IPRenewal NPEmails

From: Schelling Jr, Joe [fjschel@sandia.gov]
Sent: Friday, December 18, 2009 12:33 PM
To: Jones, Joe A
Cc: Bixler, Nathan E
Subject: RE: IP Population Estimate
Attachments: SECPOP 2000 for Indian Point-Rev1.doc

I'll give it a shot. Also, please replace the version I just sent you with the attached. We're only talkin 28 counties, not the 50 mentioned in the first one.

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ones, Joe A
iday, December 18, 2009 10:21 AM
elling Jr, Joe
RE: IP Population Estimate

Joe,
Can you integrate this into the draft I sent you and track changes.

Thanks,
Joe

Schelling Jr, Joe
iday, December 18, 2009 10:16 AM
es, Joe A
er, Nathan E
IP Population Estimate

Joe,
Here's an updated discussion of the Indian Point population in 2035. The annual growth rate based on 2000-2008 Census data for Northeast US is 0.00290; for the 50 counties within 50 miles of IP, the annual growth rate is 0.004097. These are +3.31% larger and 0.81% smaller than the total used by Entergy. I don't discuss it, but we probably account for the fraction of each county within the 50-mile radius in a similar manner, but Entergy also adds a transient population. Entergy also gets their population data from the individual states rather than using US Census data. I've also included an image to show the relationship of the SECPOP coordinate location relative to the two reactor buildings. Please let me know if you have any comments or questions. Thanks. Joe
<< File: SECPOP 2000 for Indian Point-Rev1.doc >>

Hearing Identifier: IndianPointUnits2and3NonPublic_EX
Email Number: 2473

Mail Envelope Properties (30E0C5690865734DABA83B42297BC73A87FEB6E32D)

Subject: RE: IP Population Estimate
Sent Date: 12/18/2009 12:32:48 PM
Received Date: 12/18/2009 12:32:50 PM
From: Schelling Jr, Joe

Created By: fjschel@sandia.gov

Recipients:
"Bixler, Nathan E" <nbixler@sandia.gov>
Tracking Status: None
"Jones, Joe A" <jojones@sandia.gov>
Tracking Status: None

Post Office: ES03SNLNT.srn.sandia.gov

Files	**Size**	**Date & Time**
MESSAGE	1516	12/18/2009 12:32:50 PM
SECPOP 2000 for Indian Point-Rev1.doc	571456	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Estimated 2035 Population Within 50 Miles of Indian Point Energy Center

Version 3.12.01 of SECPOP2000 – Sector Population and Economic Estimator, June 20, 2003, was used with US Census data to prepare two estimates of the population distribution in 2035 within 50 miles of Indian Point Energy Center for comparison with data provided by Entergy in the siteiec.inp MACCS2 input file. The first estimate was based on annual growth rates developed from 2000-2008 Census data for the Northeast US geographic region, and the second estimate developed from Census data over the same period for the 28 counties lying at least partially within 50 miles of Indian Point.

The location of the SECPOP 2000 coordinates for Indian Point (41° 16" 17' Lat, 73° 57" '9 Long) were first verified by comparison to the Indian Point facility layout using Google Earth, as shown in Figure 1. The yellow pushpin represents the SECPOP coordinates, and the two reactor containment buildings highlighted, with Unit #2 within approximately 350' and Unit #2 within approximately 820' of the location used with SECPOP.

Figure 1. Google Earth image of Indian Point Energy Center

US Census data from July 1, 2000 to July 1, 2008 was used to define an annual growth rate for the Northeast USA geographic area (http://www.census.gov/popest/states/NST-ann-est.html), which was then used to define a SECPOP multiplier for estimating the population within 50 miles of Indian Point in 2035.

