


<b>United States Nuclear Regulatory Commission Official Hearing Exhibit</b>	
Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)	
	<b>ASLBP #:</b> 07-858-03-LR-BD01 <b>Docket #:</b> 05000247   05000286 <b>Exhibit #:</b> ENT000006-00-BD01 <b>Admitted:</b> 10/15/2012 <b>Rejected:</b> <b>Other:</b>
	<b>Identified:</b> 10/15/2012 <b>Withdrawn:</b> <b>Stricken:</b>

ENT000006  
Submitted: March 28, 2012

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Reviewed: Kou John Hong 1/18/2012

**Calculation:** IP-SENS-POP1

**Purpose:** Population sensitivity for NYS-16 incorporating census undercount and commuters.

**Inputs / Methodology:**

Start with SAMA ER basecase population from SITE file SITEIEC.inp  
Dr. Shepherd Report (NYS000209), Table 1 (2035 pop estimates)

Add in undercounts @ 100%  
Add in commuters @ 50%

Allocate based on visual alignment of counties to 50 mile grid, Shepherd Report Fig 1.

10 to 50 miles - allocate visually, considering both land area and anticipated population centers (e.g., coasts)  
0 to 10 Miles - back calculated uniform % increase to match the visually assigned additions

Compare sensitivity MACCS2 results with IPEC Re-Analysis Results (IP-CALC-09-00265, Table 5 Dose and Cost)

**Comments**

Minor edit (subtracted 6 people) to NNW @50 to match total

SAMA SITE FILE POPULATION DATA

	0.20	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	20.00	30.00	40.00	50.00
	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
N	6	0	271	2059	2501	909	931	1223	1389	1503	1696	22955	30654	39620	51057
NNE	16	7	170	1943	2912	2051	1177	1388	1577	1798	1913	28140	39917	56226	67213
NE	17	193	883	2131	2964	3843	3910	3059	2460	1998	1915	29419	53692	62559	41261
ENE	17	364	1275	2132	2977	3453	4507	6140	6960	6960	7279	74856	119073	152175	176338
E	17	390	1218	2138	2934	3792	4424	5513	5587	7201	8076	118335	156720	200581	208394
ESE	17	409	1256	2136	2970	3592	3698	3857	5734	6783	7409	121515	144267	54180	34361
SE	17	410	1274	2138	2872	3808	4537	5279	6284	7194	8060	111946	87735	236426	379990
SSE	17	360	1268	1645	882	495	15	1442	948	1911	3214	98326	481703	1380249	1218170
S	17	400	701	246	124	620	1538	3253	4129	4455	5138	135211	1164596	3732339	3164306
SSW	17	377	562	500	1700	2882	3544	4187	4873	5517	6159	202605	395389	922649	1034467
SW	17	217	187	1566	2274	2916	3574	4188	4361	5358	6138	183372	276902	197362	246076
WSW	9	0	620	1623	2197	2924	3550	4014	4196	4255	4335	64428	209197	109102	85849
W	3	0	855	1602	2267	2815	2368	1787	1423	1775	2030	32026	50974	61380	57384
WNW	2	0	938	1624	2245	1341	1135	1419	1505	1756	2071	32528	54577	57977	29719
NW	2	45	974	1589	1933	972	1140	1351	1541	1781	2093	32572	54557	24046	22317
NNW	3	50	809	1051	1587	740	1204	1407	1620	1787	2028	31660	32569	27599	34374
TOTAL	194	3222	13261	26123	35339	37153	41252	48649	53771	62032	69554	1319894	3352522	7314470	6851276

UNDERCOUNT & COMMUTER ADDITIONS

	0.20	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	20.00	30.00	40.00	50.00
	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
N	0	0	3	23	28	10	10	14	16	17	19	500	2000	2000	2000
NNE	0	0	2	22	33	23	13	16	18	20	21	100	1500	2500	2500
NE	0	2	10	24	33	43	44	34	28	22	21	200	700	3371	4500
ENE	0	4	14	24	33	39	50	59	69	78	81	1100	5100	9837	22500
E	0	4	14	24	33	42	49	62	62	81	90	2000	5000	5000	22895
ESE	0	5	14	24	33	40	41	43	64	76	83	2000	5000	2000	5213
SE	0	5	14	24	32	43	51	59	70	80	90	2000	3000	15000	41965
SSE	0	4	14	18	10	6	0	16	11	21	36	1000	12000	39738	40000
S	0	4	8	3	1	7	17	36	46	50	57	2500	23903	139503	95757
SSW	0	4	6	6	19	32	40	47	54	62	69	2300	9000	36988	65756
SW	0	2	18	18	25	33	40	47	49	60	69	2300	9000	16879	24716
WSW	0	0	7	18	25	33	40	45	47	48	48	600	4500	4000	1129
W	0	0	10	18	25	31	26	20	16	20	23	500	1643	2000	2292
WNW	0	0	10	18	25	15	13	16	17	20	23	500	1000	1512	1000
NW	0	1	11	18	22	11	13	15	17	20	23	500	1000	2000	2000
NNW	0	1	9	12	18	8	13	16	18	20	23	500	1500	2000	2157
TOTAL	0	0	3	23	28	10	10	14	16	17	19	500	2000	2000	2000

