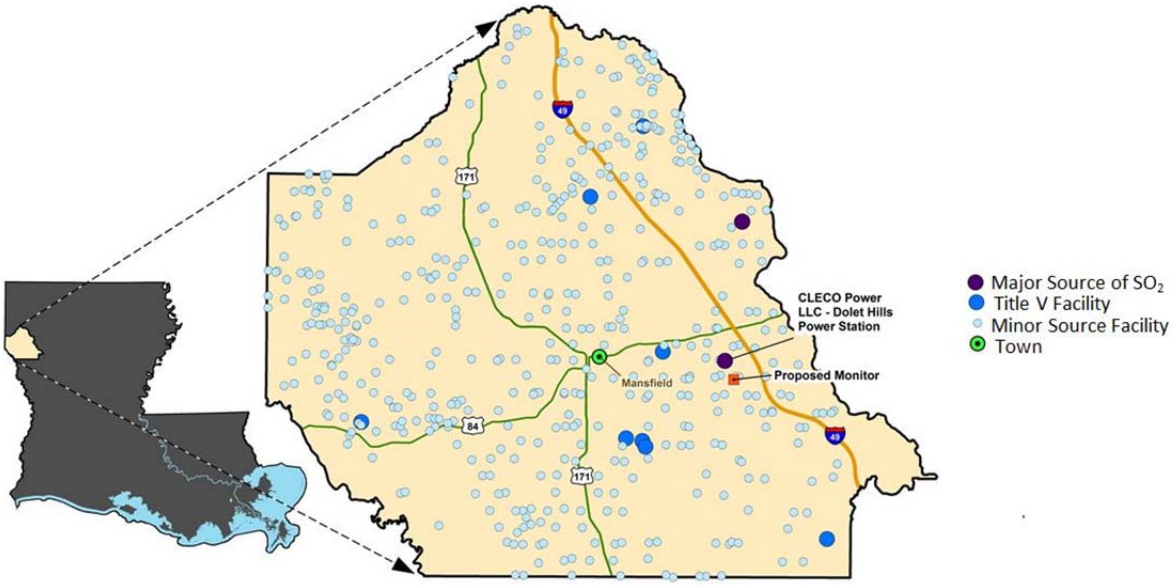
Desoto Parish Support Document

On March 2, 2015, a consent decree (CD) was filed in the United States District Court for the Northern District of California, San Francisco Division, which settled a suit between the United States Environmental Protection Agency (US EPA), the Sierra Club, and the Natural Resources Defense Council (Case No. 13-cv-03953). The CD requires US EPA to promulgate remaining area designations under the Primary National Ambient Air Quality Standard (NAAQS) for Sulfur Dioxide (SO_2) in three phases: by July 2, 2016; December 31, 2017; and December 31, 2020.

The first phase of required designations address, in part, sources that according to US EPA's Air Markets Database emitted more than 16,000 tons of SO_2 or emitted more than 2,600 tons of SO_2 and had an average emission rate of 0.45 lbs of SO_2/mmbtu or higher in 2012. Three such facilities were identified in Louisiana, including one located in De Soto Parish and two in Calcasieu Parish. Dolet Hills Power Station (DHPS), owned and operated by CLECO Corporation (CLECO), was identified as the source in De Soto Parish. The facility emitted 20,887 tons of SO_2 and had an emission rate of 0.80 lbs of SO_2/mmbtu in 2012. Therefore, the ambient air in the surrounding area, De Soto Parish, must be characterized.

De Soto Parish is located in the northwest corner of Louisiana. The parish encompasses 875.58 square miles and has a population of 27,142 according to the latest census data. Mansfield is the parish seat with a population of 5,006[1]. As of September 1, 2015, the Louisiana Department of Environmental Quality (LDEQ) recognizes 519 permitted facilities in the parish, with only 10 representing Title V facilities. Being an area rich in oil and natural gas, 99% of the minor source facilities are sector related. Two facilities in the parish are major sources of SO_2, *see figure 1 and table 1*.

Figure 1: De Soto Parish Permitted Facilities



DHPS is a fossil fuel-fired steam/electric generation facility located near Mansfield in De Soto Parish. The facility currently operates under the following permits:

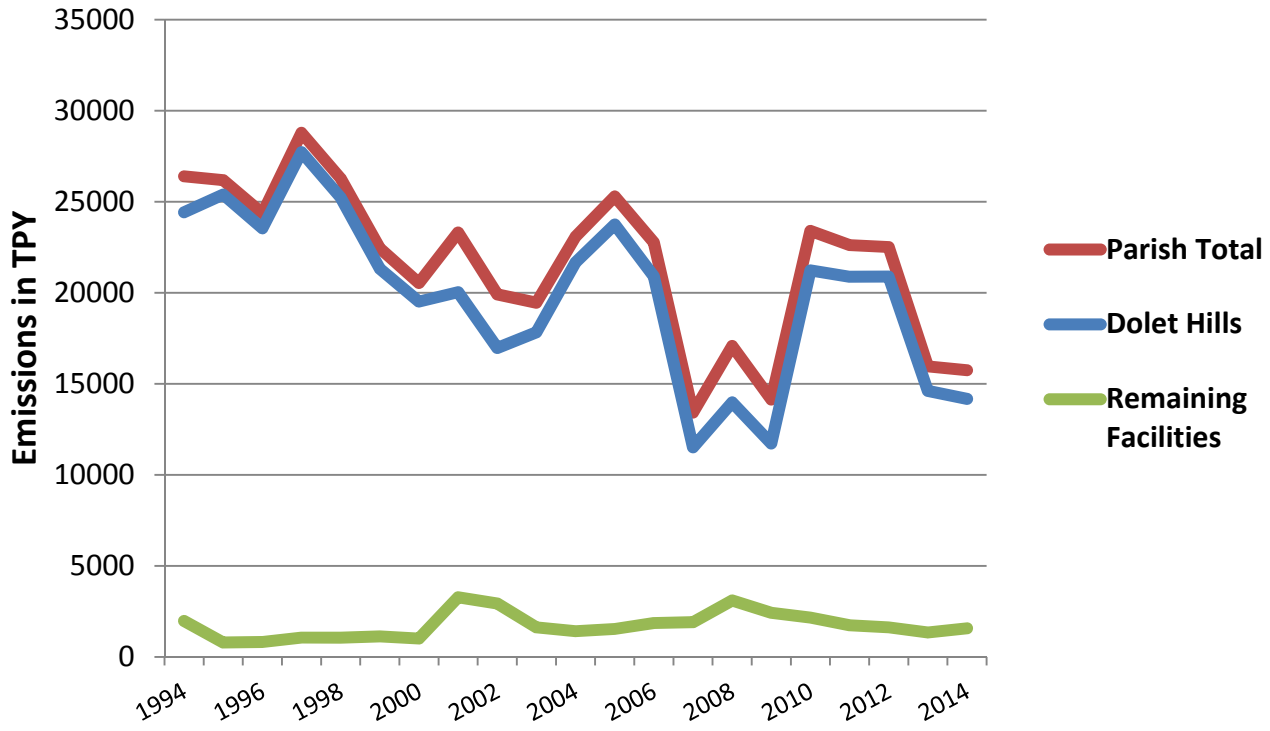
- Title V Permit Number 0760-00001-V2, issued September 20, 2013 and amended on August 4, 2014;
- Acid Rain Title IV Permit Number 0760-00001-IV3, issued September 20, 2013; and
- Prevention of Significant Deterioration Permit Number PSD-LA-117(M-5), issued December 17, 2007.

At 14,177 tons of SO_2 emitted in 2014, the facility is by far the largest SO_2 emitter in De Soto Parish and has seen an overall reduction of SO_2 emissions[2]. As one of the two facilities in the parish that are major sources of SO_2, DHPS accounts for 90% of the total SO_2 emitted in the parish, *see table 1 and figure 2*. Consequently, the facility's impact in the area represents the single deciding factor in the area designation under the 2010 SO_2 NAAQS.

Table 1: De Soto Parish Major SO_2 Sources[2]

Agency Interest Number	Facility	2014 SO_2 Emissions (TPY)
585	CLECO Power LLC - Dolet Hills Power Station	14,177
328	International Paper Company - Mansfield Mill	1,557

Figure 2: De Soto Parish SO_2 Emissions[2]



According to a letter from CLECO to US EPA dated August 19, 2015, CLECO intends to install and operate an ambient air monitor prior to the end of 2015, *see appendix A.*

The facility utilized the draft SO_2 NAAQS Designations Source Oriented Monitoring Technical Assistance Document dated December 2013, in its efforts to utilize AERMOD, version 14134, to select a location that would appropriately and sufficiently monitor ambient air in proximity to the SO_2 source. As suggested, the modeling was conducted using hourly normalized actual emissions retrieved from the continuous emissions monitoring system (CEMS), current stack parameters and temperatures, building downwash, and a Cartesian receptor grid extending to 20 km from DHPS. The grid was constructed using receptors spaced 100 meters (m) apart along the property line to 2 km out, 250 m spacing from 2 km to 10 km from the property line, and 500 m spacing from 10 km to 20 km from the property line. The model was run using five years of meteorological data. This worst case scenario model produced 10 of the 14 top ranked receptors along the southeast property boundary. Due to the clustering of the impacted receptors, LDEQ concurs with CLECO that one monitor located southeast of the facility will sufficiently characterize the ambient air in the vicinity of DHPS.

