	NEI46739	22.8	13.2	18.3	13.3	-140,493 to -716,748	-.69 to -3.5	-.249 to -1.3	-2.3 to -11.8	-10 to -53	-26 to -132	-7,162 to -36,537
154	NEI46739											
154	NEI46739											
154	NEI46739	298.6	298.6	23.8	23.8							
155	NEI33883											
155	NEI33883											
155	NEI33883											
156	NEI42338											
156	NEI42338											
156	NEI42338	44.9	44.9	11.3	11.3							
156	NEI42338											
156	NEI42338											
156	NEI42338	30.9	17.9	28.3	20.7	-250,499 to -250,499	-1.23 to -1.2	-.445 to -.4	-4.1 to -4.1	-18 to -18	-46 to -46	-12,770 to -12,769
156	NEI42338											
156	NEI42338											
156	NEI42338											
156	NEI42338											
159	NEI8177											
159	NEI8177											
159	NEI8177											
162	NEI46760											

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RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NO _x range, tpy	Secondary SO ₂ range, tpy	Secondary CO _{2e} range, tpy
162	NEI46760											
162	NEI46760											
162	NEI46760											
162	NEI46760											
162	NEI46760											
163	NEI8560											
163	NEI8560											
163	NEI8560	148.2	148.2	12.3	12.3							
163	NEI8560											
163	NEI8560											
163	NEI8560	65.0	37.7	30.7	22.4	-223,729 to -1,141,389	-1.1 to -5.6	-.397 to -.2	-3.7 to -18.7	-16 to -84	-41 to -210	-11,404 to -58,182
163	NEI8560											
163	NEI8560											
163	NEI8560											
163	NEI8560											
164	NEI42710											
164	NEI42710											
164	NEI42710											
164	NEI42710											
164	NEI42710											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
165	NEI41628											
166	NEI41314											
166	NEI41314											
166	NEI41314	89.4	89.4	37.0	37.0							
166	NEI41314											
166	NEI41314											
166	NEI41314	77.7	45.1	40.0	29.2	-189,379 to -189,379	-.93 to -.9	-.336 to -.3	-3.1 to -3.1	-14 to -14	-35 to -35	-9,654 to -9,654
166	NEI41314	101.3	58.7	52.5	38.3	-247,889 to -247,889	-1.22 to -1.2	-.44 to -.4	-4.1 to -4.1	-18 to -18	-46 to -46	-12,637 to -12,636
166	NEI41314											
166	NEI41314											
167	NEI34070											
167	NEI34070	74.0	42.9	43.2	31.6	-208,749 to -208,749	-1.02 to -1.	-.371 to -.4	-3.4 to -3.4	-15 to -15	-38 to -39	-10,642 to -10,641
167	NEI34070											
167	NEI34070	84.2	84.2	16.8	16.8							
169	NEI33013											
169	NEI33013											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
169	NEI33013											
169	NEI33013											
169	NEI33013											
171	NEI18658	34.2	19.8	7.8	5.7	-58,734 to -299,641	-.29 to -1.5	-.104 to -.5	-1. to -4.9	-4 to -22	-11 to -55	-2,994 to -15,274
171	NEI18658	34.3	19.9	7.9	5.7	-55,319 to -282,220	-.27 to -1.4	-.098 to -.5	-.9 to -4.6	-4 to -21	-10 to -52	-2,820 to -14,386
171	NEI18658	25.2	14.6	25.2	18.4	-183,226 to -934,759	-.9 to -4.6	-.325 to -1.7	-3. to -15.3	-13 to -69	-34 to -172	-9,340 to -47,650
171	NEI18658											
171	NEI18658											
171	NEI18658											
171	NEI18658											
171	NEI18658											
171	NEI18658	169.9	169.9	16.9	16.9							
172	NEI18335											
172	NEI18335											
172	NEI18335											
172	NEI18335											
173	NEI35908											
173	NEI35908											
173	NEI35908											
174	NEI40247											
174	NEI40247											
174	NEI40247	226.5	226.5	10.4	10.4							
174	NEI40247											
174	NEI40247											
174	NEI40247	107.8	62.5	25.9	18.9	-193,360 to -986,456	-.95 to -4.9	-.343 to -1.7	-3.2 to -16.2	-14 to -72	-36 to -182	-9,856 to -50,284
174	NEI40247											
175	NEI26514	0.0	0.0	0.0	0.0							
175	NEI26514											
175	NEI26514											
175	NEI26514	30.7	17.8	16.5	12.1	-164,917 to -841,349	-.81 to -4.1	-.293 to -1.5	-2.7 to -13.8	-12 to -62	-30 to -155	-8,407 to -42,888
175	NEI26514											
175	NEI26514											
175	NEI26514											
176	NEI47104											
176	NEI47104											
176	NEI47104											
177	NEI33887											
177	NEI33887											
177	NEI33887											
178	NEI26309											
178	NEI26309											
178	NEI26309											
178	NEI26309											

RTI Code	Final NEISiteID											
		GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
178	NEI26309											
179	NEI45474											
179	NEI45474											
179	NEI45474											
180	NEI26471											
180	NEI26471											
180	NEI26471											
180	NEI26471											
180	NEI26471											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
181	NEI6057											
182	NEI7181											
182	NEI7181											
182	NEI7181											
183	NEI33103											
183	NEI33103											
183	NEI33103											
184	NEI46817											
184	NEI46817											
184	NEI46817											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO _{2e} range, tpy
184	NEI46817											
184	NEI46817											
184	NEI46817											
184	NEI46817											
185	NEI46599											
185	NEI46599											
185	NEI46599											
186	NEI18334											
186	NEI18334											
186	NEI18334											
188	NEI40600											
188	NEI40600											
188	NEI40600											
188	NEI40600	22.2	12.9	18.9	13.8	-138,542 to -706,793	-.68 to -3.5	-.246 to -1.3	-2.3 to -11.6	-10 to -52	-26 to -130	-7,062 to -36,029
188	NEI40600											
188	NEI40600	20.4	11.9	17.5	12.8	-138,542 to -706,793	-.68 to -3.5	-.246 to -1.3	-2.3 to -11.6	-10 to -52	-26 to -130	-7,062 to -36,029
188	NEI40600											
188	NEI40600	62.6	62.6	16.0	16.0							
189	NEI54342											
189	NEI54342											
189	NEI54342											
189	NEI54342											
190	NEI26491											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NO _x range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
190	NEI26491											
195	NEI46835											
195	NEI46835											
195	NEI46835											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
196	NEI18660											
197	NEI18657											
197	NEI18657	22.5	22.5	4.0	4.0							
197	NEI18657	17.2	10.0	10.0	7.3	-73,564 to -375,297	-.36 to -1.8	-.131 to -.7	-1.2 to -6.2	-5 to -28	-14 to -69	-3,750 to -19,131
197	NEI18657											
198	NEI41565											
198	NEI41565											
198	NEI41565											
199	NEI18390											
199	NEI18390											
199	NEI18390											
200	NEI47077											
200	NEI47077											
200	NEI47077											
200	NEI47077											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
200	NEI47077											
201	NEI7559											
201	NEI7559											
201	NEI7559											
202	NEI12411											
202	NEI12411											
202	NEI12411											
203	NEI42410											
203	NEI42410											
203	NEI42410											
203	NEI42410											
203	NEI42410											
205	NEI8601											
205	NEI8601	45.3	26.3	32.3	23.6	-163,085 to -163,085	-.8 to -.8	-.29 to -.3	-2.7 to -2.7	-12 to -12	-30 to -30	-8,314 to -8,313
205	NEI8601											
205	NEI8601	54.6	54.6	12.9	12.9							
206	NEI40282	86.3	50.1	39.7	28.9	-189,440 to -189,440	-.93 to -.9	-.337 to -.3	-3.1 to -3.1	-14 to -14	-35 to -35	-9,657 to -9,657
206	NEI40282	89.3	51.8	40.2	29.4	-189,440 to -189,440	-.93 to -.9	-.337 to -.3	-3.1 to -3.1	-14 to -14	-35 to -35	-9,657 to -9,657
206	NEI40282	6.4	6.4	32.5	32.5							
206	NEI40282											
206	NEI40282											
206	NEI40282											
206	NEI40282											
207	NEI7104											
207	NEI7104											
207	NEI7104											
208228535	NEI18373											
208228535	NEI18373											
208228535	NEI18373											
208228535	NEI18373											
208228535	NEI18373											
208228535	NEI18373											
226	NEI33023											
226	NEI33023											
226	NEI33023											
226	NEI33023											

RTI Code	Final NEISiteID											
		GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
226	NEI33023											
226	NEI33023											
226	NEI33023											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
240	NEI26526											
242	NEI34066											
242	NEI34066											
242	NEI34066											
243	NEI8196											
243	NEI8196											
243	NEI8196											
243	NEI8196											
243	NEI8196											
340	NEI46852											
340	NEI46852											
340	NEI46852											
525	NEI8265											
525	NEI8265											
525	NEI8265											
525	NEI8265											
531	NEI8186											
531	NEI8186											
531	NEI8186											
606	NEI47091											
606	NEI47091											
606	NEI47091											
606	NEI47091											
606	NEI47091											
606	NEI47091											

RTI Code	Final NEISiteID	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
606	NEI47091											
606	NEI47091											
610	NEI6261											
610	NEI6261											
610	NEI6261											
610	NEI6261											
610	NEI6261											
613	NEI11172											
613	NEI11172											
613	NEI11172	60.8	35.3	45.8	33.4	-228,319 to -228,319	-1.12 to -1.1	-.406 to -.4	-3.7 to -3.8	-17 to -17	-42 to -42	-11,639 to -11,639
613	NEI11172											
613	NEI11172											
613	NEI11172	60.9	35.3	45.8	33.4	-228,319 to -228,319	-1.12 to -1.1	-.406 to -.4	-3.7 to -3.8	-17 to -17	-42 to -42	-11,639 to -11,639
613	NEI11172											
613	NEI11172											
613	NEI11172											
613	NEI11172											
613	NEI11172	72.1	72.1	18.1	18.1							
613	NEI11172	72.1	72.1	18.1	18.1							
615	NEI40554											
615	NEI40554											
615	NEI40554											
617	NEI42695											
617	NEI42695											
617	NEI42695											
161	NEI7621											
161	NEI7621											
161	NEI7621											
700	NEI42351											
700	NEI42351											
700	NEI42351											
106	NEI41599											
106	NEI41599											

RTI Code	Final NEISiteID											
		GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
106	NEI41599											
128	NEI11461											
128	NEI11461											
141	NEI46750											
141	NEI46750											
187	NEI42211											
187	NEI42211											
193	NEI39968											
193	NEI39968											
193	NEI39968											
193	NEI39968											
193	NEI39968											
241	NEI26382											
241	NEI26382											
244	NEI43472											
244	NEI43472											
245	NEI18347											
245	NEI18347											
245	NEI18347											

RTI Code	Final NEISiteID											
		GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reduction, tpy	Energy impacts range, MMBtu/yr	Secondary PM range, tpy	Secondary PM _{2.5} range, tpy	Secondary CO range, tpy	Secondary NOx range, tpy	Secondary SO ₂ range, tpy	Secondary CO ₂ e range, tpy
247	NEI33945											
247	NEI33945											
304	NEIVA00022											
304	NEIVA00022											
		3,478	2,754	1,273	989	-5,586,546 to -17,404,333	-27 to -86	-10 to -31	-92 to -286	-410 to -1,277	-1,029 to -3,208	-284,782 to -887,185

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)						GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy									
100	NEI40686															
100	NEI40686															
100	NEI40686															
102	NEI42341A															
102	NEI42341A															
102	NEI42341A															
103	NEI9201															
103	NEI9201															
103	NEI9201															
104	NEI11251															
104	NEI11251															
104	NEI11251															
105	NEI45182															
105	NEI45182															
105	NEI45182															
105	NEI45182															
105	NEI45182															
105	NEI45182															
105	NEI45182															
107	NEI47074															
107	NEI47074															
107	NEI47074															
108	NEI33025															
108	NEI33025															
108	NEI33025															
109	NEI32869A															
109	NEI32869A															
109	NEI32869A															
109	NEI32869A															
109	NEI32869A															
111	NEI45206															
111	NEI45206															
111	NEI45206															
112	NEI34064															
112	NEI34064															
112	NEI34064															
114	NEI26506															
114	NEI26506															
114	NEI26506															

