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March 16, 2021

Andrew Fleck, Environmental Group Manager
Pennsylvania Department of Environmental Protection
Bureau of Air Quality
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

Subject: Renovo Energy Center LLC
Response to Comments on Plan Approval 18-00033B

Dear Andrew:

On behalf of Renovo Energy Center LLC (REC), POWER Engineers, Inc. (POWER) provides the enclosed response to comments submitted by the Clean Air Council, PennFuture, the Natural Resources Defense Council, Center for Biological Diversity, Earthworks, Sierra Club, Environmental Integrity Project, and the Susquehanna Valley PA and Pittsburgh & SWPA chapters of the Climate Reality Project (Commenters) regarding REC's draft Plan Approval (Plan Approval 18-00033B) and associated documentation. As discussed, POWER is only submitting formal responses to Comments 2a, 2c, 2d, and 2g.

Please do not hesitate to reach out with any questions.

Sincerely,

Tom Rolfson
Environmental Engineer

Enclosure(s):
c: Daniel Roble, PaDEP
Dave Shimmel, PaDEP
Rick Franzese, Renovo Energy Center
Dan Lee, Renovo Energy Center
Bill Bousquet, Innovative Power Solutions
Tim Donnelly, POWER Engineers

Renovo Energy Center
Response to Comments 2a, 2c, 2d, 2g

Response to Comment 2a – Deposition Analysis

Renovo Energy Center (REC) believes that the Significant Emission Rate (SER) methodology was not misapplied, however in response to Clean Air Council Comment 2a REC provides this more detailed screening assessment based on dispersion modeling to assess the impacts of REC emissions on plants, soils, and animals. The National Ambient Air Quality Standards (NAAQS) are protective of these impacts for criteria pollutants; thus, the focus of this deposition analysis is on noncriteria trace elements emitted from the combustion turbines (CTs).

REC followed the procedures outlined in Section 5.1.3 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals* (EPA OAQPS, 12/12/1980). The general steps in the screening procedure are as follows:

- Estimate ambient maxima
- Screen for direct exposure
- Calculate deposited concentration of trace elements
- Calculate percentage increases over endogenous concentrations
- Calculate tissue concentrations in plants
- Screen for potential adverse impacts of trace elements

The following sections describe each step listed above in more detail, with result summaries embedded.

Estimate Ambient Maxima and Screening for Direct Exposure

As indicated previously, this analysis focuses only on trace elements emitted from the CTs. Criteria pollutants were evaluated using EPA-approved techniques as described in REC's Modeling Report submitted on February 27, 2020 (the Modeling Report). The trace elements included in this analysis are arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and selenium. Of those elements, only beryllium and lead have concentration-based screening concentrations. Thus, only those two trace elements can be screened for direct exposure. Using AERMOD (v19191), a unit emission rate of 1 ton/year was modeled from each CT for the entire year of collected on-site meteorological data , using the same exhaust parameters used in the annual NO_2 load case analysis presented in the Modeling Report (except that, for the purposes of satisfying CAC Comment 2b, a stack height of 70.87 meters was used rather than 79 meters). The monthly averaging period was selected, as the beryllium screening concentration is based on a one-month averaging period, while the lead screening concentration is based on a 3-month averaging period. AERMOD is unable to calculate a 3-month concentration, but a 1-month concentration yields a conservative result. The results of this dispersion modeling using actual on-site meteorological data were then used in the screening procedure and pro-rated based on the maximum potential emissions of beryllium and lead.

The following table displays the monthly ambient maxima for beryllium and lead, which reflects the worst-case load scenario modeled (Load Scenario #5 as described in the Modeling Report). The pro-rated ambient maximum concentrations are orders of magnitude below the AQRV screening concentrations.

Trace Element	Modeled Emission Rate from Both CTs Combined (tons/year)	Maximum Modeled Impact from All Load Scenarios (µg/m³)	Maximum Potential Emission Rate from Both CTs Combined (tons/year)	Pro-Rated Ambient Maximum Concentration (µg/m³)	AQRV Screening Concentration (µg/m³)
Beryllium	2.0	0.025	0.0010	0.000013	0.01
Lead			0.042	0.00053	1.5

Note: AQRV Screening Concentrations obtained from Table 5.3 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*

Calculate Deposited Concentrations of Trace Elements

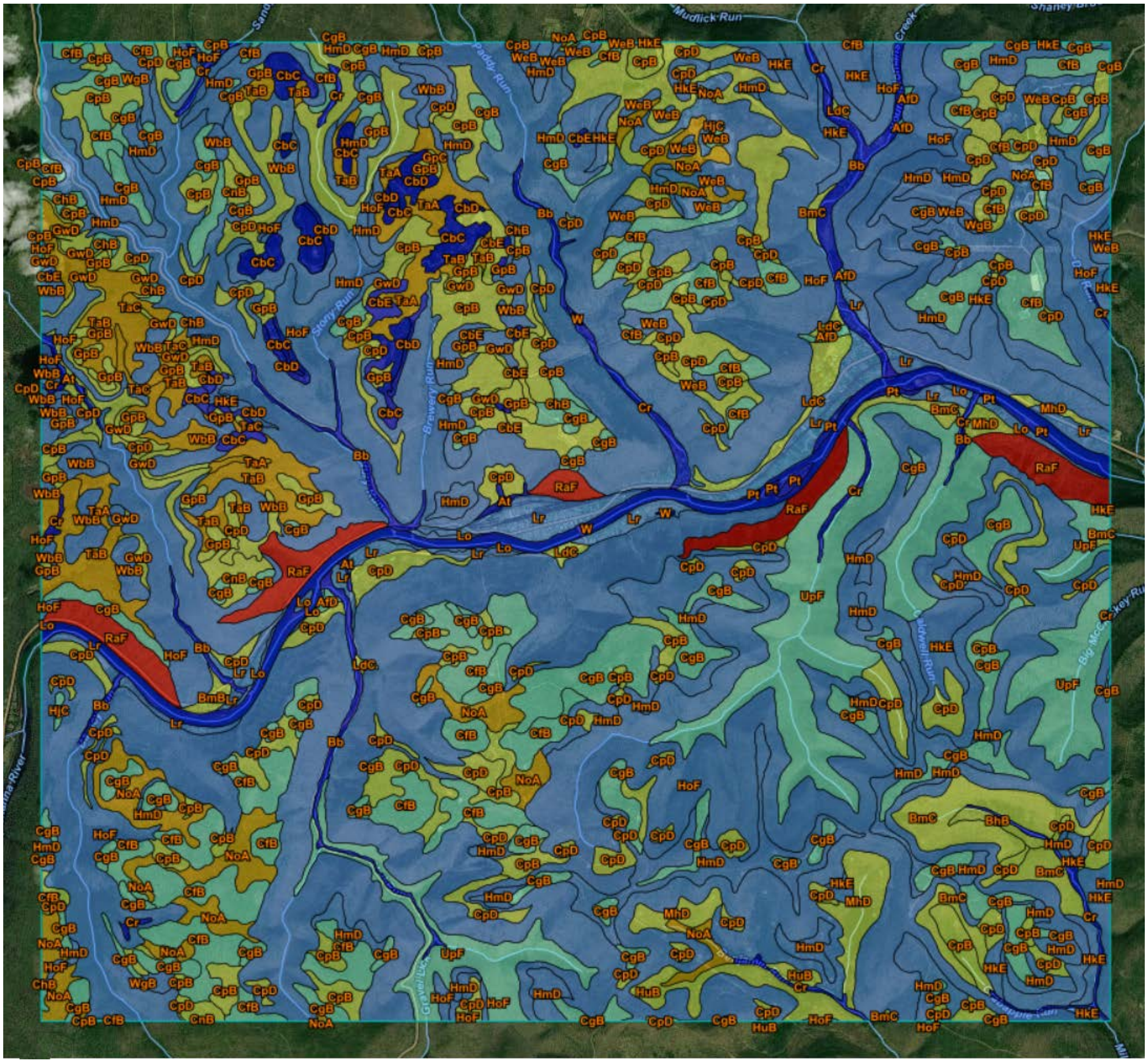
Similar to screening for direct impacts, in order to calculate the deposited concentrations of the trace elements, AERMOD was used with on-site meteorological data to calculate an annual average ambient maximum concentration based on a unit emission rate of 1 ton/year for each CT, with the results then being pro-rated based on the maximum potential emissions of each of the trace elements. Following the calculation of the maximum annual average ambient concentration of each trace element, the deposited concentrations were then calculated using Equation 5.1 from *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*.

