SMITH ALDRIDGE, INC.
Environmental Consultants

October 28, 2011

Peter Courtney
Georgia Environmental Protection Division
Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, Georgia 30354

RE: CARBO Ceramics, Inc. Greenfield Millen, Georgia Facility
Updates to Volume III of PSD Application #20615 dated August 15, 2011

Dear Mr. Courtney,

After submittal of the prevention of significant deterioration (PSD) permit application for the CARBO Ceramics Millen facility, there have been several minor changes to the design and arrangement of the plant. Specifically, the following list summarizes the changes that are no longer consistent with the modeling submitted with Volume III of the application:

- each of the four processing lines will be associated with five product storage silos, instead of four, for a total of 20 product storage silos;
- each product storage silo will have a height 109 ft., instead of 87.5 ft;
- the release height of the bin vent for each product storage silo will be 116 ft., instead of 95 ft.;
- the railcar loadout system buildings and stacks have been moved further east to accommodate the additional product storage silos;
- the base elevation for the product storage silos and railcar loadout systems and associated stacks will be 205 ft., instead of 225 ft.;
- the base elevation for all other project source stacks (i.e., spray dryers, direct-fired rotary kilns, pellet feed systems, kiln product systems, and boilers) will be 210 ft., instead of 215 ft.;
- the four natural gas-fired boilers have been collocated to a single building, instead of being installed in a separate building associated with each processing line; and
- a number of buildings have been relocated and/or reoriented;

Additionally, regardless of these changes, the 1-hour NO_2 NAAQS compliance assessment needs to be updated to reflect our October 7, 2011 response to EPA's letter providing conditional approval for the use of PVMRM. In this response, we modified the ozone database for non-ozone monitoring season months (November through February) by using the five-year average of the highest ozone observations, by month and hour-of-day, for the maximum of contemporaneous hourly observations from the Bledsoe CASTNET (EPA) and Aston (SC) monitoring sites.

After revising the BPIP input file to reflect the new UTM coordinates and elevations for the buildings and stacks affected by the above described changes, comparison of the new output file to file previously submitted with the PSD application shows that the direction-specific building downwash information for most stacks, including the spray dryers and direct-fired rotary kilns, were not influenced by the relocation or reorientation of some of the project

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buildings. Therefore, since the spray dryers and direct-fired rotary kilns are the project's most significant emission units, it is reasonable to conclude that the design concentrations for the NAAQS and PSD increments will not be materially affected by these changes. Despite this, in order to provide the agency with the most accurate information on which to base its permitting decisions, CARBO has remodeled all of the NAAQS and Class II PSD increments and updated the air quality analysis results discussion in Sections 2.5 and 2.6 of Volume III of the PSD application. Additionally, per your request, CARBO has also updated Figure 2.2.1-2 of Volume III of the PSD application to show, for the 1-hour SO_2 NAAQS, a "classed post plot" of receptors with concentrations above the significant impact level (SIL) of 7.85 $\mu g/m^3$, below the SIL but above the "buffer" of 7 $\mu g/m^3$, and below the buffer so that the significant array of receptors used for the NAAQS assessment is visually described.

The following briefly summarizes the changes to the modeled design concentrations submitted in the PSD application:

- the maximum modeled design concentrations for the 24-hour PM_{10} and $PM_{2.5}$ NAAQS decreased by 0.40 and 0.30 $\mu g/m^3$, respectively;
- the maximum modeled design concentrations for the annual $PM_{2.5}$ and NO_2 NAAQS both increased by 0.02 $\mu g/m^3$;
- the maximum modeled design concentrations for all SO_2 NAAQS increased slightly, but by no more than 0.32 $\mu g/m^3$ for any averaging period;
- CARBO's maximum significant contribution to any 1-hour NO_2 NAAQS exceedance decreased by 0.02 $\mu g/m^3$; and
- the maximum modeled design concentrations for each PSD increment followed the same general pattern as their respective NAAQS with the 24-hour PM_{10} increment results decreasing by 0.69 $\mu g/m^3$ and the remaining increments increasing slightly, but by no more than 0.18 $\mu g/m^3$ for any pollutant and averaging time

Enclosed with this letter you will find hardcopies of the updated Figure 2.2.1-2 and Sections 2.5 and 2.6 of Volume III of the PSD application. For the revised Sections 2.5 and 2.6, we have provided both clean and red-strike copies to facilitate your review. Additionally, we have included a compact disc (CD) that contains the revised BPIPPRM and AERMOD input and output files, new site diagram ("199ME1001-new.pdf"), and updated spreadsheet ("Emissions and Stack Parameters.v2.xls") which summarizes the project's emission units and source parameters. For AERMOD, we have provided the input (*.DTA), output (*.LST), plot (*.GRF), and summary (*.SUM) output files for each NAAQS and PSD increment remodeled.

If you have any questions or concerns, please do not hesitate to contact me by phone at (404) 255-0928 x112 or by e-mail at csmith@smithaldridge.com.

Best Regards,

Craig Smith, Ph.D
President

cc: Susan Jenkins – GA EPD
Stan Krivo – US EPA Region 4
Jason Goodwin – CARBO Ceramics, Inc.
Jon Bandzul – Smith Aldridge, Inc.
Wes Younger – Smith Aldridge, Inc.

enc: Revised Figure 2.2.1-2 of PSD Application #20615, Volume III
Revised Sections 2.5 and 2.6 of PSD Application #20615, Volume III (clean and red-strike copies)
CD with Revised BPRIPRM and AERMOD Input/Output Files

CARBO Ceramics, Inc. Millen Facility
PSD Application #20615
Volume III

Revised Figure 2.2.1-2 for 1-hour SO_2 Significant Impacts

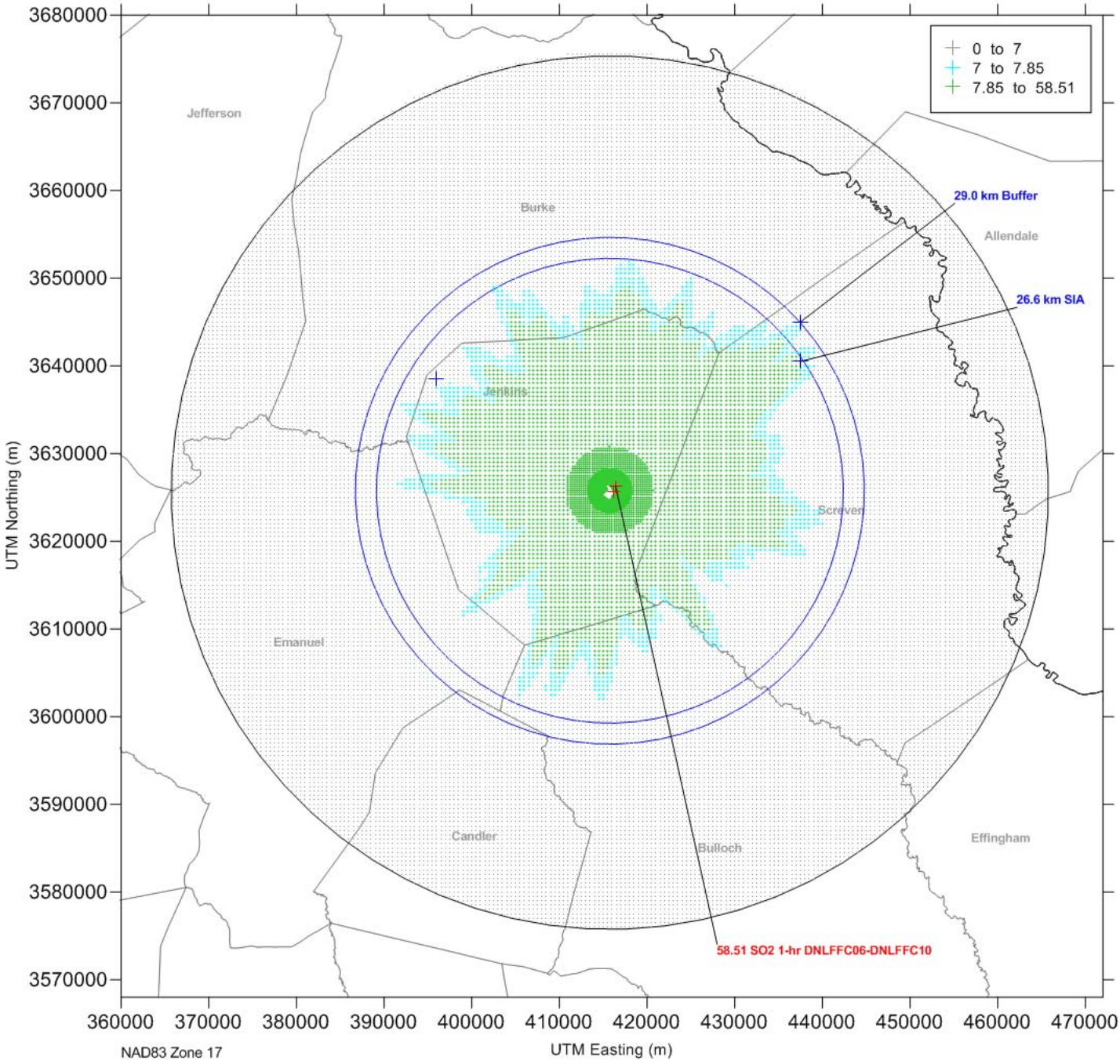

Figure 2.2.1-2: Maximum Significant Impacts for 1-hour SO_2, Contour Plot and Determination of Significant Impact Area

CARBO Ceramics, Inc. Millen Facility
PSD Application #20615
Volume III

Revised Sections 2.5 and 2.6 (red-strike)

2.5 NAAQS Air Quality Analysis

The primary NAAQS are the maximum concentration ceilings, measured in terms of total concentration of a pollutant in the atmosphere, which define the "levels of air quality which US EPA judges are necessary, with an adequate margin of safety, to protect the public health." The secondary NAAQS define the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The objective of a NAAQS analysis is to demonstrate through dispersion modeling that emissions from a proposed project, in conjunction with the background contribution from *nearby* and *other* sources, do not "cause or contribute" to a violation of the NAAQS at any ambient location. Table 2.5-1 lists the NAAQS for the pollutants modeled for the Millen facility.