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
115	NEI26476														
115	NEI26476														
115	NEI26476														
116	NEI8619														
116	NEI8619		\$ 4,760,431	\$ 765,316	525	6.1	5.5	13.8	12.42	44.1	24.3	882	0.0043	0.0016	0.01
116	NEI8619														
117	NEI42689														
117	NEI42689														
117	NEI42689														
119	NEI46814														
119	NEI46814														
119	NEI46814	-.104 to -.528													
119	NEI46814														
119	NEI46814														
119	NEI46814														
119	NEI46814														
120	NEI26495														
120	NEI26495														
120	NEI26495														
120	NEI26495														
121	NEI12492														
121	NEI12492														
121	NEI12492														
121	NEI12492	-.118 to -.602													
121	NEI12492	-.118 to -.602													
121	NEI12492														
121	NEI12492														
121	NEI12492														
121	NEI12492														
124	NEI8278	-.147 to -.748													
124	NEI8278														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
124	NEI8278	-.147 to -.748													
124	NEI8278														
124	NEI8278														
124	NEI8278														
126	NEI42317														
126	NEI42317		\$ 3,711,929	\$ 601,386	525	0.0040	0.0036	0.037	0.033	30.1	16.6	583	0.0029	0.0010	0.01
126	NEI42317														
127	NEI7933														
127	NEI7933														
127	NEI7933		\$ 4,559,859	\$ 733,931	525	5.6	5.1	17.3	15.57	42.7	23.5	821	0.0040	0.0015	0.01
127	NEI7933														
130	NEI18338	0													
130	NEI18338														
130	NEI18338	0													
130	NEI18338														
130	NEI18338														
130	NEI18338														
130	NEI18338														
130	NEI18338														
130	NEI18338														
131	NEI42254														
131	NEI42254														
131	NEI42254	-.051 to -.259													
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														
131	NEI42254														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
132	NEI8261														
132	NEI8261														
132	NEI8261														
132	NEI8261														
132	NEI8261														
133	NEI13363														
133	NEI13363														
133	NEI13363														
133	NEI13363														
133	NEI13363														
135	NEI33118														
135	NEI33118														
135	NEI33118														
135	NEI33118														
136	NEI12368														
136	NEI12368														
136	NEI12368														
137	NEI26581														
137	NEI26581														
137	NEI26581														
137	NEI26581														
137	NEI26581														
138	NEI18652														
138	NEI18652														
138	NEI18652														
139	NEI42357														
139	NEI42357														
139	NEI42357														
140	NEI13340														
140	NEI13340														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)						GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy									
140	NEI13340															
142	NEI41552															
142	NEI41552															
142	NEI41552		\$ 3,217,400	\$ 524,188	525	1.4	1.3	3.7	3.33	16.1	8.8	459	0.0023	0.0008	0.01	
142	NEI41552															
142	NEI41552															
142	NEI41552															
142	NEI41552															
143	NEI26504															
143	NEI26504															
143	NEI26504															
145	NEI33135															
145	NEI33135	0														
145	NEI33135	-.072 to -.366														
145	NEI33135															
145	NEI33135															
145	NEI706															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759															
146	NEI759	-.208 to -.208														
147	NEI6450															
147	NEI6450															
147	NEI6450															
147	NEI6450															
147	NEI6450															
147	NEI6450															
147	NEI6450															
148	NEI46931															
148	NEI46931															
148	NEI46931															

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
148	NEI46931														
148	NEI46931														
148	NEI46931														
149	NEI40488														
149	NEI40488														
149	NEI40488														
150	NEI6273														
150	NEI6273														
150	NEI6273														
150	NEI6273														
150	NEI6273														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252														
151	NEI41252	-0.149 to -0.149													
151	NEI41252														
151	NEI41252														
152	NEI11338														
152	NEI11338														
152	NEI11338														
152	NEI11338														
152	NEI11338	-0.14 to -0.14													
153	NEI33043														
153	NEI33043														
153	NEI33043														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
154	NEI46739														
154	NEI46739														
154	NEI46739														
154	NEI46739	-0.83 to -.422													
154	NEI46739	-0.89 to -.452													
154	NEI46739														
154	NEI46739	-0.86 to -.44													
154	NEI46739														
154	NEI46739														
154	NEI46739														
155	NEI33883														
155	NEI33883														
155	NEI33883														
156	NEI42338														
156	NEI42338														
156	NEI42338														
156	NEI42338														
156	NEI42338														
156	NEI42338	-.154 to -.154													
156	NEI42338														
156	NEI42338														
156	NEI42338														
156	NEI42338														
159	NEI8177														
159	NEI8177														
159	NEI8177														
162	NEI46760														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
162	NEI46760														
162	NEI46760														
162	NEI46760														
162	NEI46760														
162	NEI46760														
163	NEI8560														
163	NEI8560														
163	NEI8560														
163	NEI8560														
163	NEI8560														
163	NEI8560														
163	NEI8560	-0.137 to -0.7													
163	NEI8560		\$ 4,069,636	\$ 657,274	525	4.8	4.3	10.9	9.81	31.7	17.4	679	0.0033	0.0012	0.01
163	NEI8560														
163	NEI8560														
163	NEI8560														
163	NEI8560														
164	NEI42710														
164	NEI42710														
164	NEI42710														
164	NEI42710														
164	NEI42710														
165	NEI41628														
165	NEI41628														
165	NEI41628														
165	NEI41628														
165	NEI41628														
165	NEI41628														
166	NEI41314														
166	NEI41314														
166	NEI41314														
166	NEI41314														
166	NEI41314														
166	NEI41314	-0.116 to -0.116													
166	NEI41314	-0.152 to -0.152													
166	NEI41314														
166	NEI41314														
167	NEI34070														
167	NEI34070	-0.128 to -0.128													
167	NEI34070														
167	NEI34070														
169	NEI33013														
169	NEI33013		\$ 3,916,784	\$ 633,387	525	4.9	4.4	11.2	10.08	33.4	18.3	637	0.0031	0.0011	0.01

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)										Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr			
169	NEI33013		\$ 3,813,688	\$ 617,280	525	4.8	4.3	11.2	10.08	31.9	17.5	610	0.0030	0.0011	0.01
169	NEI33013														
169	NEI33013														
171	NEI18658	-0.036 to -.184													
171	NEI18658	-0.034 to -.173													
171	NEI18658	-.112 to -.574													
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
171	NEI18658														
172	NEI18335														
172	NEI18335		\$ 2,820,461	\$ 462,284	525	2.6	2.3	5.9	5.31	18.3	10.1	369	0.0018	0.0007	0.01
172	NEI18335		\$ 3,521,719	\$ 571,684	525	3.6	3.3	8.4	7.56	27.4	15.1	534	0.0026	0.0009	0.01
172	NEI18335														
172	NEI18335														
173	NEI35908														
173	NEI35908														
173	NEI35908														
174	NEI40247														
174	NEI40247														
174	NEI40247														
174	NEI40247														
174	NEI40247	-.119 to -.605													
174	NEI40247														
175	NEI26514														
175	NEI26514														
175	NEI26514														
175	NEI26514	-.101 to -.516													
175	NEI26514														
175	NEI26514														
175	NEI26514														
176	NEI47104														
176	NEI47104														
176	NEI47104														
177	NEI33887														
177	NEI33887														
177	NEI33887														
178	NEI26309														
178	NEI26309														
178	NEI26309														
178	NEI26309														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
178	NEI26309														
179	NEI45474														
179	NEI45474														
179	NEI45474														
180	NEI26471														
180	NEI26471														
180	NEI26471														
180	NEI26471														
180	NEI26471														
181	NEI6057														
181	NEI6057														
181	NEI6057														
181	NEI6057		\$ 3,732,428	\$ 604,587	525	2.7	2.4	11.1	9.99	29.9	16.5	588	0.0029	0.0010	0.01
181	NEI6057														
181	NEI6057														
181	NEI6057														
181	NEI6057														
181	NEI6057														
181	NEI6057														
182	NEI7181														
182	NEI7181														
182	NEI7181														
183	NEI33103														
183	NEI33103														
183	NEI33103														
184	NEI46817														
184	NEI46817														
184	NEI46817														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
184	NEI46817														
184	NEI46817														
184	NEI46817														
184	NEI46817														
185	NEI46599														
185	NEI46599														
185	NEI46599														
186	NEI18334														
186	NEI18334														
186	NEI18334														
188	NEI40600														
188	NEI40600														
188	NEI40600														
188	NEI40600	-.085 to -.433													
188	NEI40600														
188	NEI40600	-.085 to -.433													
188	NEI40600														
188	NEI40600														
189	NEI54342														
189	NEI54342		\$ 6,286,986	\$ 1,004,563	525	7.9	7.1	24.3	21.87	72.4	39.8	1403	0.0069	0.0025	0.02
189	NEI54342														
189	NEI54342														
190	NEI26491														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
190	NEI26491														
190	NEI26491														
190	NEI26491														
190	NEI26491														
190	NEI26491														
190	NEI26491														
190	NEI26491														
195	NEI46835														
195	NEI46835														
195	NEI46835														
196	NEI18660														
196	NEI18660														
196	NEI18660														
196	NEI18660														
196	NEI18660														
196	NEI18660														
196	NEI18660														
196	NEI18660														
197	NEI18657														
197	NEI18657														
197	NEI18657	-.045 to -.23													
197	NEI18657														
198	NEI41565														
198	NEI41565														
198	NEI41565														
199	NEI18390														
199	NEI18390														
199	NEI18390														
200	NEI47077														
200	NEI47077														
200	NEI47077														
200	NEI47077														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
200	NEI47077														
201	NEI7559														
201	NEI7559														
201	NEI7559														
202	NEI12411														
202	NEI12411														
202	NEI12411														
203	NEI42410														
203	NEI42410														
203	NEI42410														
203	NEI42410														
203	NEI42410														
205	NEI8601														
205	NEI8601	-1 to -.1													
205	NEI8601														
205	NEI8601														
206	NEI40282	-.116 to -.116													
206	NEI40282	-.116 to -.116													
206	NEI40282														
206	NEI40282														
206	NEI40282														
206	NEI40282														
206	NEI40282														
206	NEI40282														
207	NEI7104														
207	NEI7104														
207	NEI7104														
208228535	NEI18373														
208228535	NEI18373														
208228535	NEI18373														
208228535	NEI18373														
208228535	NEI18373														
208228535	NEI18373														
226	NEI33023														
226	NEI33023														
226	NEI33023		\$ 4,522,070	\$ 728,020	525	5.4	4.8	16.4	14.76	39.8	21.9	810	0.0040	0.0014	0.01
226	NEI33023		\$ 3,062,756	\$ 500,064	525	2.4	2.2	7.7	6.93	21.1	11.6	423	0.0021	0.0007	0.01

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
226	NEI33023														
226	NEI33023														
226	NEI33023														
240	NEI26526														
240	NEI26526														
240	NEI26526														
240	NEI26526														
240	NEI26526														
240	NEI26526														
242	NEI34066														
242	NEI34066														
242	NEI34066														
243	NEI8196														
243	NEI8196														
243	NEI8196														
243	NEI8196														
243	NEI8196														
340	NEI46852														
340	NEI46852														
340	NEI46852														
525	NEI8265														
525	NEI8265														
525	NEI8265														
525	NEI8265														
531	NEI8186														
531	NEI8186														
531	NEI8186														
606	NEI47091														
606	NEI47091														
606	NEI47091														
606	NEI47091														
606	NEI47091														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)										Secondary PM	Secondary PM _{2.5}	Secondary CO	
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr				
606	NEI47091															
606	NEI47091															
610	NEI6261															
610	NEI6261															
610	NEI6261															
610	NEI6261															
610	NEI6261															
613	NEI11172															
613	NEI11172															
613	NEI11172	-.14 to -.14														
613	NEI11172															
613	NEI11172															
613	NEI11172	-.14 to -.14														
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
613	NEI11172															
615	NEI40554															
615	NEI40554															
615	NEI40554															
617	NEI42695															
617	NEI42695															
617	NEI42695															
161	NEI7621															
161	NEI7621															
161	NEI7621															
700	NEI42351															
700	NEI42351															
700	NEI42351															
106	NEI41599		\$ 4,067,057	\$ 656,871	525	10.9	9.8	44.7	40.3	35.0	19.3	679	0.0033	0.0012	0.01	
106	NEI41599															