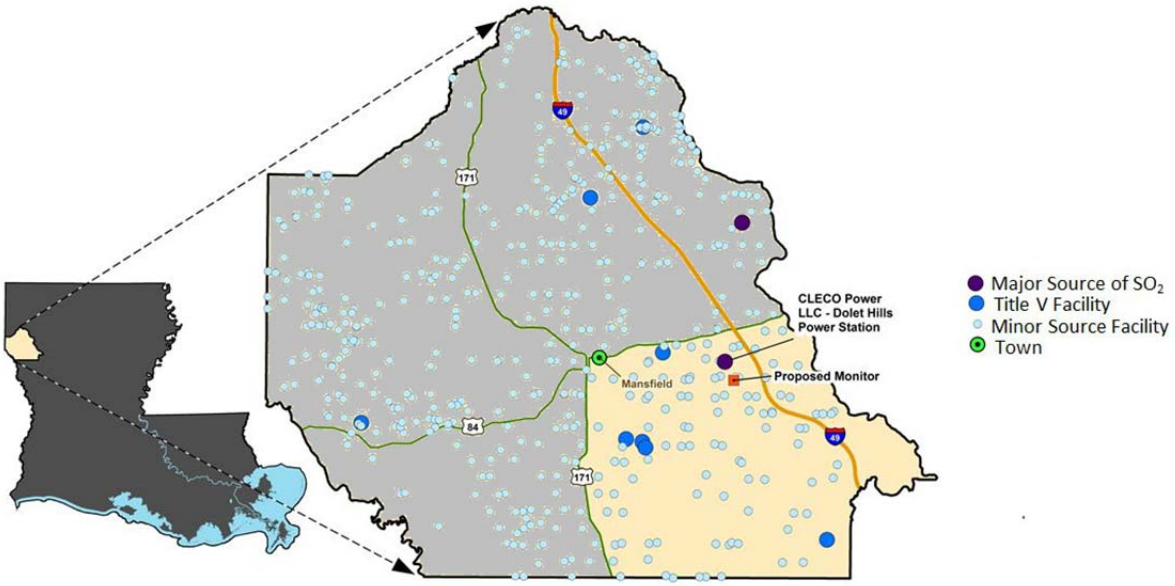
In an effort to expedite the collection of usable data, CLECO will conduct monitoring in two phases. Temporary monitoring utilizing a trailer mounted monitoring station will be conducted at a location near the proposed long-term monitor. Upon completion of construction, the long-term monitoring will commence.

CLECO plans to utilize the data from the monitor to provide support to the LDEQ and US EPA in the area designation process for the 2010 SO_2 NAAQS. Therefore, the monitor will be sited and operated in a manner equivalent to the State and Local Air Monitoring Station . Specifically, data processing will follow the procedures detailed in 40 CFR 50 Appendix T; and the monitoring data will be subject to reporting and data collection requirements prescribed in 40 CFR 58.15 and 58.16, and will satisfy applicable criteria in 40 CFR 58 Appendices A, C, and E.

The data provided by the new monitoring station will allow for an accurate characterization of air quality nearest the source of SO_2 without ambiguity. Currently, the ambient air surrounding the facility is not monitored and not otherwise characterized by reliable modeling data. At this time, it cannot be determined if the ambient air surrounding DHPS is meeting or not meeting the 2010 SO_2 NAAQS. LDEQ recommends that US EPA initially promulgate the area in De Soto Parish as *unclassifiable* and use the data collected with the aforementioned monitor later in the redesignation process. This would allow US EPA to make a final determination regarding the area's attainment of the 2010 SO_2 NAAQS using quality assured monitoring data.

Ambient SO_2 is a pollutant that arises from direct emissions, and concentrations are generally expected to be highest relatively close to the source. Since it is appropriate to evaluate each potential area on a case-by-case basis, LDEQ further recommends that only a portion of De Soto Parish be designated as *unclassifiable*. As shown above, DHPS accounts for 90% of the SO_2 emitted in the parish. Additionally, the worst case modeling provided by CLECO supports LDEQ's assertion that the facility has minimal impact at greater distances. Given this unique situation, the unclassifiable area should be limited to the southeast quadrant of the parish bounded by United States Highway 84 on the north, United States Highway 171 on the west, and the parish boundary on the east and south, *see figure 3*. Should EPA prefer to designate the entirety of the parish by July 2, 2016, LDEQ recommends that the remainder also be designated as *unclassifiable*, as it contains no sources with actual 2014 SO_2 emissions in excess of 2000 TPY.

Figure 3: De Soto Parish Recommended Unclassifiable Area



[1] United States Census Bureau: "De Soto Parish QuickFacts from the US Census Bureau." September 2015

[2] 2014 Emissions Reporting & Inventory Center, Louisiana Department of Environmental Quality, Office of Environmental Services, Emission Inventory Group. Released July 6, 2015. Downloaded September 1, 2015.

Appendix A:

Dolet Hills Power Station – Siting for Source-Specific SO_2 Ambient Monitoring

Cleco Corporation
2030 Donahue Ferry Rd
P. O. Box 5000
Pineville, LA 71361-5000

August 19, 2015

Mr. Guy R. Donaldson
U.S. Environmental Protection Agency – Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Dolet Hills Power Station – Siting for Source-Specific SO2 Ambient Monitoring

Dear Mr. Donaldson:

In a consent decree signed by the U.S. Environmental Protection Agency (EPA) in the U.S. District Court for the Northern District of California on March 2, 2015, the EPA is required to complete area designations for the SO2 NAAQS using available information within 16 months of the date of the consent decree. The Dolet Hills Power Station in Desoto Parish, Louisiana, which is owned by Cleco, was identified as one of the sources of SO2 emissions affected by the consent decree.

On July 8, 2015, Cleco representatives met with LDEQ and EPA Region 6 officials to discuss Cleco's plans to install and operate an acceptable SO2 ambient monitoring system to characterize the quality of the ambient air in the Dolet Hills facility area. At our meeting, Cleco agreed to submit a formal proposal for siting the monitor to the EPA and LDEQ.

The attached document describes the selection methodology and basis for the proposed ambient monitoring location based on published EPA guidelines along with the location of the selected site. By this submittal, Cleco requests written approval from EPA Region 6 and the written concurrence of the LDEQ on the selected location of the monitoring site and the described monitoring data processing methodology so that monitored data can be certified and used in the area designation process. Due to the accelerated timelines set forth in the above-referenced consent decree, Cleco requests the prompt review of this submittal.

If there are any questions, please contact me at 318 484-7718 or Cleco's consultant, Mr. Arijit Pakrasi of CB&I at 281 531-3106.

Respectfully submitted,

Bill Matthews
Director - Environmental Policy and Planning

cc: Ms. Vivian Aucoin- LDEQ Office of Environmental Services
Mr. Arijit Pakrasi – CB&I

Siting for Source-Specific SO_2 Ambient Monitoring for Dolet Hills Power Station

CLECO Corporation
Pineville, Louisiana

Submitted to:
CLECO Corporation
Pineville, LA

Prepared by:
CLECO Corporation
2500 City West Boulevard, Suite 1700
Houston, Texas 77042

CB&I Project No 154165
August 19, 2015

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List of Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
AQS	Air Quality System
BPIP	Building Profile Input Program
CEMs	continuous emission monitoring system
CLECO	CLECO Corporation
DHPS	Dolet Hills Power Station
ft	feet
km	kilometers
LDEQ	Louisiana Department of Environmental Quality
m	meters
MMBTu/hr	Million British Thermal Units per Hour
NAAQS	National Ambient Air Quality Standard
NDV	normalized design value
R6	Region 6
SO_2	sulfur dioxide
TAD	Technical Assistance Document
USEPA	U.S. Environmental Protection Agency

1.0 Background

The U.S. Environmental Protection Agency (USEPA) issued the final primary National Ambient Air Quality Standard (NAAQS) for 1-hour sulfur dioxide (SO_2) on June 2, 2010 (2010 SO_2 standard). On August 5, 2013, the USEPA published a notice announcing designation of nonattainment for the 2010 SO_2 standards, based on certified ambient air quality monitoring data for the years 2009-2011 that showed these areas exceeding the standard. For all other areas, the USEPA developed and proposed a Data Requirement Rule that would require states to gather and submit additional information characterizing SO_2 in areas with larger SO_2 emissions. The information will be used by the USEPA for future area designations.

Separately, in a consent decree signed with the Sierra Club in the District Court in Northern California on March 2, 2015, the USEPA is required to complete area designations with available monitoring data within 16 months of date of the consent decree. Also, for areas without adequate monitoring data, the area designations are to be completed in two phases by December 31, 2020.

The current schedule on area designation for consent decree affected sources requires the States to submit updated recommendations and supporting information to the USEPA by September 18, 2015. The USEPA will notify the States with any intended modifications no later than January 2, 2016 (120-day letter). The States can submit additional information to the USEPA by April 8, 2016.

The Dolet Hills Power Station (DHPS) in Desoto Parish, Louisiana, owned by CLECO Corporation (CLECO) has been identified as one of the large sources of SO_2 emissions affected by the consent decree. In addition, the DHPS is the largest SO_2 emissions source in Desoto Parish, and consequently, its impact in the vicinity may decide the area designation under the 2010 SO_2 standard.

