ARCADIS

Appendix C

Modeling Protocol and Agency Correspondence

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Protocol Document

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Cricket Valley Energy Center, LLC

Cricket Valley Energy Dispersion Modeling Protocol

Dover, Dutchess County, New York

September 2009

ARCADIS

Cricket Valley Energy
Dispersion Modeling Protocol

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1.0 Introduction

The purpose of this report is to document the dispersion modeling protocol proposed for the air quality impact analyses to be undertaken in support of the Cricket Valley Energy project's Prevention of Significant Deterioration (PSD) permit application and Part 201 air permit application to the United States Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC), respectively. It also discusses additional air quality impact analyses that will be undertaken as part of the State Environmental Quality Review (SEQR) Environmental Impact Statement (EIS). The protocol follows USEPA and NYSDEC guidelines on dispersion modeling procedures (USEPA, 2005; NYSDEC, 2006).

Cricket Valley Energy Center LLC (CVE) is proposing to construct an approximately 1,000 megawatt (MW) combined cycle electric generating facility, firing natural gas as its sole fuel. The project is comprised of three units capable of operating independently to respond to energy demand. Each unit consists of one F-Class Technology combustion turbine, one steam turbine, one heat recovery steam generator (HRSG) with supplemental duct firing, and an associated air cooled condenser (ACC). The project is intended to operate as a base load facility and will be permitted to operate 8,760 hours per year, incorporating a range of load conditions.

The following information is provided in this report:

- A description of facility equipment and configuration; emissions, stack and exhaust parameters; and good engineering practice (GEP) stack height.
- A discussion of federal and state regulatory requirements applicable to the modeling analyses to be undertaken for the project.
- Details of the proposed modeling, including the selected dispersion model and its supporting tools, meteorological data, and the receptor grid.
- Evaluation of pre-construction monitoring requirements and presentation of the proposed background ambient air quality data to be used in the air quality impact analyses.
- A discussion of the potential need for PSD Class I Area impact analysis.

- A review of additional impact analyses to be provided in the air permit applications and/or the SEQR EIS, including: accidental ammonia release modeling; acid deposition analysis; assessment of impacts on regional growth; assessment of impacts on Environmental Justice areas; visibility impairment assessment; and assessment of impacts to soils and vegetation.

The report is intended to establish consensus on the dispersion modeling procedures for the air quality impact analyses to be undertaken in support of the air permit applications and the SEQR EIS.

2.0 Facility Description

This section provides information with regard to the proposed facility characteristics in order to establish appropriate modeling inputs.

2.1 General Description

CVE proposes development of a nominal 1,000 MW electric generating facility at a previously developed industrial site in Dover, Dutchess County, New York (Figure 1). The facility will be comprised of three independent units, exclusively firing natural gas. Each unit is a 1x1x1 configuration consists of one F-Class Technology combustion turbine, one steam turbine, one HRSG with supplemental duct firing, and an associated ACC. In addition to the proposed three units, major project equipment will include:

- Selective catalytic reduction (SCR) and oxidation catalyst systems;
- Continuous emissions monitoring systems (CEMS);
- Two 30,000-gallon aqueous ammonia (19 percent) storage tanks;
- One 1 million-gallon raw water storage tank;
- One 250,000-gallon demineralized water storage tank;
- One natural gas-fired auxiliary boiler;
- One emergency diesel generator and associated 500-gallon distillate oil tank (integrated with the unit);
- One diesel fire pump and associated 650-gallon distillate oil tank;
- Three diesel black-start generators, each with an associated 1,000-gallon distillate oil tank (integrated with the unit); and
- A water treatment system including a proposed zero-liquid-discharge system.

Natural gas will be delivered via an interconnection with the Iroquois interstate pipeline. Electrical interconnection will be to the Consolidated Edison of New York (ConEd) 345 kilovolt (kV) transmission system. The Iroquois pipeline and ConEd transmission line rights-of-way abut the site's northern property line.

2.2 Site Location

CVE proposes to construct the project within an approximately 25-acre footprint located within a 131.6-acre industrially zoned site off of Route 22 in Dover, Dutchess County, New York. The project will be constructed in the location of existing abandoned industrial buildings on the site and can take advantage, to a great degree, of that previously disturbed footprint. Building demolition will be a component of early-stage project construction. The address of the project site is 2241 NY Route 22, Dover, New York.

The site is bounded to the east by State Route 22 and to the north by the existing ConEd 345-kV transmission line. An active commuter rail line, owned and operated by Metro-North Railroad, transects the site in a north-south direction; the proposed development footprint is located entirely to the east of the rail line (Figure 2). The property extends further west to the Swamp River. As the property extends south, a portion is located on the west side of the Swamp River; no work is proposed on property between the Metro-North Railroad and the river. The property east of the railroad is bordered to the south by existing industrial structures associated with Rasco Materials (formerly TT Materials), a petroleum-contaminated soils processing facility.

Dutchess County is in attainment of all National Ambient Air Quality Standards (NAAQS) and New York Ambient Air Quality Standards (NYAAQS) except for ozone. Dutchess County is included in the Mid-Hudson Ozone Nonattainment Area, which is classified as moderate nonattainment with respect to the 8-hour ozone standard; the entire state and most of the Northeast are within the designated Ozone Transport Region, which is also treated as a moderate nonattainment area. The project will be classified as a major source for: nitrogen oxides (NO_x); carbon monoxide (CO); volatile organic compounds (VOC); and particulate matter with diameters equal to or less than 10 micrometers (PM_{10}) and 2.5 micrometers ($PM_{2.5}$) under New York State and federal air permitting regulations. As such, it will be subject to both PSD review and Nonattainment New Source Review (NNSR).

The closest PSD Class I areas are the Lye Brook Wilderness Area located 167 kilometers (km) to the north-northeast, in southern Vermont, and the Brigantine

Division of the Edwin B. Forsythe National Wildlife Refuge in New Jersey, 216 km south-southwest of the project site.

2.3 Emissions Data

The main sources of emissions at the facility will be the combustion turbines. However, there will also be emissions from ancillary equipment including an auxiliary boiler, emergency generator, emergency fire pump, and black-start generators. The sections below present proposed emissions from these sources.

Combustion Turbines

Climatological data for the Poughkeepsie-Dutchess County Airport (KPOU) indicate an annual average temperature of 59.8 degrees Fahrenheit (ºF), mean winter low temperatures of 15ºF to 20ºF, and mean summer maximum temperatures of 80ºF to 84ºF. Additionally, extreme minimum and maximum temperatures at KPOU are -30ºF and 103ºF, respectively. Performance data available from the combustion turbine vendor relating to the more extreme temperatures and International Standards Organization (ISO) conditions were used in this analysis (-8ºF, 59ºF and 105ºF).

Based on the combustion turbine operating performance data at 100 percent and 50 percent loads, hourly and annual emission rates, as well as exhaust characteristics, were calculated for dispersion modeling input. Hourly emissions rates for PM_{10}, $PM_{2.5}$, sulfur dioxide (SO_2), NO_x, CO, and VOC for each turbine are provided in Table 1.

Table 1. Hourly Emissions per Unit for Cricket Valley Energy Project

Pollutant	Emissions per Unit (without Duct Firing) (lb/hr)[a]	Emissions per Unit from Duct Firing (lb/hr)[a]	Total Emissions Per Unit (with Duct Firing) (lb/hr)[a]
$PM_{10}/PM_{2.5}$	10	4.8	14.8
SO_2	3.1	0.7	3.8
NO_x	14.5	3.7	18.2
CO	8.8	2.2	11
VOC	2.5	3.0	5.5

a Emissions at 100% load and 59°F ambient temperature

Table 2 presents the stack parameters and emission rates that will be modeled for each of the project's combustion turbines. Exhaust from each unit will be ducted to a common stack location and vented through its own dedicated flue at a GEP stack height of 272.5 feet and an inside diameter of 19 feet. Figure 2 shows the common location of the three stacks on the plot plan.

Following is a summary of the assumptions used to develop the model input data:

- NO_x emissions are controlled to 2.0 parts per million (ppm) using SCR;
- CO emissions are controlled to 2.0 ppm with an oxidation catalyst;
- All PM_{10} emissions were assumed to also be $PM_{2.5}$; and
- Stack exit temperatures and volumetric flow rates were based on vendor supplied data.

Table 3 presents the emissions and downtimes (minimum number of hours the turbines would be off before a re-start) associated with startup and shutdown events for the combined cycle turbines. In most cases, emissions from these events are "self correcting" on an annual basis. In other words, the average hourly emissions for each startup event are less than the corresponding steady state emission rate for the minimum downtime that would precede a start. Table 3 identifies the pollutants that are self-correcting for each event. Permitted annual emission limits for the facility will incorporate those conditions that are not considered self-correcting. Table 4 presents the short term emission rates associated with each startup event that will be used in modeling. Due to the short duration and lower emissions of a shutdown compared to the startup cases, shutdowns are not proposed to be modeled. Stack parameters reflecting the 50 percent load case at ISO conditions will be used in the modeling of startup scenarios.

Table 2. Stack Parameters and Emission Rates for a Single Combustion Turbine

		Design Cases											
	Units	**Case 1A**	**Case 3**	**Case 6**	**Case 7**	**Case 9**	**Case 12**	**Case 19**	**Case 21**	**Case 24**	**Case 36/36A**	**Case 37**	**Case 39**
Fuel Type	--	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Ambient Temperature	^{o}F	105	59	-8	105	59	-8	105	59	-8	-8	105	59
Percent Load Rate	%	100%	100%	100%	100%	100%	100%	75%	75%	75%	50%	50%	50%
Duct Burner Operation	--	Y	Y	Y	N	N	N	N	N	N	N	N	N
Stack Temperature	^{o}K	385.9	377.6	379.8	382.6	378.2	379.8	379.8	375.4	377.6	378.7	378.7	378.7
Stack Exit Velocity	m/s	19.4	21.0	23.3	19.0	20.9	23.1	15.8	17.1	18.6	15.6	14.4	15.0
NO_x	g/s	2.21	2.29	2.47	1.63	1.82	2.04	1.31	1.45	1.61	1.25	1.01	1.12
CO	g/s	1.34	1.39	1.50	0.99	1.11	1.24	0.80	0.88	0.98	0.76	0.62	0.68
VOC	g/s	0.78	0.69	0.69	0.28	0.32	0.35	0.23	0.25	0.28	0.22	0.18	0.19
SO_2	g/s	0.46	0.47	0.50	0.34	0.38	0.42	0.28	0.31	0.33	0.26	0.20	0.22
Total PM_{10}	g/s	2.01	1.87	1.94	1.26	1.26	1.39	1.26	1.26	1.26	1.01	1.01	1.01

Table 3. Emissions and Downtimes Associated with Startup and Shutdown Events

	Cold Startup	Hot Startup	Warm Startup	Shutdown
Number of Events per Year	50	10	200	260
Minimum Downtime Preceding Event (hours)	72	0	8	0
Duration of Event (hours)	4	1.83	2.17	0.75
	Emissions Per Event (lb)			
$PM_{10}/PM_{2.5}$	80	20	40	12
SO_2	2.75	0.81	1.41	0.42
NO_x	420	130	180	55
CO	1400	700	800	300
VOC	180	80	100	60
	Self-Correcting?			
$PM_{10}/PM_{2.5}$	yes	yes	yes	no
SO_2	yes	yes	yes	yes
NO_x	yes	no	yes	no
CO	no	no	no	no
VOC	yes	no	no	no

Table 4. Short-Term Emissions for Startup and Shutdown Events (g/s)

Pollutant	Cold Startup	Hot Startup	Warm Startup	Shutdown
$PM_{10}/PM_{2.5}$	2.5	1.4	2.2	2.0
SO_2	0.087	0.056	0.076	0.071
NO_x	13.2	9.0	9.2	9.2
CO	31.5	34.5	92.0	35.3
VOC	4.7	6.5	6.2	4.2

Ancillary Equipment

Auxiliary Boiler

The auxiliary boiler will only burn natural gas. The maximum heat input will be 48.63 million British thermal units per hour (MMBtu/hr). Operation of the auxiliary boiler will be limited to 4,500 hours per year. Stack height and inside diameter will be 50 feet and 36 inches, respectively. The exhaust gas temperature will be 300ºF, and the exit exhaust flow will be 14,369 actual cubic feet per minute (acfm). Emissions at the stack outlet are as shown in Table 5.

Table 5. Auxiliary Boiler Emissions

Pollutant	Emission Rate	
	lb/MMBtu	g/s
NO_x	0.036	0.22
CO	0.037	0.23
VOC	0.005	0.03
$PM_{10}/PM_{2.5}$	0.005	0.03
SO_2 [a]	0.0016	0.01

a Emissions based on a natural gas sulfur content of 0.5 gr/100 scf.

Emergency Diesel Generator

One emergency diesel generator with an approximately 750 kilowatt (kW) standby rating will be provided to supply all essential safe standby loads of the plant when all other normal power sources fail. Operation of the emergency diesel generator will be limited to 500 hours per year. Stack height and diameter will be 12 feet and 8 inches, respectively. The exhaust stack gas temperature will be 949.9ºF, and the exit exhaust flow will be 5,646.8 acfm. Emissions at the stack outlet are as shown in Table 6.

Table 6. Emergency Diesel Generator Emissions

Pollutant	Emission Rate	
	g/bhp hr	g/s
NO_x	5.32	1.49
CO	0.24	0.07
VOC	0.03	0.01
$PM_{10}/PM_{2.5}$	0.022	0.01
SO_2 [a]	0.0048	0.0013
Lead (Pb)	4.5×10^{-5}	1.24×10^{-5}

a Emissions based on Ultra Low Sulfur Diesel fuel (15 ppm_w sulfur)

Fire Pump

The fire pump is part of the plant fire protection system and delivers fire water from the service/fire water tank to the various buildings and areas of the project. A diesel engine-driven fire pump serves as a backup standby fire pump. The maximum engine power of the fire pump will be 420 horsepower (hp), and will consume 22 gallons per hour of fuel. Operation of the fire pump will be limited to 500 hours per year. Stack height and exit diameter are 12 feet and 8 inches, respectively. The exhaust temperature is 907ºF, and the exhaust flow is 2,064 acfm. Emissions at the stack outlet are provided in Table 7.

Table 7. Emergency Fire Pump Emissions

Pollutant	Emission Rate	
	g/hp-hr	g/s
NO_x	6.74	0.79
CO	0.49	0.06
VOC	1.00	0.12
$PM_{10}/PM_{2.5}$	0.06	0.01
SO_2 [a]	0.0048	6.0×10^{-4}
Pb	4.5×10^{-5}	5.2×10^{-6}

a Emissions based on Ultra Low Sulfur Diesel fuel (15 ppm_w sulfur)

Black-Start Generator

Three black-start diesel generators will be used to start the plant on the rare occasion when there is no power available from the electric grid and the grid must be brought back into service. Maximum engine power for each black-start generator will be 2.8 MW. The generators will be vented through a common stack; stack height and diameter are 75 feet and 12 inches, respectively. Operation of the black-start generators will be limited to 500 hours per year for testing. Exhaust temperature is 750ºF, and exhaust gas flow is 73,697 acfm. Emissions at the stack outlet are presented in Table 8.

Table 8. Black Start Generator Emissions (per unit)

Pollutant	Emission Rate	
	g/hp hr or lb/MMBtu	g/s
NO_x	5.19 g/hp hr	5.80
CO	0.63 g/hp hr	0.70
$PM_{10}/PM_{2.5}$	0.03 g/hp hr	0.11
VOC	0.1 g/hp hr	0.01
SO_2 [a]	0.0015 lb/MMBtu	0.03
Pb	1.45×10^{-5} lb/MMBtu	0.0001

a Emissions based on Ultra Low Sulfur Diesel fuel (15 ppm_w sulfur)

Summary of Potential Emissions

Potential annual emissions for the project assuming steady state operation of the combustion turbines are presented in Table 9.

Table 9. Potential to Emit for Cricket Valley Energy (Steady State)

Pollutant	Combustion Turbine Emissions (tpy)[a]	Ancillary Equipment (tpy)	Total Project Potential to Emit (tpy)
$PM_{10}/PM_{2.5}$	194.4	0.8	195.2
SO_2	49.9	0.2	50.1
NO_x	239.2	42.9	282.1
CO	144.5	8.5	153
VOC	72.2	1.5	73.7

a Assumes 3 units with 8,760 hours per year of duct firing per unit. Combustion turbine emissions at 100% load and 59°F ambient temperature.

2.4 Good Engineering Practice Stack Height Analysis

A GEP stack height analysis was conducted to evaluate whether the plumes emitted from the turbine stacks would be subject to building wake effects. If a stack is sufficiently close to a large building or other structure, the plume can be entrained in the building's wake. The resulting "downwash" reduces the effective release height and leads to increased ground-level ambient concentrations. Building downwash effects must be evaluated when a stack is less than "formula" GEP stack height. Formula GEP stack height is defined as:

$H_{GEP} = H_B + 1.5L_B$ where:

- H_{GEP} = formula GEP stack height;
- H_B = the building's height above stack base; and
- L_B = the lesser of the building's height or maximum projected width.

A second definition of GEP stack height is "regulatory" GEP stack height. Regulatory GEP stack height is either 65 meters (m) or formula GEP stack height, whichever is greater. Sources are not allowed to take credit for ambient air concentrations that result from stacks that are higher than regulatory GEP stack height.

The USEPA Building Profile Input Program (BPIP) (USEPA, 1995) produces the model input information necessary to account for building wake effects, based on the dimensions of buildings in the vicinity of the stacks. The "PRIME" version of BPIP (BPIPPRM) (Schulman, et al., 1997) is used with AERMOD. BPIP requires a digitized

blueprint of the facility's buildings and stacks as well as other nearby structures. The position and height of buildings relative to the stack positions must be evaluated in the GEP analysis. The building positions were obtained from the site plan provided in Figure 2. Coordinates for each building tier corner were identified using a digitized geo-referenced AutoCAD survey. Tier heights for the various project elements are shown on Figure 3. The base elevation of the site is 435 feet above mean sea level (msl).

The results of the analysis for the turbine stacks indicate that structures on the top of the ACCs, with a tier height of 109 feet, are the "controlling" structures for the turbine stacks. The projected width of the controlling structure exceeds the height, so the GEP formula height is 272.5 feet (83 m), which translates to a stack-top elevation of 707.5 feet msl. The design calls for the turbine stacks to be built to GEP height. All of the auxiliary units (boiler, generators and fire pump) will have shorter stacks and will be modeled with inputs to account for building wake downwash. BPIPPRM input and output files will be provided with the modeling report.

3.0 Regulatory Requirements

State and federal regulatory requirements that pertain to the ambient air quality modeling analyses to be undertaken for the project are described below.

3.1 New York State Construction and Operation Permits

State air quality permitting requirements are spelled out in 6 NYCRR Part 201. The project will apply for a permit to construct under Part 201-5. Within one year of the commencement of operation of the facility, the project will apply for a Title V operating permit under Part 201-6.

3.2 Nonattainment New Source Review

The project will be subject to NNSR as a major source of ozone precursors, NO_x and VOC. NNSR permitting requirements are spelled out in 6 NYCRR Part 231. These include the need to apply Lowest Achievable Emission Rate (LAER) technology and obtain NO_x and VOC offsets. There are no specific ambient air quality modeling requirements with respect to NNSR for ozone.

3.3 PSD Review

Since annual emissions of at least one criteria pollutant will exceed 100 tons per year (tpy), the project will be subject to PSD review. PSD review requirements include application of Best Available Control Technology (BACT), an ambient air quality modeling analysis that includes a demonstration of compliance with NAAQS/NYAAQS and PSD increments, and an additional impacts analysis, for those pollutants which exceed significant emission rates defined in the regulations. PSD review will be required for NO_x, CO, VOC, SO_2, PM_{10}/$PM_{2.5}$, and sulfuric acid mist (H_2SO_4).

The air quality modeling analyses to be conducted are described in detail in the following sections of this protocol document.

3.4 Ambient Air Quality Standards

An air quality impact analysis must be performed to demonstrate compliance with NAAQS, NYAAQS, and PSD increments. NAAQS, NYAAQS, PSD increments, Significant Impact Levels (SILs) and Significant Monitoring Concentrations (SMCs) are shown in Table 10.

Table 10. Ambient Air Quality Standards, PSD Increments, Significant Impact Levels, and Significant Monitoring Concentrations

Pollutant	Averaging Period	Ambient Air Quality Standards		PSD Increment Class II ($\mu g/m^3$)	SIL ($\mu g/m^3$)	SMC ($\mu g/m^3$)
		NAAQS ($\mu g/m^3$)	NYAAQS ($\mu g/m^3$)			
SO_2	3-hour	1,300	1,300	512	25	none
	24-hour	365	365	91	5	13
	Annual	80	80	20	1	none
PM_{10}	24-hour	150	none	30	5	10
	Annual	revoked	none	17	1	none
$PM_{2.5}$	24-hour	35	none	pending	pending	pending
	Annual	15	none	pending	pending	pending
TSP	24-hour	none	250	none	none	none
	Annual	none	45	none	none	none
CO	1-hour	40,000	40,000	none	2,000	none
	8-hour	10,000	10,000	none	500	575
NO_2	Annual	100	100	25	1	14
Pb	3-month	1.5	none	none	none	0.1

As shown in Table 10, New York has adopted the NAAQS as NYAAQS. In addition, NYAAQS have been established for total suspended particulates (TSP), gaseous fluoride (F^-), beryllium (Be), and hydrogen sulfide (H_2S). The NYAAQS for TSP are provided in Table 10. The pollutants Pb, F^-, Be or H_2S are listed in *Policy DAR-1: Guidelines for the Control of Toxic Ambient Air Contaminants* (NYSDEC, 1997) and will be addressed in the air toxics (DAR-1) impact analysis.

4.0 Modeling Procedures

This section provides the modeling protocol including model selection, land use classification, receptor grid design, and meteorological data.

4.1 Model Selection

AERMOD (version 07026; USEPA, 2004a) was selected to predict ambient concentrations in simple, complex and intermediate terrain. The AERMOD Modeling System includes preprocessor programs (AERMET, AERSURFACE, and AERMAP) to create the required input files for meteorology and receptor terrain elevations. AERMOD is the recommended model in USEPA's *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) (USEPA, 2005). The regulatory default option will be used. This option commands AERMOD to use:

- The elevated terrain algorithms requiring input of terrain height data for receptors and emission sources;
- Stack tip downwash (building downwash automatically overrides);
- The calms processing routines;
- Buoyancy-induced dispersion; and
- The missing meteorological data processing routines.

4.2 Land Use

The potential effect of the project on air quality is dependent on the existing air quality characteristics of both land and air resources. Although the project is located on industrially zoned land that was formerly used for industrial purposes, the land use in the vicinity of the site is primarily rural.

Selection of the appropriate dispersion coefficients for air quality modeling is determined using the USEPA-preferred land use classification technique in 40 CFR 51, Appendix W (also known as the "Auer" technique). This classification technique involves assessing land use for Auer's categories within a 3-km radius of the site (Auer, 1978). USEPA recommends using urban dispersion coefficients and mixing heights if greater than 50 percent of the area is urban; otherwise, rural coefficients and

mixing heights apply. Based on an evaluation of land use in the vicinity of the site (depicted in Figure 4), less than 10 percent of the area within a 3-km radius is urban, less than 10 percent is water, and more than 80 percent is rural. Therefore, rural dispersion coefficients and mixing heights were confirmed to be appropriate for use in the modeling analysis.