Annual Growth Rate = exp{Ln(2008 Population/2000 Population)/8} – 1

= exp{Ln[(54,924,779/53,666,821)/8} – 1

= exp{Ln(1.02344)/8} – 1 = 0.00290

Growth from 2000 to 2035 = (1 + Annual Growth Rate)^{35}

= (1.00290)^{35} = 1.1067

Similarly, US Census data for the same July 1, 200 to July 1, 2008 for the 28 counties in Connecticut, New Jersey, New York, and Pennsylvania that are within 50 miles of Indian Point (http://www.census.gov/popest/counties/CO-EST2008-01.html) was used to define a SECPOP multiplier for estimating the population within 50 miles of Indian Point in 2035.

Annual Growth Rate = exp{Ln(2008 Population/2000 Population)/8} – 1

= exp{Ln[(20,635,344/19,971,294)/8} – 1

= exp{Ln(1.03325)/8} – 1 = 0.004097

Growth from 2000 to 2035 = (1 + Annual Growth Rate)^{35}

= (1.00497)^{35} = 1.1538

In comparison with the Indian Point population of 19,228,712 supplied by Entergy, SECPOP2005 estimated 18,591,824 using the 1.1067 multiplier based on the Northeast USA area and 19,384,364 using the 1.1538 multiplier based on the 28 counties. Differences of +636,888 (3.31%) and -155,652 (0.81%) relative to Entergy's value, respectively, are observed.

Table 1 shows the population input data provided by Entergy in the siteiec.inp MACCS2 input file (totals have been added in the final column and last row). Table 2 shows the distribution of population in 2035 using the 1.1067 multiplier based on growth of the Northeast US population, and Table 3 the distribution using the 1.1538 multiplier based on the 28 counties within 50 miles of Indian Point.

Rosette charts generated by SECPOP 2000 for these two alternatives are shown in Figures 2 and 3.

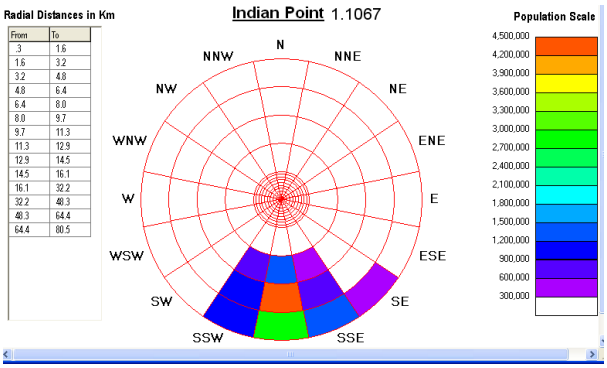

Figure 2. 2035 Population Distribution Using Population Multiplier Based on Northeast US Population Growth.

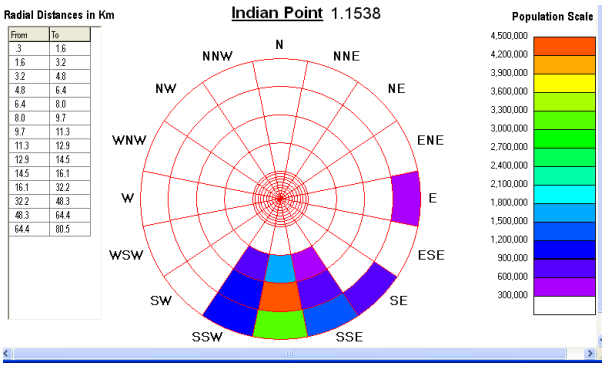

Figure 3. 2035 Population Distribution Using Population Multiplier Based on Growth of 28 Counties Within 50 Miles of Indian Point.

