
Rebuttal Commuter Analysis

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Lori Ann Potts and Jerry L.
Riggs

1.0 Purpose

This calculation provides technical input to the testimony on contention NYS-16B concerning the population estimate used in the IPEC SAMA analysis. It was prepared at direction of counsel with the following objectives.

- A. Duplicate Sheppard's commuter calculations.
- B. Assess impact of possible double counting between long-distance commuters and business transients.
- C. Evaluate impact of commuters traveling out of the 50-mile region.

2.0 Conclusions

- A. Duplicate Sheppard's commuter calculations.

The values in columns 2-4 of Table 1 of Sheppard's Report agree with Entergy's SAMA population estimates in the ENERCON Report (see Section 6.1).

The commuters-in values in Table 1 of Sheppard's Report were calculated using the methodology described in Sheppard's Report, except for the following discrepancy (see Section 6.1).

- Table 1 of Sheppard's Report underestimates the commuters into Union Co., NJ by 3,987 because an incorrect value for the 2000 resident population was used (552,541 instead of 522,541). This caused the growth rate for this county to be underestimated resulting in an underestimate of the 2035 commuters-in.

- B. Assess impact of possible double counting between long-distance commuters and business transients.

The data for commuters-in from the U.S. Census Bureau, *County-to-County Worker Flow Files* includes commuters into the 50-mile region from locations all over the country. If accounting for daily commuters was appropriate, it would not be reasonable to assume that people from more than 150 miles away commute into the region on a daily basis. Rather, these people are considered "business travelers." Business travelers have already been included in the "transient population" in the ENERCON Report.

Revising the analysis in Sheppard's Report to only count commuters-in from closer to the region (and correcting the Sheppard's Report underestimate for Union Co., NJ) decreased the number of commuters in Sheppard's Report to 964,093 (see Section 6.2).

- C. Evaluate impact of commuters traveling out of the 50-mile region.

Revising the analysis in Sheppard's Report to also account for commuters out of the region (in addition to the changes in B) decreased the net number of commuters into the 50-mile region to 110,663 (see Section 6.3).

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The revised analysis resulted in a more accurate estimate of the “work day” population distribution within the 50-mile region. The following observations can be made.

- The four counties closest to IPEC (Orange, Putnam, Rockland, and Westchester), where doses would be higher, show a net reduction of over 100,000 commuters.
- Seven counties in the 50-mile region show a net increase in commuters. Of these seven counties; New York, NY county has a net increase of about 1.4 million commuters; Morris, NJ county has a net increase of about 40,000 commuters; Fairfield, CT and Essex, NJ counties each have a net increase of about 24,000 commuters; and the other three counties (Bergen, Middlesex, and Somerset, NJ) have a combined net increase of about 7,000 commuters.

3.0 Input and Design Criteria

3.1 Dr. Sheppard’s Commuter Calculations

Dr. Sheppard’s commuter calculations are described in Reference 4.1, also known as “Sheppard’s Report.”

Sheppard’s Report describes his commuter calculations, using data from the U.S. Census Bureau, *County-to-County Worker Flow Files* available at <http://www.census.gov/population/www/cen2000/commuting/index.html>, as follows.

“An additional deficiency in the SAMA report population estimates relates to the number of persons who would be present within 50 miles of IPEC during a substantial portion of the day, not because they permanently reside there, nor because they are transient overnight visitors to the area, but because they commute to workplaces that are within the area. Because such workers are part of the population potentially at risk from a severe accident, it is important to include them in the estimate of population in the area.