4.3 Receptors

A receptor grid consisting of 1,646 receptors contained within five nested Cartesian grids is proposed for the analysis. The grid has a total coverage of 8 km by 8 km. Receptor spacing is as follows:

- Inner grid = 25 m spacing out to a distance of 200 m;
- Second grid = 50 m spacing out to a distance of 400 m;
- Third grid = 100 m spacing from X = -2,400 to +800 m, and from Y = -800 to +1,600 m;
- Fourth grid = 500 m spacing out to a distance of 4 km;
- Outer grid = 1,000 m spacing out to a distance of 8 km.

The 100 m receptor spacing was extended to provide higher resolution in an area with steeply rising terrain northwest of the project site. Receptor resolution will be increased in other areas if warranted, based on model predictions.

Receptor elevations are assigned using the USEPA's AERMAP software tool (version 06341; USEPA, 2004b), which is designed to extract elevations from United States Geological Survey (USGS) National Elevation Dataset (NED) data at 1 degree (approximately 30 m) resolution in GeoTIFF format (USGS, 2002).

AERMAP, the terrain preprocessor for AERMOD, uses interpolation procedures to assign elevations to a receptor:

- For each receptor, the program searches through the NED data index files to determine the two profiles (longitudes or eastings) that straddle the receptor.

- For each of these two profiles, the program then searches through the nodes in the index file to determine which two rows (latitudes or northings) straddle the receptor.

- The program then reads the elevations for these four points. A two-dimensional distance-weighted interpolation is then used to determine the elevation at the receptor location based on the elevations at the four nodes determined above.

A summary of AERMAP files is provided on the CDROM in Appendix A. Using Lakes AERMOD View® software, a topographic map of the model region was generated from AERMAP elevations; this map was compared with the actual USGS 7.5-minute topographic maps to ensure accurate representation of terrain features.

Surveyed topographic information was available for the site. The developed base elevation of the site will be 435 feet msl, which includes consideration of site grading as provided by the design engineers. The nearest terrain at or above stack height is about 1.4 km (4,600 feet) to the west of the project site.

4.4 Meteorological Data

NYSDEC and USEPA recommend using a five-year data set in order to capture typical and atypical meteorological characteristics (e.g., inversions, high wind scenarios) that could impact dispersion. Careful consideration was given to selecting a location from which to obtain meteorological data that was representative of site conditions and had appropriately collected data.

The Cricket Valley Energy site is located along Route 22 south of Dover Furnace, New York, in the Ten Mile River Valley. The site base elevation is at 435 feet msl. The valley is about 5 km (3 miles) wide and oriented north-south (N-S), with a ridge of elevated terrain rising steeply within 1.5 km west of the site, including Bald Mountain (1,266 feet msl), West Mountain (1,286 feet msl), and Dobar Mountain (1,086 feet msl) and a parallel ridge beginning almost 4 km east-northeast of the site, including Schaghticoke Mountain (1,325 feet msl) and continuing to the north. Compared to the surrounding area, near surface winds in this terrain setting would be channeled along the valley, toward N-S transport directions.

The Poughkeepsie-Dutchess County Airport (KPOU) is situated in the Hudson River Valley, about 16 miles west of the Cricket Valley Energy site (as shown in Figure 5).

The Hudson River Valley is somewhat broader than the Ten Mile River Valley, but has a very similar N-S orientation. Base elevation at KPOU is 165 feet msl. An N-S ridge about 6 miles to the west of KPOU is approximately 800 feet msl, with a similar ridge 8 miles to the east of KPOU.

The influence of local topography on channeling of the winds diminishes with height above the surface, as well as with the width of the valley. With stack height and plume rise, the Cricket Valley Energy emissions will be transported 500 feet or more above the ground, based on a stack height of 272.5 feet. The channeling influence of local topography on winds 300-500 feet above the surface is considerably less than the influence on winds closer to the surface. Both the near-surface wind directions in the broader valley at KPOU (wind measurement height on the meteorological tower is 26 feet above ground level) and the winds at 500 feet above the narrower Ten Mile River Valley at the Cricket Valley Energy site will be dominated by the synoptic (regional-scale) wind flow. The secondary influence of channeling due to local topography is oriented N-S at both locations.

Based upon a review of the most recent data available and consultation with NYSDEC and USEPA, it was determined that processing of the raw meteorological data, using methods still under development by USEPA, would be preferable to use of available hourly average data. An analysis of the National Climatic Data Center (NCDC) hourly surface data for the KPOU location for 2004-2008 showed a high number of “calm” observations and lower than expected average wind speed. These findings are consistent with (but somewhat more extreme than) trends seen at other Automated Surface Observing Systems (ASOS) stations. After discussing this matter with NYSDEC and with USEPA, ARCADIS developed software for calculating hourly average winds based on one-minute ASOS data collected at the KPOU site. This approach greatly reduced the frequency of calms and also increased the average wind speed.

Given the above factors, the meteorological data selected for the sequential modeling consist of hourly surface observations calculated for one-minute ASOS data collected at KPOU from March 20, 2005 through March 19, 2009. (The NCDC archive of one-minute ASOS data from KPOU starts in March of 2005; only the less-refined hourly data are available prior to that time.) Upper air radiosonde data concurrent with the surface meteorological data were obtained from NCDC for Albany, New York. A wind rose for the four year period 2005-2008 is provided in Figure 6. The prevailing wind directions are southwest and north, each 8 percent of the time. Lighter winds (below 4 knots) are most frequently from the southeast

quadrant, while higher wind speeds (above 11 knots) are most often associated with west winds. By averaging the one-minute wind observations, calms were reduced from about 40 percent of hours to about 10 percent. See Appendix B for details.

USEPA modeling guidance calls for a five-year modeling period when using NWS meteorological data. Since the one-minute data are not available for five years, peak short-term impacts will be evaluated based on maximum predicted concentrations, rather than on the highest, second-highest value, for standards not to be exceeded more than once per year. For the 24-hour $PM_{2.5}$ standard, which is based on the three-year average of 98th percentile value, compliance will be evaluated based on the highest 98th percentile value predicted for any year.

Following the averaging procedure to compute hourly-average winds, as described in Appendix B, surface and upper air input files for AERMOD will be prepared using the AERMET processor programs. The inputs to AERMET for surface characteristics (surface roughness, Albedo and Bowen ratio) are determined using the AERSURFACE preprocessor, based on land use in the area surrounding the airport anemometer site. To assess the representativeness of the airport data for the proposed model application, the land use distribution and estimated values of surface roughness (z_0), Bowen ratio and Albedo for the area surrounding the project site were compared to surface parameters for the area surrounding the airport.

Table 11 summarizes the land use distribution within 1 km from the airport anemometer and from the location of the turbine stacks. The largest differences between the sites are seen for Low Intensity Residential, Commercial/Industrial/Transport, and Urban/Recreational Grasses (all higher at KPOU) and Forests and Woody Wetlands (which total almost 90 percent of the area around the project site). Table 12 provides the comparison of estimated values of surface roughness (z_0), Albedo, and Bowen ratio by month. Surface roughness around the project site ranges from 0.6 to 0.95 m, consistently higher than the roughness around the airport, which ranges from 0.10 to 0.17 m. These differences reflect the higher roughness associated with forest in the project vicinity. Albedo and Bowen ratio estimates are comparable between the two sites.

Table 11. Comparison of Land Use within 1 Kilometer of the Project Site and the Airport (KPOU) Anemometer Site

Class	Land Use Category	Project Site	KPOU
11	Open Water	0.4%	0.7%
21	Low Intensity Residential	0.7%	18.2%
22	High Intensity Residential	0.0%	0.8%
23	Commercial/Industrial/Transportation	2.8%	9.6%
31	Bare Rock/Sand/Clay	0.0%	0.0%
32	Quarries/Strip Mines/Gravel	0.0%	0.0%
41	Deciduous Forest	23.5%	18.8%
42	Evergreen Forest	17.7%	0.9%
43	Mixed Forest	26.6%	23.7%
81	Pasture/Hay	6.8%	5.4%
82	Row Crops	1.8%	2.3%
85	Urban/Recreational Grasses	0.1%	19.6%
91	Woody Wetlands	19.7%	0.0%
92	Emergent Herbaceous Wetlands	0.0%	0.0%

Table 12. Comparison of Surface Parameters for the Project Site and the Airport (KPOU) Anemometer Site (based on Land Use within 1 km)

	Project Site			KPOU		
Month	Z_0 (m)	Albedo	Bowen ratio	Z_0 (m)	Albedo	Bowen ratio
1	0.61	0.16	0.85	0.097	0.17	0.87
2	0.61	0.16	0.85	0.097	0.17	0.87
3	0.61	0.16	0.85	0.097	0.17	0.87
4	0.778	0.15	0.6	0.128	0.15	0.64
5	0.778	0.15	0.6	0.128	0.15	0.64
6	0.953	0.15	0.32	0.165	0.16	0.5
7	0.953	0.15	0.32	0.165	0.16	0.5
8	0.953	0.15	0.32	0.165	0.16	0.5
9	0.953	0.15	0.32	0.165	0.16	0.5
10	0.952	0.15	0.84	0.149	0.16	0.86
11	0.952	0.15	0.84	0.149	0.16	0.86
12	0.61	0.16	0.85	0.097	0.17	0.87

The meteorological observations at KPOU are judged to be representative and suitable for modeling the air quality impacts of the proposed Cricket Valley Energy facility. Comparison of the airport and project sites supports the following conclusions:

- The proximity of KPOU to the project site (within 16 miles) ensures that the information will be regionally representative.

- The similar N-S orientation of the Ten Mile River Valley project location and Hudson River Valley airport location ensures that local topographic channeling effects will have similar orientation.

- Albedo and Bowen ratio estimates are nearly identical for the two sites.

- Land use around both sites is predominantly rural. Differences in surface roughness were noted, but such differences are not expected to influence dispersion conditions at or above stack-top elevation. Use of wind profiles that reflect airport surface conditions should provide a reliable basis for computing wind speeds at stack-top elevation.

- The effect of inversions (which can result as colder air settles in the valley, typically during the night under conditions with few clouds and light winds) can strongly influence near-surface conditions at the project site. Strong local inversions will generally be confined to within 100-200 feet of the ground surface. Under these conditions, the turbine stacks will be above the inversion layer, and the inversion will prevent the plumes from mixing down to ground level. KPOU data will provide regionally representative wind speed and cloud cover observations. Dispersion conditions at plume height, 500 feet above the ground surface, should be characterized well by observed conditions at KPOU.

5.0 Single Source Modeling Analysis

The purpose of this significant impact modeling analysis is to assess the need for interactive source modeling. NYSDEC and USEPA modeling guidelines require evaluation of various operating loads, to ensure that the conditions leading to predicted worst-case impacts are identified. For the turbines, we propose to evaluate impacts for 12 operating scenarios: three temperatures (-8^{o}F, 59^{o}F, 105^{o}F) for 100 percent load, 75 percent load and 50 percent load, all without duct firing, plus the three 100 percent load cases with duct firing. Cold, warm and hot startup scenarios will also be modeled, to assess potential peak short-term impacts. Operation of ancillary equipment will be modeled consistent with anticipated usage; the black start generator, for example, will never operate at the same time as other emission sources, aside from periodic test firing.

Single source modeling results will be evaluated relative to SILs (shown on Table 10), to determine whether interactive modeling is warranted, and if so, for which pollutants. At the conclusion of single source modeling, a report will be prepared documenting the results. If the results demonstrate that all predicted impacts are insignificant, this report will accompany the permit application. If impacts exceed the SILs, the Significant Impact Area will be defined, in preparation for interactive modeling.

For $PM_{2.5}$, for which SILs have not yet been established, project impacts will be added to existing background levels (discussed in the next section) and the sum compared to the appropriate NAAQS.

Project impacts will also be evaluated for toxic air contaminants. Impacts will be compared to the health-effect based annual and short-term guideline concentrations (AGCs and SGCs) as defined in NYSDEC Policy DAR-1 (NYSDEC, 1997). A spreadsheet will be used to scale AERMOD-predicted impacts based on the estimated emissions of individual contaminants.

6.0 Background Air Quality Monitoring Data

It is anticipated that modeled project impacts will be demonstrated to be below the SMCs (shown on Table 10). As such, the project would qualify for a waiver from PSD pre-construction monitoring requirements. Background air quality levels for the air quality impact analysis will be based on existing monitoring data, as discussed below.

Based on review of available data, ambient monitors located in Dutchess County and adjacent counties were selected for the determination of background ambient air quality concentrations to be used in the NAAQS assessment. The only NYSDEC monitoring station in Dutchess County, in Millbrook, measures ozone, but does not monitor criteria pollutants of direct concern for modeling. The nearest monitor for SO_2 and PM_{10} is the Mt. Ninham site (3951-01), located in Carmel (Putnam County), 20 miles south of the project site. For $PM_{2.5}$, monitors are located in Newburgh (Orange County), 26 miles southwest of the project site; Cornwall, Connecticut (Litchfield County), 17.5 miles northeast of the project site; and Thomaston, Connecticut (Litchfield County), 26 miles east of the project site. For NO_2 and for CO, the nearest monitor is located in Thomaston, Connecticut. Three of these sites are rural, consistent with the project site; the Newburgh site is located in a more heavily developed area. Table 13 provides identification and location information for the monitoring sites.

Table 13. Background Air Quality Monitoring Sites

Monitor	USEPA AIRS ID	Address	Pollutants
Mt. Ninham	36-079-0005	Gypsy Trail Rd, Carmel, NY	SO_2, PM_{10}
Newburgh	36-071-0002	55 Broadway, Newburgh, NY	$PM_{2.5}$
Mohawk Mt	09-005-0005	Cornwall, CT	$PM_{2.5}$
Thomaston	09-005-0004	Old Waterbury Rd, Thomaston, CT	$PM_{2.5}$, CO, NO_2, SO_2

Table 14 summarizes the most recent available ambient air quality monitoring data for SO_2, PM_{10}, $PM_{2.5}$, CO, and NO_2. As shown in that table, all measured concentrations for these pollutants are less than their respective NAAQS. The listed short-term concentrations represent the second-highest measurement recorded by the monitor during each year, except for $PM_{2.5}$, where the 98^{th} percentile value is given. As such, these data provide a conservative representation of background air quality in the region.

Table 14. Regional Ambient Air Quality Data

Monitor Location	Pollutant	Averaging Period	Concentration (µg/m^3)				NAAQS (µg/m^3)
			Year	Year	year		
			2007	**2006**	**2005**		
Mt. Ninham	SO_2	3-hour	44.2	48.1	44.2		1,300
		24-hour	23.4	28.0	25.7		365
		Annual	3.9	4.4	5.7		80
			1998	**1997**	**1996**		
Mt. Ninham	PM_{10}	Annual	14	14	14		50*
		24-hour	39	-	-		150
			2008	**2007**	**2006**		
Thomaston	NO_2	Annual	14.2	17.0	23.0		100
			2008	**2007**	**2006**		
Thomaston	CO	1-hour	1200	1100	1650		40,000
		8-hour	1000	900	1200		10,000
			2007	**2006**	**2005**	**3-yr avg**	
Newburgh	$PM_{2.5}$	24-hour	30.4	27.5	29.6	29	35
		Annual	10.6	9.6	12.1	10.8	15
			2008	**2007**	**2006**	**3-yr avg**	
Thomaston	$PM_{2.5}$	24-hour	25.0	29.3	24.2	26	35
		Annual	9.6	10.2	8.7	9.5	15
			2008	**2007**	**2006**	**3-yr avg**	
Mohawk Mt	$PM_{2.5}$	24-hour	23.0	31.0	25.1	26	35
		Annual	7.6	8.1	7.2	7.6	15

*Revoked.

A summary of selected background air quality concentrations is provided in Table 15. For PM_{10}, NO_2, and CO, the highest value from Table 12 was selected for each averaging time. For $PM_{2.5}$, the 3-year average observed values for Thomaston, Connecticut were selected. The Thomaston and Mohawk Mountain sites were judged to be more representative of air quality at the project site than the Newburgh monitor, which is in a more densely populated location.

Table 15. Background Air Quality Levels for the Cricket Valley Energy Project

Pollutant	Averaging Period	Background Air Quality (µg/m^3)
SO_2	3-hour	48.1
	24-hour	28.0
	Annual	5.7
PM_{10}	24-hour	39
	Annual	14
$PM_{2.5}$	24-hour	26
	Annual	9.5
CO	1-hour	1650
	8-hour	1200
NO_2	Annual	23.0

7.0 PSD Class I Area Impact Analyses

PSD Class I areas are designed in 40 CFR Part 81, and are areas of special national or regional value from a natural, scenic, recreational or historic perspective. The PSD Class I areas that are most proximate to the project site are mandatory Federal Class I areas, which include the following areas in existence on August 7, 1977:

- International parks;
- National wilderness areas which exceed 5,000 acres in size;
- National memorial parks which exceed 5,000 acres in size; and
- National parks which exceed 6,000 acres in size.

These areas are administered by the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), or the U.S. Forest Service (USFS). These Federal Land Managers (FLMs) are responsible for evaluating proposed projects' air quality impacts in the Class I areas and may make recommendations to the permitting agency to approve or deny permit applications.

The closest designated PSD Class I areas are the Lye Brook Wilderness Area, located 167 km north-northeast of the site in southern Vermont, and the Brigantine Division of the Edwin B. Forsythe National Wildlife Refuge in New Jersey, 216 km south-southwest of the site. Class I area impact analyses consist of:

- An air quality impact analysis;
- A visibility impairment analysis; and
- An analysis of impacts on other air quality related values (AQRVs) such as impacts to flora and fauna, water, and cultural resources.

Based on the distances from the project site and the quantity of project emissions, it is expected that the FLMs will not require Class I modeling analyses for the project.

8.0 Additional Impacts Analyses

Additional impacts analyses consist of: an accidental release assessment of impacts from a hypothetical failure of the ammonia storage tank; an assessment of potential acidic deposition on sensitive receptors; an assessment of impacts resulting from the project on community growth; impacts on Environmental Justice areas; an assessment of visibility impairment; and impacts to soils and vegetation.

8.1 Aqueous Ammonia Release

Aqueous ammonia will be stored on site for use in the SCR emissions control system for NO_x. An aqueous solution of 19 percent by weight will be stored in two 30,000 gallon tanks. The tanks will be located within an impermeable containment area, surrounded by a wall. The floor of the containment area will be covered with plastic balls designed to float on the liquid surface in the event of a spill. The plastic balls would reduce the surface area of the exposed liquid and thereby reduce the rate of evaporation of ammonia to the atmosphere in the event of an accidental release of aqueous ammonia from the tank.

Facilities that store aqueous ammonia solutions containing less than 20 percent ammonia by weight are not subject to the USEPA Risk Management Planning (RMP) Rule. However, an analysis of potential impacts from a hypothetical ammonia tank failure will be conducted. The assessment will use the most recent version of the Areal Locations of Hazardous Atmosphere (ALOHA) model (version 5.6.1). ALOHA was developed by USEPA and the National Oceanic and Atmospheric Administration (NOAA) and is designed for use for emergency response to chemical releases and for emergency planning and training.

Consistent with RMP Rule guidance, worst-case and alternate scenarios will be modeled. In each case, the total failure of the ammonia tank resulting in the spilling of tank contents into the containment area will be assumed. The worst-case scenario will assume class F atmospheric stability and a wind speed of 1.5 meters per second. The alternate scenario will assume class D atmospheric stability and a wind speed of 3.0 meters per second. Ambient temperatures for the worst-case and alternate scenarios will be selected based on an analysis of data from KPOU. ALOHA will be used to determine the downwind distances at which the ammonia concentration resulting from the hypothetical accidental releases would decrease to less than the Emergency Response Planning Guideline Level 2 (ERPG-2) threshold defined by the American Industrial Hygiene Association (AIHA). The ERPG-2 for ammonia is 150

ppm. The predicted endpoint distances will be compared to the distance to the nearest "public receptor."

8.2 Acidic Deposition

An assessment of potential acidic deposition on sensitive receptors will be conducted, following the procedures outlined in the March 1993 memorandum by Leon Sedefian (NYSDEC, 1993). The specified source location will be Dutchess County. Impacts will be estimated at the 18 sensitive receptors identified in the State Acid Deposition Control Act (SADCA). Impacts will be calculated using the proposed annual project emissions of NO_x and SO_2, and the impact ratios tabulated in the 1993 memorandum. Project impacts will be summarized and compared to the total estimated New York state acidic deposition.

8.3 Growth Analysis

CVE anticipates that 25-30 new employees will be hired to operate the proposed facility, working in shifts, which will increase long-term jobs within the community. There will be additional short-term local employment during the construction phase of the proposed project. Short-term employment is expected to reach 750 workers over a short period of time (5 months).

Work Force

During the anticipated construction period associated with the proposed project, the majority of construction jobs will be filled by local area workers. Due to the large available labor pool in the region, supplemental short-term labor is not likely to require a significant influx of temporary workers relocating to the Dutchess County area during the construction phase. CVE anticipates that the additional temporary workers during the construction phase will have minimal effect on the environment, but will have a positive effect on the local economy.

For daily operation and maintenance of the project, CVE anticipates that the required full time staff will be mostly comprised of nearby Dutchess County residents, and the project will not result in a significant increase in residential housing demand.

During the construction phase of the project, there will be a temporary increase in truck traffic. Once in operation, it is anticipated that less than 25 trucks per week will be needed to provide the facility with supplies.

The resulting increase in employment is not anticipated to significantly impact the air quality of the area because the increase represents a small fraction of the regional population. Thus, construction and operation of the proposed project will have a positive impact on the work force in Dutchess County and the surrounding areas, but its net impact on the environment and to residential resource consumption is anticipated to be minimal.

Industry

Because much of the growth from the project will be filled by local labor and resources and the project is intended to support existing energy needs throughout the regional electricity grid area, CVE does not anticipate any significant corresponding commercial or industrial growth. Because the commercial and industrial growth resulting from the project is anticipated to be minimal, air quality impacts resulting from such commercial and industrial growth are also expected to be minimal.

8.4 Environmental Justice Areas

NYSDEC has identified potential Environmental Justice Areas (EJAs) of concern relating to impacts on communities or facilities housing disadvantaged population groups. The map of potential EJA areas in Dutchess County was reviewed; the only potential EJA in the eastern portion of Dutchess County is the location of a former state hospital (Harlem Valley). That property has been sold for private development. With no EJA in the project vicinity, no impact analysis is planned.

8.5 Visibility Impairment Analysis

The visibility impairment analysis addressed here is distinct from the analysis required for Class I areas. NPS guidance addresses the need for visibility analysis in “Class II floor areas,” although no specific guidance is provided that quantifies visibility impairment for these areas. Class II floor areas include the following areas in existence on August 7, 1977 that exceed 10,000 acres in size:

- National monuments;
- National primitive areas;
- National preserves;

- National recreational areas;
- National wild and scenic rivers;
- National wildlife refuges; and
- National lakeshores and seashores.

These Class II floor areas also include the following areas established after August 7, 1977 that exceed 10,000 acres in size:

- National parks; and
- National wilderness areas.

No areas meeting these Class II floor criteria were identified within 80 km (50 miles) of the project site. Therefore, no assessment of visibility impairment is proposed.

8.6 Soils and Vegetation Analysis

Ambient air quality screening levels are provided for soils and vegetation in USEPA guidance (USEPA, 1980). Table 16 summarizes the relevant screening levels. USEPA has not published screening values for PM_{10} (or $PM_{2.5}$).

Table 16. Soils and Vegetation Screening Modeling

Parameter	Averaging Period	USEPA Screening Level ($\mu g/m^3$)
SO_2	1-hour	917
	3-hour	786
	Annual	18
NO_2	4-hour	3,760
	8-hour	3,760
	1-month	564
	Annual	94

Maximum predicted concentrations for SO_2 and NO_2 will be compared to the screening levels shown in Table 16. If modeling results are less than the concentrations shown in Table 16, impacts to soils and vegetation will be considered negligible.