Table 1. ENTERGY siteiec.inp Population

Radii(km)	0.3219	1.6093	3.2187	4.828	6.4374	8.0467	9.6561	11.2654	12.8748	14.4841	16.0935	32.1869	48.2804	64.3739	80.4674	Sum
N	6	0	271	2,059	2,501	909	931	1,223	1,389	1,503	1,696	22,955	30,654	39,620	51,057	156,774
NNE	16	7	170	1,943	2,912	2,051	1,177	1,388	1,577	1,798	1,913	28,140	39,917	56,226	67,213	206,448
NE	17	193	883	2,131	2,964	3,843	3,910	3,059	2,464	1,998	1,915	29,419	53,692	62,559	41,261	210,308
ENE	17	364	1,275	2,132	2,977	3,453	4,507	5,282	6,140	6,960	7,279	74,856	119,073	152,175	176,338	562,828
E	17	390	1,218	2,138	2,934	3,792	4,424	5,513	5,587	7,201	8,076	118,335	156,720	200,581	208,394	725,320
ESE	17	409	1,256	2,136	2,970	3,592	3,698	3,857	5,734	6,783	7,409	121,515	144,267	54,180	34,361	392,184
SE	17	410	1,274	2,138	2,872	3,808	4,537	5,279	6,284	7,194	8,060	111,946	87,735	236,426	379,990	857,970
SSE	17	360	1,268	1,645	882	495	15	1,442	948	1,911	3,214	98,326	481,703	1,380,249	1,218,170	3,190,645
S	17	400	701	246	124	620	1,538	3,253	4,129	4,455	5,138	135,211	1,164,596	3,732,339	3,164,306	8,217,073
SSW	17	377	562	500	1,700	2,882	3,544	4,187	4,873	5,517	6,159	202,605	395,389	922,649	1,034,467	2,585,428
SW	17	217	187	1,566	2,274	2,916	3,574	4,188	4,361	5,358	6,138	183,372	276,902	197,362	246,076	934,508
WSW	9	0	620	1,623	2,197	2,924	3,550	4,014	4,196	4,255	4,335	64,428	209,197	109,102	85,849	496,299
W	3	0	855	1,602	2,267	2,815	2,368	1,787	1,423	1,775	2,030	32,026	50,974	61,380	57,384	218,689
WNW	2	0	938	1,624	2,245	1,341	1,135	1,419	1,505	1,756	2,071	32,528	54,577	57,977	29,719	188,837
NW	2	45	974	1,589	1,933	972	1,140	1,351	1,541	1,781	2,093	32,572	54,557	24,046	22,317	146,913
NNW	3	50	809	1,051	1,587	740	1,204	1,407	1,620	1,787	2,028	31,660	32,569	27,599	34,374	138,488
Sum	194	3,222	13,261	26,123	35,339	37,153	41,252	48,649	53,771	62,032	69,554	1,319,894	3,352,522	7,314,470	6,851,276	19,228,712

Table 2. 2035 Population Estimate Using 1.1067 Population Multiplier Based on Northeast US Population Growth

Radii(km)	0.3219	1.6093	3.2187	4.828	6.4374	8.0467	9.6561	11.2654	12.8748	14.4841	16.0935	32.1869	48.2804	64.3739	80.4674	Sum
N	0	0	12	121	36	347	411	2,336	1,562	8,169	497	56,295	98,801	68,465	68,870	305,922
NNE	0	0	0	266	756	1,824	774	673	620	935	733	9,012	55,041	21,142	12,654	104,430
NE	0	0	2,793	8,700	3,486	3,033	4,286	3,683	1,618	1,452	2,055	28,649	26,387	38,547	14,553	139,242
ENE	0	19	2,676	4,683	5,372	1,669	4,106	3,184	5,239	8,507	5,834	45,431	124,517	62,366	111,189	384,792
E	0	51	1,240	0	1,185	1,737	888	1,518	837	3,915	3,819	25,681	52,973	203,344	292,032	589,220
ESE	0	138	202	812	708	1,016	120	595	952	545	1,577	35,309	175,845	106,756	27,470	352,045
SE	0	398	1,367	995	3,278	924	4,793	3,428	3,002	8,691	7,308	60,156	170,272	96,290	579,958	940,860
SSE	0	161	1,668	1,595	389	242	0	100	0	4,878	11,881	152,480	528,640	854,954	1,348,631	2,905,619
S	0	103	696	34	0	636	6,934	1,263	4,256	8,372	9,313	101,288	1,459,266	4,236,612	2,917,149	8,745,922
SSW	0	73	537	695	3,638	12,001	7,409	3,184	4,627	6,656	11,434	196,676	680,363	953,138	930,976	2,811,407
SW	0	0	17	1,940	2,919	3,565	1,239	4,487	3,482	1,535	2,716	65,819	135,447	167,188	220,858	611,212
WSW	0	0	518	539	50	342	147	53	148	0	5	10,665	36,035	51,678	92,777	192,957
W	0	0	347	122	0	0	0	0	0	0	32	19,671	29,796	37,929	19,283	107,180
WNW	0	0	0	21	0	0	0	0	9	260	2,141	53,239	66,779	21,379	9,992	153,820
NW	0	0	0	66	0	125	0	0	0	10	1,348	22,134	27,386	24,519	25,353	100,941
NNW	0	0	0	0	60	1,073	655	6	0	0	0	70,972	35,175	25,799	12,515	146,255
Sum	0	943	12,073	20,589	21,877	28,534	31,762	24,510	26,352	53,925	60,693	953,477	3,702,723	6,970,106	6,684,260	18,591,824

