

Chapter 9: Best Available Retrofit Technology (BART)

Under section 169A(b)(2)(A) of the CAA, states must require certain large stationary sources to install and operate additional emission controls called BART. This BART provision applies only to major stationary sources from a list of sources ranging from fossil-fuel fired steam electric plants of more than 250 million British thermal units (Btus) per hour heat input to chemical process plants to carbon black plants. EPA has identified 26 source categories of stationary sources that encompass the entire list in the CAA. The sources must have become operational between 1962 and 1977, and emit 250 tons or more per year of any air pollutant, that may reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I areas. The rule allows a state to implement an emissions trading or other alternative program in lieu of BART if the state can demonstrate that the trading program or alternative will achieve greater reasonable progress than the installation of BART.

LDEQ is requiring sources subject to BART to install, operate, and maintain BART rather than implement an emissions trading program or other alternative measure instead of BART.

On July 6, 2005, U. S. EPA published a revised final rule, including Appendix Y to 40 CFR part 51 “Guidelines for BART Determinations Under the Regional Haze Rule” that provides direction to states on determining which of these older sources may need to install BART and how to determine BART.

9.1 BART –Eligible Sources in Louisiana

The BART-eligible sources were identified using the methodology in the Guidelines for BART Determinations under the Regional Haze Rules or Guidelines (40 CFR Part 51, Appendix Y). The department sent a survey to every reporter to the emissions inventory for the state. All reporters eventually responded. The results of the survey are those facilities listed in Appendix E. The following guideline-established criteria were used by facilities to determine if an emission unit source was BART eligible:

- One or more emissions units at the facility fit within one of the 26 categories listed in the Guidelines;

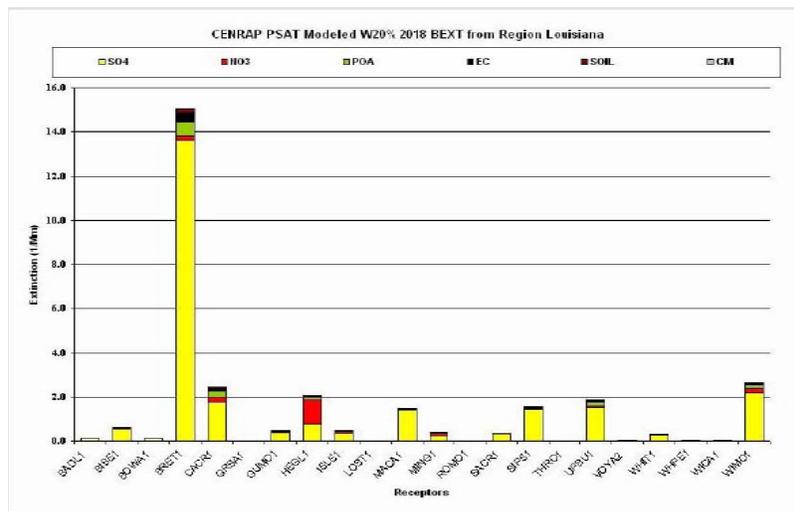
- The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
- The limited potential emissions from all emission units identified in the previous two bullets emission units were greater than 250 tons or more per year of any of these visibility-impairing pollutants: SO₂, NO_x, and PM₁₀.

A detailed description of each BART-eligible emission unit is included in Appendix E.

The Guidelines recommend addressing these visibility-impairing pollutants: sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM) during the identification process. LDEQ addressed these three pollutants and used PM less than 10 microns in diameter (PM₁₀) as an indicator for PM to identify BART-eligible units, as the Guidelines suggests. Consistent with the Guidelines, LDEQ did not evaluate emissions of Volatile Organic Compounds (VOCs) and ammonia in BART determinations although VOC and ammonia emissions data were collected for these reasons:

- 1) As is depicted in Figure 9.1 there is an overwhelming majority of light extinction due to SO₄. It appears VOCs do not contribute enough to justify addressing.
- 2) Ammonia emissions are being addressed through the Louisiana Toxic Air Pollutant Emission Control Program. Ammonia is considered a state toxic air pollutant and efforts are being made to lower ammonia emissions in the state.