In order to estimate the number of commuters, I use data on county-to-county commuter flows in 2000 made available by the Census Bureau. These data provide, for every county in the US, the estimated number of commuters coming into the county each day from any other individual county in the US. Thus these data can tell us how many commuters can be expected to come to workplaces within a 50 mile radius of IPEC from residential locations outside of this radius. Using these data, I estimated the total commuter flow into the area within 50 miles of IPEC by the following procedure:

1. *For every county that is 100 percent within the 50 mile boundary:*
 - a. *Take 100 percent of the average daily commuter flows into that county that come from counties that are completely outside of the 50 mile boundary.*
 - b. *Take (100-S) percent of the average daily commuter flows into that county that come from counties that have S percent of their area within the 50 mile boundary.*

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2. For every county that is partially within the 50 mile boundary, where P percent is the percentage of land area in the county located within 50 miles of IPEC:

a. Take P percent of the average daily commuter flows into that county that come from counties that are completely outside the 50 mile boundary.

b. Take $P \times (100 - S)$ percent of the average daily commuter flows into that county that come from counties that have S percent of their area within the 50 mile boundary.

Just as using the shares of land area within 50 miles of IPEC to adjust resident, transient, and undercounted population in each county was equivalent to assuming population in each county is uniformly distributed over the entire county, the steps outlined above add the assumption that employment locations are also distributed uniformly over the entire land area of each county.

Thus, for example, if a county has 25 percent of its land area within 50 miles of IPEC and 100 commuters come into that county from a county that is entirely outside of the 50 mile radius, we count 25 commuters as being present within the area that is being evaluated for SAMA (the other 75 are known to work in the county, but are assumed to be employed outside of the 50 mile radius). If 200 commuters come into this same county from a different county that has 50 percent of its area within 50 miles of IPEC, then 100 of those commuters are counted as already residing within the 50 mile boundary (and thus they are already counted under the resident population total) and the other 100 are counted as persons coming from outside the 50 mile area. Of these, 25 are counted as having employment within the area evaluated for SAMA and the other 75 are counted as having employment farther than 50 miles from IPEC.

This procedure provides estimates of the commuter population in 2000 into that portion of each county that is within 50 miles of IPEC. Taking the county population growth rates from 2000 to 2035 used in the original report as a conservative estimate of growth in county employment, we apply those growth rates to total commuter population for each county to obtain the estimates provided in column 6 of Table 1.”

Note that although it is not stated in Sheppard’s Report, the calculations described in Section 6.1 indicate that the following is true. If 400 residents of this county (with 25 percent of its land area within 50 miles of IPEC) stay in the same county to work, 100 are counted as already residing within the 50 mile boundary (and thus they are already counted under the resident population total) and the other 300 are counted as persons residing outside the 50 mile area. Of these, 75 are counted as having employment within the area evaluated for SAMA and the other 225 are counted as having employment farther than 50 miles from IPEC.

Table 1 of Sheppard’s Report is reproduced below for convenient reference.

Rebuttal Commuter Analyses – Region within 50 miles of IPEC

Table 1: Estimates of 2035 Population within 50 Miles of IPEC

County	Pct within 50 mi.	Resident Pop	Transient Pop	Undercount	Commuters	Total Pop
Fairfield	100.0	918,600	14,228	5,701	52,388	990,917
Litchfield	41.5	90,183	1,397	114	20,633	112,328
New Haven	32.9	294,904	4,568	1,823	85,165	386,459
Bergen	100.0	1,089,428	25,448	7,056	30,893	1,152,826
Essex	100.0	868,715	20,292	14,474	62,809	966,290
Hudson	100.0	690,981	16,140	9,208	30,913	747,242
Middlesex	1.8	18,963	443	180	7,739	27,325
Morris	80.8	527,786	12,328	2,026	83,176	625,317
Passaic	100.0	553,404	12,926	6,255	12,135	584,721
Somerset	4.5	21,156	494	131	9,169	30,950
Sussex	93.9	204,652	4,780	262	9,762	219,456
Union	92.9	548,682	12,816	5,369	69,446	636,315
Warren	0.5	780	18	1	256	1,056
Bronx	100.0	1,634,750	22,930	34,396	6,683	1,698,759
Dutchess	88.9	283,939	6,809	1,392	18,957	311,096
Kings	100.0	2,618,418	36,727	46,188	34,740	2,736,073
Nassau	97.9	1,225,359	29,384	7,610	78,710	1,341,063
New York	100.0	1,570,657	22,031	21,506	154,793	1,768,987
Orange	100.0	445,234	10,676	2,177	14,410	472,498
Putnam	100.0	120,738	2,895	222	1,251	125,106
Queens	100.0	3,024,717	42,426	50,742	47,269	3,165,154
Richmond	65.4	433,496	6,080	2,914	37,816	480,305
Rockland	100.0	278,799	6,685	1,931	1,779	289,195
Suffolk	21.3	317,533	7,614	1,467	87,491	414,106
Sullivan	36.3	34,142	819	150	6,724	41,835
Ulster	58.1	129,363	3,102	430	19,466	152,360
Westchester	100.0	914,934	21,939	7,865	8,702	953,440
Pike	18.7	19,343	3,222	40	2,503	25,108
Total		18,879,657	349,218	231,632	995,778	20,456,285