Equation 5.1: $DC = 21.5 \times (\frac{N}{d})X$

Where: DC = deposited concentration (ppmw)
N = expected lifetime of source (years)
d = depth of soil through which deposited material is distributed (cm)
X = maximum annual average ambient concentration from the source (µg/m³)

For the purposes of this analysis, N is assumed to be 40 years, while d is assumed to be 48 cm. The value for d was determined using the U.S. Department of Agriculture's Web Soil Survey (WSS) interactive mapping tool. An Area of Interest (AOI) approximately 14 km by 14 km, centered on REC, was analyzed for the "depth to any soil restrictive layer." The definition of "restrictive layer" given in the WSS is "a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers." Thus, the "depth to any soil restrictive layer" represents an appropriate approximation for the variable "d."

Shown below is a map of the AOI with the various classifications of soil identified by different colors.



The table below summarizes the different types of soil, their portion of the AOI, and their depth to any soil restrictive layer.

Soil Type ID	Soil Type Name	Rating (cm)	Acres in AOI	Percent of AOI
AfD	Allegheny silt loam, 8 to 25 percent slopes	148	48.5	0.10%
At	Atkins silt loam, 0 to 3 percent slopes, frequently flooded	>200	52.1	0.10%
Bb	Barbour-Craigsville complex	>200	502.3	1.00%
BhB	Buchanan gravelly loam, 3 to 8 percent slopes	74	45.7	0.10%
BmB	Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony	74	39.1	0.10%
BmC	Buchanan channery loam, 8 to 25 percent slopes, extremely stony	73	665.3	1.40%
CbC	Cedarcreek extremely channery loam, strongly sloping	230	518.1	1.10%
CbD	Cedarcreek extremely channery loam, moderately steep	230	153.7	0.30%
CbE	Cedarcreek extremely channery loam, steep	230	82.5	0.20%
CfB	Clymer channery loam, 0 to 8 percent slopes, extremely stony	127	2,375.30	4.90%

Soil Type ID	Soil Type Name	Rating (cm)	Acres in AOI	Percent of AOI
CgB	Clymer-Cookport channery loams, 0 to 8 percent slopes, extremely stony	127	2,959.70	6.10%
ChB	Clymer-Hazleton sandy loams, 0 to 8 percent slopes, extremely stony	127	148.3	0.30%
CnB	Cookport silt loam, 3 to 8 percent slopes	61	163	0.30%
CpB	Cookport channery loam, 0 to 8 percent slopes, extremely stony	58	2,218.50	4.60%
CpD	Cookport channery loam, 8 to 25 percent slopes, extremely stony	58	3,289.00	6.80%
Cr	Craigsville gravelly loam	>200	329.4	0.70%
GpB	Gilpin silt loam, 3 to 8 percent slopes	79	514.7	1.10%
GpC	Gilpin silt loam, 8 to 15 percent slopes	80	7.6	0.00%
GwD	Gilpin-Wharton silt loams, 15 to 25 percent slopes	74	303.1	0.60%
HjC	Hazleton channery sandy loam, 8 to 25 percent slopes, extremely stony	147	23.8	0.00%
HkE	Hazleton channery sandy loam, 25 to 80 percent slopes, rubbly	153	1,730.40	3.60%
HmD	Hazleton-Clymer channery loams, 8 to 25 percent slopes, extremely stony	152	3,094.50	6.40%
HoF	Hazleton-Laidig complex, 25 to 50 percent slopes, extremely stony	152	18,351.40	37.70%
HuB	Hustontown silt loam, 3 to 8 percent slopes	76	232	0.50%
LdC	Laidig gravelly loam, 8 to 25 percent slopes, extremely stony	86	189.3	0.40%
Lo	Linden silt loam, occassionally flooded	178	113.3	0.20%
Lr	Linden silt loam, rarely flooded	178	928.9	1.90%
MhD	Meckesville channery loam, 8 to 25 percent slopes, very stony	89	369.4	0.80%
NoA	Nolo silt loam, 0 to 3 percent slopes	48	941.2	1.90%
Pt	Potomac gravelly sandy loam	230	55.7	0.10%
RaF	Rock outcrop-Rubble land complex, 50 to 90 percent slopes	0	822.1	1.70%
TaA	Tilsit silt loam, 0 to 3 percent slopes	48	336.7	0.70%
TaB	Tilsit silt loam, 3 to 8 percent slopes	48	1,037.00	2.10%
TaC	Tilsit silt loam, 8 to 15 percent slopes	48	123.3	0.30%
UpF	Ungers-Meckesville complex, 25 to 50 percent slopes, extremely stony	122	2,696.20	5.50%
W	Water	>200	733.1	1.50%
WbB	Wharton silt loam, 3 to 8 percent slopes	175	1,085.40	2.20%
WeB	Wharton silt loam, 0 to 8 percent slopes, very stony	165	1,254.50	2.60%
WgB	Wharton-Cookport complex, 0 to 8 percent slopes, very stony	165	127.2	0.30%
Totals for Area of Interest			48,661.20	100.00%

Aside from the rocky outcrop-rubble land complex, the minimum value for the depth to any soil restrictive layer is 48 cm. Thus, the use of 48 cm represents a conservative estimate for the variable "d."

As described previously, the values for X were determined using dispersion modeling. The following table summarizes the annual average model results and ultimate values of X for each trace element.

Trace Element	Modeled Emission Rate from Both CTs Combined (tons/year)	Maximum Modeled Impact from All Load Scenarios (µg/m³)	Maximum Potential Emission Rate from Both CTs Combined (tons/year)	X: Pro-Rated Ambient Maximum Concentration (µg/m³)
Arsenic	2.0	0.0129	0.034	0.00022
Beryllium			0.0010	0.0000066
Cadmium			0.023	0.00015
Chromium			0.043	0.00028
Cobalt			0.00062	0.0000040
Lead			0.042	0.00027
Manganese			2.37	0.015
Mercury			0.0055	0.000036
Nickel			0.029	0.00019
Selenium			0.075	0.00048

Assigning values for the variables N, d, and X as described, the deposited concentration, DC, was calculated for each trace metal. The following table summarizes the calculated DC for each trace element, with a comparison to the endogenous concentration for each trace element obtained from Table 3.5 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*. As indicated by this comparison, no adverse impacts are expected on soils.