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)					GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy								
106	NEI41599														
128	NEI11461														
128	NEI11461														
141	NEI46750														
141	NEI46750														
187	NEI42211														
187	NEI42211														
193	NEI39968														
193	NEI39968														
193	NEI39968														
193	NEI39968														
193	NEI39968														
241	NEI26382														
241	NEI26382														
244	NEI43472														
244	NEI43472														
245	NEI18347														
245	NEI18347														
245	NEI18347														

RTI Code	Final NEISiteID	Secondary Hg range, tpy	Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)													
			Capital cost, \$2015 BE&K	Annualized cost, \$2015/yr BE&K	Labor impact, hr/yr	Methanol emissions, tpy	Methanol emission reduction, tpy	GOH emissions, tpy	GOH emission reduction, tpy	TRS emissions, tpy	TRS emission reductions, tpy	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO	
247	NEI33945															
247	NEI33945															
304	NEIVA00022															
304	NEIVA00022															
		-3.4 to -10.7	\$ 56,063,204	\$ 9,060,836	7,350	63	57	187	168	474	261	9,477	0.047	0.017	0.16	

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
100	NEI40686				
100	NEI40686				
100	NEI40686				
102	NEI42341A				
102	NEI42341A				
102	NEI42341A				
103	NEI9201				
103	NEI9201				
103	NEI9201				
104	NEI11251				
104	NEI11251				
104	NEI11251				
105	NEI45182				
105	NEI45182				
105	NEI45182				
105	NEI45182				
105	NEI45182				
105	NEI45182				
105	NEI45182				
107	NEI47074				
107	NEI47074				
107	NEI47074				
108	NEI33025				
108	NEI33025				
108	NEI33025				
109	NEI32869A				
109	NEI32869A				
109	NEI32869A				
109	NEI32869A				
109	NEI32869A				
111	NEI45206				
111	NEI45206				
111	NEI45206				
112	NEI34064				
112	NEI34064				
112	NEI34064				
114	NEI26506				
114	NEI26506				
114	NEI26506				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
115	NEI26476				
115	NEI26476				
115	NEI26476				
116	NEI8619				
116	NEI8619	0.06	0.16	44.9	0.00054
116	NEI8619				
117	NEI42689				
117	NEI42689				
117	NEI42689				
119	NEI46814				
119	NEI46814				
119	NEI46814				
119	NEI46814				
119	NEI46814				
119	NEI46814				
119	NEI46814				
119	NEI46814				
120	NEI26495				
120	NEI26495				
120	NEI26495				
120	NEI26495				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
121	NEI12492				
124	NEI8278				
124	NEI8278				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
124	NEI8278				
124	NEI8278				
124	NEI8278				
124	NEI8278				
126	NEI42317				
126	NEI42317	0.04	0.11	29.7	0.00036
126	NEI42317				
127	NEI7933				
127	NEI7933				
127	NEI7933	0.06	0.15	41.8	0.00050
127	NEI7933				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
130	NEI18338				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				
131	NEI42254				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
132	NEI8261				
132	NEI8261				
132	NEI8261				
132	NEI8261				
132	NEI8261				
133	NEI13363				
133	NEI13363				
133	NEI13363				
133	NEI13363				
133	NEI13363				
135	NEI33118				
135	NEI33118				
135	NEI33118				
135	NEI33118				
136	NEI12368				
136	NEI12368				
136	NEI12368				
137	NEI26581				
137	NEI26581				
137	NEI26581				
137	NEI26581				
137	NEI26581				
138	NEI18652				
138	NEI18652				
138	NEI18652				
139	NEI42357				
139	NEI42357				
139	NEI42357				
140	NEI13340				
140	NEI13340				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
140	NEI13340				
142	NEI41552				
142	NEI41552				
142	NEI41552	0.03	0.08	23.4	0.00028
142	NEI41552				
142	NEI41552				
142	NEI41552				
142	NEI41552				
143	NEI26504				
143	NEI26504				
143	NEI26504				
145	NEI33135				
145	NEI33135				
145	NEI33135				
145	NEI33135				
145	NEI33135				
145	NEI706				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
146	NEI759				
147	NEI6450				
147	NEI6450				
147	NEI6450				
147	NEI6450				
147	NEI6450				
147	NEI6450				
147	NEI6450				
148	NEI46931				
148	NEI46931				
148	NEI46931				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
148	NEI46931				
148	NEI46931				
148	NEI46931				
149	NEI40488				
149	NEI40488				
149	NEI40488				
150	NEI6273				
150	NEI6273				
150	NEI6273				
150	NEI6273				
150	NEI6273				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
151	NEI41252				
152	NEI11338				
152	NEI11338				
152	NEI11338				
152	NEI11338				
153	NEI33043				
153	NEI33043				
153	NEI33043				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
154	NEI46739				
155	NEI33883				
155	NEI33883				
155	NEI33883				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
156	NEI42338				
159	NEI8177				
159	NEI8177				
159	NEI8177				
162	NEI46760				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
162	NEI46760				
162	NEI46760				
162	NEI46760				
162	NEI46760				
162	NEI46760				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560	0.05	0.12	34.6	0.00042
163	NEI8560				
163	NEI8560				
163	NEI8560				
163	NEI8560				
164	NEI42710				
164	NEI42710				
164	NEI42710				
164	NEI42710				
164	NEI42710				
165	NEI41628				
165	NEI41628				
165	NEI41628				
165	NEI41628				
165	NEI41628				
165	NEI41628				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
166	NEI41314				
167	NEI34070				
167	NEI34070				
167	NEI34070				
167	NEI34070				
169	NEI33013				
169	NEI33013	0.05	0.12	32.5	0.00039

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
169	NEI33013	0.04	0.11	31.1	0.00037
169	NEI33013				
169	NEI33013				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
171	NEI18658				
172	NEI18335				
172	NEI18335	0.03	0.07	18.8	0.00023
172	NEI18335	0.04	0.10	27.2	0.00033
172	NEI18335				
172	NEI18335				
173	NEI35908				
173	NEI35908				
173	NEI35908				
174	NEI40247				
174	NEI40247				
174	NEI40247				
174	NEI40247				
174	NEI40247				
174	NEI40247				
175	NEI26514				
175	NEI26514				
175	NEI26514				
175	NEI26514				
175	NEI26514				
175	NEI26514				
175	NEI26514				
176	NEI47104				
176	NEI47104				
176	NEI47104				
177	NEI33887				
177	NEI33887				
177	NEI33887				
178	NEI26309				
178	NEI26309				
178	NEI26309				
178	NEI26309				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
178	NEI26309				
179	NEI45474				
179	NEI45474				
179	NEI45474				
180	NEI26471				
180	NEI26471				
180	NEI26471				
180	NEI26471				
181	NEI6057				
181	NEI6057				
181	NEI6057				
181	NEI6057	0.04	0.11	30.0	0.00036
181	NEI6057				
181	NEI6057				
181	NEI6057				
181	NEI6057				
181	NEI6057				
181	NEI6057				
182	NEI7181				
182	NEI7181				
182	NEI7181				
183	NEI33103				
183	NEI33103				
183	NEI33103				
184	NEI46817				
184	NEI46817				
184	NEI46817				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
184	NEI46817				
184	NEI46817				
184	NEI46817				
184	NEI46817				
185	NEI46599				
185	NEI46599				
185	NEI46599				
186	NEI18334				
186	NEI18334				
186	NEI18334				
188	NEI40600				
188	NEI40600				
188	NEI40600				
188	NEI40600				
188	NEI40600				
188	NEI40600				
188	NEI40600				
188	NEI40600				
189	NEI54342				
189	NEI54342	0.10	0.26	71.4	0.00086
189	NEI54342				
189	NEI54342				
190	NEI26491				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
190	NEI26491				
190	NEI26491				
190	NEI26491				
190	NEI26491				
190	NEI26491				
190	NEI26491				
190	NEI26491				
195	NEI46835				
195	NEI46835				
195	NEI46835				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
196	NEI18660				
197	NEI18657				
197	NEI18657				
197	NEI18657				
197	NEI18657				
198	NEI41565				
198	NEI41565				
198	NEI41565				
199	NEI18390				
199	NEI18390				
199	NEI18390				
200	NEI47077				
200	NEI47077				
200	NEI47077				
200	NEI47077				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
200	NEI47077				
201	NEI7559				
201	NEI7559				
201	NEI7559				
202	NEI12411				
202	NEI12411				
202	NEI12411				
203	NEI42410				
203	NEI42410				
203	NEI42410				
203	NEI42410				
203	NEI42410				
205	NEI8601				
205	NEI8601				
205	NEI8601				
205	NEI8601				
206	NEI40282				
206	NEI40282				
206	NEI40282				
206	NEI40282				
206	NEI40282				
206	NEI40282				
206	NEI40282				
206	NEI40282				
207	NEI7104				
207	NEI7104				
207	NEI7104				
208228535	NEI18373				
208228535	NEI18373				
208228535	NEI18373				
208228535	NEI18373				
208228535	NEI18373				
208228535	NEI18373				
226	NEI33023				
226	NEI33023				
226	NEI33023	0.06	0.15	41.2	0.00050
226	NEI33023	0.03	0.08	21.5	0.00026

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
226	NEI33023				
226	NEI33023				
226	NEI33023				
240	NEI26526				
240	NEI26526				
240	NEI26526				
240	NEI26526				
240	NEI26526				
240	NEI26526				
242	NEI34066				
242	NEI34066				
242	NEI34066				
243	NEI8196				
243	NEI8196				
243	NEI8196				
243	NEI8196				
243	NEI8196				
340	NEI46852				
340	NEI46852				
340	NEI46852				
525	NEI8265				
525	NEI8265				
525	NEI8265				
525	NEI8265				
531	NEI8186				
531	NEI8186				
531	NEI8186				
606	NEI47091				
606	NEI47091				
606	NEI47091				
606	NEI47091				
606	NEI47091				
606	NEI47091				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
606	NEI47091				
606	NEI47091				
610	NEI6261				
610	NEI6261				
610	NEI6261				
610	NEI6261				
610	NEI6261				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
613	NEI11172				
615	NEI40554				
615	NEI40554				
615	NEI40554				
617	NEI42695				
617	NEI42695				
617	NEI42695				
161	NEI7621				
161	NEI7621				
161	NEI7621				
700	NEI42351				
700	NEI42351				
700	NEI42351				
106	NEI41599	0.05	0.12	34.6	0.00042
106	NEI41599				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
106	NEI41599				
128	NEI11461				
128	NEI11461				
141	NEI46750				
141	NEI46750				
187	NEI42211				
187	NEI42211				
193	NEI39968				
193	NEI39968				
193	NEI39968				
193	NEI39968				
193	NEI39968				
241	NEI26382				
241	NEI26382				
244	NEI43472				
244	NEI43472				
245	NEI18347				
245	NEI18347				
245	NEI18347				

RTI Code	Final NEISiteID				
		Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
247	NEI33945				
247	NEI33945				
304	NEIVA00022				
304	NEIVA00022				
		0.69	1.7	483	0.0058

Appendix B

Documentation of Costs and Impacts

Appendix B1. Cost and Impacts Algorithms for Recovery Furnace Gaseous Organic HAP Options

Appendix B2. Cost and Impacts Algorithms for Opacity Options

Appendix B1. Cost and Impacts Algorithms for Recovery Furnace Gaseous Organic HAP Options

Table B1-1. Conversion to NDCE

Table B1-2. Recovery Furnace Replacement

Table B1-3. Mill A - DCE Recovery Furnaces Conversion (Furnace 1)

Table B1-4. Mill A - DCE Recovery Furnaces Conversion (Furnace 2)