9.0 References

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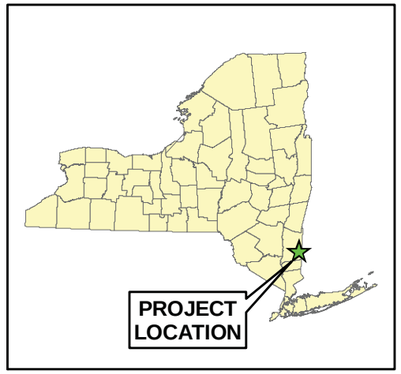
FIGURES



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Site Boundary

SOURCE:
U.S. Geological Survey, 7.5 x 15 Minute Quadrangle, Dover Plains, NY/CT, Verbank, NY

0 2,000 4,000 Feet

GRAPHIC SCALE

ARCADIS

CRICKET VALLEY ENERGY

FIGURE 1
SITE LOCATION

Dutchess County, New York

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TRUE NORTH
PLANT NORTH

PROJECT LOCATION

EXISTING FG LINE
NEW ACCESS ROAD
FLAGGED WETLAND BOUNDARY AS LOCATED MAY 2009
TEST WELL B-3
300 (FT SET BACK FROM ROAD
FG CONDITIONING & PRESSURE REDUCING STATION
GIS SWITCHYARD
UNDERGROUND DUCT BANK (TYP)
NEW FG PIPE UNDERGROUND
FG METERING STATION
YARD GATE
MAIN GATE
SECONDARY GATE
ADMIN./ WAREHOUSE BLDG.
GSUT
CTG
TURBINE GENERATOR BUILDING
HRSG
TEST WELL B-4
LAYDOWN AREA
EXISTING BUILDING
LEACH FIELD
FIN FAN COOLER
DETENTION POND
WATER TREATMENT/ FIRE PROTECTION AREA
NEW FG PIPE UNDERGROUND
TEST WELL B-1
FLAGGED WETLAND BOUNDARY AS LOCATED MAY & JULY 2009
100FT SET BACK FROM RAILROAD FENCE
WETLAND 100FT SET BACK
LAYDOWN AREA
TEST WELL B-2
AIR COOLED CONDENSERS
FLAGGED WETLAND BOUNDARY AS LOCATED MAY 2009
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CHIPPAWALLA PROPERTIES, INC. DOC. #: 2008-39380

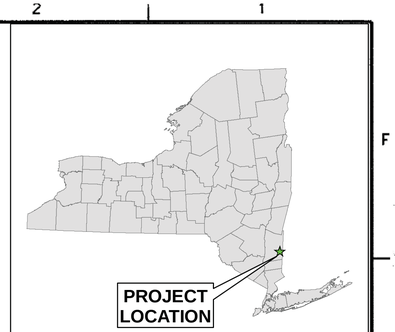
GRAPHIC SCALE
0 50' 100' 200' 300'
1" = 100.0'

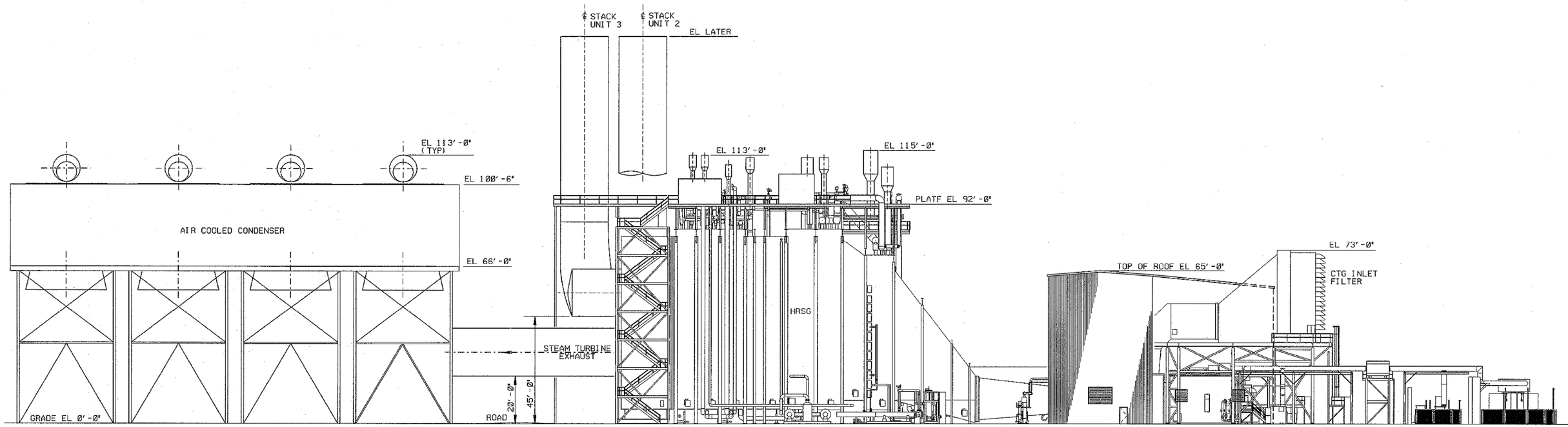
ARCADIS

CRICKET VALLEY ENERGY

FIGURE 2
SITE PLAN

Dutchess County, New York





UNIT 3
ELEVATION LOOKING NORTH

GRAPHIC SCALE

Ø 10' 20' 40' 60'

1" = 20.Ø'

PRELIMINARY

NOTES:

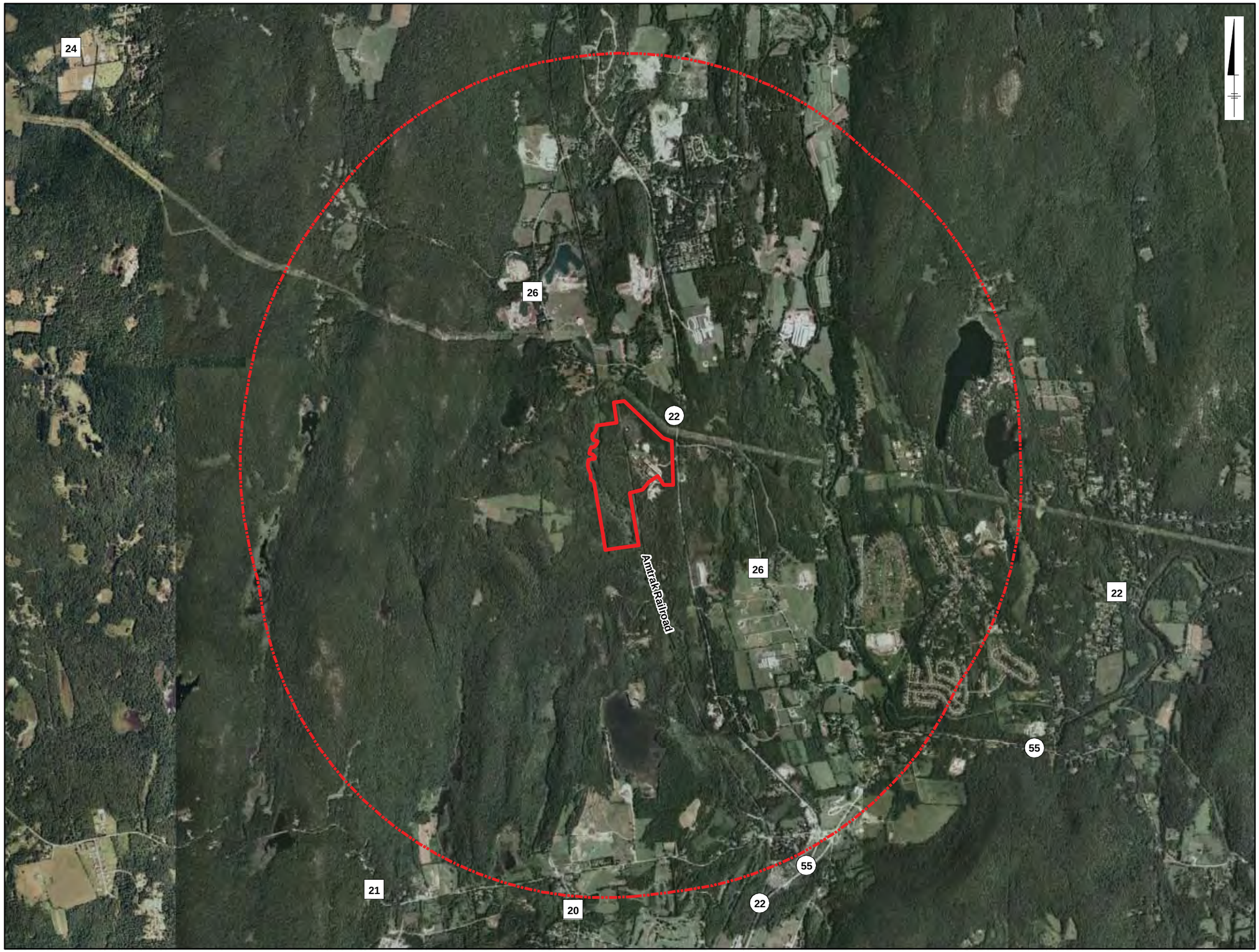
1. ALL ELEVATIONS ARE PRELIMINARY

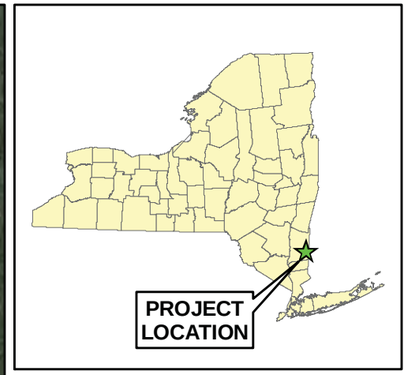
ARCADIS

CRICKET VALLEY ENERGY

FIGURE 3
SITE ELEVATIONS

Dutchess County, New York





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Site Boundary

3-km Radius

0 2,000 4,000 Feet

GRAPHIC SCALE

ARCADIS

CRICKET VALLEY ENERGY

FIGURE 4
LAND USE WITHIN 3KM OF THE SITE

Dutchess County, New York

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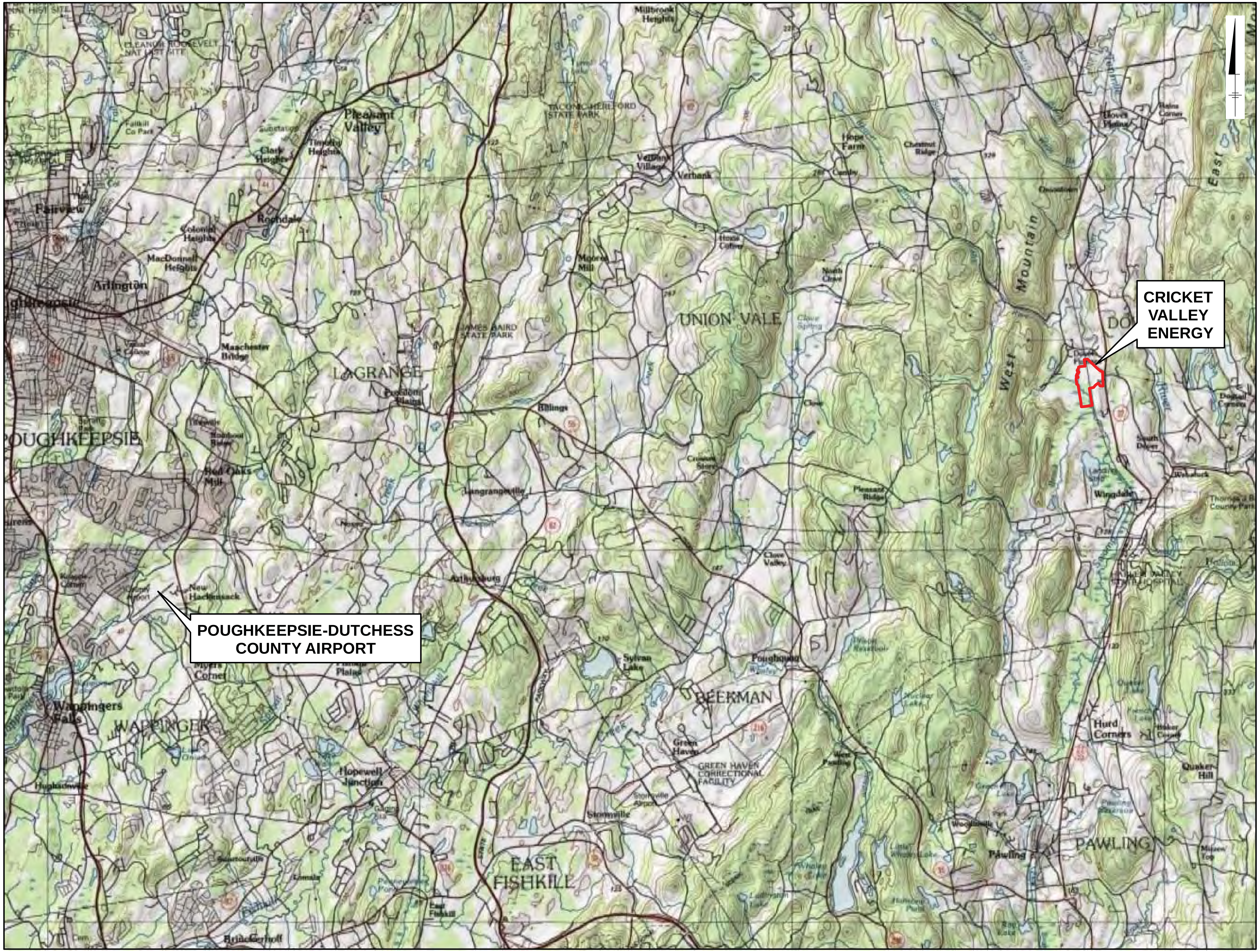

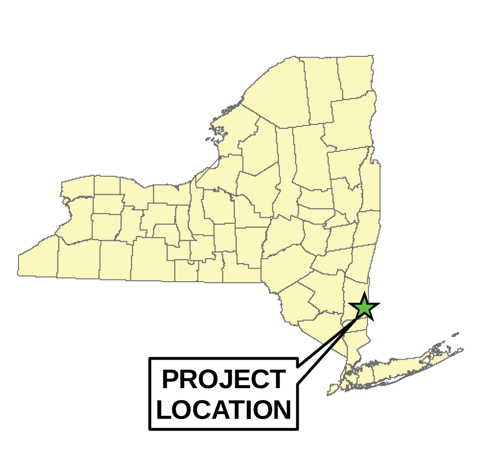

0 1 2 3 Miles

GRAPHIC SCALE

ARCADIS

CRICKET HILL ENERGY CENTER

FIGURE 5
LOCATION OF POUGHKEEPSIE-DUTCHESS COUNTY AIRPORT

Dutchess County, New York

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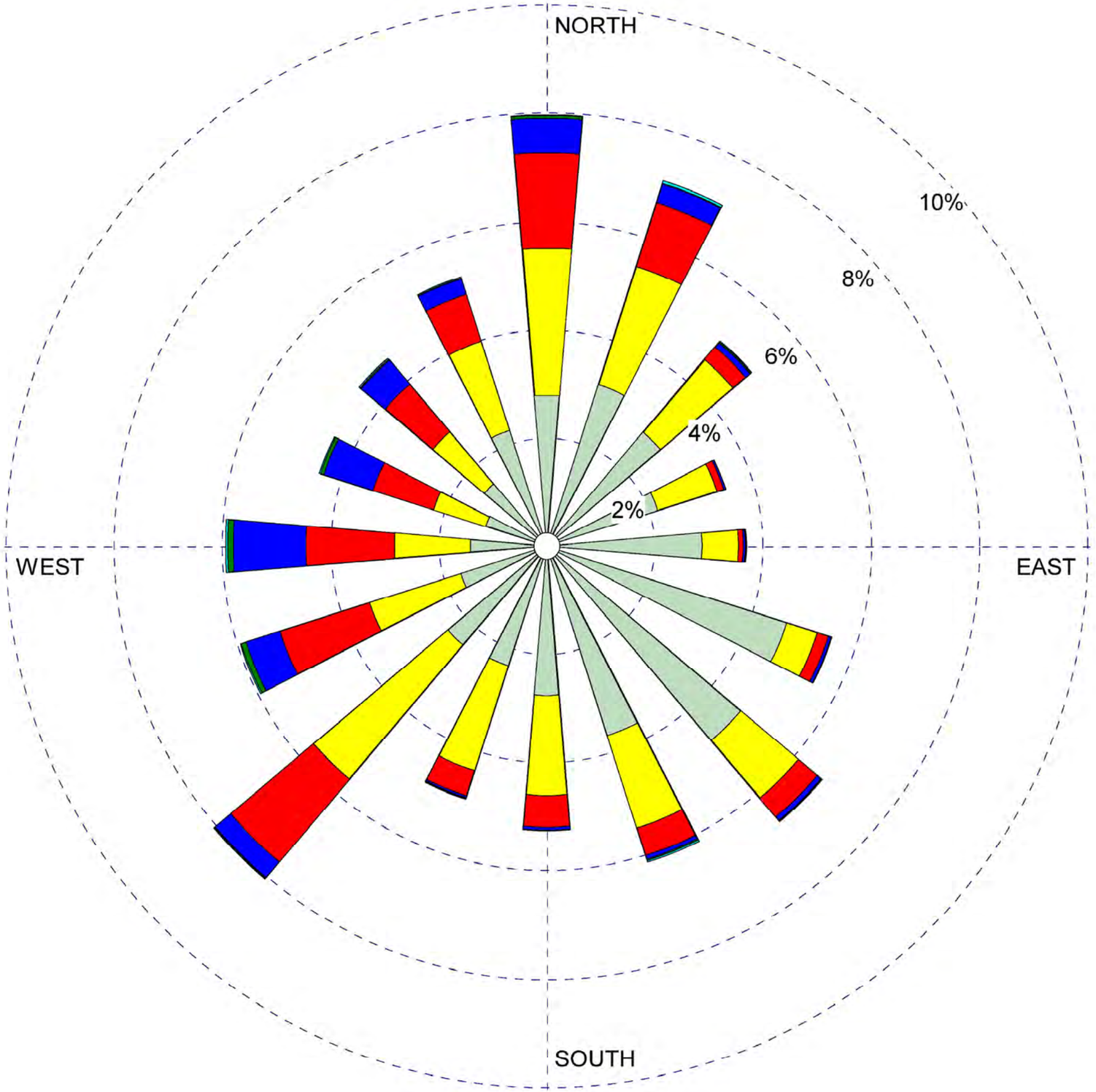

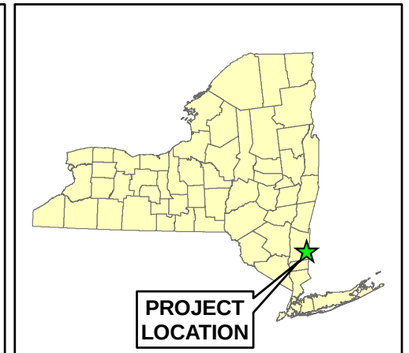

Station # 14757 - Poughkeepsie
Dutchess, NY

Wind Speed (Knots)

- >= 22
- 17 - 21
- 11 - 17
- 7 - 11
- 4 - 7
- 1 - 4

DATA PERIOD: 2005 2008 2006 2007 Jan 1 - Dec 1 00:00 - 23:00
CALM WINDS: 10.35%
AVG. WIND SPEED: 4.93 knots
TOTAL COUNT: 33,924 hrs.
DATE: 9/18/2009

ARCADIS

CRICKET VALLEY ENERGY

FIGURE 6
WIND ROSE

Dutchess County, New York

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ARCADIS

Appendix A

AERMAP Files

Electronic files not provided in this copy.

ARCADIS

Appendix B

Meteorological Data Processing

ARCADIS
2 Executive Drive
Suite 303
Chelmsford
Massachusetts 01824
Tel 978.937.9999
Fax 978.937.7555

MEMO

To:
Leon Sedefian/NYSDEC
Margaret Valis/NYSDEC

Copies:
Jeff Ahrens/CVE

From:
Dick Londergan
Fred Sellars

Date:
September 3, 2009

ARCADIS Project No.:
CO001447.0003.00004

Subject:
Poughkeepsie One-Minute ASOS Data Processing for the Cricket Valley Energy Center Air Quality Modeling (Updated)

As we previously reported to you, ARCADIS has developed software for calculating hourly average winds based on one-minute Automated Surface Observing Systems (ASOS) data. This approach was undertaken to address the high number of "calm" observations and lower than expected average wind speed in the National Climatic Data Center (NCDC) hourly surface data for the Poughkeepsie-Dutchess County Airport (Poughkeepsie). Our initial test using one-minute ASOS data from Poughkeepsie for 2007 indicates that this approach greatly reduces the frequency of calms and also increases the average wind speed. The software we provided to you on August 12, 2009 has subsequently been modified to provide greater consistency with the U.S. Environmental Protection Agency's (USEPA's) draft procedure, following discussions with James Thurman of the USEPA's Office of Air Quality Planning and Standards.

The approach is described below. We have attached a set of files that include the executable and Fortran code for the averaging routine, example monthly files of (input) one-minute data and (output) hourly averages, and an Excel file with the resulting values for the full year.

Wind Averaging for One-Minute ASOS Data

A procedure was developed to compute hourly average wind speed (WS) and wind direction (WD) values, starting from the one-minute values for ASOS stations archived by the NCDC (data set 6405). The purpose of this averaging exercise is to replace the selective wind values archived by NCDC in the "Hourly Surface Data" (DS3505) files with average values representing observations for the full hour. The "hourly"

data values for wind speed and direction reported by NCDC are based on two-minute average wind data taken five minutes before the end of an hour. (The prevalence of "hourly" values reported as "calm" by NCDC in DS3505 has increased following the transition to ASOS. Computed hourly averages are expected to yield fewer hours classified as calm.) The ARCADIS averaging procedure was tested using a one-year data set from Poughkeepsie (WBAN 14757, call sign KPOU) for calendar year 2007.

The ARCADIS averaging procedure to develop an annual file of hourly average wind values involves four processing steps:

1) Download monthly files that contain the "raw" one-minute ASOS data. These files provide two-minute running average values of wind direction and wind speed, reported every minute. (The ASOS system takes a reading every five seconds, so each two-minute average involves up to 24 data points.) Reported WD values are given to the nearest whole degree, and reported WS values are given to the nearest knot (truncated).
2) Import each monthly file to Excel, eliminate extraneous information (site ID, etc.) and rationalize "missing" flags. In the NCDC files, "missing" data values are flagged using varying combinations of the symbol "M" and square brackets […]. To simplify processing, the flag "999" was inserted for all missing WD values, and "99" for all missing WS values. The monthly Excel file was then exported as a formatted (__.dat) file.
3) The Fortran program "windavgM3" (described below) was applied to compute hourly average wind values.
4) Hourly average values from each monthly file were copied into one annual Excel file.

Fortran Program (windavgM3)

The wind averaging procedures utilize scalar and vector averaging. Alternate values are skipped, so that averages are computed based on 30 independent two-minute average values. For wind speed, the "scalar" average (WSS) is the arithmetic average of the individual one-minute values WS_i. To compensate for truncation, 0.5 knots is added to each reported one-minute value (including values reported as zero). At least six two-minute values are required for a valid hourly average wind speed.

For wind direction, the north (uy) and east (ux) components of the unit vector wind are calculated for each one-minute WD value, where uy = cos (WD_i) and ux = sin (WD_i). If an individual wind speed value is below the 2-knot threshold, the corresponding WD value is treated as missing. Hourly average wind components of the unit vector wind, <ux> and <uy>, are calculated, and the "scalar" wind direction (WDS) is computed as:

WDS = arctan (<ux>/<uy>)

At least three two-minute WD values with WS above the 2-knot threshold are required for a valid hourly average wind direction. If fewer than three two-minute average values are above the 2-knot threshold, winds are reported as “calm” (WD=888; WS=88).