CLECO plans to gather ambient monitoring data for SO_2 in the vicinity of the DHPS to provide supporting information to both the Louisiana Department of Environmental Quality (LDEQ) and the USEPA Region 6 (USEPA R6) in the area designation process for 1-hour SO_2 NAAQS. Due to the schedule of the designation process described earlier, CLECO plans to start monitoring as soon as possible. The monitoring will be conducted and the monitoring data will be processed following the USEPA ambient monitoring guidelines for SO_2.

This document describes the methodology of selection of the monitoring site in conformance with the USEPA guidelines and the location of the selected site. CLECO requests approval from LDEQ and USEPA R6 on the selected location of the monitoring and the monitoring data processing methodology described in this document so that the monitored data could be certified and used in the area designation process.

Installation of a permanent monitor may require resolution of several logistical issues such as access to power, security, and leasing of the location, all of which could take some time. Due to the urgency of gathering monitoring data to meet the deadlines for submittal to the agencies, CLECO is planning to use a two-phase strategy as follows:

- Phase 1(Short-term) Monitoring: CLECO will start monitoring as soon as possible with a temporary trailer-mounted monitoring station for 3 to 4 months (expected August 2015 through November 2015), while all logistical issues are resolved regarding the location of a longer term monitoring site.

- Phase 2 (Long-term) Monitoring: Start monitoring at the longer term monitoring site after 3 to 4 months and close down the temporary monitoring site.

1.1 SO_2 Emission Sources in DHPS

Unit 1 at the DHPS is a 7,600 million British Thermal Units per hour (MMBTu/hr) coal-fired boiler and the only continuous SO_2 emission source in the facility. The emissions are vented to the atmosphere via the Unit 1 stack (EQT 02). The facility also operates a diesel-fired emergency generator and a diesel-fired fire pump, which run intermittently.

Table 1-1 shows details of the Unit 1 boiler as in the current Title V air permit. **Figure 1-1** shows the layout of the site with the location of the Unit 1 stack.

Table 1-1: Details of SO_2 Emission Source in DHPS – Unit 1

Source Name	Source ID	UTM Easting (X) (m)	UTM Northing (Y) (m)	Stack Height (ft)	Stack Diameter (ft)
1-78 Unit 1 Boiler	EQT 02	446284.1	3544210.3	525	25

Reference: Title V operating permit issued September 20, 2013

1.2 Description of Surrounding Area

Figure 1-2 shows a Google Earth view of the area surrounding the facility, which is primarily rural in nature and heavily wooded on all sides. The nearest city is Mansfield, Louisiana, approximately 12 kilometers (km) to the west of the facility. There are no major roads near the facility.

CLECO owns a large tract of land surrounding the facility shown as shaded green areas in **Figure 1-2**. Most of these areas are unfenced and have unrestricted access to the public. The Dolet Hills mine, in which CLECO has an ownership stake, also owns tracts of lands around the facility as shown in red lines in **Figure 1-2**. Again, most of these areas have no fences and are unrestricted to the public.

1.3 SO_2 Emission Sources in Desoto Parish

Unit 1 of the DHPS facility is the major SO_2 emission source in the Desosto Parish. **Figure 1-3** shows the locations of permitted SO_2 emission sources near the facility and most of these emission sources are small compared to Unit 1. The nearest large emission source for SO_2 is the International Paper—approximately 14 km north of the facility. **Table 1-2** shows the *actual* emissions of SO_2 from sources within Desoto Parish for last three calendar years. **Table 1-3** shows all other SO_2 emissions from sources adjacent to Desoto Parish within 20 km of the DHPS facility.

Table 1-2: SO_2 Emission Sources within Desoto Parish

Facilities Within Desoto Parish	2013		2012		2011	
	tons/yr	% of Total	tons/yr	% of Total	tons/yr	% of Total
CLECO Unit 1	14612	99.8%	20887	99.7%	20875	99.9%
Other CLECO Sources	0.03	0.0002%	0.03	0.0001%	0.03	0.0001%
Other Off-site Sources	36	0.2%	58	0.3%	20	0.1%
Total in Desoto Parish	**14648**	**100.0%**	**20945**	**100.0%**	**20895**	**100.0%**

Table 1-3: SO_2 Emission Sources Adjacent to Desoto Parish within 20 Km from DHPS

Facilities Within Desoto Parish	2013		2012		2011	
	tons/yr	% of Total	tons/yr	% of Total	tons/yr	% of Total
CLECO Unit 1	14612	91.7%	20887	92.8%	20875	92.3%
International Paper (Outside Desoto Parish)	1296	8.1%	1569	7.0%	1722	7.6%
Other Off-site Sources (Outside Desoto Parish)	34	0.2%	51	0.2%	14	0.1%
Total	**14648**	**100.0%**	**20945**	**100.0%**	**20895**	**100.0%**

The data show that Unit 1 is the major source impacting the SO_2 ambient concentration in Desoto Parish and a source-oriented monitoring of the DHPS facility (primarily Unit 1) will provide a representative ambient air quality data for SO_2 in this parish, which could be used for the area designation process for the 1-hour SO_2 NAAQS.

2.0 Monitor Siting Methodology

The USEPA has published a Technical Assistance Document (2013 Monitoring TAD) for selection of monitoring sites for SO_2 designation (SO_2 NAAQS Designation Source Oriented Modeling Technical Assistance Document – Draft dated December 2013). The TAD (Appendix A) provides an example of modeling used for selection of monitor placement using normalized emissions. This methodology was used in the selection of the monitoring site for the DHPS monitoring. The methodology is described below.

2.1 Step-Wise Procedure for Monitoring Site Selection

The USEPA acknowledged in the TAD that modeling is a powerful tool that could be used for selection of siting for monitor(s) provided the modeling is conducted with current USEPA procedures. The goal of the modeling will be to select candidates of monitoring sites based on ”likely” areas of “high” concentrations from the operation of the source based on at least three years of historical meteorological data. Once a set of priority locations are identified, logistical issues such as security, access to power, and data access are considered to finalize the monitoring location(s).

One important aspect of the modeling for monitoring site selection is that normalized emissions rather than actual emissions are used. The use of normalized emissions can be used when modeling to inform monitor siting decisions because the goal of the modeling is not to determine the attainment status of an area, but to identify the location or locations of ambient SO_2 concentration maxima. The normalization of the emissions preserves the relative magnitude of emissions forecast at each receptor by the model and the spatial distribution of modeled normalized design values (NDV). To normalize the emissions, the actual hourly emissions are divided by a reference emission rate, which can be the overall highest emission rate or any alternative reference emission rate. This normalized emission is then input to the model using hourly stack parameters to calculate the NDV at the receptors.

The USEPA has provided a scoring strategy to prioritize the monitoring sites amongst all receptors based on NDV concentration and frequency of having the 1-hour daily maximum concentration. This scoring strategy follows a step-wise procedure as follows:

1. Calculate the NDV at each receptor and rank from highest to lowest receptor. Rank of 1 means the highest design value.

2. Using the MAXDAILY output option in AERMOD, determine each day’s highest normalized concentration and receptor. The MAXDAILY option in AERMOD outputs each receptor’s highest concentration for each modeled day.

3. Using the output from step 2, determine the number of days each receptor is the highest concentration for the day among all receptors.

4. Rank the results from step 3 from highest to lowest number of days. Rank of 1 means the highest number of days having the daily maximum value.

5. For each receptor, add the concentration rank and the day rank. The lowest possible score is 2, meaning the receptor was the highest overall normalized design value and also had the highest number of days where the receptor was the highest concentration for the day.

This strategy provides a list of receptor locations, ranked in general order of desirability with regard to potentially siting permanent source-oriented SO_2 monitors. This scoring strategy was used in the site selection for the DHPS monitoring.

2.2 Modeling Domain and Receptor Network

As described in the 2013 Monitoring TAD, a Cartesian receptor grid extending to 20 km from the DHPS was used in the modeling. The spacing of the receptor grid followed LDEQ guidance and was as follows:

- Along property line – receptors spaced 100 meters (m) apart
- From property line to 2 km – receptors spaced 100 m apart
- From 2 km to 10 km – receptors spaced 250 m apart
- From 10 km to 20 km – receptors spaced 500 m apart

Figure 2-1 shows the receptor grid around the facility.

2.3 Air Quality Model

The latest version of the USEPA's AERMOD model (version 14134) was used for the analysis using all regulatory default parameters.

2.4 Meteorological Data

It is not feasible to find the exact location of the highest NDV and frequency receptor in future years from historical meteorological and stack data. However, the use of five years of data is expected to exclude the outliers and provide a reasonable estimate of the "most likely" location of the high impacts from the source(s) being monitored, which will be representative of the background air quality in the region.

The latest five years of surface and upper air hourly meteorological data (2010-2014) from the nearest national weather station at Shreveport, Louisiana, was used in the modeling. This weather station is approved by LDEQ for air impact modeling of sources in Desoto Parish. For the Phase 1 (short-term) monitoring, the analysis was completed with the meteorological data between August and November for calendar years 2010-2014.

Figure 2-2 and **Figure 2-3** show the five-year wind rose for the time period for Phase 1 short-term (August to November) and Phase 2 long-term (all months) monitoring. Both the wind roses show prevailing wind directions from south-southeast and from north-northwest.