Table B1-5. Mill B - DCE Recovery Furnace Conversion

Table B1-6. Mill C - 2 DCE Recovery Furnaces Replacement

Table B1-7. Mill D - 3 DCE Recovery Furnaces Replacement

Table B1-8. Wet to Dry ESP System Conversion

Table B1-1. Conversion to NDCE

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
Design Parameters				
Furnace Size, MM lb BLS/d	1.7	1.7		
Cost Indexes				
CEPCI	394.3	556.8		
CPI	124 (1989)	237.07		
Capital Costs, \$				
Total Installed Cost (TIC) ²	\$19,664,100	\$27,768,123	$\$19,664,100 \times (\text{furnace size}/1.7\text{MM})^{0.6} \times 556.8/394.3 \text{ CEPCI}$	BE&K, RUST
Pulp Production Losses	\$1,606,282	\$2,795,898	$25\% \text{ profit margin} \times \$646/\text{ton bleached pulp market price} \times 237.07/124 \text{ CPI} \times 20\text{-d downtime} \times 420 \text{ ADTP/d} \times (\text{furnace size}/1.5 \text{ MM})^{0.6}$	Subpart MM TSD (profit margin, market price), BE&K (downtime)
Total Capital Cost	\$21,270,382	\$30,564,021	$\\$5,584 \times (\text{furnace size})^{0.6}$	
Annual Costs, \$/yr				
Maintenance & Materials	\$589,923	\$833,044	3% of TIC	BE&K
Energy	\$132,428	\$171,196	$450 \text{ kW power} \times 70\% \text{ power usage factor} \times \text{furnace size}/1.7\text{MM} \times 350 \text{ d/yr} \times 24 \text{ hr/d} \times \$0.0647/\text{kWh}^3$	BE&K, with updated elec. unit cost from EIA
Labor	\$26,666	\$28,581	$3 \text{ hr/d} \times 350 \text{ d/yr} \times \$27.22/\text{hr}^4$	BE&K, with updated labor rate from BLS
Testing	\$5,000	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Utilities	(\$566,667)	(\$566,664)	$26,984 \text{ lb/hr steam} \times 50\% \text{ recovered steam factor} \times \text{furnace size}/1.7\text{MM} \times 350 \text{ d/yr} \times 24 \text{ hr/d} \times \$0.005/\text{lb steam}$	BE&K
Admin., Taxes, and Insurance	\$786,564	\$1,110,725	4% of TIC	OAQPS Cost Manual

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
Capital Recovery	\$1,856,291	\$2,621,311	$0.0944 \times \text{TIC}$, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annual Cost, \$/yr	\$2,830,205	\$4,222,193	$(0.1644 \times \text{capital cost}) - (0.2326 \times \text{furnace size}) + \\$52,581$	
Energy Impacts				
Energy to generate electricity, MMBtu/yr	19,417	25,102	Energy cost (\$/yr)/(\$0.0647/kWh) x 3415.179 Btu/kWh x MMBtu/1E6 Btu / 36% power plant efficiency ³	
Steam Savings, lb steam/yr	(113,333,333)	(113,332,800)	Utilities cost (\$/yr)/(\$0.005/lb steam)	
Total Energy Impacts, MMBtu/yr	(116,583)	(110,898)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) x 1200 Btu/lb steam x MMBtu/1E6 Btu	
Secondary Impacts, tpy				
PM	(0.572)	(0.544)	Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM _{2.5}	(0.207)	(0.197)		
CO	(1.91)	(1.82)		
NO _x	(8.55)	(8.13)		
SO ₂	(21.5)	(20.4)		
CO ₂	(5,911)	(5,623)		
CH ₄	(0.476)	(0.453)		
N ₂ O	(0.0673)	(0.0640)		
Hg	(0.0716)	(0.0681)		

1. Costs are in 2015 dollars.

2. Total installed cost includes cost to replace DCE, upgrade ESP, convert ESP to dry bottom, and install new economizer, new spent pulping liquor concentrator, additional soot blowers, ash mix tank, and CEMS.

3. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

4. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B1-2. Recovery Furnace Replacement

Parameters	Original cost, 2008\$	Updated cost, 2015\$	Equation ¹	Source
Design Parameters				
Furnace Size, MM lb BLS/d	3.76	3.76		
Cost Indexes				
CEPCI	575.4	556.8		
Total Capital Cost, \$	\$93,000,000	\$89,993,743	\$93,000,000 x (furnace size/3.76MM)^{0.6} x 556.8/575.4 = \$10,212 x (furnace size)^{0.6}	Andover memo
Annual Cost, \$/yr				
Maintenance, Fuel, and Power	(\$6,324,000)	(\$6,119,575)	6.8% of capital cost (reduction)	Andover memo
Labor	\$26,666	\$28,581	3 hr/d x 350 d/yr x \$27.22/hr ²	BE&K, with updated labor rate from BLS
Testing	\$5,000	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Admin., Taxes, and Insurance	\$3,720,000	\$3,599,750	4% of capital cost	OAQPS Cost Manual
Capital Recovery	\$6,975,000	\$6,749,531	0.0750 x capital cost, based on 40-yr service life and 7% interest	OAQPS Cost Manual
Total	\$4,402,666	\$4,282,287	(0.047 x capital cost) + \$52,581	
Energy Impacts, MMBtu/yr	(366,843)	(366,843)	297 Btu/lb BLS x furnace size (lb BLS/d) x 365 d/yr x 90% capacity factor x MMBtu/1E6 Btu	Andover memo
Secondary Impacts, tpy				
PM	(1.80)	(1.80)	Energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu)	
PM _{2.5}	(0.651)	(0.651)		
CO	(6.02)	(6.02)		

Parameters	Original cost, 2008\$	Updated cost, 2015\$	Equation ¹	Source
NOx	(26.9)	(26.9)	x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
SO ₂	(68)	(67.6)		
CO ₂	(18,599)	(18,599)		
CH ₄	(1.50)	(1.50)		
N ₂ O	(0.212)	(0.212)		
Hg	(0.225)	(0.225)		

1. Costs are in 2015 dollars.

2. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B1-3. Mill A - DCE Recovery Furnaces Conversion (Furnace 1)

Parameters	Values	Equation	Source
Design Parameters			
Furnace Size, MM lb BLS/d	2.3424		AECOM estimate
Cost Indexes (CPI)			
1989	124		
2015	237.07		
Capital Costs, 2015\$			
Recovery Furnace Modification	\$18,500,000		AECOM estimate
Evaporator Modification	\$4,700,000		AECOM estimate
Turbine Generator	\$26,600,000		AECOM estimate
ESP Upgrade	\$19,445,794	$\$25,582,918 \times (\text{furnace size}/3.7\text{MM})^{0.6}$	BE&K
Wet to Dry ESP System Conversion	\$2,482,742	$\$3,266,300 \times (\text{furnace size}/3.7\text{MM})^{0.6}$	BE&K
Total Installed Cost (TIC)	\$71,728,536		
Pulp Production Losses	\$4,253,017	25% profit margin x \$646/ton bleached pulp market price x 237.07/124 CPI x 20-d downtime x 750 ADTP/d x (furnace size/2.7 MM) ^{0.6}	Subpart MM TSD
Total Capital Cost	\$75,981,553	$\\$75,981,553 \times (\text{furnace size}/2.3424\text{MM})^{0.6}$	
Annual Costs, \$/yr			
Maintenance & Materials	\$2,151,856	3% of TIC	BE&K
Energy	\$235,888	450 kW power x 70% power usage factor x furnace size/1.7MM x 350 d/yr x 24 hr/d x \$0.0647/kWh ¹	BE&K
Labor	\$28,581	3 hr/d x 350 d/yr x \$27.22/hr ²	BE&K
Testing	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Utilities	(\$780,796)	26,984 lb/hr steam x 50% recovered steam factor x furnace size/1.7MM x 350 d/yr x 24 hr/d x \$0.005/lb steam	BE&K

Parameters	Values	Equation	Source
Admin., Taxes, and Insurance	\$2,869,141	4% of TIC	OAQPS Cost Manual
Capital Recovery	\$6,771,174	$0.0944 \times \text{TIC}$, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$11,299,844	$(0.1644 \times \text{capital cost}) - (0.2326 \times \text{furnace size}) + \\$52,581$	
Energy Impacts			
Energy to Generate Electricity, MMBtu/yr	34,587	$\text{Energy cost (\$/yr)} / (\$0.0647/\text{kWh}) \times 3415.179 \text{ Btu/kWh} \times \text{MMBtu}/1\text{E}6 \text{ Btu} / 36\% \text{ power plant efficiency}^1$	
Steam Savings, lb steam/yr	(156,159,265)	$\text{Utilities cost (\$/yr)} / (\$0.005/\text{lb steam})$	
Total Energy Impacts, MMBtu/yr	(152,804)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) x 1200 Btu/lb steam x MMBtu/1E6 Btu	
Secondary Impacts, tpy			
PM	(0.750)	Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM _{2.5}	(0.271)		
CO	(2.51)		
NO _x	(11.2)		
SO ₂	(28.2)		
CO ₂	(7,747)		
CH ₄	(0.624)		
N ₂ O	(0.0882)		
Hg	(0.0938)		

1. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.
2. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B1-4. Mill A - DCE Recovery Furnaces Conversion (Furnace 2)

Parameters	Values	Equation	Source
Design Parameters			
Furnace Size, MM lb BLS/d	1.9776		AECOM estimate
Cost Indexes (CPI)			
1989	124		
2015	237.07		
Capital Costs, 2015\$			
Recovery Furnace Modification	\$16,200,000		AECOM estimate
Evaporator Modification	\$6,600,000		AECOM estimate
Turbine Generator	\$22,400,000		AECOM estimate
ESP Upgrade	\$17,567,587	$\$25,582,918 \times (\text{furnace size}/3.7\text{MM})^{0.6}$	BE&K
Wet to Dry ESP System Conversion	\$2,242,942	$\$3,266,300 \times (\text{furnace size}/3.7\text{MM})^{0.6}$	BE&K
Total Installed Cost (TIC)	\$65,010,529		
Pulp Production Losses	\$3,842,231	$25\% \text{ profit margin} \times \$646/\text{ton bleached pulp market price} \times 237.07/124 \text{ CPI} \times 20\text{-d downtime} \times 750 \text{ ADTP/d} \times (\text{furnace size}/2.7 \text{ MM})^{0.6}$	Subpart MM TSD
Total Capital Cost	\$68,852,761	$\\$68,852,761 \times (\text{furnace size}/1.9776\text{MM})^{0.6}$	
Annual Costs, \$/yr			
Maintenance & Materials	\$1,950,316	3% of TIC	BE&K
Energy	\$199,152	$450 \text{ kW power} \times 70\% \text{ power usage factor} \times \text{furnace size}/1.7\text{MM} \times 350 \text{ d/yr} \times 24 \text{ hr/d} \times \$0.0647/\text{kWh}^1$	BE&K
Labor	\$28,581	$3 \text{ hr/d} \times 350 \text{ d/yr} \times \$27.22/\text{hr}^2$	BE&K
Testing	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Utilities	(\$659,197)	$26,984 \text{ lb/hr steam} \times 50\% \text{ recovered steam factor} \times \text{furnace size}/1.7\text{MM} \times 350 \text{ d/yr} \times 24 \text{ hr/d} \times \$0.005/\text{lb steam}$	BE&K

Parameters	Values	Equation	Source
Admin., Taxes, and Insurance	\$2,600,421	4% of TIC	OAQPS Cost Manual
Capital Recovery	\$6,136,994	$0.0944 \times \text{TIC}$, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$10,280,267	$(0.1644 \times \text{capital cost}) - (0.2326 \times \text{furnace size}) + \\$52,581$	
Energy Impacts			
Energy to Generate Electricity, MMBtu/yr	29,201	$\text{Energy cost } (\$/\text{yr}) / (\$0.0647/\text{kWh}) \times 3415.179 \text{ Btu/kWh} \times \text{MMBtu}/1\text{E}6 \text{ Btu} / 36\% \text{ power plant efficiency}^1$	
Steam Savings, lb steam/yr	(131,839,380)	$\text{Utilities cost } (\$/\text{yr}) / (\$0.005/\text{lb steam})$	
Total Energy Impacts, MMBtu/yr	(129,007)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) \times 1200 Btu/lb steam \times MMBtu/1E6 Btu	
Secondary Impacts, tpy			
PM	(0.633)	Total energy impacts (MMBtu/yr) \times (emission factor for solid fuel, lb/MMBtu \times projected coal fuel mix + emission factor for natural gas, lb/MMBtu \times projected fuel mix for oil/natural gas and other) \times ton/2000 lb	
PM _{2.5}	(0.229)		
CO	(2.12)		
NO _x	(9.46)		
SO ₂	(23.8)		
CO ₂	(6,541)		
CH ₄	(0.527)		
N ₂ O	(0.0745)		
Hg	(0.0792)		

1. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.
2. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B1-5. Mill B - DCE Recovery Furnace Conversion