Vector averages are calculated by averaging the north ($wy = WS_i \cos(WD_i)$) and east ($wx = WS_i \sin(WD_i)$) component of each two-minute wind vector. (Again, 0.5 knots is added to each reported two-minute speed value.) The “resultant” wind speed (WSR) is the magnitude of the vector average wind:

WSR = sqrt (<wx>^2 + <wy>^2),

while WDR = arctan (<wx>/<wy>).

The 2-knot threshold also applies for calculating vector averages. (The scalar average wind speed and unit vector average wind direction will be used for model inputs. The vector average values were calculated for comparison purposes.)

Poughkeepsie Application

For the one-year test data set (Poughkeepsie – Dutchess County, 2007), the averaging procedure increased data recovery at lower wind speeds. The wind rose in Figure 1 shows the wind frequency based on NCDC Surface Hourly data. Figure 2 shows a wind rose for the same year of data, based on the one-minute data. The number of calms is greatly reduced, from 41.8 percent with NCDC hourly data to 7.7 percent using one-minute data. In the NCDC hourly data from Poughkeepsie, wind speed values below 3 knots are reported as zero and classified as “calm.” By contrast, we are only classifying events below 2 knots as calm. The average wind speed also increases using one-minute data (4.95 knots, compared to 4.0 knots with NCDC hourly data). With fewer calms, the wind direction frequency is also modified. (The 613 missing hours with one-minute data is higher than 500 missing hours with NCDC hourly data. Some periods with missing one-minute data can be filled using NCDC hourly data.)

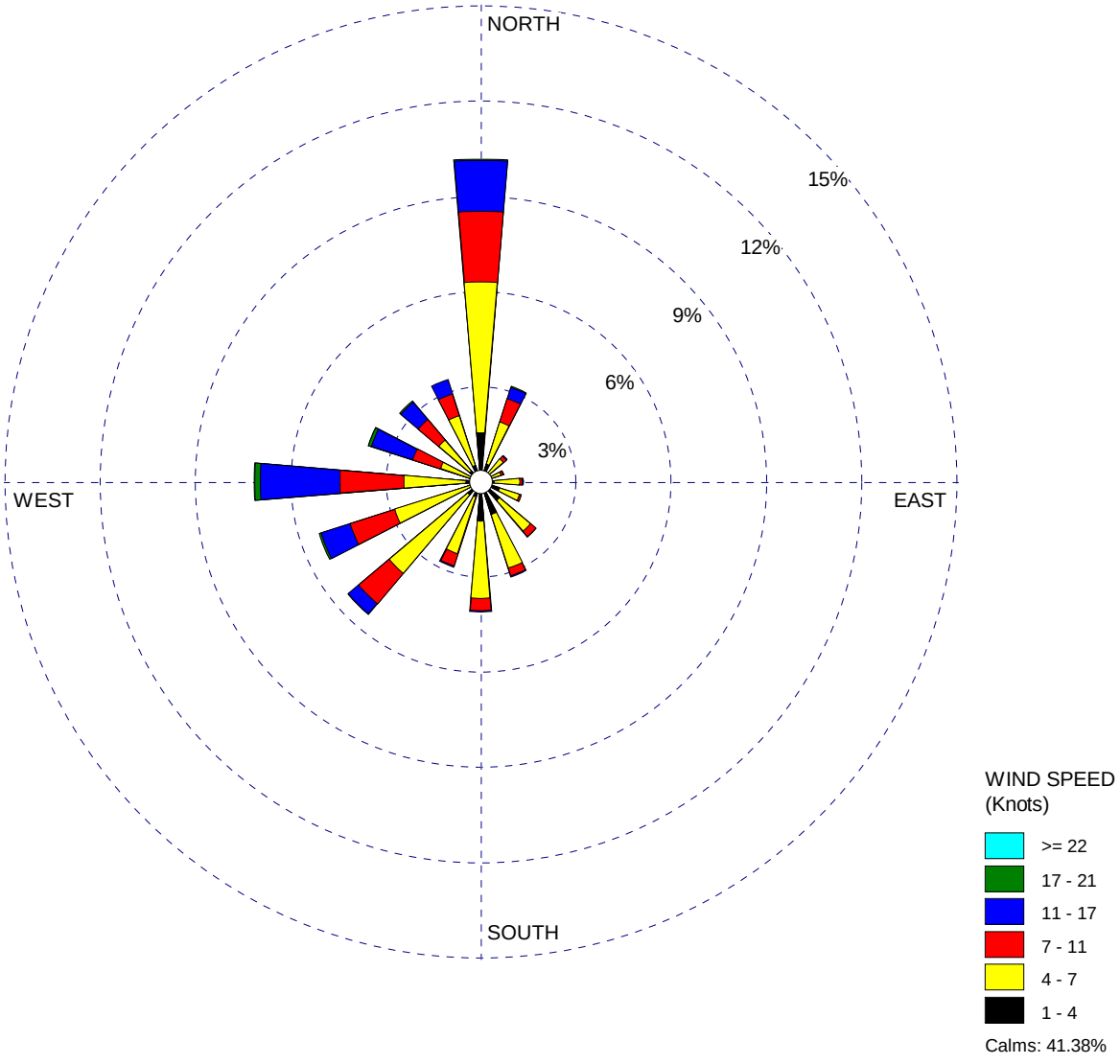
We believe that with these more applicable computations, the Poughkeepsie data are suitable for use in the air quality modeling analyses for the Cricket Valley Energy project, and look forward to further discussions with you in this regard.

WIND ROSE PLOT:

Station #14757 - Poughkeepsie Dutchess, NY

DISPLAY:

Wind Speed
Direction (blowing from)



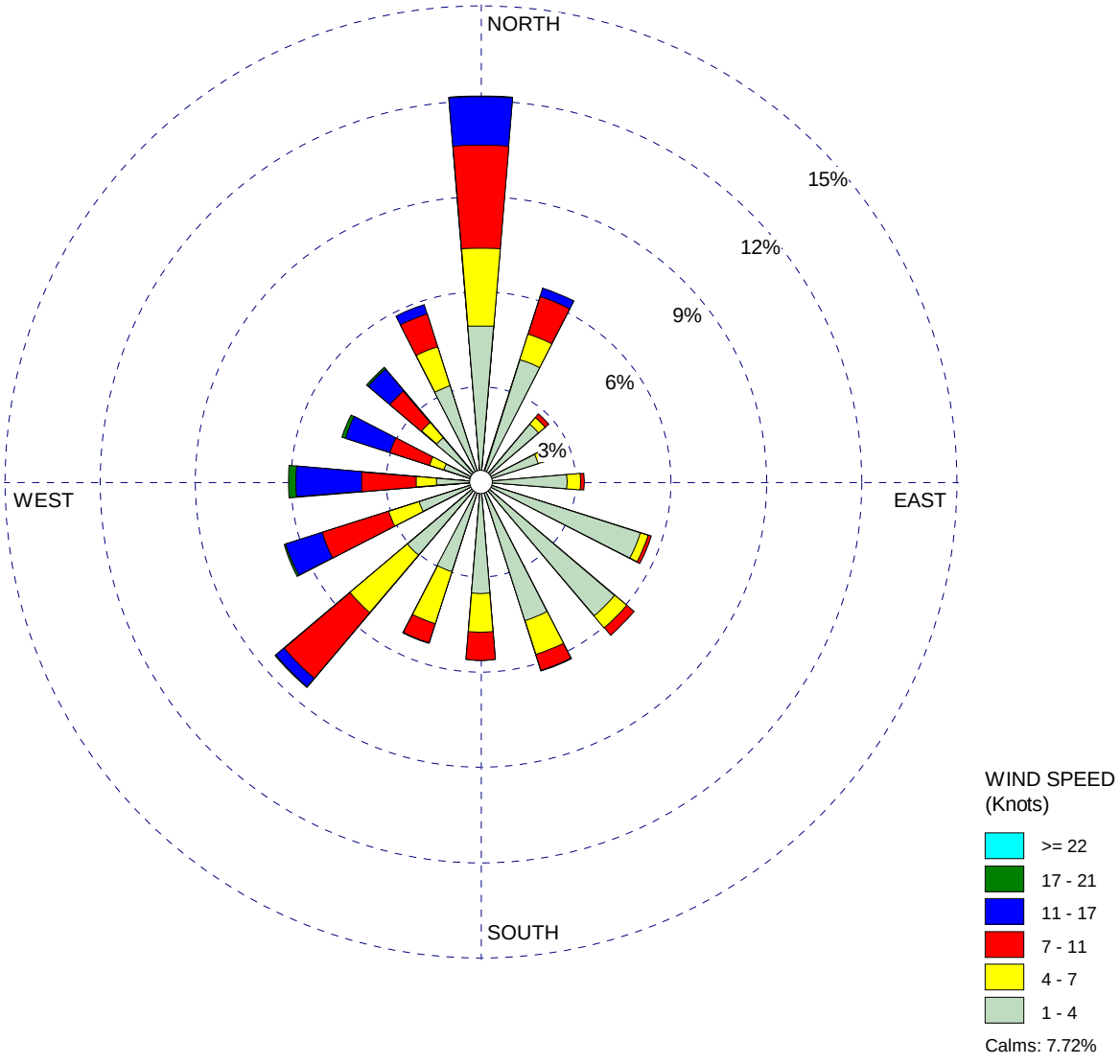
COMMENTS:	DATA PERIOD: **2007** **Jan 1 - Dec 31** **00:00 - 23:00**	COMPANY NAME:	
		MODELER:	Figure 1
	CALM WINDS: **41.38%**	TOTAL COUNT: **8260 hrs.**	
	AVG. WIND SPEED: **4.00 Knots**	DATE: **8/11/2009**	PROJECT NO.:

WIND ROSE PLOT:

Station #14757 - Poughkeepsie Dutchess, NY

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **2007 Jan 1 - Dec 31 00:00 - 23:00**	COMPANY NAME:	
		MODELER:	Figure 2
	CALM WINDS: **7.72%**	TOTAL COUNT: **8147 hrs.**	
	AVG. WIND SPEED: **4.90 Knots**	DATE: **8/18/2009**	PROJECT NO.:

Electronic files not provided in this copy.

Appendix C
Modeling Protocol and Agency Correspondence

Protocol Correspondence

New York State Department of Environmental Conservation
Division of Air Resources
Bureau of Stationary Sources, 2nd Floor
625 Broadway, Albany, New York 12233-3254
Phone: (518) 402-8403 • **FAX:** (518) 402-9035
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

November 19, 2009

Mr. Frederick Sellars
ARCADIS
2 Executive Dr.
Suite 303
Chelmsford, MA 01824

Dear Mr. Sellars:

This letter summarizes my review of the "Cricket Valley Energy Dispersion Modeling Protocol," dated September 2009. Although DEC finds that the protocol is acceptable once these comments are addressed and incorporated into a revised protocol, EPA Region 2 must still approve the protocol prior to submission of the PSD Application.

1. Comments pertaining to the processing of meteorological data and the use of AERSURFACE were listed in an e-mail to Richard Londergan on October 21, 2009 (enclosed). Subsequent e-mails to and from Mr. Londergan dated October 27 – November 3, 2009 (enclosed) further addressed met data issues and proposed sensitivity runs to account for differences in estimated surface characteristics between the Poughkeepsie Airport and the Facility.

2. Due to a high percentage of calm winds reported by the Poughkeepsie Airport the project has proposed to use ASOS archived 1-minute meteorological data. EPA OAQPS should be involved in the review of the proposed methodology to process this data to ensure consistency with the 1-minute ASOS program under development by EPA.

3. Because less than 5 years of the 1-minute data is available, the project proposes to use the highest 98th percentile value predicted for comparison to the 24-hr PM2.5 standard and the maximum predicted concentrations for other short-term impacts. This issue needs to be discussed further with EPA Region 2 prior to finalizing the protocol.

4. Stack parameters reflecting the 50% load case are proposed to be used in modeling of start-up conditions. Please provide details as to how these parameters best represent the start-up conditions.

5. A more detailed plot plan which clearly identifies the building footprints, stack locations and fenceline with associated scale should be submitted with the GEP/BPIP analysis. The geo-referenced AutoCAD file for the facility would be preferred.

6. Although SILs for PM2.5 are pending (Table 10), NESCAUM has recommended values of 0.3 ug/m3 for annual averages and 2.0 ug/m3 for 24-hr averages. These values should be used until EPA finalizes the PM2.5 SILs.

7. Receptors should be placed every 25 meters along the fenceline or wherever the public has access. As such, receptors should also be placed along the commuter rail line which runs through the property.

8. If available for the area, NED data for use in ARCMAP should be the 1/3 arc-second resolution data (approximately 10m horizontal resolution).

9. The FLM should be contacted and made aware of the project to confirm that Class I modeling is not necessary.

10. Note that AERMOD was recently updated; the most current version (09292) should be used in the modeling analysis.

If you have any questions, please contact me by phone at (518) 402-8403 or by e-mail at mxvalis@gw.dec.state.ny.us.

Sincerely,

Margaret Valis
Air Pollution Meteorologist
Bureau of Stationary Sources
Division of Air Resources

Enclosure

cc: L. Sedefian
C. Hogan
J. Lawyer
A. Coulter
R. Londergan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

DEC 15 2009

Mr. Fredrick M. Sellars
Vice President, Arcadis
2 Executive Drive, Suite 303
Chelmsford, Massachusetts 01824

Re: Air Quality Modeling Protocol for the Cricket Valley Energy Project, Dover, New York

Dear Mr. Sellars:

The U.S. Environmental Protection Agency, Region 2 Office reviewed the September 2009 air quality modeling protocol in support of a Prevention of Significant Deterioration (PSD)of Air Quality permit application. The PSD permit is for the proposed Cricket Valley Energy Project, a 1000 MW combined cycle electric generating facility located in Dover, Dutchess County, New York. The protocol proposes to use the EPA model AERMOD with meteorological data obtained from Poughkeepsie-Dutchess airport between 2005 and 2009. With the exception of 2 points in the protocol in which we are seeking further concurrence from our Office of Air Quality Planning and Standards, our comments on the protocol are discussed below. The 2 points are the first two bullets below. We will respond to these in a separate letter. The remaining bullets pertain to the remaining protocol. See below:

1.) The protocol proposed to obtained refined meteorology for input to the dispersion model. That is, you proposed a method to determine an hourly average wind speed and direction derived from the 1 minute averages measured during the hour rather than taking the a single reading every hour as is traditionally done. Using this procedure reduces the number of "calm" or "missing hours" substantially. EPA Region 2 would like to support this procedure but is seeking OAQPS concurrence since OAQPS is also in the process of developing a similar approach. We would want to provide you with the best guidance on implementing this for your project.

2.) The National Weather Service began archiving the 1 minute data in 2005. Therefore, for now there are only 4 years of data available. The Guideline on Air Quality Models recommends 5 years of data for demonstrating compliance with the NAAQS. Section 7.2.1.1c of this same Guideline also has provisions for cases where less than 5 years of data are available. However, this section has not been updated with respect to PM2.5. Therefore, you propose to use the maximum 98th percentile impact of any given year. While this proposal has merit, it establishes a policy precedent where we need to seek concurrence from OAQPS before we respond.

3.) Furthermore, you may want to note that although we are seeking guidance from OAQPS regarding your proposal to use the maximum 98th percentile for demonstrating compliance with the 24 hour average PM2.5 this does not apply to the single source modeling analysis where impacts are compared to the SILs. The SILs analysis is based on the maximum impact.

4.) Page 23 states that since EPA has not yet finalized a significant impact level for PM2.5 that the modeling will comprise of Cricket Valley's impact plus the measured ambient monitoring data. This is not acceptable. The NAAQS compliance demonstration must be a cumulative modeling analysis of Cricket Valley and other existing sources, in addition to the measured background in accordance with the Guideline on Air Quality Models (40 CFR Part 51 Appendix W). We understand that EPA has not yet finalized the PM2.5 Significant Impact Levels (SILs). However, we suggest using the strictest SILs that were proposed in order to define the significant impact area and whether the single source analysis is sufficient. This procedure is also in accordance with a NESCAUM agreement for the North East States.

5.) A preconstruction ambient air monitoring waiver must be submitted to our Region 2 office in order to be exempt from preconstruction ambient air monitoring requirements. A waiver may be considered based on the preliminary modeled impacts of the project when compared to the Significant Monitoring Concentration in 40 CFR Part 52.21. If impacts are above the SMC, we may consider the use of existing monitoring data provided the concentrations are representative of your project site.

6.) The protocol states that the project will operate in combined cycle mode. If the applicant would like to have operational flexibility to operate in simple cycle, a modeling analysis of these impacts must also be provided. Otherwise, the permit will be limited to combine cycle mode.

7.) Impacts due to startups and shut downs must be provided. The protocol states that the start ups will be self correcting on an annual basis. This does not ensure that any short term NAAQS are protected. Therefore, please provide a separate modeling analysis that demonstrates compliance with short term limit. As you may know, there will be a BACT limit defined in the permit for this scenario.

8.) Page 17 states that the terrain data will be based on 1 degree DEM data. Later in the protocol it states that 7.5 minute data will be used. EPA guidance prefers the use of the 7.5 minute data. This point needs to be clarified in the protocol.

9.) The additional impacts analysis must conform to 40 CFR Part 52.21(o). This includes a visibility analysis of the plume in the nearby area. It is not sufficient to state that there are no scenic vistas.

10.) The additional impact analysis must also address impacts on soils and vegetation that the project is PSD affected. The proposal stated only NOx and SO2.

11.) An Environmental Justice analysis should be part to the application. We recommend visiting our website for a copy of the EPA Region 2 EJ Interim Policy for further guidance.

12.) A letter from the Federal Land Manager which states that the requirements of the Endangered Species Act have been met must be part of the application.

Please provide us with a copy of the modeling analyses on a CD/DVD with clearly defined input and output files including a detailed readme file. If you have any questions regarding this letter you may contact Annamaria Coulter of my staff at (212) 637-4016.

Sincerely,

Steven C. Riva, Chief
Permitting Section, APB

cc: Leon Sedefian, NYSDEC
Margaret Valis, NYSDEC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

JAN 26 2010

Mr. Fredrick M. Sellars
Vice President, Arcadis
2 Executive Drive, Suite 303
Chelmsford, Massachusetts 01824

Re: Additional Comments on the Air Quality Modeling Protocol for the Cricket Valley Energy Project in Dover, New York.

Dear Mr. Sellars:

This is a follow up letter to our December 15, 2009 letter to you regarding the modeling protocol for the Cricket Valley Energy Project. In that letter we indicated that we would respond to 2 proposals made in the protocol where we needed to confirm with our EPA Office of Air Quality Planning and Standards (OAQPS). We have not formally received a response from OAQPS. However, in order to provide you with some direction, we are making the following recommendations. These comments are as follows:

1.) We agree that the use of the 1 minute ASOS data is an acceptable approach for determining hourly average meteorological conditions measured at the Poughkeepsie-Dutchess airport (POU). As you know, EPA is in the process of developing a similar preprocessor for the AERMET model that would allow the use of the 1 minute ASOS data. This model has not yet been released. However, some sensitivity analyses performed by NYSDEC shows that the two models produce virtually identical results. There are 2 differences between the models and we recommend that you make these adjustments to your preprocessor in order to better match the approach that is under consideration by EPA. These 2 differences are described in the table below.

The key differences in the 2 programs for processing the minute data are listed below.

ARCADIS - Cricket Valley	EPA
A valid hour is: Six 2-minute average values	A valid hour is: At least 2 non-calm observations in the 1st half of an hour, or at least 1 non-calm observation in the last half hour
Instrument threshold: 1-knot	Instrument threshold: If station has Ice Free Winds (IFW) instrumentation (POU has as of 9/12/06), 1knot is the threshold. If not part of IFW, 2knots is the threshold

In addition, please confirm that the hourly wind data is calculated in accordance with the methods described section 6 of the Meteorological Monitoring Guidance for Regulatory Modeling Applications (EPA-454/R-99-005, February 2000).
We approve the use of your preprocessor for this project since it greatly improves the data base. In addition, we have seen from other studies that air quality impacts using 1 minute data tends to calculate more conservative impacts. However, we would like to note that if EPA finalizes its preprocessor prior to the completion of your permit application, that you reassess the impacts to ensure compliance with the EPA procedures.

2.) At the time of the protocol submittal, there were less than the required 5 years of the 1 minute meteorological data available at this Poughkeepsie-Dutchess site. The EPA Guideline on Air Quality Models under section 7.2.1.1c contains provisions for situations when there are less than 5 years of representative meteorological data. For example, for SO2, this provision states that the highest impact rather than the highest-2nd-highest impact must be used to show compliance with the 24 hour average NAAQS. However, this section has not been updated with respect to PM2.5. Since the form of the NAAQS is different for PM2.5 than for other pollutants, you proposed to use the highest 98th percentile for any given year rather than the highest 8th highest.

We have consulted with our Office of Air Quality Planning and Standards. While we agree that this method has merit, it is still uncertain what the final agency decision will be on this policy. Your colleague, Richard Londergan, has contacted our office and requested if the application could be submitted at this time using your proposed procedure with the understanding that you would revise the analysis once you obtain the remaining meteorological data through March 2010 (i.e., thereby negating the need to implement section 7.2.1.1c.) Since the final decision on the air quality analysis will be based on the complete 5 years of data, we agree that this is acceptable.

If you have any questions on this letter please contact Annamaria Coulter of my staff at (212) 637-4016.

Sincerely,

Steven C. Riva, Chief
Permitting Section, APB

cc: Richard Londergan, Arcadis
Leon Sedefian, NYSDEC
Margaret Valis, NYSDEC

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Margaret Valis
Bureau of Stationary Sources
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-3254

Steven C. Riva
Chief, Permitting Section, APB
United States Environmental Protection Agency
290 Broadway
New York, New York 10007-1866

Date:
January 27, 2010

Contact:
Frederick Sellars

Phone:
978.937.9999 ext. 317

Email:
Frederick.Sellars
@arcadis-us.com

Our ref:
CO001447.0003.00004

Subject:
Revisions to Cricket Valley Energy Dispersion Modeling Protocol

Dear Ms. Valis and Mr. Riva:

On behalf of the proposed Cricket Valley Energy (CVE) project, ARCADIS submitted a draft dispersion modeling protocol on September 25, 2009. Comments have been received to clarify and refine the procedures outlined in the protocol. This letter (with attachments) summarizes resolution of each issue and documents the proposed revisions to the planned modeling effort.

Comments on the draft protocol were provided in two letters, one from the New York State Department of Environmental Conservation (NYSDEC) (Margaret Valis to Frederick Sellars, dated November 19, 2009) and one from the United States Environmental Protection Agency (EPA Region 2) (Steven C. Riva to Frederick Sellars, dated December 15, 2009).

The comments from NYSDEC are discussed below, followed by comments from EPA Region 2.

Response to NYSDEC comments.

Comment NY-1. Comments pertaining to the processing of meteorological data and the use of AERSURFACE were listed in an e-mail to Richard Londergan on October 21, 2009 (enclosed). Subsequent e-mails to and from Mr. Londergan dated October 27-November 3, 2009 (enclosed) further addressed met data issues and proposed sensitivity runs to account for differences in estimated surface characteristics between the Poughkeepsie Airport and the Facility.