Table 2.5-1: Primary and Secondary National Ambient Air Quality Standards

Pollutant	Averaging Period				
	1-hour ($\mu g/m^3$)	3-hour ($\mu g/m^3$)	8-hour ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	Annual ($\mu g/m^3$)
NO_2	188 [4]	--	--	--	100 [1]
SO_2	196 [4]	1,300 [3]	--	365 [2, 6]	80 [2, 6]
PM_{10}	--	--	--	150 [1]	Revoked 12/18/2006 71 FR 61144 [5]
$PM_{2.5}$	--	--	--	35 [1]	15 [1]

[1] For PM_{10} (24-hour), $PM_{2.5}$ (24-hour and annual), and NO_2 (annual), the secondary NAAQS are the same as the primary
[2] For SO_2 (24-hour and annual), there are no secondary NAAQS
[3] For SO_2 (3-hour), there is no primary NAAQS
[4] For NO_2 (1-hour) and SO_2 (1-hour), new primary NAAQS are final and secondary NAAQS are proposed
[5] For PM_{10} (annual), the NAAQS were revoked at the time the primary and secondary NAAQS for 24-hour $PM_{2.5}$ were reduced
[6] For SO_2 (24-hour and annual), the primary NAAQS were revoked at the time the new 1-hour NAAQS was made final. However, these standards remain in effect until one year following the date of initial nonattainment designations for the 1-hour SO_2 primary standard (no later than June 2012)

In order to evaluate compliance with the NAAQS, AERMOD was used with the airport location meteorological data set to estimate the total air quality concentrations for comparison to the NAAQS. The total air quality concentration included the impacts from the project emissions, nearby sources from the regional source inventories, and the background concentrations. For each pollutant, except 1-hour SO_2 and NO_2, a refined receptor grid containing fenceline receptors spaced no further than 100 meters apart and 100 meter spaced receptors extending outward from the Millen facility in all directions to the distance of the applicable SIA was used. For the 1-hour SO_2 NAAQS, only the array of significant receptors plus "buffer" locations (i.e., all locations predicted to be above 7 $\mu g/m^3$) from the preliminary impact assessment was used. Please refer to Figure 2.2.1-2. The buffered array of significant receptors for 1-hour SO_2 does not contain any non-adjacent outlier receptor locations. For the 1-hour NO_2 NAAQS, the receptor grid that was used was identical to the initial grid used for 1-hour SO_2 significance modeling (i.e.,

with 500 meters spaced receptors carried all the way out to a distance of 50 km). Table 2.5-2 summarizes the results of the NAAQS air quality analysis.

Table 2.5-2: NAAQS Modeling Results

Pollutant	Avg. Period	Year	Back-Ground Conc. ($\mu g/m^3$)	Total Air Quality Concentration [6]			NAAQS Comparison		
				UTM NAD83					
				East (m)	North (m)	Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Violations Predicted	# of Violating Receptors
PM_{10}	24-hr [1]	5YR	38	415,113.20	3,625,579.50	58.3575	150	No	N/A
$PM_{2.5}$	24-hr [2]	5YR	25	415,049.8011 3.20	3,625,513.40 579.50	34.4676	35	No	N/A
$PM_{2.5}$	Annual [2]	5YR	15	416,127.8016 8.30	3,625,819.70 735.50	14.1715	15	No	N/A
NO_2	**1-hr** [3,7]	**5YR**	**33.24**	**3750,00.00**	**3,597,500.00**	**228.9484**	**188**	**Yes**	**3**
NO_2	Annual [8]	2006	5.2	416,300.00	3,626,00062 5,900.00	16.6353	100	No	N/A
		2007		416,300.00	3,626,00010 0.00	15.6755		No	N/A
		2008		416,300.00	3,625,900.00	15.2729		No	N/A
		2009		416,300.00	3,625,600.00	15.30		No	N/A
		2010		416,249.20	3,625,567.10	18.0503		No	N/A
SO_2	1-hr [4]	5YR	67.18	416,200.00	3,626,500.00	112.9967	196	No	N/A
SO_2	3-hr [5]	2006	54.18	419,000.00	3,627,800.00	93.07	1,300	No	N/A
		2007		418,600.00	3,627,900.00	104.74		No	N/A
		2008		418,000.00	3,627,500.00	97.53		No	N/A
		2009		414,800.00	3,625,400.00	104.78		No	N/A
		2010		418,400.00	3,628,200.00	111.32		No	N/A
SO_2	24-hr [5]	2006	16.75	415,113.20	3,625,579.50	31.5654	365	No	N/A
		2007		415,175.20	3,624,990.80	30.84		No	N/A
		2008		414,922.80	3,625,381.00	33.0232. 85		No	N/A
		2009		416,500.00	3,625,600.00	31.1230. 97		No	N/A
		2010		415,240.20	3,625,711.90	32.4729		No	N/A
SO_2	Annual [4]	2006	3.89	416,300.00	3,626,00062 5,900.00	7.3936	80	No	N/A
		2007		416,300.00	3,626,000.00	7.0805		No	N/A
		2008		416,300.00	3,625,900.00	6.95		No	N/A
		2009		416,400300.0 0	3,625,60062 6,100.00	7.0504		No	N/A
		2010		416,300.00	3,625,600.00	7.49		No	N/A

[1] The PM_{10} 24-hour NAAQS is based on the highest sixth-high concentration over a five-year period
[2] The $PM_{2.5}$ 24-hour and annual NAAQS are based on the five-year average of the highest first-high concentrations at each receptor
[3] The 1-hour NO_2 NAAQS is based on the five-year average of the 98th-percentile (highest eighth-high) annual distribution of daily maximum 1-hour concentrations at each receptor location
[4] The 1-hour SO_2 NAAQS is based on the five-year average of the 99th-percentile (highest fourth-high) annual distribution of daily maximum 1-hour concentrations at each receptor location

[5] The 3-hour and 24-hour SO_2 NAAQS are based on the highest second-high concentration for each year modeled
[6] The total air quality concentration represents the "NAAQS" source group in each AERMOD modeling run and includes the appropriate background concentration as defined by specifying BACKGRND as a source in the SO pathway and including the keyword "BACKGROUND" in the "NAAQS" source group
[7] Design concentration determined using PVMRM
[8] Design concentrations determine using Tier 1 full conversion of NO_x to NO_2

As shown in Table 2.5-2, there were no predicted violations of the NAAQS for any pollutants except the 1-hour NO_2 NAAQS. Figure 2.5-1 and show the locations of receptors with 1-hour NO_2 NAAQS violations.

