Appendix D14

Unmonitored Area Analysis from the New York Department of Environmental Conservation and the Delaware Department of Natural Resources and Environmental Control

Two unmonitored area analyses are presented within this Appendix, each conducted by a state that is part of a multi-state nonattainment area that includes New Jersey. The analysis conducted by the New York State Department of Environmental Conservation (NYSDEC) shows that the projected design values (DVFs) using the United States Environmental Protection Agency (USEPA) Modeled Attainment Test Software (MATS) analysis (referred to as 'DVF-MATS') in several of the unmonitored grids are above the National Ambient Air Quality Standard (NAAQS) for 8-hour ozone. However, consistent with the conclusion of the New Jersey attainment demonstration, these DVF-MATS should be for transport. In general, the adjustment for transport is in the range of 3-7 ppb (see Chapter 5). By adjusting these values, all grid cells within the Northern New Jersey/New York/Connecticut nonattainment area attain the 8-hour ozone standard by 2009.

The analysis conducted by the Delaware Department of Natural Resources and Environmental Control (DEDNREC) shows that no grid cells in the Southern New Jersey/Philadelphia nonattainment area are predicted to exceed the 8-hour ozone NAAQS.

Pre-proposal Draft - New York State Department of Environmental Conservation Unmonitored Area Analysis[1]

Unmonitored Area Analysis

As per EPA guidance (2005, 2006a), we [the New York State Department of Environmental Conservation] investigated the potential occurrence of currently unmonitored locations that are projected to be above the 8-h ozone NAAQS for this nonattainment area. The procedure suggested is to examine all grid cells for all counties within and immediately surrounding the nonattainment area using the spatial interpolation and gradient adjustment techniques implemented in the EPA-MATS (Model Attainment Test System) software (Timin, 2006).

In this application, we utilized MATS to spatially interpolate base year observed design values. We also utilized MATS to estimate gradient adjustment factors that were based on the CMAQ predictions of the top-30 daily maximum 8-h ozone concentrations at each grid cell for the 2002 base case. The relative effect of the emission reduction under the 2009BOTW scenario on daily maximum 8-h concentrations was then estimated by calculating a gridded field of RRF by treating each grid cell as a monitor location. Two approaches were used for calculating the RRF. Use MATS to provide RRF at each grid cell, and the other approach is based on 9-grid cells as described in TSD-1g and TSD-1h. Finally, Future design value (DVF) for each grid cell is estimated by multiplying the spatially interpolated Base Design Values (DVB) from MATS with the gridded gradient adjustment factors (from MATS) and with the gridded RRF fields estimated by the two methods.

The New York CMSA 8-h ozone nonattainment is abutted by the Philadelphia, Poughkeepsie, and Greater Connecticut 8-h ozone nonattainment areas, and as such are not considered in this analysis and discussed elsewhere (New York CMSA, 2007).

Table 12a and 12b lists all the counties pertaining to the nonattainment area and some of the surrounding counties identified by their FIPS code and location of the grid cells in the CMAQ modeling domain for the 2009BOTW and 2012BOTW scenarios, respectively. The Tables also provide information as to whether or not the grid cell is associated with an ozone monitor and the percent of the grid area located over water based upon the land classification used in the meteorological modeling with MM5. This analysis shows that for the 2009BOTW scenario, there are several other grid cells that are not associated with a monitor but a percent of the grid cell is over water that are above the 84 ppb threshold both under the hybrid MATS or MATS methodology. In particular, a grid cell that is not associated with water in Bergen County, NJ is at 92ppb or 91ppb depending upon either MATS methodology. Considering the 2012BOTW scenario (see Table 12b) again the Bergen county grid cell that is not associated with water is projected at 88ppb or 87ppb depending upon the MATS methodology, while other grid cells above the 84 ppb threshold are found to be associated with water. Thus the unmonitored area analysis

[1] From personal e-mail communication: Dr. Gopal Sisla, NYDEC to Ray Papalski, NJDEP, May 8, 2007, entitled “Unmonitored Area Analysis – draft”.

suggests the potential exists for projected 8-h ozone levels to be above the 8-h ozone NAAQS level under the 2009BOTW scenario, but are essentially absent under the 2012 scenario.