Parameters	Values	Equation	Source
Design Parameters			
Furnace Size, MM lb BLS/d	4.2		AECOM estimate
Cost Indexes (CPI)			
1989	124		
2015	237.07		
Capital Costs, 2015\$			
Planning/Engineering	\$21,000,000		AECOM estimate
Recovery Furnace Modification	\$37,000,000		AECOM estimate
Evaporator Modification	\$21,000,000		AECOM estimate
New ESP	\$21,000,000		AECOM estimate
Balance of Plant Items	\$8,000,000		AECOM estimate
Total Installed Cost (TIC)	\$108,000,000		calculated
Pulp Production Losses	\$13,584,152	25% profit margin x \$646/ton bleached pulp market price x 237.07/124 CPI x 45-d downtime x 750 ADTP/d x (furnace size/2.7 MM) ^{0.6}	AECOM estimate (45-d downtime), Subpart MM TSD (all other parameters)
Total Capital Cost	\$121,584,152	\$121,584,152 x (furnace size/4.2MM)^{0.6}	
Annual Costs, \$/yr			
Maintenance & Materials	\$3,240,000	3% of TIC	BE&K
Energy	\$422,955	450 kW power x 70% power usage factor x furnace size/1.7MM x 350 d/yr x 24 hr/d x \$0.0647/kWh ¹	BE&K
Labor	\$28,581	3 hr/d x 350 d/yr x \$27.22/hr ²	BE&K
Testing	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Utilities	(\$1,399,993)	26,984 lb/hr steam x 50% recovered steam factor x furnace size/1.7MM x 350 d/yr x 24 hr/d x \$0.005/lb steam	BE&K
Admin., Taxes, and Insurance	\$4,320,000	4% of TIC	OAQPS Cost Manual

Parameters	Values	Equation	Source
Capital Recovery	\$10,195,200	$0.0944 \times \text{TIC}$, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$16,830,743	$(0.1644 \times \text{capital cost}) - (0.2326 \times \text{furnace size}) + \\$52,581$	
Energy Impacts			
Electricity Generated, MMBtu/yr	62,016	$\text{Energy cost (\$/yr)} / (\$0.0647/\text{kWh}) \times 3415.179 \text{ Btu/kWh} \times \text{MMBtu}/1\text{E}6 \text{ Btu} / 36\% \text{ power plant efficiency}^1$	
Steam Savings, lb steam/yr	(279,998,682)	$\text{Utilities cost (\$/yr)} / (\$0.005/\text{lb steam})$	
Total Energy Impacts, MMBtu/yr	(273,983)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) x 1200 Btu/lb steam x MMBtu/1E6 Btu	
Secondary Impacts, tpy			
PM	(1.35)	Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM _{2.5}	(0.486)		
CO	(4.50)		
NO _x	(20.1)		
SO ₂	(50.5)		
CO ₂	(13,891)		
CH ₄	(1.12)		
N ₂ O	(0.158)		
Hg	(0.168)		

1. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

2. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B1-6. Mill C - 2 DCE Recovery Furnaces Replacement

Parameters	Values	Equation	Source
Design Parameters			
Furnace Size, MM lb BLS/d	5.6688		AECOM estimate
Cost Indexes (CPI)			CPI used to scale pulp price
1989	124		
2015	237.07		
Capital Costs, 2015\$			
New NDCE Furnace (with New ESP)	see TIC		AECOM estimate
New SDT	see TIC		AECOM estimate
New Evaporator	see TIC		AECOM estimate
New Concentrator	see TIC		AECOM estimate
New Turbine Generator	see TIC		AECOM estimate
Several Tanks	see TIC		AECOM estimate
Total Installed Cost (TIC)	\$375,000,000		AECOM estimate
Pulp Production Losses	\$7,227,617	25% profit margin x \$646/ton bleached pulp market price x 237.07/124 CPI x 20-d downtime x 750 ADTP/d x (furnace size/2.7 MM) ^{0.6}	Subpart MM TSD
Total Capital Cost	\$382,227,617	\$382,227,617 x (furnace size/5.6688MM)^{0.6}	
Annual Costs, \$/yr			
Maintenance & Materials	\$11,250,000	3% of TIC	BE&K
Purchased Electricity Savings	(\$11,661,531)	(\$7,200,000) x (furnace size/3.5MM)	AECOM estimate for Mill D
Energy Savings	(\$4,632,219)	(\$2,860,000) x (furnace size/3.5MM)	AECOM estimate for Mill D
Chemical Savings	(\$3,401,280)	(\$2,100,000) x (furnace size/3.5MM)	AECOM estimate for Mill D
Labor	(\$457,296)	Elimination of 2 positions x 4 shifts/d x 6 hr/shift x 350 d/yr x \$27.22/hr ¹	AECOM estimate for Mill D
Testing	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Admin., Taxes, and Insurance	\$15,000,000	4% of TIC	OAQPS Cost Manual

Parameters	Values	Equation	Source
Capital Recovery	\$28,125,000	$0.075 \times \text{TIC}$, based on 40-yr service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$22,996,673		
Energy Impacts			
Electricity Savings, MMBtu/yr	(1,709,867)	Purchased electricity savings (\$/yr)/(\$0.0647/kWh) x 3415.179 Btu/kWh x MMBtu/1E6 Btu / 36% power plant efficiency ²	
Steam Savings, lb steam/yr	(926,443,886)	Energy savings (\$/yr)/(\$0.005/lb steam)	
Total Energy Impacts, MMBtu/yr	(2,821,599)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) x 1200 Btu/lb steam x MMBtu/1E6 Btu	
Secondary Impacts, tpy		Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM	(13.9)		
PM _{2.5}	(5.00)		
CO	(46.3)		
NOx	(207)		
SO ₂	(520)		
CO ₂	(143,057)		
CH ₄	(11.5)		
N ₂ O	(1.63)		
Hg	(1.73)		

1. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

2. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

Table B1-7. Mill D - 3 DCE Recovery Furnaces Replacement

Parameters	Values	Equation	Source
Design Parameters			
Furnace Size, MM lb BLS/d	3.5		Subpart MM inventory
Cost Indexes (CPI)			CPI used to scale pulp price
1989	124		
2015	237.07		
Capital Costs, 2015\$			
Planning and Engineering	\$13,000,000		AECOM estimate
New Recovery Furnace	\$92,000,000		AECOM estimate
New Evaporator	\$15,400,000		AECOM estimate
New Turbine Generator	\$30,600,000		AECOM estimate
New ESP	\$11,000,000		AECOM estimate
Balance of Plant Items	\$27,600,000		AECOM estimate
Total Installed Cost (TIC)	\$189,600,000		AECOM estimate
Pulp Production Losses	\$5,411,794	25% profit margin x \$646/ton bleached pulp market price x 237.07/124 CPI x 20-d downtime x 750 ADTP/d x (furnace size/2.7 MM) ^{0.6}	Subpart MM TSD
Total Capital Cost	\$195,011,794	\$195,011,794 x (furnace size/3.5MM)^{0.6}	
Annual Costs			
Maintenance & Materials	\$5,688,000	3% of TIC	BE&K
Purchased Electricity Savings	(\$7,200,000)	(\$7,200,000) x (furnace size/3.5MM)	AECOM estimate
Energy Savings	(\$2,860,000)	(\$2,860,000) x (furnace size/3.5MM)	AECOM estimate
Chemical Savings	(\$2,100,000)	(\$2,100,000) x (furnace size/3.5MM)	AECOM estimate
Labor Savings	(\$685,944)	Elimination of 3 positions x 4 shifts/d x 6 hr/shift x 350 d/yr x \$27.22/hr ¹	AECOM estimate
Testing	\$24,000	\$24,000/yr per recovery furnace	Updated cost for testing PM + gaseous organic HAP
Admin., Taxes, and Insurance	\$7,584,000	4% of TIC	OAQPS Cost Manual

Parameters	Values	Equation	Source
Capital Recovery	\$14,220,000	$0.075 \times \text{TIC}$, based on 40-yr service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$14,670,056		
Energy Impacts			
Electricity Savings, MMBtu/yr	(1,055,697)	Purchased electricity savings (\$/yr)/(\$0.0647/kWh) x 3415.179 Btu/kWh x MMBtu/1E6 Btu / 36% power plant efficiency ²	
Steam Savings, lb steam/yr	(572,000,000)	Energy savings (\$/yr)/(\$0.005/lb steam)	
Total Energy Impacts, MMBtu/yr	(1,742,097)	Energy used to generate electricity (MMBtu/yr) + steam savings (lb steam/yr) x 1200 Btu/lb steam x MMBtu/1E6 Btu	
Secondary Impacts, tpy		Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM	(8.55)		
PM _{2.5}	(3.09)		
CO	(28.6)		
NO _x	(128)		
SO ₂	(321)		
CO ₂	(88,326)		
CH ₄	(7.11)		
N ₂ O	(1.01)		
Hg	(1.07)		

1. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

2. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016

Table B1-8. Wet to Dry ESP System Conversion

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
Design Parameters				
Furnace Size, MM lb BLS/d	3.7	3.7		
Cost Indexes				
CEPCI	394.3	556.8		
Capital Costs, \$				
Total Installed Cost (TIC) ²	\$3,266,300	\$4,612,417	$\$3,266,300 \times (\text{furnace size}/3.7\text{MM})^{0.6} \times 556.8/394.3 \text{ CEPCI}$	BE&K
Annual Costs, \$/yr				
Maintenance & Materials	\$65,326	\$92,248	2% of TIC	BE&K
Energy	\$4,386	\$5,707	15 kW power x 70% power usage factor x furnace size/3.7MM x 350 d/yr x 24 hr/d x \$0.0647/kWh ³	BE&K
Labor	\$13,333	\$14,291	1.5 hr/d x 350 d/yr x \$27.22/hr ⁴	BE&K
Testing	\$5,000	\$24,000	\$24,000/yr per recovery furnace	BE&K
Admin., Taxes, and Insurance	\$130,652	\$184,497	4% of TIC	OAQPS Cost Manual
Capital Recovery	\$308,339	\$435,412	0.0944 x TIC, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annual Cost	\$527,036	\$756,154		
Energy Impacts, MMBtu/yr	643	837	Annual energy cost (\$/yr)/(\$0.0647/kWh) x 3415.179 Btu/kWh x MMBtu/1E6 Btu / 36% power plant efficiency ³	
Secondary Impacts, tpy			Total energy impacts (MMBtu/yr) x (emission factor for solid fuel, lb/MMBtu x projected coal fuel mix + emission factor for natural gas, lb/MMBtu x projected fuel mix for oil/natural gas and other) x ton/2000 lb	
PM	0.00316	0.00411		
PM2.5	0.00114	0.00148		
CO	0.0106	0.0137		
NOx	0.0471	0.0613		
SO2	0.119	0.154		
CO2	32.6	42.4		

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
CH4	0.00263	0.00342		
N2O	0.000371	0.000483		
Hg	0.000395	0.000514		

1. Costs are in 2015 dollars.

2. Total installed cost includes cost for new dry bottom hopper, ash mix tank, and conveyors.

3. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

4. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 – Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Appendix B2. Cost and Impacts Algorithms for Opacity Options

Table B2-1. Recovery Furnace ESP Upgrade Costs (Adding Two Parallel Fields)

Table B2-2. Lime Kiln ESP Upgrade Cost (Adding a Single Field)

Table B2-3. Non-Mercury HAP Metal Percentage of Total PM for Subpart MM Emission Units

Table B2-1. Recovery Furnace ESP Upgrade Costs (Adding Two Parallel Fields)

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
Design Parameters				
Furnace Size, MM lb BLS/d	3.7	3.7		
Cost Indexes				
CEPCI	394.3	556.8		
Total Capital Cost, \$	\$5,372,400	\$7,586,500	$\$5,372,400 \times (\text{furnace size}/[3.7\text{MM lb BLS/d}])^{0.6} \times 556.8/394.3$	BE&K ESP upgrade - adding 2 parallel fields to get to "best" option of 0.015 gr/dscf @ 8% O ₂
Annual Cost, \$/yr				
Maintenance & Materials	\$107,448	\$151,730	2% of capital cost	Calculated as 2% of BE&K's capital cost
Energy	\$88,200	\$156,359	411 kW power x 70% power usage factor x furnace size/[3.7MM lb BLS/d] x 350 d/yr x 24 hr/d x \$0.0647/kWh ²	BE&K (pp. 49, 85), with updated electricity unit cost from EIA
Labor	\$13,333	\$14,291	1.5 hr/d x 350 d/yr x \$27.22/hr ³	BE&K, with updated labor rate from BLS
Testing	\$5,000	\$10,000	\$10,000/yr per recovery furnace	BE&K, with updated testing cost from algorithm
Admin., Taxes, and Insurance	\$214,896	\$303,460	4% of capital cost	OAQPS Cost Manual
Capital Recovery	\$507,155	\$716,166	0.0944 x capital cost, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annualized Cost, \$/yr	\$936,000	\$1,352,000		
Energy Impacts, MMBtu/yr	22,926	22,926	Annual energy cost (\$/yr)/(\$0.0647/kWh) x 3415.179 Btu/kWh x MMBtu/1E6 Btu / 36% power plant efficiency	