Response to NY-1. As referenced in the e-mail exchange (reproduced in Attachment A), the primary concern was the use of AERSURFACE for processing surface meteorological data. Specific issues included: the choice between processing the meteorological data using surface characteristics for the area surrounding the National Weather Service (NWS) anemometer (at Poughkeepsie Dutchess County Airport) versus surface characteristics for the area surrounding the CVE project site; details concerning how to apply AERSURFACE for each site; and the sensitivity analysis that would be required to determine which site was preferred. The referenced e-mails document the approval by NYSDEC of the land-use sectors proposed for each site. The agreed approach is modeling to assess single-source impacts using two separate sets of meteorological data, one set with AERSURFACE inputs reflecting land use from the anemometer site and one set reflecting the CVE project site. The meteorological data set that results in the highest impacts will be used to compare project impacts to respective Significant Impact Levels (SILs). Cumulative impact modeling, should any SIL be exceeded, would also be performed using the meteorological data set that results in higher predicted project impacts.

Comment NY-2. Due to a high percentage of calm winds reported by the Poughkeepsie Dutchess County Airport the project has proposed to use ASOS archived 1-minute meteorological data. EPA OAQPS should be involved in the review of the proposed methodology to process this data to ensure consistency with the 1-minute ASOS program under development by EPA.

Response to NY-2. EPA has completed its review of the proposed methodology. See response below to Comment EPA-1.

Comment NY-3. Because less than 5 years of the 1-minute data is available, the project proposes to use the highest 98th percentile value predicted for comparison to the 24-hr PM2.5 standard and the maximum predicted concentrations for other short-term impacts. This issue needs to be discussed further with EPA Region 2 prior to finalizing the protocol.

Response to NY-3. See response below to comment EPA-2.

Comment NY-4. Stack parameters reflecting the 50% load case are proposed to be used in modeling of start-up conditions. Please provide details as to how these parameters best represent the start-up conditions.

Response to NY-4. We now propose to use time-weighted average flow rates and conservative exhaust temperature estimates based on operating curves for startup and shutdown provided by turbine vendors, rather than stack parameters for 50% load. Table NY-4 presents the short term emission rates and stack parameters associated with each startup event that will be used in modeling. We propose to model only the cold start and warm start cases; the hot start and shutdown cases have shorter duration, lower emission rates, and higher exhaust temperatures, as compared to the cold start and warm start cases, and would therefore have lower impacts. For computing annual average impacts, all pollutants will be modeled based on steady-state operating conditions; annual emission rates for modeling will include the contribution from the maximum permitted number of startups and shutdowns.

Table NY-4. Modeling Inputs for Startup and Shutdown Events

Pollutant	Cold Startup	Hot Startup	Warm Startup	Shutdown
$PM_{10}/PM_{2.5}$ (g/s)	2.5	1.4	2.3	2.0
SO_2 (g/s)	0.087	0.056	0.082	0.071
CO (g/s)	78.8	37.9	58.1	50.4
Exit Temperature (K)	359.8	379.3	369.5	N/A
Exit Velocity (m/s)	12.3	9.2	7.4	N/A

Comment NY-5. A more detailed plot plan which clearly identifies the building footprints, stack locations and fenceline with associated scale should be submitted with the GEP/BPIP analysis. The geo-referenced AutoCAD file for the facility would be preferred.

Response to NY-5. The detailed plot plan and geo-referenced AutoCAD file will be provided with the GEP/BPIP analysis in the Permit Application submittal.

Comment NY-6. Although SILs for PM2.5 are pending (Table 10), NESCAUM has recommended values of 0.3 µg/m^3 for annual averages and 2.0 µg/m^3 for 24-hr averages. These values should be used until EPA finalizes the PM2.5 SILs.

Response to NY-6. The 24-hour SIL value referenced above (2.0 µg/m^3) is higher than the value recommended by EPA. We propose to use SIL values of 0.3 µg/m^3 for annual averages and 1.2 µg/m^3 for 24-hour averages, as discussed in response to EPA-4.

Comment NY-7. Receptors should be placed every 25 meters along the fenceline or wherever the public has access. As such, receptors should also be placed along the commuter rail line which runs through the property.

Response to NY-7. Given the fenceline's proximity to the facility, we propose to place receptors at 10 m spacing along the fenceline, including along the commuter rail line.

Comment NY-8. If available for the area, NED data for use in ARCMAP should be the 1/3 arc-second resolution data (approximately 10m horizontal resolution).

Response to NY-8: National Elevation Dataset (NED) data is available at 1/3 arc-second resolution and will be used with AERMAP to determine receptor elevations.

Comment NY-9. The FLM *should be contacted and made aware of the project to confirm that Class I modeling is not necessary.*

Response to NY-9. The nearest Class I Area is Lye Brook Wilderness in the Green Mountain National Forest. The responsible Federal Land Manager (FLM), the U.S. Forest Service, Region 9, has been contacted. The FLM response, which is provided in Attachment B, confirmed that dispersion modeling to assess Class I impacts is not necessary.

Comment NY-10. Note that AERMOD was recently updated; the most current version (09292) should be used in the modeling analysis.

Response to NY-10. The modeling analysis will be performed with the most current regulatory version of AERMOD (version 09292).

Response to EPA comments

Comment EPA-1. The protocol proposed to obtain refined meteorology for input to the dispersion model. That is, you proposed a method to determine an hourly average wind speed and direction derived from the 1 minute averages measured during the hour rather than taking a single reading every hour as is traditionally done. Using this procedure reduces the number of "calm" or "missing hours" substantially. EPA Region 2 would like to support this procedure but is seeking OAQPS concurrence since OAQPS is also in the process of developing a similar approach. We would want to provide you with the best guidance on implementing this for your project.

Response to EPA-1. EPA has now given provisional approval for the proposed averaging method, with revisions to procedures for minimum wind speed and to the criteria for the number of valid one-minute values to report a valid hourly average (Attachment C – letter from S. Riva to F. Sellars, January 26, 2010);. The averaging method has been revised to address these comments; the new version will be provided to NYSDEC and EPA Region 2 electronically.

Comment EPA-2. The National Weather Service began archiving the 1 minute data in 2005. Therefore, for now there are only 4 years of data available. The Guideline on Air Quality Models recommends 5 years of data for demonstrating compliance with the NAAQS. Section 7.2.1.1c of this same Guideline also has provisions for cases where less than 5 years of data are available. However, this section has not been updated with respect to PM2.5. Therefore, you propose to use the maximum 98th percentile impact of any given year. While this proposal has merit, it establishes a policy precedent where we need to seek concurrence from OAQPS before we respond.

Response to EPA-2. The permit application will be prepared and submitted using the proposed criteria (maximum 98^{th} percentile value for any year). At such time as a fifth complete year of one-minute data becomes available, modeling will be performed for that additional year to supplement the Permit Application. Revised modeling results will then be reported, based on five full years of data; the highest 3-year average 98^{th} percentile value will then be used to assess compliance with the 24-hour standard for $PM_{2.5}$. We understand that Permit Application review will proceed prior to receipt of this supplemental modeling.

Comment EPA-3. Furthermore, you may want to note that although we are seeking guidance from OAQPS regarding your proposal to use the maximum 98th percentile for demonstrating compliance with the 24 hour average PM2.5 this does not apply to the single source modeling analysis where impacts are compared to the SILs. The SILs analysis is based on the maximum impact.

Response to EPA-3. It is understood that comparisons to SILs will be based on maximum predicted impacts for all averaging times.

Comment EPA-4. Page 23 states that since EPA has not yet finalized a significant impact level for PM2.5 the modeling will be comprised of Cricket Valley's impact plus the measured ambient monitoring data. This is not acceptable. The NAAQS compliance demonstration must be a cumulative modeling analysis of Cricket Valley and other existing sources, in addition to the measured background in accordance with the Guideline on Air Quality Models (40 CFR Part 5 1 Appendix W). We understand that EPA has not yet finalized the PM2.5 Significant Impact Levels (SILs). However, we suggest using the strictest SILs that were proposed in order to define the significant impact area and whether the single source analysis is sufficient. This procedure is also in accordance with a NESCAUM agreement for the North East States.

Response to EPA-4. We propose to use the most stringent SIL values from the alternatives proposed for $PM_{2.5}$ by EPA (Federal Register p.54112, September 21, 2007), specifically, 0.3 $\mu g/m^3$ for annual averages and 1.2 $\mu g/m^3$ for 24-hour averages.

Comment EPA-5. A preconstruction ambient air monitoring waiver must be submitted to our Region 2 office in order to be exempt from preconstruction ambient air monitoring requirements. A waiver may be considered based on the preliminary modeled impacts of the project when compared to the Significant Monitoring Concentration in 40 CFR Part 52.21. If impacts are above the SMC, we may consider the use of existing monitoring data provided the concentrations are representative of your project site.

Response to EPA-5. The request for a preconstruction ambient air monitoring waiver will be prepared upon completion of the modeling analysis and included in the Permit Application package. The submittal will include a comparison of modeled impacts of the project to SILs and to SMCs, including the most stringent proposed SMC for 24-hour average $PM_{2.5}$ (2.3 $\mu g/m^3$).

Comment EPA-6. The protocol states that the project will operate in combined cycle mode. If the applicant would like to have operational flexibility to operate in simple cycle, a modeling analysis of these impacts must also be provided. Otherwise, the permit will be limited to combined cycle mode.

Response to EPA-6. The project does not propose to operate in simple cycle mode.

Comment EPA-7. Impacts due to startups and shut downs must be provided. The protocol states that the startups will be self correcting on an annual basis. This does not ensure that any short term NAAQS are protected. Therefore, please provide a separate modeling analysis that demonstrates compliance with short term limits. As you may know, there will be a BACT limit defined in the permit for this scenario.

Response to EPA-7. Impacts during startups will be assessed as part of the modeling analysis. Please see the related discussion in response to NY-4.

Comment EPA-8. Page 17 states that the terrain data will be based on 1 degree DEM data. Later in the protocol it states that 7.5 minute data will be used. EPA guidance prefers the use of the 7.5 minute data. This point needs to be clarified in the protocol.

Response to EPA-8. As noted in response to NY-8, NED data is available at 1/3 arc-second resolution and will be used with AERMAP to determine receptor elevations. This represents the highest resolution digital terrain data available from the U.S. Geological Survey.

Comment EPA-9. The additional impacts analysis must conform to 40 CFR Part 52.21(0). This includes a visibility analysis of the plume in the nearby area. It is not sufficient to state that there are no scenic vistas.

Response to EPA-9. A visibility impact analysis of the plume will be provided, consistent with 40 CFR Part 52.21(0). We will consult with EPA and NYSDEC to determine specific locations for this analysis.

Comment EPA-10. The additional impact analysis must also address impacts on soils and vegetation for which the project is PSD affected. The proposal stated only NOx and S02.

Response to EPA-10. Potential impacts of the project on soils and vegetation will be addressed for all PSD affected pollutants, consistent with EPA guidance and criteria.

Comment EPA-11. An Environmental Justice analysis should be part of the application. We recommend visiting our website for a copy of the EPA Region 2 EJ Interim Policy for further guidance.

Response to EPA-11. Federal, state and local resources have been reviewed to identify the location of any potential minority or economically disadvantaged population in the project vicinity. Based on Census 2000 data, the federal and state GIS systems identify one potential EJ area associated with the former Harlem Valley State Hospital. This facility and its population of patients and residents no longer exist . Documentation following the EPA Region 2 EJ Interim Policy will be included in the Permit Application package.

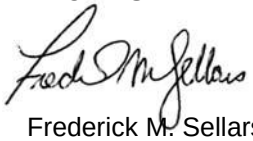
Comment EPA-12. A letter from the Federal Land Manager which states that the requirements of the Endangered Species Act have been met must be part of the application.

Response to EPA-12. As noted in response to NY-9, no Class I Area analysis will be required. The U.S. Fish and Wildlife Service has been consulted to ensure that any endangered species present within the project vicinity have been identified. Potential impacts of project air emissions on such species will be assessed, consistent with requirements of the Endangered Species Act.

Thank you for your valuable input on the CVE project modeling protocol. I look forward to your written confirmation that, with amendments as discussed in this letter, the CVE modeling protocol is approved for implementation. Please do not hesitate to contact me if any of the above responses require further clarification or discussion.

Sincerely,

ARCADIS



Frederick M. Sellars
Vice President

Copies:
J. Ahrens, CVE
C. Hogan, NYSDEC
L. Sedefian, NYSDEC
R. Londergan, ARCADIS

ARCADIS

Infrastructure, environment, buildings

Attachment A

Margaret Valis - Cricket Valley Protocol

From: Margaret Valis
To: richard.londergan@arcadis-us.com
Date: 10/21/2009 11:17 AM
Subject: Cricket Valley Protocol
CC: Coulter.Annamaria@EPA.GOV; Sedefian, Leon

Dick,

I wanted to summarize our comments and our recent discussions regarding the land use and AERSURFACE described in Section 4.4 Meteorological Data in the protocol. We will formalize these comments and any others we may have on the remainder of the protocol soon, but we wanted to resolve any met data issues now, so we don't hold up the met data processing.

1. The correct coordinates to be used in AERSURFACE and AERMET for the Poughkeepsie Airport met tower are: 41.626, -73.882 (lat, lon).

2. A more thorough comparison of the airport met site and the facility site to determine met site representativeness should be included in the final protocol. This would include maps of the land use surrounding both the airport and facility and AERSURFACE results using 12 sectors and sectors appropriate for final met processing. Proposed sectors should be depicted on the land use maps. All AERSURFACE input and output files should be submitted for review. Also, a sensitivity analysis will be necessary to determine whether differences in Zo for the airport vs. the facility have a significant difference in impacts. This would entail processing the met data with surface characteristics for both the airport and the facility and running AERMOD for the worst-case scenario to ensure maximum impacts are modeled.

3. A explanation and justification for use of the non-default month to season assignment in the AERSURFACE runs should be included in the final protocol.

Thank you for the items that you have already sent to me in response to some of these comments. If you have any questions, please contact me.

Margaret

Margaret Valis

NYSDEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3254
---
(518)402-8403
mxvalis@gw.dec.state.ny.us

Margaret Valis - RE: protocol

From: "Londergan, Richard" <Richard.Londergan@arcadis-us.com>
To: Margaret Valis <mxvalis@gw.dec.state.ny.us>
Date: 11/3/2009 12:18 PM
Subject: RE: protocol
CC: "coulter.annamaria@epa.gov" <coulter.annamaria@epa.gov>, Leon Sedefian <lxsedefi@gw.dec.state.ny.us>, "Sellars, Fred" <Frederick.Sellars@arcadis-us.com>
Attachments: Cricket Site 5 sector 1103.pdf; KPOU 4 sector 1103.pdf; SURF_CVE_5sect.log; SURF_CVE_5sect.out

Margaret – we have prepared land use figures with an overlay of the proposed AERSURFACE sectors for Poughkeepsie Dutchess County Airport (KPOU) and for the CVE Project Site, as you requested.

While preparing these figures, I discovered that I had specified the wrong datum for LATLON coordinates for the project site in the earlier land use figure and AERSURFACE run. I have revised the proposed sectors to reflect the new location. (The turbine stacks are at the center of the circle.) The proposed (now five) sectors for the project site are 0-55, 55-90, 90-180, 180-270 and 270-0. I have also attached new AERSURFACE output files based on the revised location and sectors.

To respond briefly to two other items that you raised:

- The intent is to operate a duct burner only when a turbine is at full load, and the proposed modeling scenarios reflect that intent.
- Regarding the "smaller sources", the black start generators and the auxiliary boiler will be exhausted through the (GEP) stack for Turbine 1, so the turbine sensitivity runs should be reasonably representative. Only the fire pump will have a short stack, and that unit would only run in the event of a fire, aside from test firing.

Please give me a call when you receive this. Thanks – Dick L

From: Margaret Valis [mailto:mxvalis@gw.dec.state.ny.us]
Sent: Friday, October 30, 2009 10:36 AM
To: Londergan, Richard
Cc: coulter.annamaria@epa.gov; Leon Sedefian
Subject: Re: protocol

Dick,

I have looked at your proposal for the sensitivity analysis and discussed it with Leon and I have a couple of comments.

First, we need to resolve the definition of sectors for AERSURFACE runs for both the airport and the facility site. During a phone conversation, we had discussed using 4 sectors at the airport (25-120, 120-180, 180-210 and 210-25) and 4 sectors for the facility (25-80, 80-165, 165-295 and 295-25). Looking at a land use map of the surrounding areas, these sectors seem to be acceptable, but a map with the sectors overlaid on the land use will be needed to make a final determination.

As for the sensitivity analysis, all sources will need to be modeled, not just the turbines, since the smaller

sources may be more sensitive to the differences in the Zo. Also, limiting the analysis to just the max emission case will not be enough if the worst-case scenario is different for the max emission scenario. Although you propose to look at just one year for the sensitivity analysis initially, please note that it may need to be expanded to the full set of meteorology in the impact analysis for the application. There also could be more than one operating scenario that you carry out throughout the impact analysis using both sets of surface characteristics, for example one scenario for short-term averages and another for annual.

I have a question regarding Table 2 from the Protocol. I notice you have only listed stack parameters for Duct Burner Operation only for the 100% load rate. Will the duct burners operate for other loads? If so will it effect the emissions and/or the stack parameters for the other load conditions?

I will get formal comments out soon so that you will be able to revise the protocol to incorporate our comments as well as any EPA may have.

Margaret

Margaret Valis

NYSDEC - Division of Air Resources
625 Broadway
Albany, NY 12233-3254
---
(518)402-8403
mxvalis@gw.dec.state.ny.us

>>> "Londergan, Richard" <Richard.Londergan@arcadis-us.com> 10/27/2009 2:07 PM >>>
Margaret – we are still preparing for the sensitivity runs. Those will be completed as soon as we have a GEP stack height. (Building dimensions are still being finalized.)

I have attached a matrix of the turbine scenarios we propose to run – once we get past the surface roughness sensitivity issue. After we have run the full matrix for the turbines, we plan to run the "worst case" turbine scenarios in combination with ancillary equipment (fire pumps, black start generators, aux boiler).

For the sensitivity runs, I plan to model the max emissions scenario: 3 turbines at 100% load, with duct burners, at ambient temperature of -8 F. Please let me know if there is a different scenario that you want to see. (we have not modeled the full matrix yet, so we aren't certain what will turn out to be "worst case" for predicted impacts).

One last detail: please confirm that the LAT-LON coordinates you provided for the anemometer are NAD83 (that's what I have assumed).

Thanks - Dick

ARCADIS
Dick Londergan
Principal Scientist

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Mobile 860-593-5280
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www.arcadis-us.com

New York State Department of Environmental Conservation
Division of Air Resources
Bureau of Stationary Sources, 2nd Floor
625 Broadway, Albany, New York 12233-3254
Phone: (518) 402-8403 • **FAX:** (518) 402-9035
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

February 11, 2010

Mr. Frederick Sellars
ARCADIS
2 Executive Drive
Suite 303
Chelmsford, MA 01824

Dear Mr. Sellars:

I have reviewed your revisions to the Cricket Valley Protocol, dated January 27, 2010. The responses provided in your submission adequately address our previous comments. However, there are a few points that need some clarification and are listed below.

1. Per regulatory requirement, the preconstruction monitoring waiver must be obtained from EPA Region 2 prior to submittal of the permit application.

2. As a follow up to EPA Comment #9, I suggest using James Baird State Park as the location for the visibility analysis. The Park is located in the Town of LaGrange, approximately 15 km to the west of the proposed Cricket Valley facility, and is the closest State Park.

3. Inventory data for sources within a 55km radius from the proposed facility were provided by Tom Christoffel (e-mail dated February 2, 2010). Any questions regarding that data should be directed to him. Please confer with Jeffrey Lawyer to assist with other data which may be needed to complete an accurate interactive source inventory for the modeling analysis. Prior to performing the cumulative impact analysis, the final source inventory should be submitted for review and approval.

4. The recent publication of the one-hour NO2 NAAQS, effective April 12, 2010, will require that one-hour NO2 impacts be modeled and compared to the new NAAQS. EPA OAQPS is developing a post-processor to assist with this analysis.

If you have any questions, please contact me at (518) 402-8403 or by e-mail at mxvalis@gw.dec.state.ny.us.

Sincerely,

Margaret Valis

Margaret Valis
Air Pollution Meteorologist
Bureau of Stationary Sources
Division of Air Resources

cc: L. Sedefian
C. Hogan
J. Lawyer
A. Coulter
R. Londergan
T. Christoffel

Appendix C
Modeling Protocol and Agency Correspondence

Other Agency Correspondence

ARCADIS
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www.arcadis-us.com

Steven C. Riva
Chief, Permitting Section, APB
United States Environmental Protection Agency
290 Broadway
New York, New York 10007-1866

Subject:
Request for Preconstruction Monitoring Waiver - Cricket Valley Energy, Dover, Dutchess County, New York

Date:
February 25, 2010

Contact:
Frederick Sellars

Phone:
978.937.9999 ext. 317

Email:
Frederick.Sellars
@arcadis-us.com

Our ref:
CO001447.0003.00004

Dear Mr. Riva:

As we have previously discussed, Cricket Valley Energy Center, LLC proposes to construct a new 1,000 megawatt natural gas fired combined-cycle electric generating facility in Dover, New York (Dutchess County). ARCADIS is preparing the Prevention of Significant Deterioration (PSD) air permit application for this facility. On behalf of the applicant, ARCADIS is requesting a waiver from PSD preconstruction monitoring requirements. Predicted impacts of the project are well below all of the Significant Monitoring Concentrations (SMCs) established by the United States Environmental Protection Agency (USEPA). However, predicted impacts for particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$) fall within the range of SMC values proposed, but not yet promulgated, by USEPA. Nonetheless, existing ambient air quality monitoring stations for $PM_{2.5}$ maintained by the New York State Department of Environmental Conservation and the Connecticut Department of Environmental Protection provide more than three years of concentration measurements representative of conditions in the project vicinity.

Dispersion modeling performed in accordance with the approved modeling protocol demonstrates that peak impacts from the project are below the established SMCs. Table 1 summarizes peak predicted impacts, based on modeling for four years and 9.5 months of meteorological data (beginning March 10, 2005). For $PM_{2.5}$, USEPA has not yet established an SMC. On November 21, 2007, USEPA proposed three candidate SMC values for 24-hour average $PM_{2.5}$, ranging from 2.3 micrograms per cubic meter ($\mu g/m^3$) to10 $\mu g/m^3$. The project's peak predicted 24-hour average impact, 3.9 $\mu g/m^3$, falls within the range of SMC values currently under consideration by USEPA.

Table 1. Comparison of Maximum Predicted Project Impacts to SMCs

Pollutant	Averaging Time	Maximum Predicted Impact	Significant Monitoring Concentration
		($\mu g/m^3$)	($\mu g/m^3$)
NO_2	**annual**	0.4	14
CO	**8-hour**	20.9	575
SO_2	**24-hour**	3.6	13
PM_{10}	**24-hour**	3.9	10
$PM_{2.5}$	**24-hour**	3.9	2.3 – 10*

*SMC not yet established.

Since peak predicted impacts exceed the lowest candidate SMC value for $PM_{2.5}$, ARCADIS has reviewed the ambient monitoring stations that provide measurements of $PM_{2.5}$ in the region surrounding the project. The three closest monitoring stations are listed in Table 2; their locations are shown on the attached figure.

Table 2. PM-2.5 Monitoring Stations in the Project Region

Site ID	Location	Distance from Project	Population Density (persons/square mile)
090050005	Mohawk Mountain (Cornwall, CT)	29 kilometer (km)	31
090050004	Thomaston, CT	42 km	624
360710002	Newburgh, NY	41 km	7,394

All three stations provide at least three years of $PM_{2.5}$ data, collected using the Federal Reference Method. Two of the stations are relatively rural, with population densities similar to that of Dover Township (154 persons/square mile), where the project is located. The closest station to Cricket Valley (29 km) is Mohawk Mountain, Connecticut; this station is part of the USEPA IMPROVE network. Thomaston, Connecticut and Newburgh, New York are at comparable distances from the project, but the population density of Newburgh is higher than that of Dover by more than a factor of 40. The rural area extending east from Poughkeepsie across Dutchess County, New York and Litchfield County, Connecticut includes the project site and both of the Connecticut monitoring stations.

