

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-1: The Battery, NY CO-OP Station 8518750 Top 20 Extreme Water Levels (AREVA, 2013a)

Rank	Year	Month	Highest (feet NAVD88)	Category/Type
1	2012	10	11.27	TS
2	1960	9	7.24	H2
3	1992	12	6.93	ET
4	1953	11	6.74	ET
5	2011	8	6.73	TS
6	1950	11	6.34	ET
7	1962	3	6.14	ET
8	2010	3	6.03	ET
9	1991	10	5.95	ET
10	1984	3	5.75	ET
11	1987	1	5.6	ET
12	1993	3	5.58	ET
13	1968	11	5.56	ET
14	1960	2	5.54	ET
15	1961	4	5.54	ET
16	1996	3	5.51	ET
17	1996	10	5.5	ET
18	1985	9	5.46	H2
19	1938	9	5.44	H2
20	1944	9	5.44	H1

Notes:

1. TS indicates Tropical Storm
2. H1 indicates Category 1 Hurricane
3. H2 indicates Category 2 Hurricane
4. ET indicates Extra-tropical storm

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-2: Sandy Hook, NJ CO-OP Station 8531680 Top 20 Extreme Water Levels (AREVA, 2013a)

Rank	Year	Month	Highest (feet)	Category/Type
1	1960	9	7.27	H2
2	1992	12	7.26	ET
3	2011	8	6.95	TS
4	1953	11	6.87	ET
5	1944	9	6.57	H1
6	1962	3	6.57	ET
7	2012	10	6.53	TS
8	2010	3	6.21	ET
9	1950	11	6.17	ET
10	1968	11	5.99	ET
11	1966	1	5.97	ET
12	1984	3	5.85	ET
13	1993	3	5.84	ET
14	1987	1	5.81	ET
15	1985	9	5.76	H2
16	1991	10	5.74	ET
17	1961	4	5.67	ET
18	1996	3	5.51	ET
19	1972	2	5.43	ET
20	2009	10	5.34	unknown

Notes:

1. TS indicates Tropical Storm
2. H1 indicates Category 1 Hurricane
3. H2 indicates Category 2 Hurricane
4. ET indicates Extra-tropical storm

Table 3.4-3: SLOSH MOMs at the Battery, NY and Sandy Hook, NJ (AREVA, 2013a)

NOAA CO-OP Station	SLOSH Grid Cell	CAT 1 (ft)	CAT 2 (ft)	CAT 3 (ft)	CAT 4 (ft)
The Battery, NY	49-89	9.7	16.3	22.5	28.1
Sandy Hook, NJ	67-53	8.5	14.1	20.1	25.4



Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-4: ADCIRC Simulated Probable Maximum Storm Surges (AREVA, 2013d)

Storm Simulation Number and Meteorological Parameters (Forward Speed, Rad. Max Winds, Landfall Location, Storm Azimuth Direction)	Peak Surge at The Battery, NY (ft)		Peak Surge at IPEC (ft)	
	(NAVD88)	(NGVD29)	(NAVD88)	(NGVD29)
965 - (45knots, 30nm Rmax, landfall Point 1, 335°), HT at IPEC	24.3	25.4	14.5	15.5
961 - (45knots, 30nm Rmax, landfall Point 1, 325°), HT at IPEC	25.3	26.4	14.6	15.6
941 - (40knots, 30nm Rmax, landfall Point 1, 335°), HT at IPEC	25.1	26.2	15.9	16.9
962 - (45knots, 30nm Rmax, landfall Point 2, 325°), HT at IPEC	25.1	26.2	13.8	14.8
937 - (40knots, 30nm Rmax, landfall Point 1, 325°), HT at IPEC	26.1	27.2	15.8	16.8
938 - (40knots, 30nm Rmax, landfall Point 2, 325°), HT at IPEC	25.9	27	15.2	16.2
969 - (45knots, 30nm Rmax, landfall Point 1, 345°), HT at IPEC	22.8	23.9	13.6	14.6
966 - (45knots, 30nm Rmax, landfall Point 2, 335°), HT at IPEC	23.5	24.6	13.4	14.4
945 - (40knots, 30nm Rmax, landfall Point 1, 345°), HT at IPEC	23.3	24.4	15.2	16.2
605 - (45knots, 25nm Rmax, landfall Point 1, 335°), HT at IPEC	23.3	24.4	13.2	14.2
978 - (45knots, 30nm Rmax, landfall Point 2, 365°), HT at IPEC	15.3	16.4	10.0	11.0
959 - (40knots, 30nm Rmax, landfall Pt 3, 370°), HT at IPEC	15.7	16.8	10.1	11.1
949 - (40knots, 30nm Rmax, landfall Pt 1, 355°), HT at IPEC	19.9	21	13.6	14.6
973 - (45knots, 30nm Rmax, landfall Pt 1, 355°), HT at IPEC	19.6	20.7	12.4	13.4
950 - (40knots, 30nm Rmax, landfall Pt 2, 355°), HT at IPEC	18.1	19.2	12.4	13.4
925 - (30knots, 30nm Rmax, landfall Pt 1, 355°), HT at IPEC	19.5	20.6	16.2	17.2
925n - (30knots, 25nm Rmax, landfall Pt 1, 355°), HT at IPEC	19.0	20.1	16.0	17.0
974 - (45knots, 30nm Rmax, landfall Pt 2, 355°), HT at IPEC	18.0	19.1	11.3	12.3
926 - (30knots, 30nm Rmax, landfall Pt 2, 355°), HT at IPEC	18.4	19.5	14.9	15.9
985 - (30knots, 30nm Rmax, landfall Pt 5, 355°), HT at IPEC	20.4	21.5	18.0	19.0
985* - (30knots, 30nm Rmax, landfall Pt 5, 355°), HT at IPEC	19.3	20.4	15.9	16.9

Notes: Storm 985 is a steady state simulation; Storm 985* is a non-steady state simulation. A linear decaying of the maximum wind speed and a corresponding adjustment to the pressure deficit was applied after landfall for Storm 985*.

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-5: Discretized Probabilities for Central Pressure Deficit (CPD) (AREVA, 2013e)

Bin Value (millibars)	Bin Probability	Cumulative Probability
40	0.08	0.858
50	0.038	0.896
60	0.045	0.941
70	0.032	0.973
80	0.023	0.996
90	0.004	1
100	0.000	1

Table 3.4-6: Discretized Probabilities for Forward Direction (θ) (AREVA, 2013e)

Bin Value (degrees)	Bin Probability	Cumulative Probability
-60	0.0076	0.0376
-50	0.0124	0.05
-40	0.0203	0.0703
-30	0.0382	0.1085
-20	0.0564	0.1649
-10	0.0825	0.2474
0	0.1114	0.3588
10	0.136	0.4948
20	0.147	0.6418

Note:

1. Bearing is storm heading measured clockwise from north. Negative indicates west of north.

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-7: Discretized Probabilities for Forward Speed (Vf) (AREVA, 2013e)

Bin Value (knots)	Bin Probability	Cumulative Probability
15	0.172	0.322
20	0.258	0.58
25	0.1724	0.7524
30	0.1351	0.8875
35	0.0594	0.9469
40	0.0335	0.9804
45	0.0087	0.9891

Table 3.4-8: Discretized Probabilities for Radius of Maximum Winds (R_{max}) (AREVA, 2013e)

Bin Value (nautical miles)	Bin Probability	Cumulative Probability
16	0.0878	0.1078
20	0.238	0.3458
24	0.2207	0.5665
28	0.2312	0.7977
32	0.0991	0.8968
36	0.0634	0.9602

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-9: Factor of Landfall Probability R_{max}/L for Track Offsets (AREVA, 2013e)

Offset ID	Adjustment Factor	Distances to Adjacent Tracks (right, left)
1	1.00	--, R_{max}
2	0.75	R_{max} , $\frac{1}{2} R_{max}$
3	0.50	$\frac{1}{2} R_{max}$, $\frac{1}{2} R_{max}$
4	0.50	$\frac{1}{2} R_{max}$, $\frac{1}{2} R_{max}$
5	0.50	$\frac{1}{2} R_{max}$, $\frac{1}{2} R_{max}$
6	0.75	R_{max} , $\frac{1}{2} R_{max}$
7	1.00	R_{max} , --

Notes:

1. Left/right defined relative to storm heading.
2. "--" denotes no track; zone of coverage extends beyond footprint of storm tracks.

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-10: Top 10 JPM SLOSH-Calculated Storm Surge Events (Determined by Simulated Surge Magnitude at IPEC) (AREVA, 2013e)

Storm #	CPD (mb)	θ (deg.)	V_f (kts)	R_{max} (nm)	Offset ID	Event Joint Probability	Max Stillwater Elevation			
							(feet, NAVD88)		(feet, NGVD29)	
							IPEC [95 149]	Battery [49 89]	IPEC [95 149]	Battery [49 89]
15385	90	10	25	20	6	2.33E-07	18.0	19.3	19.0	20.4
14832	90	-10	30	16	6	3.27E-08	17.6	24.7	18.6	25.8
14460	90	-20	20	20	5	1.45E-07	17.5	19.4	18.5	20.5
14881	90	-10	35	20	6	4.87E-08	17.4	26.4	18.4	27.5
11451	80	-40	45	28	6	1.37E-08	17.3	28.6	18.3	29.7
14586	90	-20	35	20	5	3.33E-08	17.3	27.0	18.3	28.1
9070	70	-30	40	36	5	4.88E-08	17.3	23.2	18.3	24.3
11611	80	-30	30	24	5	3.28E-07	17.3	23	18.3	24.1
11324	80	-40	30	28	5	2.13E-07	17.3	22.7	18.3	23.8
11745	80	-30	45	28	6	2.58E-08	17.2	27.9	18.2	29.0

1) Notes:

1. CPD , θ , V_f , R_{max} reported in millibars, degrees relative to north, knots, and nautical miles, respectively.
2. IPEC [95 149] and Battery [49 89] refer to SLOSH model grid cell locations.
3. Cumulative joint probability reflects joint probability based on storm intensity parameters, bearing and rate of occurrence.
4. Datum conversions between NAVD88 and NGVD29 for IPEC and The Battery are included as Appendix C (NGS, 2013).
5. Figure 14 provides an example depicting offset ID assignment.

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-11: Top 10 JPM SLOSH-Calculated Storm Surge Events (Determined by Simulated Surge Magnitude at The Battery) (AREVA, 2013e)

Storm #	CPD (mb)	θ (deg.)	V_f (kts)	R_{max} (nm)	Offset ID #	Cumulative Joint Probability	Max Stillwater Elevation			
							(feet, NAVD88)		(feet, NGVD29)	
							IPEC [95 149]	Battery [49 89]	IPEC [95 149]	Battery [49 89]
13789	90	-50	45	20	6	1.07E-09	16.6	29.7	17.6	30.8
14083	90	-40	45	20	6	1.76E-09	16.9	29.6	17.9	30.7
13495	90	-60	45	20	6	6.57E-10	16.6	29.5	17.6	30.6
14377	90	-30	45	20	6	3.30E-09	17.0	29.2	18.0	30.3
11157	80	-50	45	28	6	8.38E-09	17.1	29.0	18.1	30.1
14041	90	-40	40	20	6	6.76E-09	16.9	29.0	17.9	30.1
10863	80	-60	45	28	6	5.14E-09	16.8	29.0	17.8	30.1
13747	90	-50	40	20	6	4.13E-09	15.9	28.9	16.9	30.0
14335	90	-30	40	20	6	1.27E-08	17.0	28.8	18.0	29.9
14082	90	-40	45	20	5	1.76E-09	16.7	28.7	17.7	29.8

2) Notes:

1. CPD, θ , V_f , R_{max} reported in millibars, degrees relative to north, knots, and nautical miles, respectively.
2. IPEC [95 149] and Battery [49 89] refer to SLOSH model grid cell locations.
3. Cumulative joint probability reflects joint probability based on storm intensity parameters, bearing and rate of occurrence.
4. Datum conversions between NAVD88 and NGVD29 for IPEC and The Battery are included as Appendix C (NGS, 2013).
5. Figure 14 provides an example depicting offset ID assignment.



Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-12: ADCIRC Simulated Storm Surge Stillwater Elevations (AREVA, 2013e)

Rank	Storm ID (<i>V</i> _{max} , <i>V</i> _f , <i>R</i> _{max} , <i>CPD</i> , <i>θ</i>), Tide at IPEC	Peak Surge			
		The Battery	IPEC	The Battery	IPEC
		(feet, NAVD88)		(feet, NGVD29)	
1	14460 - (131kts <i>V</i> _{max} , 20kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -20°), HT at IPEC	17.49	18.08	18.59	19.08
2	13915 - (134kts <i>V</i> _{max} , 25kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -40°), HT at IPEC	23.26	17.22	24.36	18.22
3	11661 - (132kts <i>V</i> _{max} , 35kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -30°), HT at IPEC	24.47	17.20	25.57	18.20
4	15385 - (134kts <i>V</i> _{max} , 25kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, 10°), HT at IPEC	15.32	17.16	16.42	18.16
5	14251 - (137kts <i>V</i> _{max} , 30kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -30°), HT at IPEC	23.97	17.11	25.07	18.11
6	11367 - (124kts <i>V</i> _{max} , 35kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -40°), HT at IPEC	24.46	16.84	25.56	17.84
7	11324 - (121kts <i>V</i> _{max} , 30kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -40°), HT at IPEC	22.41	16.50	23.51	17.50
8	11611 - (125kts <i>V</i> _{max} , 30kts <i>V</i> _f , 24nm <i>R</i> _{max} , 80mb, -30°), HT at IPEC	21.39	16.44	22.49	17.44
9	11703 - (127kts <i>V</i> _{max} , 40kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -30°), HT at IPEC	23.65	16.37	24.75	17.37
10	14790 - (138kts <i>V</i> _{max} , 25kts <i>V</i> _f , 16nm <i>R</i> _{max} , 90mb, -10°), HT at IPEC	17.91	16.28	19.01	17.28
11	11409 - (126kts <i>V</i> _{max} , 40kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -40°), HT at IPEC	24.58	16.24	25.68	17.24
12	14881 - (140kts <i>V</i> _{max} , 35kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -10°), HT at IPEC	20.96	16.11	22.06	17.11
13	11696 - (131kts <i>V</i> _{max} , 40kts <i>V</i> _f , 24nm <i>R</i> _{max} , 80mb, -30°), HT at IPEC	23.95	15.99	25.05	16.99
14	11996 - (126kts <i>V</i> _{max} , 40kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -20°), HT at IPEC	22.47	15.88	23.57	16.88
15	14538 - (141kts <i>V</i> _{max} , 30kts <i>V</i> _f , 16nm <i>R</i> _{max} , 90mb, -20°), HT at IPEC	21.10	15.88	22.20	16.88
16	11451 - (129kts <i>V</i> _{max} , 45kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -40°), HT at IPEC	24.61	15.85	25.71	16.85
17	14292 - (140kts <i>V</i> _{max} , 35kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -30°), HT at IPEC	24.84	15.80	25.94	16.80
18	11745 - (129kts <i>V</i> _{max} , 45kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -30°), HT at IPEC	23.62	15.78	24.72	16.78
19	14335 - (142kts <i>V</i> _{max} , 40kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -30°), HT at IPEC	25.33	15.77	26.43	16.77
20	14586 - (140kts <i>V</i> _{max} , 35kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -20°), HT at IPEC	23.56	15.74	24.66	16.74
21	11990 - (131kts <i>V</i> _{max} , 40kts <i>V</i> _f , 24nm <i>R</i> _{max} , 80mb, -20°), HT at IPEC	22.20	15.58	23.30	16.58
22	14832 - (141kts <i>V</i> _{max} , 30kts <i>V</i> _f , 16nm <i>R</i> _{max} , 90mb, -10°), HT at IPEC	19.68	15.52	20.78	16.52
23	11157 - (129kts <i>V</i> _{max} , 45kts <i>V</i> _f , 28nm <i>R</i> _{max} , 80mb, -50°), HT at IPEC	25.23	15.52	26.33	16.52
24	14041 - (143kts <i>V</i> _{max} , 40kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -40°), HT at IPEC	25.76	15.52	26.86	16.52
25	14377 - (145kts <i>V</i> _{max} , 45kts <i>V</i> _f , 20nm <i>R</i> _{max} , 90mb, -30°), HT at IPEC	25.49	15.45	26.59	16.45



Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

Table 3.4-12: ADCIRC Simulated Storm Surge Stillwater Elevations (con't)

Rank	Storm ID (Vmax, Vf, Rmax, CPD, θ), Tide at IPEC	Peak Surge			
		The Battery	IPEC	The Battery	IPEC
		(feet, NAVD88)		(feet, NGVD29)	
26	14629 - (143kts Vmax, 40kts Vf, 20nm Rmax, 90mb, -20°), HT at IPEC	23.65	15.34	24.75	16.34
27	11408 - (126kts Vmax, 40kts Vf, 28nm Rmax, 80mb, -40°), HT at IPEC	23.85	15.32	24.95	16.32
28	12039 - (129kts Vmax, 45kts Vf, 28nm Rmax, 80mb, -20°), HT at IPEC	21.64	15.32	22.74	16.32
29	10863 - (129kts Vmax, 45kts Vf, 28nm Rmax, 80mb, -60°), HT at IPEC	25.10	15.29	26.20	16.29
30	14083 - (145kts Vmax, 45kts Vf, 20nm Rmax, 90mb, -40°), HT at IPEC	25.87	15.29	26.97	16.29
31	12032 - (134kts Vmax, 45kts Vf, 24nm Rmax, 80mb, -20°), HT at IPEC	22.69	15.26	23.79	16.26
32	11941 - (132kts Vmax, 35kts Vf, 20nm Rmax, 80mb, -20°), HT at IPEC	21.23	15.22	22.33	16.22
33	14923 - (143kts Vmax, 40kts Vf, 20nm Rmax, 90mb, -10°), HT at IPEC	21.65	15.19	22.75	16.19
34	14922 - (143kts Vmax, 40kts Vf, 20nm Rmax, 90mb, -10°), HT at IPEC	22.60	15.18	23.70	16.18
35	11744 - (129kts Vmax, 45kts Vf, 28nm Rmax, 80mb, -30°), HT at IPEC	23.47	15.12	24.57	16.12
36	9057 - (119kts Vmax, 40kts Vf, 28nm Rmax, 70mb, -30°), HT at IPEC	20.93	15.06	22.03	16.06
37	14671 - (146kts Vmax, 45kts Vf, 20nm Rmax, 90mb, -20°), HT at IPEC	23.79	15.02	24.89	16.02
38	11450 - (129kts Vmax, 45kts Vf, 28nm Rmax, 80mb, -40°), HT at IPEC	23.90	14.91	25.00	15.91
39	11737 - (134kts Vmax, 45kts Vf, 24nm Rmax, 80mb, -30°), HT at IPEC	23.86	14.72	24.96	15.72
40	13789 - (145kts Vmax, 45kts Vf, 20nm Rmax, 90mb, -50°), HT at IPEC	26.03	14.63	27.13	15.63
41	8182 - (115kts Vmax, 40kts Vf, 32nm Rmax, 70mb, -60°), HT at IPEC	22.01	14.47	23.11	15.47
42	14040 - (143kts Vmax, 40kts Vf, 20nm Rmax, 90mb, -40°), HT at IPEC	25.00	14.43	26.10	15.43
43	9070 - (111kts Vmax, 40kts Vf, 36nm Rmax, 70mb, -30°), HT at IPEC	19.44	14.41	20.54	15.41
44	9358 - (115kts Vmax, 40kts Vf, 32nm Rmax, 70mb, -20°), HT at IPEC	17.89	14.40	18.99	15.40
45	14670 - (145kts Vmax, 45kts Vf, 20nm Rmax, 90mb, -20°), HT at IPEC	24.02	14.38	25.12	15.38
46	8217 - (122kts Vmax, 45kts Vf, 28nm Rmax, 70mb, -60°), HT at IPEC	22.60	14.34	23.70	15.34
47	8776 - (111kts Vmax, 40kts Vf, 36nm Rmax, 70mb, -40°), HT at IPEC	19.72	14.21	20.82	15.21
48	9393 - (122kts Vmax, 45kts Vf, 28nm Rmax, 70mb, -20°), HT at IPEC	19.46	14.21	20.56	15.21
49	14082 - (145kts Vmax, 45kts Vf, 20nm Rmax, 90mb, -40°), HT at IPEC	25.01	14.14	26.11	15.14
50	8517 - (118kts Vmax, 45kts Vf, 32nm Rmax, 70mb, -50°), HT at IPEC	21.13	13.55	22.23	14.55

Note: Rank shown in Table 3.4-12 based on the ADCIRC calculated maximum water levels at IPEC.