Trace Element	DC: Deposited Concentration (ppmw)	Endogenous Concentration (ppmw)	Increase from Endogenous Concentration
Arsenic	0.0040	6	0%
Beryllium	0.00012	6	0%
Cadmium	0.0026	0.06	4%
Chromium	0.0050	100	0%
Cobalt	0.000072	8	0%
Lead	0.0049	10	0%
Manganese	0.27	850	0%
Mercury	0.00064	--	--
Nickel	0.0034	40	0%
Selenium	0.0087	0.5	2%

Calculate tissue concentrations in plants

The calculation of Tissue Concentrations (TCs) in plants is conducted by multiplying the deposited concentration by the Plant: Soil Concentration Ratios (CR) presented in Table 3.6 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*. The following table summarizes the CRs and the resulting TCs.

Trace Element	DC (ppmw)	CR	TC (ppmw)
Arsenic	0.0040	0.14	0.00056
Beryllium	0.00012	--	--
Cadmium	0.0026	10.7	0.028
Chromium	0.0050	0.02	0.00010
Cobalt	0.000072	0.11	0.0000079
Lead	0.0049	0.45	0.0022
Manganese	0.27	0.066	0.018
Mercury	0.00064	0.5	0.00032
Nickel	0.0034	0.045	0.00015
Selenium	0.0087	1.0	0.0087

Screen for potential adverse impacts of trace elements

Screening for adverse impacts is a 3-step process:

1. Compare DC to soil screening concentrations in Table 3.4 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*.
2. Compare TC to tissue screening concentrations in Table 3.4 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*.
3. Compare TC to dietary screening thresholds in Table 3.7 of *A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals*.

The following table summarizes REC's three-step screening process for potential adverse effects of trace elements.

	Step 1		Steps 2 and 3		
Trace Element	Calculated DC (ppmw)	DC Screening Level (ppmw)	Calculated TC (ppmw)	TC Screening Level (ppmw)	Dietary Screening Level (ppmw)
Arsenic	0.0040	3	0.00056	0.25	3
Beryllium	0.00012	--	--	--	--
Cadmium	0.0026	2.5	0.028	3	15
Chromium	0.0050	8.4	0.00010	1	--
Cobalt	0.000072	--	0.0000079	19	1
Lead	0.0049	1000	0.0022	126	80
Manganese	0.27	2.5	0.018	400	500
Mercury	0.00064	455	0.00032	--	--
Nickel	0.0034	500	0.00015	60	1000
Selenium	0.0087	13	0.0087	100	5

As indicated by the results of the analysis presented above, REC's DCs are all far less than the soil screening concentrations, and REC's TCs are all far less than the tissue screening concentrations and dietary screening levels. Thus, REC is not expected to have an adverse impact on plants, soils, or animals.

Response to Comment 2c – Associated Growth Analysis

There are no associated facilities planned in support of REC, and in particular the proposed natural gas synthesis plant is not being proposed as a result of REC. The proposed natural gas synthesis plant is in the developmental planning stages only at this point, with no guarantee that it will be constructed. PaDEP has further indicated that no Plan Approval application has been filed at this point. Therefore, this plant should not be included in the dispersion modeling as it does not represent a secondary emission source associated with REC operations. Additionally, REC has made no commitments on where it will obtain ammonia and approaching project developers to discuss potential commercial partnerships is not a viable option at this stage.

The article in footnote 14 of the CAC comment document indicates that the proposed natural gas synthesis plant would "convert stranded natural gas to hydrogen, ammonia, and urea." The term "stranded natural gas" is further explained in the article as a significant issue in Pennsylvania, as "much of Pennsylvania's natural gas supply currently is stranded, due mostly to the lack of political will for pipelines in adjacent states." In other words, there is abundant natural gas supply in Pennsylvania without the need for "many new gas wells" as the CAC comment indicates. REC may actually be able to help alleviate the stranded natural gas issues in the immediate area and will utilize the natural gas in a highly efficient application.

Furthermore, the associated growth analysis is intended only to include general commercial, residential, industrial and other growth associated with the source. As previously stated, there are no additional facilities that will be associated with REC, and the associated growth analysis included in the Report provided an analysis of the commercial and residential growth that may be associated with REC. There are no significant air quality impacts predicted from associated growth related to REC.

Response to Comment 2d – Background Data

REC provides this revised version of Section 10.0 of the Protocol that was submitted on January 30, 2020.

10.0 REPRESENTATIVE AMBIENT BACKGROUND CONCENTRATIONS

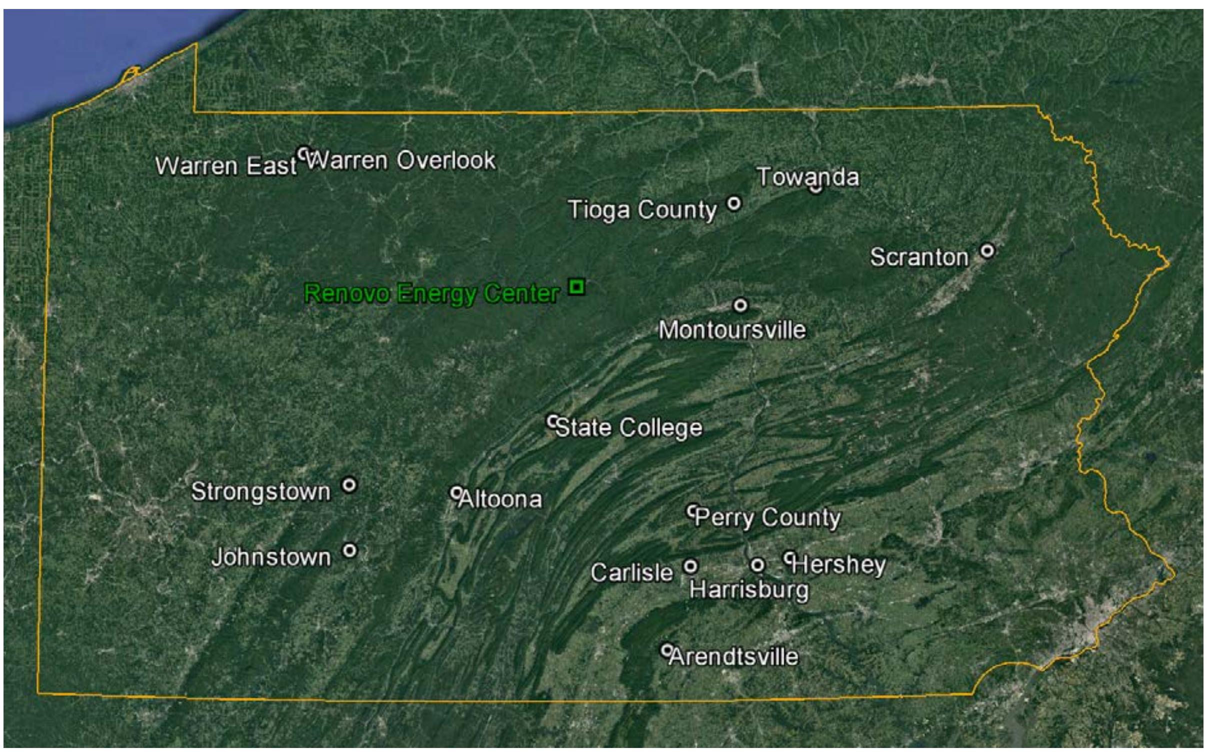
In order to determine the cumulative impacts of REC's emissions, the levels of ambient background air quality must be considered. REC and any nearby interactive sources' modeled impacts will be added to the selected background concentrations to determine the project's cumulative ambient impact, which will be compared to the NAAQS for each applicable pollutant and averaging period. The background concentrations must be representative of the project site and were obtained from the most recent three years (2017 through 2019) of certified monitoring data available. Representativeness of each monitoring site to the project site was justified based on EPA guidance contained in Section 8.3 of the "Guideline on Air Quality Models" (Background Concentrations), and Section 2.4 of the "Ambient Monitoring Guidelines for Prevention of Significant Deterioration" (Use of Representative Air Quality Data). Also, attention was given to the EPA February 10, 2020 memorandum "DRAFT Guidance for Ozone and Fine Particulate Matter Permit Modeling" for the justification of $PM_{2.5}$ background monitoring sites. Generally, the location of the data relative to the project site, and the quality of the data are the most important factors in selecting an ambient monitoring location.