3.2 U.S. Census Bureau County-to-County Worker Flow Files

As indicated in Sheppard’s Report, these files are available at <http://www.census.gov/population/www/cen2000/commuting/index.html>. The files listed below for states with land area within 50 miles of IPEC (Connecticut, New Jersey, New York, and Pennsylvania) were downloaded from this website.

Files showing the work destinations for people who live in each county of Connecticut, New Jersey, New York, and Pennsylvania:

- 2KRESCO_CT.xls
- 2KRESCO_NJ.xls
- 2KRESCO_NY.xls
- 2KRESCO_PA.xls

Files showing the origins for people who work in each county of Connecticut, New Jersey, New York, and Pennsylvania:

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2KWRKCO_CT.xls
 2KWRKCO_NJ.xls
 2KWRKCO_NY.xls
 2KWRKCO_PA.xls

3.3 Entergy’s SAMA Population Estimates

Entergy’s SAMA population estimates were developed in the “ENERCON Report,” Reference 4.3. Tables 1.1, 2.1, and 2.3 of this document are reproduced below for convenient reference.

Table 1.1 Counties within 50-miles of IPEC.

<i>State/County</i>	<i>Land Area (square miles)</i>	<i>Percent within 50-mile zone</i>
<i>Connecticut</i>		
Fairfield	620	100.0
Litchfield	907	41.5
New Haven	595	32.9
<i>New Jersey</i>		
Bergen	231	100.0
Essex	122	100.0
Hudson	44	100.0
Middlesex	306	1.8
Morris	451	80.8
Passaic	185	100.0
Somerset	304	4.5
Sussex	515	93.9
Union	102	92.9
Warren	356	0.5
<i>New York</i>		
Bronx	41	100.0
Dutchess	793	88.9
Kings	67	100.0
Nassau	269	97.9
New York	23	100.0
Orange	812	100.0
Putnam	226	100.0
Queens	106	100.0
Richmond	56	65.4
Rockland	173	100.0
Suffolk	895	21.3
Sullivan	957	36.3
Ulster	1123	58.1
Westchester	430	100.0
<i>Pennsylvania</i>		
Pike	540	18.7

Rebuttal Commuter Analyses – Region within 50 miles of IPEC

Table 2.1 Population projections (2035 calculated from table).

County	2000	2004	2010	2015	2020	2025	2030	2035
<i>Connecticut</i>								
Fairfield	882,567	903,291	857,870	874,730	893,240			918,600
Litchfield	182,193	189,246	192,290	197,730	203,280			217,309
New Haven	824,008	845,694	838,340	852,840	868,690			896,364
<i>New Jersey</i>								
Bergen	884,118	902,998	949,100	966,500	997,800	1,034,900		1,089,428
Essex	793,633	796,684	816,400	823,700	834,400	849,500		868,715
Hudson	608,975	606,240	635,100	641,000	655,200	668,700		690,981
Middlesex	750,162	785,095	858,600	881,400	922,300	968,900		1,053,511
Morris	470,212	488,173	532,700	547,200	571,800	603,400		653,201
Passaic	489,049	500,427	515,500	518,400	525,200	535,900		553,404
Somerset	297,490	316,750	357,800	371,000	393,900	422,700		470,131
Sussex	144,166	152,218	167,500	173,600	185,400	198,200		217,947
Union	522,541	531,957	545,400	550,600	559,700	573,300		590,616
Warren	102,437	110,018	121,400	125,900	132,700	140,700		156,074