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



Figure 3.4-1: Location of NOAA Co-Op Stations in the Vicinity of IPEC (AREVA, 2013a)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

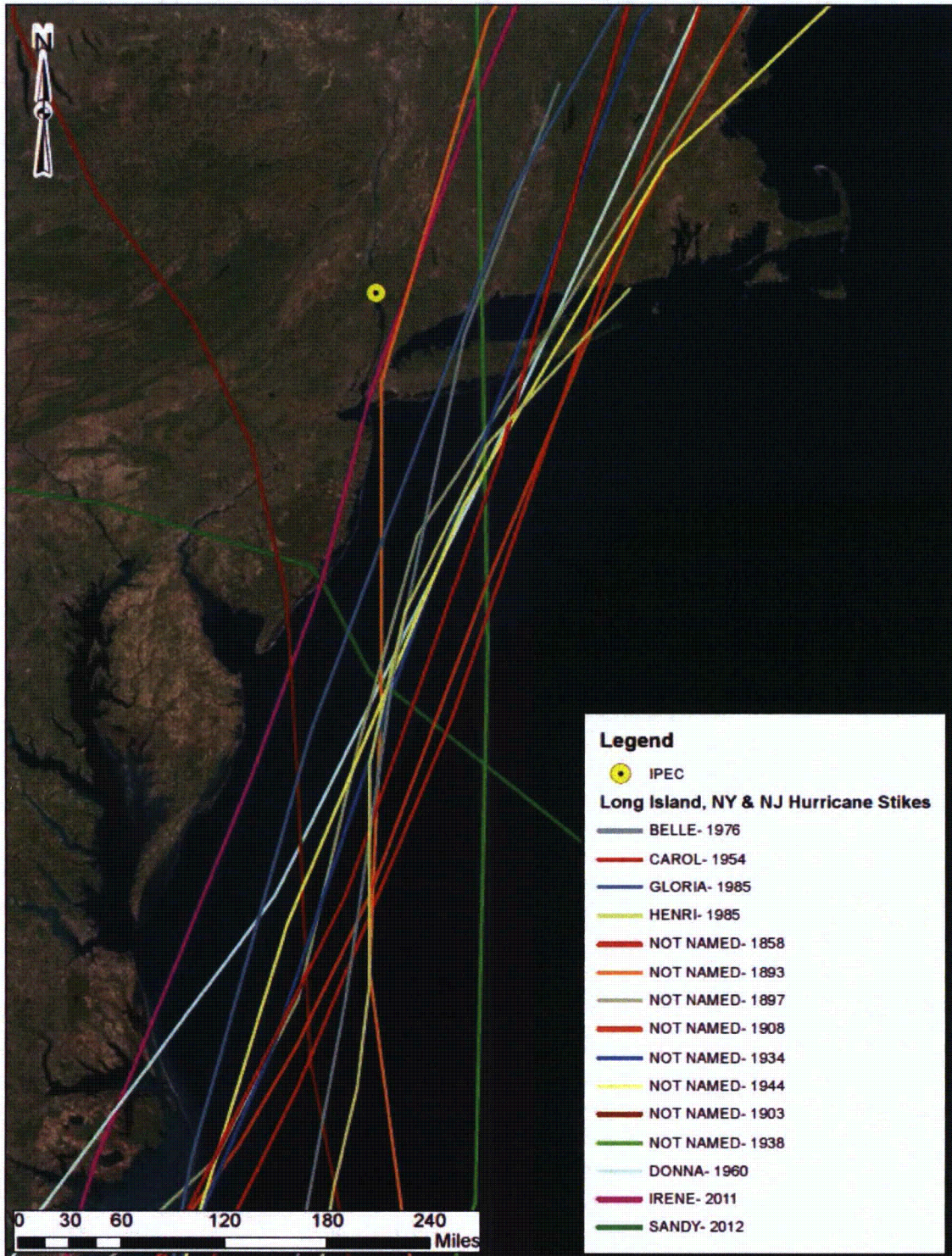


Figure 3.4-2: Hurricane Strikes to New York and New Jersey (AREVA, 2013a)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

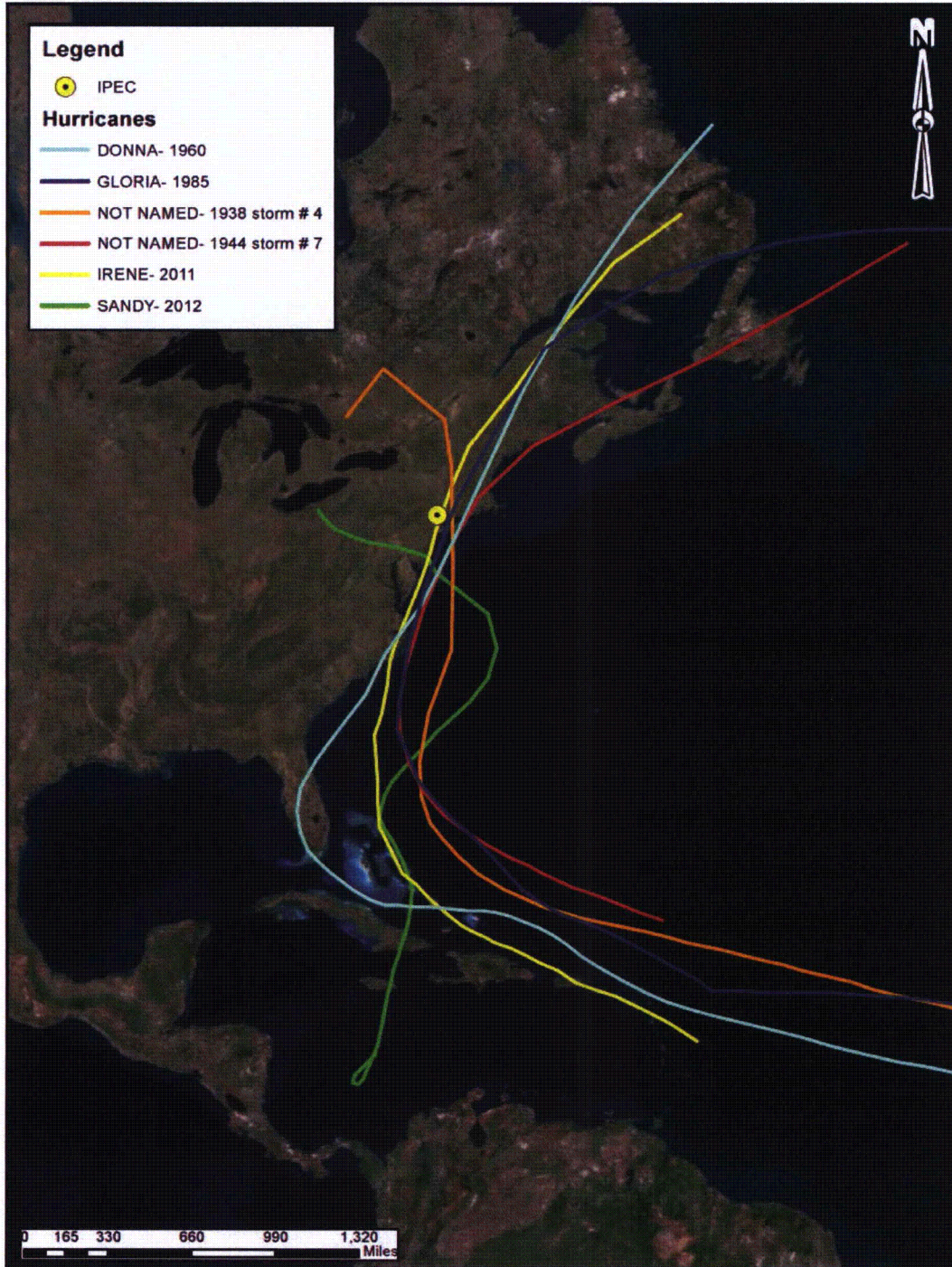


Figure 3.4-3: Hurricane Tracks of Recorded Extreme Water Levels at Sandy Hook, NJ and the Battery, NY (AREVA, 2013a)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

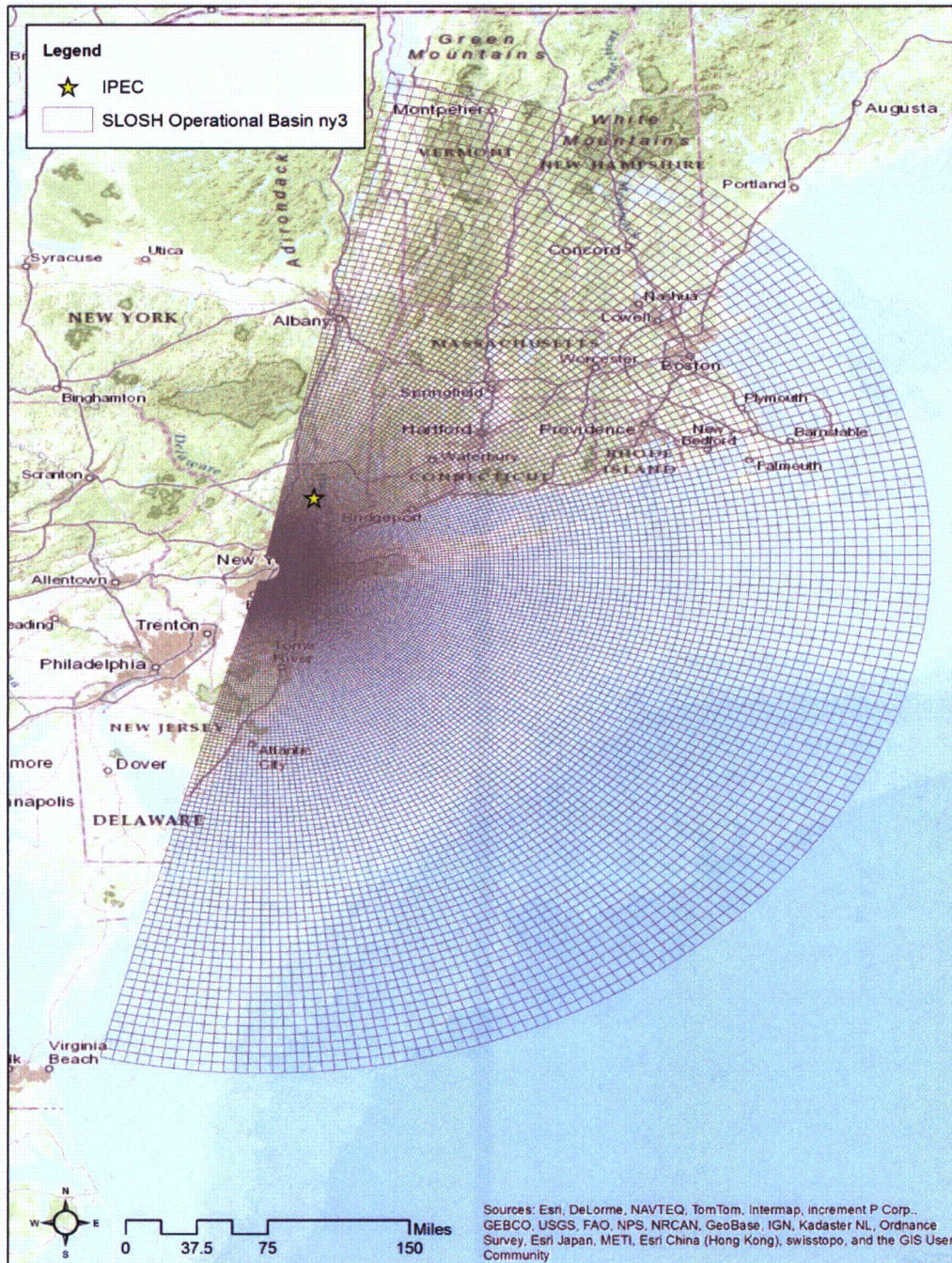


Figure 3.4-4: New York, Version 3 (ny3) SLOSH 3.97 Model Grid (ADCIRC Mesh Model Elevation (m, NAVD88))

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

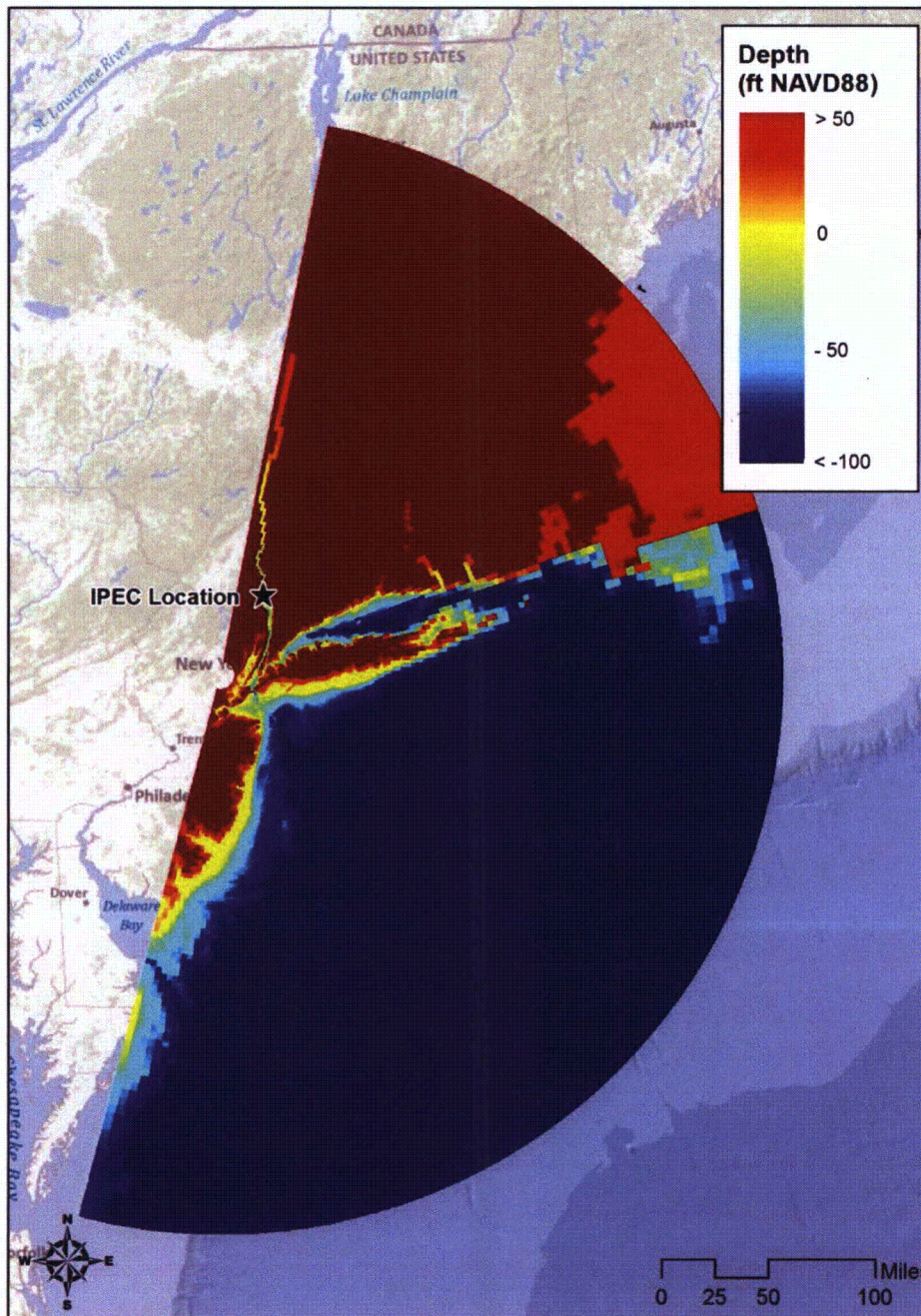


Figure 3.4-5: New York, Version 3 (ny3) Basin Digital Elevation Model (DEM) Defining Base of Model Domain (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

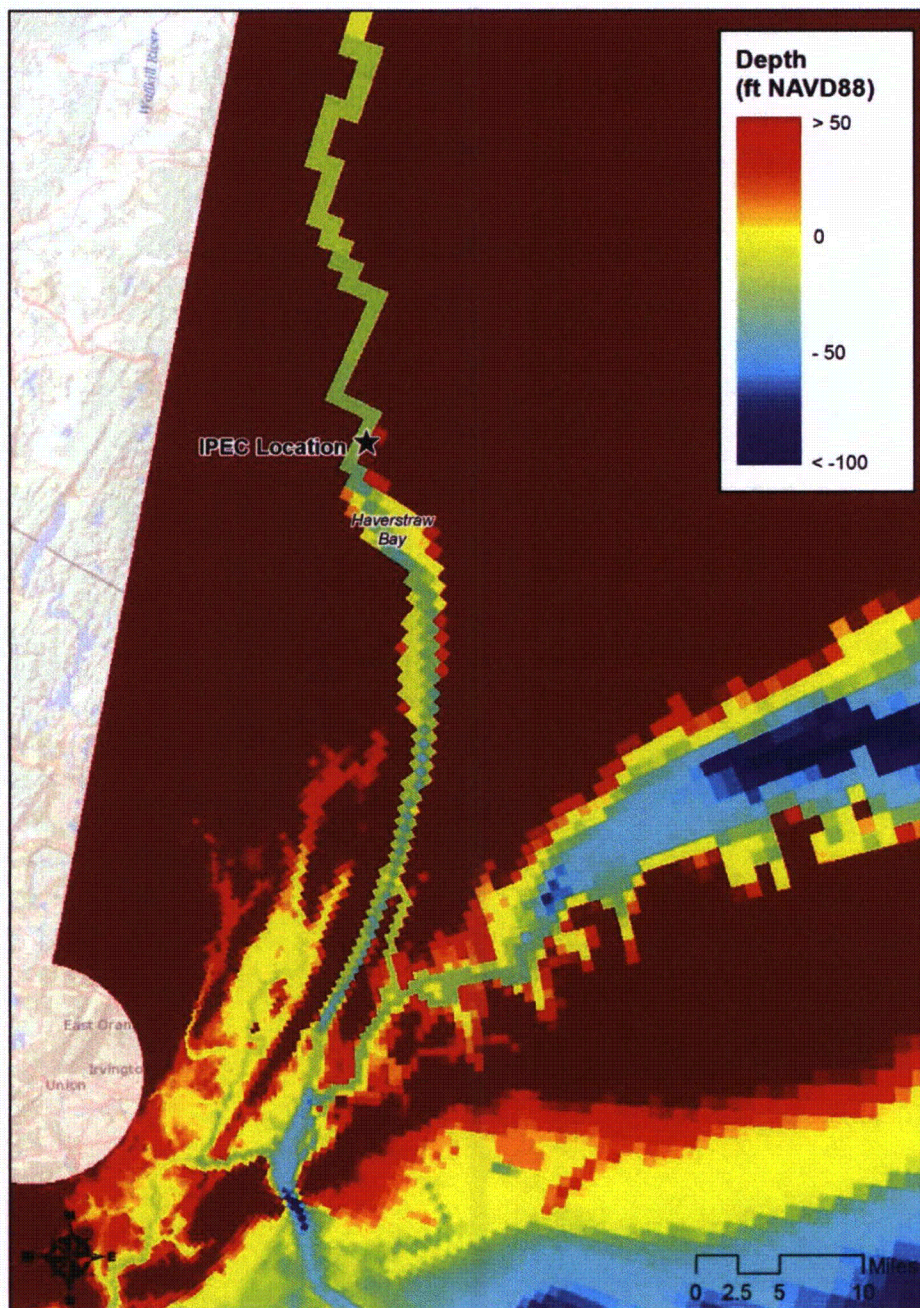


Figure 3.4-6: New York, Version 3 (ny3) Basin Digital Elevation Model (DEM) Defining Base of Model Domain in IPEC Vicinity (Upper Bay, New York and Hudson River) (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