Minor edit to NNW @50 to match total

(0 to 10)

729521

336380

284328

18600

4367

85846

85846

1319894

3352522

7314470

6851276

6851276

SAMA + ADDITIONS

	0.20	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	20.00	30.00	40.00	50.00
	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
N	6	0	274	2082	2529	919	941	1237	1405	1520	1715	23455	32654	41620	53057
NNE	16	7	172	1965	2945	2074	1190	1404	1595	1818	1934	28240	41417	58726	69713
NE	17	195	893	2155	2997	3886	3954	3093	2492	2020	1936	29619	54392	65930	45761
ENE	17	368	1289	2156	3010	3492	4557	5341	6209	7038	7360	75956	124173	162012	198838
E	17	394	1232	2162	2967	3834	4473	5575	5649	7282	8166	120335	161720	205581	231289
ESE	17	414	1270	2160	3003	3632	3739	3900	5798	6859	7492	123515	149267	56180	39574
SE	17	415	1288	2162	2904	3851	4588	5338	6354	7274	8150	113946	90735	251426	421955
SSE	17	364	1282	1663	892	501	15	1458	959	1932	3250	99326	493703	1419987	1258170
S	17	404	709	249	125	627	1555	3289	4175	4505	5195	137711	1188499	3871842	3260063
SSW	17	381	568	506	1719	2914	3584	4234	4927	5579	6228	204905	404389	959637	1100223
SW	17	219	189	1584	2299	2949	3614	4235	4410	5418	6207	185672	285902	214241	270792
WSW	9	0	627	1641	2222	2957	3590	4059	4243	4303	4383	65028	213697	113102	86978
W	3	0	865	1620	2292	2846	2394	1807	1439	1795	2053	32526	52617	63380	59676
WNNW	2	0	948	1642	2270	1356	1148	1435	1522	1776	2094	33028	55577	59489	30719
NW	2	46	985	1607	1955	983	1153	1366	1558	1801	2116	33072	55557	26046	24317
NNW	3	51	818	1063	1605	748	1217	1423	1638	1807	2051	32160	34069	29599	36531
	194	3258	13409	26417	35734	37569	41712	49194	54373	62727	70330	1338494	3438368	7598798	19958233

Dr. Shepherd Table 1 Data (page 8)

County	Pct within 50 mi.	Resident Pop	Transient Pop	Undercount	Commuters	Total Pop	Sensitivity Addition
Fairfield	100	918,600	14,228	5,701	52,388	990,917	31,895
Litchfield	41.5	90,183	1,397	114	20,633	112,328	10,431
New Haven	32.9	294,904	4,568	1,823	85,165	386,459	44,406
Bergen	100	1,089,428	25,448	7,056	30,893	1,152,826	22,503
Essex	100	868,715	20,292	14,474	62,809	966,290	45,879
Hudson	100	690,981	16,140	9,208	30,913	747,242	24,665
Middlesex	1.8	18,963	443	180	7,739	27,325	4,050
Morris	80.8	527,786	12,328	2,026	83,176	625,317	43,614
Passaic	100	553,404	12,926	6,255	12,135	584,721	12,323
Somerset	4.5	21,156	494	131	9,169	30,950	4,716
Sussex	93.9	204,652	4,780	262	9,762	219,456	5,143
Union	92.9	548,682	12,816	5,369	69,446	636,315	40,092
Warren	0.5	780	18	1	256	1,056	129
Bronx	100	1,634,750	22,930	34,396	6,683	1,698,759	37,738
Dutchess	88.9	283,939	6,809	1,392	18,957	311,096	10,871
Kings	100	2,618,418	36,727	46,188	34,740	2,736,073	63,558
Nassau	97.9	1,225,359	29,384	7,610	78,710	1,341,063	46,965
New York	100	1,570,657	22,031	21,506	154,793	1,768,987	98,903
Orange	100	445,234	10,676	2,177	14,410	472,498	9,382
Putnam	100	120,738	2,895	222	1,251	125,106	848
Queens	100	3,024,717	42,426	50,742	47,269	3,165,154	74,377
Richmond	65.4	433,496	6,080	2,914	37,816	480,305	21,822
Rockland	100	278,799	6,685	1,931	1,779	289,195	2,821
Suffolk	21.3	317,533	7,614	1,467	87,491	414,106	45,213
Sullivan	36.3	34,142	819	150	6,724	41,835	3,512
Ulster	58.1	129,363	3,102	430	19,466	152,360	10,163
Westchester	100	914,934	21,939	7,865	8,702	953,440	12,216
Pike	18.7	19,343	3,222	40	2,503	25,108	1,292
<b>Total</b>		18,879,657	349,218	231,632	995,778	20,456,285	729,521
Check		18,879,656	349,217	231,630	995,778	20,456,287	