The initial list of monitoring sites analyzed for representativeness to the project site, the pollutants monitored, and the distances from the project site are summarized in Table 15 below. The locations of each of the monitoring sites (and the project site) are shown below in Figure 3.

TABLE 15 POTENTIAL MONITORING SITES

MONITORING SITE	COUNTY	POLLUTANTS MONITORED	DISTANCE AND DIRECTION FROM PROJECT SITE
Altoona	Blair	PM_{10}, $PM_{2.5}$, SO_2	~102 km SSW
Arendtsville	Adams	CO, NO_2, $PM_{2.5}$, SO_2	~160 km SSE
Carlisle	Cumberland	$PM_{2.5}$	~130 km SSE
Harrisburg	Dauphin	$PM_{2.5}$	~143 km SE
Hershey	Dauphin	PM_{10}	~148 km SE
Johnstown	Cambria	CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2	~150 km SW
Montoursville	Lycoming	PM_{10}	~71 km E
Perry County	Perry	NO_2, SO_2	~108 km SSE
Scranton	Lackawanna	CO, NO_2, $PM_{2.5}$	~180 km ENE
State College	Centre	NO_2, $PM_{2.5}$, SO_2	~58 km SSW
Strongstown	Indiana	SO_2	~130 km SW
Tioga County	Tioga	NO_2, $PM_{2.5}$	~77 km ENE
Towanda	Bradford	NO_2, $PM_{2.5}$	~112 km ENE
Warren East	Warren	SO_2	~126 km WNW
Warren Overlook	Warren	SO_2	~131 km WNW

FIGURE 3 MONITORING SITE LOCATIONS



The table below displays counties and their respective emission profiles for each pollutant included in the modeling analysis. Only emission values for those pollutants for which the county has an ambient monitor are shown, with the exception of Clinton County, which has no monitors but is the location of the proposed project.

TABLE 16 EMISSIONS ESTIMATES FOR COMPARISON OF AMBIENT MONITORING LOCATIONS

	2017 COUNTYWIDE EMISSIONS									
	CO		NOx		PM_{10}		$PM_{2.5}$		SO_2	
COUNTY	tons	tons/mi^2	tons	tons/mi^2	tons	tons/mi^2	tons	tons/mi^2	tons	tons/mi^2
Clinton	9,943	11.07	2,295	2.56	933	1.04	497	0.55	41	0.05
Adams	*13,461*	25.79	2,458	4.71	--	--	1,088	2.09	65	0.12
Blair	--	--	--	--	2,423	4.60	1,113	2.11	706	1.34
Bradford	--	--	3,169	*2.73*	--	--	1,096	0.94	--	--
Cambria	16,309	*23.53*	4,986	7.19	*1,985*	2.86	1,163	1.68	6,319	9.12
Centre	--	--	4,080	3.67	--	--	1,386	1.25	324	0.29
Cumberland	--	--	--	--	--	--	2,059	3.74	--	--
Dauphin	--	--	--	--	6,154	11.03	2,408	4.31	--	--
Indiana	--	--	--	--	--	--	--	--	17,704	21.23
Lackawanna	23,095	49.67	3,992	8.59	--	--	1,313	2.82	--	--
Lycoming	--	--	--	--	2,357	*1.89*	--	--	--	--
Perry	--	--	1,921	3.46	--	--	--	--	*36*	*0.065*
Tioga	--	--	*2,175*	1.91	--	--	*731*	*0.64*	--	--
Warren	--	--	--	--	--	--	--	--	381	0.42

While the project site is in an area of complex terrain, the relatively small quantity of emissions in Clinton County as compared to other counties with monitoring sites will provide for a conservative estimate of background air quality. County emissions estimates for each pollutant included in the modeling analysis were obtained from EPA's 2017 National Emission Inventory (NEI), which is the most recent NEI with full data availability. In comparison to nearby counties with applicable ambient air monitoring sites Clinton County was typically one of the lowest pollutant emitters. The NEI data used in this analysis is included in Appendix F. For PM_{10} and $PM_{2.5}$, Clinton County was the lowest emitter among counties with PM_{10}/$PM_{2.5}$ monitoring sites on both a total emissions basis and an emissions per area basis. The same statement is true for counties with CO monitoring sites. For NOx, only Perry County and Tioga County had lower emissions on a total emissions basis, and only Tioga County had lower emissions on an emissions per area basis for counties with NOx monitoring sites. For SO_2, Clinton County had lower total emissions and emissions per area than any county with SO_2 monitoring sites, with the exception of Perry County which lad lower total SO_2 emissions but higher emissions per area.

In addition to the quantitative comparison above, a qualitative comparison of the areas immediately surrounding the monitoring sites and the project site are helpful in determining which monitoring site is most representative of the project site for each pollutant to be included in the ambient air quality impact analysis. Appendix G contains satellite imagery of the areas immediately surrounding each site as well as the proposed project site. Two images are displayed for each site–one image with a 1-kilometer radius drawn around the selected site, and one image with a 10-kilometer radius drawn around the selected site.

The following subsections describe the comparisons of the project site with the applicable monitoring site for each pollutant to be included in the ambient air quality impact analysis and justify the proposed selection of which monitoring site data will be used.

10.1 CO

CO monitoring sites include the Arendtsville, Johnstown, and Scranton monitoring stations. None of the monitoring sites is significantly closer in proximity to the project site than another. As mentioned above, Clinton County has lower total emissions of CO, as well as a lower emissions density (calculated as tons of CO per square mile) than any of the counties with CO monitoring sites. When comparing the areas immediately surrounding the project and monitoring sites, it is clear that both the Scranton and Johnstown monitoring sites have significantly more development in the surrounding area then the project site. The Arendtsville monitoring site is most representative of the REC project site's rural nature when viewing both the 1-km and 10-km areas. Adams County also had the lowest emissions density of the three monitoring sites, yet still significantly above Clinton County on total CO emissions as well as CO emissions per square mile. Therefore, CO monitoring data from the Arendtsville monitoring site will be used in the cumulative air quality impact analysis.