Figure 9.1 CENRAP Modeled 20% Worst Days



9.2 BART Air Quality Modeling Approach

EPA's BART guidance lists acceptable air quality modeling approaches. The approach the department chose to use is the individual source attribution approach. This approach entails modeling source-specific BART-eligible units and comparing modeled impacts to the deciview threshold. The modeling approach used is specifically designed for conducting a source-specific subject-to-BART screening analysis. If the screening indicates modeled impacts to visibility at any Class I area below a certain value, in this case 0.5 deciviews, then the modeled BART-eligible units are considered not subject to BART. This modeling should not be confused with the visibility analysis conducted for a New Source Review permit. But because they are similar, the same air dispersion model may be used for both.

9.3 Determination of Sources Subject to BART

According to the Guidelines, a state has two options for determining its BART-eligible sources: A) make BART determinations for all sources or B) consider exempting those sources which do not cause or contribute to visibility impairment in a Class I area. LDEQ has chosen Option B. When using Option B, the Guidelines suggest three sub-options for determining whether certain sources need not be subject to BART:

- (1) Individual source attribution approach (dispersion modeling)
- (2) Use of model plants to exempt sources with common characteristics
- (3) Cumulative modeling to show that no sources in Louisiana are subject to BART

LDEQ has chosen a hybrid combination of sub-options 1 and 2. Initially, model-like facilities were used to exclude as many BART-eligible sources as possible from the BART requirement. Following this modeling, individual source attribution was used for those remaining BART-eligible sources that initially were not excluded.

Table 9.1 contains the list of Class I areas to be included in the modeling analysis for states in CENRAP. The list was developed for the subject-to-BART screening evaluation conducted by ENVIRON for CENRAP.

Table 9.1 – Potential Class I Areas Included in BART Impact Assessment in the CENRAP California Puff Model (CALPUFF) South Domain

Class I Area	State	Visibility Monitoring Site Name
Bandelier Wilderness Area	NM	BAND1
Big Bend National Park	TX	BIBE1
Bosque del Apache Wilderness Area	NM	BOAP1
Breton Wilderness Area	LA	BRET1
Caney Creek Wilderness Area	AR	CACR1
Carlsbad Caverns National Park	NM	GUMO1
Great Sand Dunes Wilderness Area	CO	GRSA1
Guadalupe Mountains National Park	TX	GUMO1
Hercules-Glades Wilderness Area	MO	HEGL1
La Garita Wilderness Area	CO	WEMI1
Mesa Verde National Park	CO	MEVE1
Mingo Wilderness Area	MO	MING1
Pecos Wilderness Area	NM	WHPE1
Salt Creek Wildlife Refuges	NM	SACR1
San Pedro Parks Wilderness Area	NM	SAPE1
Upper Buffalo Wilderness Area	AR	UPBU1
Weminuche Wilderness Area	CO	WEMI1
Wheeler Peak Wilderness Area	NM	WHPE1
White Mountain Wilderness Area	NM	WHIT1
Wichita Mountains Wildlife Refuges	OK	WIMO1

Because of transport due to meteorological conditions, a Louisiana facility may impact a number of Class I areas. The year 2018 CENRAP CAMx source apportionment (PSAT) modeling analysis, see Figure 9.1, indicates the Class I areas potentially impacted by emissions from all of Louisiana facilities, not just BART sources, and the modeled visibility degradation.

Modeling results in Figure 9.1 (page 9-2) indicate that there are seven (7) Class I areas that experience an impact of over 1.0 deciview from emissions from sources in Louisiana. According to the modeled results the Class I areas impacted are:

- Breton (LA),
- Caney Creek (AR),
- Hecules Glades (MO),
- Mammoth Cave (KY),
- Sipsey (AL),
- Upper Buffalo (AR), and
- Wichita Mountain (OK)