**BASECASE - IP2**

IP2 - IPEC SAMA MACCS2 Re-Analysis (IP-CALC-09-00265) Table 5 Dose and Cost Results

Source Term	IP2 Freq (per yr)	Dose (sv)	Dose Risk (sv/year)	% of Total	Tot. Cost (\$)	Cost Risk (\$/yr)	% of Total
NCF	1.19E-05	<b>4.75E+01</b>	5.65E-04	0.06%	<b>9.98E+04</b>	1.19E+00	0.00%
Early High	6.50E-07	<b>6.51E+05</b>	4.23E-01	48.44%	<b>2.05E+11</b>	1.33E+05	62.87%
Early Medium	4.23E-07	<b>1.94E+05</b>	8.21E-02	9.39%	<b>5.87E+10</b>	2.48E+04	11.71%
Early Low	1.11E-07	<b>7.93E+04</b>	8.80E-03	1.01%	<b>6.39E+09</b>	7.09E+02	0.33%
Late High	6.88E-07	<b>1.63E+05</b>	1.12E-01	12.84%	<b>4.64E+10</b>	3.19E+04	15.06%
Late Medium	3.43E-06	<b>6.87E+04</b>	2.36E-01	26.98%	<b>6.06E+09</b>	2.08E+04	9.81%
Late Low	6.43E-07	<b>1.61E+04</b>	1.04E-02	1.19%	<b>6.59E+08</b>	4.24E+02	0.20%
Late Low Low	5.82E-08	<b>1.38E+04</b>	8.03E-04	0.09%	<b>5.62E+08</b>	3.27E+01	0.02%
Total	1.79E-05		8.74E-01			<b>2.12E+05</b>	
		Total (rem/yr)	<b>8.74E+01</b>				

Dose (rem)	Dose Risk (rem/year)
4.75E+03	5.65E-02
6.51E+07	4.23E+01
1.94E+07	8.21E+00
7.93E+06	8.80E-01
1.63E+07	1.12E+01
6.87E+06	2.36E+01
1.61E+06	1.04E+00
1.38E+06	8.03E-02
1.19E+08	8.74E+01

IP2 - Sensitivity Pop = Undercount & 1/2 Commuters - IPPOP1.out (1/15/2012)

Source Term	Frequency (per yr)	Dose (sv)	Dose Risk (sv/year)	% of Total	Tot. Cost (\$)	Cost Risk (\$/yr)	% of Total
NCF	1.19E-05	<b>4.85E+01</b>	5.77E-04	0.06%	<b>9.98E+04</b>	1.19E+00	0.00%
Early High	6.50E-07	<b>6.72E+05</b>	4.37E-01	48.48%	<b>2.12E+11</b>	1.38E+05	63.03%
Early Medium	4.23E-07	<b>2.00E+05</b>	8.46E-02	9.39%	<b>6.06E+10</b>	2.56E+04	11.72%
Early Low	1.11E-07	<b>8.19E+04</b>	9.09E-03	1.01%	<b>6.50E+09</b>	7.22E+02	0.33%
Late High	6.88E-07	<b>1.68E+05</b>	1.16E-01	12.83%	<b>4.78E+10</b>	3.29E+04	15.04%
Late Medium	3.43E-06	<b>7.08E+04</b>	2.43E-01	26.95%	<b>6.16E+09</b>	2.11E+04	9.66%
Late Low	6.43E-07	<b>1.66E+04</b>	1.07E-02	1.18%	<b>6.66E+08</b>	4.28E+02	0.20%
Late Low Low	5.82E-08	<b>1.42E+04</b>	8.26E-04	0.09%	<b>5.68E+08</b>	3.31E+01	0.02%
Total	1.79E-05		9.01E-01			<b>2.19E+05</b>	
		Total (rem/yr)	<b>9.01E+01</b>				
		delta base	<b>3.1%</b>			<b>3.2%</b>	