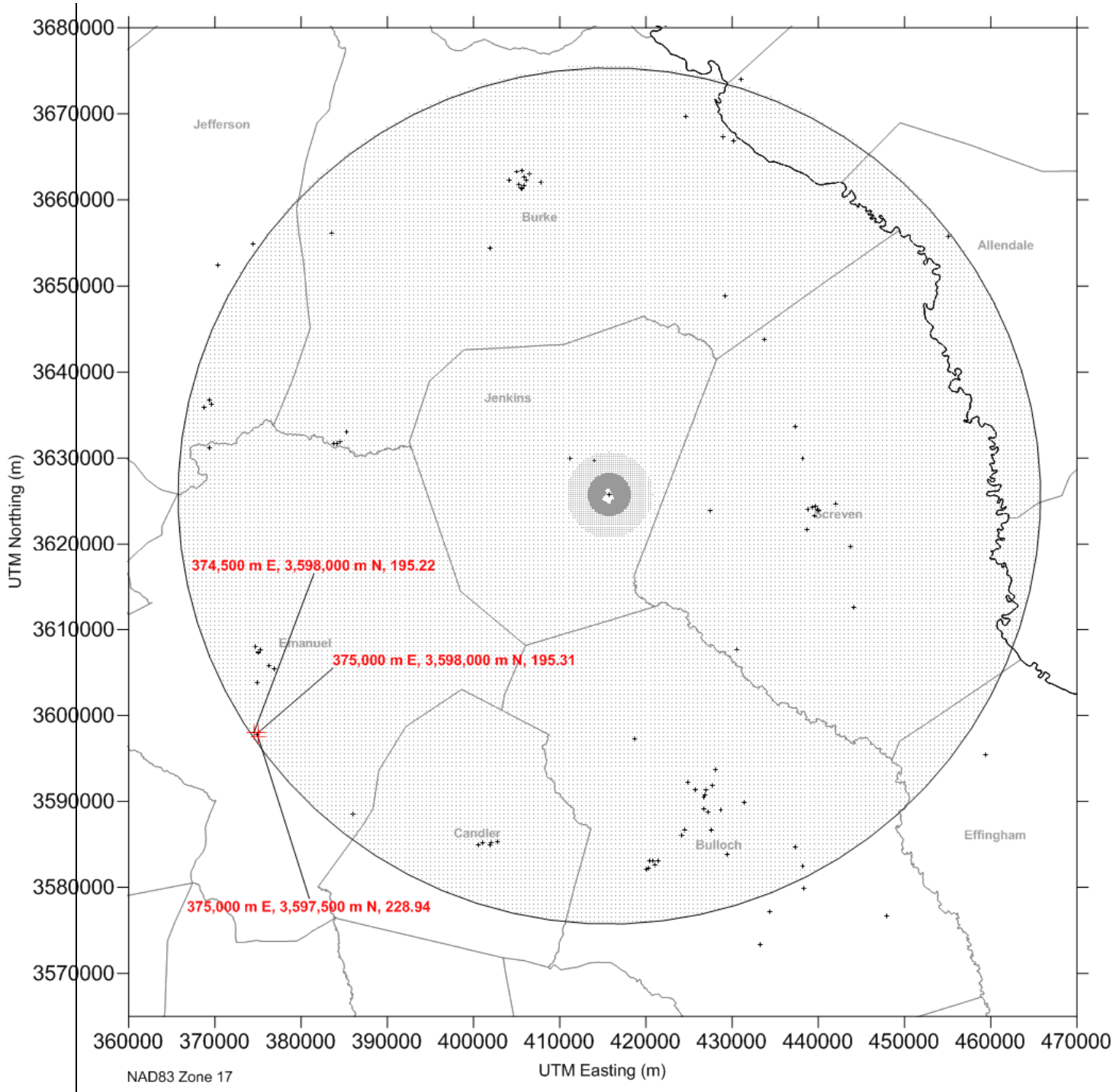

Figure 2.5-1: Location of 1-hour NO_2 NAAQS Exceedances

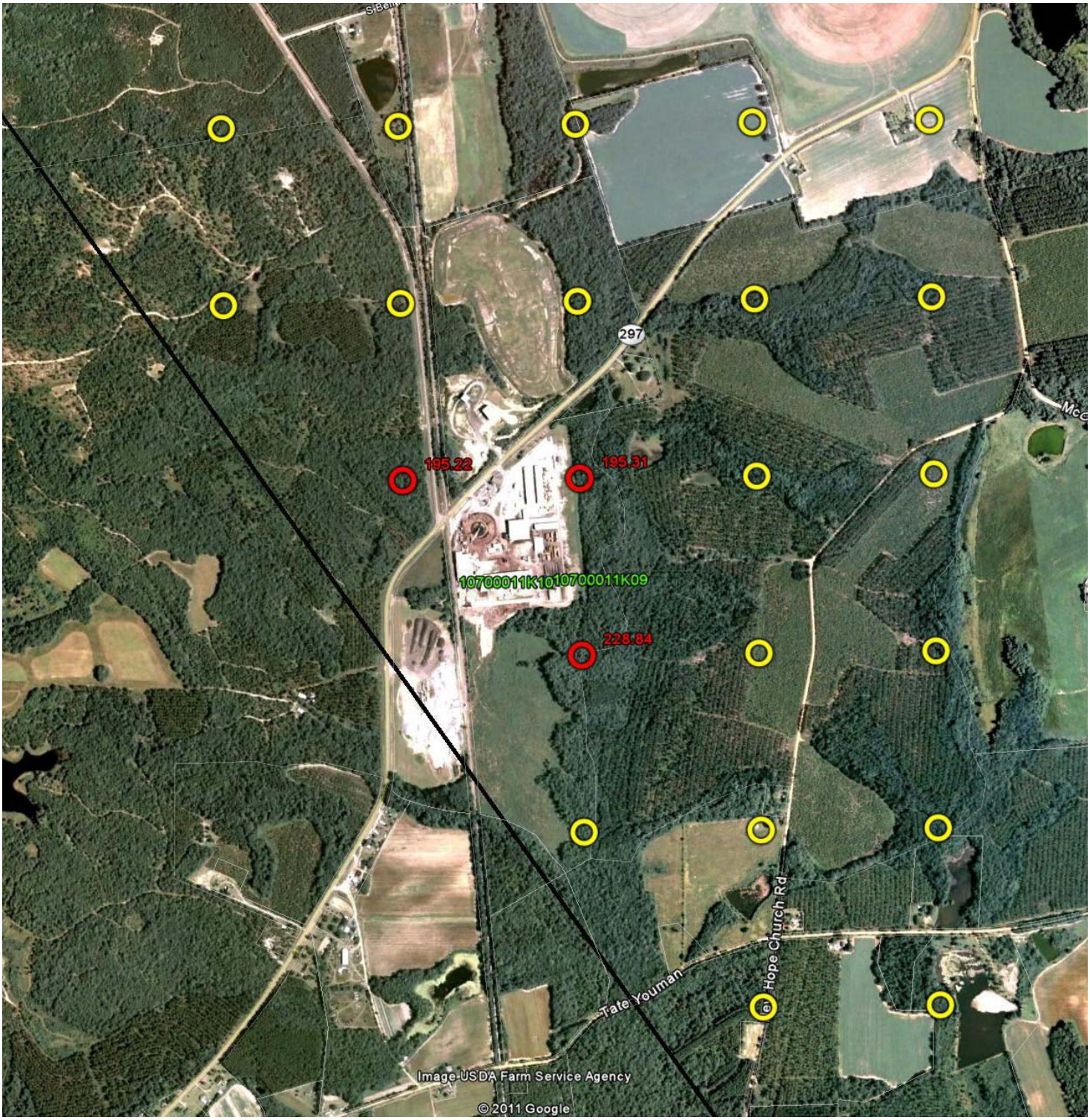

Figure 2.5-2: Aerial View of 500 m Spaced Receptors with 1-hour NO_2 NAAQS Exceedances

As shown in Figure 2.5-1 and Figure 2.5-2, there are three receptors with violations of the 1-hour NO2 NAAQS just inside the edge of the 50 km SIA. The exceedances occur in the 500 meter spaced portion of the receptor grid near the Rayonier Wood Products Swainsboro Sawmill (AIRS 10700011). Figure 2.5-2 also shows the location of Rayonier's direct-fired lumber drying kilns, Emission Unit ID Nos. DK09 and DK10 (Modeled Source ID Nos. 10700011DK09 and 10700011DK10).[27]

Since the lumber kilns are direct-fired, there is no stack associated with their continuous operation. Each kiln has four roof vents on each end which open periodically to adjust relative humidity and temperature during the drying process. Therefore, each kiln was modeled as a volume source (single, elevated, on or adjacent to a building). Based on the facility's Title V application, the vents discharge at a height of 27 feet. This height was used to determine the initial vertical dimension of the volume for each kiln. To determine the initial lateral dimension, a width of 40 feet and length of 100 feet for each kiln was estimated from aerial photography. Since the lateral dimension for a volume source should be based on square, the geometric mean of the width and length was used to model each kiln as a single volume source, as opposed to two adjacent volumes. NO_x emissions from each kiln were based on each kiln's maximum capacity, 13.1 million board feet per hour (mmbf/hr), and a NO_x emission factor of 0.135 lb/mmbf from NCASI. This is the same emission factor used to estimate future potential emissions for PSD applicability in the March 2006 PSD application.

As noted in the most recent clarifying guidance regarding application of Appendix W modeling for the 1-hour NO_2 NAAQS, PVMRM may overestimate the NO_2/NO_x ratio for low-level plumes since the algorithm does not prevent the plume from extending below ground level when the volume is calculated. Since the kilns were modeled as volume sources using PVMRM, this may be the cause for the NAAQS violations. Therefore, prior to conducting a culpability analysis, the three receptors with violations were remodeled using the ozone limiting method (OLM), as opposed to PVMRM, with the recommended OLMGROUP ALL option. The results of this analysis are summarized in Table 2.5-3.

[27] By way of background, Rayonier's initial Part 70 operating permit was amended on November 30, 2004 to allow for the construction and operation of two wood gasifier direct heated, batch-type, lumber drying kilns (DK07 and DK08), which replaced their six existing kilns. The permit amendment was not subject to PSD review and included a PSD avoidance limit for drying lumber of 118.42 million board feet (mmbf) per year. Rayonier later applied for and was issued a PSD permit (2421-107-0011–V-02-3) on July 16, 2007 authorizing the modification of lumber drying kilns DK07 and DK08 to convert them from batch to continuous, after which they were to be renamed as DK09 and DK10. This permit also authorized an increase in the allowable lumber drying to 220 mmbf/year. Since Rayonier had not begun modifying the kilns prior to the 18 month PSD deadline, the facility applied for and was granted a one-year extension. However, the facility did begin construction by the extended deadline causing the PSD permit to expire. In 2010, Rayonier submitted another application to convert their kilns in the same manner proposed in 2006. This permit (2421-107-0011-V-03-3) was issued on February 8, 2011 and serves as the basis for the modeled NO_x emissions and source parameters.

Table 2.5-3: Comparison of PVMRM and OLM for 1-hour NO_2 NAAQS Violations

Total Air Quality Concentration PVMRM			Total Air Quality Concentration OLMGROUP ALL		
UTM NAD83		Conc. ($\mu g/m^3$)	UTM NAD83		Conc. ($\mu g/m^3$)
East (m)	North (m)		East (m)	North (m)	
375,000.00	3,597,500.00	228.9~~484~~	375,000.00	3,597,500.00	220.32~~215.38~~
375,000.00	3,598,000.00	195.31	375,000.00	3,598,000.00	194.88
374,500.00	3,598,000.00	195.22	374,500.00	3,598,000.00	194.67~~20~~

As shown in the table above, when compared to using OLM, PVMRM does result in slightly higher predicted impacts for NO_2. However, since the difference in predicted impacts can not explain the NAAQS violations, further modeling was performed to determine if the Millen facility causes or contributes to these exceedances. Since the violations occur within the 500 meter spaced portion of the grid, a refined grid of 100 meter spaced receptors was created to ensure that all NAAQS violations within 50 km of the project site are found and evaluated. The receptor grid used for the culpability analysis is shown in Figure 2.5-3 and contains both ambient and non-ambient air receptors with respect to Rayonier, but are all considered ambient air receptors with respect to the Millen facility. In total, 196 receptors were used for the analysis.

After establishing the receptor grid for the culpability analysis, another AERMOD run was conducted using PVMRM and the five-year concatenated airport location meteorological data set. However, in addition to the "NAAQS" source group, two additional source groups were created: "CARBO" and "01700011". The "CARBO" source group included all project sources with NO_x emissions and the "01700011" source group included Rayonier's direct-fired lumber kilns. Additionally, the "RECTABLE" output option was modified to determine all five-year average daily maximum 1-hour concentrations, ranked from the highest first-high through the 366th-high as follows:

```
OU RECTABLE 1 1-366
```

Then, the "MAXDCONT" output option was used to determine the contribution of source groups "CARBO" and "01700011" paired in time and spaced to each ranked five-year average air quality impact for the "NAAQS" source group in excess of the level of the 1-hour NO_2 NAAQS as follow:

```
OU MAXDCONT NAAQS 8 THRESH 188
```

Figure 2.5-4 shows that 79 of the 196 culpability receptors have 1-hour NO_2 NAAQS violations.

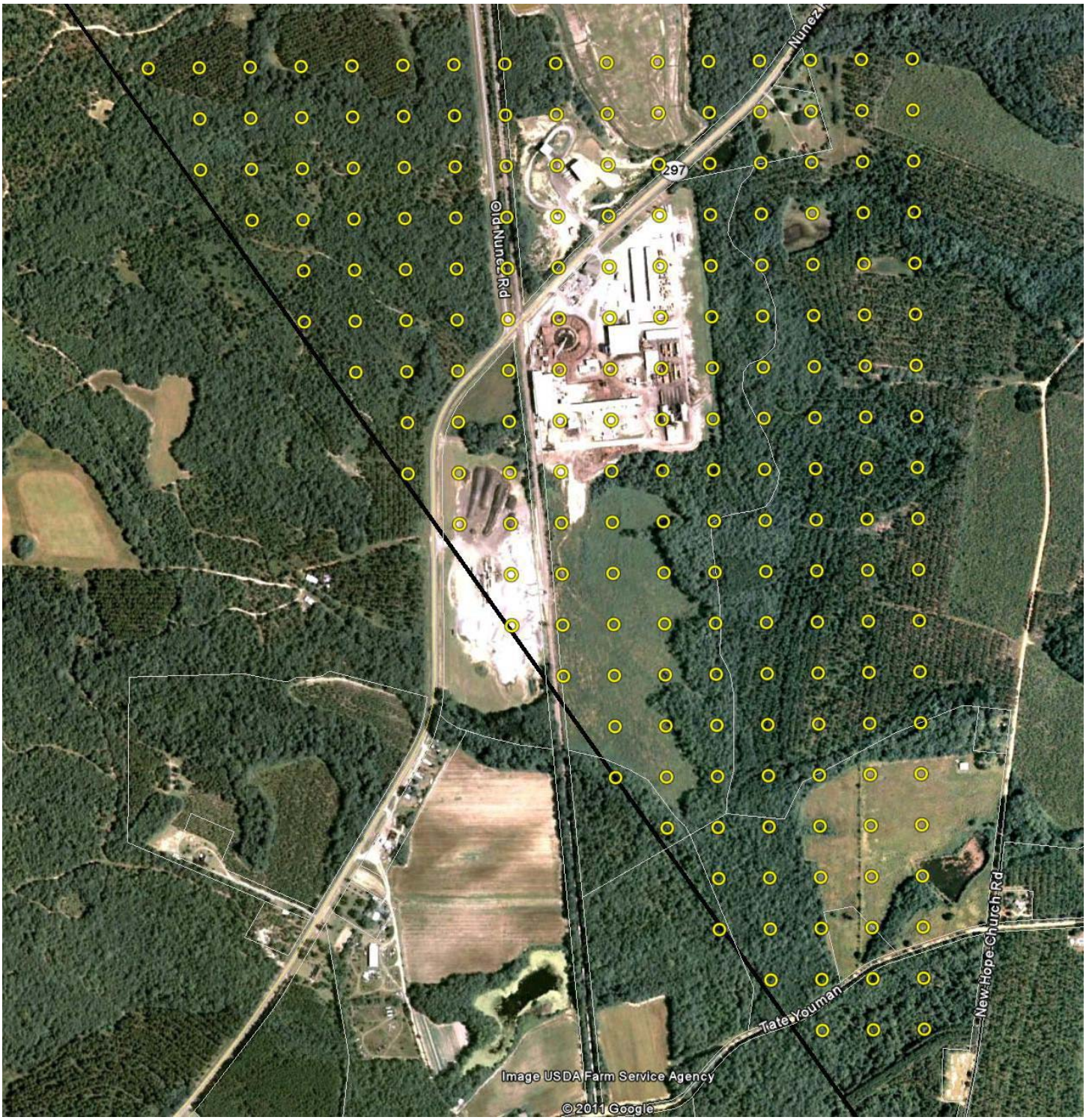

Figure 2.5-3: Aerial View of 100 meter Spaced Receptor Grid for 1-hour NO_2 NAAQS Violations Culpability