ARCADIS believes that measured $PM_{2.5}$ concentrations from the existing monitoring stations at Mohawk Mountain and Thomaston, Connecticut are representative of

conditions in the project vicinity, based on geographic proximity and comparable population density. The modest impacts predicted from the project (less than all of the established SMCs and two of the three $PM_{2.5}$ SMC values currently under consideration), and the availability of representative data from existing monitors, provide a sound technical basis for a waiver from preconstruction monitoring.

Please do not hesitate to contact me if you have any questions or comments concerning this waiver request.

Sincerely,

ARCADIS

Frederick M. Sellars
Vice President

Copies:
J. Ahrens, CVE
C. Hogan, NYSDEC
L. Sedefian, NYSDEC
R. Londergan, ARCADIS


ARCADIS
Infrastructure, environment, buildings

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

MAR 24 2010

Mr. Fredrick Sellars
Vice President Arcadis
2 Executive Drive
Suite 303
Chelmsford, Massachusetts 01824

Re: Request for Preconstruction Monitoring Waiver – Cricket Valley Energy

Dear Mr. Sellars:

The U.S. Environmental Protection Agency, Region 2 Office, reviewed your request for a waiver from the preconstruction ambient air monitoring requirements allowed under 40 CFR 52.21(i) in relation to the proposed Cricket Valley Energy project in Dover, New York. We agree that this may be waived for NO_2, CO, SO_2 and PM_{10} since preliminary modeling shows that the impacts from the proposed facility are less than the PSD Significant Monitoring Concentrations (SMCs) which are de minimis levels for granting this waiver.

Regarding $PM_{2.5}$, EPA proposed 3 SMC de minimis values in 2007 but has not yet finalized which value it will select in a final rule. However, you note that the preliminary impacts from your proposed facility fall within the range of the 3 proposed de minimis values. Therefore, you will need to collect $PM_{2.5}$ ambient monitoring data. In order to meet this requirement, you propose to use data from one of the 3 existing $PM_{2.5}$ monitoring sites in the area. Of the 3, you request selecting data from either the Mohawh Mountain site in Cornwall, CT or the Thomaston site also in CT. The third is located in Newburgh, NY but you believe that this site in not representative of the air quality in Dover.

After reviewing several factors, we believe that the data measured at the Thomaston site is more appropriate than the other 2 sites for meeting both the preconstruction ambient air monitoring requirements and for obtaining suitable background concentrations for a cumulative $PM_{2.5}$ modeling analyses. We based this decision on several factors. First as you note, this is located in an area of similar population density as the project site. In addition, we note that in your February 23, 2010 letter to NYSDEC requesting information on the background source emission inventory, that the predicted "Significant Impact Area" (SIA) is about 5.66 km. This SIA includes a small number of sources classified as minor which is similar to the location of this monitor. (Other major sources are located outside the SIA but will be modeled for their impacts inside the SIA.) It is also worth noting that all 3 sites measure comparable concentrations despite the

differences in populations indicating that the $PM_{2.5}$ background component is relatively uniform throughout the region. However, the monitor in Thomaston is also upwind of the project's maximum impact area and includes influences from a nearby town and a nearby roadway. Therefore, for the purpose of background concentration to be added with the cumulative modeling analysis, we believe the Thomaston site is the preferred background monitor for the Dover site.

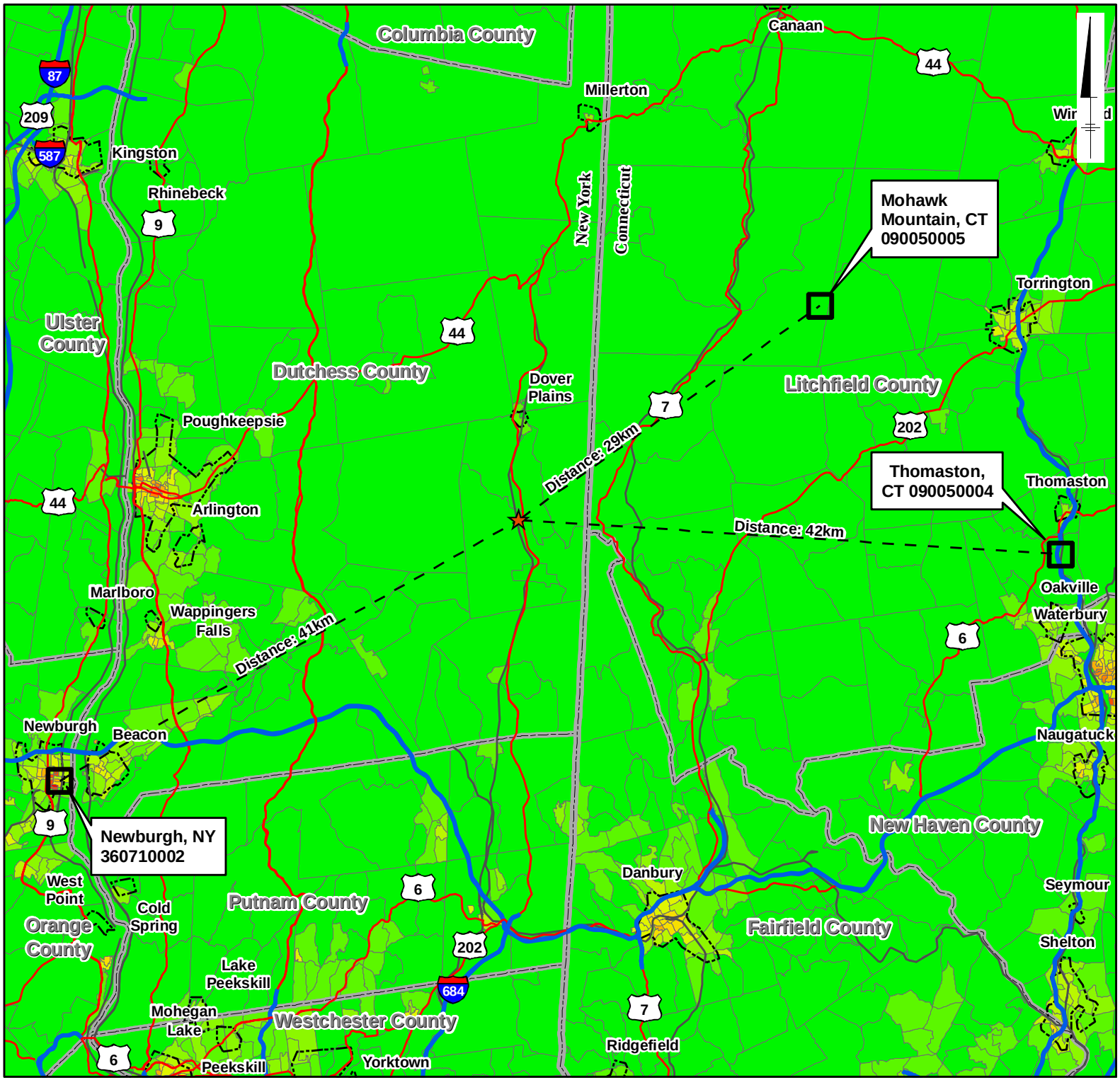
The approvability of the data collected at the Thomaston monitor is contingent upon the fact that this monitor has met quality assurance/control requirements, and it has met at least 75% data capture per year. In addition, EPA recommends that the data selected be current. Therefore, the most current 3 years of data available from this site should be selected. This information must be documented in the permit application.

If you have any questions regarding this letter, please contact Ms. Annamaria Coulter of my staff at (212) 637-4016.

Sincerely,

for Steven C. Riva, Chief
Permitting Section
Air Programs Branch

cc: Leon Sedefian, NYSDEC
Margaret Valis, NYSDEC
Richard Londergan, Arcadis



Legend

- Cricket Valley Energy Center N41.676168/W73.580618
- PM 2.5 Monitoring Stations
- Primary Limited Access or Interstate
- Primary US or State Highway
- County Boundary

Block Groups

POP07_SQMI

- 0.0 - 994.4
- 994.5 - 2280.0
- 2280.1 - 3954.5
- 3954.6 - 6124.4
- 6124.5 - 9015.2
- 9015.3 - 12900.0
- 12900.1 - 17400.0
- 17400.1 - 23140.1
- 23140.1 - 34257.1
- 34257.2 - 65300.0

0 5 10 15
Kilometers

Base data courtesy of ESRI Street Map Pro

ARCADIS

CRICKET VALLEY ENERGY CENTER

PM 2.5 MONITORING STATIONS

Dutchess County, New York

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Request for Applicability of Class I Area Modeling Analysis
Eastern Region, U.S. Forest Service

Facility Name (Company Name)	Cricket Valley Energy Center, LLC
New Facility or Modification?	New facility
Source Type	Combined cycle electric generating facility
Project Location (County/State/ Lat. & Long. in decimal degrees)	Dutchess County NY; N41.676168º, W73.580618º (NAD83)

Application Contacts

Applicant		*Consultant*		*Air Agency Permit Engineer*	
Company	Cricket Valley Energy Center, LLC	**Company**	ARCADIS	**Agency**	NYSDEC
Contact	Robert De Meyere	**Contact**	Frederick Sellars	**Contact**	Leon Sedefian
Address	31 Milk Street, Suite 1001 Boston, MA 02109	**Address**	2 Executive Drive Suite 303 Chelmsford MA 01824	**Address**	625 Broadway Albany, NY 12233-3254
Phone #	617-456-2214	**Phone #**	978-937-9999 ext 317	**Phone #**	518-402-8403
Email	bdemeyere@advancedpowerna.com	**Email**	frederick.sellars@arcadis-us.com	**Email**	lxsedefi@gw.dec.state.ny.us

Briefly Describe the Proposed Project

Combined cycle electric generating facility (approx. 1,000 MW) firing natural gas as sole fuel.

Proposed Emissions and BACT

Criteria Pollutant	***Proposed Emissions (tons/year)***	***Emission Factor (AP-42, Stack Test, Other?)***	***Proposed BACT***
Nitrogen Oxides	282.1	Equipment vendor	2.0 ppm - Selective Catalytic Reduction
Sulfur Dioxide	50.1	Fuel specification	0.002 lb/MMBtu – natural gas usage
Particulate Matter	195.2	Equipment vendor	0.007 lb/MMBtu – natural gas usage
Volatile Organic Compounds	73.7	Equipment vendor	2.0 ppm – oxidation catalyst
Sulfuric Acid Mist	15.5	Engineering estimate	6.2×10^{-4} lb/MMBtu – natural gas usage

Proximity to U.S. Forest Service Class I Areas

Class I Area	Lye Brook Wilderness		
Distance from Facility (km)	167		

For Additional Information or Questions, Contact Ralph Perron
(802) 222-1444 or rperron@fs.fed.us

United States Department of Agriculture
Forest Service
Green Mountain & Finger Lakes National Forests
Supervisor's Office
231 North Main St.
Rutland, Vermont 05701
Tel. (802) 747-6700
FAX (802) 747-6766
www.fs.fed.us/r9/gmfl

File Code: 2580-3
Date: November 12, 2009

Frederick Sellars
ARCADIS
2 Executive Drive
Suite 303
Chelmsford, MA 01824

Dear Mr. Sellars,

Thank you for the opportunity to review the proposed Cricket Valley Energy Center, LLC project in Dutchess County, New York. I understand that this new facility would consist of a combined cycle electric generating facility. It is also my understanding that the Cricket Valley Energy Center's proposed emissions include those listed in Table 1. The total of these emissions, divided by the distance in kilometers (167) from proposed Cricket Valley Energy Center to Lye Brook Wilderness Area, results in a Q/d value of less than 4.

Table 1

Criteria Pollutant	Nitrogen Oxides	Sulfur Dioxide	Particulate Matter	Sulfuric Acid Mist
Proposed Emissions (tons/year)	282.1	50.1	195.2	15.5

As the Federal Land Manager for Lye Brook Class I Wilderness Area my role is to address Air Quality Related Values including visibility and deposition. After reviewing the proposed emissions and the distance from the source to Lye Brook Wilderness Area, the US Forest Service will not require further analysis of the Cricket Valley Energy Center project.

I appreciate being consulted as part of your plans. If you have any further questions please contact Ralph Perron (802-222-1444 or rperron@fs.fed.us), the Green Mountain National Forest's Air Quality Specialist.

Sincerely,

/s/ Jerri Marr
JERRI MARR
Acting Forest Supervisor

cc: Richard Londergan

Alex Sienkiewicz
Ann Acheson
Charles E Sams
Thomas R Doane
Ralph Perron

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Tel 978.937.9999
Fax 978.937.7555
www.arcadis-us.com

Mr. Jeff Lawyer
Division of Air Resources, Region 3
New York State Department of Environmental Conservation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Subject:
Modeling Inventory for the Cricket Valley Energy Project, Dover, New York

Dear Mr. Lawyer:

Date:
January 19, 2010

Contact:
Fred Sellars

Phone:
978.937-9999 x317

Email:
frederick.sellars@
arcadis-us.com

Our ref:
CO001447-0003-00004

As you know, Cricket Valley Energy Center LLC (CVEC) is proposing to construct a nominal 1,000 megawatt natural gas fired combined cycle electric generating facility in Dover, NY (Dutchess County). ARCADIS is preparing the air permit application for this facility. We anticipate that cumulative impact modeling for $PM_{2.5}$ will be required to support the air permit application for this facility. The proposed facility is located within New York State Department of Environmental Conservation (NYSDEC) Region 3, and the likely domain for cumulative impact modeling (Significant Impact Area [SIA] plus 50 kilometers [km]) from the proposed facility) will include a large area within Region 3. We are therefore requesting your assistance to obtain inventory (modeling) data for existing and proposed (permitted) major emissions sources to support cumulative impact modeling, consistent with the procedures specified in NYSDEC's Air Guide 36.

The attached map illustrates the likely domain for interactive modeling. The facility location is Latitude N41.676168 degrees, Longitude W73.580618 degrees (NAD83). Based on a preliminary modeling analysis, we anticipate that the predicted impacts of the CVEC project will exceed the most stringent proposed 24-hour average Significant Impact Level (SIL) for $PM_{2.5}$ (1.2 $\mu g/m^3$) on elevated terrain in the project vicinity; the predicted SIA is expected to extend less than 5 km from the facility. Since the estimated SIA for the project is located in Region 3, we are requesting your assistance in identifying all permitted sources of PM emissions within the SIA (in eastern Dutchess County), plus facilities with potential PM emissions exceeding 100 tons per year (tpy) located within 55 km, but outside of the SIA.

The likely modeling domain includes Dutchess County, Putnam County, northern Westchester County, eastern Orange County and Ulster County, and a small area in the northeast corner of Rockland County; it also covers the southern portion of Columbia County, in NYSDEC Region 4. In reviewing the recent air permit application for CPV Valley in Wawayanda, New York, we noted that the cumulative PM_{10} impact modeling for that project included a number of facilities that are also located within the likely modeling domain for the CVEC project. (The CPV Valley

project itself, however, is more than 55 km from the CVEC project.) Please confirm that the modeling inputs, developed by CPV Valley for PM_{10} cumulative impact modeling, can be used for $PM_{2.5}$ cumulative impact modeling by the CVEV project for the following sources, as applicable:

- Chemprene, Inc. (Beacon)
- Dutchess County Resource Recovery (Poughkeepsie)
- IBM South Road (Poughkeepsie)
- Vassar College (Poughkeepsie)
- Metal Container Corp (New Windsor)
- BASF (Peekskill)
- LaFarge North America (Buchanan)
- New England Laminates (Newburgh)

Other sources incorporated in the CPV Valley modeling inventory are not major sources of PM emissions. Following Air Guide 36, any non-major facilities that are not located within the project's SIA would not need to be modeled. (None of these facilities is located within 15 km of CVEC.)

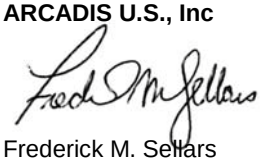
In addition to the facilities modeled for CPV Valley, existing Title V sources were considered for potential inclusion in the cumulative impact modeling. No Title V sources located within 55 km of CVEC were identified in NYSDEC Region 4. Of the Title V sources within Region 3 listed below, please confirm which sources qualify for inclusion in the cumulative impact modeling for the CVEV project:

- Algonquin Gas Southeast Compressor Station (Brewster)
- Bedford Hills Correctional Center (Bedford Hills)
- Danskammer Generating Station (Roseton)
- Roseton Generating Station (Roseton)
- IBM East Fishkill (E. Fishkill)
- Northeast Solite (Mount Marion)
- Revere Smelting (Wallkill)
- Thomas Watson Research Center (Yorktown Heights)
- U.S. Military Academy (West Point)
- Wheelabrator Westchester (Peekskill)

We look forward to working with Region 3 to identify candidate facilities, to determine their potential PM emissions, to identify any inventory-consuming sources for PSD analysis, and to develop emission inputs for modeling. Please contact me if you have any questions or require any additional information relating to this request.

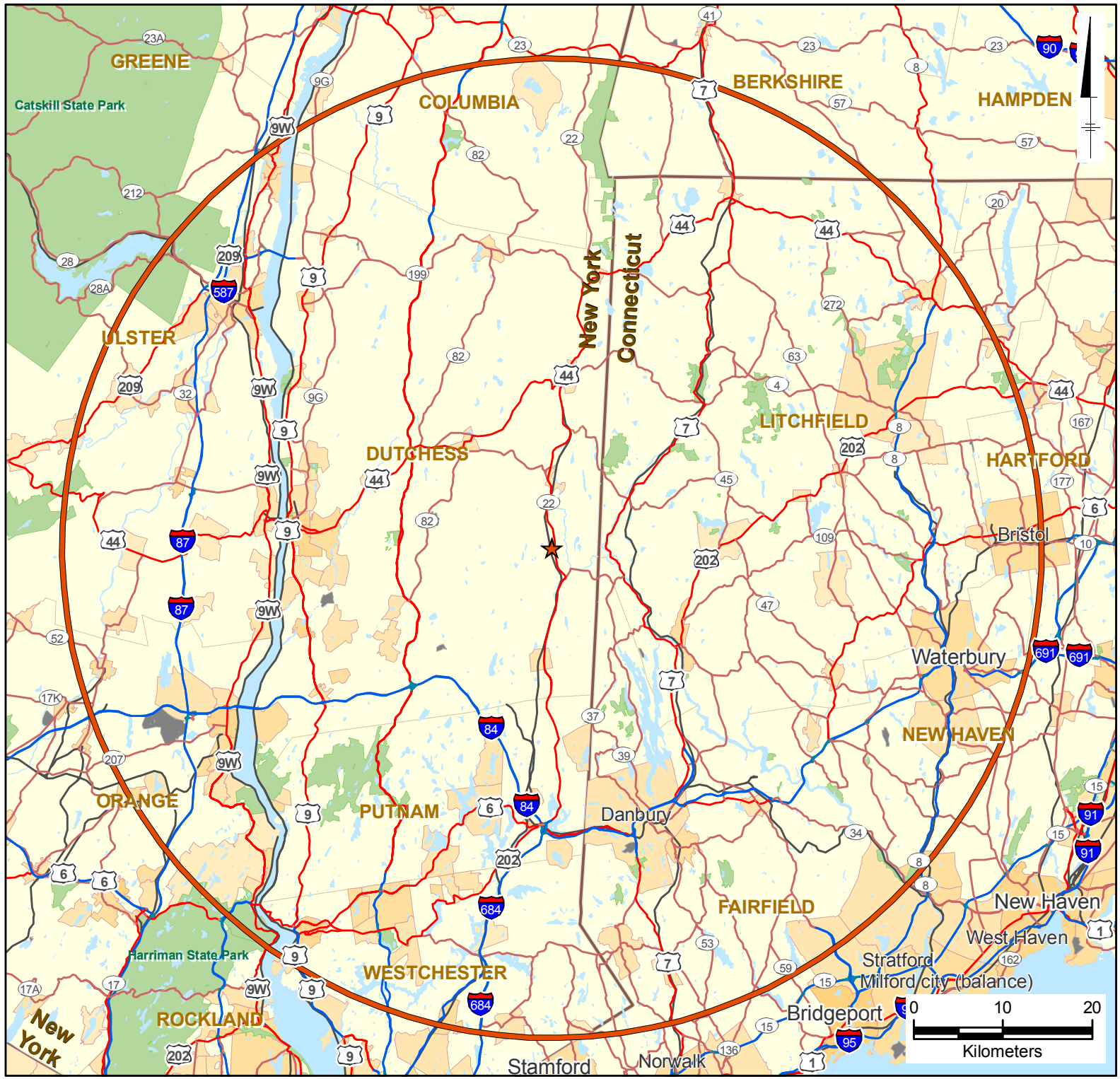
Sincerely,

ARCADIS U.S., Inc



Frederick M. Sellars
Vice President

Copies:
Jeff Ahrens, Cricket Valley Energy
Steve Riva, USEPA
Chris Hogan, NYSDEC
Leon Sedefian, NYSDEC



Legend

- Cricket Valley Energy Center N41.676168/W73.580618
- 55km Radius from CVEC
- Primary Limited Access or Interstate
- Primary US or State Highway
- Secondary State and County Highway
- Local or rual road
- Ramp, other
- Traffic Circle or Cul-de-sac
- Freeway ramp
- Ferry
- Railroads
- Airports
- National / State Parks

City Areas - Population Sq/Mi

- 0.00 - 500.00
- 500.01 - 2000.00
- 2000.01 - 4000.00
- 4000.01 - 8000.00
- 8000.01 - 7707406.44
- State - Province Boundaries
- County Boundaries
- State - Province Areas

Base data courtesy of ESRI Street Map Pro

ARCADIS

CRICKET VALLEY ENERGY CENTER

PROJECT LOCATION

Dutchess County, New York

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ARCADIS
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Fax 978.937.7555
www.arcadis-us.com

Craig Goff
Permit Chief
Massachusetts Department of Environmental Protection
Western Region
436 Dwight Street
Springfield, MA 01103

Subject:
Modeling Inventory for the Cricket Valley Energy Project, Dover, New York

Date:
January 19, 2010

Contact:
Fred Sellars

Phone:
978.937-9999 x317

Email:
frederick.sellars@
arcadis-us.com

Our ref:
CO001447-0003-00004

Dear Mr. Goff:

Cricket Valley Energy Center LLC (CVEC) is proposing to construct a nominal 1,000 megawatt natural gas fired combined cycle electric generating facility in Dover, NY (Dutchess County). ARCADIS is preparing the air permit application for this facility. We anticipate that cumulative impact modeling for $PM_{2.5}$ will be required to support the air permit application for this facility. The likely domain for cumulative impact modeling (Significant Impact Area [SIA] plus 50 kilometers [km]) from the proposed facility) is anticipated to extend into a small area of Massachusetts. We are therefore requesting the assistance of the Massachusetts Department of Environmental Protection (MADEP) to obtain inventory (modeling) data for existing and proposed (permitted) major emissions sources to support cumulative impact modeling.

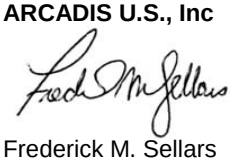
The attached map illustrates the likely domain for interactive modeling. The facility location is Latitude N41.676168 degrees, Longitude W73.580618 degrees (NAD83). Based on a preliminary modeling analysis, we anticipate that the predicted impacts of the CVEC project will exceed the most stringent proposed 24-hour average Significant Impact Level (SIL) for $PM_{2.5}$ (1.2 µg/m^3) on elevated terrain in the project vicinity; the predicted SIA is expected to extend less than 5 km from the facility. Since the estimated SIA for the project does not extend into Massachusetts, facilities in Massachusetts with potential emissions exceeding 100 tons per year (tpy) of $PM_{2.5}$ will be of primary concern for cumulative impact modeling.