In order to refine the number of possible Class I areas that may have visibility impacts from BART sources in Louisiana, an artificial “model” source was created to examine impacts to the north and west. The model source was placed in De Soto Parish in the northwest corner of Louisiana. Several California Puff Model (CALPUFF) iterations, each reducing NO_x and SO₂ emissions, were made until the “model” facility’s emissions no longer impacted the visibility of Upper Buffalo, Hercules Glades, or Wichita Mountain. The criterion used to determine this “no impact” was that the CALPUFF model results must indicate a visibility impact of less than 0.5 deciviews at each of these Class I areas. If emissions from this model facility are less 1392 tons per year (tpy) of both NO_x and SO₂ and 2514 tpy of PM₁₀ then there is no impact at Upper Buffalo, Hercules Glades, or Wichita Mountain. The stack parameters used in CALPUFF were 160 meters--stack height, 7.62 meter—stack diameter, 12.65 meters/sec.—stack velocity, and 345.77 K— exit stack temperature, selected to accommodate long range transport of visibility impairing pollutants. The analysis assumes that the much smaller subset of emissions from BART sources in Louisiana would potentially affect the same Class I areas as those impacted by the source apportionment results (Figure 9.1) based upon the emissions of all Louisiana facilities. Because of the spatial relationship of the “model” facility’s location with respect to the Class I areas that were included in the CALPUFF screening, it is reasonable to conclude all Louisiana BART facilities to the south and the east of the “model” facility would not have an impact of 0.5 deciviews or more to Upper Buffalo, Hercules Glades, or Wichita Mountains.

For the Sipsey (Figure 9.2) and Mammoth Cave (Figure 9.3) Class I areas, analyses of trajectories rule out Louisiana facilities from much impact.

Figure 9.2

Back Trajectories for 2002 20% Worst Days Sipsey, AL

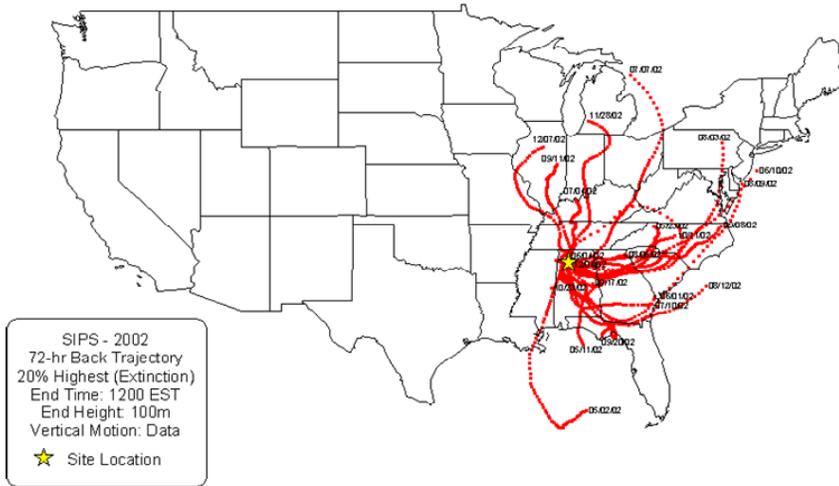
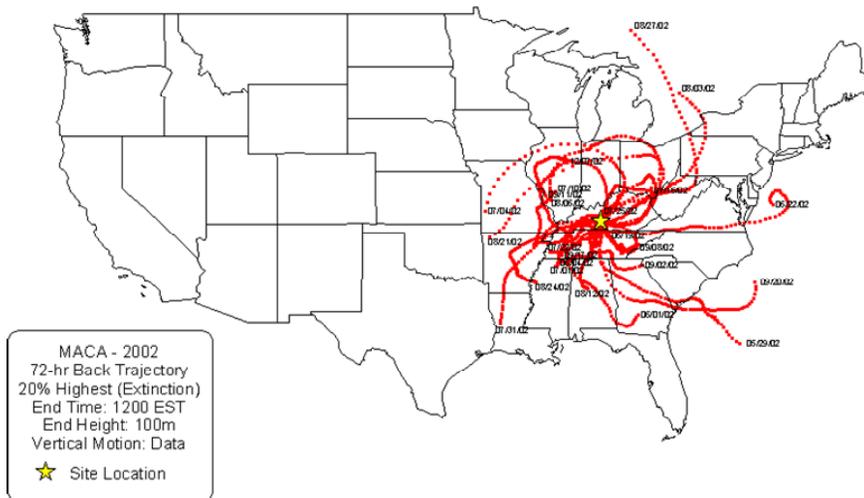


Figure 9.3

Back Trajectories for 20% Worst Days for 2002 Mammoth Cave



VISTAS, the regional planning organization adjoining CENRAP, conducted the back trajectory analyses shown above. Both figures indicate that on only one day does the backtrack trajectory originate or travel over any part of Louisiana. Using this data, it is reasonable to conclude that the visibility impact, if any, is minimal and those BART facilities in Louisiana show no impact to either Class I areas.