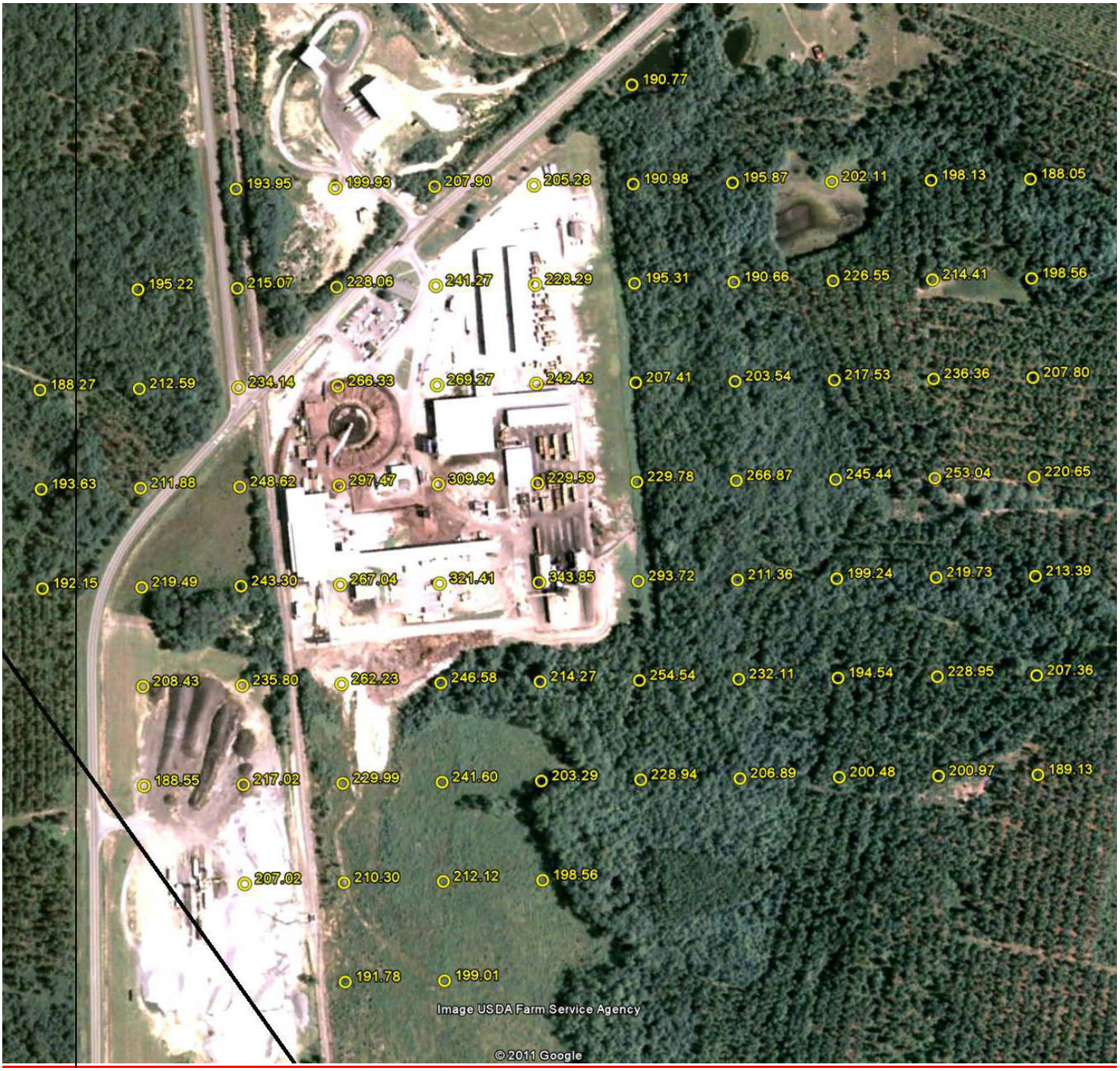

Figure 2.5-4: Aerial View of 100 m Spaced Culpability Receptors with 1-hour NO_2 NAAQS Exceedances

For the 79 receptors shown in Figure 2.5-4, 1-hour NO_2 NAAQS violations were predicted from the design concentration (98th-percentile) to the 148th ranked five-year average. However, this particular receptor (374,900.00 m east, 3,597,700.00, m north, 343.85~~334.71~~ $\mu g/m^3$) is almost directly on top lumber kiln DK10. Based on the MAXDCONT output, the maximum paired contribution of the Millen facility to any of the ranked NAAQS violations predicted at any of the culpability receptors was 2.55~~57~~ $\mu g/m^3$. Since this is less than the 1-hour NO_2 SIL, the Millen facility will not cause or contribute to any violations of the NAAQS. Table 2.5-4 lists the maximum contribution of the Millen facility to any 1-hour NO_2 NAAQS violation predicted during the culpability analysis.

Table 2.5-4: Listing of Maximum Contribution of Millen Facility to Each Culpability Receptor with 1-hour NO_2 NAAQS Violations

#	UTM NAD83		NAAQS ($\mu g/m^3$)	Rank	CARBO ($\mu g/m^3$)	#	UTM NAD83		NAAQS ($\mu g/m^3$)	Rank	CARBO ($\mu g/m^3$)
	East (m)	North (m)					East (m)	North (m)			
1	374,400	3,597,700	188.6117~~191.6574~~	9TH~~8TH~~	0.00164~~00184~~	41	374,900	3,597,900	197. 49982~~998~~	37TH	0.00993~~01044~~
2	374,400	3,597,800	193.6307~~6306~~	8TH	0.00113~~00108~~	42	374,900	3,598,000	198.5273~~190.4719~~	22ND~~27TH~~	0.00606~~00481~~
3	374,400	3,597,900	188.2727	8TH	0.00108~~00102~~	43	374,900	3,598,100	192.5207~~191.5049~~	14TH	0.00191
4	374,500	3,597,500	188.55215~~519~~	8TH	0.00281~~00267~~	44	375,000	3,597,500	192.6822~~191.2342~~	23RD	0.01139~~01099~~
5	374,500	3,597,600	195.4682~~201.0507~~	11TH~~9TH~~	0.00270~~00232~~	45	375,000	3,597,600	214.28670~~9925~~	30TH~~29TH~~	0.02103~~01928~~
6	374,500	3,597,700	193.14355~~246~~	15TH~~16TH~~	0.00323~~00304~~	46	375,000	3,597,700	235.0015~~223.767~~	74TH~~83RD~~	0.10811~~08886~~
7	374,500	3,597,800	195.07330~~732~~	15TH	0.00335~~00324~~	47	375,000	3,597,800	203.7130~~196.1311~~	44TH~~55TH~~	0.02789~~02856~~
8	374,500	3,597,900	188.60755~~169~~	22ND	0.00210~~0022~~	48	375,000	3,597,900	195.4168~~188.4195~~	17TH~~23RD~~	0.00587~~00801~~
9	374,500	3,598,000	188.6385	13TH	0.00140~~00134~~	49	375,000	3,598,000	189.3163	11TH	0.00103
10	374,600	3,597,400	192.19191~~918~~	10TH	0.00271~~00261~~	50	375,000	3,598,100	190.9842	8TH	0.00093~~00091~~
11	374,600	3,597,500	202.23231~~943~~	12TH	1.36143~~32337~~	51	375,000	3,598,200	190.77497~~748~~	8TH	0.00095~~00094~~
12	374,600	3,597,600	196.2013~~207.558~~	19TH~~17TH~~	0.00508~~00447~~	52	375,100	3,597,500	193.3610	13TH	0.00290~~00284~~
13	374,600	3,597,700	204.1440~~189.2195~~	23RD~~27TH~~	0.00567	53	375,100	3,597,600	195.5615~~197.3358~~	21ST~~19TH~~	0.01185~~01252~~
14	374,600	3,597,800	201.5770~~199.6599~~	26TH	0.00544~~00487~~	54	375,100	3,597,700	192.4707~~194.7365~~	35TH~~25TH~~	0.00873~~01177~~
15	374,600	3,597,900	199.9476~~189.1466~~	28TH~~35TH~~	0.00410~~00408~~	55	375,100	3,597,800	194.1750~~209.8677~~	66TH~~58TH~~	0.01153~~01246~~
16	374,600	3,598,000	188.27612~~759~~	21ST	0.00287~~00275~~	56	375,100	3,597,900	192.2355~~833~~	21ST~~19TH~~	0.00338~~00499~~
17	374,600	3,598,100	188.9798~~191.0646~~	10TH~~9TH~~	0.00157~~00141~~	57	375,100	3,598,000	189.64142~~678~~	9TH	0.00109~~00011~~
18	374,700	3,597,300	191.7816~~189.507~~	8TH~~9TH~~	0.00211~~00206~~	58	375,100	3,598,100	195.8689	8TH	0.00079~~00078~~
19	374,700	3,597,400	196.8744~~195.2526~~	11TH	0.00317~~00273~~	59	375,200	3,597,500	189.4090	12TH	0.00515~~00511~~
20	374,700	3,597,500	199.98825~~413~~	16TH	0.00480~~00504~~	60	375,200	3,597,600	194.5384~~192.7292~~	8TH	0.00114~~00012~~
21	374,700	3,597,600	217.2219~~215.1367~~	22ND	0.75046~~73846~~	61	375,200	3,597,700	193.5613~~195.0494~~	14TH~~10TH~~	0.00361~~00336~~
22	374,700	3,597,700	205.6970~~192.8938~~	36TH~~40TH~~	0.01059~~01271~~	62	375,200	3,597,800	193.66895~~099~~	54TH	0.00559~~00557~~
23	374,700	3,597,800	189.2783	50TH	0.00897~~00903~~	63	375,200	3,597,900	213.9634~~214.3442~~	12TH~~11TH~~	0.00278~~00295~~
24	374,700	3,597,900	192.6970~~191.498~~	52ND~~53RD~~	0.00869~~00871~~	64	375,200	3,598,000	198.1231	27TH	0.00210~~00204~~
25	374,700	3,598,000	191.25792~~578~~	28TH	0.00339~~00328~~	65	375,200	3,598,100	189.4765	13TH	0.00180~~00175~~
26	374,700	3,598,100	195.9490~~189.9524~~	10TH~~12TH~~	0.00210~~0018~~	66	375,300	3,597,500	195.3270	9TH	0.00245~~00238~~
27	374,800	3,597,300	199.0143	8TH	0.00180~~0017~~	67	375,300	3,597,600	191.5091~~188.4221~~	31ST~~33RD~~	0.00268~~0032~~
28	374,800	3,597,400	188.4637	18TH	0.00333	68	375,300	3,597,700	192.2245~~197.562~~	34TH~~26TH~~	0.00204~~00198~~
29	374,800	3,597,500	193.5987~~238.9922~~	8TH	0.00562~~00624~~	69	375,300	3,597,800	203.2558~~193.4685~~	41ST~~48TH~~	0.00379~~00373~~
30	374,800	3,597,600	192.2365~~190.8192~~	37TH	2.55621~~56606~~	70	375,300	3,597,900	198.02280~~227~~	34TH	0.00325~~00317~~
31	374,800	3,597,700	253.7584~~256.3819~~	39TH~~37TH~~	0.02039~~02117~~	71	375,300	3,598,000	203.5508~~193.4246~~	14TH~~20TH~~	0.00188~~00014~~
32	374,800	3,597,800	206.39212~~602~~	87TH	0.01819~~02052~~	72	375,300	3,598,100	188.1343	14TH	0.00105~~00099~~
33	374,800	3,597,900	190.1228~~207.9392~~	56TH~~44TH~~	0.01324~~00599~~	73	375,400	3,597,500	188.1259~~0071~~	8TH	0.00159~~00195~~
34	374,800	3,598,000	192.62156~~214~~	31ST	0.00494	74	375,400	3,597,600	193.28791~~335~~	14TH	0.00122~~00139~~
35	374,800	3,598,100	196.3221	12TH	0.00219~~00209~~	75	375,400	3,597,700	195.2494~~194.6488~~	19TH	0.00139
36	374,900	3,597,400	190.930924~~22~~	12TH	0.00110~~00117~~	76	375,400	3,597,800	193.6209~~6208~~	22ND	0.00223~~00212~~
37	374,900	3,597,500	203.2863~~202.5554~~	8TH	0.00575~~0052~~	77	375,400	3,597,900	192.0036~~0035~~	15TH	0.00161~~00149~~
38	374,900	3,597,600	202.4749~~203.1083~~	14TH~~12TH~~	0.01975~~02174~~	78	375,400	3,598,000	189.7917~~192.5063~~	13TH~~10TH~~	0.00131~~00124~~
39	374,900	3,597,700	223.3586~~222.5964~~	114TH	1.23686~~21867~~	79	375,400	3,598,100	188.0494	8TH	0.00081~~00078~~
40	374,900	3,597,800	228.6830~~188.7167~~	81ST	0.05039~~03304~~						