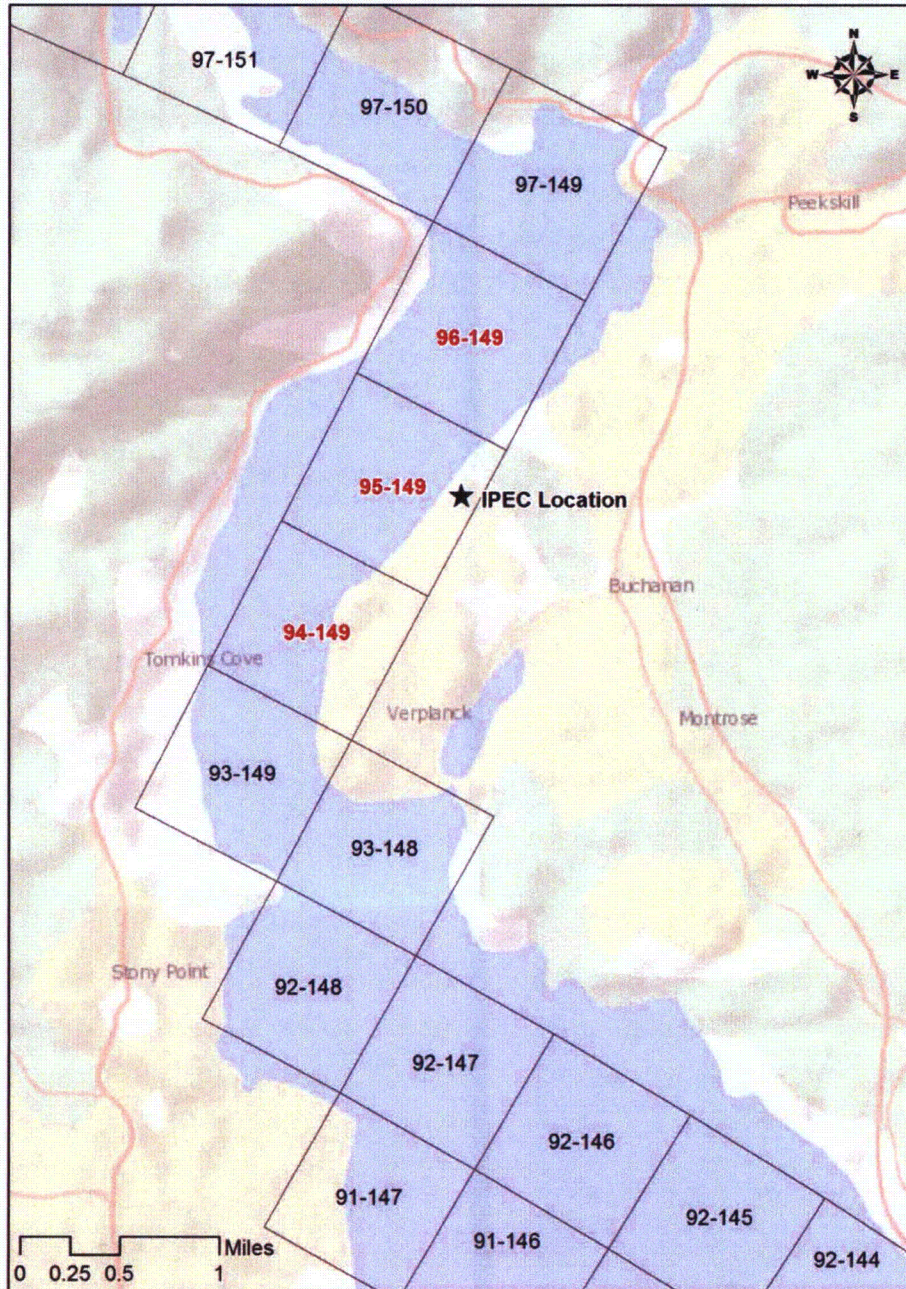


Figure 3.4-7: New York, Version 3 (ny3) Grid Cells Corresponding to the IPEC River Frontage (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



Figure 3.4-8: Landfall Points for SLOSH 3.97 Storm Tracks (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

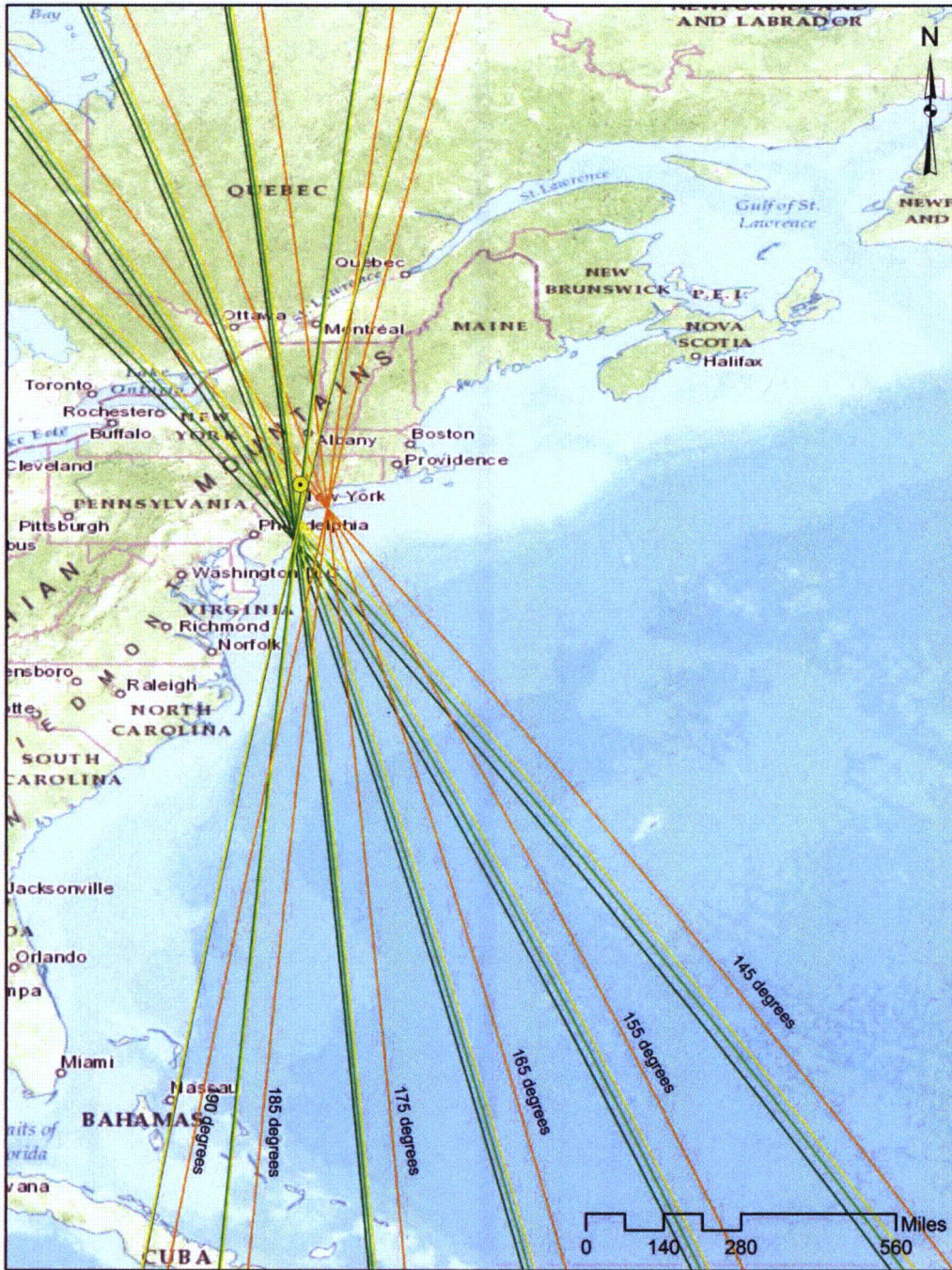


Figure 3.4-9: SLOSH 3.97 Bearing Range for Northerly Storm Tracks (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

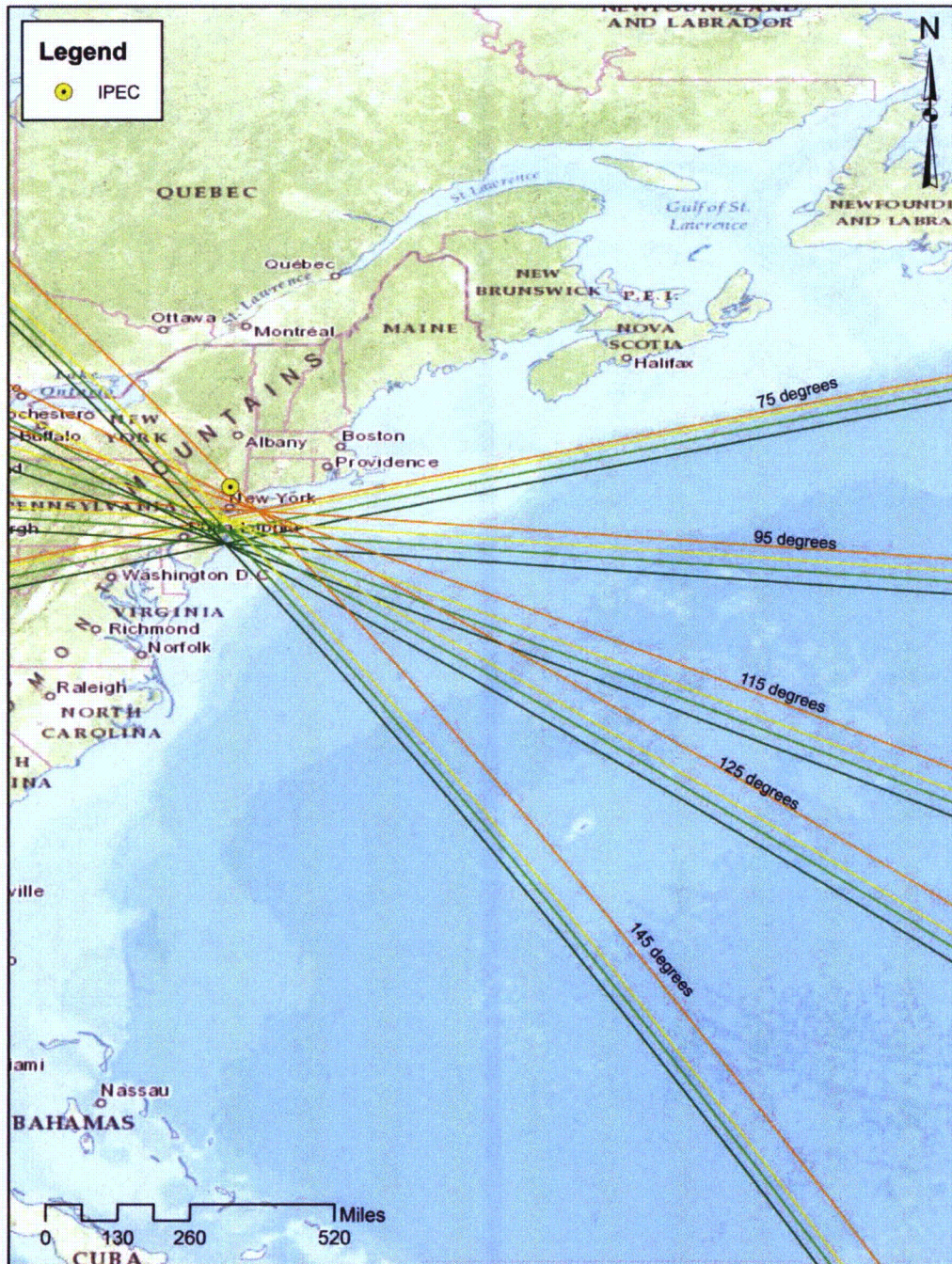


Figure 3.4-10: SLOSH 3.97 Bearing Range for Westerly Storm Tracks (AREVA, 2013d)

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

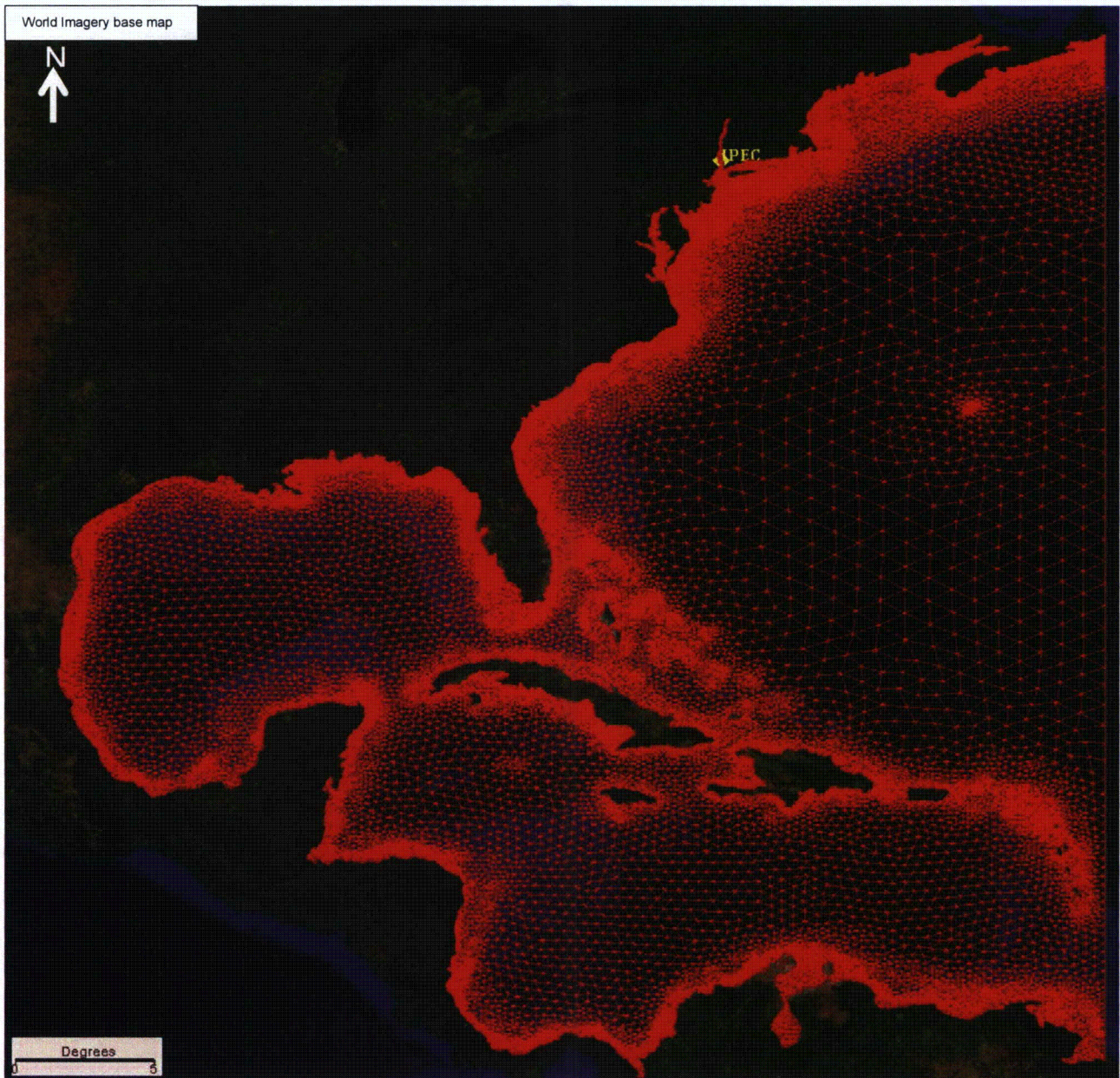


Figure 3.4-11: ADCIRC FEMA Region II Finite Element Mesh – Northern Atlantic (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



Figure 3.4-12: ADCIRC FEMA Region II Finite Element Mesh – New Jersey/New York (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

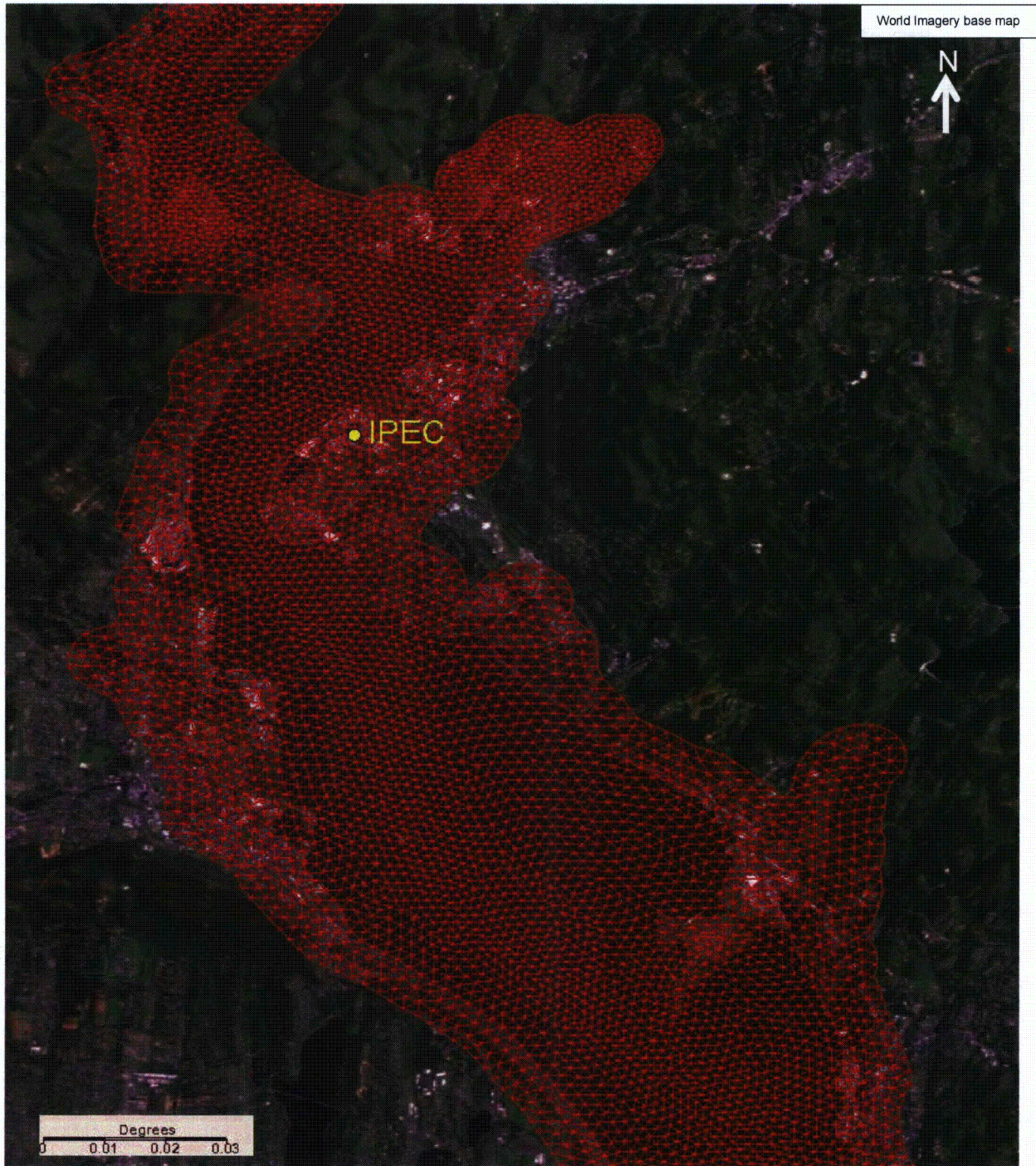


Figure 3.4-13: ADCIRC FEMA Region II Finite Element Mesh – IPEC Vicinity (AREVA, 2013d)