Therefore it can be concluded from the results of the CALPUFF screening and the examination of the backtrack trajectories that the Class I areas of concern for Louisiana BART facilities are Caney Creek in Arkansas and Breton in Louisiana.

The discussion that follows is a description of the process used to determine BART sources. First, the BART-eligible facilities in Louisiana with visibility impairing pollutants and distances to the nearest Class 1 area were placed in a spreadsheet and sorted primarily to the nearest Class 1 area and subsequently by the distance to the Class 1 area. There are two Class 1 areas of concern: Louisiana's Breton Wilderness Area and Caney Creek Wilderness Area in Arkansas. The ratio of the total of visibility impairing emissions to the distance was calculated on the spreadsheet. See spreadsheet in Appendix E.

Then the state performed CALPUFF modeling to screen the BART-eligible facilities in Louisiana. The following criteria were used in the model runs 1) EPA regulatory approved model, CALPUFF version 5.711a, 2) the CENRAP 6 km spacing resolution domains with no observation CALMET met data of 2001, 2002 and 2003, and 3) 2001, 2003 Louisiana state ozone data and 2002 CENRAP southern region ozone data were used in the screening process. The 24 hour maximum pollutant emissions of NO_x, SO₂ and particulate reported in the BART survey were used for the model emissions inputs. POSTUTIL was used in calculation of repartitioning of NO₃/HNO₃ without ammonia data. The CALPOST version 5.51 was used to determine the visibility impact on the Class I area of interest. Figures 9.4, 9.5, and 9.6 depict various BART-eligible sources, their modeled deciview impact, and their location and distance from the two Class I areas, namely Breton and Caney Creek for 2001, 2002, and 2003. Referring to figures 9.4, 9.5, and 9.6 while reading the description of this procedure may clear up any confusion.

Caney Creek

- i. Instead of creating a model facility, LDEQ modeled Smurfit Stone Container Enterprise and Chemtrade Refinery Services. Modeled results showed no visibility impact at Caney Creek from either facility. Revisions to visibility impairing emissions from Graphic Packaging International were updated after the computer

screening analysis was completed and the facility was sent a letter requesting that the facility perform refined CALPUFF modeling.

- ii. The ten other BART-eligible sources in Louisiana on the spreadsheet, (See Appendix E) closer to Caney Creek than to Breton were eliminated from BART consideration because they were further away from Caney Creek but emitted less visibility impairing pollutants than Smurfit Stone Container Enterprise and Chemtrade Refinery Services, or had a lesser emissions/distance ratio.

Breton

- iii. LDEQ modeled the ConocoPhillips Alliance Refinery which is located outside of Belle Chasse, LA. Modeling indicated a visibility impact at Breton. LDEQ then chose to model Big Cajun 2; however, Louisiana is a CAIR state so only the particulate component was modeled. Modeling indicated a minimal impact at Breton. LDEQ sent letters to 10 facilities, requesting that they perform refined CALPUFF modeling. The criteria were an emissions/distance ratio equal to or greater than Big Cajun 2's including the ConocoPhillips Alliance Refinery. The 10 facilities are included in the list in Table 9.3.
- iv. LDEQ modeled Murphy Oil USA's Meraux Refinery, and Entergy Michoud in east New Orleans, LA. For Michoud only the particulate component was used again because Louisiana is a CAIR state. Both were found to have a small visibility impact at Breton. These facilities were then added to the prior list of facilities receiving letters.
- v. LDEQ modeled Dupont Pontchartrain Diamines Unit. There was no visibility impact at Breton. All BART-eligible sources not already sent letters requesting refined modeling that were at a greater distance from Breton than this Dupont facility were removed from the BART consideration.
- vi. As a check, LDEQ modeled a carbon black plant that was over 300 kms from Breton which emitted high amounts of visibility impairing pollutants from a tall stack. The modeling indicated no impact at either Breton or Caney Creek.
- vii. Finally, to ensure that all BART-eligible facilities that may impact Breton were considered, letters requesting the facility perform refined CALPUFF modeling were sent to 13 facilities with emissions exceeding 5 tons with a greater distance from Dupont to Breton. These, too, were added to the list in Table 9.2.