Table 12 Estimated future design values (ppb) for grid cells that are within the nonattainment area or adjacent counties of New York CMSA

(a) For scenario 2009

State	County	County Name	CMAQ Column	CMAQ Row	DVF Hybrid (ppb)	DVF MATS (ppb)	Monitor in grid	Percent in water
9	1	Fairfield	142	107	89	90	Y	18.6
9	1	Fairfield	139	105	85	83	N	2.6
9	1	Fairfield	141	106	85	86	Y	32.9
9	1	Fairfield	141	107	85	84	N	0
9	1	Fairfield	141	108	85	83	N	0
9	1	Fairfield	142	108	85	85	N	0
9	1	Fairfield	140	106	84	84	N	0
9	1	Fairfield	140	107	84	83	N	0
9	1	Fairfield	141	109	84	82	N	0
9	1	Fairfield	140	108	83	83	Y	0
9	1	Fairfield	139	109	82	82	N	1
9	1	Fairfield	140	109	82	82	N	0
9	1	Fairfield	139	108	81	81	N	0
9	7	Middlesex	146	109	88	87	Y	20.2
9	7	Middlesex	145	110	85	84	N	0
9	7	Middlesex	146	110	83	82	N	0
9	7	Middlesex	145	111	82	83	Y	0
9	7	Middlesex	146	111	82	82	N	0
9	7	Middlesex	144	111	81	81	N	0
9	7	Middlesex	145	112	80	79	N	0
9	9	New Haven	145	109	89	89	N	8.6
9	9	New Haven	143	108	86	86	N	25.5
9	9	New Haven	142	109	85	83	N	0
9	9	New Haven	143	109	85	84	Y	0.2
9	9	New Haven	143	110	85	83	N	0
9	9	New Haven	144	109	85	85	N	4.1
9	9	New Haven	144	110	85	84	N	0
9	9	New Haven	142	110	82	81	N	0
9	9	New Haven	142	111	78	78	N	0
34	3	Bergen	137	104	92	91	N	0
34	3	Bergen	136	104	88	88	N	0
34	3	Bergen	137	103	85	85	Y	1.2
34	3	Bergen	137	102	81	81	N	4.9
34	13	Essex	135	101	86	86	N	0
34	13	Essex	136	102	83	83	N	2
34	13	Essex	135	102	79	81	N	1
34	13	Essex	136	101	75	79	N	0
34	17	Hudson	137	101	79	78	Y	16.1
34	19	Hunterdon	132	98	81	79	Y	0
34	19	Hunterdon	132	99	81	80	N	6.8
34	19	Hunterdon	132	97	80	79	N	0
34	19	Hunterdon	132	100	80	79	N	0