2.5 Stack Parameters and Emission Rates

As mentioned earlier, hourly values of normalized emission rate were used in the model using the HOUREMIS keyword in the AERMOD model. In addition, *actual* hourly stack gas flow rate and stack gas temperatures were used concurrent with the hourly emissions to develop a realistic distribution of the normalized impacts.

Hourly normalized emissions of SO_2 were obtained by obtaining the hourly emission data from the continuous emission monitoring system (CEMs) as reported by the facility to USEPA under the Acid Rain Program and dividing each hour of data by the maximum hourly rate over the entire span of calendar years 2010-2014. The hourly stack gas flow rate and temperature data were also obtained from the CEMs data at the facility; however,

these were not normalized and actual hourly values were used. **Appendix 1** shows the raw data from the CEMs and the data processing to convert the units suitable for input to AERMOD model. These hourly data were used in the AERMOD via an external file using the HOUREMIS keyword.

2.6 Building Downwash

Building downwash was considered in the modeling to obtain a realistic normalized impact. The major building/structure causing downwash to the Unit 1 stack is the boiler building. All other buildings and structures were insignificant for aerodynamic downwash; however, they were included in the analysis using the USEPA's Building Profile Input Program (BPIP). The input/output from the BPIP is included in **Appendix 2**.

3.0 Results

3.1 Normalized Emission Rate Modeling

The NDVs were calculated as the 5-year average of the 98th percentile of normalized concentrations at each receptor. The top 200 NDV receptors were considered for frequency analysis. The frequency of occurrence of the maximum daily impact at each of these top 200 receptors were calculated based on modeling with AERMOD using the MAXDAILY keyword and counting the number of days of maximum daily impact at each of the receptors. All the top 200 receptors from NDV modeling were then ranked by frequency of maximum daily 1-hour impact. The overall rank was calculated by adding the NDV rank and frequency rank and reranking the sum. The processing of the top 200 receptors for ranking is shown in spreadsheets included in **Appendix 2**.

Table 3-1 and **Table 3-2** show the top ten receptors ranked per the USEPA procedure for the short-term (August to November meteorological data) and long-term (all months) for the calendar years 2010-2014. The model input and output files are in **Appendix 2.**

Table 3-1: Priority Ranking for 1-hour SO_2 Monitoring Site – Short Term (August to November)

Easting (m)	Northing (m)	NDV Concentration (µg/m^3)	No. of Days Max Occurred	% Max Day Occurred	Rank by NDV Concentration (RNDV)	Rank By Frequency of Occurrence (RF)	Score 1 (RNDV + RF)	Final Rank by Score 1
447007.45	3542933.34	0.11186	10	1.9%	3	15	18	1
447007.18	3543033.86	0.10594	14	2.6%	11	11	22	2
443490	3545050	0.11221	1	0.2%	1	24	25	3A
447007.73	3542832.83	0.11194	2	0.4%	2	23	25	3B
447008	3542732.32	0.10932	5	0.9%	6	20	26	4
443690	3544850	0.11147	1	0.2%	4	24	28	5
443890	3544950	0.11051	1	0.2%	5	24	29	6
443890	3545050	0.10913	1	0.2%	7	24	31	7
443690	3545150	0.10813	1	0.2%	8	24	32	8
447090	3542850	0.10747	1	0.2%	9	24	33	9
447190	3542650	0.10663	1	0.2%	10	24	34	10A
447290	3542450	0.10579	3	0.6%	12	22	34	10B

Note: The NDV is based on 5-yr average of 98th percentile concentration using normalized hourly emissions and hourly actual stack gas flow rate and temperature. The meteorological data for all 5 years were limited to the months of August, September, October, and November, which is the expected duration of Phase 1 (short-term) monitoring.

Table 3-2: Priority Ranking for 1-Hour SO_2 Monitoring Site – Long Term (All Months)

UTM E	UTM N	NDV Concentration ($\mu g/m^3$)	No. of Days Max Occurred	% Max Day Occurred	Rank by NDV Concentration (RNDV)	Rank By Frequency of Occurrence (RF)	Score 1 (RNDV + RF)	Rank by Score 1
443590	3544250	0.15936	10	0.7%	1	25	26	1
447190	3542150	0.15596	8	0.6%	2	26	28	2
447008.55	3542531.29	0.14859	29	2.1%	19	12	31	3
447150.79	3542214.23	0.15508	3	0.2%	3	31	34	4
447173.39	3542292.07	0.1524	1	0.1%	4	33	37	5
447173.46	3542392.58	0.15092	2	0.1%	6	32	38	6B
447190	3542050	0.15228	1	0.1%	5	33	38	6A
442990	3544450	0.14984	5	0.4%	11	29	40	7B
443240	3544200	0.15043	1	0.1%	7	33	40	7A
443890	3544150	0.15021	2	0.1%	9	32	41	8B
447053.04	3542474.58	0.15032	1	0.1%	8	33	41	8A
447008	3542732.32	0.14503	30	2.1%	31	11	42	9B
447050.28	3542214.8	0.14711	21	1.5%	24	18	42	9A
447190	3542350	0.15003	1	0.1%	10	33	43	10

Note: The NDV is based on 5-yr average of 98th percentile concentration using normalized hourly emissions and hourly actual stack gas flow rate and temperature. The meteorological data for all 5 years were limited to all months of the calendar years, which is the expected duration of Phase 2 (long-term) monitoring.

Figure 3-1 and **Figure 3-2** show the location of the top ten ranked receptors for the short-term and long-term monitoring. In both cases, the top ten receptors are clustered primarily along the southeast corner of the facility and secondarily on the west of the facility, approximately 2 km from the Unit 1 stack.

Table 3-3 and **Table 3-4** show the comparison of the frequency of the highest daily impacts in the southeast and west areas of the facility. Clearly, the highest impacts are "more likely" to occur within the cluster of receptors in the southeast of the facility, both for short-term and long-term monitoring.

Table 3-3: Frequency Distribution of Highest Daily 1-Hour Impact for August-November, CY 2010-2014

Receptor Cluster Location*	Receptor Ranking	Frequency of Daily Maximum
Southeast	1	1.9%
	2	2.6%
	3B	0.4%
	4	0.9%
	9	0.2%
	10A	0.2%
	10B	0.6%
Total Southeast		**6.6%**
West	3A	0.2%
	5	0.2%
	6	0.2%
	7	0.2%
	8	0.2%
Total West		**1.0%**

** Location is with respect to the facility*

Table 3-4: Frequency Distribution of Highest Daily 1-Hour Impact for CY 2010-2014

Receptor Cluster Location*	Receptor Ranking	Frequency of Daily Maximum
Southeast	2	0.6%
	3	2.1%
	4	0.2%
	5	0.1%
	6A	0.1%
	6B	0.1%
	9A	1.5%
	9B	2.1%
	10	0.1%
Total Southeast		**6.9%**
West	1	0.7%
	7A	0.1%
	7B	0.4%
	8B	0.1%
Total West		**1.3%**

**Location is with respect to the facility*

3.2 Proposed Location of Monitor

CLECO plans to utilize a single monitor to characterize the ambient air quality for 1-hour SO_2 around the DHPS facility because of the proximity of the top ten ranked receptors to the facility. All of the top ten ranked receptors have unrestricted access for the public, and therefore, represent ambient air quality. Logistical issues and siting criteria are considered to make a decision on the siting of the monitor as described below.

From the modeling of daily maximum 1-hour concentration and as shown in **Tables 3-3** and **3-4**, there is greater likelihood of occurrence of the daily maximum values in the southeast area of the facility than the west of the facility, both during Phase 1 (short-term) and Phase 2 (long-term) monitoring. The southeast receptors are located closer to the facility property which will ensure better security of the monitoring station. The southeast location has better access from the facility and electrical power lines, which will be important for installation and servicing of the monitoring station. For these reasons, CLECO plans to locate the monitoring station in the southeast of the facility at or near the receptors which ranked within the top ten from the normalized emission rate modeling using the USEPA methodology.

As shown in **Figure 3-1** and **Figure 3-2**, all of the potential top ten monitoring locations in the southeast are surrounded by trees. 40 CFR 58 Appendix E (Probe and Monitoring Path Criteria for Ambient Air Quality Monitoring dated 3/18/2015) Section 5 specifies the spacing requirements from trees. Trees can provide surfaces for SO_2 adsorption or reactions. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where the trees are of a sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path. To reduce this possible interference/ obstruction, 40 CFR 58 Appendix E specifies that the probe, inlet, or at least 90 percent of the monitoring path must be at least 10 m or further from the drip line of trees.

To meet these siting criteria, CLECO proposes to site the monitor at the location shown in **Figure 3-3.** A close-up view of the location is shown in **Figure 3-4**. This location is within the cluster of locations within top ten ranked locations from the modeling with normalized emissions. The location is near the CLECO property and therefore can be readily accessed by CLECO personnel for servicing but also avoids the gas pipelines in the area to avoid safety issues. This location also meets the definition of “ambient air’ due to unrestricted public access. The trees around this area will be cut by CLECO to meet the siting criteria for SO_2 monitoring per 40 CFR 58.