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

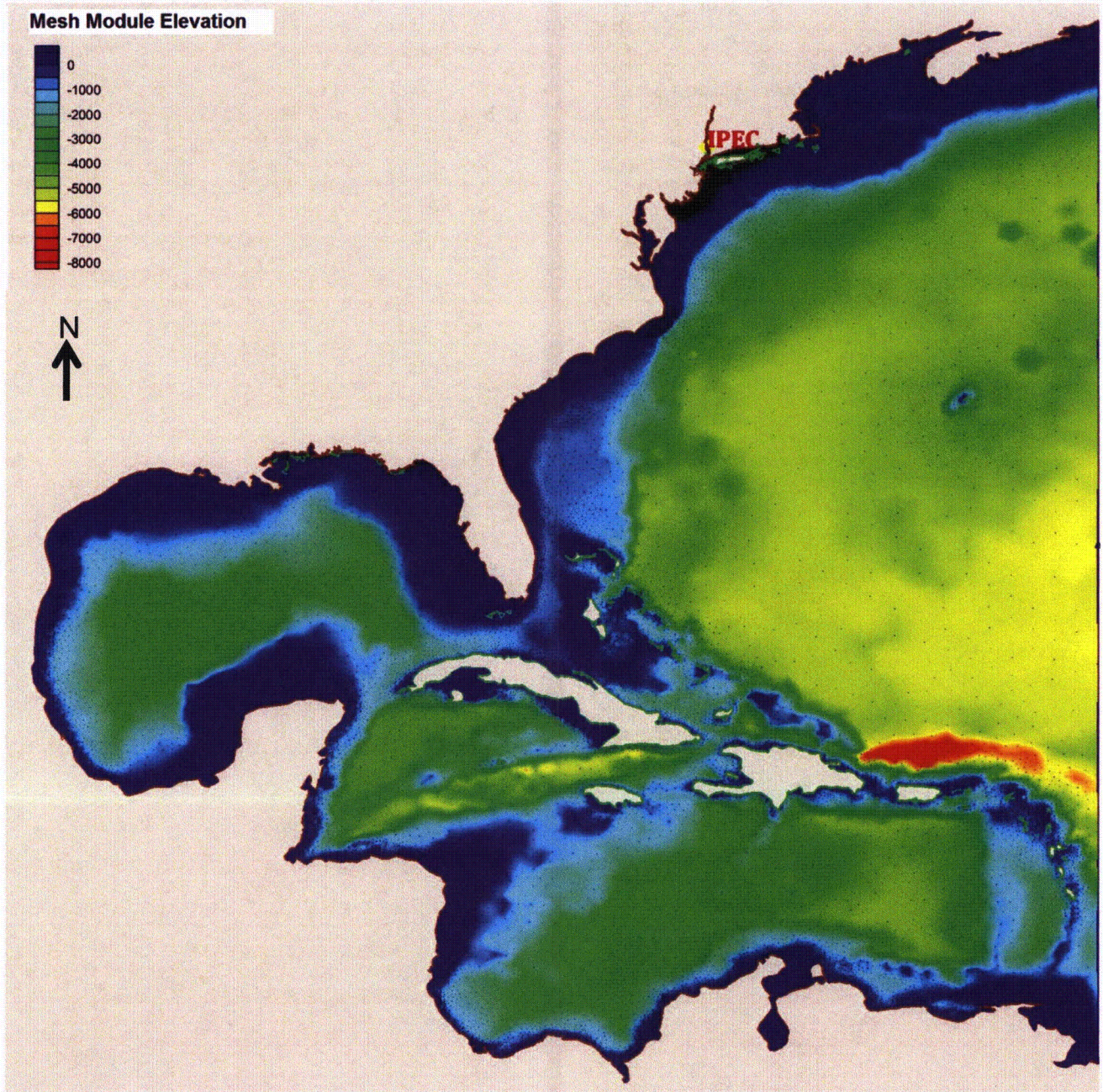


Figure 3.4-14: ADCIRC Module Mesh Elevation (m, NAVD88) – Northern Atlantic (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

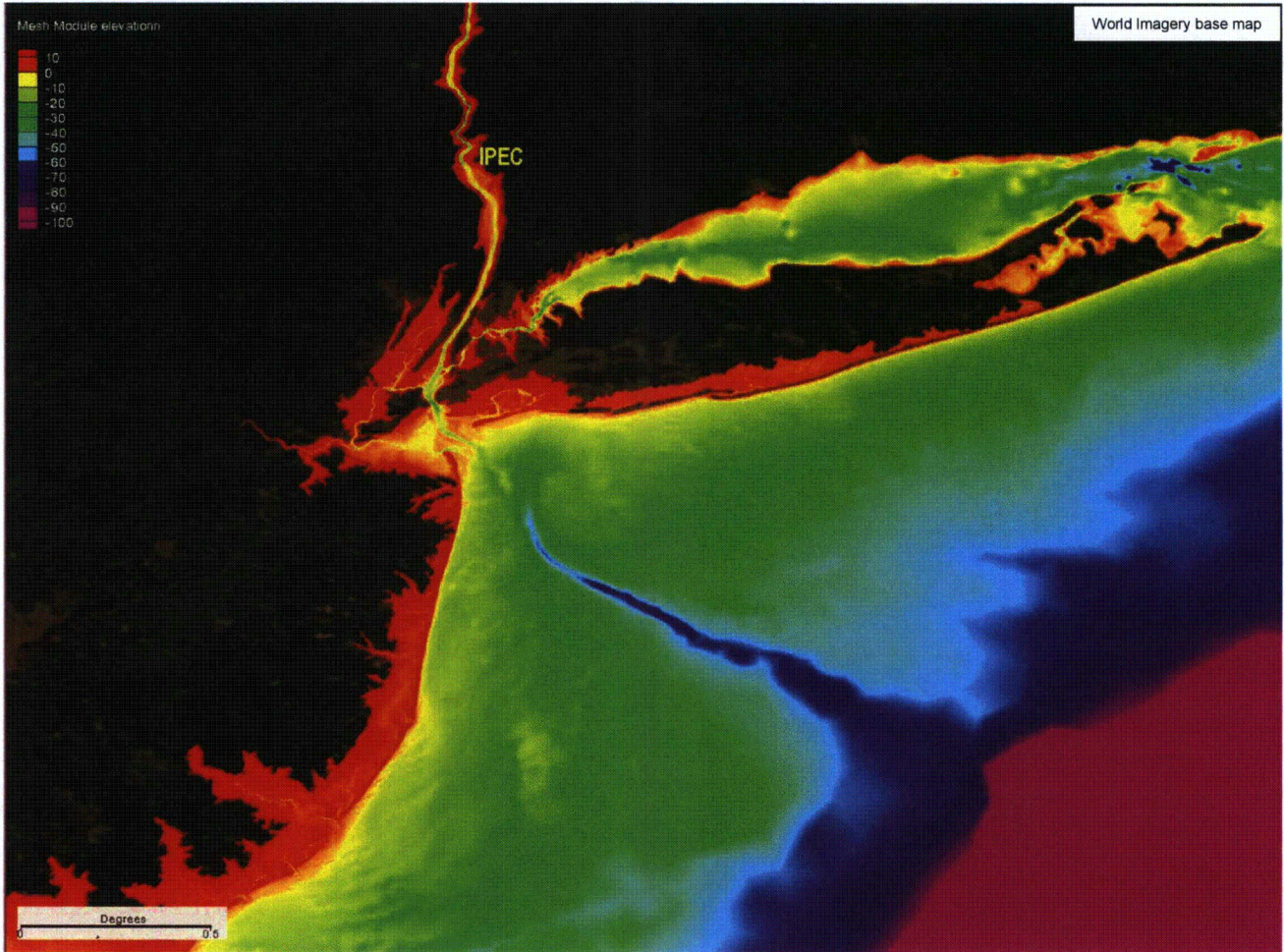


Figure 3.4-15: ADCIRC Mesh Model Elevation (m, NAVD88) – New Jersey / New York (AREVA, 2013e)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

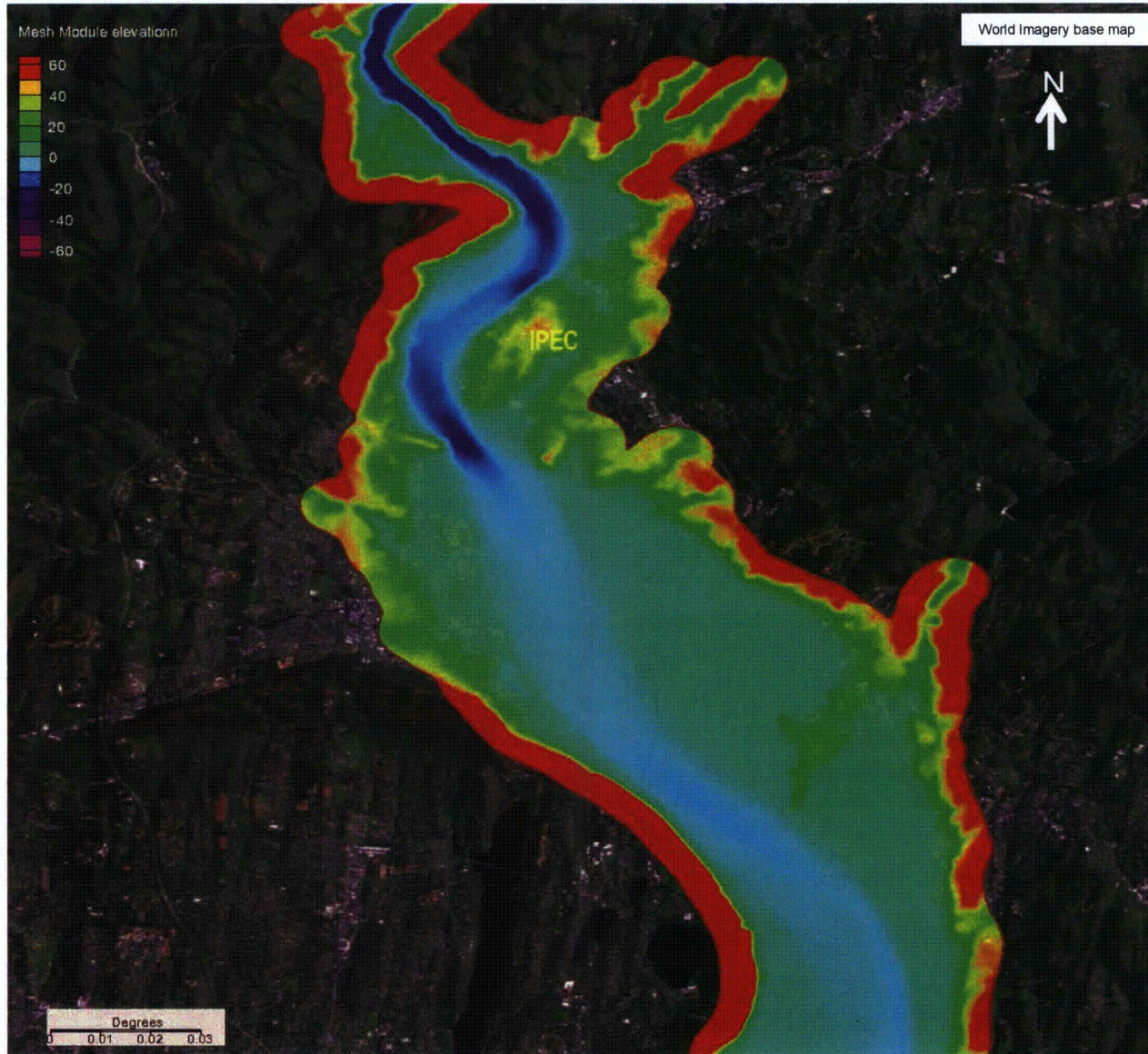


Figure 3.4-16: ADCIRC Mesh Model Elevation (m, NAVD88) – IPEC Vicinity (AREVA, 2013d)

Entropy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

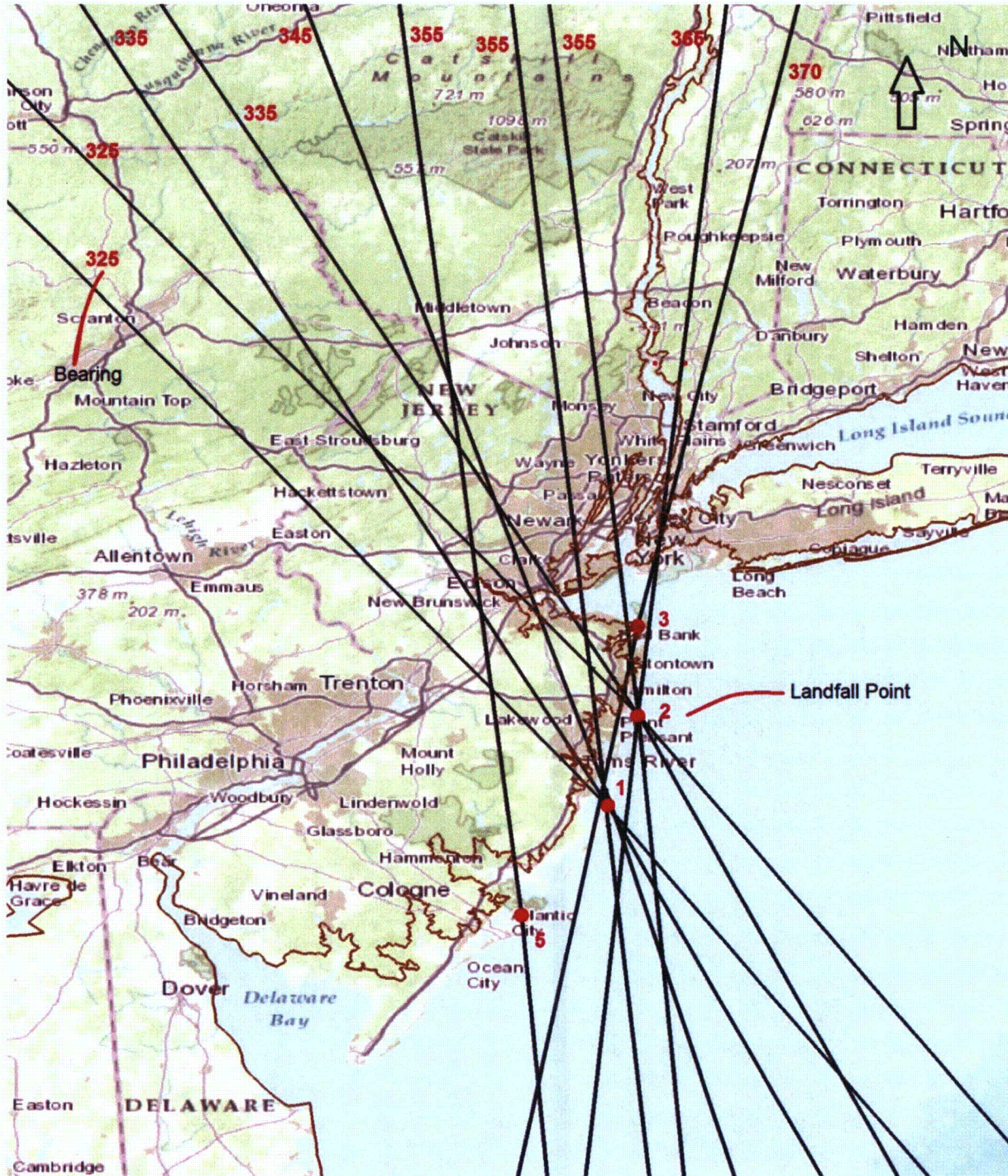


Figure 3.4-17: Track Directions and Landfall Locations for ADCIRC Simulations (AREVA, 2013d)

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

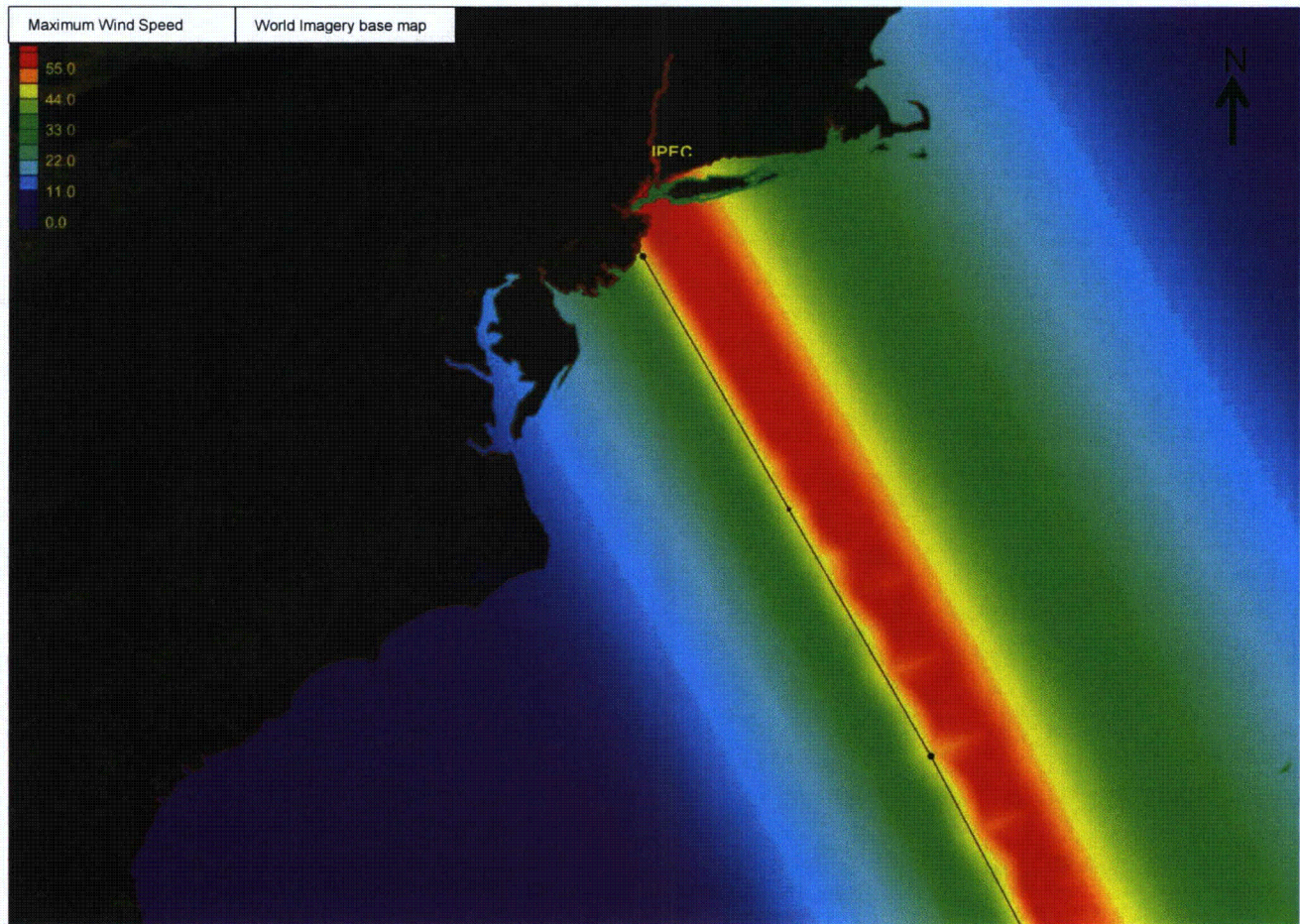


Figure 3.4-18: ADCIRC Envelope of Maximum Winds (m/s) of Storm No. 941 (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