34	19	Hunterdon	131	99	79	78	N	3.6
34	19	Hunterdon	131	98	77	76	N	0.1
34	23	Middlesex	135	98	84	83	Y	0.3
34	23	Middlesex	135	99	83	84	N	0
34	23	Middlesex	135	97	82	81	N	0
34	23	Middlesex	136	98	81	77	N	2.6
34	23	Middlesex	136	99	81	80	N	4.2
34	25	Monmouth	135	95	87	87	N	0
34	25	Monmouth	138	98	86	84	N	8.9
34	25	Monmouth	138	97	82	80	N	4.9
34	25	Monmouth	136	96	81	82	N	0
34	25	Monmouth	137	98	81	79	N	6.4
34	25	Monmouth	136	97	80	79	N	0
34	25	Monmouth	137	96	78	79	N	1.9
34	25	Monmouth	137	97	78	78	N	0.3
34	25	Monmouth	138	96	78	77	N	7.7
34	27	Morris	135	103	85	83	N	0
34	27	Morris	133	101	82	81	Y	0
34	27	Morris	134	101	81	82	N	0
34	27	Morris	134	103	80	78	N	0
34	27	Morris	134	102	79	81	N	2
34	27	Morris	132	101	78	78	N	0
34	27	Morris	133	102	77	79	N	1.6
34	27	Morris	133	103	76	75	N	0.3
34	31	Passaic	136	103	85	86	N	0
34	31	Passaic	135	104	77	76	Y	0
34	31	Passaic	134	104	75	74	N	0
34	35	Somerset	134	98	83	82	N	0
34	35	Somerset	133	98	82	82	N	0
34	35	Somerset	133	99	82	83	N	0
34	35	Somerset	133	100	81	81	N	0
34	35	Somerset	134	99	80	81	N	0
34	35	Somerset	134	100	80	81	N	0
34	37	Sussex	132	102	76	76	N	0
34	37	Sussex	132	103	75	74	N	0
34	37	Sussex	131	103	74	74	N	0.3
34	37	Sussex	131	104	73	72	N	0.7
34	37	Sussex	132	104	73	73	N	0
34	37	Sussex	133	104	73	73	N	0
34	37	Sussex	131	105	72	71	N	0
34	37	Sussex	132	105	71	72	N	0
34	37	Sussex	133	105	71	71	N	0
34	39	Union	135	100	86	86	N	0
34	39	Union	136	100	82	81	N	0.1
34	41	Warren	130	99	79	79	N	1
34	41	Warren	130	100	79	79	N	0.1
34	41	Warren	131	100	79	78	N	0
34	41	Warren	131	101	77	77	N	0
34	41	Warren	130	101	76	77	N	0
34	41	Warren	131	102	76	76	N	0
34	41	Warren	130	102	75	76	N	0
36	5	Bronx	138	103	75	80	Y	9.5
36	47	Kings	138	101	75	76	N	1.8
36	59	Nassau	140	101	93	92	N	35.4
36	59	Nassau	140	103	88	90	N	17.8
36	59	Nassau	141	103	84	87	Y	2.4
36	59	Nassau	141	102	83	85	N	10.5

36	59	Nassau	140	102	80	86	N	0.8
36	81	Queens	139	101	83	84	N	15.6
36	81	Queens	139	102	74	79	Y	14.3
36	81	Queens	138	102	64	67	N	12.9
36	85	Richmond	137	100	83	82	Y	28.8
36	87	Rockland	137	105	89	89	N	16.4
36	87	Rockland	136	105	87	85	N	0
36	87	Rockland	136	106	80	79	N	2.2
36	103	Suffolk	143	105	102	104	N	62.3
36	103	Suffolk	143	104	92	91	N	2.4
36	103	Suffolk	141	104	89	89	N	42.7
36	103	Suffolk	142	104	88	89	N	9.6
36	103	Suffolk	143	103	87	88	N	28.8
36	103	Suffolk	144	105	86	85	N	28.3
36	103	Suffolk	144	104	85	86	Y	0.4
36	103	Suffolk	142	103	82	86	N	4.3
36	103	Suffolk	145	104	81	81	N	14.1
36	103	Suffolk	145	105	79	79	N	14.1
36	103	Suffolk	148	106	78	76	N	43.4
36	103	Suffolk	146	105	77	77	N	8.2
36	103	Suffolk	146	106	77	76	Y	49
36	103	Suffolk	149	107	77	74	N	49.2
36	119	Westchester	139	104	91	90	N	39.8
36	119	Westchester	138	104	87	86	N	7.2
36	119	Westchester	139	107	86	84	N	0
36	119	Westchester	138	106	85	83	N	0
36	119	Westchester	139	106	85	84	N	0
36	119	Westchester	137	106	84	84	N	13.3
36	119	Westchester	138	105	83	82	Y	0.4
36	119	Westchester	138	107	83	85	N	0
36	119	Westchester	137	107	82	81	N	0