The proposed monitoring location is approximately 320 feet northeast of the model ranked Receptor No. 3 for long-term monitoring (see **Figure 3-2**) and closer to the facility as shown in **Figure 3-5**. The proposed location is within 400 feet south of the receptor ranked 4 for short-term monitoring analysis **(Figure 3-1)**. The Unit 1 stack is approximately 5,500 feet from model ranked Receptor No. 3, so the shift in location from the receptors is less than 6 percent of the distance to the Unit 1 stack. Moreover, the proposed monitoring location is aligned in the same wind direction and is closer to the facility, and therefore, is expected to have similar impacts as the model ranked Receptor No. 3 and near the cluster of top ten receptors from the modeling analysis.

4.0 Monitoring Installation and Data Processing

For continuous monitoring of the 1-hour concentrations, CLECO is proposing a sampling system, analyzer, instrument rack, and a data logger to comply with the regulatory requirements. As mentioned in Section 1.0, CLECO plans to start monitoring immediately (Phase 1) with a temporary monitoring station, while preparing the site for long-term monitoring (Phase 2). For Phase 1 (short-term) monitoring during the initial August-November 2015 period, CLECO is proposing to use a trailer-mounted system for speedy deployment. The trailer will contain all required analyzer, data logger, and associated systems and will be located at the proposed location shown in **Figure 3-5**. The permanent monitor for long-term monitoring will be also located in this area. Electric power will be provided to the monitoring station from nearby electric lines.

4.1 Description of Monitoring System

Figure 4-1 shows a typical diagram of the monitoring station. The monitoring components consist of an analyzer (Teledyne - API or Thermo) for monitoring SO_2 in ambient air as well as a multi-gas calibrator (e.g., API T1700 model) that generates calibration gas for the monitoring system. The analyzer will use U-V fluorescence methodology, which is the automated federal equivalent method for monitoring of SO_2.

The data acquisition for this project consists of one data logger and a cellular modem to allow daily system monitoring via a remote location. The data logger will manage calibrations, alarms, analog and digital inputs/outputs, data processing, and short-term data storage (approximately 30 days) of all measured parameters in case of a communication failure. All data will be provided in the USEPA's Air Quality System (AQS) format.

The analyzer, calibrator, and data logger will be installed in an environmentally controlled National Electrical Manufacturer's Association (NEMA) 4-rated 19-inch instrument rack (enclosed in a trailer for the rental). This instrument rack is designed to be located near the DHPS in a location to be determined.

CLECO also proposes to install and operate an on-site meteorological monitoring station to measure local weather data which could be correlated with the ambient monitoring data. The meteorological tower will allow CLECO to analyze the SO_2 monitoring data for anomalies and outliers. CLECO proposes to use a standard, 10 m freestanding meteorological tower with lightning protection and grounding at a suitable location within the facility meeting the siting criteria for meteorological towers per 40 CFR 58 Appendix E.

The meteorological tower will monitor hourly values of wind speed, wind direction, atmospheric stability (via sigma Theta method or SRDT method) by calculation, temperature, barometric pressure, relative humidity, precipitation, and solar radiation.

4.2 Regulatory Compliance

The design, implementation, operation, quality assurance, and data reporting for the proposed Ambient Monitoring Station will meet or exceed the requirements included in the following regulations and guidance documents:

- USEPA, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume I – Principles," EPA-600/9-76-005, Office of Research and Development, Research Triangle Park, North Carolina, January 1976.

- USEPA, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II – Ambient Air Specific Methods," EPA-600/4-77-027a, Office of Research and Development, Research Triangle Park, North Carolina, May 1977.

- USEPA, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV – Meteorological Measurements," EPA-600/4-82-060, Office of Research and Development, Research Triangle Park, North Carolina, August 1989.

- USEPA, "Meteorological Monitoring Guidance for Regulatory Modeling Applications," EPA-454/R-99-005, Office of Air Quality Planning and Standards, Research Triangle Park, NC, February 2000.

- USEPA, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," EPA-600/4-83-004, Office of Research and Development, Research Triangle Park, North Carolina, February 1983.

- USEPA "SO_2 NAAQS Designations Source-Oriented Monitoring Technical Assistance Document (TAD)," EPA-450/4-87-007, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, December 2013, Draft.

- USEPA 40 CFR part 58 – "Ambient Air Quality Surveillance," Appendices A, C, and E.

- USEPA 40 CFR part 51 – "Data Requirements Rule for the 1-Hour SO_2 Primary National Ambient Air Quality Standards (NAAQS)," May 2014, Proposed Rule.

- USEPA Automated Equivalent Method: EQSA-0495-100 UV Fluorescence Detection of SO_2.

- LDEQ "Ambient Air Quality Standards," Chapter 7 of LAC 33:III

4.3 Data Processing and Reporting

Quality assurance of the data obtained from the monitoring system will be per the requirements 40 CFR 58 Appendix A. A Quality Management Plan and Quality Assurance Project Plan will be developed for the project prior to the data collection. Visual checks on the monitoring system will be conducted once a week to assure that the monitors have not been damaged. Preventive monitoring tests will be conducted each quarter and system audits and calibrations will be conducted as needed.

The system functionality will be checked remotely on a daily basis on all weekdays and the data will be downloaded once each week for processing. The data processing will follow the procedures detailed in 40 CFR 50 Appendix T (Interpretation of Primary National Ambient Air Quality Standard for Sulfur Oxides dated 4/6/2015). The data with all quality assurance procedures will be submitted to LDEQ for certification and upload to the USEPA's AQS.