County	2000	2004	2010	2015	2020	2025	2030	2035
<i>New York</i>								
Bronx	1,332,650	1,365,536	1,425,170	1,469,206	1,511,322	1,550,580	1,586,661	1,634,750
Dutchess	280,150	293,395	293,520	299,468	304,815	309,007	311,809	319,391
Kings	2,465,326	2,475,290	2,531,424	2,554,579	2,571,602	2,580,325	2,580,903	2,618,418
Nassau	1,334,544	1,339,641	1,312,166	1,300,125	1,290,328	1,278,213	1,260,336	1,251,644
New York	1,537,195	1,562,723	1,587,098	1,600,353	1,606,718	1,605,202	1,595,353	1,570,657
Orange	341,367	370,352	370,521	386,015	401,414	415,973	429,580	445,234
Putnam	95,745	100,570	103,786	107,436	110,891	113,917	116,428	120,738
Queens	2,229,379	2,237,216	2,452,109	2,567,898	2,685,206	2,799,559	2,908,709	3,024,717
Richmond	443,728	463,314	505,844	537,493	569,636	600,954	630,683	662,838
Rockland	286,753	293,626	291,706	291,618	290,732	288,593	284,768	278,799
Suffolk	1,419,369	1,475,488	1,456,195	1,466,808	1,474,746	1,476,069	1,468,072	1,490,766
Sullivan	73,966	76,110	79,522	82,524	85,512	88,362	91,092	94,055
Ulster	177,749	181,779	190,389	197,153	203,871	210,096	215,719	222,655
Westchester	923,459	942,444	926,798	925,714	924,149	919,864	911,278	914,934
<i>Pennsylvania</i>								
Pike	46,302	54,117	60,059	69,447	79,170			103,437

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Table 2.3 Projected total population (2035) by county.

County	Transient/Permanent Ratio	2035 Projected Permanent Population	2035 Projected Total Population
<i>Connecticut</i>			
Fairfield	0.015	918,600	932,828
Litchfield	0.015	217,309	220,675
New Haven	0.015	896,364	910,248
<i>New Jersey</i>			
Bergen	0.023	1,089,428	1,114,876
Essex	0.023	868,715	889,007
Hudson	0.023	690,981	707,121
Middlesex	0.023	1,053,511	1,078,120
Morris	0.023	653,201	668,459
Passaic	0.023	553,404	566,330
Somerset	0.023	470,131	481,112
Sussex	0.023	217,947	223,038
Union	0.023	590,616	604,412
Warren	0.023	156,074	159,719
<i>New York</i>			
Bronx	0.014	1,634,750	1,657,680
Dutchess	0.024	319,391	327,050
Kings	0.014	2,618,418	2,655,145
Nassau	0.024	1,251,644	1,281,658
New York	0.014	1,570,657	1,592,688
Orange	0.024	445,234	455,910
Putnam	0.024	120,738	123,633
Queens	0.014	3,024,717	3,067,143
Richmond	0.014	662,838	672,135
Rockland	0.024	278,799	285,484
Suffolk	0.024	1,490,766	1,526,514
Sullivan	0.024	94,055	96,310
Ulster	0.024	222,655	227,994
Westchester	0.024	914,934	936,873
<i>Pennsylvania</i>			
Pike	0.15	103,437	120,669

4.0 **References**

- 4.1 REPORT OF DR. STEPHEN C. SHEPPARD, PH.D. IN SUPPORT OF CONTENTION NYS-16/16A/16B (“NYS-16B”) In re: License Renewal Application Submitted by Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, and Entergy Nuclear Operations, Inc. Docket Nos. 50-247-LR; 50-286-LR ASLBP No. 07-858-03-LR-BD01 DPR-26, DPR-64, December 16, 2011
- 4.2 U.S. Census Bureau, *County-to-County Worker Flow Files* available at <http://www.census.gov/population/www/cen2000/commuting/index.html>, downloaded January 10, 2012
- 4.3 Site Specific MACCS2 Input Data for Indian Point Energy Center, Revision 1 prepared for Entergy Nuclear Northeast by Enercon Services, Inc., Section 2.3, Page 2-5, Dec. 2009