(b) for scenario 2012

State	County	County Name	CMAQ Column	CMAQ Row	DVF Hybrid (ppb)	DVF MATS (ppb)	Monitor in grid	Percent in water
9	1	Fairfield	142	107	85	86	Y	18.6
9	1	Fairfield	139	105	82	80	N	2.6
9	1	Fairfield	141	108	82	78	N	0
9	1	Fairfield	140	107	81	78	N	0
9	1	Fairfield	141	106	81	82	Y	32.9
9	1	Fairfield	142	108	81	81	N	0
9	1	Fairfield	140	106	80	80	N	0
9	1	Fairfield	141	107	80	80	N	0
9	1	Fairfield	140	108	79	78	Y	0
9	1	Fairfield	141	109	79	77	N	0
9	1	Fairfield	139	109	78	77	N	1
9	1	Fairfield	140	109	78	77	N	0
9	1	Fairfield	139	108	77	77	N	0
9	7	Middlesex	146	109	83	82	Y	20.2
9	7	Middlesex	145	110	80	79	N	0
9	7	Middlesex	145	111	78	78	Y	0
9	7	Middlesex	146	110	78	77	N	0
9	7	Middlesex	144	111	77	77	N	0
9	7	Middlesex	146	111	77	77	N	0
9	7	Middlesex	145	112	75	74	N	0

9	9	New Haven	145	109	83	84	N	8.6
9	9	New Haven	143	108	82	82	N	25.5
9	9	New Haven	143	109	81	80	Y	0.2
9	9	New Haven	144	109	81	81	N	4.1
9	9	New Haven	142	109	80	79	N	0
9	9	New Haven	143	110	80	78	N	0
9	9	New Haven	144	110	80	80	N	0
9	9	New Haven	142	110	78	76	N	0
9	9	New Haven	142	111	74	73	N	0
34	3	Bergen	137	104	88	87	N	0
34	3	Bergen	136	104	84	83	N	0
34	3	Bergen	137	103	82	81	Y	1.2
34	3	Bergen	137	102	78	78	N	4.9
34	13	Essex	135	101	82	81	N	0
34	13	Essex	136	102	80	79	N	2
34	13	Essex	135	102	75	76	N	1
34	13	Essex	136	101	72	76	N	0
34	17	Hudson	137	101	77	75	Y	16.1
34	19	Hunterdon	132	98	76	74	Y	0
34	19	Hunterdon	132	97	75	74	N	0
34	19	Hunterdon	132	99	75	74	N	6.8
34	19	Hunterdon	132	100	75	74	N	0
34	19	Hunterdon	131	99	73	73	N	3.6
34	19	Hunterdon	131	98	72	72	N	0.1
34	23	Middlesex	135	98	79	78	Y	0.3
34	23	Middlesex	135	99	78	79	N	0
34	23	Middlesex	135	97	77	76	N	0
34	23	Middlesex	136	98	77	73	N	2.6
34	23	Middlesex	136	99	77	76	N	4.2
34	25	Monmouth	138	98	83	80	N	8.9
34	25	Monmouth	135	95	82	83	N	0
34	25	Monmouth	137	98	78	74	N	6.4
34	25	Monmouth	136	96	77	77	N	0
34	25	Monmouth	138	97	77	75	N	4.9
34	25	Monmouth	136	97	75	74	N	0
34	25	Monmouth	137	96	75	74	N	1.9
34	25	Monmouth	138	96	75	72	N	7.7
34	25	Monmouth	137	97	74	73	N	0.3
34	27	Morris	135	103	80	78	N	0
34	27	Morris	133	101	77	76	Y	0
34	27	Morris	134	101	76	77	N	0
34	27	Morris	134	102	75	76	N	2
34	27	Morris	134	103	75	73	N	0
34	27	Morris	132	101	74	72	N	0
34	27	Morris	133	102	73	74	N	1.6
34	27	Morris	133	103	71	70	N	0.3
34	31	Passaic	136	103	81	82	N	0
34	31	Passaic	135	104	74	71	Y	0
34	31	Passaic	134	104	70	69	N	0
34	35	Somerset	134	98	78	77	N	0
34	35	Somerset	133	98	77	76	N	0
34	35	Somerset	133	99	77	78	N	0
34	35	Somerset	133	100	76	76	N	0
34	35	Somerset	134	99	75	77	N	0
34	35	Somerset	134	100	75	76	N	0
34	37	Sussex	132	102	72	71	N	0
34	37	Sussex	132	103	70	69	N	0

