APPENDIX C – LOUISIANA CALCULATION METHODOLOGY FOR ANNUAL AND OZONE SEASON CAIR NO_X ALLOWANCES

Calculating Annual CAIR NOx Allowances
Using the Louisiana Method

Attached is a spreadsheet with the CAIR NOx annual and ozone season allowances allocated per the method proposed by LDEQ. The method generally reflects the recommendations of the Louisiana Public Service Commission. The spreadsheet columns will be referred to in the explanation of the calculation method.

ANNUAL NOx ALLOCATIONS

Step 1: Calculate the average annual NOx emissions per CAIR unit.

- See worksheet tab "Annual for Non-Utility Units"
  This step applies *only* to electricity-generating units that have not been certified by the LPSC or a municipal authority. This includes independent power producers (IPPs) and co generators.
- Initial allocation of allowances for 2009, 2010, & 2011:

  - ✓ LDEQ's emissions inventory data for the years 2002, 2003, and 2004 was used for the calculation of the average Annual NOx emissions per CAIR Unit.
  - ✓ The Federal Acid Rain database information was used for allocating Ozone Season NOx allocations for non-utility units. Information concerning the database can be found at : http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=whereyoulive.state&displaymode=view&programYearSelection=none&prg_code=ALL&year=2006&state=LA
  - ✓ Example using actual NOx emissions [tons per year (tpy)]:

    $$\frac{2002 + 2003 + 2004}{3} = \text{Average actual NOx emissions (tpy)}$$

    Enter the result of the calculation in columns H and I of the spreadsheet.

- Beginning in 2008, each control period allowance allocation will be calculated using emission data from the 3 calendar years immediately preceding the year in which the control period allocations are submitted to the Administrator.
  - ✓ Examples:

    To allocate 2012 allowances in 2008 use 2005, 2006, 2007;

    To allocate 2013 allowances in 2009 use 2006, 2007, 2008.

- For new units, NOx allocations will not be made until there is a calendar year of data. Data from that calendar year will be used instead of an average. When there are 2 calendar years of data, the 2 year's data will be averaged.
- Once a unit is operating, commencing from start up, every calendar year will be considered an operating year even if the emissions are zero.
- NOx averages in tons per year must be manually entered in the spreadsheets

Step 2: Calculate the average heat input (MMBtu) per CAIR unit.

- See worksheet tab "Annual for Utility Units"
- This Step applies only to utility units which are either units that have been certified/approved by the LPSC or municipal authority and are operational or are non-utility units that have an effective and active long term contract with a utility unit.
- Initial allocation of allowances for 2009, 2010, & 2011:

  2002, 2003, and 2004 data was used from the Acid Rain Program database available at:

  http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=whereyoulive.state&displaymode=view&programYearSelection=none&prg_code=ALL&year=2006&state=LA
  - ✓ Enter the heat input data (MMBtu) for the appropriate years and the Excel spreadsheet will perform the calculations.

    Examples:

$$\frac{2002\ \text{MMBtu} + 2003\ \text{MMBtu} + 2004\ \text{MMBtu}}{3} = \text{Average MMbtu}$$

[Columns (I+J+K)/3 = Column M]

- Beginning in 2008, use the heat input (MMBtu) for the most recent three (3) calendar years; this information should be available in the LDEQ emissions inventory. If the data can not be obtained from the LDEQ emissions inventory, the data in the Federal Acid Rain Program database can be used. Calculations will include heat input for the most recent three (3) calendar years divided by 3 (for 3 years).
  - ✓ Example:
    - To allocate 2012 allowances in 2008 use the heat input (MMBtu) from 2005, 2006, and 2007
    - To allocate 2013 allowances in 2009 use the heat input (MMBtu) from 2006, 2007, and 2008

  If data is available for only the two (2) most recent calendar years, average the data. If data is available for only one (1) calendar year, use the heat input for that calendar year. Once a unit is operating, commencing from start up, every calendar year will be considered an operating year even if the emissions are zero. Heat inputs must be manually entered on the spreadsheet.
- Certified units.
  - ✓ An electricity-generating unit or contract that has been certified/approved by the LPSC or municipal authority but is not yet in operation. The unit must be subject to CAIR.
  - ✓ Certified units may have different gross electrical outputs for different years.
  - ✓ For new coal-fired units multiply the certified gross electrical output in MW by 7,900 Btu/kWh and divide by 1,000,000 Btu/mmBtu (basis for calculation in CAIR model rule, 40 CFR Part 96.142). To convert from hourly to yearly multiply by 8,760 hours per year and to convert MW to kW multiply by 1,000. Certified gross electrical output should be modified by operating capacity.

Example for a new coal-fired unit with a certified gross electrical output of 700 MW:

Calculated heat input =

$$\left(\frac{700MW \times 7900Btu/kWh \times 8760h \times 1000kW/MW}{1{,}000{,}000Btu/MMBtu}\right) = 48{,}442{,}800MMBtu$$

- ✓ For new non coal-fired units, multiply the certified gross electrical output in MW by 6,675 Btu/kWh and divide by 1,000,000 Btu/mmBtu (basis for calculation in CAIR model rule, 40 CFR Part 96.142). To convert from hourly to annual multiply by 8,760 hours per year and to convert MW to kW multiply by 1,000. Certified gross electrical output should be modified by operating capacity.