10.2 NOx

NOx monitoring sites include the Arendtsville, Johnstown, Perry County, Scranton, State College, Tioga County, and Towanda monitoring stations. Four of the sites (Perry County, State College, Tioga County, and Towanda) are significantly closer in proximity to the project site than the others. As mentioned above, only Perry County and Tioga County had lower emissions on a total emissions basis, and only Tioga County had a lower emissions density for counties with NOx monitoring sites. When comparing the areas immediately surrounding the project and monitoring sites, the Scranton, Johnstown, and State College monitoring sites have significantly more development in the surrounding area than the project site. With the remaining choices of Towanda, Perry County, and Tioga County, Tioga County NOx monitoring data will be used due to proximity, a comparison of the area immediately surrounding the sites, and data completeness.

10.3 PM_{10}

PM_{10} monitoring sites include the Altoona, Harrisburg, Hershey, Johnstown, and Montoursville monitoring stations. The Montoursville monitoring station is significantly closer in proximity than any of the other sites, and because there is no significant difference in the development surrounding each of the monitoring sites, PM_{10} monitoring data from Montoursville will be selected for inclusion in the cumulative air quality impact analysis. This is also expected to be a conservative estimate of background air quality, as the REC project site has a significantly lower amount of development in the project area. Note that due to the shutdown of the Montoursville monitoring station in early 2018, monitoring data from 2015-2017 will be used. The significant differences in the spatial representativeness of the other monitoring sites does not warrant their use for the sole benefit of having more recent data.

10.4 $PM_{2.5}$

$PM_{2.5}$ monitoring sites include the Altoona, Arendtsville, Carlisle, Harrisburg, Johnstown, Scranton, State College, and Tioga County monitoring stations. The State College and Tioga County monitoring stations are significantly closer in proximity to the project site than any of the other monitoring stations. At the time of the initial dispersion modeling analysis for REC (June 2017), a complete data set was not available from Tioga County as the monitor was installed in 2014. Thus, a complete 3-year data set was not available until the 2015-2017 data had been reviewed and approved (2018). With REC's protocol submittal in 2020, data was available from Tioga County but State College data was selected for consistency and conservatism. While a comparison of the surrounding areas within the 10-km radius of the project site to the State College monitoring station is not representative, a comparison of the surrounding area in the 10-km radius of the project site to the Tioga County monitoring station is most representative. The 19-kilometer increase in distance from the project site to Tioga County vs. State College is not significant enough to warrant the selection of State College over Tioga County. Additionally, both the total emissions and emissions per area of Clinton County is much more comparable to those of Tioga County than Centre County (State College). Thus, the $PM_{2.5}$ monitoring data from Tioga County will be used in the cumulative air quality impact analysis.

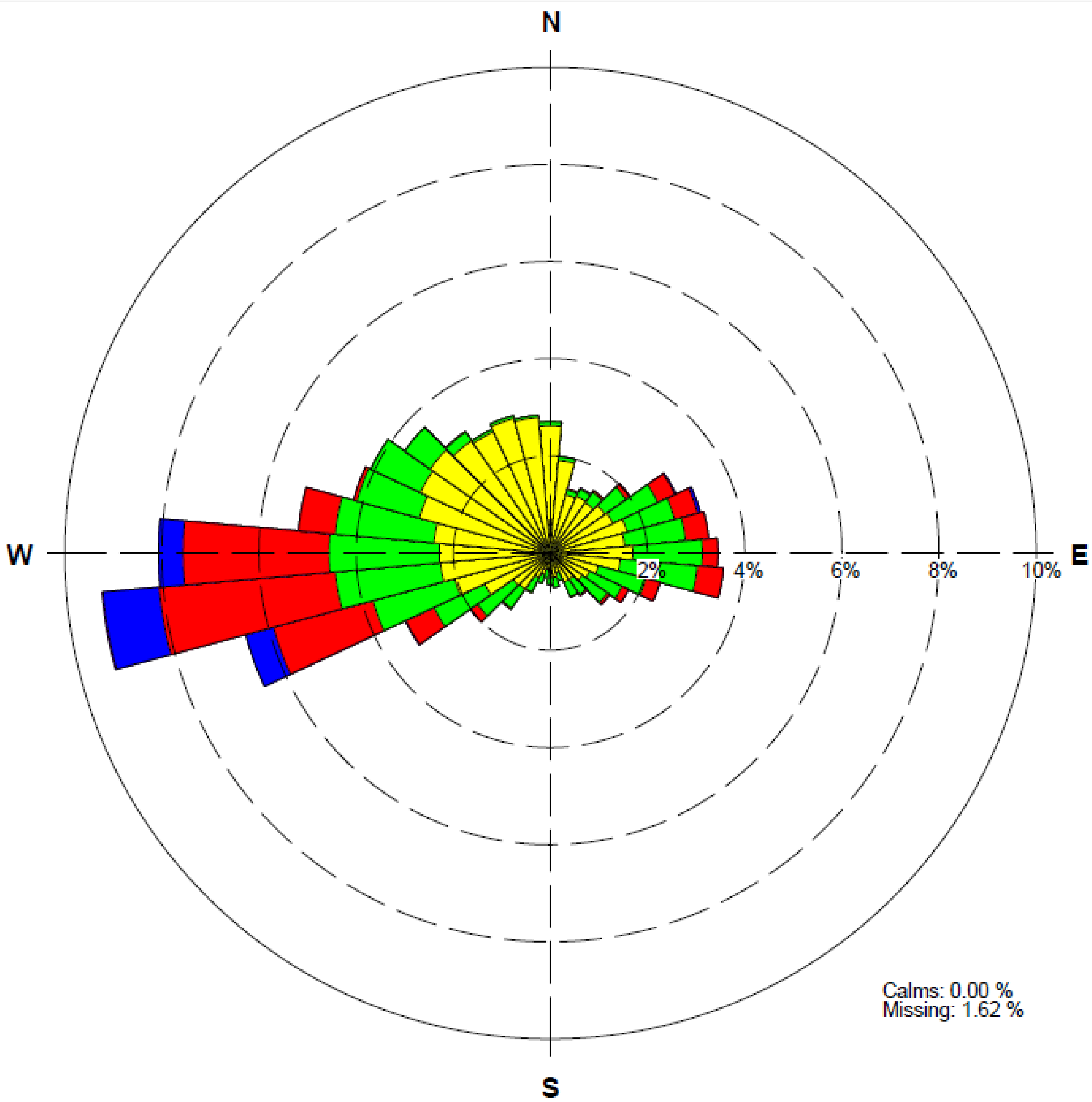
EPA's "Guidance for $PM_{2.5}$ Permit Modeling" indicates that the monitored background concentration of $PM_{2.5}$ must be considered to determine whether a substantial portion of the NAAQS has already been consumed. EPA's guidance suggests that if the difference between the $PM_{2.5}$ NAAQS and the $PM_{2.5}$ background concentrations is greater than or equal to the $PM_{2.5}$ SIL value, EPA believes it would be sufficient to use the 24-hour and annual $PM_{2.5}$ SILs as a screening tool to determine whether it is necessary to conduct a cumulative analysis for $PM_{2.5}$ NAAQS compliance. The 24-hour and annual $PM_{2.5}$ background design values from Tioga County are 16 $\mu g/m^3$ and 7.1 $\mu g/m^3$, respectively. The difference between the NAAQS and background values are thus 19 $\mu g/m^3$ and 4.9 $\mu g/m^3$, respectively, which are both greater than their respective SILs. It is therefore appropriate to use the $PM_{2.5}$ SILs as a screening tool to determine whether it is necessary to conduct a cumulative analysis for $PM_{2.5}$.