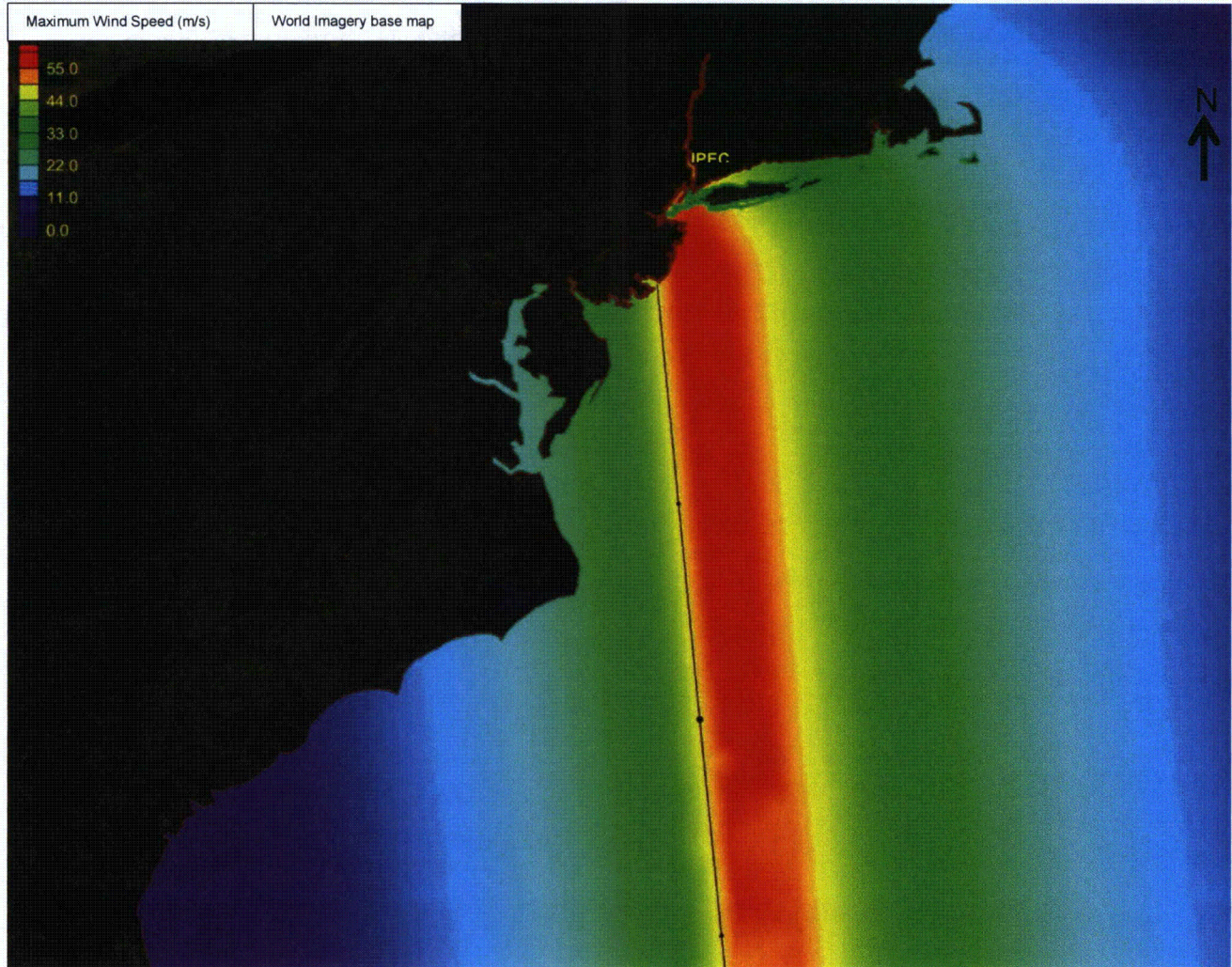


Figure 3.4-19: ADCIRC Envelope of Maximum Winds (m/s) of Storm No. 985* (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

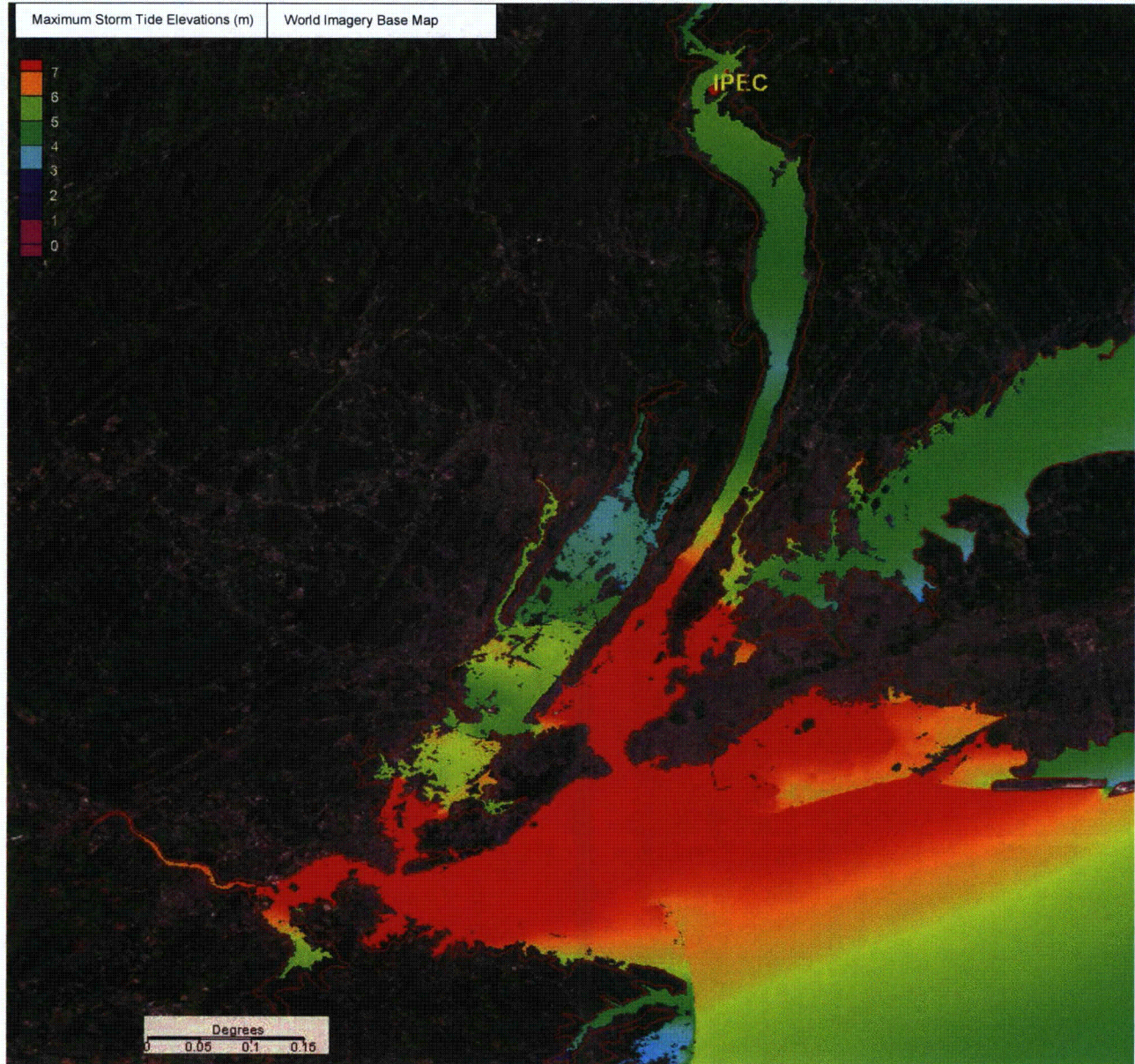


Figure 3.4-20: ADCIRC Maximum Storm Tide Stillwater Elevations (m, NAVD88) of Storm No. 941 (AREVA, 2013d)

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

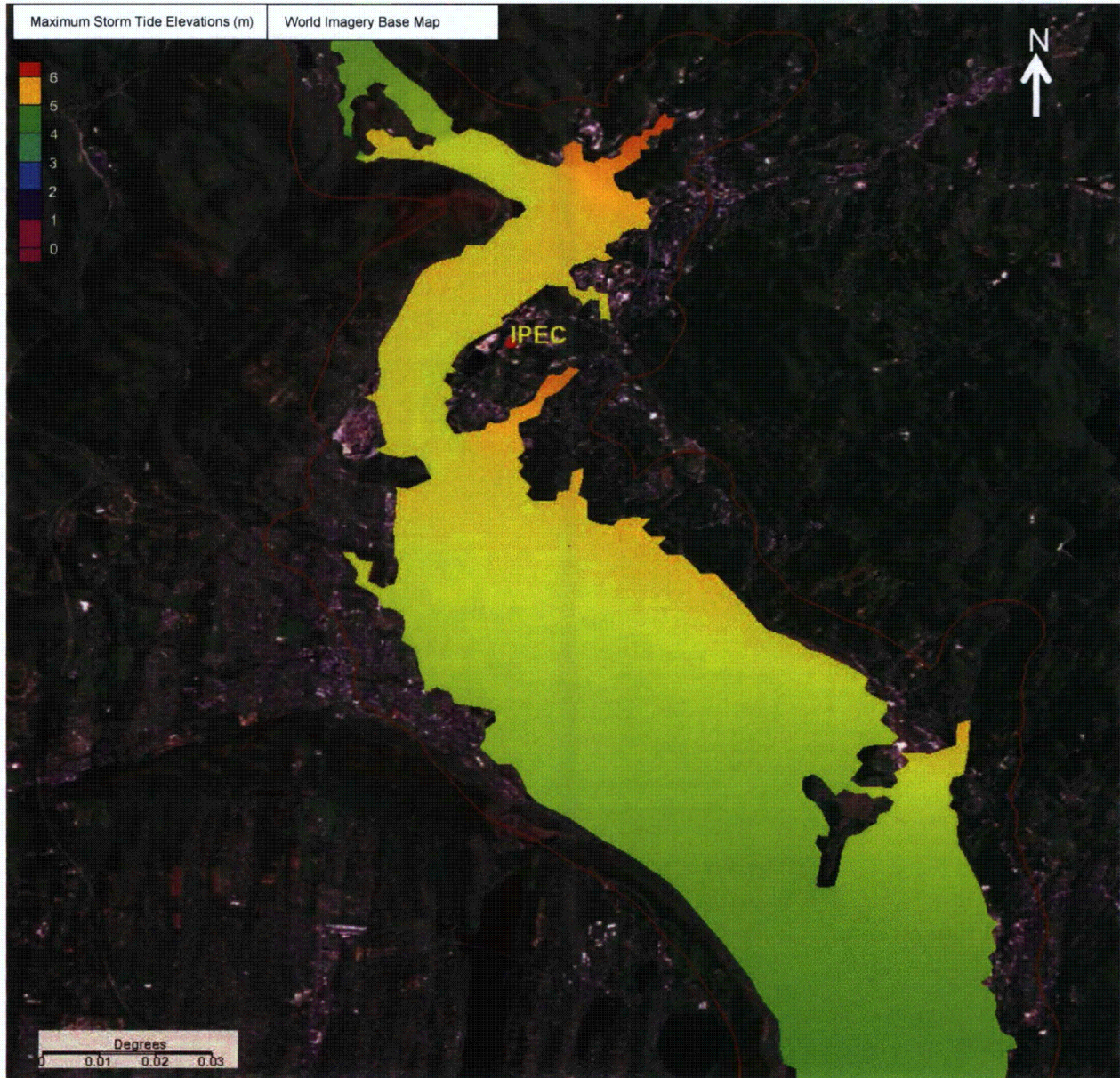


Figure 3.4-21: ADCIRC Maximum Storm Tide Stillwater Elevations (m, NAVD88) of Storm No. 941 – IPEC Vicinity (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

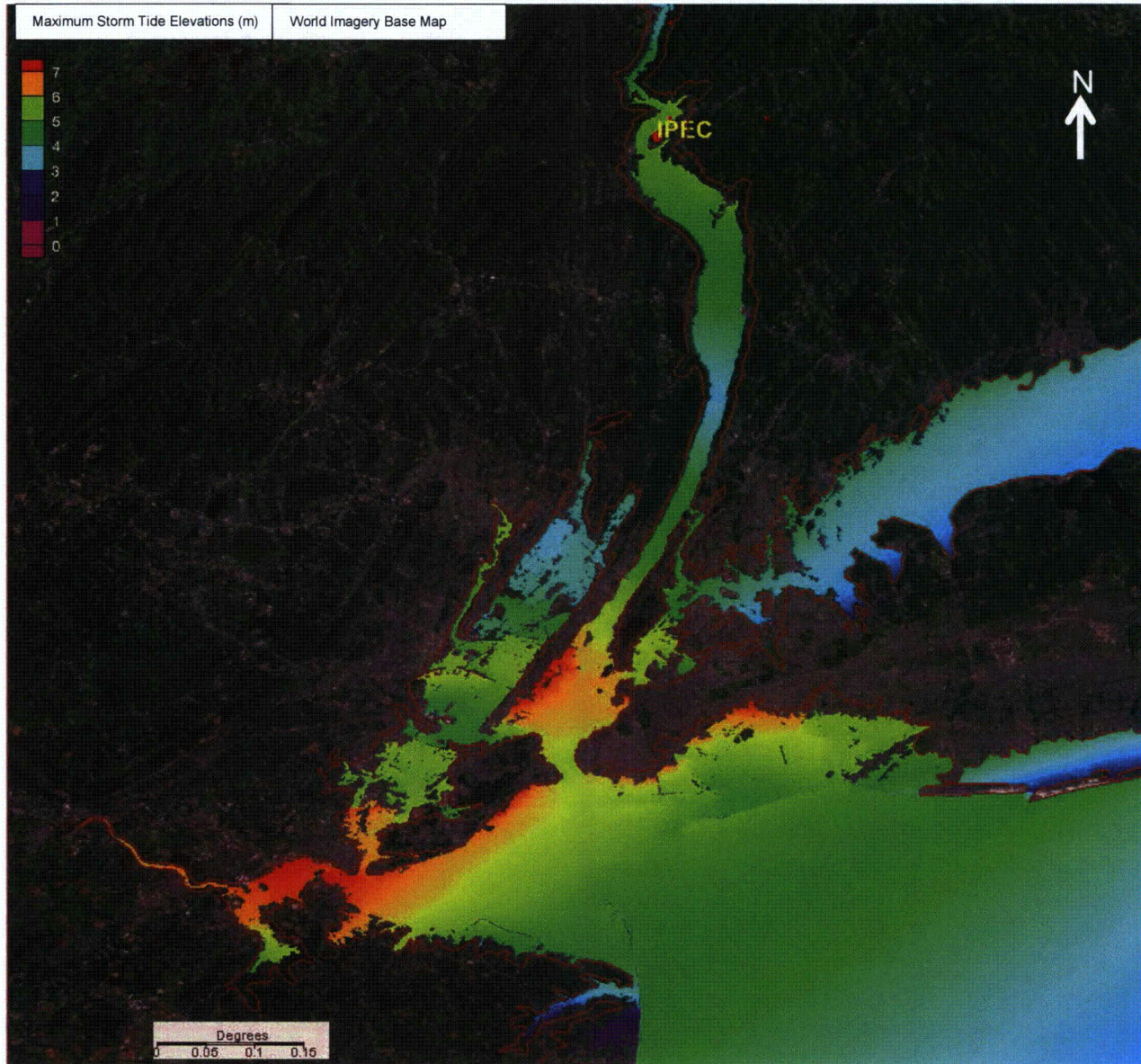


Figure 3.4-22: ADCIRC Maximum Storm Tide Stillwater Elevations (m, NAVD88) of Storm No. 985*(AREVA, 2013d)

Entergy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

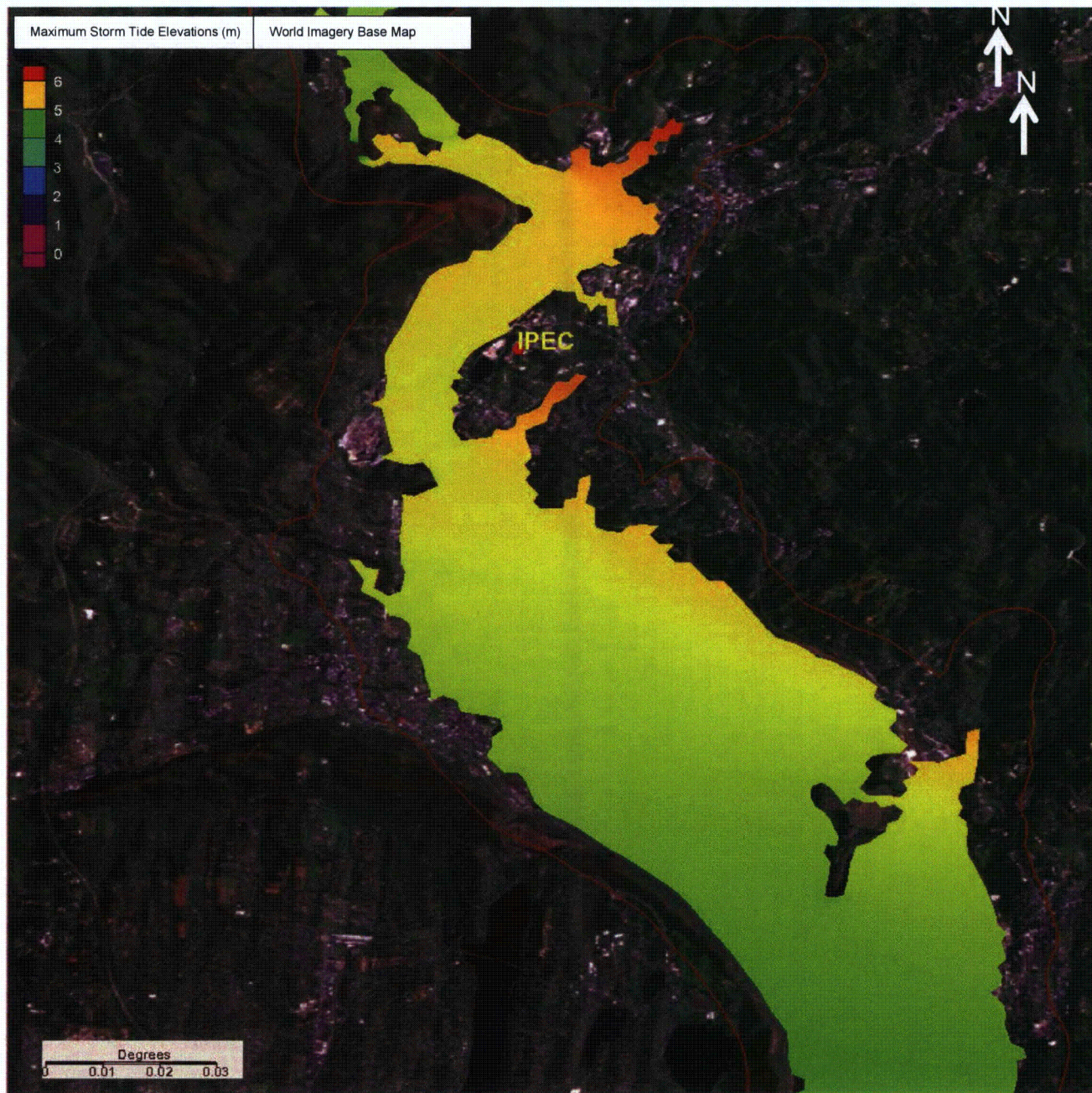


Figure 3.4-23: Maximum Storm Tide Stillwater Elevations (m, NAVD88) of Storm No. 985* - IPEC Vicinity (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