34	37	Sussex	133	104	69	68	N	0
34	37	Sussex	131	103	68	68	N	0.3
34	37	Sussex	131	104	68	67	N	0.7
34	37	Sussex	132	104	68	68	N	0
34	37	Sussex	131	105	67	66	N	0
34	37	Sussex	133	105	67	67	N	0
34	37	Sussex	132	105	66	67	N	0
34	39	Union	135	100	81	82	N	0
34	39	Union	136	100	78	77	N	0.1
34	41	Warren	130	99	74	74	N	1
34	41	Warren	130	100	74	74	N	0.1
34	41	Warren	131	100	73	73	N	0
34	41	Warren	131	101	72	72	N	0
34	41	Warren	130	101	71	72	N	0
34	41	Warren	131	102	71	70	N	0
34	41	Warren	130	102	70	70	N	0
36	5	Bronx	138	103	72	79	Y	9.5
36	47	Kings	138	101	73	74	N	1.8
36	59	Nassau	140	101	89	88	N	35.4
36	59	Nassau	140	103	86	87	N	17.8
36	59	Nassau	141	103	81	85	Y	2.4
36	59	Nassau	141	102	79	82	N	10.5
36	59	Nassau	140	102	77	84	N	0.8
36	81	Queens	139	101	81	81	N	15.6
36	81	Queens	139	102	72	78	Y	14.3
36	81	Queens	138	102	63	65	N	12.9
36	85	Richmond	137	100	80	78	Y	28.8
36	87	Rockland	137	105	86	84	N	16.4
36	87	Rockland	136	105	82	80	N	0
36	87	Rockland	136	106	76	74	N	2.2
36	103	Suffolk	143	105	99	99	N	62.3
36	103	Suffolk	143	104	88	87	N	2.4
36	103	Suffolk	141	104	85	85	N	42.7
36	103	Suffolk	142	104	85	85	N	9.6
36	103	Suffolk	143	103	83	85	N	28.8
36	103	Suffolk	144	104	82	82	Y	0.4
36	103	Suffolk	144	105	82	81	N	28.3
36	103	Suffolk	142	103	79	84	N	4.3
36	103	Suffolk	145	104	77	77	N	14.1
36	103	Suffolk	145	105	75	75	N	14.1
36	103	Suffolk	146	105	73	73	N	8.2
36	103	Suffolk	148	106	73	72	N	43.4
36	103	Suffolk	146	106	72	72	Y	49
36	103	Suffolk	149	107	72	70	N	49.2
36	119	Westchester	139	104	88	87	N	39.8
36	119	Westchester	138	104	84	83	N	7.2
36	119	Westchester	138	106	83	78	N	0
36	119	Westchester	139	106	82	79	N	0
36	119	Westchester	139	107	82	79	N	0
36	119	Westchester	137	106	81	80	N	13.3
36	119	Westchester	138	105	80	79	Y	0.4
36	119	Westchester	138	107	80	80	N	0
36	119	Westchester	137	107	78	76	N	0

Proposed Draft - Delaware Department of Natural Resources And Environmental Control Unmonitored Area Analysis for the Southern New Jersey/Philadelphia Nonattainment Area[2]

7.8.1.2 Unmonitored Area Analysis

The purpose of the unmonitored area analysis is to insure that there are no predicted violations of ambient air quality standards in the non-attainment area areas. This analysis was prepared in accordance with the EPA modeling guidance document (2005). For the purposes of this analysis, all counties within the PA-NJ-DE-MD non-attainment area and all counties that bordering this area are considered.