2.6 PSD Increment Air Quality Analysis

As part of the air quality analysis, a PSD applicant must demonstrate that emissions from the proposed construction and operation of a facility will not cause or contribute to air pollution in violation of any "maximum allowable increase" over the baseline concentration in any area. The ''maximum allowable increase'' of an air pollutant that is allowed to occur above the baseline concentration is referred to as the PSD increment. By establishing the maximum allowable level of ambient pollutant concentration increase in a particular area, an increment defines ''significant deterioration'' of air quality in that area. Table 2.6-1 lists the PSD increment for pollutants modeled for the Millen facility.

Table 2.6-1: PSD Increments

Pollutant	Averaging Period				
	1-hour ($\mu g/m^3$)	3-hour ($\mu g/m^3$)	8-hour ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	Annual ($\mu g/m^3$)
NO_2	--	--	--	--	25
SO_2	--	512	--	91	20
PM_{10}	--	--	--	30	17

In order to evaluate compliance with the PSD increments, AERMOD was used with the airport location meteorological data set to estimate the total increase in pollutant concentrations above the applicable baseline concentration. Since this PSD application establishes the minor source baseline date for PM_{10} and SO_2, the total increase in pollutant concentrations was determined as the emission increases associated with the Millen facility and all emission increases occurring at major PSD sources after the major source baseline date for PM_{10} and SO_2 (January 6, 1975). For NO_2, since the baseline concentration was established in 1988, all emission increases occurring at both major and minor sources during and after 1988 were used to evaluate the increment. No increment expansion was considered for any pollutant in the analysis. For each pollutant, a refined receptor grid containing fenceline receptors spaced no further than 100 meters apart and 100 meter spaced receptors extending outward from the Millen facility in all directions to the distance of the applicable SIA was used. Table 2.6-2 summarizes the results of the PSD increment air quality analysis.

Table 2.6-2: PSD Increment Modeling Results

Pollutant	Avg. Period	Year	Increase Above Baseline Concentration			PSD Increment Comparison		
			UTM NAD83		Conc. ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)	Violations Predicted	# of Violating Receptors
			East (m)	North (m)				
PM_{10}	24-hr [1]	2006	415,113.20	3,625,579.50	18.4685	30	No	N/A
		2007	416,200.00	3,626,100.00	18.3121		No	N/A
		2008	415,113.20	3,625,579.50	23.7824.47		No	N/A
		2009	415,100.00	3,625,700.00	21.5122.64		No	N/A
		2010	415,049.80	3,625,513.40	16.7817.30		No	N/A
PM_{10}	Annual	2006	416,127.80	3,625,819.70	3.032.89	17	No	N/A
		2007	416,127.8016 8.30	3,625,819.70 735.50	2.7264		No	N/A
		2008	416,200.0016 8.30	3,625,800.00 735.50	2.8781		No	N/A
		2009	416,200.0020 8.80	3,625,800.00 651.30	2.6766		No	N/A
		2010	416,168.30	3,625,735.50	3.3329		No	N/A
NO_2	Annual [2]	2006	416,300.00	3,626,00062 5,900.00	10.1607	25	No	N/A
		2007	416,300.00	3,626,00010 0.00	9.3020		No	N/A
		2008	416,300.00	3,625,900.00	9.1011		No	N/A
		2009	416,300.00	3,625,600.00	8.3637		No	N/A
		2010	416,249.20	3,625,567.10	10.7675		No	N/A
SO_2	3-hr [1]	2006	415,376.20	3,625,991.00	37.2815	512	No	N/A
		2007	416,289.70	3,625,482.90	34.2523		No	N/A
		2008	416,500.00	3,625,600.00	35.8785		No	N/A
		2009	417,600.00	3,629,100.00	45.67		No	N/A
		2010	418,400.00	3,628,200.00	52.2221		No	N/A
SO_2	24-hr [1]	2006	416,400.00	3,626,000.00	14.0405	91	No	N/A
		2007	416,300.00	3,625,600.00	13.7468		No	N/A
		2008	414,922.80	3,625,381.00	16.2406		No	N/A
		2009	416,500.00	3,625,600.00	14.3419		No	N/A
		2010	415,200.0017 6.70	3,625,700.00 645.70	12.9286		No	N/A
SO_2	Annual	2006	416,300.00	3,626,00062 5,900.00	2.5452	20	No	N/A
		2007	416,300.00	3,626,.-000.00	2.3431		No	N/A
		2008	416,300.00	3,625,900.00	2.2425		No	N/A
		2009	416,400300.00	3,625,60062 6,100.00	2.1615		No	N/A

		2010	416,300.00	3,625,600.00	2.77		No	N/A

[1] Results for the short-term PSD increment analysis for each pollutant are based on the highest second-high concentration for each year modeled (*exceedance rate of one per year at any one location*)

[2] Design concentrations determine using Tier 1 full conversion of NO_x to NO_2

As shown in Table 2.6-2, there were no predicted exceedances of the PSD increments for any pollutant. Therefore, the Millen facility will not cause or contribute to any air pollutant in violation of the maximum allowable increase over the baseline concentration in any area.

CARBO Ceramics, Inc. Millen Facility
PSD Application #20615
Volume III

Revised Sections 2.5 and 2.6 (clean)

2.5 NAAQS Air Quality Analysis

The primary NAAQS are the maximum concentration ceilings, measured in terms of total concentration of a pollutant in the atmosphere, which define the "levels of air quality which US EPA judges are necessary, with an adequate margin of safety, to protect the public health." The secondary NAAQS define the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The objective of a NAAQS analysis is to demonstrate through dispersion modeling that emissions from a proposed project, in conjunction with the background contribution from *nearby* and *other* sources, do not "cause or contribute" to a violation of the NAAQS at any ambient location. Table 2.5-1 lists the NAAQS for the pollutants modeled for the Millen facility.

Table 2.5-1: Primary and Secondary National Ambient Air Quality Standards

Pollutant	Averaging Period				
	1-hour ($\mu g/m^3$)	3-hour ($\mu g/m^3$)	8-hour ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	Annual ($\mu g/m^3$)
NO_2	188 [4]	--	--	--	100 [1]
SO_2	196 [4]	1,300 [3]	--	365 [2, 6]	80 [2, 6]
PM_{10}	--	--	--	150 [1]	Revoked 12/18/2006 71 FR 61144 [5]
$PM_{2.5}$	--	--	--	35 [1]	15 [1]

[1] For PM_{10} (24-hour), $PM_{2.5}$ (24-hour and annual), and NO_2 (annual), the secondary NAAQS are the same as the primary
[2] For SO_2 (24-hour and annual), there are no secondary NAAQS
[3] For SO_2 (3-hour), there is no primary NAAQS
[4] For NO_2 (1-hour) and SO_2 (1-hour), new primary NAAQS are final and secondary NAAQS are proposed
[5] For PM_{10} (annual), the NAAQS were revoked at the time the primary and secondary NAAQS for 24-hour $PM_{2.5}$ were reduced
[6] For SO_2 (24-hour and annual), the primary NAAQS were revoked at the time the new 1-hour NAAQS was made final. However, these standards remain in effect until one year following the date of initial nonattainment designations for the 1-hour SO_2 primary standard (no later than June 2012)

In order to evaluate compliance with the NAAQS, AERMOD was used with the airport location meteorological data set to estimate the total air quality concentrations for comparison to the NAAQS. The total air quality concentration included the impacts from the project emissions, nearby sources from the regional source inventories, and the background concentrations. For each pollutant, except 1-hour SO_2 and NO_2, a refined receptor grid containing fenceline receptors spaced no further than 100 meters apart and 100 meter spaced receptors extending outward from the Millen facility in all directions to the distance of the applicable SIA was used. For the 1-hour SO_2 NAAQS, only the array of significant receptors plus "buffer" locations (i.e., all locations predicted to be above 7 $\mu g/m^3$) from the preliminary impact assessment was used. Please refer to Figure 2.2.1-2. The buffered array of significant receptors for 1-hour SO_2 does not contain any non-adjacent outlier receptor locations. For the 1-hour NO_2 NAAQS, the receptor grid that was used was identical to the initial grid used for 1-hour SO_2 significance modeling (i.e.,

with 500 meters spaced receptors carried all the way out to a distance of 50 km). Table 2.5-2 summarizes the results of the NAAQS air quality analysis.

