

Calculating Annual CAIR NO_x Allowances Using the Louisiana Method

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

ANNUAL NO_x ALLOCATIONS

Step 1: Calculate the average annual NO_x 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:
 - ✓ For 2002, 2003, and 2004, data from the department’s emissions inventory were used. The Federal Acid Rain database information is available at http://cfpub.epa.gov/gdm/index.cfm?fuseaction=whereyoulive.state&displaymode=view&programYearSelection=none&prg_code=ARP&year=2003&state=LA and was used for allocating ozone season NO_x allocations for non-utility units.
 - ✓ Example using actual NO_x emissions [tons per year (tpy)]:
 $2002 + 2003 + 2004/3 = \text{average actual NO}_x \text{ emissions (tpy)}$
Enter the result of the average calculation in columns H and I of the spreadsheet.
- Each control period allowance allocations beginning in 2008 will use 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, NO_x allocations will not be made until there is a calendar year of data (partial or complete). Data from that calendar year will be used instead of an average. When there are 2 calendar year’s of data, the 2 years 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.

ANNUAL NO_x ALLOCATIONS (cont.)

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:
 - ✓ For 2002, 2003, and 2004 data was used from the Acid Rain Program database which is available at http://cfpub.epa.gov/gdm/index.cfm?fuseaction=whereyoulive.state&displaymode=view&programYearSelection=none&prg_code=ARP&year=2003&state=LA
 - ✓ Enter the heat input data (MMBtu) for the appropriate years and the Excel spreadsheet will perform the calculations.

Examples:

$$\text{Heat input 2002} + \text{heat input 2003} + \text{heat input 2004} / 3 = \text{average heat input (MMBtu)}$$

$$\text{Columns I+J+K} / 3 = \text{Column M}$$

- Beginning in 2008, use the heat input (MMBtu) for the most recent three (3) calendar years. The information should be available in the department’s emission inventory. If the data can not be obtained from the emission inventory, use the data in the Federal Acid Rain Program database. Use the 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.

- 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.
 - ✓ 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.

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

Calculated heat input =

$$700 \times 7,900 \times 8760 \times 1000 / 1,000,000 = 48,442,800 \text{ MMBtu.}$$

ANNUAL NO_x ALLOCATIONS

Step 2: Continued

- ✓ For new units, not coal-fired, 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 yearly multiply by 8,760 hours per year and to convert MW to kW multiply by 1,000.

Example for a new gas-fired unit with a certified gross electrical output of 200 MW.

Calculated heat input =

$$200 \times 6675 \times 8760 \times 1000 / 1,000,000 = 11,694,600 \text{ mmBtu.}$$

- ✓ 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.

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

- See worksheet tab “Annual for Utility Units”
- This Step applies only to certified 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 X O = Column Q
- Example: Little Gypsy –Unit 1 4,993,669 MMBtu X .4 = 1,997,467 MMBtu
- Beginning in 2008 this step will be calculated in the same manner using the appropriate data.
- No fuel adjustment factor is used for new certified units—the fuel type is accounted for in the gross electrical output calculation to obtain a converted heat input.

Step 4: Adjust the Louisiana Budget

- This Step applies only to certified 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 NO_x annual budget for the control period. Louisiana (LA) Phase 1 NO_x Annual Budget 2009-2014 = 35,512 tpy; LA Phase 2 NO_x 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 Column T, Line 6.

ANNUAL NO_x ALLOCATIONS

Step 4: Continued

- The calculations are performed by the Excel spreadsheet using the ratio value (column S) and the adjusted heat input (column Q). The allowances appear in column T.
- To allocate the initial allowances for 2009, 2010, and 2011
 - ✓ Use the ratio of each unit’s adjusted heat input (MMBtu) (Column Q) to the total adjusted heat input (the total of Column Q). The value of this ratio (%) is in Column S. The Column S value is **multiplied by** the LA cap Phase 1 NO_x Annual Budget for 2009 (Column T, Line 6). Round to nearest whole number and the allowance is located in Column T.
 - ✓ Column Q for the unit/Column Q Total =Column S (% ratio)
Column S X 30,688 tpy = Column T (allowances)

Example: Little Gypsy-1

1,997,467 MMBtu **divided by** the sum of all column R values (33,831,569 MMBtu) **multiplied by** 30,688 tpy (adjusted Louisiana budget for 2009)
= 141 tpy.

- ✓ 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 NO_x ALLOCATIONS

- Calculated in the same manner as annual NO_x allowances.
- Use Steps 1-4 but modify all the emissions (NO_x 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 Seasonal NO_x Budget 2009-2014 = 17,085 tpy; LA Phase 2 Seasonal NO_x Budget for 2015 forward =14,238 tpy

Example:

Joe's Electrical Generating Unit emitted an average of 200 tons per year for 2009, 2010, and 2011. To calculate the average ozone season NO_x emissions:

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

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

$$34,200,228 \times 5/12 = 14,250,095$$