The baseline data for this analysis is the ozone model data 2002 BaseB1 dataset, which contains the daily maximum 8-hour ozone concentrations, for each grid cell in the modeling domain, simulated by CMAQ for May 15 September 29 using 2002 BaseB1 emissions data. The projected data uses the ozone model data 2009 BaseB4 dataset, which contains the for the 2009 BaseB4 BOTB/BOTW scenario data for the same period. Both of these datasets were generated by the New York DEC using the SMOKE/CMAQ modeling system with MM5 meteorology.

Processing of the data was done with MATS version 1.1.043 (February 2007). This involved four steps:

Step 1: Interpolating the base year ambient data to the spatial fields.
Step 2: Adjusting the spatial fields using the base year gridded model output gradients.
Step 3: Applying the gridded model Relative Response Values to the gradient adjusted spatial fields.
Step 4: Determining if any unmonitored areas exceed the NAAQS.

As shown in Figure 7-2, no grid cells in this analysis are predicted to exceed the 8-hour ozone NAAQS.

[2] DEDNREC. Proposed draft - Delaware State Implementation Plan for Attainment of the 8-Hour Ozone National Ambient Air Quality Standard, Reasonable Further Progress and Attainment Demonstration. Submitted to U.S. Environmental Protection Agency by the Delaware Department of Natural Resources and Environmental Control, May 2007.

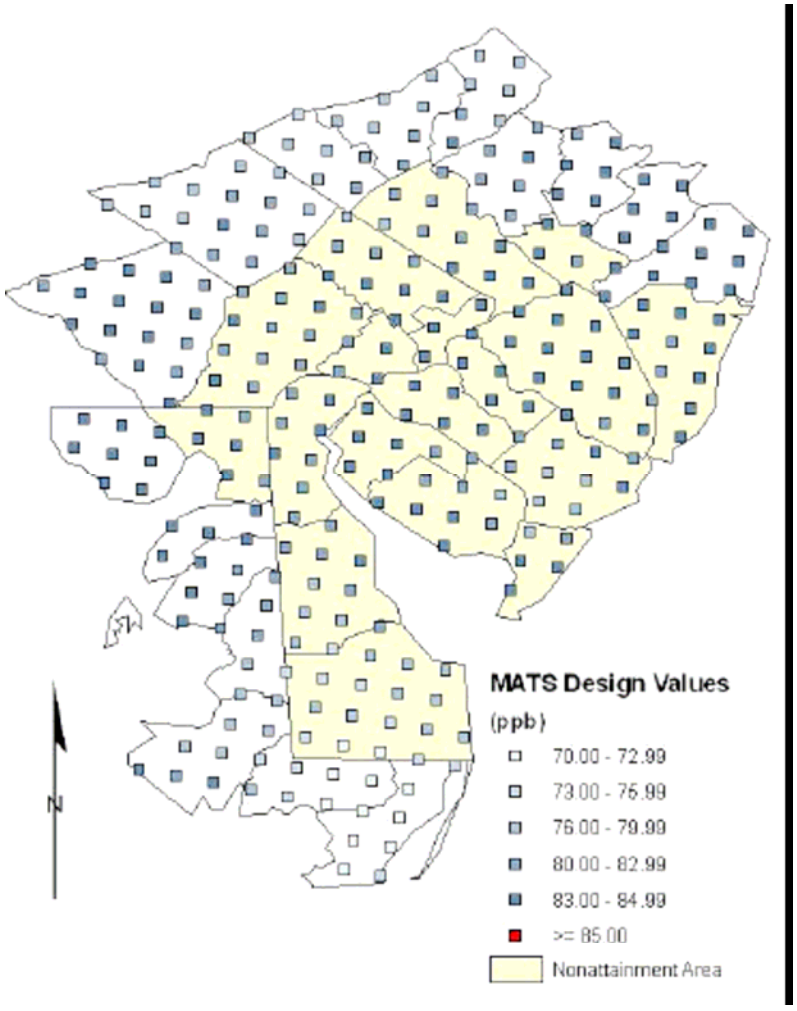

Figure 7-2: Predicted ozone design values