5.0 Assumptions

- 5.1 Employment locations are distributed uniformly over the entire land area of each county. (Sheppard's Report also uses this assumption.)
- 5.2 Workers who commute out of a county come from locations distributed uniformly over the entire land area of the county. (Corollary to assumption 5.1.)
- 5.3 The county population growth rates from 2000 to 2035 used in Reference 4.2 are a conservative estimate of growth in county employment. (Sheppard's Report also uses this assumption.)
- 5.4 The county population growth rates from 2000 to 2035 used in Reference 4.2 are a conservative estimate of growth in the number of people commuting out of the county. (Corollary to assumption 5.3.)
- 5.5 People who live more than 150 miles outside the 50-mile region do not commute into the region on a daily basis. Rather, these people are considered "business travelers." The impact of excluding these business travelers can be approximated by excluding commuters from states other than Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.

6.0 Method of Analysis and Calculations

The calculations described below were performed within an Excel spreadsheet entitled "Duplicate Sheppard Analysis Spreadsheet.xlsx." The worksheets mentioned below are within this spreadsheet.

- 6.1 Duplicate Sheppard's commuter calculations.
 - 6.1.1 Verify that the values in columns 2-4 of Table 1 of Sheppard's Report agree with Entergy's SAMA population estimates in the ENERCON Report.

See worksheet "Verify Sheppard Table 1 Input" for calculations.

The values in Column 2 of Table 1 of Sheppard's Report (Pct within 50 mi.) are equal to the (Percent within 50-mile zone) values in Table 1.1 of the ENERCON Report. No discrepancies noted.

The values in Column 3 of Table 1 of Sheppard's Report (Resident Pop) are equal to the 2035 permanent population projection in Table 2.1 of the ENERCON Report times the Percent within 50-mile zone values. No discrepancies noted.

The values in Column 4 of Table 1 of Sheppard's Report (Transient Pop) are equal to the 2035 total population projection in Table 2.3 of the ENERCON Report times the Percent within 50-mile zone values minus the Resident Pop. No discrepancies noted; only minor rounding differences.
 - 6.1.2 For each of the 28 counties with area in the region, copy the records showing the origins for people who work in each county from the U.S.

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Census bureau files to a worksheet with the county name, state abbreviation and the words “commute in” such as “Fairfield, CT Commute In.”

Worksheets labeled as described above were created by copying the appropriate lines from 2KWRKCO_CT.xls, 2KWRKCO_NJ.xls, 2KWRKCO_NY.xls, and 2KWRKCO_PA.xls.

- 6.1.3 In each county worksheet from 6.1.2 add a column entitled “Commuters In”.

For residence counties completely outside the 50 mile region,

Commuters In = count (from the U.S. Census bureau file).

For residence counties with area inside the 50 mile region,

Commuters In = count * (100 - % of residence county within 50 miles)/100.

Sum the “Commuters In” column.

The “Commuters In” column in each county worksheet accounts for the percentage of the residence county that is within the 50 mile region (S in Sheppard’s Report.)

- 6.1.4 In worksheet entitled “Section 6.1 Worksheet”, calculate the number of commuters into each county in 2000 by taking the Sum of “Commuters In” column in the county worksheet, multiplying by the % within 50 miles and dividing by 100.

Column E (2000 Commuters In Calculated) in worksheet “Section 6.1 Worksheet” contains this calculation which accounts for the percentage of the workplace county that is within the 50 mile region (P in Sheppard’s Report.)

- 6.1.5 In the same worksheet (Section 6.1 Worksheet), calculate the county population growth rates from 2000 to 2035 using data from Table 2.1 of the ENERCON Report. Apply those growth rates to calculate the year 2035 commuters-in for each of the counties.