1. Costs are in 2015 dollars.

2. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

3. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B2-2. Lime Kiln ESP Upgrade Cost (Adding a Single Field)

Parameters	Original cost, 2001\$	Updated cost, 2015\$	Equation ¹	Source
Design Parameters				
Kiln Size, tons CaO/day	240.0	240.0		
Cost Indexes				
CEPCI	394.3	556.8		
Total Capital Cost, \$	\$1,274,280	\$1,799,400	$\$1,274,280 \times (\text{kiln size}/[240 \text{ tons CaO/day}])^{0.6} \times 556.8/394.3$	BE&K ESP upgrade - adding 1 parallel field to get to "best" option of 0.01 gr/dscf @ 10% O ₂
Annual Cost, \$/yr				
Maintenance & Materials	\$107,448	\$17,994	1% of capital cost	Calculated as 2% of BE&K's capital cost
Energy	\$88,200	\$38,044	$100 \text{ kW power} \times 70\% \text{ power usage factor} \times \text{kiln size}/[240 \text{ tons CaO/d}] \times 350 \text{ d/yr} \times 24 \text{ hr/d} \times \$0.0647/\text{kWh}^2$	BE&K (pp. 49, 85), with updated electricity unit cost from EIA
Labor	\$13,333	\$14,291	$1.5 \text{ hr/d} \times 350 \text{ d/yr} \times \$27.22/\text{hr}^3$	BE&K, with updated labor rate from BLS
Testing	\$5,000	\$10,000	\$10,000/yr per recovery furnace	BE&K, with updated testing cost from algorithm
Admin., Taxes, and Insurance	\$50,971	\$71,976	4% of capital cost	OAQPS Cost Manual
Capital Recovery	\$120,292	\$169,863	0.0944 x capital cost, based on 20-yr remaining service life and 7% interest	OAQPS Cost Manual
Total Annualized Cost, \$/yr	\$385,200	\$322,200		
Energy Impacts, MMBtu/yr	5,578	5,578	$\text{Annual energy cost } (\$/\text{yr})/(\$0.0647/\text{kWh}) \times 3415.179 \text{ Btu/kWh} \times \text{MMBtu}/1\text{E}6 \text{ Btu} / 36\% \text{ power plant efficiency}$	

1. Costs are in 2015 dollars.

2. Source for electricity unit cost: U.S. Energy Information Administration. Electric Power Monthly with Data for March 2016. Table 5.6.A. Average Price of Electricity to Ultimate Customers by End-Use Sector, by State, March 2016 and 2015 (Cents per Kilowatthour). May 2016.

3. Source for labor rate: Bureau of Labor Statistics, Occupational Employment Statistics, May 2015 National Industry-Specific Occupational Employment and Wage Estimates. NAICS 322100 - Pulp, Paper, and Paperboard Mills. Plant and System Operators. March 30, 2016.

Table B2-3. Non-Mercury HAP Metal Percentage of Total PM for Subpart MM Emission Units

Process unit type	Emission factors			Percent of total PM
	Total non-Hg HAP metals ¹	Total PM ²	Emission factor units	
Recovery furnace	2.30E-04	0.698	lb/ton BLS	0.03%
SDT	1.57E-04	0.16	lb/ton BLS	0.10%
Lime kiln	6.40E-03	1.33	lb/ton CaO	0.48%
Sulfite combustion unit	1.75E-03	1.73	lb/ton RLS	0.10%

1. Total non-mercury HAP metals emission factors derived from data in NCASI Technical Bulletin No. 973.

2. Total PM emission factors in NCASI Technical Bulletin No. 884.

Appendix C

Mill-specific Impacts for the Mills Impacted by Subpart MM RTR Regulatory Options

Table C-1. Labor Impacts by Facility

Table C-2. Energy and Secondary Impacts of the Opacity Options by Facility

Table C-3. Energy and Secondary Impacts of Gaseous Organic HAP Option 2 by Facility

Table C-4. Energy and Secondary Impacts of Gaseous Organic HAP Option 3 by Facility

Table C-1. Labor Impacts by Facility

			Opacity options			GOH Opt 2	GOH Opt 3
RTI Code	Final NEISiteID	Incremental R&R labor hours, hr/yr	Opacity Opt 2 labor, hr/yr	Opacity Opt 3 labor, hr/yr	Opacity Opt 4 labor, hr/yr	Labor impact, hr/yr	Labor impact, hr/yr
100	NEI40686	128					
102	NEI42341A	128					
103	NEI9201	128					
104	NEI11251	128					
105	NEI45182	128					
107	NEI47074	128					
108	NEI33025	128					
109	NEI32869A	128		525	525		
111	NEI45206	128					
112	NEI34064	128					
114	NEI26506	128					
115	NEI26476	128					
116	NEI8619	128					525
117	NEI42689	128					
119	NEI46814	128		525	525	1,050	
120	NEI26495	128					
121	NEI12492	40				(16,800)	
124	NEI8278	128				(16,800)	
126	NEI42317	128					525
127	NEI7933	128					525
130	NEI18338	128					
131	NEI42254	128				1,050	
132	NEI8261	128					
133	NEI13363	128					
135	NEI33118	128					
136	NEI12368	128					
137	NEI26581	128					
138	NEI18652	128					

			Opacity options			GOH Opt 2	GOH Opt 3
RTI Code	Final NEISiteID	Incremental R&R labor hours, hr/yr	Opacity Opt 2 labor, hr/yr	Opacity Opt 3 labor, hr/yr	Opacity Opt 4 labor, hr/yr	Labor impact, hr/yr	Labor impact, hr/yr
139	NEI42357	128			525		
140	NEI13340	128					
142	NEI41552	128					525
143	NEI26504	128					
145	NEI33135	128				(8,400)	
146	NEI759	128				1,050	
147	NEI6450	128					
148	NEI46931	128					
149	NEI40488	128					
150	NEI6273	128					
151	NEI41252	128				1,050	
152	NEI11338	128				1,050	
153	NEI33043	40					
154	NEI46739	128				(25,200)	
155	NEI33883	128					
156	NEI42338	40				1,050	
159	NEI8177	40					
162	NEI46760	128					
163	NEI8560	40				1,050	525
164	NEI42710	128					
165	NEI41628	128					
166	NEI41314	128				2,100	
167	NEI34070	128				1,050	
169	NEI33013	128					1,050
171	NEI18658	128			1,575	(25,200)	
172	NEI18335	128					1,050
173	NEI35908	128					
174	NEI40247	128				1,050	
175	NEI26514	128				1,050	

			Opacity options			GOH Opt 2	GOH Opt 3
RTI Code	Final NEISiteID	Incremental R&R labor hours, hr/yr	Opacity Opt 2 labor, hr/yr	Opacity Opt 3 labor, hr/yr	Opacity Opt 4 labor, hr/yr	Labor impact, hr/yr	Labor impact, hr/yr
176	NEI47104	128					
177	NEI33887	128					
178	NEI26309	128					
179	NEI45474	128					
180	NEI26471	128					
181	NEI6057	168					525
182	NEI7181	128					
183	NEI33103	128					
184	NEI46817	128					
185	NEI46599	128					
186	NEI18334	128					
188	NEI40600	128				(16,800)	
189	NEI54342	128					525
190	NEI26491	128					
195	NEI46835	128					
196	NEI18660	128					
197	NEI18657	128				1,050	
198	NEI41565	128					
199	NEI18390	128					
200	NEI47077	128					
201	NEI7559	128					
202	NEI12411	128					
203	NEI42410	128					
205	NEI8601	128				1,050	
206	NEI40282	128				2,100	
207	NEI7104	128					
208228535	NEI18373	128		525	525		
226	NEI33023	128					1,050
240	NEI26526	128					

			Opacity options			GOH Opt 2	GOH Opt 3
RTI Code	Final NEISiteID	Incremental R&R labor hours, hr/yr	Opacity Opt 2 labor, hr/yr	Opacity Opt 3 labor, hr/yr	Opacity Opt 4 labor, hr/yr	Labor impact, hr/yr	Labor impact, hr/yr
242	NEI34066	128					
243	NEI8196	128					
340	NEI46852	128					
525	NEI8265	128					
531	NEI8186	128					
606	NEI47091	128		525	525		
610	NEI6261	128					
613	NEI11172	128				2,100	
615	NEI40554	128					
617	NEI42695	128					
161	NEI7621	128					
700	NEI42351	40					
106	NEI41599	128					525
128	NEI11461						
141	NEI46750	40					
187	NEI42211	40					
193	NEI39968	40					
241	NEI26382	40					
244	NEI43472	40					
245	NEI18347						
247	NEI33945	40					
304	NEIVA00022	40					
		12,464	-	2,100	4,200	(90,300)	7,350

Table C-2. Energy and Secondary Impacts of the Opacity Options by Facility

Opacity Options									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy	Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy
100	NEI40686								
102	NEI42341A								
103	NEI9201								
104	NEI11251								
105	NEI45182								
107	NEI47074								
108	NEI33025								
109	NEI32869A	10,534	0.052	0.019	0.17	0.8	1.9	537	0
111	NEI45206								
112	NEI34064								
114	NEI26506								
115	NEI26476								
116	NEI8619								
117	NEI42689								
119	NEI46814	16,296	0.080	0.029	0.26	1.2	2.9	831	0
120	NEI26495								
121	NEI12492								
124	NEI8278								
126	NEI42317								
127	NEI7933								
130	NEI18338								
131	NEI42254								
132	NEI8261								
133	NEI13363								
135	NEI33118								
136	NEI12368								
137	NEI26581								
138	NEI18652								

Opacity Options									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy	Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy
139	NEI42357	10,534	0.052	0.019	0.17	0.8	1.9	537	0
140	NEI13340								
142	NEI41552								
143	NEI26504								
145	NEI33135								
146	NEI759								
147	NEI6450								
148	NEI46931								
149	NEI40488								
150	NEI6273								
151	NEI41252								
152	NEI11338								
153	NEI33043								
154	NEI46739								
155	NEI33883								
156	NEI42338								
159	NEI8177								
162	NEI46760								
163	NEI8560								
164	NEI42710								
165	NEI41628								
166	NEI41314								
167	NEI34070								
169	NEI33013								
171	NEI18658	18,880	0.093	0.034	0.30	1.4	3.4	963	0
172	NEI18335	24,723	0.121	0.045	0.40	1.8	4.5	1,261	0
173	NEI35908								
174	NEI40247								
175	NEI26514								

Opacity Options									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy	Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy
176	NEI47104								
177	NEI33887								
178	NEI26309								
179	NEI45474								
180	NEI26471								
181	NEI6057								
182	NEI7181								
183	NEI33103								
184	NEI46817								
185	NEI46599								
186	NEI18334								
188	NEI40600								
189	NEI54342								
190	NEI26491								
195	NEI46835	17,597	0.086	0.032	0.28	1.3	3.2	897	0
196	NEI18660								
197	NEI18657								
198	NEI41565								
199	NEI18390								
200	NEI47077	25,281	0.124	0.046	0.40	1.8	4.6	1,289	0
201	NEI7559								
202	NEI12411								
203	NEI42410								
205	NEI8601								
206	NEI40282								
207	NEI7104								
208228535	NEI18373	29,928	0.147	0.054	0.48	2.2	5.4	1,526	0
226	NEI33023								
240	NEI26526								