Table 9.2: Facilities Requested to either Screen or Perform Refined Modeling

Company Name	Source Name	AI Number
Graphic Packaging International	West Monroe Mill	1432
ConocoPhillips Co.	Alliance Refinery	2418
Marathon Petroleum Company, LLC	Garyville Refinery	3165
PCS Nitrogen	Geismar Plant	3732
Mosaic Fertilizer LLC	Uncle Sam Plant	2532
Degussa Engineered Carbons LP	Ivanhoe Carbon Black Plant	2518
Temple Inland	Bogalusa Mill	38936
Rhodia, Inc	Baton Rouge Facility	1314
E.I. du Pont de Nemours & Co., Inc.	Burnside Plant	67572
Sid Richardson Carbon Company	Addis Plant	4174
Louisiana Generating LLC	Big Cajun 2 Power Plant	38867
Murphy Oil USA, Inc.	Meraux Refinery	1238
Entergy New Orleans	Michoud	32494
Lyondell Chemical Company	Lake Charles Plant	27051
Chalmette Refining , L.L.C.	Chalmette Refinery	1376
Valero Refining-New Orleans, LLC	St Charles Refinery	26003
Motiva Enterprises LLC	Norco Refinery	1406
Shell Chemical LP	Norco Chemical Plant – East Site	26336
Union Carbide Corp.	Taft/Star Manufacturing Complex	2083
Gramercy Alumina	Gramercy Alumina	1388
Mosaic Fertilizer LLC	Faustina Plant	2425
CF Industries	CF Industries Donaldsonville	2416
Entergy Gulf States	Willow Glen	2625
ExxonMobil Refining & Supply Co.	ExxonMobil Baton Rouge Refinery	2638
ExxonMobil	Baton Rouge Chemical Plant	286
Placid Refining Company, L.L.C.	Port Allen Refinery	2366
Exide Technologies	Baton Rouge Smelter	1396
Georgia Pacific	Port Hudson Operations	2617

In accordance with the Guidelines, a contribution threshold of 0.5 deciviews (98th percentile) was used for determining which sources were subject to BART. The screening

evaluation criterion was a maximum deciview impact of greater than 0.5 deciviews to require a refined analysis.

The results of the individual screening analyses for each source are included in Table 9.3. Each modeling exercise was reviewed and approved by LDEQ, FLM, and EPA. Appendix G contains more detailed results of the screen-modeling analyses for each BART-eligible facility which was notified to either run the screening or refined model.

Table 9.3: CALPUFF/CALPOST Screening Results

Facility	AI Number	Status
Graphic Packaging	1432	Passed Screening Model
Conoco Philips Co.	2418	Failed Refined Model
Marathon Petroleum Company, LLC	3165	Passed Screening Model
PCS Nitrogen	3732	Passed Refined Model
Mosaic Fertilizer, LLC	2532	Passed Refined Model
Degussa Engineered Carbons, LP	2518	Passed Refined Model
Temple Inland	38936	Passed Screening Model
Rhodia, Inc.	1314	Failed Refined Model
E.I. du Pont de Nemours & Co., Inc.	67572	Have to remodel using approved Model
Sid Richardson Carbon Company	4174	Failed Refined Model
Louisiana Generating, LLC	38867	Passed Refined Model
Murphy Oil USA, Inc.	1238	Passed Refined Model
Entergy New Orleans	32494	Have to remodel using approved Model
Lyondell Chemical Company	27051	Removed from the list
Chalmette Refining, LLC	1376	Passed Screening Model
Valero Refining-New Orleans, LLC	26003	Passed Screening Model
Motiva Enterprises, LLC	1406	Passed Refined Model
Shell Chemical, LP	26336	Passed Refined Model
Union Carbide Corp.	2083	Passed Screening Model
Gramercy Alumina	1388	Passed Screening Model

Facility	AI Number	Status
Mosaic Fertilizer, LLC	2425	Passed Screening Model
CF Industries	2416	Passed Screening Model
Entergy Gulf States	2625	Have to remodel using approved Model
Exxon Mobil Refining and Supply Co.	2638	Passed Screening Model
Exxon Mobil	286	Passed Screening Model
Placid Refining Company, LLC	2366	Passed Screening Model
Exide Technologies	1396	Passed Screening Model
Georgia Pacific	2617	Passed Screening Model
International Paper	???	Passed Screening Model

The facilities with BART-eligible units found to be subject to BART are shown in Table 9.4. Facilities found subject to BART must complete a BART analysis.