Columns F, G, and H in worksheet “Section 6.1 Worksheet” calculate the population growth rate for each county. Column I (2035 Commuters In Calculated) applies those growth rates to the 2000 Commuter-In values to calculate the 2035 commuters-in for each county.

- 6.1.6 Compare the year 2035 commuters-in values in “Section 6.1 Worksheet” to the commuters-in values in Table 1 of Sheppard’s Report.

The commuters-in values in Table 1 of Sheppard’s Report were reproduced in this calculation, except for the following discrepancy.

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- Sheppard’s Report underestimated the commuters into Union Co., NJ by 3,987 because he used an incorrect value for the 2000 resident population (552,541 instead of 522,541). This caused the growth rate for this county to be underestimated resulting in an underestimate of the 2035 commuters-in.

6.2 Assess impact of possible double counting between long-distance commuters and business transients.

The calculations described below were performed within an Excel spreadsheet entitled “Rebuttal Commuter Analysis Spreadsheet.xlsx.” The worksheets mentioned below are within this spreadsheet.

6.2.1 Commuters originating from within a circle with a radius of 200 miles centered on the IPEC site are within 150 miles of the 50-mile region. This circle includes all or portions of the following states as well as portions of Canada.

Connecticut
Maine
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont

To simplify the analysis, it was assumed that all commuters from the listed states are counted as commuters-in. This is a conservative assumption since some of the commuters from some of these states are more than 150 miles away from the 50-mile region. The conservatism is mitigated somewhat by the fact that the datasets from the U.S. Census Bureau, *County-to-County Worker Flow Files* do not account for commuters into the region from Canada.

- 6.2.2 Copy the spreadsheet used to calculate the commuters into the region in Section 6.1 (Duplicate Sheppard Analysis Spreadsheet.xlsx) to a new spreadsheet entitled “Rebuttal Commuter Analysis Spreadsheet.xlsx.” Delete unnecessary worksheet “Verify Sheppard Table 1 Input” and change the name of “Section 6.1 Worksheet” to “Section 6.2 Worksheet”.
- 6.2.3 Within each of the county worksheets (such as “Fairfield, CT Commute In”), delete line items for commuters coming from states other than those listed in Section 6.2.1.
- 6.2.4 Compare the year 2035 commuters-in values in worksheet “Section 6.2 Worksheet” to the commuters-in values in Table 1 of Sheppard’s Report.

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These results reflect the population values if the commuters from far away are not included. (They also correct the underestimate in the Sheppard's Report values for Union Co., NJ mentioned in Section 6.1.6. The italicized, underlined values in the following table are the corrected Sheppard's Report values.)

The number of commuters-in decreased slightly to 964,093. See the following table.

County	% within 50 miles	Sheppard Report Table 1 Commuters	Sheppard Report Table 1 Total Pop	2000 Commuters In Calculated	2035 Commuters In Revised	Revised Total Pop
Fairfield, CT	100.0	52,388	990,917	48,605	50,590	989,119
Litchfield, CT	41.5	20,633	112,328	17,237	20,559	112,254
New Haven, CT	32.9	85,165	386,459	78,069	84,924	386,218
Bergen, NJ	100.0	30,893	1,152,826	23,190	28,575	1,150,508
Essex, NJ	100.0	62,809	966,290	53,508	58,571	962,052
Hudson, NJ	100.0	30,913	747,242	26,379	29,931	746,260
Middlesex, NJ	1.8	7,739	27,325	5,483	7,700	27,286
Morris, NJ	80.8	83,176	625,317	58,800	81,682	623,823
Passaic, NJ	100.0	12,135	584,721	10,327	11,686	584,272
Somerset, NJ	4.5	9,169	30,950	5,766	9,112	30,893
Sussex, NJ	93.9	9,762	219,456	6,364	9,621	219,315
Union, NJ	92.9	<u>73,433</u>	<u>640,302</u>	64,280	72,654	639,523
Warren, NJ	0.5	256	1,056	168	255	1,055
Bronx, NY	100.0	6,683	1,698,759	5,126	6,288	1,698,364
Dutchess, NY	88.9	18,957	311,096	16,417	18,716	310,855
Kings, NY	100.0	34,740	2,736,073	31,312	33,257	2,734,590
Nassau, NY	97.9	78,710	1,341,063	81,881	76,794	1,339,147
New York, NY	100.0	154,793	1,768,987	140,883	143,950	1,758,144
Orange, NY	100.0	14,410	472,498	10,684	13,934	472,022
Putnam, NY	100.0	1,251	125,106	924	1,166	125,021
Queens, NY	100.0	47,269	3,165,154	30,945	41,985	3,159,870
Richmond, NY	65.4	37,816	480,305	25,002	37,348	479,837
Rockland, NY	100.0	1,779	289,195	1,559	1,516	288,932
Suffolk, NY	21.3	87,491	414,106	83,046	87,223	413,838
Sullivan, NY	36.3	6,724	41,835	5,269	6,700	41,811
Ulster, NY	58.1	19,466	152,360	15,496	19,411	152,305
Westchester, NY	100.0	8,702	953,440	7,521	7,452	952,190
Pike, PA	18.7	2,503	25,108	1,115	2,492	25,097
Total		<u>999,765</u>	<u>20,460,274</u>	855,357	964,093	20,424,602