Table 2.5-2: NAAQS Modeling Results

Pollut-ant	Avg. Period	Year	Back-Ground Conc. ($\mu g/m^3$)	Total Air Quality Concentration [6]			NAAQS Comparison		
				UTM NAD83		Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Violations Predicted	# of Violating Receptors
				East (m)	North (m)				
PM_{10}	24-hr [1]	5YR	38	415,113.20	3,625,579.50	58.35	150	No	N/A
$PM_{2.5}$	24-hr [2]	5YR	25	415,049.80	3,625,513.40	34.46	35	No	N/A
$PM_{2.5}$	Annual [2]	5YR	15	416,127.80	3,625,819.70	14.17	15	No	N/A
NO_2	**1-hr** [3,7]	**5YR**	**33.24**	**3750,00.00**	**3,597,500.00**	**228.94**	**188**	**Yes**	**3**
NO_2	Annual [8]	2006	5.2	416,300.00	3,626,000.00	16.63	100	No	N/A
		2007		416,300.00	3,626,000.00	15.67		No	N/A
		2008		416,300.00	3,625,900.00	15.27		No	N/A
		2009		416,300.00	3,625,600.00	15.30		No	N/A
		2010		416,249.20	3,625,567.10	18.05		No	N/A
SO_2	1-hr [4]	5YR	67.18	416,200.00	3,626,500.00	112.99	196	No	N/A
SO_2	3-hr [5]	2006	54.18	419,000.00	3,627,800.00	93.07	1,300	No	N/A
		2007		418,600.00	3,627,900.00	104.74		No	N/A
		2008		418,000.00	3,627,500.00	97.53		No	N/A
		2009		414,800.00	3,625,400.00	104.78		No	N/A
		2010		418,400.00	3,628,200.00	111.32		No	N/A
SO_2	24-hr [5]	2006	16.75	415,113.20	3,625,579.50	31.56	365	No	N/A
		2007		415,175.20	3,624,990.80	30.84		No	N/A
		2008		414,922.80	3,625,381.00	33.02		No	N/A
		2009		416,500.00	3,625,600.00	31.12		No	N/A
		2010		415,240.20	3,625,711.90	32.47		No	N/A
SO_2	Annual [4]	2006	3.89	416,300.00	3,626,000.00	7.39	80	No	N/A
		2007		416,300.00	3,626,000.00	7.08		No	N/A
		2008		416,300.00	3,625,900.00	6.95		No	N/A
		2009		416,400.00	3,625,600.00	7.05		No	N/A
		2010		416,300.00	3,625,600.00	7.49		No	N/A

[1] The PM_{10} 24-hour NAAQS is based on the highest sixth-high concentration over a five-year period

[2] The $PM_{2.5}$ 24-hour and annual NAAQS are based on the five-year average of the highest first-high concentrations at each receptor

[3] The 1-hour NO_2 NAAQS is based on the five-year average of the 98th-percentile (highest eighth-high) annual distribution of daily maximum 1-hour concentrations at each receptor location

[4] The 1-hour SO_2 NAAQS is based on the five-year average of the 99th-percentile (highest fourth-high) annual distribution of daily maximum 1-hour concentrations at each receptor location

[5] The 3-hour and 24-hour SO_2 NAAQS are based on the highest second-high concentration for each year modeled

[6] The total air quality concentration represents the "NAAQS" source group in each AERMOD modeling run and includes the appropriate background concentration as defined by specifying BACKGRND as a source in the SO pathway and including the keyword "BACKGROUND" in the "NAAQS" source group

[7] Design concentration determined using PVMRM

[8] Design concentrations determine using Tier 1 full conversion of NO_x to NO_2

As shown in Table 2.5-2, there were no predicted violations of the NAAQS for any pollutants except the 1-hour NO_2 NAAQS. Figure 2.5-1 and Figure 2.5-2 show the locations of receptors with 1-hour NO_2 NAAQS violations.

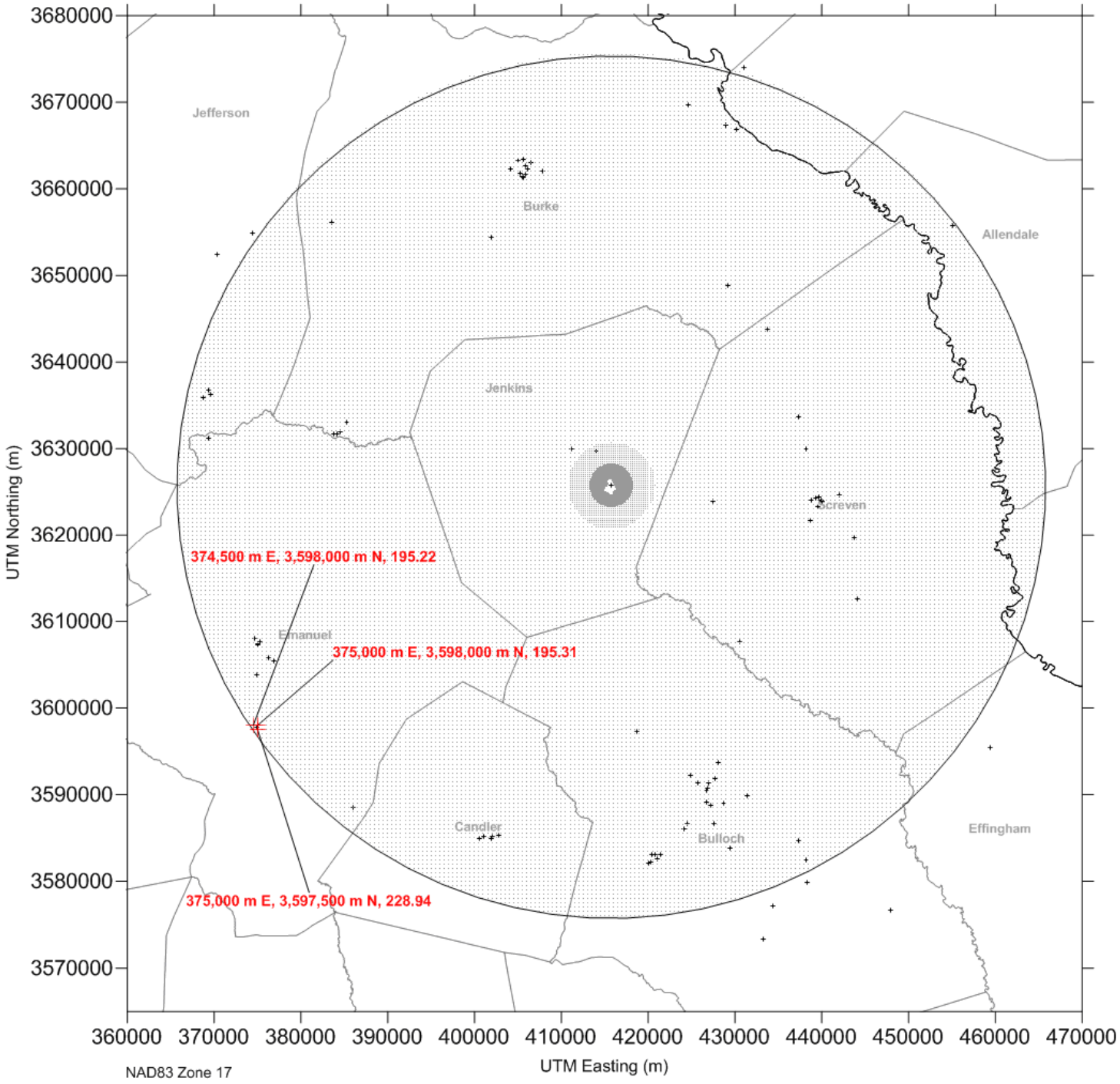

Figure 2.5-1: Location of 1-hour NO_2 NAAQS Exceedances

Figure 2.5-2: Aerial View of 500 m Spaced Receptors with 1-hour NO_2 NAAQS Exceedances

As shown in Figure 2.5-1 and Figure 2.5-2, there are three receptors with violations of the 1-hour NO_2 NAAQS just inside the edge of the 50 km SIA. The exceedances occur in the 500 meter spaced portion of the receptor grid near the Rayonier Wood Products Swainsboro Sawmill (AIRS 10700011). Figure 2.5-2 also shows the location of Rayonier's direct-fired lumber drying kilns, Emission Unit ID Nos. DK09 and DK10 (Modeled Source ID Nos. 10700011DK09 and 10700011DK10).[27]

Since the lumber kilns are direct-fired, there is no stack associated with their continuous operation. Each kiln has four roof vents on each end which open periodically to adjust relative humidity and temperature during the drying process. Therefore, each kiln was modeled as a volume source (single, elevated, on or adjacent to a building). Based on the facility's Title V application, the vents discharge at a height of 27 feet. This height was used to determine the initial vertical dimension of the volume for each kiln. To determine the initial lateral dimension, a width of 40 feet and length of 100 feet for each kiln was estimated from aerial photography. Since the lateral dimension for a volume source should be based on square, the geometric mean of the width and length was used to model each kiln as a single volume source, as opposed to two adjacent volumes. NO_x emissions from each kiln were based on each kiln's maximum capacity, 13.1 million board feet per hour (mmbf/hr), and a NO_x emission factor of 0.135 lb/mmbf from NCASI. This is the same emission factor used to estimate future potential emissions for PSD applicability in the March 2006 PSD application.

As noted in the most recent clarifying guidance regarding application of Appendix W modeling for the 1-hour NO_2 NAAQS, PVMRM may overestimate the NO_2/NO_x ratio for low-level plumes since the algorithm does not prevent the plume from extending below ground level when the volume is calculated. Since the kilns were modeled as volume sources using PVMRM, this may be the cause for the NAAQS violations. Therefore, prior to conducting a culpability analysis, the three receptors with violations were remodeled using the ozone limiting method (OLM), as opposed to PVMRM, with the recommended OLMGROUP ALL option. The results of this analysis are summarized in Table 2.5-3.

[27] By way of background, Rayonier's initial Part 70 operating permit was amended on November 30, 2004 to allow for the construction and operation of two wood gasifier direct heated, batch-type, lumber drying kilns (DK07 and DK08), which replaced their six existing kilns. The permit amendment was not subject to PSD review and included a PSD avoidance limit for drying lumber of 118.42 million board feet (mmbf) per year. Rayonier later applied for and was issued a PSD permit (2421-107-0011–V-02-3) on July 16, 2007 authorizing the modification of lumber drying kilns DK07 and DK08 to convert them from batch to continuous, after which they were to be renamed as DK09 and DK10. This permit also authorized an increase in the allowable lumber drying to 220 mmbf/year. Since Rayonier had not begun modifying the kilns prior to the 18 month PSD deadline, the facility applied for and was granted a one-year extension. However, the facility did begin construction by the extended deadline causing the PSD permit to expire. In 2010, Rayonier submitted another application to convert their kilns in the same manner proposed in 2006. This permit (2421-107-0011-V-03-3) was issued on February 8, 2011 and serves as the basis for the modeled NO_x emissions and source parameters.