Figures

Figure 1-1: Dolet Hills Power Station

Figure 1-2: Dolet Hills Lignite Mine Area Close-up

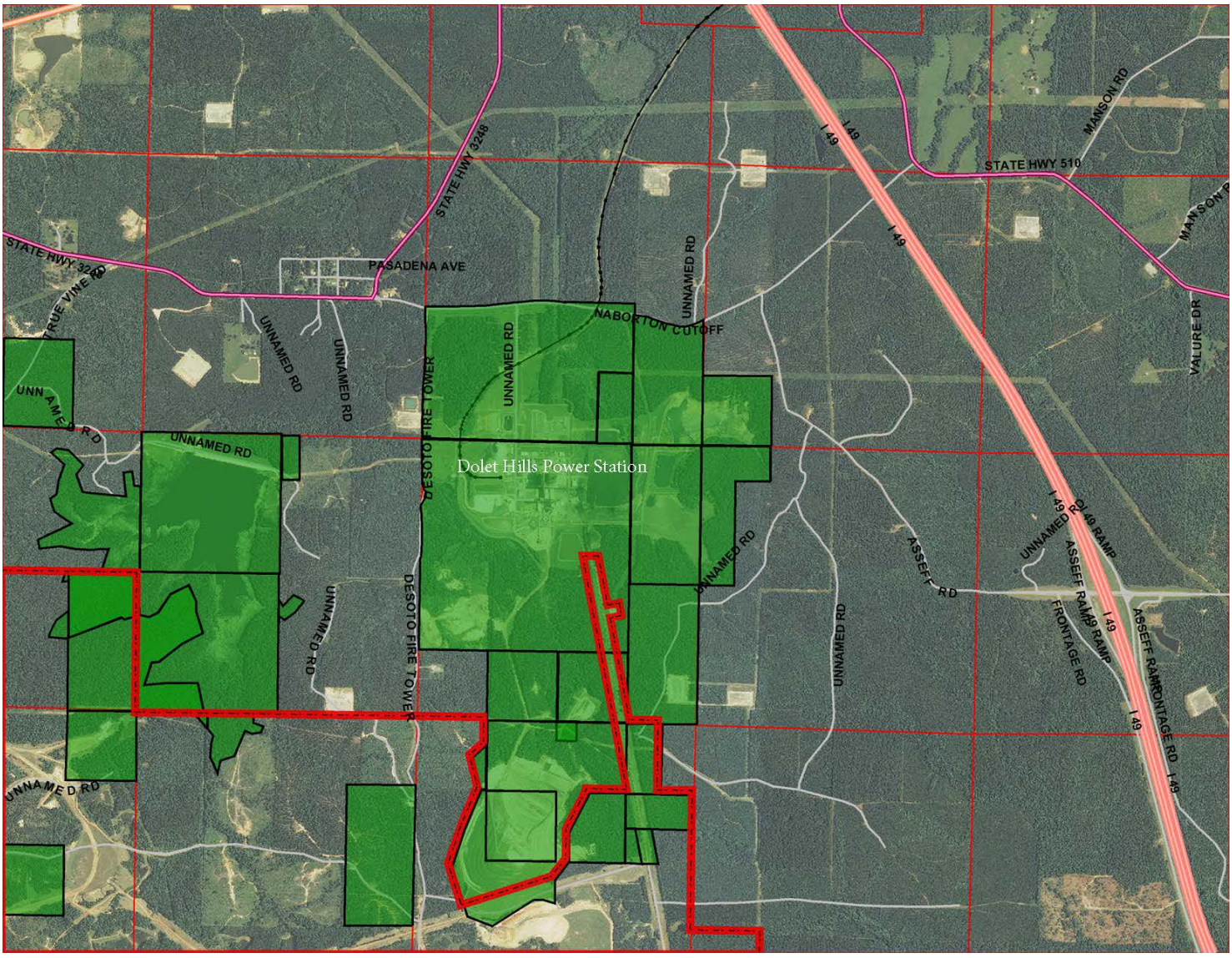

Figure 1-3: SO_2 Emission Sources in Desoto Parish – 2013 Data

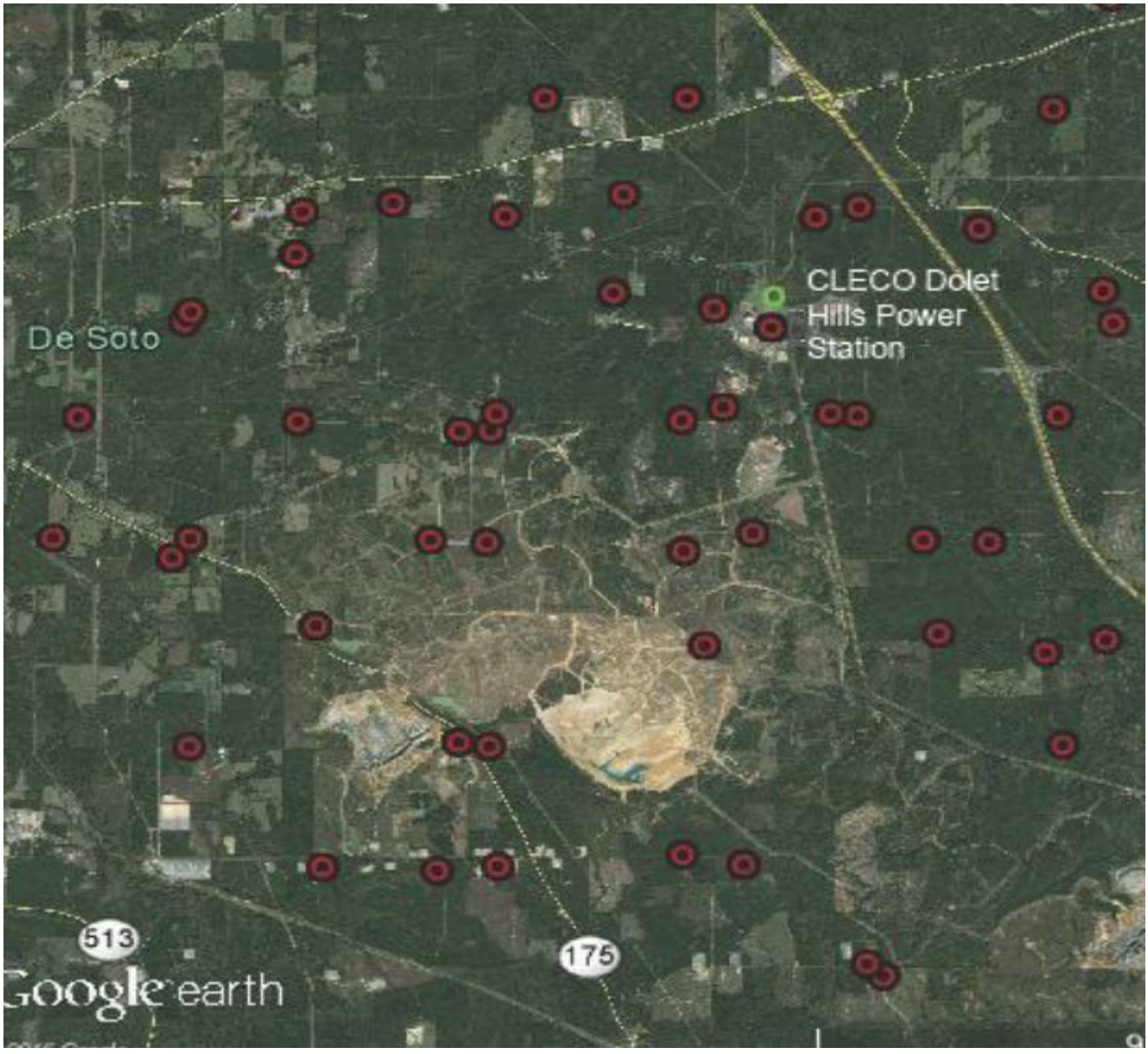

Figure 2-1: Receptor Network for Modeling for Monitor Siting Analysis

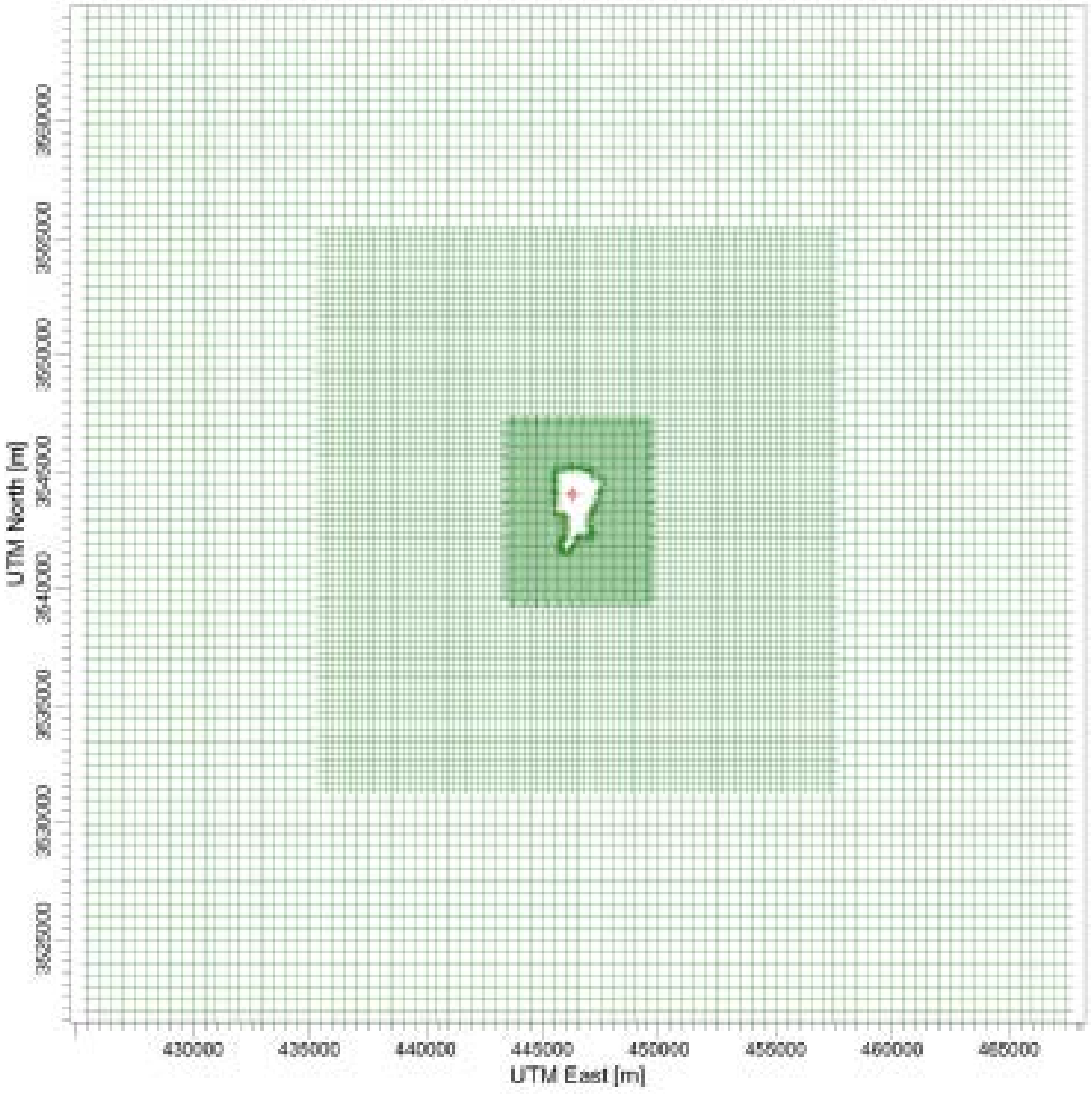

Figure 2-2: Wind Rose – August-November 2010-2014

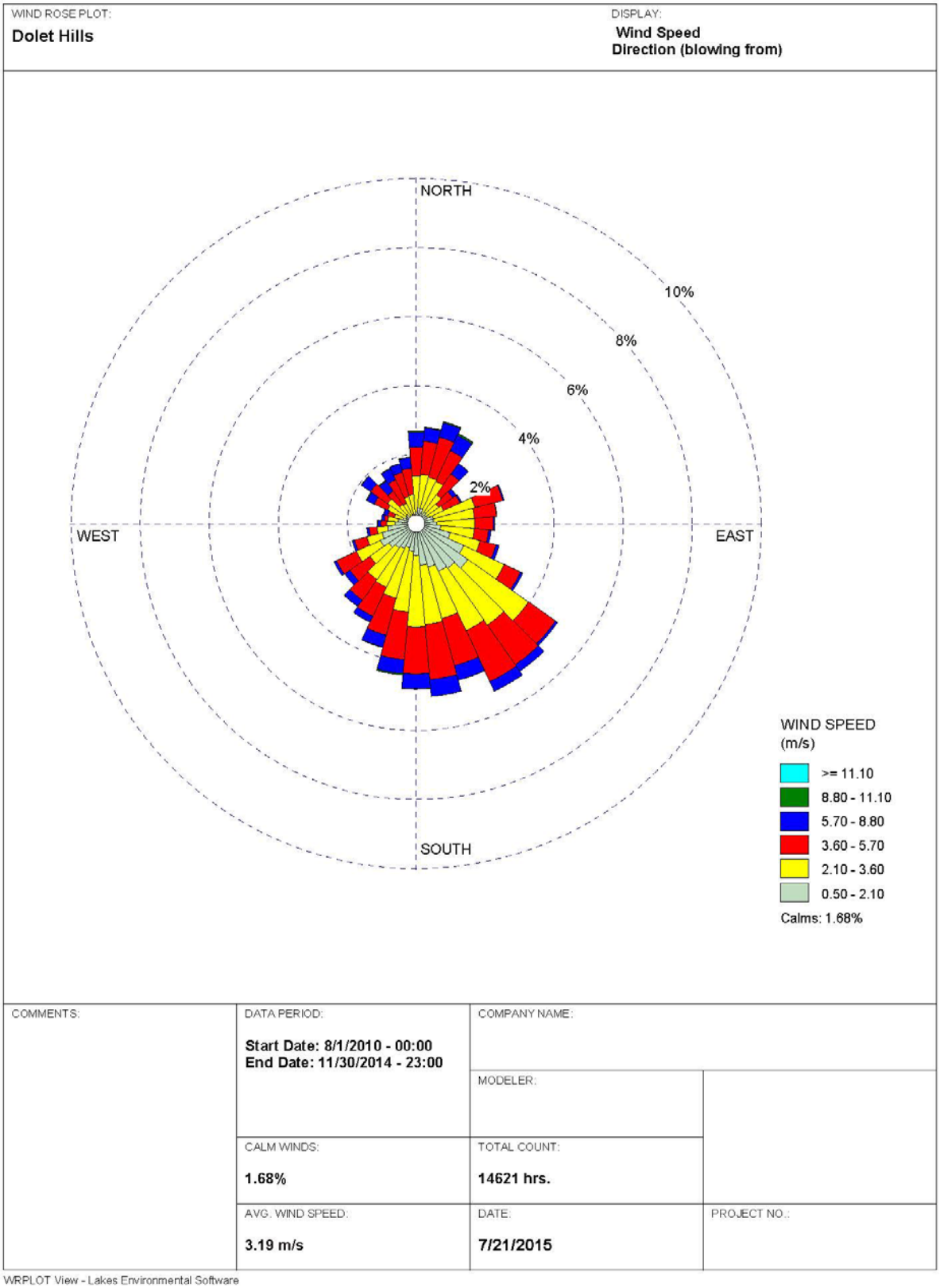

Figure 2-3: Wind Rose – 2010-2014 – All Months – Shreveport

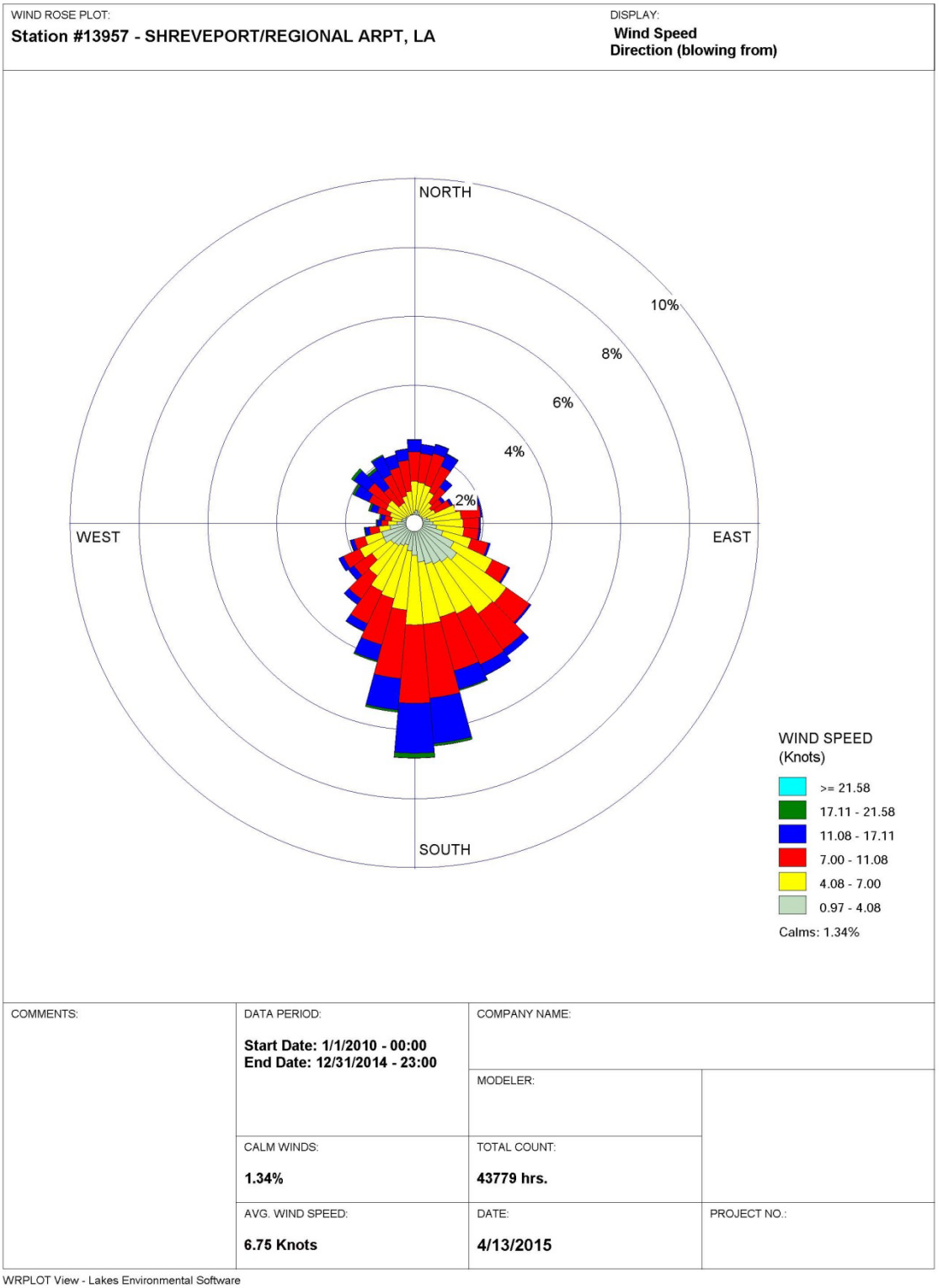

Figure 3-1: Dolet Power Station, Top 10 Receptors, August-November

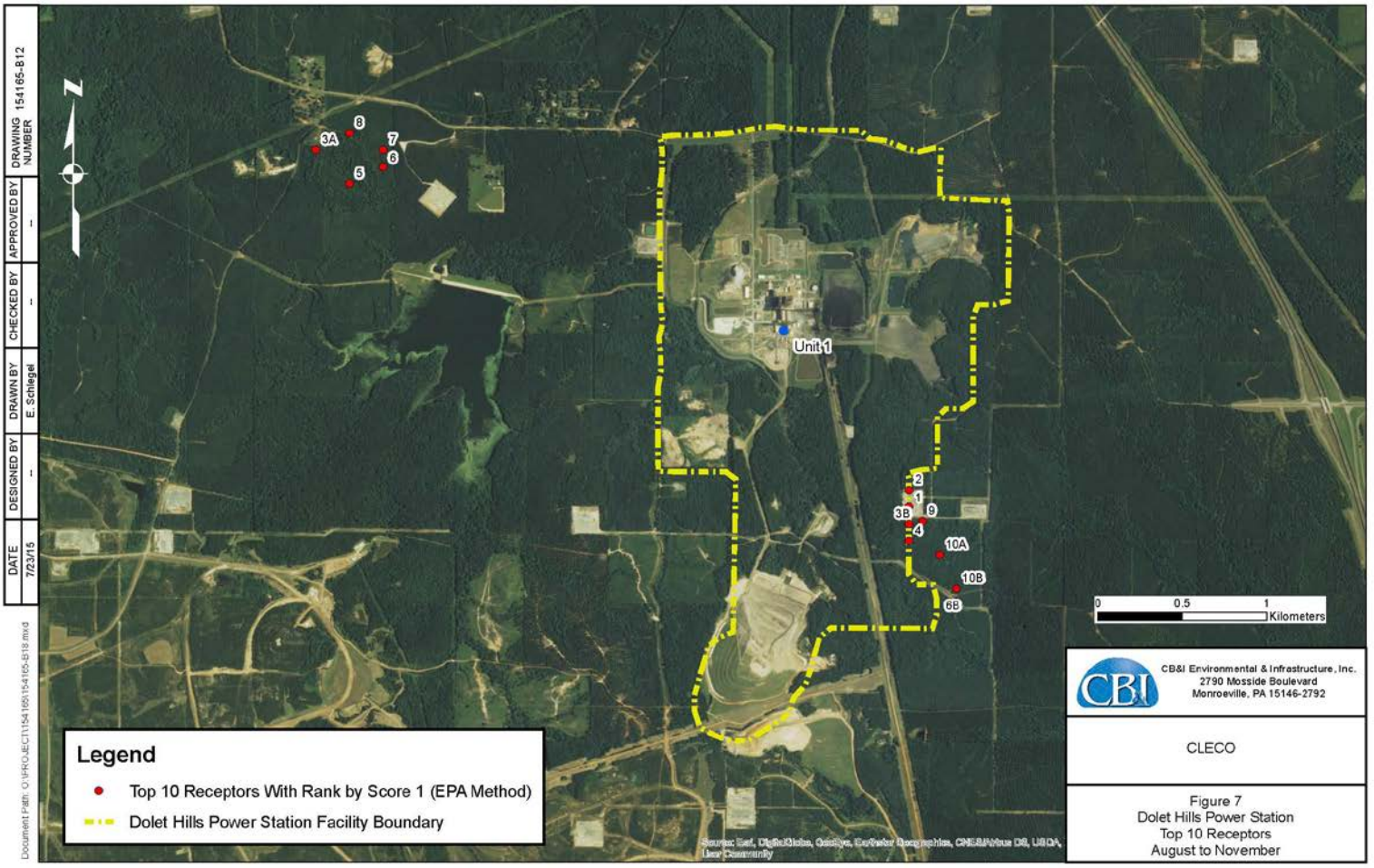

Figure 3-2: Dolet Hills Power Station – All Top Ten Receptors

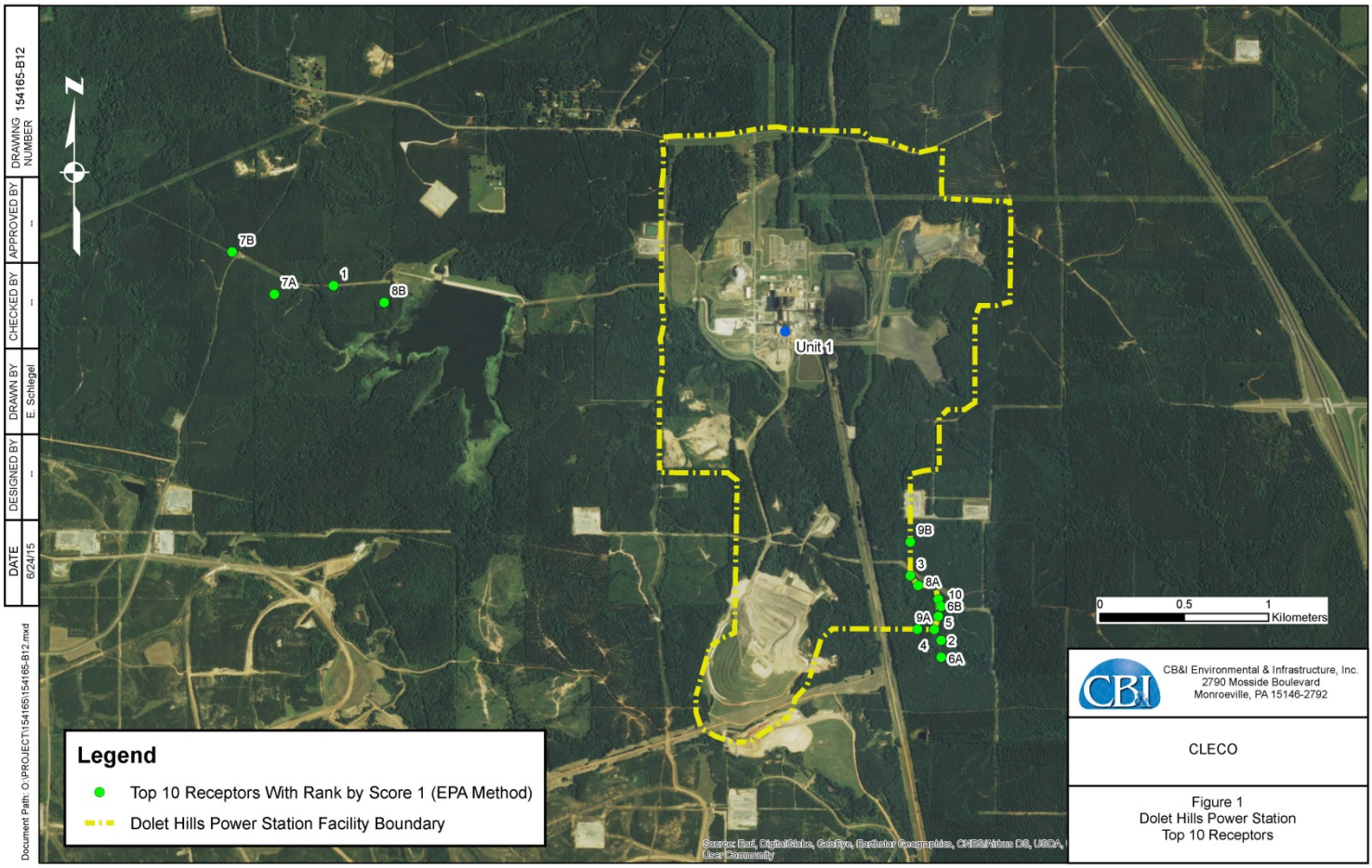

Figure 3-3: Location of Proposed SO_2 Monitor for Dolet Hills

Figure 3-4: Location of Proposed SO_2 Monitor for Dolet Hills – Close up 1

Note:

The proposed monitoring location is approximately 330 feet northeast of the receptor ranked 3 for long-term monitor siting analysis and 400 feet south of receptor no 4 for short-term monitor siting analysis.

Figure 3-5: Location of Proposed SO_2 Monitor for Dolet Hills – Close Up 2

Notes:
1: The proposed location is near CLECO property boundary and has unrestricted access to the public (i.e. no fences or restrictions existing or planned)
2: The trees around the monitor will be cut to meet the siting criteria of 40 CFR 58 Appendix E.

Figure 4-1 – Typical SO_2 Monitoring Station

Figure 4-2 – Typical SO_2 Monitoring Station Set-up

Appendix 1

Hourly Emission and Stack Parameters for Unit 1 Used in Modeling

(On USB Drive)

Appendix 2

Model Input/Output Files

(On USB Drive)

Appendix 3

LDEQ Monitoring Siting Form for SO_2 Monitor at DHPS

Appendix 3