The likely modeling domain extends into the southwest corner of Berkshire County, including the town of Sheffield. Our initial search has identified no Title V sources in MA located within 55 km of the CVEC project. The closest Title V source, Fox River Paper in Great Barrington, is more than 60 km from the CVEC project. We are seeking to confirm that the area of concern (in Massachusetts) does not contain any permitted major sources of particulate matter.

We look forward to working with MADEP to identify candidate facilities (if any), to determine their potential emissions and to develop emission inputs for modeling. Please contact me if you have any questions or require any additional information relating to this request.

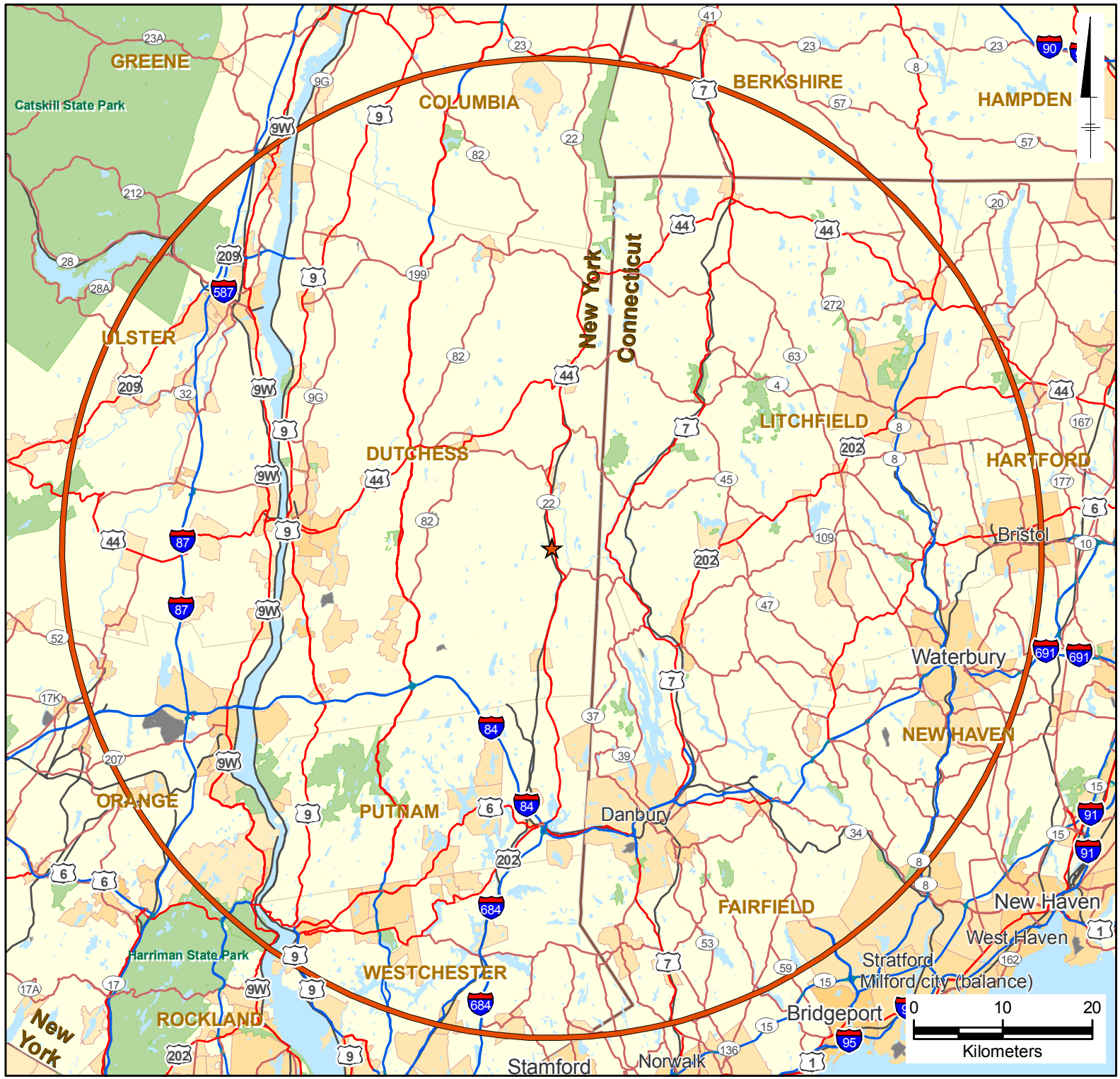
Sincerely,

ARCADIS U.S., Inc



Frederick M. Sellars
Vice President

Copies:
Jeff Ahrens, CVEC
Steve Riva, USEPA
Chris Hogan, NYSDEC
Leon Sedefian, NYSDEC



Legend

- Cricket Valley Energy Center N41.676168/W73.580618
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- Ramp, other
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- Freeway ramp
- Ferry
- Railroads
- Airports
- National / State Parks

City Areas - Population Sq/Mi

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- 2000.01 - 4000.00
- 4000.01 - 8000.00
- 8000.01 - 7707406.44
- State - Province Boundaries
- County Boundaries
- State - Province Areas

Base data courtesy of ESRI Street Map Pro

ARCADIS

CRICKET VALLEY ENERGY CENTER

PROJECT LOCATION

Dutchess County, New York

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ARCADIS
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www.arcadis-us.com

Mr. Jude Catalano
Planning & Standards
Bureau of Air Management
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Subject:
Modeling Inventory for the Cricket Valley Energy Project, Dover, New York

Date:
January 19, 2010

Contact:
Fred Sellars

Phone:
978.937-9999 x317

Email:
frederick.sellars@
arcadis-us.com

Our ref:
CO001447-0003-00004

Dear Mr. Catalano:

Cricket Valley Energy Center LLC (CVEC) is proposing to construct a nominal 1,000 megawatt natural gas fired combined cycle electric generating facility in Dover, NY (Dutchess County). ARCADIS is preparing the air permit application for this facility. We anticipate that cumulative impact modeling for $PM_{2.5}$ will be required to support the air permit application for this facility. The likely domain for cumulative impact modeling (Significant Impact Area [SIA] plus 50 kilometers [km]) from the proposed facility) is anticipated to extend into Connecticut. We are therefore requesting the assistance of the Connecticut Department of Environmental Protection (CTDEP) to obtain inventory (modeling) data for existing and proposed (permitted) major emissions sources to support cumulative impact modeling.

The attached map illustrates the likely domain for interactive modeling. The facility location is Latitude N41.676168 degrees, Longitude W73.580618 degrees (NAD83). Based on a preliminary modeling analysis, we anticipate that the predicted impacts of the CVEC project will exceed the most stringent proposed 24-hour average Significant Impact Level (SIL) for $PM_{2.5}$ (1.2 µg/m^3) on elevated terrain in the project vicinity; the predicted SIA is expected to extend less than 5 km from the facility. Since the estimated SIA for the project does not extend into Connecticut, facilities in CT with potential emissions exceeding 100 tons per year (tpy) of $PM_{2.5}$ will be of primary concern for cumulative impact modeling.

The likely modeling domain includes most of Litchfield County, northern Fairfield County, western Hartford County, and a small area in the northwest corner of New Haven County. Our initial search has identified the following Title V sources in CT located within 55 km of the CVEC project:

- City of Danbury Landfill and Wastewater Treatment Plant
- Kingswood Kitchens (Danbury)
- Risdon (Danbury)
- Vishnay Vitramon (Monroe)

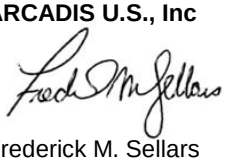
- Borough of Naugatuck Sludge Incinerator
- Kimberly Clark (New Milford)
- Waste Management Landfill (New Milford)
- Quality Rolling (Thomaston)
- Whyco Technology (Thomaston)
- Eyelet Design (Waterbury)
- Somers Thin Strip (Waterbury)
- Coats America (Watertown)
- Eyelematic (Watertown)

Based on a quick review of the Title V permits on CTDEP's website, none of these facilities may warrant inclusion for cumulative impact modeling, since they are not major sources of particulate emissions. We are also interested in identifying any permitted, but not yet constructed, major sources of PM, as well as existing sources, in the area of concern.

We look forward to working with CTDEP to identify candidate facilities (if any), determine their potential emissions and develop emission inputs for modeling. Please contact me if you have any questions or require any additional information relating to this request.

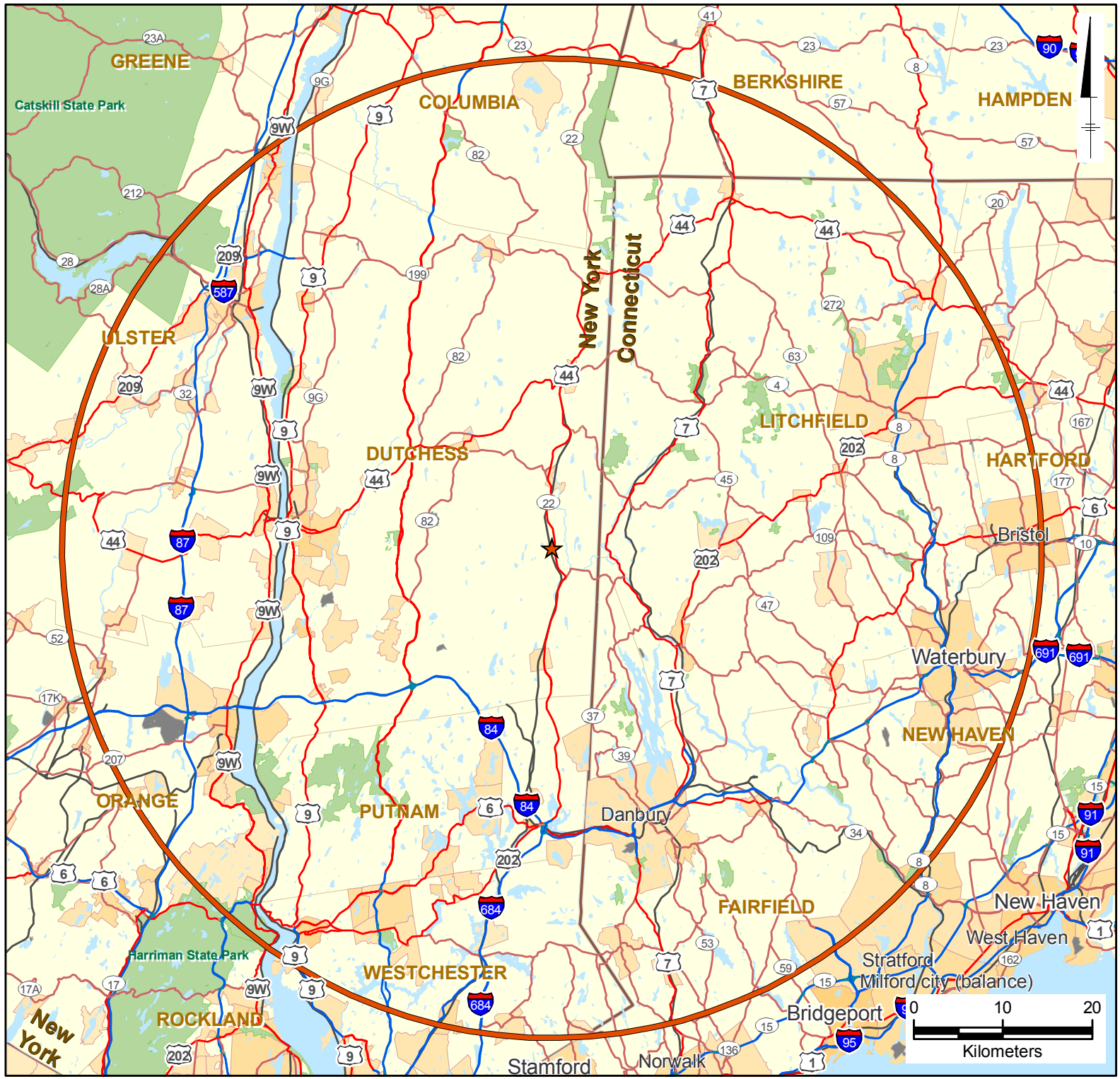
Sincerely,

ARCADIS U.S., Inc



Frederick M. Sellars
Vice President

Copies:
Steve Riva, USEPA
Chris Hogan, NYSDEC
Leon Sedefian, NYSDEC
Chris Mulcahy, CTDEP
Jeff Ahrens, CVEC



Legend

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- State - Province Boundaries
- County Boundaries
- State - Province Areas

Base data courtesy of ESRI Street Map Pro

ARCADIS

CRICKET VALLEY ENERGY CENTER

PROJECT LOCATION

Dutchess County, New York

C:\Projects\PP_Misc\20090511_CricketHill\GIS\FIGURES\MXDS\20100119_CricketValley55km.mxd - 1/19/2010 @ 10:22:17 AM

ARCADIS
Infrastructure, environment, buildings

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www.arcadis-us.com

U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045-9349
Attn: Robyn Niver

Subject:
Advanced Power NA - Cricket Valley Site

Dear Ms. Niver:

The purpose of this letter is to request a determination from the U.S. Fish and Wildlife Service (USFWS) regarding the potential for the presence of threatened/endangered wildlife species or significant habitat on the 131.6-acre area shown on the attached Figure 1 in Dover, Dutchess County, New York. As can be seen on Figure 1, the site is bounded on the east by Route 22, and the Swamp River flows through the site's westernmost extent. An active railroad line also extends through the site in a north-south direction. The area east of the railroad tracks includes dilapidated structures that would be removed as part of project development at this previously developed industrial site. The proposed development area will focus on the portion of the site east of the railroad tracks, although some related activities could occur to the west.

Consistent with the current USFWS protocol for evaluating the potential presence of protected species on a site, we have reviewed the information presented on your website for Dutchess County and found the bog turtle and Indiana bat listed as present in the County. As we discussed, a meeting last week with the New York State Department of Environmental Conservation (NYSDEC) identified that proximate bog turtle records indicated the need for a Phase 1 survey. We understand that Indiana bat records exist to the south of the site. The project goal is to avoid substantial tree clearing to the greatest extent possible, which should minimize the potential for this species impact.

We would appreciate your input regarding the need for species review and look forward to working with you at this site. If you have any questions or require additional information, please do not hesitate to contact me. Thank you in advance for your assistance.

Sincerely,

ARCADIS

Lynn Gresock

Lynn Gresock
Environmental Consultant

Copies: C. Hogan, NYSDEC; J.Ahrens, Advanced Power

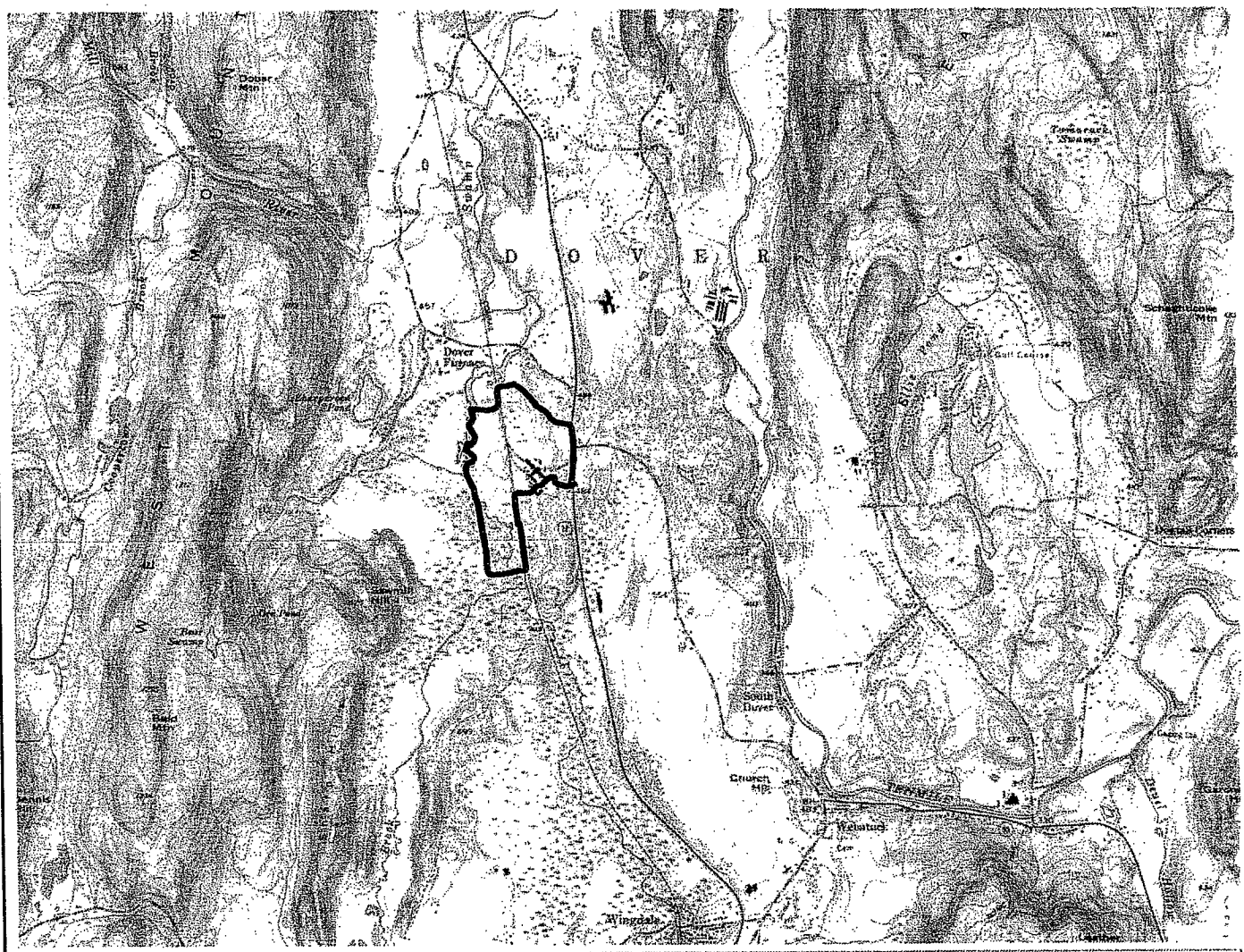
Date:
June 2, 2009

Contact:
Lynn Gresock

Phone:
978.937.9999, ext. 320

Email:
lynn.gresock@
arcadis-us.com

Our ref:
CO001447



Source: USGS Dover Plains Quadrangle; 7.5 Minute Series (Topographic); Revised 1958.

CRICKET VALLEY SITE - DOVER, NY

ADVANCED POWER NA

SITE LOCATION MAP

ARCADIS
Infrastructure, environment, buildings

FIGURE 1

Figure 1 - Site Location.xlsm
6/2/2009

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

July 20, 2009

Mr. Lynn Gresock
Associate Vice President
ARCADIS
Two Executive Drive, Suite 303
Chelmsford, MA 01824

Dear Mr. Gresock:

This is in response to your June 2, 2009, letter regarding the proposed 131.6-acre Cricket Valley Site in the Town of Dover, Dutchess County, New York. The following comments are provided pursuant to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). This response does not preclude additional U.S. Fish and Wildlife Service (Service) comments under other legislation.

Given our understanding of the project site, it appears that the Federally-listed threatened and State-listed endangered bog turtle (*Glypemys [=Clemmys] muhlenbergii*) occurs within and around the vicinity of the project area. Therefore, efforts must be made to avoid direct and indirect effects to the wetlands within and offsite of the proposed project area.

At this time, the Service has no information regarding the plans for the site. However, adverse impacts associated with residential and commercial development could include, but are not limited to, fragmentation of habitat and alterations to bog turtle dispersal routes; introduction of contaminated surface water runoff into the wetland from pesticides, herbicides, fertilizers, road deicers, etc.; alteration of wetland hydrology; introduction of nutrients from septic systems; introduction of yard and other waste materials into wetlands; introduction of people, pets, and recreational vehicles into wetlands; and death/injury of bog turtles that wander onto lawns and roads. Generally, the larger the upland buffer, the lower the risk of many of these potential adverse affects. However, some of the effects may not be adequately addressed by buffers. The Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan (U.S. Fish and Wildlife Service 2001) (Appendix A - Bog Turtle Conservation Zones) includes recommendations for minimum buffers for various activities. You can find this document at http://nyfo.fws.gov/es/btconszone.pdf. Please note that the Service generally recommends a minimum of a 300-foot buffer around wetlands with known or likely bog turtle populations. The Recovery Plan recommends avoiding many activities within this area including development, delineation of lot lines, herbicide application, and pesticide or fertilizer application.

In addition to the bog turtle, there is potential for the Federally- and State-listed endangered Indiana bat (*Myotis sodalis*) to occur within the proposed project area. Two males were captured approximately 2 miles from the project area and there is likely a maternity colony approximately

5 miles from the site. The Service recommends that the applicant conduct mist netting between May 15 and August 15. The Service's current mist-netting guidelines are available on our website.* Should any Indiana bats be captured during mist-netting activities, a radio-transmitter should be attached to the bat and the bat should be tracked to determine whether there is roosting, foraging, and/or maternity habitat present within the proposed project area. We encourage the applicant to coordinate with the Service to develop the proposed survey and tracking scope of work. This type of information can greatly assist the Service and any involved Federal agencies with a full analysis of the effects of the proposed activity. We recommend that the applicant provide the requested information to the Service to determine whether additional conservation measures may be needed to avoid or minimize adverse effects to Indiana bats.

In addition, the New England cottontail (*Sylvilagus transitionalis*) is known to occur within 4 miles of the proposed project. The New England cottontail is a candidate species which is being considered by the Service for addition to the Federal List of Endangered and Threatened Wildlife and Plants. Candidate species are species for which the Service has on file sufficient information on the biological vulnerability and threat(s) to support issuance of a proposal to list, but issuance of a proposed rule is currently precluded by higher priority listing actions. Candidate species do not receive substantive or procedural protection under the ESA; however, the Service does encourage Federal agencies and other appropriate parties to consider these species in the project planning process.

Should the New England cottontail be proposed for listing as endangered or threatened prior to completion of this project, conference procedures pursuant to Section 7(a)(4) of the ESA may be necessary if your project involves Federal authorizations. Should this species be listed prior to completion of the project, further coordination or consultation pursuant to the ESA will be required to evaluate potential adverse effects of project implementation on the New England cottontail or its habitat, and to determine if formal consultation is necessary. Please visit our website for more information on New England cottontail.

The most recent compilation of Federally-listed and proposed endangered and threatened species in New York is available for your information. Until the proposed project is complete, we recommend that you check our website every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project is current.

As stated above, the Indiana bat and bog turtle are listed as endangered by the State of New York. The New England cottontail is a New York State Species of Special Concern. Any additional information regarding the project and its potential to impact listed species should be coordinated with both this office and with the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC contact for the Endangered Species Program is Mr. Peter Nye, Endangered Species Unit, 625 Broadway, Albany, NY 12233 (telephone: [518] 402-8859).

In summary, we have concerns about potential impacts to Federally-listed species from the proposed project. We recommend additional coordination among the appropriate consulting firms, the NYSDEC, any involved Federal agencies, the applicant, and the Service regarding these potential impacts.

Thank you for your time. If you require additional information please contact Robyn Niver at (607) 753-9334. Future correspondence with us on this project should reference project file 90453.