Table 2.5-3: Comparison of PVMRM and OLM for 1-hour NO_2 NAAQS Violations

Total Air Quality Concentration PVMRM			Total Air Quality Concentration OLMGROUP ALL		
UTM NAD83		Conc. ($\mu g/m^3$)	UTM NAD83		Conc. ($\mu g/m^3$)
East (m)	North (m)		East (m)	North (m)	
375,000.00	3,597,500.00	228.94	375,000.00	3,597,500.00	220.32
375,000.00	3,598,000.00	195.31	375,000.00	3,598,000.00	194.88
374,500.00	3,598,000.00	195.22	374,500.00	3,598,000.00	194.67

As shown in the table above, when compared to using OLM, PVMRM does result in slightly higher predicted impacts for NO_2. However, since the difference in predicted impacts can not explain the NAAQS violations, further modeling was performed to determine if the Millen facility causes or contributes to these exceedances. Since the violations occur within the 500 meter spaced portion of the grid, a refined grid of 100 meter spaced receptors was created to ensure that all NAAQS violations within 50 km of the project site are found and evaluated. The receptor grid used for the culpability analysis is shown in Figure 2.5-3 and contains both ambient and non-ambient air receptors with respect to Rayonier, but are all considered ambient air receptors with respect to the Millen facility. In total, 196 receptors were used for the analysis.

After establishing the receptor grid for the culpability analysis, another AERMOD run was conducted using PVMRM and the five-year concatenated airport location meteorological data set. However, in addition to the "NAAQS" source group, two additional source groups were created: "CARBO" and "01700011". The "CARBO" source group included all project sources with NO_x emissions and the "01700011" source group included Rayonier's direct-fired lumber kilns. Additionally, the "RECTABLE" output option was modified to determine all five-year average daily maximum 1-hour concentrations, ranked from the highest first-high through the 366th-high as follows:

```
OU RECTABLE 1 1-366
```

Then, the "MAXDCONT" output option was used to determine the contribution of source groups "CARBO" and "01700011" paired in time and spaced to each ranked five-year average air quality impact for the "NAAQS" source group in excess of the level of the 1-hour NO_2 NAAQS as follow:

```
OU MAXDCONT NAAQS 8 THRESH 188
```

Figure 2.5-4 shows that 79 of the 196 culpability receptors have 1-hour NO_2 NAAQS violations.

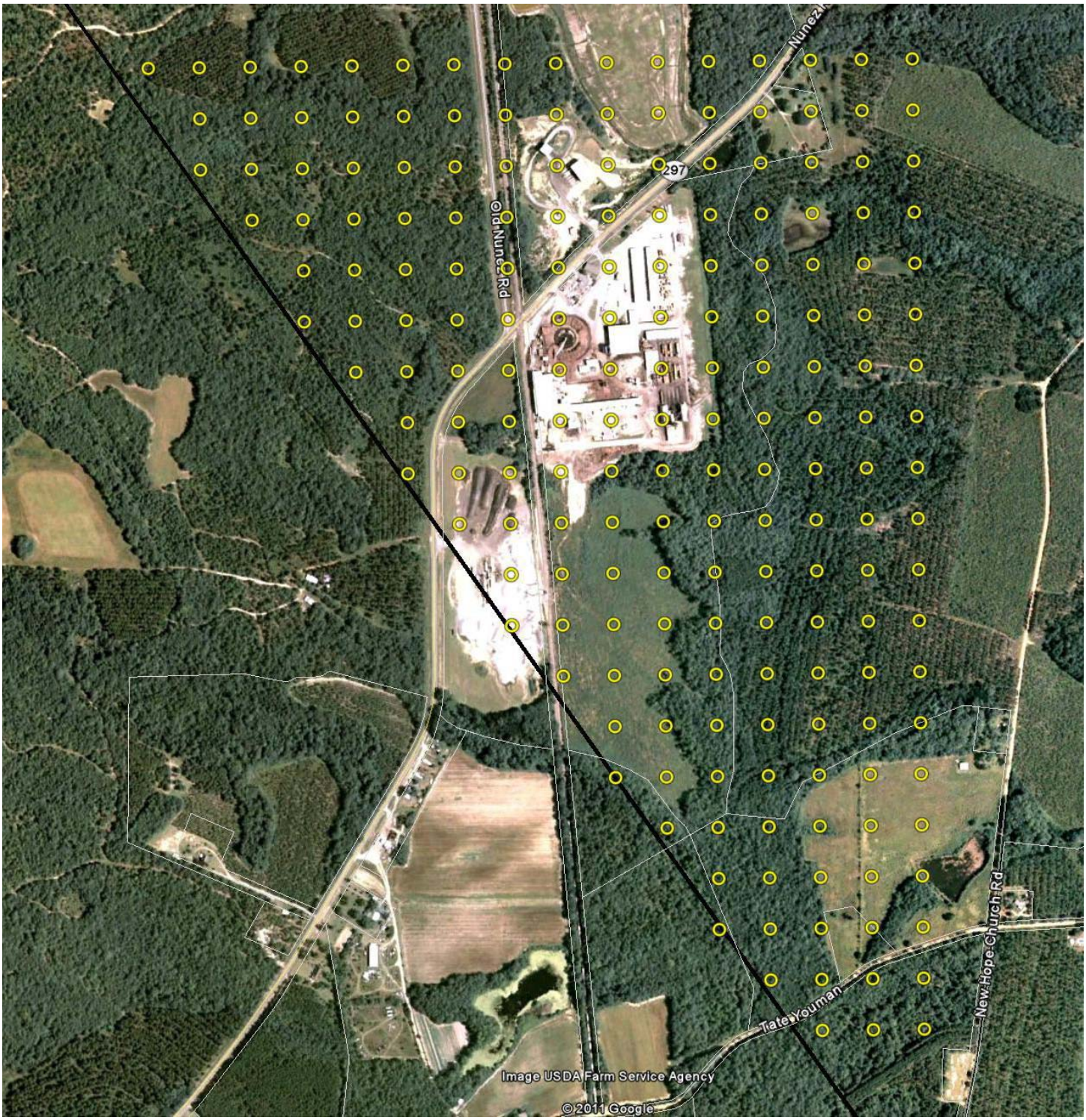

Figure 2.5-3: Aerial View of 100 meter Spaced Receptor Grid for 1-hour NO_2 NAAQS Violations Culpability

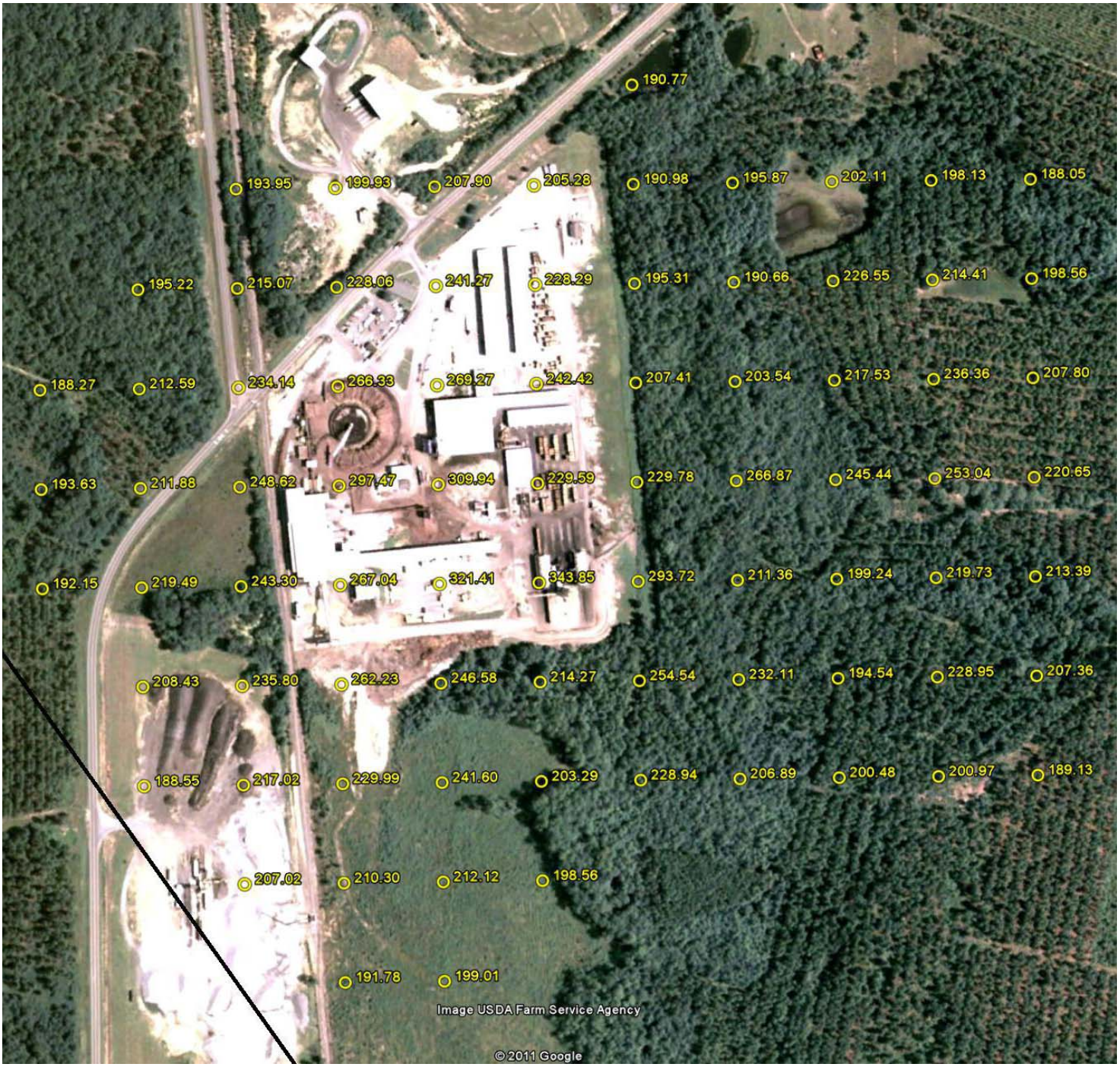

Figure 2.5-4: Aerial View of 100 m Spaced Culpability Receptors with 1-hour NO_2 NAAQS Exceedances

For the 79 receptors shown in Figure 2.5-4, 1-hour NO_2 NAAQS violations were predicted from the design concentration (98th-percentile) to the 148th ranked five-year average. However, this particular receptor (374,900.00 m east, 3,597,700.00, m north, 343.85 $\mu g/m^3$) is almost directly on top lumber kiln DK10. Based on the MAXDCONT output, the maximum paired contribution of the Millen facility to any of the ranked NAAQS violations predicted at any of the culpability receptors was 2.55 $\mu g/m^3$. Since this is less than the 1-hour NO_2 SIL, the Millen facility will not cause or contribute to any violations of the NAAQS.