6.3 Evaluate impact of commuters traveling in and out of each county, and each partial county, in the 50-mile region.

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The calculations described below were performed within an Excel spreadsheet entitled “Rebuttal Commuter Analysis Spreadsheet.xlsx.” The worksheets mentioned below are within this spreadsheet.

- 6.3.1 For each of the 28 counties with area in the region, copy the records showing the work destinations for people who live in each county from the U.S. Census bureau files to a worksheet in Section 6.3 Spreadsheet.xlsx. Name each worksheet with the county name, state abbreviation and the words “commute out” such as “Fairfield, CT Commute Out.”

Worksheets labeled as described above were created by copying the appropriate lines from 2KRESCO_CT.xls, 2KRESCO_NJ.xls, 2KRESCO_NY.xls, and 2KRESCO_PA.xls.

- 6.3.2 In each “Commuters In” county worksheet created in Section 6.1, sum the commuters into the county and subtract the commuters from the county being analyzed.

Commuters originating from Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont were retained as commuters. Workers originating from other states were considered “business travelers” and were not counted as commuters.

The commuters-in from counties that are only partially within the 50-mile region are not adjusted as was done in Sheppard’s Report because that adjustment results in the workers remaining in their residence county. To get an accurate representation of the “work day” population in each county, the commuters are moved to their workplace county in this analysis.

The commuters who live and work in the same county are not included in the calculation because there is no net change and these workers have already been included in the permanent population.

- 6.3.3 In each “Commuters Out” county worksheet, sum the commuters out of the county and subtract the commuters from the county being analyzed.

All commuters leaving the county were counted as commuters out of the county. Workers going to places other than Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont are actually “business travelers”. But, since the original Entergy population estimates did not consider these business travelers, they are considered here to get a more accurate representation of the “work day” population in each county.

The commuters who live and work in the same county are not included in the calculation because there is no net change and these workers have already been included in the permanent population.

- 6.3.4 In worksheet entitled “Section 6.3 Worksheet”, calculate the net number of commuters into each county in 2000 by subtracting the commuters-out for

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the county from the commuters-in for the county and multiplying by the fraction of the county within the 50-mile region.

Column E (2000 Net Commuters In Calculated) in worksheet “Section 6.3 Worksheet” contains this calculation which accounts for the percentage of the workplace county that is within the 50 mile region.

- 6.3.5 In the same worksheet (Section 6.3 Worksheet), calculate the county population growth rates from 2000 to 2035 using data from Table 2.1 of the ENERCON Report. Apply those growth rates to calculate the year 2035 net commuters-in for each of the counties.

Columns F, G, and H in worksheet “Section 6.3 Worksheet” calculate the population growth rate for each county. Column K (2035 Net Commuters In Calculated) applies those growth rates to the 2000 net commuters-in values to calculate the 2035 net commuters-in for each county.