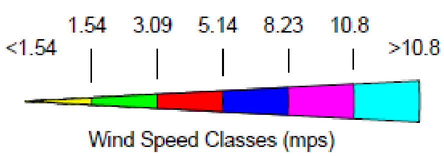
10.5 SO_2

SO_2 monitoring sites include the Altoona, Johnstown, Perry County, State College, Strongstown, Warren East, and Warren Overlook monitoring stations. Similar to the $PM_{2.5}$ monitoring stations, the State College monitoring station is significantly closer in proximity to the project site than any of the other monitoring sites, with the Altoona and Perry County monitoring sites being the next closest. As previously mentioned, the State College monitoring site has a significantly higher amount of development in the surrounding area than the project site, as does the Altoona monitoring site. However, the Perry County monitoring site was discontinued in 2014 and the State College monitoring data is not complete. Therefore, the Altoona monitoring station is the most representative site available and SO_2 monitoring data from Altoona will be used in the cumulative air quality impact analysis.

Response to Comment 2g – Meteorological Data Wind Rose

REC inadvertently processed the wind rose using only data from the 2015 calendar year (specifically, from October 27, 2015 through December 31, 2015). When processing the wind rose to reflect the full year of meteorological data used in the dispersion analyses (from October 27, 2015 through October 26, 2016), a wind rose is generated that is nearly identical to the wind rose in the CAC Exhibit B. The air dispersion modeling is thus based on accurate data. Below is the revised wind rose.





Note: Diagram of the frequency of occurrence of each wind direction.

Met File Type: AERMET SFC
File: REC_2015-2016.SFC

Figure 1
WINDROSE

Station No. 14778
WILLIAMSPORT REGIONAL AIRPORT, PA
Period: 10/27/2015 - 10/26/2016

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Appendix F
Renovo Energy Center
2017 National Emissions Inventory Data for PA Counties with Ambient Monitoring Data

County	Pollutant	Emissions (tons)	County Area (mi^2)	Emissions per Area ($tons/mi^2$)
Adams	CO	13,461	522	25.79
Adams	NOX	2,458	522	4.71
Adams	PM10-PRI	2,917	522	5.59
Adams	PM25-PRI	1,088	522	2.09
Adams	SO2	65	522	0.12
Blair	CO	16,677	527	31.65
Blair	NOX	3,498	527	6.64
Blair	PM10-PRI	2,423	527	4.60
Blair	PM25-PRI	1,113	527	2.11
Blair	SO2	706	527	1.34
Bradford	CO	10,990	1,161	9.47
Bradford	NOX	3,169	1,161	2.73
Bradford	PM10-PRI	3,166	1,161	2.73
Bradford	PM25-PRI	1,096	1,161	0.94
Bradford	SO2	91	1,161	0.08
Cambria	CO	16,309	693	23.53
Cambria	NOX	4,986	693	7.19
Cambria	PM10-PRI	1,985	693	2.86
Cambria	PM25-PRI	1,163	693	1.68
Cambria	SO2	6,319	693	9.12
Centre	CO	21,866	1,112	19.66
Centre	NOX	4,080	1,112	3.67
Centre	PM10-PRI	2,786	1,112	2.51
Centre	PM25-PRI	1,386	1,112	1.25
Centre	SO2	324	1,112	0.29
Clinton	CO	9,943	898	11.07
Clinton	NOX	2,295	898	2.56
Clinton	PM10-PRI	933	898	1.04
Clinton	PM25-PRI	497	898	0.55
Clinton	SO2	41	898	0.05
Cumberland	CO	30,632	551	55.59
Cumberland	NOX	7,856	551	14.26
Cumberland	PM10-PRI	4,567	551	8.29
Cumberland	PM25-PRI	2,059	551	3.74
Cumberland	SO2	506	551	0.92

Appendix F
Renovo Energy Center
2017 National Emissions Inventory Data for PA Counties with Ambient Monitoring Data

County	Pollutant	Emissions (tons)	County Area (mi^2)	Emissions per Area ($tons/mi^2$)
Dauphin	CO	41,327	558	74.06
Dauphin	NOX	6,226	558	11.16
Dauphin	PM10-PRI	6,154	558	11.03
Dauphin	PM25-PRI	2,408	558	4.31
Dauphin	SO2	269	558	0.48
Indiana	CO	23,907	834	28.67
Indiana	NOX	19,136	834	22.94
Indiana	PM10-PRI	3,851	834	4.62
Indiana	PM25-PRI	2,144	834	2.57
Indiana	SO2	17,704	834	21.23
Lackawanna	CO	23,095	465	49.67
Lackawanna	NOX	3,992	465	8.59
Lackawanna	PM10-PRI	2,544	465	5.47
Lackawanna	PM25-PRI	1,313	465	2.82
Lackawanna	SO2	371	465	0.80
Lycoming	CO	16,857	1,244	13.55
Lycoming	NOX	3,441	1,244	2.77
Lycoming	PM10-PRI	2,357	1,244	1.89
Lycoming	PM25-PRI	1,152	1,244	0.93
Lycoming	SO2	141	1,244	0.11
Perry	CO	7,752	556	13.94
Perry	NOX	1,921	556	3.46
Perry	PM10-PRI	1,889	556	3.40
Perry	PM25-PRI	648	556	1.17
Perry	SO2	36	556	0.06
Tioga	CO	8,948	1,137	7.87
Tioga	NOX	2,175	1,137	1.91
Tioga	PM10-PRI	1,932	1,137	1.70
Tioga	PM25-PRI	731	1,137	0.64
Tioga	SO2	143	1,137	0.13
Warren	CO	8,882	898	9.89
Warren	NOX	2,051	898	2.28
Warren	PM10-PRI	1,006	898	1.12
Warren	PM25-PRI	599	898	0.67
Warren	SO2	381	898	0.42