Table 2.5-4 lists the maximum contribution of the Millen facility to any 1-hour NO_2 NAAQS violation predicted during the culpability analysis.

Table 2.5-4: Listing of Maximum Contribution of Millen Facility to Each Culpability Receptor with 1-hour NO_2 NAAQS Violations

#	UTM NAD83		NAAQS ($\mu g/m^3$)	Rank	CARBO ($\mu g/m^3$)	#	UTM NAD83		NAAQS ($\mu g/m^3$)	Rank	CARBO ($\mu g/m^3$)
	East (m)	North (m)					East (m)	North (m)			
1	374,400	3,597,700	188.6117	9TH	0.00164	41	374,900	3,597,900	197. 4998	37TH	0.00993
2	374,400	3,597,800	193.6307	8TH	0.00113	42	374,900	3,598,000	198.5273	22ND	0.00606
3	374,400	3,597,900	188.2727	8TH	0.00108	43	374,900	3,598,100	192.5207	14TH	0.00191
4	374,500	3,597,500	188.5521	8TH	0.00281	44	375,000	3,597,500	192.6822	23RD	0.01139
5	374,500	3,597,600	195.4682	11TH	0.00270	45	375,000	3,597,600	214.2867	30TH	0.02103
6	374,500	3,597,700	193.1435	15TH	0.00323	46	375,000	3,597,700	235.0015	74TH	0.10811
7	374,500	3,597,800	195.0733	15TH	0.00335	47	375,000	3,597,800	203.7130	44TH	0.02789
8	374,500	3,597,900	188.6075	22ND	0.00210	48	375,000	3,597,900	195.4168	17TH	0.00587
9	374,500	3,598,000	188.6385	13TH	0.00140	49	375,000	3,598,000	189.3163	11TH	0.00103
10	374,600	3,597,400	192.1919	10TH	0.00271	50	375,000	3,598,100	190.9842	8TH	0.00093
11	374,600	3,597,500	202.2323	12TH	1.36143	51	375,000	3,598,200	190.7749	8TH	0.00095
12	374,600	3,597,600	196.2013	19TH	0.00508	52	375,100	3,597,500	193.3610	13TH	0.00290
13	374,600	3,597,700	204.1440	23RD	0.00567	53	375,100	3,597,600	195.5615	21ST	0.01185
14	374,600	3,597,800	201.5770	26TH	0.00544	54	375,100	3,597,700	192.4707	35TH	0.00873
15	374,600	3,597,900	199.9476	28TH	0.00410	55	375,100	3,597,800	194.1750	66TH	0.01153
16	374,600	3,598,000	188.2761	21ST	0.00287	56	375,100	3,597,900	192.2355	21ST	0.00338
17	374,600	3,598,100	188.9798	10TH	0.00157	57	375,100	3,598,000	189.6414	9TH	0.00109
18	374,700	3,597,300	191.7816	8TH	0.00211	58	375,100	3,598,100	195.8689	8TH	0.00079
19	374,700	3,597,400	196.8744	11TH	0.00317	59	375,200	3,597,500	189.4090	12TH	0.00515
20	374,700	3,597,500	199.9882	16TH	0.00480	60	375,200	3,597,600	194.5384	8TH	0.00114
21	374,700	3,597,600	217.2219	22ND	0.75046	61	375,200	3,597,700	193.5613	14TH	0.00361
22	374,700	3,597,700	205.6970	36TH	0.01059	62	375,200	3,597,800	193.6689	54TH	0.00559
23	374,700	3,597,800	189.2783	50TH	0.00897	63	375,200	3,597,900	213.9634	12TH	0.00278
24	374,700	3,597,900	192.6970	52ND	0.00869	64	375,200	3,598,000	198.1231	27TH	0.00210
25	374,700	3,598,000	191.2579	28TH	0.00339	65	375,200	3,598,100	189.4765	13TH	0.00180
26	374,700	3,598,100	195.9490	10TH	0.00210	66	375,300	3,597,500	195.3270	9TH	0.00245
27	374,800	3,597,300	199.0143	8TH	0.00180	67	375,300	3,597,600	191.5091	31ST	0.00268
28	374,800	3,597,400	188.4637	18TH	0.00333	68	375,300	3,597,700	192.2245	34TH	0.00204
29	374,800	3,597,500	193.5987	8TH	0.00562	69	375,300	3,597,800	203.2558	41ST	0.00379
30	374,800	3,597,600	192.2365	37TH	2.55621	70	375,300	3,597,900	198.0228	34TH	0.00325
31	374,800	3,597,700	253.7584	39TH	0.02039	71	375,300	3,598,000	203.5508	14TH	0.00188
32	374,800	3,597,800	206.3921	87TH	0.01819	72	375,300	3,598,100	188.1343	14TH	0.00105
33	374,800	3,597,900	190.1228	56TH	0.01324	73	375,400	3,597,500	188.1259	8TH	0.00159
34	374,800	3,598,000	192.6215	31ST	0.00494	74	375,400	3,597,600	193.2879	14TH	0.00122
35	374,800	3,598,100	196.3221	12TH	0.00219	75	375,400	3,597,700	195.2494	19TH	0.00139
36	374,900	3,597,400	190.9309	12TH	0.00110	76	375,400	3,597,800	193.6209	22ND	0.00223
37	374,900	3,597,500	203.2863	8TH	0.00575	77	375,400	3,597,900	192.0036	15TH	0.00161
38	374,900	3,597,600	202.4749	14TH	0.01975	78	375,400	3,598,000	189.7917	13TH	0.00131
39	374,900	3,597,700	223.3586	114TH	1.23686	79	375,400	3,598,100	188.0494	8TH	0.00081
40	374,900	3,597,800	228.6830	81ST	0.05039						

2.6 PSD Increment Air Quality Analysis

As part of the air quality analysis, a PSD applicant must demonstrate that emissions from the proposed construction and operation of a facility will not cause or contribute to air pollution in violation of any "maximum allowable increase" over the baseline concentration in any area. The ''maximum allowable increase'' of an air pollutant that is allowed to occur above the baseline concentration is referred to as the PSD increment. By establishing the maximum allowable level of ambient pollutant concentration increase in a particular area, an increment defines ''significant deterioration'' of air quality in that area. Table 2.6-1 lists the PSD increment for pollutants modeled for the Millen facility.

Table 2.6-1: PSD Increments

Pollutant	Averaging Period				
	1-hour ($\mu g/m^3$)	3-hour ($\mu g/m^3$)	8-hour ($\mu g/m^3$)	24-hour ($\mu g/m^3$)	Annual ($\mu g/m^3$)
NO_2	--	--	--	--	25
SO_2	--	512	--	91	20
PM_{10}	--	--	--	30	17

In order to evaluate compliance with the PSD increments, AERMOD was used with the airport location meteorological data set to estimate the total increase in pollutant concentrations above the applicable baseline concentration. Since this PSD application establishes the minor source baseline date for PM_{10} and SO_2, the total increase in pollutant concentrations was determined as the emission increases associated with the Millen facility and all emission increases occurring at major PSD sources after the major source baseline date for PM_{10} and SO_2 (January 6, 1975). For NO_2, since the baseline concentration was established in 1988, all emission increases occurring at both major and minor sources during and after 1988 were used to evaluate the increment. No increment expansion was considered for any pollutant in the analysis. For each pollutant, a refined receptor grid containing fenceline receptors spaced no further than 100 meters apart and 100 meter spaced receptors extending outward from the Millen facility in all directions to the distance of the applicable SIA was used. Table 2.6-2 summarizes the results of the PSD increment air quality analysis.

Table 2.6-2: PSD Increment Modeling Results

Pollutant	Avg. Period	Year	Increase Above Baseline Concentration			PSD Increment Comparison		
			UTM NAD83		Conc. ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)	Violations Predicted	# of Violating Receptors
			East (m)	North (m)				
PM_{10}	24-hr [1]	2006	415,113.20	3,625,579.50	18.46	30	No	N/A
		2007	416,200.00	3,626,100.00	18.31		No	N/A
		2008	415,113.20	3,625,579.50	23.78		No	N/A
		2009	415,100.00	3,625,700.00	21.51		No	N/A
		2010	415,049.80	3,625,513.40	16.78		No	N/A
PM_{10}	Annual	2006	416,127.80	3,625,819.70	3.03	17	No	N/A
		2007	416,127.80	3,625,819.70	2.72		No	N/A
		2008	416,200.00	3,625,800.00	2.87		No	N/A
		2009	416,200.00	3,625,800.00	2.67		No	N/A
		2010	416,168.30	3,625,735.50	3.33		No	N/A
NO_2	Annual [2]	2006	416,300.00	3,626,000.00	10.16	25	No	N/A
		2007	416,300.00	3,626,000.00	9.30		No	N/A
		2008	416,300.00	3,625,900.00	9.10		No	N/A
		2009	416,300.00	3,625,600.00	8.36		No	N/A
		2010	416,249.20	3,625,567.10	10.76		No	N/A
SO_2	3-hr [1]	2006	415,376.20	3,625,991.00	37.28	512	No	N/A
		2007	416,289.70	3,625,482.90	34.25		No	N/A
		2008	416,500.00	3,625,600.00	35.87		No	N/A
		2009	417,600.00	3,629,100.00	45.67		No	N/A
		2010	418,400.00	3,628,200.00	52.22		No	N/A
SO_2	24-hr [1]	2006	416,400.00	3,626,000.00	14.04	91	No	N/A
		2007	416,300.00	3,625,600.00	13.74		No	N/A
		2008	414,922.80	3,625,381.00	16.24		No	N/A
		2009	416,500.00	3,625,600.00	14.34		No	N/A
		2010	415,200.00	3,625,700.00	12.92		No	N/A
SO_2	Annual	2006	416,300.00	3,626,000.00	2.54	20	No	N/A
		2007	416,300.00	3,626,000.00	2.34		No	N/A
		2008	416,300.00	3,625,900.00	2.24		No	N/A
		2009	416,400.00	3,625,600.00	2.16		No	N/A
		2010	416,300.00	3,625,600.00	2.77		No	N/A

[1] Results for the short-term PSD increment analysis for each pollutant are based on the highest second-high concentration for each year modeled (*exceedance rate of one per year at any one location*)

[2] Design concentrations determine using Tier 1 full conversion of NO_x to NO_2

As shown in Table 2.6-2, there were no predicted exceedances of the PSD increments for any pollutant. Therefore, the Millen facility will not cause or contribute to any air pollutant in violation of the maximum allowable increase over the baseline concentration in any area.