Opacity Options									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM, tpy	Secondary PM _{2.5} , tpy	Secondary CO, tpy	Secondary NO _x , tpy	Secondary SO ₂ , tpy	Secondary CO ₂ e, tpy	Secondary Hg, tpy
242	NEI34066								
243	NEI8196								
340	NEI46852								
525	NEI8265								
531	NEI8186								
606	NEI47091	19,897	0.097	0.036	0.32	1.5	3.6	1,015	0
610	NEI6261	21,315	0.104	0.038	0.34	1.6	3.837	1,087	0
613	NEI11172								
615	NEI40554								
617	NEI42695								
161	NEI7621								
700	NEI42351								
106	NEI41599								
128	NEI11461								
141	NEI46750								
187	NEI42211								
193	NEI39968								
241	NEI26382								
244	NEI43472								
245	NEI18347								
247	NEI33945								
304	NEIVA00022								
		194,984	1.0	0.35	3.1	14	35	9,944	0.12

Table C-3. Energy and Secondary Impacts of Gaseous Organic HAP Option 2 by Facility

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr BE&K/Andover	Secondary PM BE&K/Andover	Secondary PM _{2.5} BE&K/Andover	Secondary CO BE&K/Andover	Secondary NOx BE&K/Andover	Secondary SO ₂ BE&K/Andover
100	NEI40686						
102	NEI42341A						
103	NEI9201						
104	NEI11251						
105	NEI45182						
107	NEI47074						
108	NEI33025						
109	NEI32869A						
111	NEI45206						
112	NEI34064						
114	NEI26506						
115	NEI26476						
116	NEI8619						
117	NEI42689						
119	NEI46814	(168,787)	(1)	(0)	(3)	(12)	(31)
120	NEI26495						
121	NEI12492	(384,898)	(2)	(1)	(6)	(28)	(71)
124	NEI8278	(478,067)	(2)	(1)	(8)	(35)	(88)
126	NEI42317						
127	NEI7933						
130	NEI18338						
131	NEI42254	(82,930)	(0)	(0)	(1)	(6)	(15)
132	NEI8261						
133	NEI13363						
135	NEI33118						
136	NEI12368						
137	NEI26581						
138	NEI18652						
139	NEI42357						
140	NEI13340						

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr BE&K/Andover	Secondary PM BE&K/Andover	Secondary PM _{2.5} BE&K/Andover	Secondary CO BE&K/Andover	Secondary NOx BE&K/Andover	Secondary SO ₂ BE&K/Andover
142	NEI41552						
143	NEI26504						
145	NEI33135	(117,078)	(1)	(0)	(2)	(9)	(22)
146	NEI759	(339,217)	(2)	(1)	(6)	(25)	(62)
147	NEI6450						
148	NEI46931						
149	NEI40488						
150	NEI6273						
151	NEI41252	(242,671)	(1)	(0)	(4)	(18)	(45)
152	NEI11338	(228,319)	(1)	(0)	(4)	(17)	(42)
153	NEI33043						
154	NEI46739	(419,528)	(2)	(1)	(7)	(31)	(77)
155	NEI33883						
156	NEI42338	(250,499)	(1)	(0)	(4)	(18)	(46)
159	NEI8177						
162	NEI46760						
163	NEI8560	(223,729)	(1)	(0)	(4)	(16)	(41)
164	NEI42710						
165	NEI41628						
166	NEI41314	(437,268)	(2)	(1)	(7)	(32)	(80)
167	NEI34070	(208,749)	(1)	(0)	(3)	(15)	(38)
169	NEI33013						
171	NEI18658	(297,279)	(1)	(1)	(5)	(22)	(55)
172	NEI18335						
173	NEI35908						
174	NEI40247	(193,360)	(1)	(0)	(3)	(14)	(36)
175	NEI26514	(164,917)	(1)	(0)	(3)	(12)	(30)
176	NEI47104						
177	NEI33887						
178	NEI26309						
179	NEI45474						

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr BE&K/Andover	Secondary PM BE&K/Andover	Secondary PM _{2.5} BE&K/Andover	Secondary CO BE&K/Andover	Secondary NOx BE&K/Andover	Secondary SO ₂ BE&K/Andover
180	NEI26471						
181	NEI6057						
182	NEI7181						
183	NEI33103						
184	NEI46817						
185	NEI46599						
186	NEI18334						
188	NEI40600	(277,084)	(1)	(0)	(5)	(20)	(51)
189	NEI54342						
190	NEI26491						
195	NEI46835						
196	NEI18660						
197	NEI18657	(73,564)	(0)	(0)	(1)	(5)	(14)
198	NEI41565						
199	NEI18390						
200	NEI47077						
201	NEI7559						
202	NEI12411						
203	NEI42410						
205	NEI8601	(163,085)	(1)	(0)	(3)	(12)	(30)
206	NEI40282	(378,880)	(2)	(1)	(6)	(28)	(70)
207	NEI7104						
208228535	NEI18373						
226	NEI33023						
240	NEI26526						
242	NEI34066						
243	NEI8196						
340	NEI46852						
525	NEI8265						
531	NEI8186						
606	NEI47091						

Gaseous Organic HAP (GOH) Option 2 (DCE conversions/replacements)							
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr BE&K/Andover	Secondary PM BE&K/Andover	Secondary PM _{2.5} BE&K/Andover	Secondary CO BE&K/Andover	Secondary NOx BE&K/Andover	Secondary SO ₂ BE&K/Andover
610	NEI6261						
613	NEI11172	(456,639)	(2)	(1)	(7)	(33)	(84)
615	NEI40554						
617	NEI42695						
161	NEI7621						
700	NEI42351						
106	NEI41599						
128	NEI11461						
141	NEI46750						
187	NEI42211						
193	NEI39968						
241	NEI26382						
244	NEI43472						
245	NEI18347						
247	NEI33945						
304	NEIVA00022						
		(5,586,546)	(27)	(10)	(92)	(410)	(1,029)

RTI Code	Final NEISiteID	Secondary CO ₂ e BE&K/Andover	Secondary Hg BE&K/Andover	Energy impacts, MMBtu/yr AECOM	Secondary PM AECOM	Secondary PM _{2.5} AECOM	Secondary CO AECOM	Secondary NOx AECOM
100	NEI40686							
102	NEI42341A							
103	NEI9201							
104	NEI11251							
105	NEI45182							
107	NEI47074							
108	NEI33025							
109	NEI32869A							
111	NEI45206							
112	NEI34064							
114	NEI26506							
115	NEI26476							
116	NEI8619							
117	NEI42689							
119	NEI46814	(8,604)	(0)	(861,093)	(4)	(2)	(14)	(63)
120	NEI26495							
121	NEI12492	(19,620)	(0)	(1,963,621)	(10)	(3)	(32)	(144)
124	NEI8278	(24,369)	(0)	(2,438,935)	(12)	(4)	(40)	(179)
126	NEI42317							
127	NEI7933							
130	NEI18338							
131	NEI42254	(4,227)	(0)	(423,081)	(2)	(1)	(7)	(31)
132	NEI8261							
133	NEI13363							
135	NEI33118							
136	NEI12368							
137	NEI26581							
138	NEI18652							
139	NEI42357							
140	NEI13340							

RTI Code	Final NEISiteID	Secondary CO ₂ e BE&K/Andover	Secondary Hg BE&K/Andover	Energy impacts, MMBtu/yr AECOM	Secondary PM AECOM	Secondary PM _{2.5} AECOM	Secondary CO AECOM	Secondary NOx AECOM
142	NEI41552							
143	NEI26504							
145	NEI33135	(5,968)	(0)	(597,290)	(3)	(1)	(10)	(44)
146	NEI759	(17,293)	(0)	(339,217)	(2)	(1)	(6)	(25)
147	NEI6450							
148	NEI46931							
149	NEI40488							
150	NEI6273							
151	NEI41252	(12,371)	(0)	(242,671)	(1)	(0)	(4)	(18)
152	NEI11338	(11,639)	(0)	(228,319)	(1)	(0)	(4)	(17)
153	NEI33043							
154	NEI46739	(21,385)	(0)	(2,140,291)	(11)	(4)	(35)	(157)
155	NEI33883							
156	NEI42338	(12,770)	(0)	(250,499)	(1)	(0)	(4)	(18)
159	NEI8177							
162	NEI46760							
163	NEI8560	(11,404)	(0)	(1,141,389)	(6)	(2)	(19)	(84)
164	NEI42710							
165	NEI41628							
166	NEI41314	(22,291)	(0)	(437,267)	(2)	(1)	(7)	(32)
167	NEI34070	(10,642)	(0)	(208,749)	(1)	(0)	(3)	(15)
169	NEI33013							
171	NEI18658	(15,154)	(0)	(1,516,620)	(7)	(3)	(25)	(111)
172	NEI18335							
173	NEI35908							
174	NEI40247	(9,856)	(0)	(986,456)	(5)	(2)	(16)	(72)
175	NEI26514	(8,407)	(0)	(841,349)	(4)	(1)	(14)	(62)
176	NEI47104							
177	NEI33887							
178	NEI26309							
179	NEI45474							

RTI Code	Final NEISiteID	Secondary CO ₂ e BE&K/Andover	Secondary Hg BE&K/Andover	Energy impacts, MMBtu/yr AECOM	Secondary PM AECOM	Secondary PM _{2.5} AECOM	Secondary CO AECOM	Secondary NOx AECOM
180	NEI26471							
181	NEI6057							
182	NEI7181							
183	NEI33103							
184	NEI46817							
185	NEI46599							
186	NEI18334							
188	NEI40600	(14,124)	(0)	(1,413,587)	(7)	(3)	(23)	(104)
189	NEI54342							
190	NEI26491							
195	NEI46835							
196	NEI18660							
197	NEI18657	(3,750)	(0)	(375,297)	(2)	(1)	(6)	(28)
198	NEI41565							
199	NEI18390							
200	NEI47077							
201	NEI7559							
202	NEI12411							
203	NEI42410							
205	NEI8601	(8,314)	(0)	(163,085)	(1)	(0)	(3)	(12)
206	NEI40282	(19,315)	(0)	(378,879)	(2)	(1)	(6)	(28)
207	NEI7104							
208228535	NEI18373							
226	NEI33023							
240	NEI26526							
242	NEI34066							
243	NEI8196							
340	NEI46852							
525	NEI8265							
531	NEI8186							
606	NEI47091							

RTI Code	Final NEISiteID	Secondary CO ₂ e BE&K/Andover	Secondary Hg BE&K/Andover	Energy impacts, MMBtu/yr AECOM	Secondary PM AECOM	Secondary PM _{2.5} AECOM	Secondary CO AECOM	Secondary NOx AECOM
610	NEI6261							
613	NEI11172	(23,279)	(0)	(456,638)	(2)	(1)	(8)	(33)
615	NEI40554							
617	NEI42695							
161	NEI7621							
700	NEI42351							
106	NEI41599							
128	NEI11461							
141	NEI46750							
187	NEI42211							
193	NEI39968							
241	NEI26382							
244	NEI43472							
245	NEI18347							
247	NEI33945							
304	NEIVA00022							
		(284,782)	(3.4)	(17,404,333)	(86)	(31)	(286)	(1,277)

RTI Code	Final NEISiteID	Secondary SO ₂ AECOM	Secondary CO ₂ e AECOM	Secondary Hg AECOM
100	NEI40686			
102	NEI42341A			
103	NEI9201			
104	NEI11251			
105	NEI45182			
107	NEI47074			
108	NEI33025			
109	NEI32869A			
111	NEI45206			
112	NEI34064			
114	NEI26506			
115	NEI26476			
116	NEI8619			
117	NEI42689			
119	NEI46814	(159)	(43,894)	(1)
120	NEI26495			
121	NEI12492	(362)	(100,095)	(1)
124	NEI8278	(449)	(124,324)	(1)
126	NEI42317			
127	NEI7933			
130	NEI18338			
131	NEI42254	(78)	(21,566)	(0)
132	NEI8261			
133	NEI13363			
135	NEI33118			
136	NEI12368			
137	NEI26581			
138	NEI18652			
139	NEI42357			
140	NEI13340			