APPENDIX G SATELLITE IMAGERY OF PROJECT SITE AND MONITORING SITES

Figure G.1a
Proposed Location of Renovo Energy Center with 1 Kilometer Radius

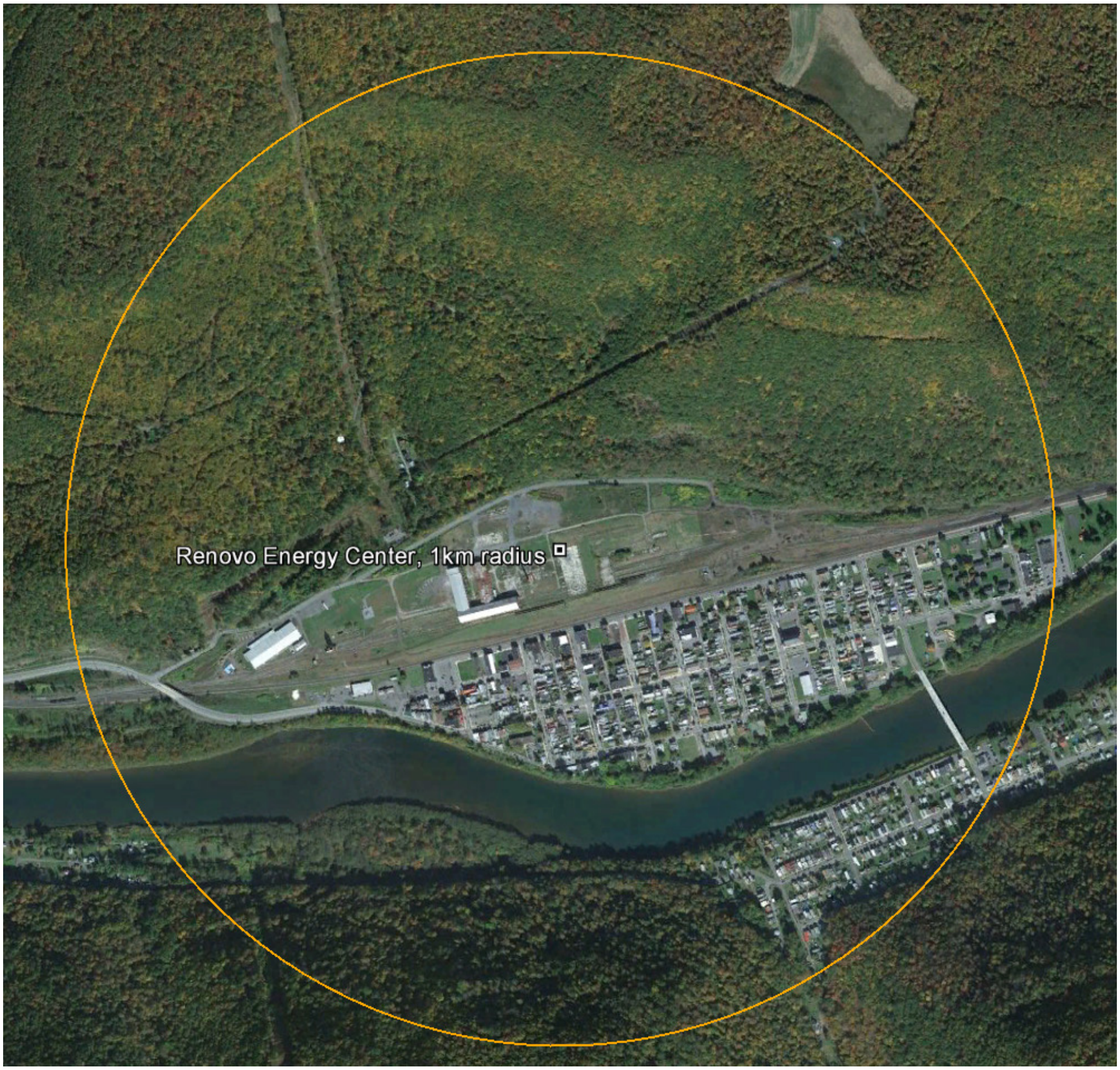

Figure G.1b
Proposed Location of Renovo Energy Center with 10 Kilometer Radius

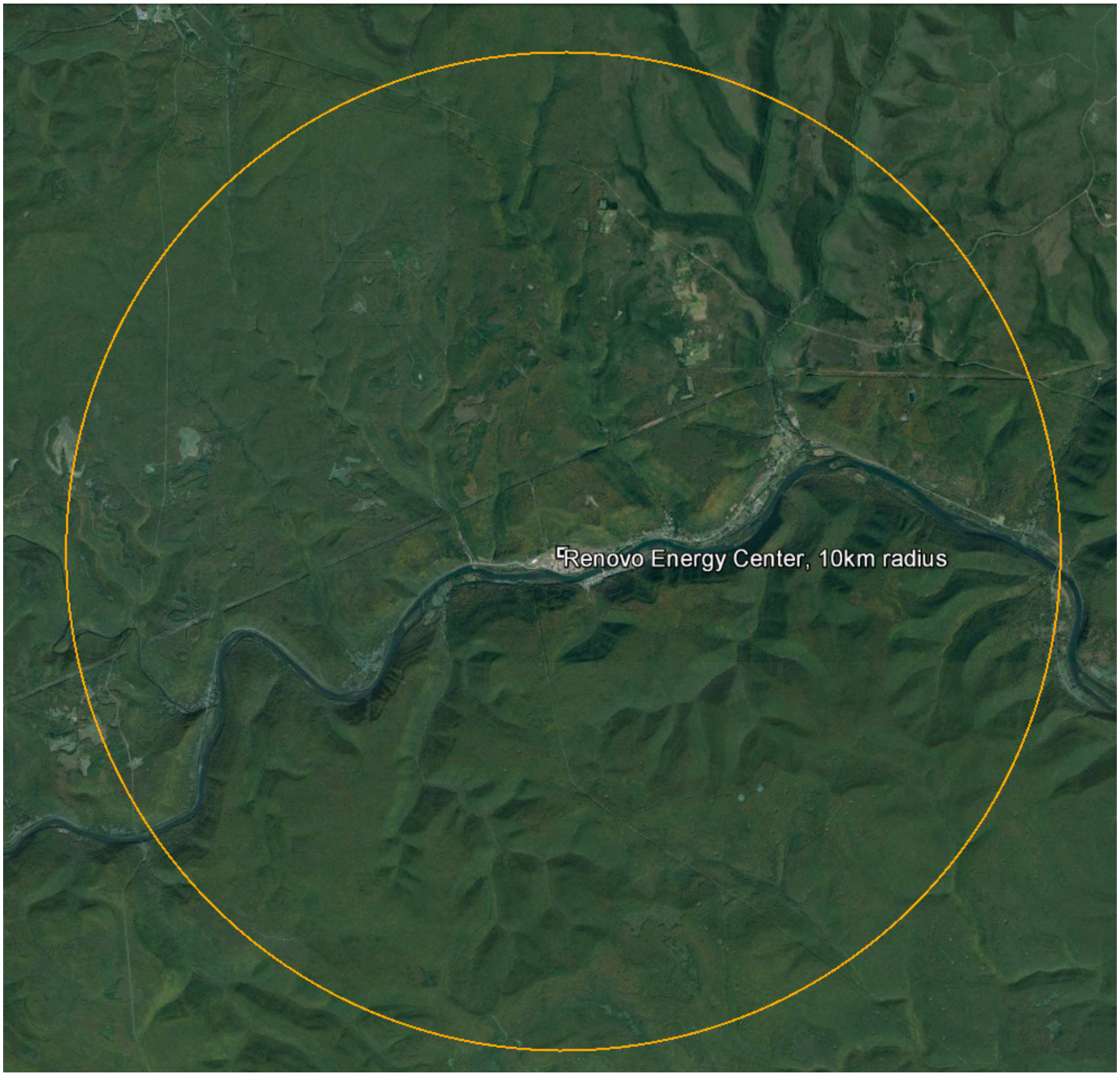

Figure G.11a
State College (Centre County) Monitoring Station with 1 Kilometer Radius

Figure G.11b
State College (Centre County) Monitoring Station with 10 Kilometer Radius