Table 3. 2035 Population Estimate Using 1.1538 Population Multiplier Based on Growth of 28 Counties Within 50 Miles of Indian Point.

Radii(km)	0.3219	1.6093	3.2187	4.828	6.4374	8.0467	9.6561	11.2654	12.8748	14.4841	16.0935	32.1869	48.2804	64.3739	80.4674	Sum
N	0	0	13	126	38	362	430	2,436	1,628	8,518	520	58,715	103,006	71,369	71,798	318,959
NNE	0	0	0	277	789	1,901	810	702	647	976	763	9,390	57,384	22,034	13,199	108,872
NE	0	0	2,910	9,070	3,632	3,162	4,466	3,843	1,686	1,513	2,141	29,873	27,513	40,175	15,168	145,152
ENE	0	20	2,789	4,876	5,605	1,738	4,276	3,323	5,461	8,865	6,084	47,376	129,803	65,023	115,939	401,178
E	0	52	1,293	0	1,237	1,812	927	1,584	873	4,080	3,979	26,768	55,235	212,032	304,487	614,359
ESE	0	144	211	847	740	1,059	124	621	992	570	1,646	36,815	183,345	111,302	28,631	367,047
SE	0	416	1,424	1,038	3,417	962	4,999	3,574	3,132	9,070	7,625	62,740	177,516	100,390	604,652	980,955
SSE	0	167	1,739	1,665	407	252	0	104	0	5,089	12,386	159,002	551,215	891,369	1,406,088	3,029,483
S	0	107	725	36	0	663	7,229	1,317	4,442	8,731	9,703	105,627	1,521,517	4,417,104	3,041,567	9,118,768
SSW	0	76	559	723	3,789	12,510	7,724	3,322	4,826	6,932	11,921	205,064	709,324	993,786	970,679	2,931,235
SW	0	0	17	2,025	3,045	3,715	1,291	4,678	3,628	1,600	2,833	68,655	141,243	174,315	230,287	637,332
WSW	0	0	538	563	52	358	153	55	155	0	6	11,119	37,575	53,881	96,719	201,174
W	0	0	363	128	0	0	0	0	0	0	33	20,509	31,051	39,538	20,123	111,745
WNW	0	0	0	22	0	0	0	0	9	272	2,232	55,505	69,626	22,308	10,420	160,394
NW	0	0	0	69	0	131	0	0	0	10	1,409	23,087	28,535	25,558	26,430	105,229
NNW	0	0	0	0	62	1,117	683	6	0	0	0	73,996	36,676	26,903	13,039	152,482
Sum	0	982	12,581	21,465	22,813	29,742	33,112	25,565	27,479	56,226	63,281	994,241	3,860,564	7,267,087	6,969,226	19,384,364