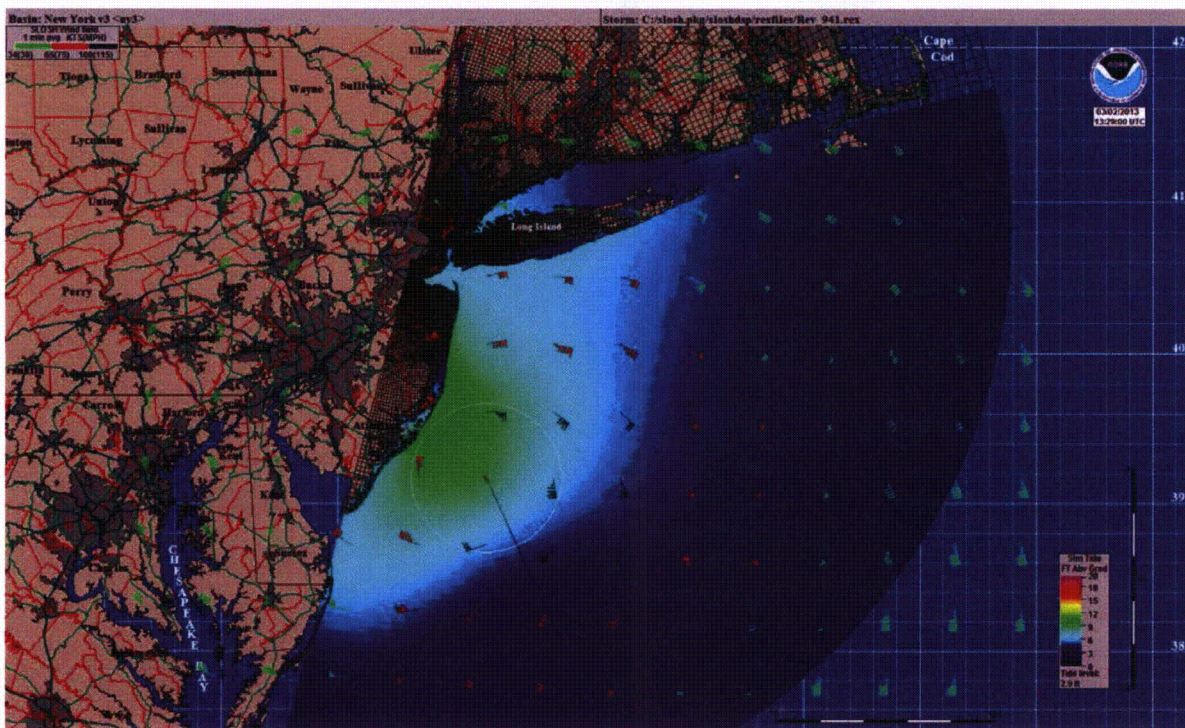
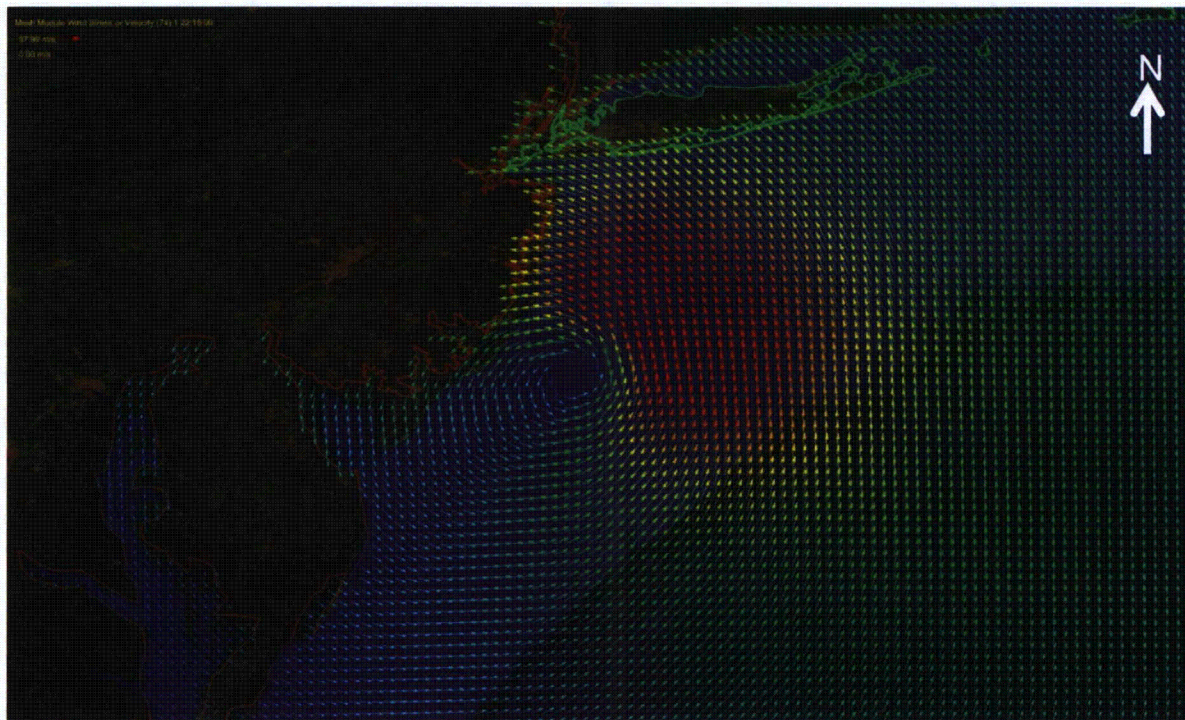


Figure 3.4-24: Comparison of Wind Field of ADCIRC and SLOSH Models – Storm No. 941 (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

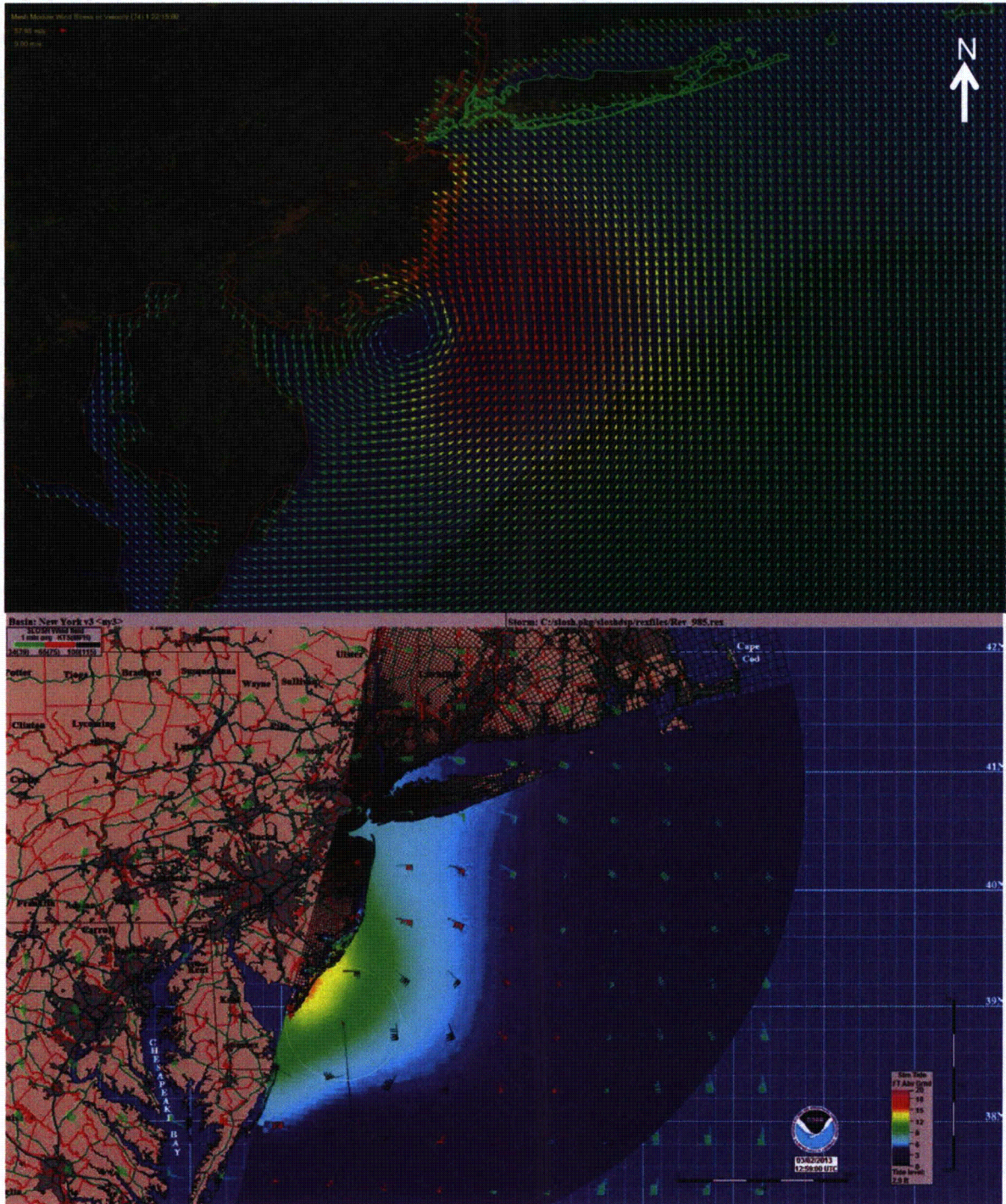


Figure 3.4-25: Comparison of Wind Field of ADCIRC and SLOSH Models – Storm No. 985* (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

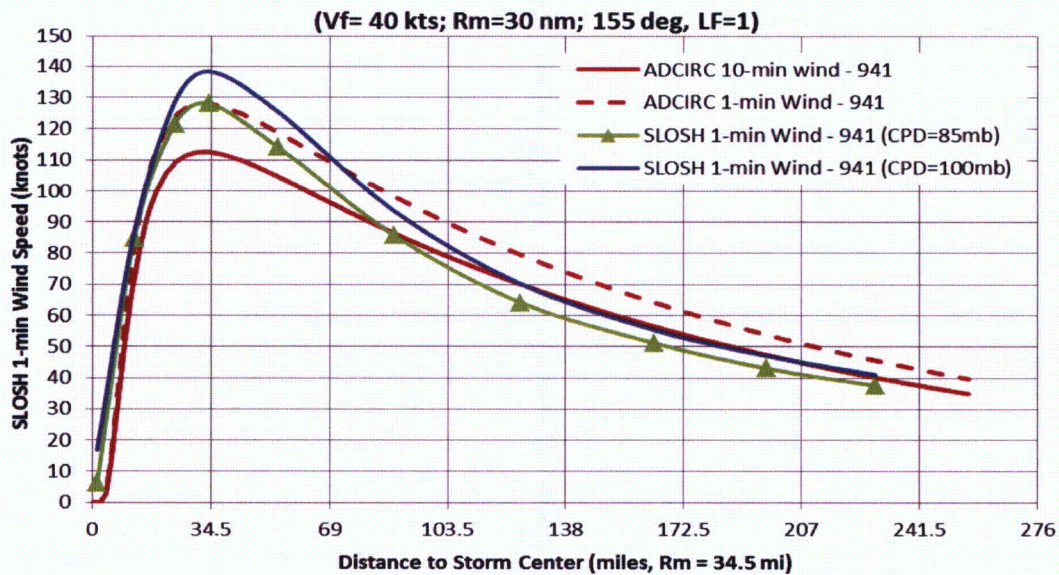
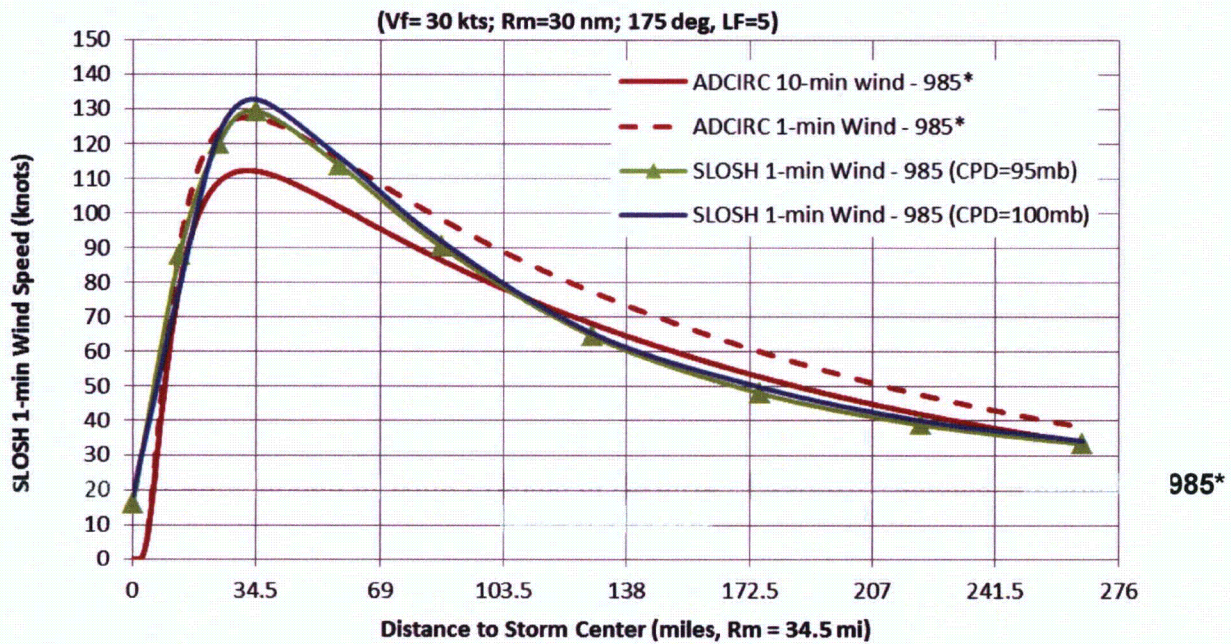


Figure 3.4-26: Comparison of Wind Profiles of ADCIRC and SLOSH Models – Storm No. 941



985*

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

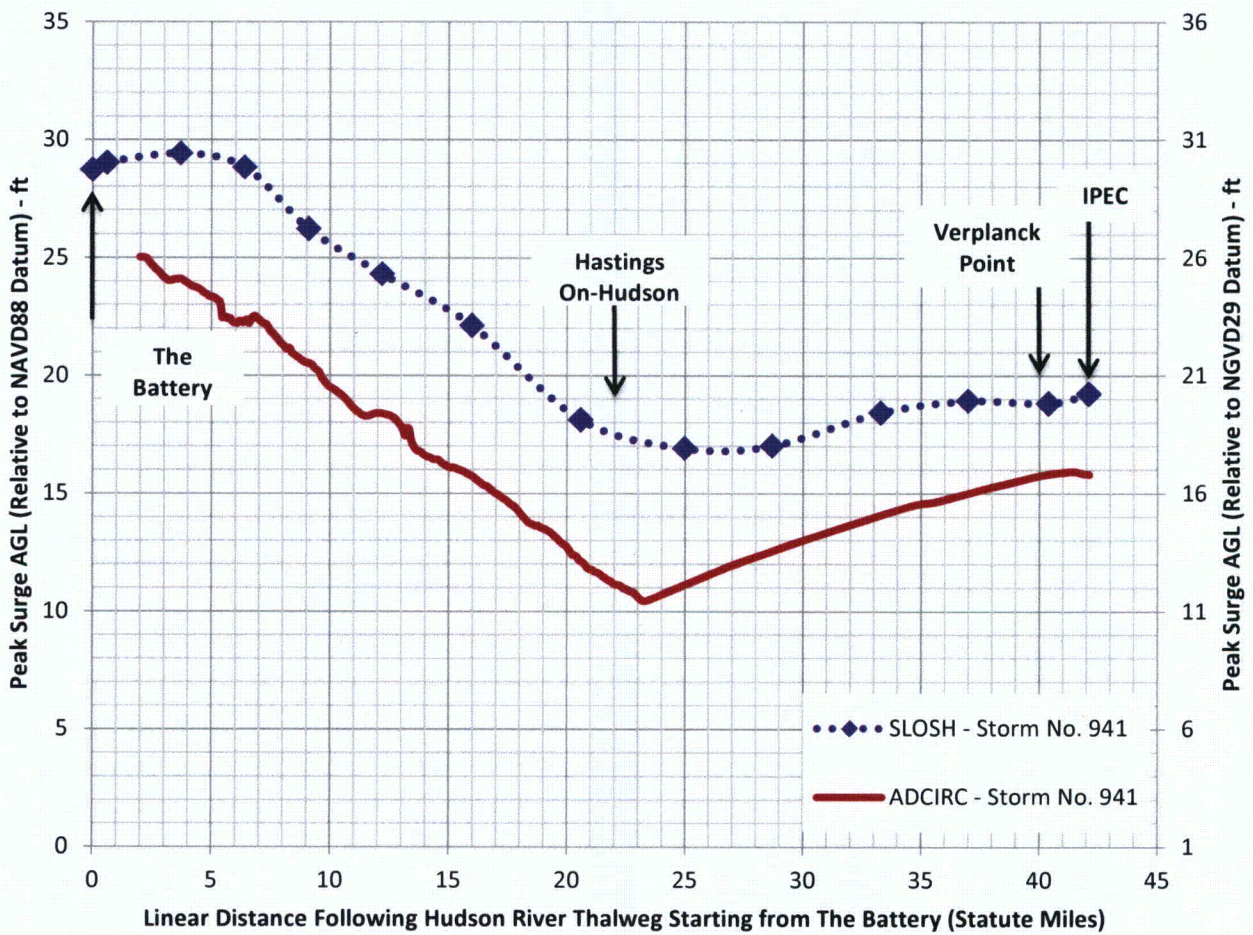


Figure 3.4-28: Comparison of Water Levels on Hudson River of ADCIRC and SLOSH Models – Storm 941 (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