RTI Code	Final NEISiteID	Secondary SO ₂ AECOM	Secondary CO ₂ e AECOM	Secondary Hg AECOM
142	NEI41552			
143	NEI26504			
145	NEI33135	(110)	(30,447)	(0)
146	NEI759	(63)	(17,291)	(0)
147	NEI6450			
148	NEI46931			
149	NEI40488			
150	NEI6273			
151	NEI41252	(45)	(12,370)	(0)
152	NEI11338	(42)	(11,639)	(0)
153	NEI33043			
154	NEI46739	(394)	(109,103)	(1)
155	NEI33883			
156	NEI42338	(46)	(12,769)	(0)
159	NEI8177			
162	NEI46760			
163	NEI8560	(210)	(58,182)	(1)
164	NEI42710			
165	NEI41628			
166	NEI41314	(81)	(22,290)	(0)
167	NEI34070	(39)	(10,641)	(0)
169	NEI33013			
171	NEI18658	(279)	(77,311)	(1)
172	NEI18335			
173	NEI35908			
174	NEI40247	(182)	(50,284)	(1)
175	NEI26514	(155)	(42,888)	(1)
176	NEI47104			
177	NEI33887			
178	NEI26309			
179	NEI45474			

RTI Code	Final NEISiteID	Secondary SO ₂ AECOM	Secondary CO ₂ e AECOM	Secondary Hg AECOM
180	NEI26471			
181	NEI6057			
182	NEI7181			
183	NEI33103			
184	NEI46817			
185	NEI46599			
186	NEI18334			
188	NEI40600	(261)	(72,057)	(1)
189	NEI54342			
190	NEI26491			
195	NEI46835			
196	NEI18660			
197	NEI18657	(69)	(19,131)	(0)
198	NEI41565			
199	NEI18390			
200	NEI47077			
201	NEI7559			
202	NEI12411			
203	NEI42410			
205	NEI8601	(30)	(8,313)	(0)
206	NEI40282	(70)	(19,313)	(0)
207	NEI7104			
208228535	NEI18373			
226	NEI33023			
240	NEI26526			
242	NEI34066			
243	NEI8196			
340	NEI46852			
525	NEI8265			
531	NEI8186			
606	NEI47091			

RTI Code	Final NEISiteID	Secondary SO ₂ AECOM	Secondary CO ₂ e AECOM	Secondary Hg AECOM
610	NEI6261			
613	NEI11172	(84)	(23,277)	(0)
615	NEI40554			
617	NEI42695			
161	NEI7621			
700	NEI42351			
106	NEI41599			
128	NEI11461			
141	NEI46750			
187	NEI42211			
193	NEI39968			
241	NEI26382			
244	NEI43472			
245	NEI18347			
247	NEI33945			
304	NEIVA00022			
		(3,208)	(887,185)	(10.7)

Table C-4. Energy and Secondary Impacts of Gaseous Organic HAP Option 3 by Facility

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO	Secondary NO _x	Secondary SO ₂	Secondary CO _{2e}	Secondary Hg
100	NEI40686								
102	NEI42341A								
103	NEI9201								
104	NEI11251								
105	NEI45182								
107	NEI47074								
108	NEI33025								
109	NEI32869A								
111	NEI45206								
112	NEI34064								
114	NEI26506								
115	NEI26476								
116	NEI8619	882	0.0043	0.0016	0.014	0.065	0.16	45	0.00054
117	NEI42689								
119	NEI46814								
120	NEI26495								
121	NEI12492								
124	NEI8278								
126	NEI42317	583	0.0029	0.0010	0.010	0.043	0.11	30	0.00036
127	NEI7933	821	0.0040	0.0015	0.013	0.060	0.15	42	0.00050
130	NEI18338								
131	NEI42254								
132	NEI8261								
133	NEI13363								
135	NEI33118								
136	NEI12368								
137	NEI26581								
138	NEI18652								
139	NEI42357								
140	NEI13340								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO	Secondary NOx	Secondary SO ₂	Secondary CO _{2e}	Secondary Hg
142	NEI41552	459	0.0023	0.0008	0.008	0.034	0.08	23	0.00028
143	NEI26504								
145	NEI33135								
146	NEI759								
147	NEI6450								
148	NEI46931								
149	NEI40488								
150	NEI6273								
151	NEI41252								
152	NEI11338								
153	NEI33043								
154	NEI46739								
155	NEI33883								
156	NEI42338								
159	NEI8177								
162	NEI46760								
163	NEI8560	679	0.0033	0.0012	0.011	0.050	0.12	35	0.00042
164	NEI42710								
165	NEI41628								
166	NEI41314								
167	NEI34070								
169	NEI33013	1247	0.0061	0.0022	0.020	0.091	0.23	64	0.00077
171	NEI18658								
172	NEI18335	903	0.0044	0.0016	0.015	0.066	0.17	46	0.00055
173	NEI35908								
174	NEI40247								
175	NEI26514								
176	NEI47104								
177	NEI33887								
178	NEI26309								
179	NEI45474								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO	Secondary NOx	Secondary SO ₂	Secondary CO _{2e}	Secondary Hg
180	NEI26471								
181	NEI6057	588	0.0029	0.0010	0.010	0.043	0.11	30	0.00036
182	NEI7181								
183	NEI33103								
184	NEI46817								
185	NEI46599								
186	NEI18334								
188	NEI40600								
189	NEI54342	1403	0.0069	0.0025	0.023	0.103	0.26	71	0.00086
190	NEI26491								
195	NEI46835								
196	NEI18660								
197	NEI18657								
198	NEI41565								
199	NEI18390								
200	NEI47077								
201	NEI7559								
202	NEI12411								
203	NEI42410								
205	NEI8601								
206	NEI40282								
207	NEI7104								
208228535	NEI18373								
226	NEI33023	1233	0.0061	0.0022	0.020	0.090	0.23	63	0.00076
240	NEI26526								
242	NEI34066								
243	NEI8196								
340	NEI46852								
525	NEI8265								
531	NEI8186								
606	NEI47091								

Gaseous Organic HAP (GOH) Option 3 (Wet to dry ESP system conversions)									
RTI Code	Final NEISiteID	Energy impacts, MMBtu/yr	Secondary PM	Secondary PM _{2.5}	Secondary CO	Secondary NOx	Secondary SO ₂	Secondary CO ₂ e	Secondary Hg
610	NEI6261								
613	NEI11172								
615	NEI40554								
617	NEI42695								
161	NEI7621								
700	NEI42351								
106	NEI41599	679	0.0033	0.0012	0.011	0.050	0.12	35	0.00042
128	NEI11461								
141	NEI46750								
187	NEI42211								
193	NEI39968								
241	NEI26382								
244	NEI43472								
245	NEI18347								
247	NEI33945								
304	NEIVA00022								
		9,477	0.047	0.017	0.16	0.69	1.7	483	0.0058

Appendix D

Emission Factors and Other Factors Used In Secondary Impacts Calculations

Table D-1. Emission Factors for Calculating Secondary Air Impacts

Table D-2. Nationwide Power Plant Efficiency for Calculating Energy Impacts

Table D-3. Fuel Mix for Calculating Secondary Air Impacts

Table D-4. Conversion Factors for Calculating Secondary Air Impacts

Table D-5. Multipliers x Energy Impact (MMBtu/yr) for Secondary Impacts

Table D-1. Emission Factors for Calculating Secondary Air Impacts^{1,2}

Pollutant	Value	Units
PM	1.9	lb/MM ft ³ natural gas
	0.001862745	lb/MMBtu natural gas
	0.03	lb/MMBtu solid, liquid, gaseous fuel
PM _{2.5}	1.9	lb/MM ft ³ natural gas
	0.001862745	lb/MMBtu natural gas
	0.00957	lb/MMBtu solid, liquid, gaseous fuel
CO	84	lb/MM ft ³ natural gas
	0.0824	lb/MMBtu natural gas
	0.02	lb/MMBtu solid fuel
NO _x	100	lb/MM ft ³ natural gas
	0.0980	lb/MMBtu natural gas
	0.37	lb/MMBtu solid fuel
SO ₂	0.6	lb/MM ft ³ natural gas
	0.00059	lb/MMBtu natural gas
	1.2	lb/MMBtu solid fuel
CO ₂	53.06	kg/MMBtu natural gas
	116.98	lb/MMBtu natural gas
	93.28	kg/MMBtu solid fuel
	205.65	lb/MMBtu solid fuel
CH ₄	1.00E-03	kg/MMBtu natural gas
	2.20E-03	lb/MMBtu natural gas
	1.10E-02	kg/MMBtu solid fuel
	2.43E-02	lb/MMBtu solid fuel
N ₂ O	1.00E-04	kg/MMBtu natural gas
	2.20E-04	lb/MMBtu natural gas
	1.60E-03	kg/MMBtu solid fuel
	3.53E-03	lb/MMBtu solid fuel
Hg	2.60E-04	lb/MM ft ³ natural gas
	2.55E-07	lb/MMBtu natural gas
	4.0	lb/Tbtu coal
	0.004	lb/MMBtu coal

1. For natural gas combustion, used AP-42 emission factors for PM, CO, NO_x, SO₂, and Hg and GHG Reporting Rule emission factors for CO₂, CH₄, and N₂O (40 CFR part 98, subpart C, general stationary combustion sources). Assumed 1,020 Btu/ft³ of natural gas in estimating secondary emissions. Also assumed that 100% of PM is PM_{2.5}, based on statement in AP-42 that PM from natural gas combustion is estimated to be less than 1 micron in size.

2. For solid fuel combustion, used NSPS emission factors for PM and SO₂ (40 CFR part 60, subpart Da, coal-fired utility plants), AP-42 emission factors for NO_x and CO (bituminous/subbituminous coal combustion), GHG Reporting Rule emission factors for CO₂, CH₄, and N₂O (40 CFR part 98, subpart C, general stationary combustion sources), and utility NESHAP emission factors for Hg (40 CFR part 63, subpart UUUUU). The NO_x emission factor was based on average of NO_x emission factors for PC dry-bottom wall-fired NSPS boilers burning bituminous (12 lb/ton) and subbituminous (7.4 lb/ton) coal.

Assumed 13,000 Btu/lb of coal in estimating NOx and CO secondary emissions. According to AP-42, the percentage of PM that is PM_{2.5} for dry-bottom coal-fired boilers is 29% with ESP, 53% with FF, and 6% if uncontrolled. Assumed 84% of utility boilers controlled with ESP and 14% with FF, leaving 2% uncontrolled, based on information from EPA document on control of emissions from coal-fired utility boilers.

Table D-2. Nationwide Power Plant Efficiency for Calculating Energy Impacts

Fuel	Heat rate, Btu/kWh	Plant efficiency
Coal	10,415	33%
Oil/natural gas	8,185	42%
Nuclear	10,452	33%
Hydroelectric	9,756	35%
Renewable		
Weighted average ¹		36%

1. Weighted average determined by multiplying power plant efficiencies for each fuel by the fuel mix in Table D-3 below.

Table D-3. Fuel Mix for Calculating Secondary Air Impacts

Fuel	Projected generation for 2020, TWh	Percent of generation	Notes
Coal	1,262	31%	
Oil/natural gas	1,304	32%	
Nuclear	746	18%	No secondary air emissions estimated
Hydroelectric	277	7%	No secondary air emissions estimated
Renewable	481	12%	No secondary air emissions estimated
Other	41	1%	Assumed equivalent to natural gas
Total	4,111		

Notes:

1. Assume electricity generated using the above mix (from IPM Version 5.15 for the year 2020 for reference case), from June 2016 MJB&A Summary of IPM Modeling Results.
2. IPM = EPA Integrated Planning Model, which is a multi-regional, dynamic, deterministic linear programming model of the U.S. electric power sector that "provides forecasts of least-cost capacity expansion, electricity dispatch, and" emission control strategies for meeting energy demand and environmental, "transmission, dispatch, and reliability constraints."

Table D-4. Conversion Factors for Calculating Secondary Air Impacts

Conv. factors	Units
3415.179	Btu/kWh
2.204623	lb/kg
1,020	Btu/ft ³ natural gas
13,000	Btu/lb coal

Table D-5. Multipliers x Energy Impact (MMBtu/yr) for Secondary Impacts

Pollutant	Ton/MMBtu
PM ¹	4.91E-06
PM _{2.5}	1.77E-06
CO	1.64E-05
NOx	7.33E-05
SO ₂	1.84E-04
CO ₂	5.07E-02
CH ₄	4.08E-06
N ₂ O	5.77E-07
CO ₂ e ²	5.10E-02
Hg	6.14E-07

1. Example derivation for PM: PM ton/MMBtu = (lb/MMBtu solid fuel x coal % of generation) + (lb/MMBtu natural gas x (Oil/natural gas + Other % of generation))/(2000 lb/ton)

2. Global warming potentials used in calculating CO₂e: CH₄ = 25, N₂O = 298