LDEQ Site/Monitor Information Form

Site Name: Dolet Hills Power Station

Site Address: Mansfield, LA

City & County: Desoto Parish

Site Coordinates: Lat: 32 Deg 1 min 51.24 sec and Long: 93 Deg 34 min 8.88 sec (at Unit 1 Stack)

Site Elevation (m): 74

Criteria Pollutants Monitored: Sulfur Dioxide (SO2)

Other Parameters: Meteorological data such as wind speed, wind direction, ambient temperature, solar radiation, and relative humidity. The meteorological tower will be located within the facility.

Nearest Meteorological Site: Shreveport, LA
('onsite' is met tower present at this site)

Photographs to and from each cardinal direction attached?: No. The site is being cleared of trees. Photographs will be submitted after clearance. Google Earth maps included at this time.

Name(s) of Report Preparer(s) : Arijit Pakrasi, CB&I

Date: August 26, 2015

Phone Number: (281) 531-3106

Site Map

Provide map of site and surrounding terrain and features, up to 100 meters.

Map notes

The DHPS is shown at the center of the map

Monitor Information

	Pollutants
	SO_2
Manufacturer	API-Teledyne or Thermo Electron
Model	TBD
Serial number	TBD
Scale of representation MICro, MIDdle, Neighborhood, Urban	Source-oriented in a primarily rural area
Averging time 1-, 8-, 24-hour	1-hour
Objective (Population, Max concentration, Background, Transport)	Source Impact for providing supporting data for 1-hour SO2 area designation at the Desoto Parish
Height of probe above ground(m)	>4
Distance from obstruction (m)	15 m minimum in all directions
Type of obstruction (Wall, Tree, etc)	Trees
Distance from roadway (m)	Nearest roadway is at 185 m distance (between DHPS and Dolet Mines). This roadway is not open to public and there are approximately 15-20 vehicles on this road per day