Sincerely,

David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at: http://www.fws.gov/northeast/nyfo/es/section7.htm

References:

U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

cc: NYSDEC, New Paltz, NY (Attn: L. Masi/A. Ciesluk)
NYSDEC, Albany, NY (Endangered Species; Attn: P. Nye)
COE, New York, NY (Attn: B. Orzel)

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Tel 978.937.9999
Fax 978.937.7555
www.arcadis-us.com

U.S. Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045-9349
Attn: Robyn Niver

Subject:
Advanced Power NA – Cricket Valley Site – Project File Number 90453

Dear Ms. Niver:

This letter is to provide follow-up information regarding the correspondence received from David Stilwell of your office dated July 20, 2009. We appreciate that the information you provided was based on site location only, and that no details of the project had been provided. Since that time, additional efforts on the project have occurred that better characterize the site and project details. We would appreciate your review of the information in this letter, and your response with regard to the conclusions we have reached for each issue. Below, please find additional information with regard to the Federal-listed threatened and State-listed endangered bog turtle (*Glypemys [=Clemmys] muhlenbergii*); the Federal- and State-listed endangered Indiana bat (Myotis sodais); and the candidate species New England cottontail (*Sylvilagus transitionalis*).

Date:
August 17, 2009

Contact:
Lynn Gresock

Phone:
978.937.9999, ext. 320

Email:
lynn.gresock@
arcadis-us.com

Our ref:
CO001447

Bog Turtle

As recommended by New York State Department of Environmental Conservation (NYSDEC) and using an expert from the list provided by the United States Fish and Wildlife Services (USFWS), a Phase I Bog Turtle Survey has been completed for the project site. The report, included with this letter, concludes that suitable bog turtle habitat is not located at the site. We look forward to review of the report by your office and NYSDEC to confirm whether any further actions are recommended in this regard. Note that the report also includes a habitat assessment for timber rattlesnake (*Crotalus horridus*), which was also recommended by NYSDEC; that assessment concluded that this site does not have suitable den habitat and that abundant and more suitable habitat for this species exists more proximate to documented regional den sites.

Indiana Bat

Your correspondence notes the potential for Indiana bat to occur in the project area, with reference to two males captured within 2 miles from the project area and the likelihood of a maternity colony approximately 5 miles away. A mist netting survey was suggested, consistent with USFWS guidelines, which would require completion of the survey between May 15 and August 15. Due to the specific location of the

proposed project and existing buildings, we do not believe a mist netting survey is warranted for the project in order to provide adequate protection for the avoidance and minimization of adverse effects to Indiana bats. Information about the existing condition and location of the proposed project, a general description of project activities, and the area and characteristics for anticipated tree encroachment are provided below to provide additional context for this issue.

Site Location and Condition

As previously provided, the site is located in Dover, Dutchess County (Figure 1). As shown on Figure 1, the site is bounded on the east by Route 22, and the Swamp River flows through the site's westernmost extent. An active railroad line also extends through the site in a north-south direction. The area east of the railroad tracks includes many dilapidated structures that would be removed as part of project development at this previously developed industrial site. The proposed development area will focus on the portion of the site east of the railroad tracks; no work is proposed west of the railroad. The entire parcel optioned by Cricket Valley Energy is 131.6 acres. The proposed development parcel, however, is considerably smaller at approximately 56 acres (the portion of the site east of the railroad tracks on Figure 1).

Figure 2 provides representative photographs showing some of the industrial buildings currently located on the site. The extent of the development area currently disturbed can also be seen on the aerial photograph in Figure 3.

Project Activities and Characteristics

The proposed Cricket Valley Energy project is a 1,000 megawatt natural gas-fired combined-cycle electric generating facility. Figure 4 provides a preliminary site plan for the facility. As shown in that figure, natural gas (the project's sole fuel) and electrical interconnections will be made with existing infrastructure adjacent to the site. The project will utilize air cooling and a zero liquid discharge system in order to minimize water demand and eliminate the need for wastewater discharge (with the exception of septic and stormwater flows).

Project Location and Tree Encroachment

The project's preliminary layout can be overlain onto the aerial photograph to illustrate the degree to which the proposed facility would utilize previously disturbed and developed industrial area. Three separate areas around the perimeters of the

existing developed land are anticipated to require clearing, as shown in Figure 3. A significant priority in the layout of the project has been maintaining trees throughout the site for their benefits that include visual buffer. No work is proposed west of the railroad tracks, where much of the on-site forested habitat and the Swamp River are located.

Area 1, the gas insulated switchgear (GIS) switchyard area, is partially wooded with eastern red cedar, sycamore, black cherry, red maple and cottonwood of diameters ranging from 1 inch to 10 inches. The use of a GIS switchyard has been selected at significant cost to the project in order to greatly minimize the potential for wetland encroachment and tree clearing. It is estimated that approximately 2.24 acres of clearing would occur in this area.

Area 2 includes elements associated with the project that are related to the natural gas and electrical interconnections. Again, a GIS substation has been selected to substantially minimize the footprint. Access and piping estimates have been conservatively located for the assessment of potential impact. The vegetated portions of this area contain relatively small white ash, eastern red cedar, black walnut and black cherry trees. It is estimated that approximately 4.24 acres of clearing would occur in this area.

Area 3 is the detention pond and a portion of one air-cooled condenser. This area supports small (< 6" diameter) cottonwood, aspen, and eastern red cedar trees that recently colonized a formerly open area of the site. Layout elements have avoided wetland impact in this area, and will be further optimized as design work continues for the project. As currently shown, approximately 2.74 acres of clearing would occur in this area.

Summary

Although clearing will occur at the site, relatively small areas of clearing in disparate locations around the perimeter of previously developed area are proposed. Significant forested area will remain, more proximate to the Swamp River and more contiguous forest. The project itself is unlikely to pose a risk to Indiana bat individuals with the potential to utilize the area. We do not believe that additional surveys, such as mist netting, would conclusively determine the use of the area, nor would provide for additional species protection. We look forward to your comments and will be pleased to work with USFWS to address any remaining concerns.

New England Cottontail

Although the New England cottontail is not yet a listed species, we appreciate the information regarding its current proposed status. We understand that the New England cottontail prefers early successional forests, often called thickets, with thick and tangled vegetation. A dense shrub layer allows them to forage more safely from predators. As is the case for the Indiana bat, we believe the selection of a site that utilizes previously developed industrial property and selection of technologies that minimize the footprint limit potential concerns about encroachment on habitat.

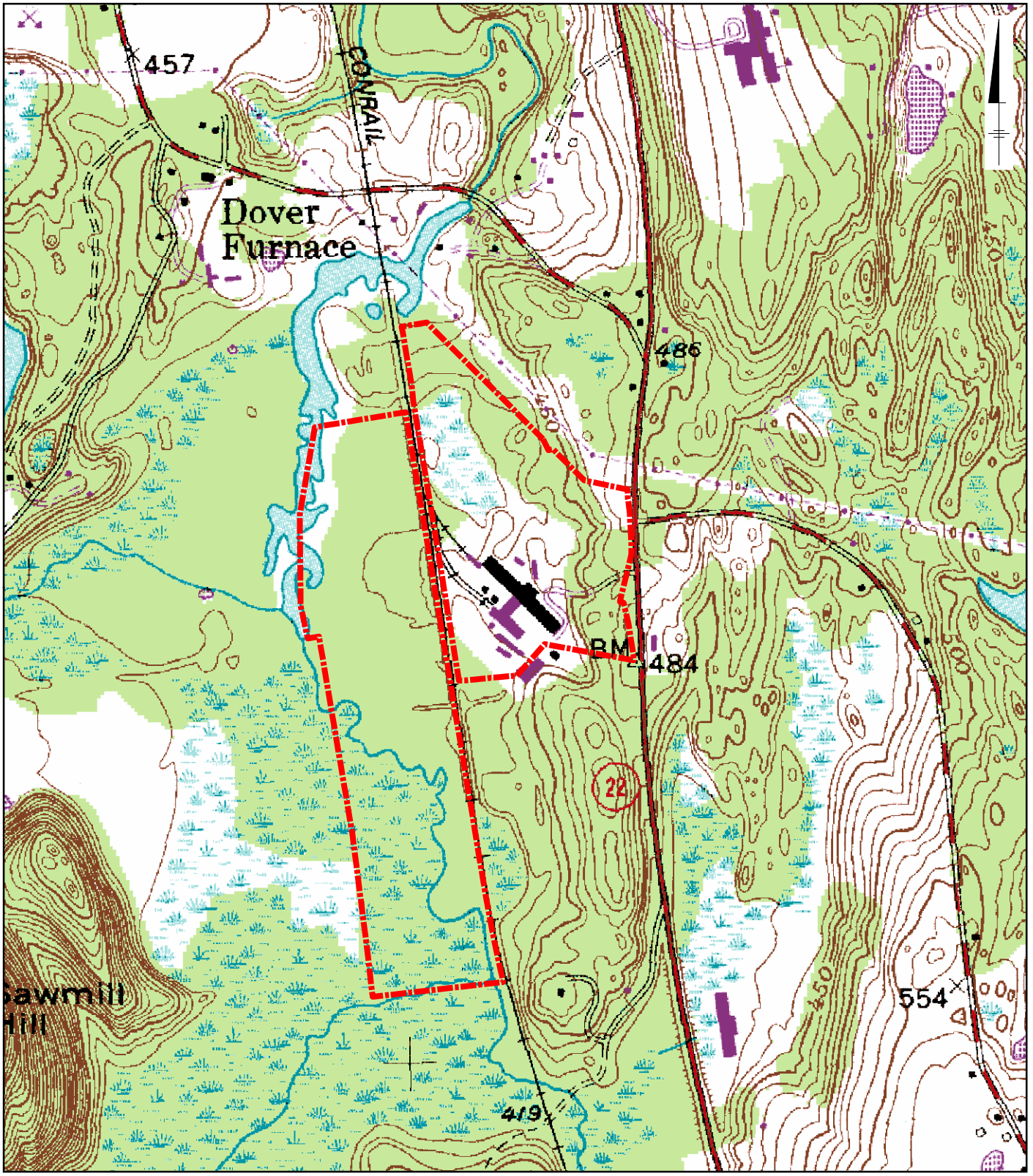
We look forward to your additional guidance with regard to species issues at this site. If you have any questions or require additional information, please do not hesitate to contact me. Thank you in advance for your assistance.

Sincerely,

ARCADIS

Lynn Gresock
Environmental Consultant

Copies: C. Hogan, NYSDEC; J.Ahrens, Advanced Power



0 1,000 2,000 Feet

GRAPHIC SCALE

NOTE:

1. DOVER PLAINS, NY USGS QUAD MAP PHOTOREVISED 1984.

CRICKET VALLEY ENERGY CENTER LLC
DOVER, NY

WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

SITE LOCATION MAP

ARCADIS

FIGURE 1

CITY: SYR DIV/GROUP: SYE40 DB: KEW JCR
Adv. Power (CO001447.0001.00002)
Q:\AdvancedPower\DoverNY\WetlandID_and_BoundaryDelinReport\mxd\SiteLocationMap_v2.mxd - 7/28/2009 @ 10:59:21 AM

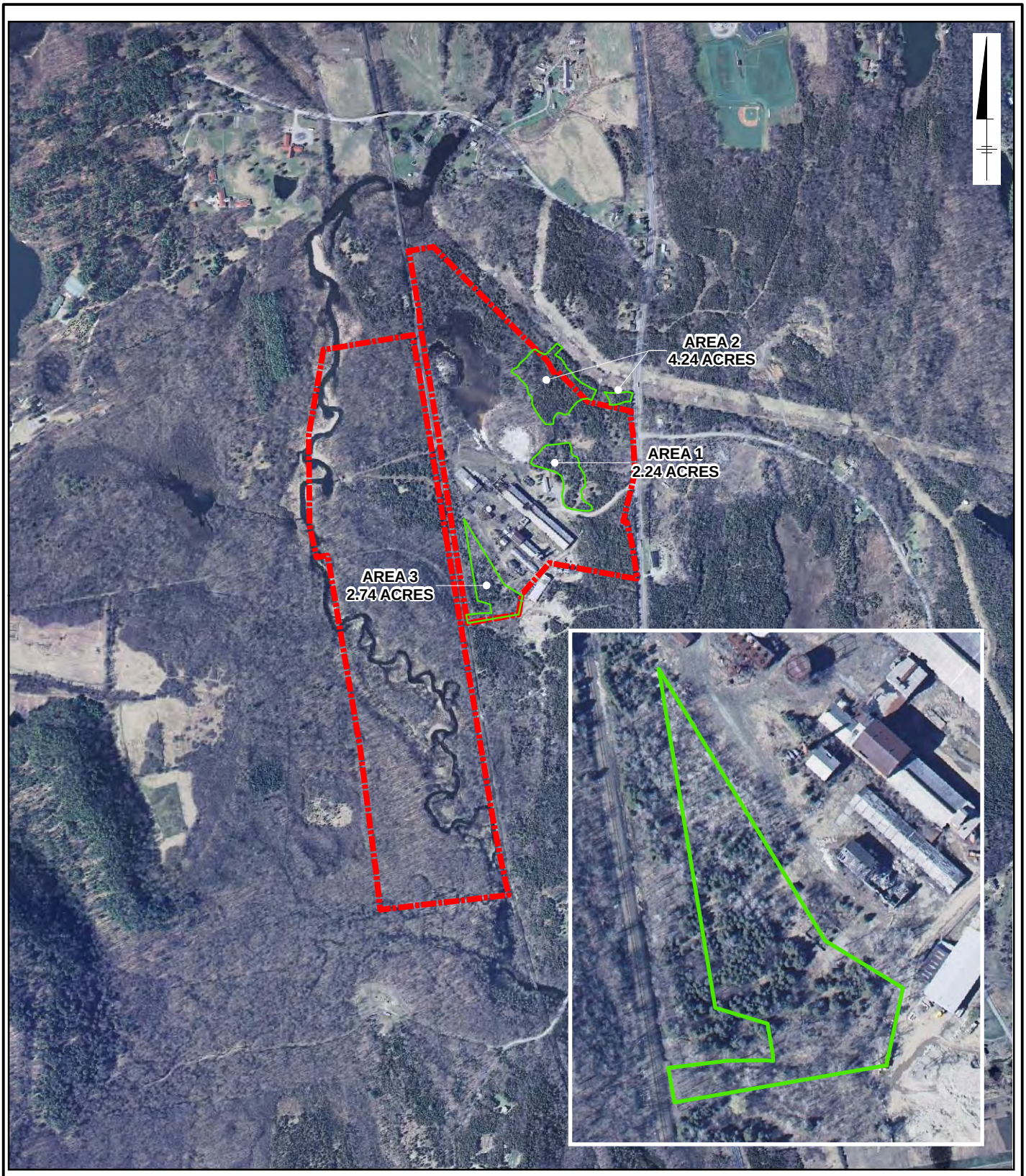
View towards site to the east from driveway off of Route 22

View from the east towards main building

Site buildings viewed from the south

Site buildings viewed from the north

Figure 2. Representative Photographs of Existing Site Structures



LEGEND:

VEGETATION CLEARING

WETLAND ASSESSMENT AREA

0 1,000 2,000 Feet

GRAPHIC SCALE

CRICKET VALLEY ENERGY CENTER LLC
DOVER, NY

WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

VEGETATION CLEARING AREAS

ARCADIS

FIGURE 3

CITY: SYR DIV/GROUP: SYE40 DB: KEW
Adv. Power (CO001447.0001.00002)
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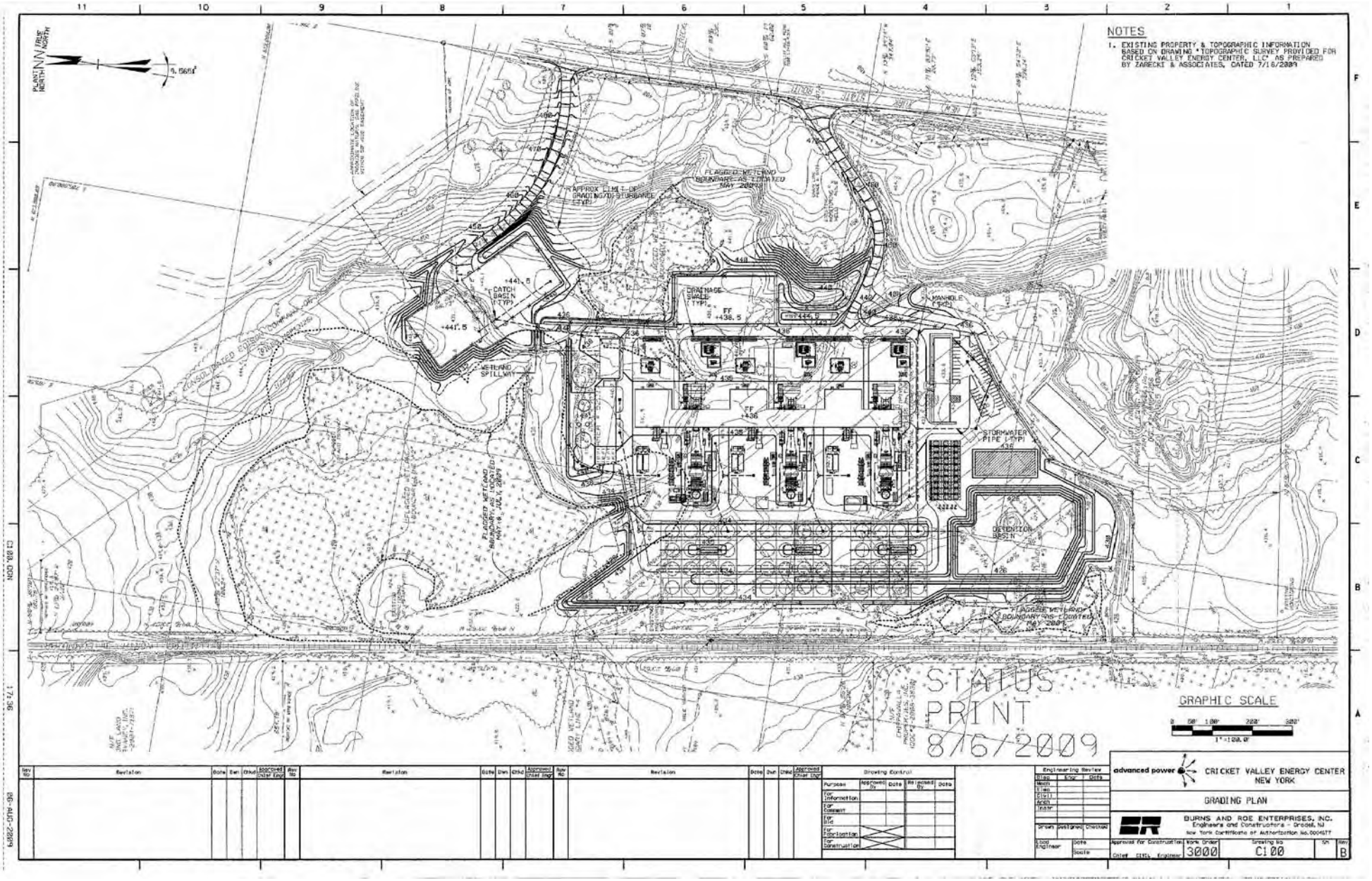

Figure 4. Preliminary Site Plan

Faxed 09/21/2009

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

September 21, 2009

Ms. Lynn Gresock
Environmental Consultant
ARCADIS
Two Executive Drive, Suite 303
Chelmsford, MA 01824

Dear Ms. Gresock:

This is in response to your August 17, 2009, letter regarding the proposed 131.6-acre Cricket Valley Site in the Town of Dover, Dutchess County, New York. The following comments are provided pursuant to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). This response does not preclude additional U.S. Fish and Wildlife Service (Service) comments under other legislation.

The Service previously provided initial comments on the potential for listed species to occur at the project area in our July 20, 2009, letter to you. As you are aware, we stated that the Federally-listed threatened and State-listed endangered bog turtle (*Glypemys [=Clemmys] muhlenbergii*) is known to occur within and around the vicinity of the project area. In addition, we noted the potential for the Federally- and State-listed endangered Indiana bat (*Myotis sodalis*) to occur within the proposed project area.

We have reviewed the additional information provided in your August 17, 2009, letter and the above statements continue to represent our general findings of known/potential presence. We offer specific comments and recommendations by species below.

Bog turtle

We understand that Phase 1 bog turtle surveys were conducted in June 2009. While no suitable habitat was found within the property limits, New York State Department of Environmental Conservation (NYSDEC) wetland DP-22 (part of which occurs within the property) contains known occurrences of bog turtles off-site. Therefore, the next step is to determine the potential for impacts to this species. We previously provided you with a list (although not exhaustive) of potential impacts to bog turtles to consider. Given the negative results of the Phase 1 surveys within the project limits, it appears that the focus of the assessment should address potential indirect effects to wetland DP-22.

Indiana bat

We have reviewed the additional details (size of the patches [2.24-4.24 acres], overall acreage of tree removal [9.22 acres], separation of patches, tree description, current developed nature of the portion of the parcel proposed for development, and remaining forested acreage) provided on proposed tree-clearing activities for the project and agree with your conclusion that mist-netting is not warranted to assist with an analysis of impacts to the Indiana bat. Without any additional site-specific bat studies, it is reasonable to assume that Indiana bats are using the project area given its location and natural features of the site. Therefore, similar to the bog turtle, the next step is to determine the potential impacts to this species.

The Service considers the potential for direct and indirect effects to Indiana bats. For example, indirect effects may result from the loss and/or fragmentation of roosting or foraging habitat. In addition, lighting may deter Indiana bats from using areas (Sparks et al. 2005). It appears that tree removal associated with the project is unlikely to result in indirect effects to Indiana bats. However, additional information is necessary to evaluate the potential for other impacts. We offer the following recommended conservation measures for the proposed project and look forward to discussing these with you further. Tree removal should occur between October 1 and March 31 to avoid direct effects to Indiana bats associated with tree clearing. Bright orange fencing/flagging should clearly demarcate trees to be protected compared with those to be cut prior to the initiation of any construction activities at the site. This will help ensure that contractors do not accidently remove more trees than anticipated. To minimize potential impacts to Indiana bats from increased lighting in the area, we recommend limiting the number of lights, including motion sensors or timers, directing the lights towards the ground and buildings, and including shields to direct the light downward. We discourage the use of lighting and chemicals in/around storage detention basins. Finally, we recommend placing a conservation easement on the property west of the railroad tracks. As we continue to further understand the proposed project, we may have additional recommendations for you.

We have no further comments on the New England cottontail (*Sylvilagus transitionalis*) at this time.

As a reminder, the most recent compilation of Federally-listed and proposed endangered and threatened species in New York* is available for your information. Until the proposed project is complete, we recommend that you check our website* every 90 days from the date of this letter, to ensure that the listed species presence/absence information for the proposed project is current. Any additional information regarding the project and its potential to impact listed species should be coordinated with both this office and with the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC contact for the Endangered Species Program is Mr. Peter Nye, Endangered Species Unit, 625 Broadway, Albany, NY 12233 (telephone: [518] 402-8859).

Thank you for your time. If you require additional information please contact Robyn Niver at (607) 753-9334. Future correspondence with us on this project should reference project file 90453.

Sincerely,

David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at: http://www.fws.gov/northeast/nyfo/es/section7.htm

References:

Sparks, D.W., C. M Ritzi, J. E. Duchamp, and J. O. Whitaker, Jr. 2005. Foraging habitat of the Indiana bat (*Myotis sodalis*) at an urban-rural interface. Journal of Mammalogy 86:713-718.

cc: NYSDEC, New Paltz, NY (Attn: L. Masi/A. Ciesluk)
NYSDEC, Albany, NY (Endangered Species; Attn: P. Nye)
COE, New York, NY (Attn: B. Orzel)