Dose (rem)	Dose Risk (rem/year)
4.85E+03	5.77E-02
6.72E+07	4.37E+01
2.00E+07	8.46E+00
8.19E+06	9.09E-01
1.68E+07	1.16E+01
7.08E+06	2.43E+01
1.66E+06	1.07E+00
1.42E+06	8.26E-02
	9.01E+01



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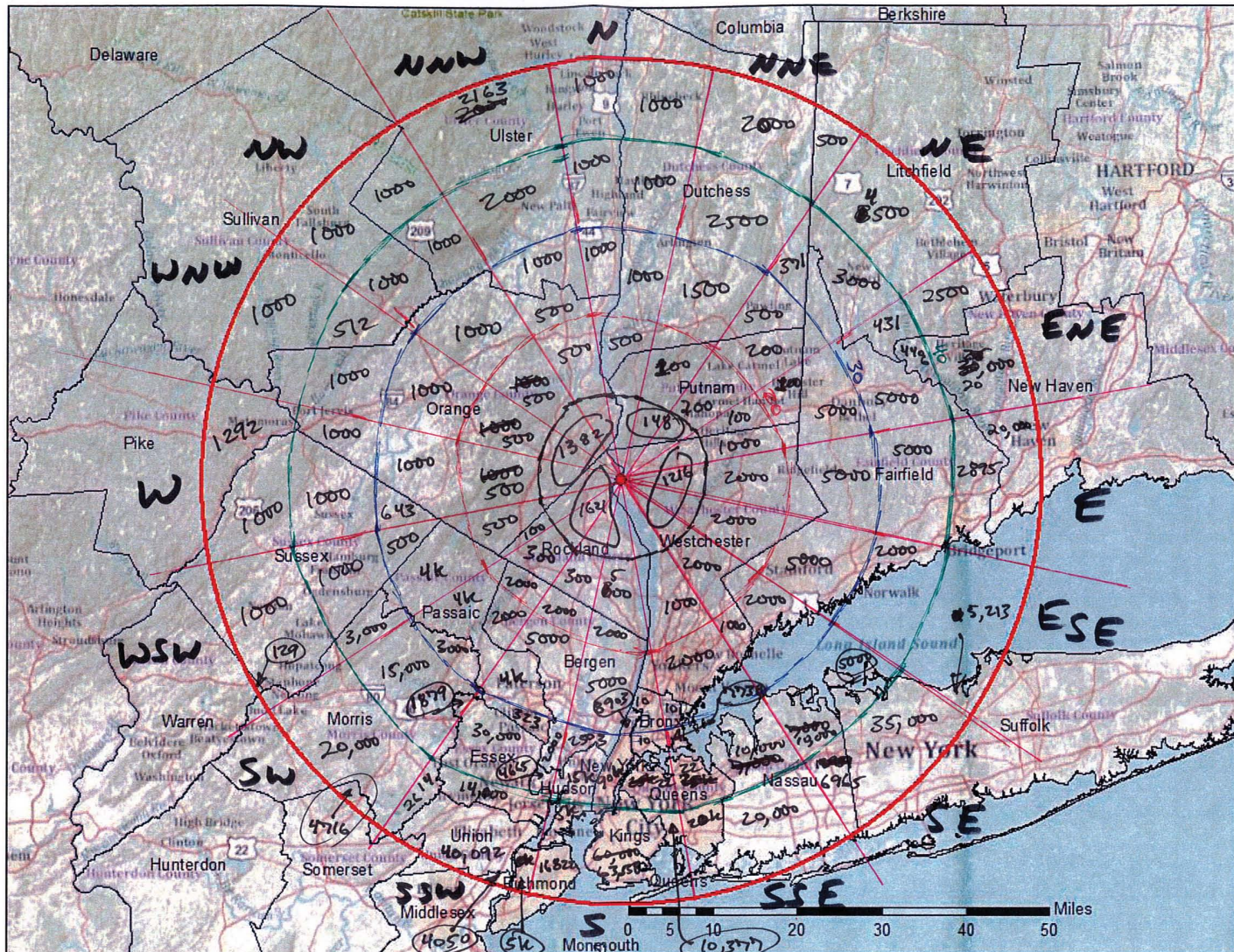


Figure 1: Region within 50 miles of IPEC

Through this procedure, Entergy's consultants obtained an estimate of the 2035 resident population within 50 miles of IPEC (shown in column 3 of Table 1 below) for each county, providing an estimated population of 18,879,657 persons residing within 50 miles of IPEC, plus an adjustment for the transient tourist and business traveler population of 240,219