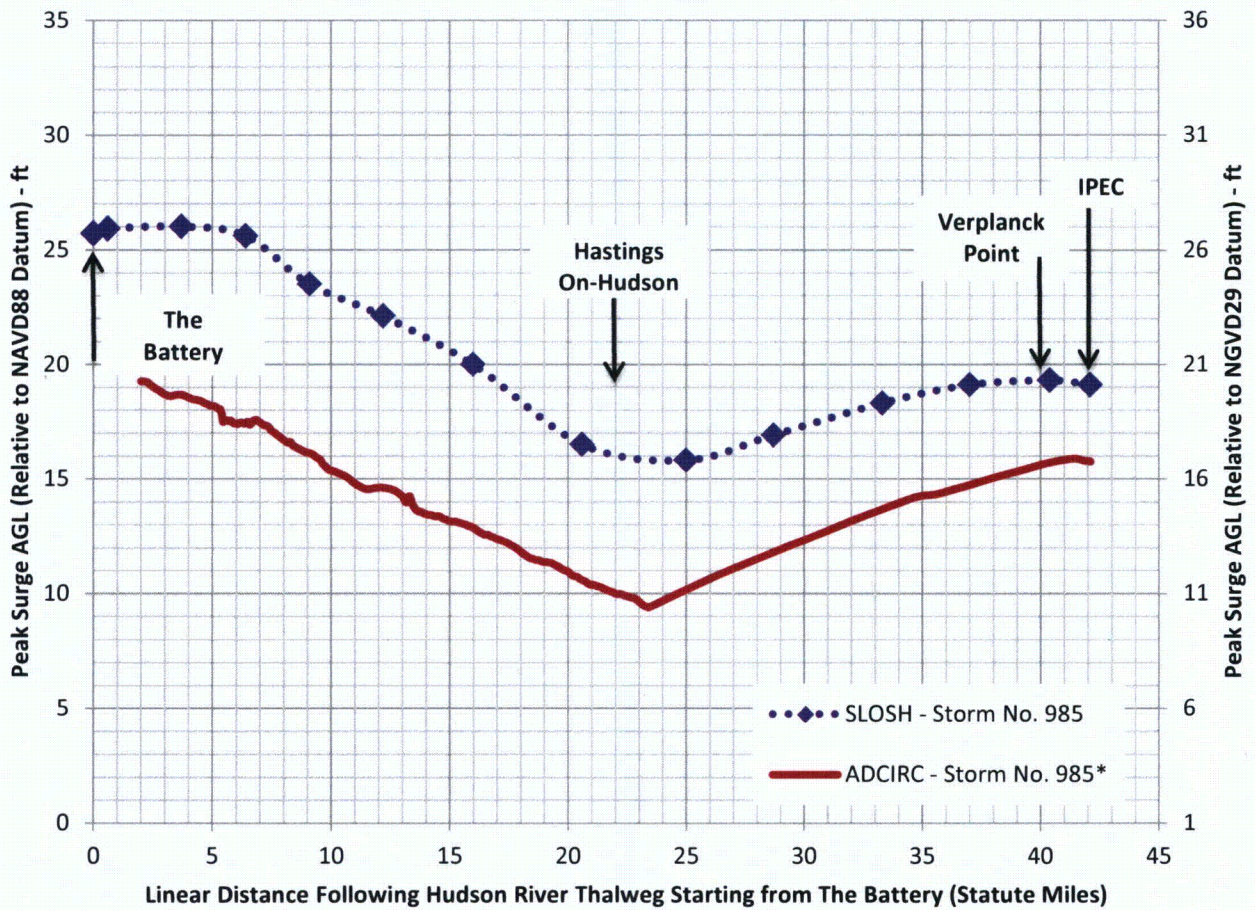
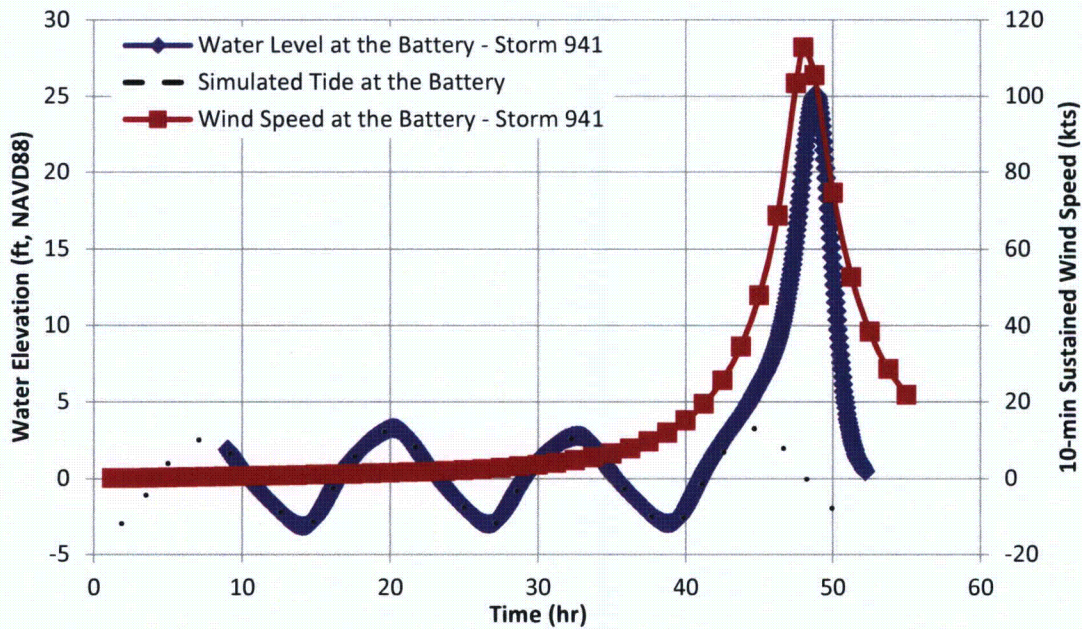
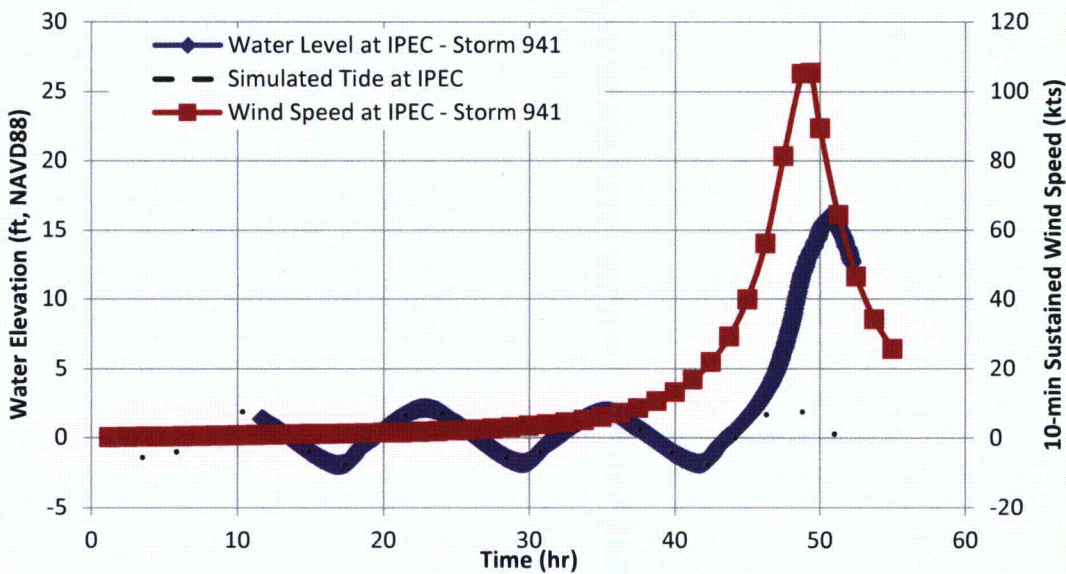


Figure 3.4-29: Comparison of Water Levels on Hudson River of ADCIRC and SLOSH Models – Storm 985* (AREVA, 2013d)

Energy Fleet Fukushima Program
Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



(a) The Battery

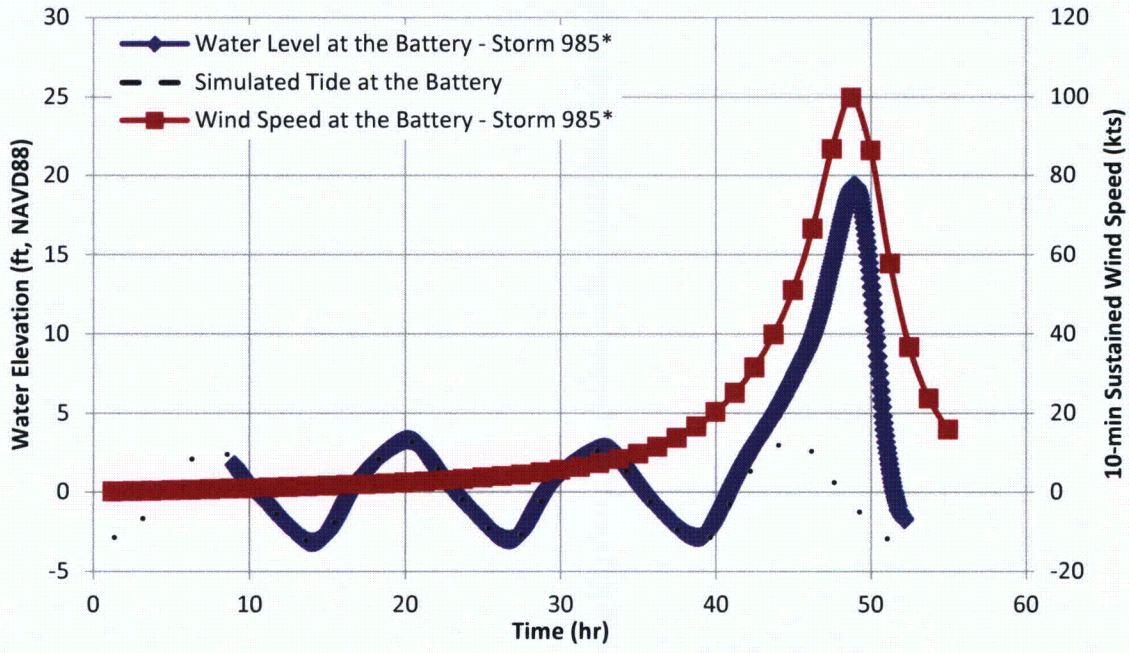


(b) IPEC

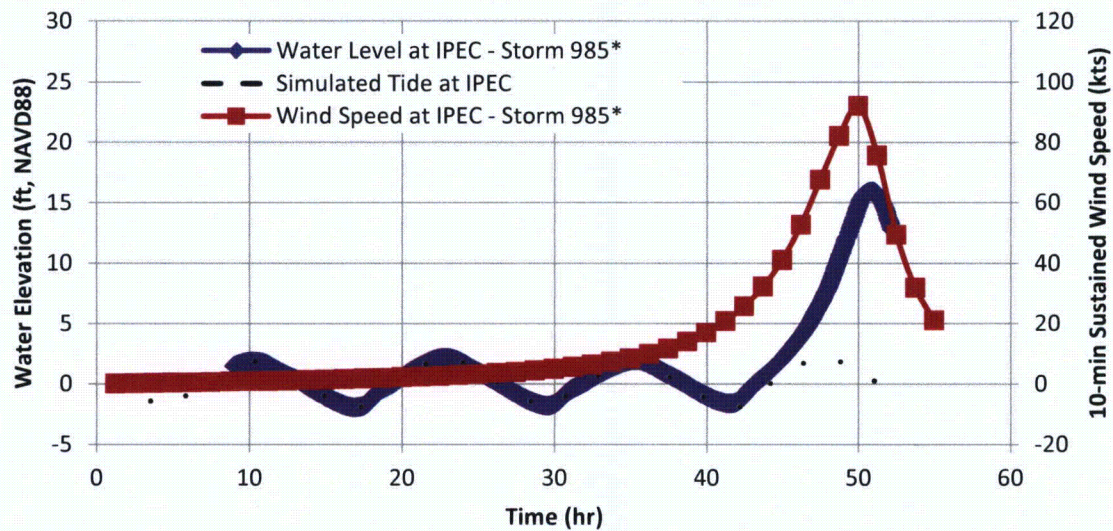
Figure 3.4-30: Time Series of Wind and Storm Tide Stillwater Elevation – Storm No. 941

Note: Hurricane (wind) decay after landfall not applied for Storm No. 941. (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



(a) The Battery



(b) IPEC

Figure 3.4-31: Time Series of Wind and Storm Tide Stillwater Elevation – Storm No. 985*

Note: Hurricane (wind) decay after landfall applied for Storm No. 985*. (AREVA, 2013d)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3



Figure 3.4-32: Example Storm Tracks (θ =-40 degree bearing) with Offset Calculation (Offset IDs Indicated) from Base Track (AREVA, 2013e)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

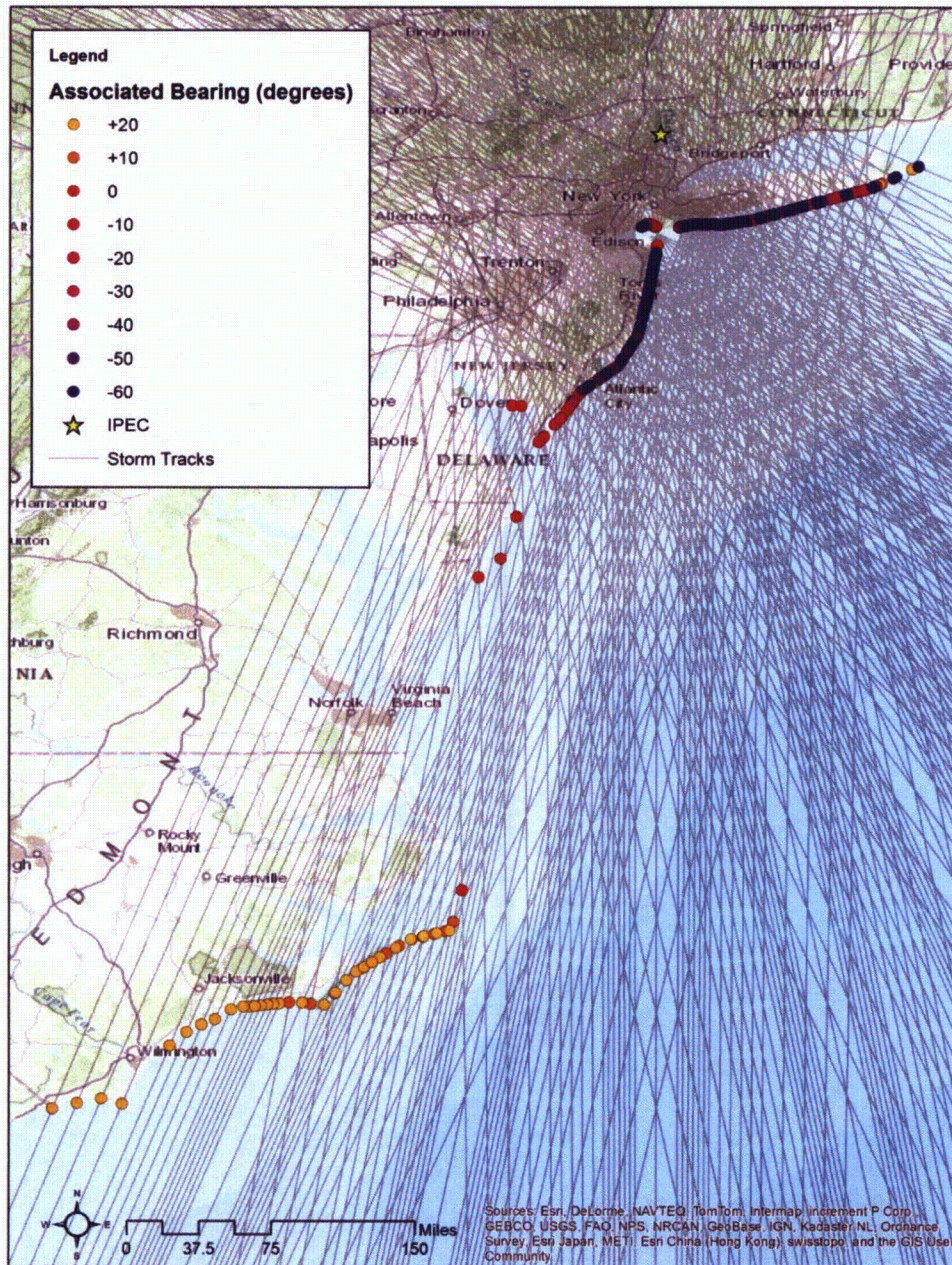


Figure 3.4-33: Landfall Points for the JPM Synthetic Storms Shown by Associated Storm Track Bearing (θ) in Degrees (AREVA, 2013e)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

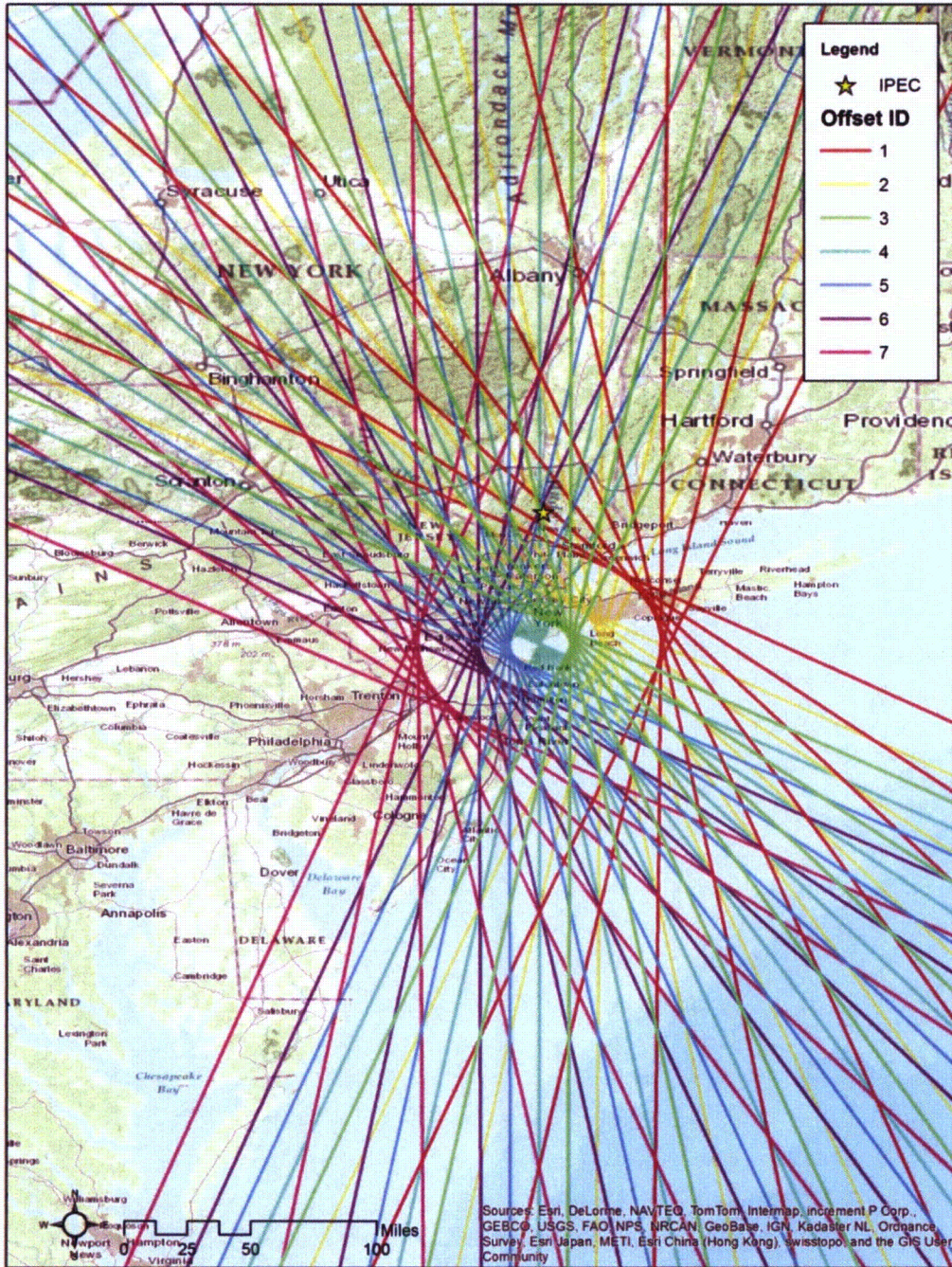


Figure 3.4-34: Storm Tracks ($R_{max} = 16$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)