Table 9.4 Facilities with Units Subject to BART in Louisiana

Facility Name	AI Number	Emission Units Subject to BART	Pollutants Evaluated in BART	Determination Contribution to Visibility Impair (delta deciview)
Conoco Philips Co.	2418	Various emission points in facility	SO ₂ , NO _x , and PM	2.689
Rhodia, Inc.	1314	Sulfuric acid Units 1 and 2	SO ₂	1.043/0.164
Sid Richardson Carbon Company	4174	Units 1,2, and 3 flares and dryers 2,3, and 4	SO ₂	0.568

Figure 9.4 BART Source CALPUFF Screening 2001

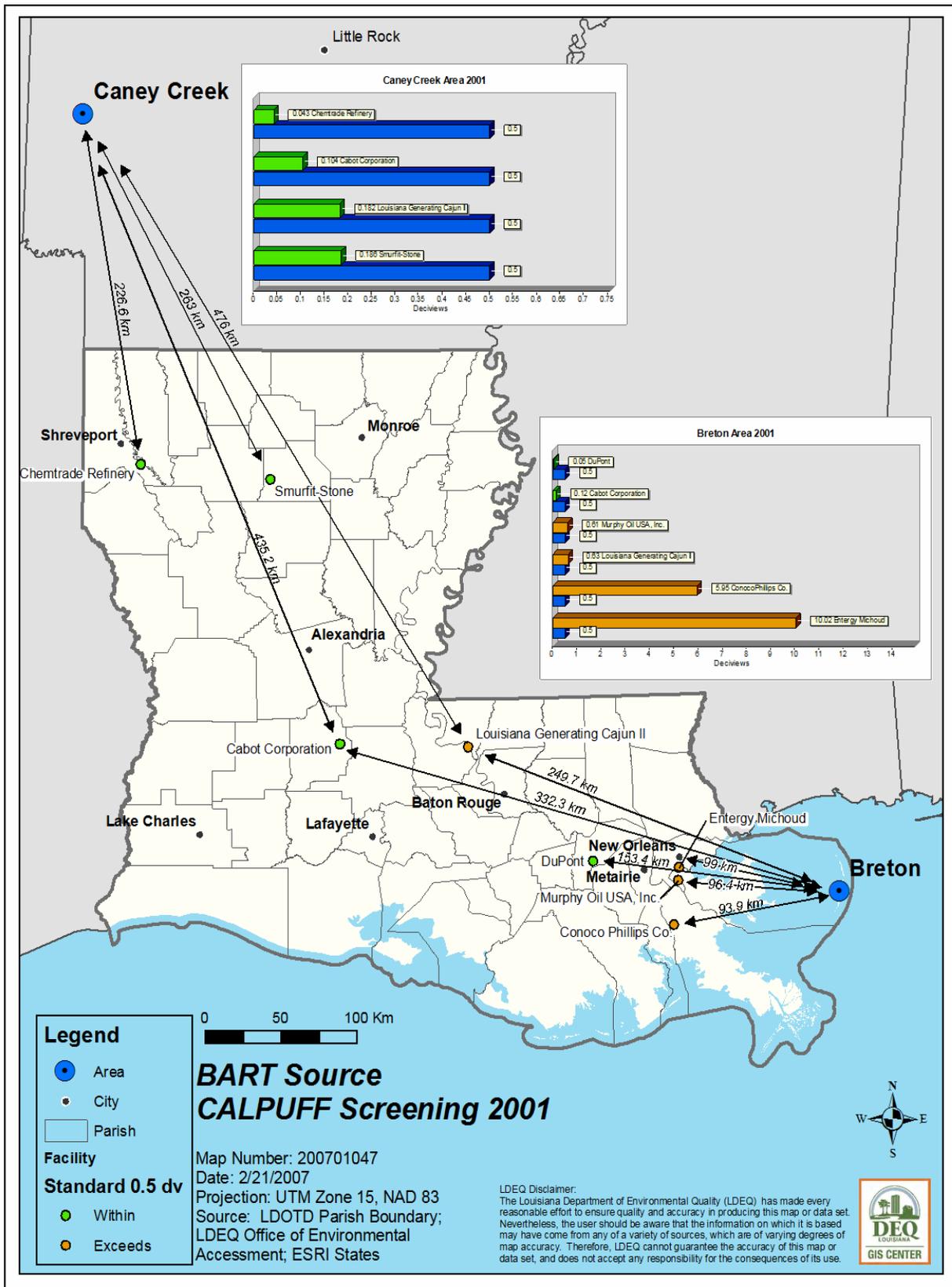


Figure 9.5 BART Source CALPUFF Screening 2002

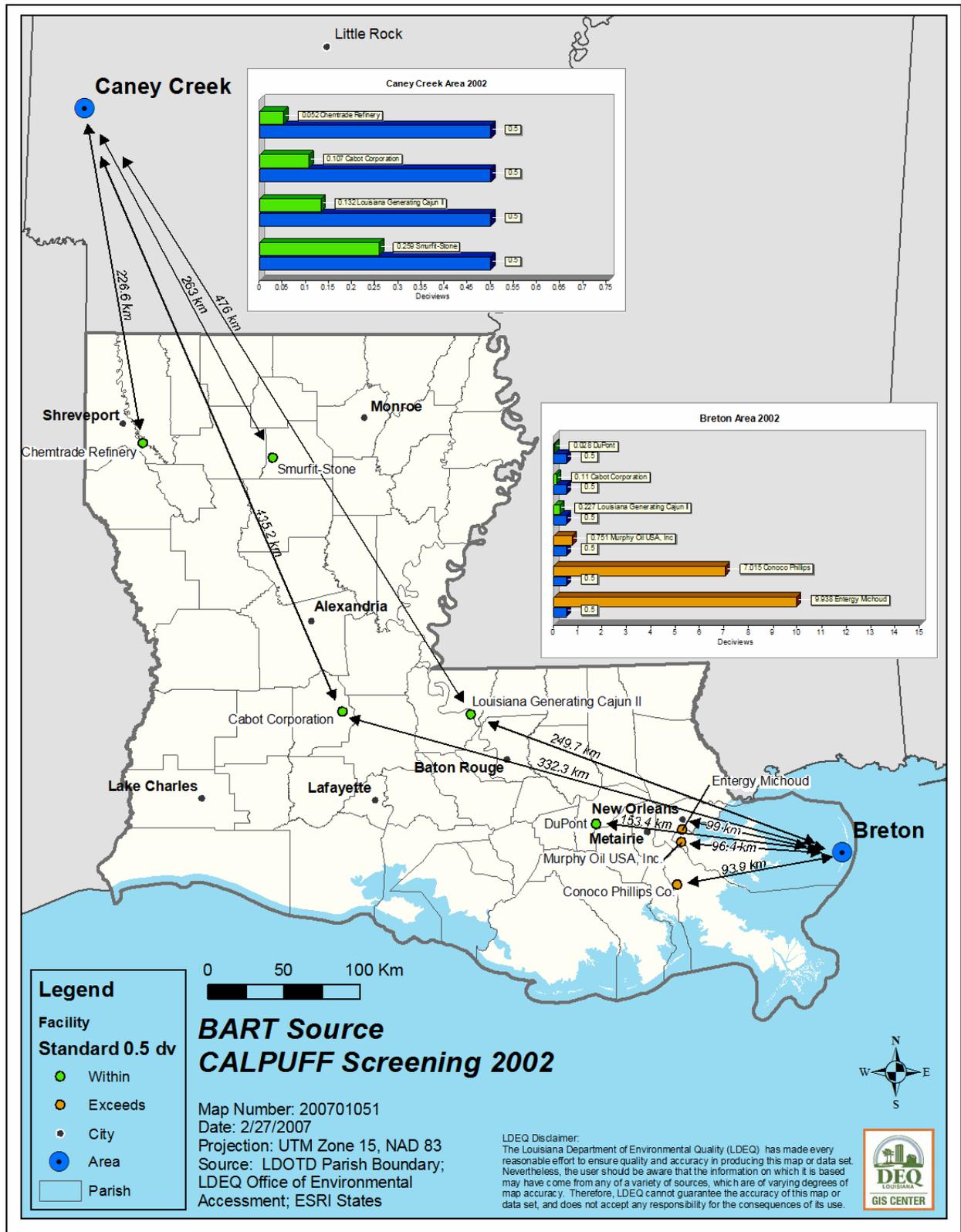


Figure 9.6 BART Source CALPUFF Screening 2001