- 6.3.6 Compare the “2035 Net Commuters In Calculated” values in worksheet “Section 6.3 Worksheet” to the commuters-in values in Table 1 of Sheppard’s Report.

These results reflect the population values if the commuters and business travelers out of the region are not included. They also assume that commuters-in from far away are not included. (They also correct the underestimate in the Sheppard’s Report values for Union Co., NJ mentioned in Section 6.1.6. The italicized, underlined values in the following table are the corrected Sheppard’s Report values.)

The revised number of commuters decreased to 110,663. See the following table.

The revised analysis resulted in a more accurate estimate of the “work day” population distribution within the 50-mile region. The following observations can be made.

- The four counties closest to IPEC (Orange, Putnam, Rockland, and Westchester), where doses would be higher, show a net reduction of over 100,000 commuters.
- Seven counties in the 50-mile region show a net increase in commuters. Of these seven counties; New York, NY county has a net increase of about 1.4 million commuters; Morris, NJ county has a net increase of about 40,000 commuters; Fairfield, CT and Essex, NJ counties each have a net increase of about 24,000 commuters; and the other three counties (Bergen, Middlesex, and Somerset, NJ) have a combined net increase of about 7,000 commuters.

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County	% within 50 miles	Sheppard Report Table 1 Commuters	Sheppard Report Table 1 Total Pop	2000 Net Commuters In Calculated	2035 Net Commuters In Calculated	Revised Total Pop
Fairfield, CT	100.0	52,388	990,917	22,985	23,923	962,452
Litchfield, CT	41.5	20,633	112,328	-9,849	-11,748	79,947
New Haven, CT	32.9	85,165	386,459	-8,750	-9,518	291,776
Bergen, NJ	100.0	30,893	1,152,826	5,255	6,475	1,128,408
Essex, NJ	100.0	62,809	966,290	22,101	24,192	927,673
Hudson, NJ	100.0	30,913	747,242	-30,716	-34,852	681,477
Middlesex, NJ	1.8	7,739	27,325	91	128	19,714
Morris, NJ	80.8	83,176	625,317	28,922	40,178	582,319
Passaic, NJ	100.0	12,135	584,721	-37,557	-42,499	530,087
Somerset, NJ	4.5	9,169	30,950	458	723	22,504
Sussex, NJ	93.9	9,762	219,456	-30,872	-46,672	163,022
Union, NJ	92.9	<u>73,433</u>	<u>640,302</u>	-9,536	-10,779	556,090
Warren, NJ	0.5	256	1,056	-65	-99	701
Bronx, NY	100.0	6,683	1,698,759	-134,458	-164,938	1,527,138
Dutchess, NY	88.9	18,957	311,096	-12,731	-14,515	277,624
Kings, NY	100.0	34,740	2,736,073	-234,946	-249,536	2,451,797
Nassau, NY	97.9	78,710	1,341,063	-65,769	-61,684	1,200,669
New York, NY	100.0	154,793	1,768,987	1,326,196	1,355,065	2,969,259
Orange, NY	100.0	14,410	472,498	-25,195	-32,861	425,227
Putnam, NY	100.0	1,251	125,106	-24,242	-30,570	93,285
Queens, NY	100.0	47,269	3,165,154	-339,054	-460,013	2,657,872
Richmond, NY	65.4	37,816	480,305	-46,683	-69,735	372,754
Rockland, NY	100.0	1,779	289,195	-31,597	-30,721	256,695
Suffolk, NY	21.3	87,491	414,106	-23,091	-24,253	302,362
Sullivan, NY	36.3	6,724	41,835	-2,155	-2,740	32,371
Ulster, NY	58.1	19,466	152,360	-9,919	-12,425	120,469
Westchester, NY	100.0	8,702	953,440	-25,396	-25,162	919,576
Pike, PA	18.7	2,503	25,108	-2,105	-4,703	17,902
Total		<u>999,765</u>	<u>20,460,274</u>	301,320	110,663	19,571,172