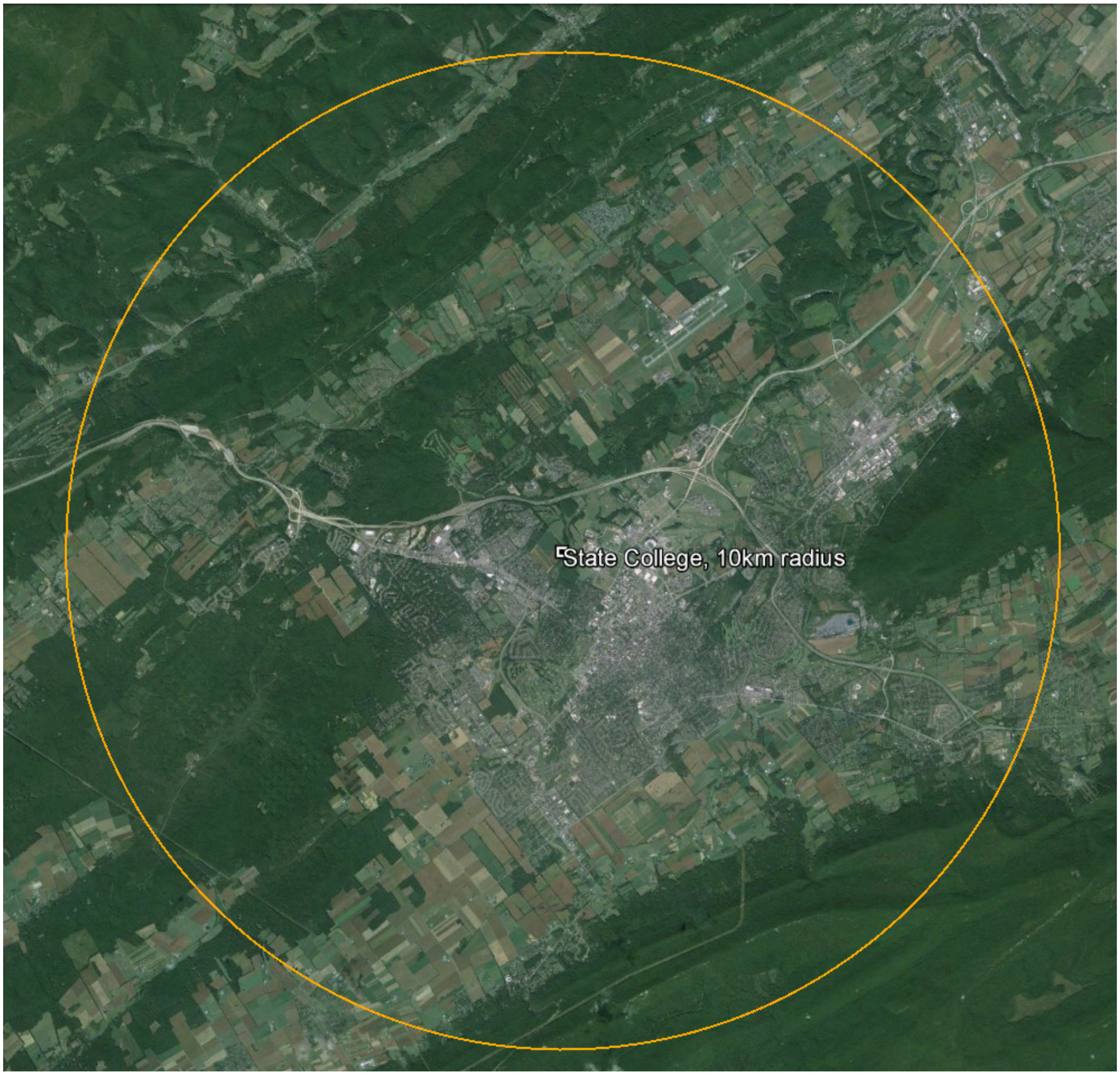

Figure G.13a
Tioga County Monitoring Station with 1 Kilometer Radius

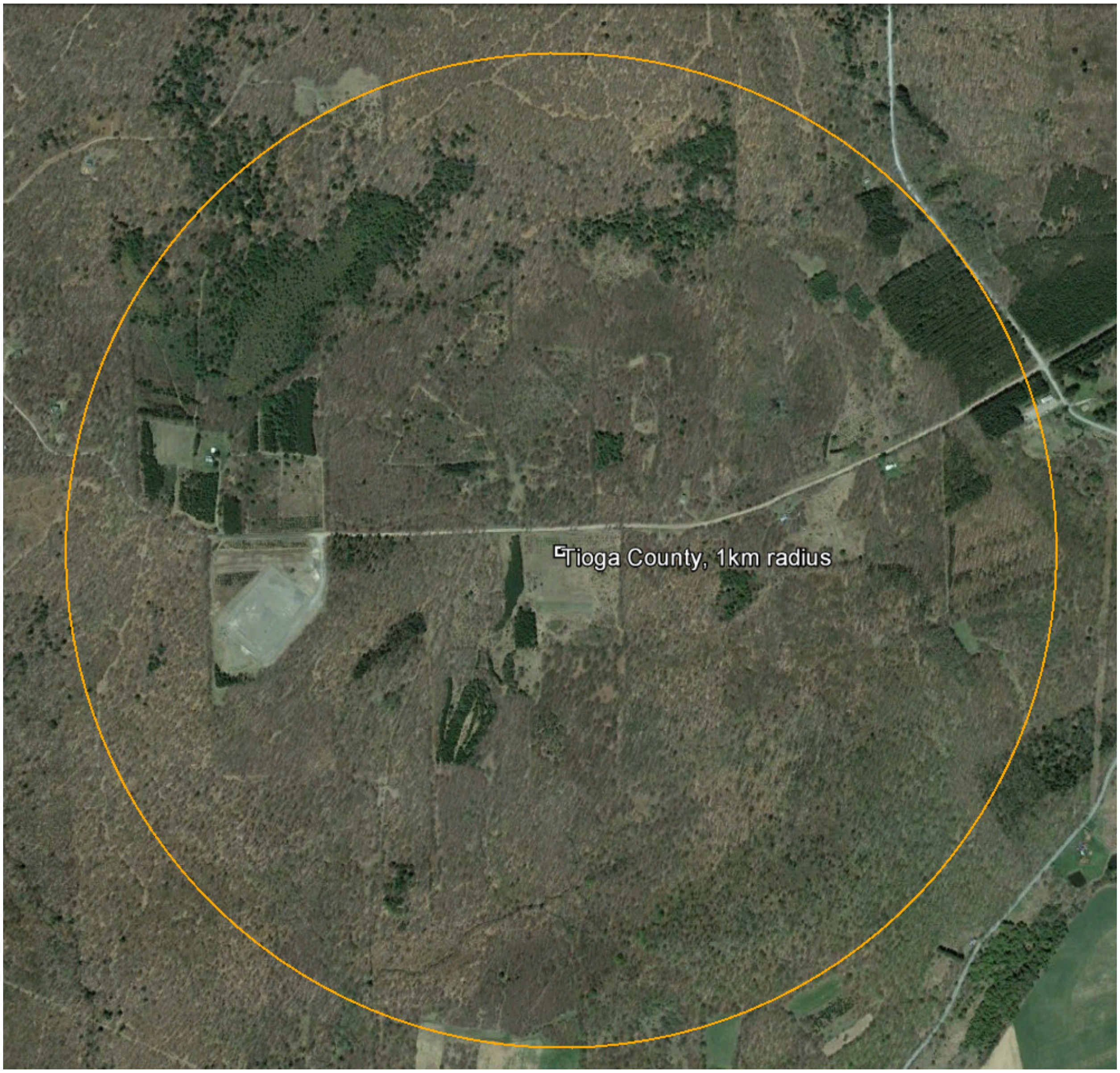

Figure G.13b
Tioga County Monitoring Station with 10 Kilometer Radius