Entropy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

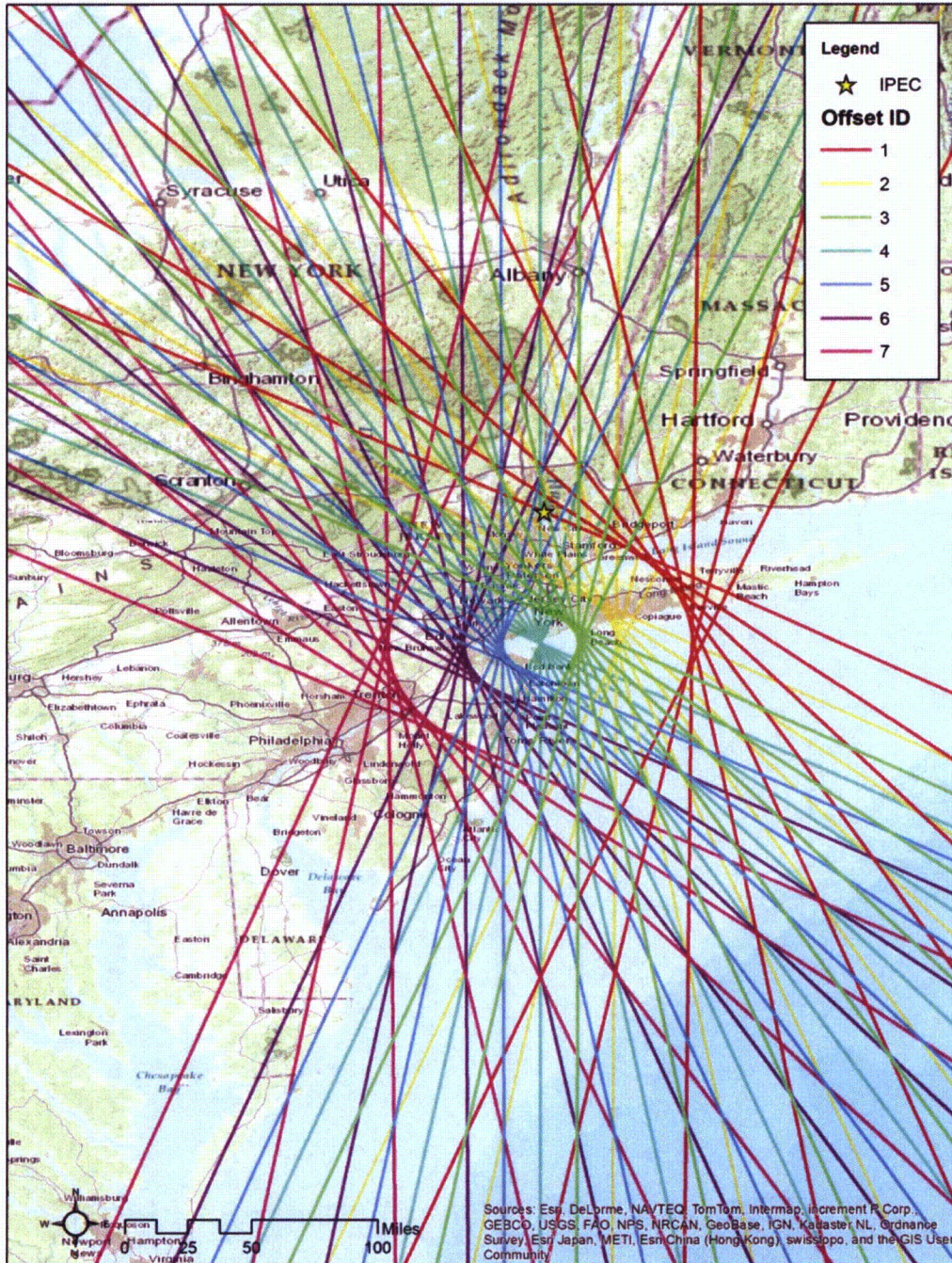


Figure 3.4-35: Storm Tracks ($R_{max} = 20$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)

Entergy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

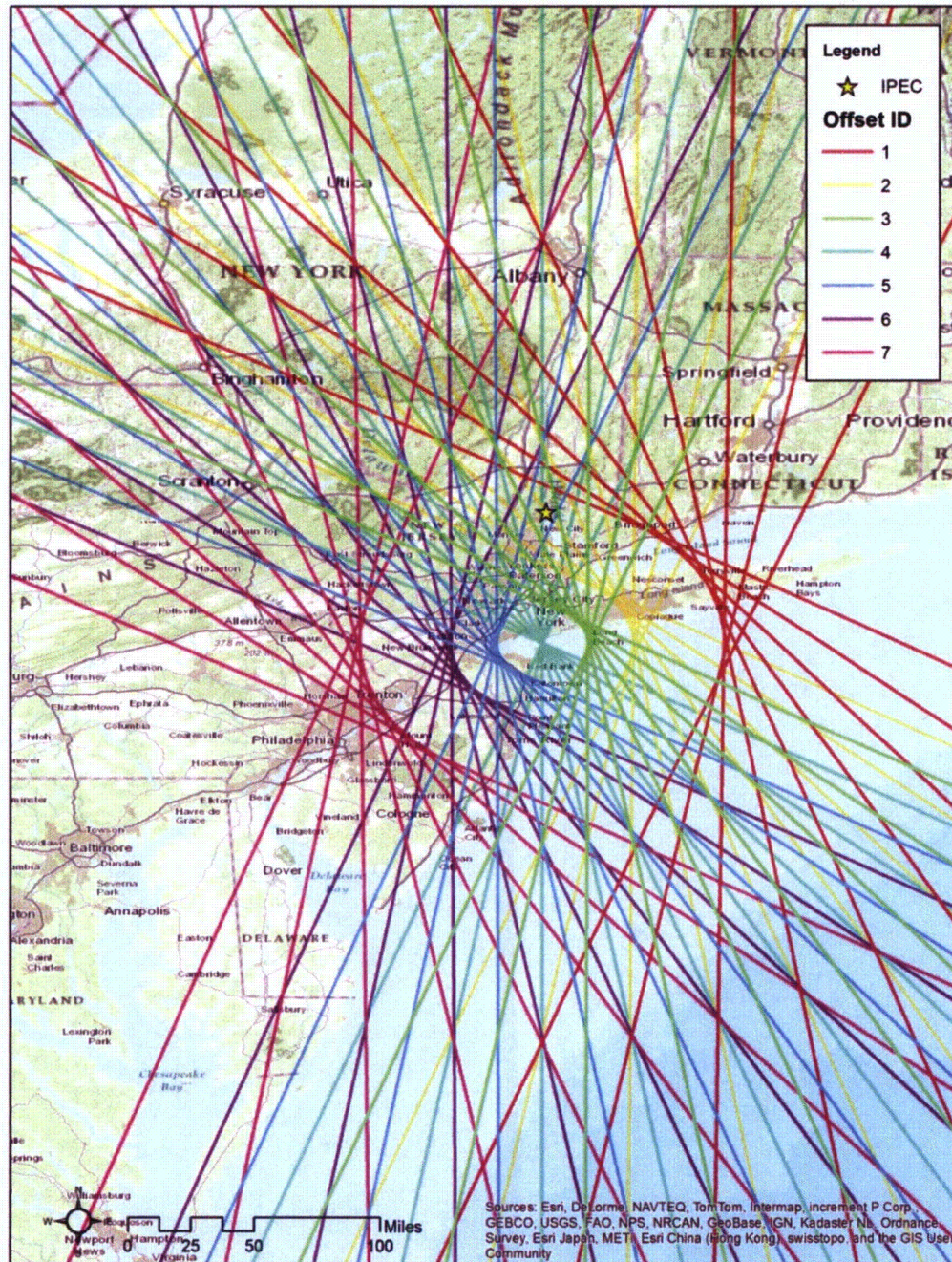


Figure 3.4-36: Storm Tracks ($R_{max} = 24$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

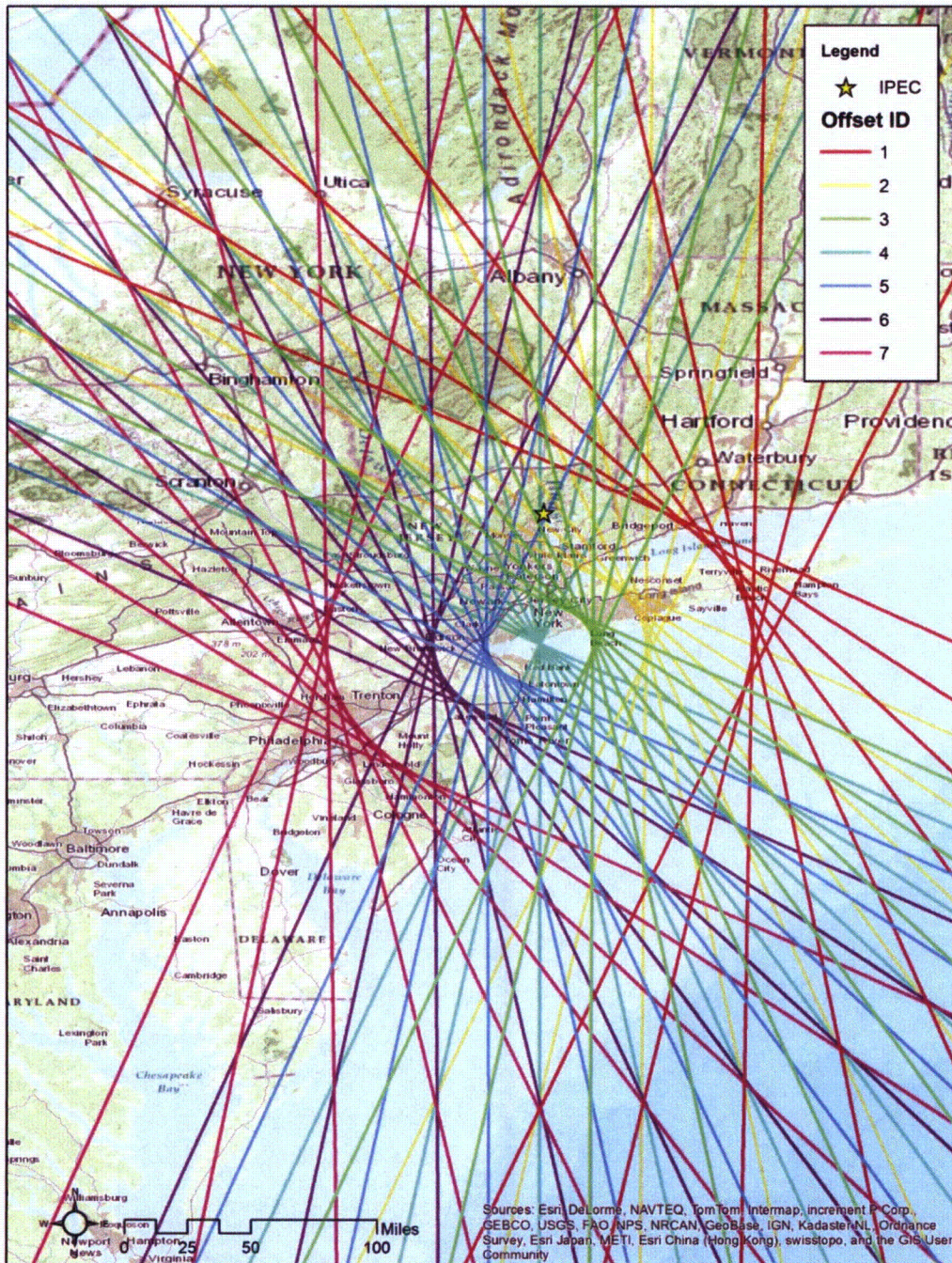


Figure 3.4-37: Storm Tracks ($R_{max} = 28$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

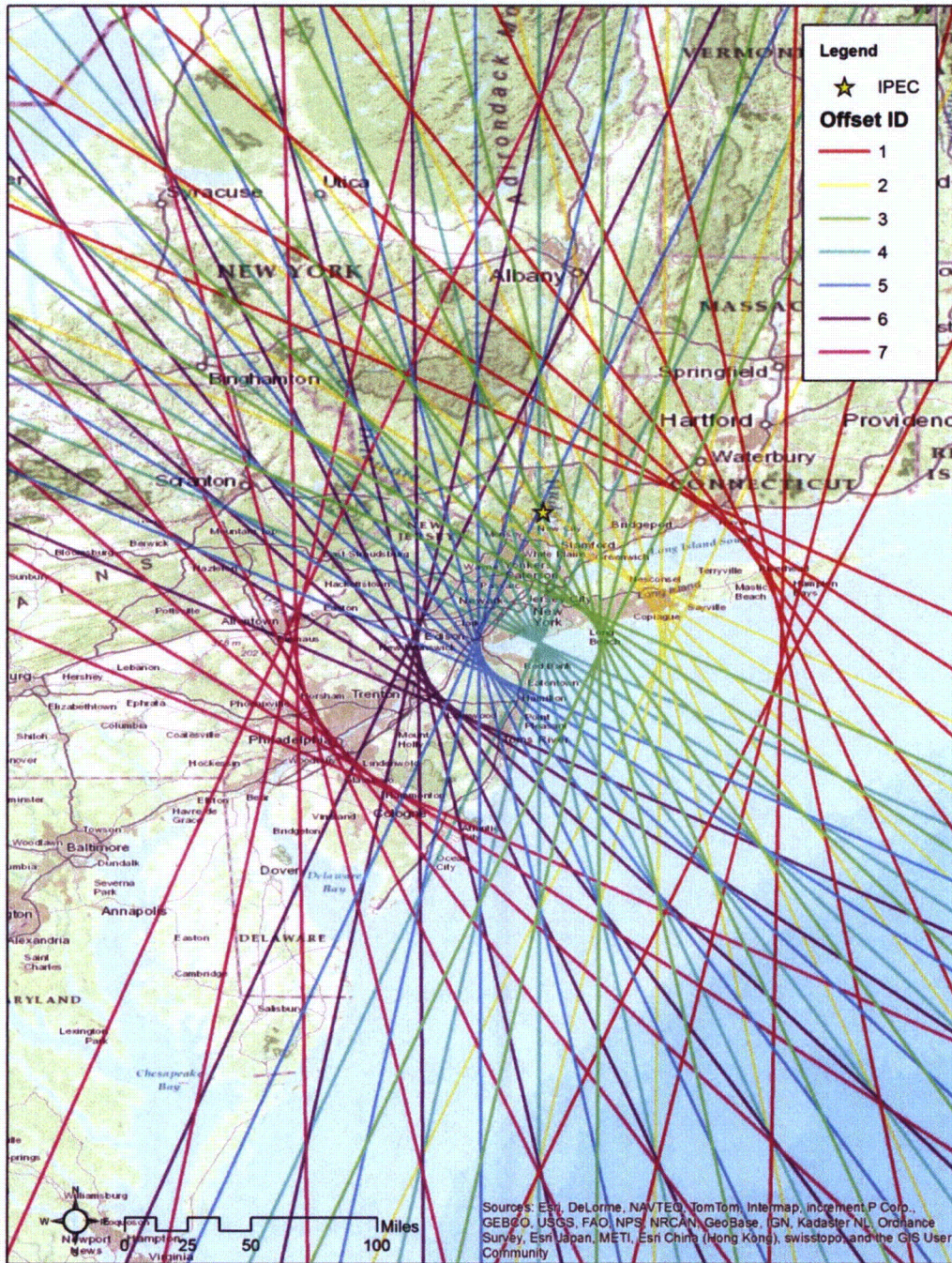


Figure 3.4-38: Storm Tracks ($R_{max} = 32$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)

Energy Fleet Fukushima Program
 Flood Hazard Reevaluation Report for Indian Point Energy Center (IPEC) Units 2 and 3

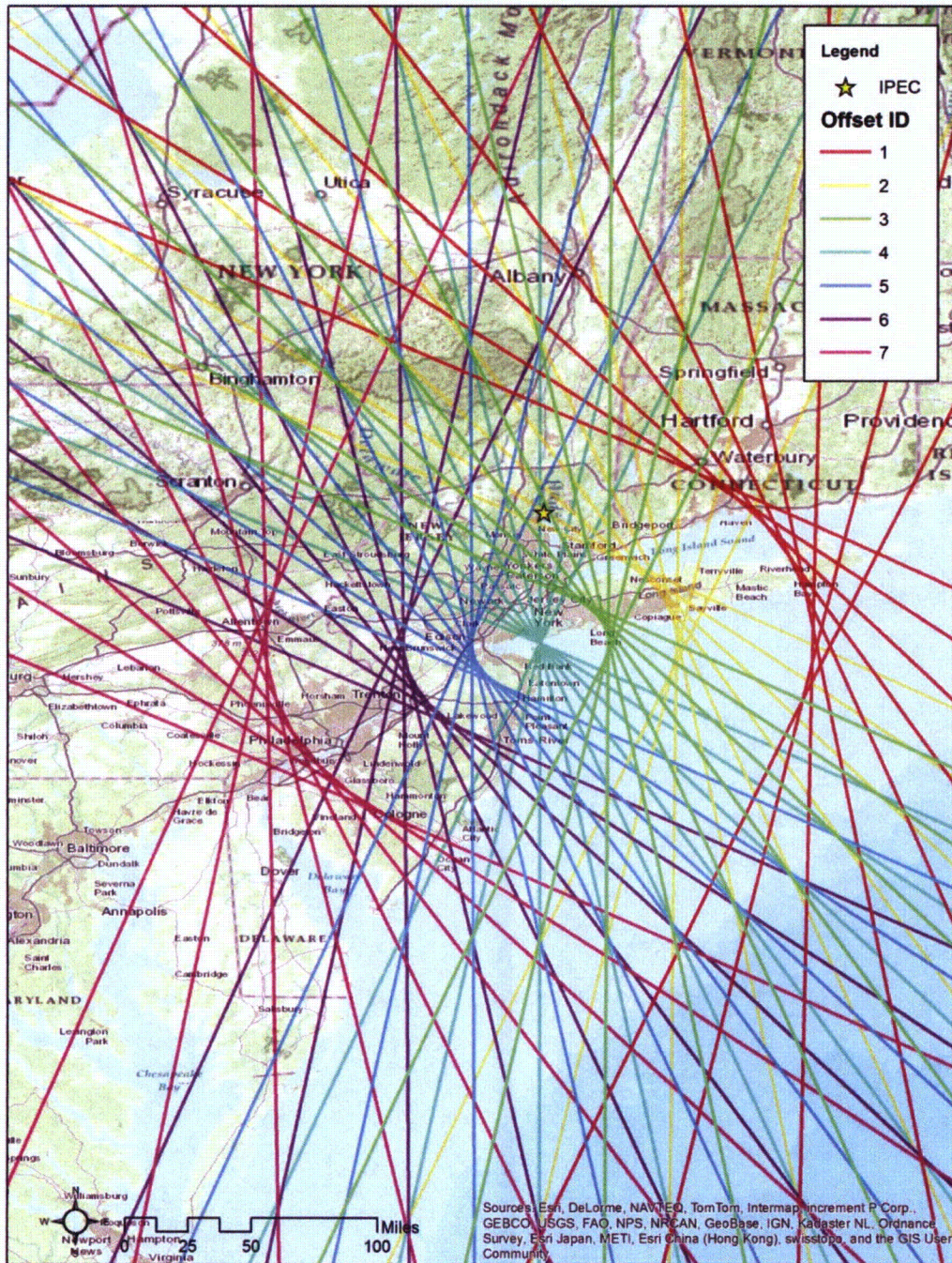


Figure 3.4-39: Storm Tracks ($R_{max} = 36$ nautical miles) for the JPM Synthetic Storms (AREVA, 2013e)