  Example of the calculation of heat input for a new gas-fired unit with a certified gross electrical output of 200 MW follows:

$$\left(\frac{200MW \times 6675Btu/kWh \times 8760h \times 1000kW/MW}{1{,}000{,}000Btu/MMBtu}\right) = 11{,}694{,}600MMBtu$$

- ✓ The adjusted heat input for new certified units will be used until there exists three (3) calendar years of operating data prior to the allowance allocation year for a control period for which allowances have not been allocated. Once a unit is operating, commencing from start up, every calendar year will be considered an operating year even if the emissions are zero.
- ✓ If the certified gross electrical output is received for one year, insert the calculated heat input in Column Q. If the certified gross electrical output is received for multiple years, insert the calculated heat input in Columns R, S, and/or T.

Step 3: Calculate the adjusted heat input (MMBtu) for each CAIR unit.

- ➢ See worksheet tab "Annual for Utility Units"

- This step applies only to utility units that are in operation or a non-utility unit that has an effective and active long term contract with a utility unit.
- Initial allocation of allowances for 2009, 2010, & 2011:
  - ✓ average heat input (MMBtu) **multiplied by** fuel adjustment factor (taken from the FIP) = adjusted heat input (MMBtu) for the unit
  - ✓ Fuel adjustment factor (Column O) based on fuel used:
    - coal = 1;
    - gas = 0.4;
    - other type fuels, consult the FIP
  - ✓ Columns M × O = Column Q

    Example: Little Gypsy –Unit 1

    $$4{,}993{,}669 MMBtu \times (.4) = 1{,}997{,}467\ MMBtu$$

- Beginning in 2008 this step will be calculated in the same manner using the appropriate data.
- The fuel adjustment factor is not used for new certified units—the fuel type is accounted for in the gross electrical output calculation to obtain a converted heat input.
- Manually enter the fuel factors.

Step 4: Adjust the Louisiana Budget

This step applies only to utility units that are in operation or a non-utility unit that has an effective and active long term contract with a utility unit.

- Total Column I on the worksheet tab "Annual for Non-Utility Units"
- Subtract the total of Column I from the Louisiana (LA) NOx annual budget for the control period.
  - LA Phase 1 NOx Annual Budget 2009-2014 = 35,512 tpy;
  - LA Phase 2 NOx Annual Budget for 2015 forward =29,593 tpy.

  **Note: The Louisiana Budget for utility units will need to be adjusted each year beginning with 2008 when the allowances for control period 2012 are allocated because non-utility units are allocated first.

- The adjusted Louisiana Budget appears on the worksheet tab "Annual for Utility Units" in Columns W, Z, and AC, Line 8.

- The calculations will be performed by the Excel spreadsheet using the ratio value (columns V, Y, or AB), the adjusted heat input (column Q) plus Columns R, S, and T for new certified units and the adjusted Louisiana budget. The allowances will appear in columns W, Z, and AC.
- To allocate the initial allowances for 2009, 2010, and 2011
  - ✓ Use the ratio of each unit's adjusted heat input (MMBtu) (Column Q or Columns R, S, and T for new certified units) to the total adjusted heat input (the total of Column Q plus Columns R, S, or T for new certified units). The value of this ratio (%) is in Columns V, Y, or AB. The Columns V, Y, or AB value is **multiplied by** the LA cap Phase 1 NOx Annual Budget for 2009 (Columns W, Z, or AC, Line 8). Round to nearest whole number and the allowance is located in Columns W, Z, and AC.
  - ✓ Column Q for the unit/Column R74 = Column V (% ratio)
    Columns V, × 30189 tpy = Column W (allowances)

    Example unit: Little Gypsy-1
    1,997,467 MMBtu **divided by** the sum of all column Q +R73 values 367,100,810 MMBtu **multiplied by** 30189 (adjusted Louisiana budget for 2009) = 164 allowances.
    Example of new certified unit: Rodemacher-3
    18,183,075 MMBtu **divided by** 367,100,810 **multiplied by** 30847 = 1528 allowances.
  - ✓ Beginning in 2008 for control period 2012, and for each control period after, this step will be calculated in the same manner using the appropriate data

OZONE SEASON NOx ALLOCATIONS

- Calculated in the same manner as Annual NOx allowances.
- Use Steps 1-4 but modify all the emissions (NOx tpy) and heat input (MMBtu) data by using seasonal (May through September) data found in the Federal Acid Rain database at the web address listed above. If seasonal data is not available use annual data and multiply the data by 5/12.
- Louisiana (LA) Phase 1 Ozone Season NOx Budget 2009-2014 = 17,085 tpy; LA Phase 2 Ozone Season NOx Budget for 2015 forward =14,238 tpy

  Examples:

  1.) Joe's Electrical Generating Unit emitted an average of 200 tons per year for 2009, 2010, and 2011. To calculate the average Ozone Season NOx emissions:

  $$200 \text{ tpy} \times (5/12) = 83 \text{ tpy}$$

  2.) A LPSC regulated utility had an average adjusted heat input of 34,200,228 MMBtu. To calculate the average adjusted heat input for the ozone season:

  $$34{,}200{,}228 \times (5/12) = 14{,}250{,}095 \text{ MMBtu}$$