Unrestricted airflow (Yes, No)	Yes. In all directions
Designation (NCore, SLAMS,etc)	SLAM equivalent
Siting Criteria Met (Yes, No)	Yes

Note: See report for more details on the monitor.

Area Information

Street Name	Traffic Count (Vehicles/day)
Unpaved road between DHPS and Dolet Mines – inaccessible to public –used by only the facility and mine personnel.	15-20

Direction	*Predominant Land Use (Industry, Residential, Commercial or Agriculture)*
North	Rural: Small trees surrounding the station and a small industrial activity approximately 300 m distance
East	Rural: Small trees surrounding the station
South	Rural: Combination of small and larger trees surrounding the station
West	Rural: Larger trees surrounding the station and a conveyor belt for coal and an unpaved roadway approximately 200 m distance

Direction	Obstructions	Height (m)	Distance (m)
North	Small trees	10	20
East	Small trees	10	25
South	Small trees	10	17
West	Larger trees	20	20

Note: This table is for large obstructions that affect the entire site, such as large clusters of trees or entire buildings. Individual obstructions, such as walls, single trees, other monitors, etc, should be entered in the Monitor Information table.

Direction	*Topographic Features* (hills, valleys, rivers, etc.)	*General Terrain* (flat, rolling, rough)
North	None within 10 km	Flat
East	None within 10 km	Flat
South	None within 10 km	Flat
West	None within 10 km	Flat

Comments: The figures below show the proposed location of the SO_2 monitoring station.

Proposed Location of SO_2 Monitor for Dolet Hills Power Station (DHPS)

Approximate Coordinates:
Lat: 32 degrees 01 minutes 0.5.66 seconds N
Long: 93 Degrees 33 minutes 41.97 seconds W

Area Surrounding the Proposed SO_2 Monitor for Dolet Hills Power Station