



UFSAR Revision 30.0

 <p>An AEP Company</p>	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 16.1 Table: 2.1-1 Page: 1 of 1
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POPULATION TRENDS OF THE COUNTIES SURROUNDING THE DONALD C. COOK NUCLEAR PLANT SITE

County	State	1940	1950	1960	1970	1975	1985	1990	2000	2037
Allegan	Michigan	41,839	47,493	57,279	66,575	70,264	70,900	90,509	101,300	123,047
Berrien	Michigan	89,117	115,702	149,865	163,875	165,294	179,900	161,378	172,771	187,556
Cass	Michigan	22,810	28,185	39,932	43,312	42,388	46,700	49,477	54,300	56,520
Kalamazoo	Michigan	100,085	126,707	169,712	201,550	209,678	235,400	223,411	219,700	247,643
Ottowa	Michigan	59,660	73,751	98,719	128,181	139,947	172,600	187,768	204,000	275,055
St. Joseph	Michigan	31,749	35,071	42,332	47,392	50,388	55,100	58,913	68,900	73,235
Van Buren	Michigan	35,111	39,194	48,395	56,173	62,643	75,900	70,060	81,300	87,380
Elkhart	Indiana	72,634	84,512	106,790	126,529	136,900	161,800	156,200	169,600	186,600
Fulton	Indiana	15,577	16,565	16,957	16,984	17,900	19,700	18,800	19,000	19,900
Jasper	Indiana	14,397	17,031	18,842	20,429	23,000	28,000	25,000	25,700	27,300
Kosciusko	Indiana	29,561	33,002	40,373	48,127	52,800	53,700	65,300	70,300	80,900
Lagrange	Indiana	14,352	15,347	17,380	20,890	23,200	29,000	29,500	33,800	48,600
Lake	Indiana	293,195	368,152	513,269	546,253	550,100	569,900	475,600	470,400	490,600
Laporte	Indiana	63,600	76,808	95,111	105,343	105,900	111,000	107,100	108,200	110,400
Marshall	Indiana	25,935	29,468	32,443	34,896	38,500	45,600	42,200	44,300	48,800
Noble	Indiana	22,776	25,075	28,162	31,382	33,100	37,700	37,900	40,200	45,200
Porter	Indiana	27,936	40,076	60,279	87,114	95,800	122,900	128,900	133,000	127,100
Pulaski	Indiana	12,056	12,493	12,837	12,534	12,900	13,600	12,600	12,700	14,500
St. Joseph	Indiana	161,823	205,058	238,614	245,045	241,900	240,500	247,100	254,500	256,900
Starke	Indiana	12,258	15,282	17,911	19,280	21,000	24,100	22,700	23,400	24,800
Cook	Illinois	4,063,342	4,508,792	5,129,725	5,492,369	5,371,897	5,418,100	5,105,067	5,276,875	5,338,749

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POPULATION TRENDS OF CITIES AND TOWNSHIPS IN BERRIEN COUNTY, MICHIGAN

City or Township	1940	1950	1960	1970	1975	1980	1990	2000	2037
Benton Harbor City	16,668	18,769	19,136	16,481	15,668	14,707	12,818	13,000	13,185
Buchanan City	4,056	5,224	5,341	4,645	4,722	5,142	4,992	5,152	5,350
Niles City	11,328	13,145	13,842	12,988	13,277	13,115	12,456	13,144	13,957
St. Joseph City	8,863	10,223	11,755	11,042	11,001	9,622	9,214	9,300	9,387
Bainbridge	2,046	2,194	2,503	2,784	2,764	2,879	2,865	2,889	2,931
Baroda	1,433	1,558	1,877	2,167	2,473	2,666	2,731	2,670	2,626
Benton	8,105	16,732	23,658	22,714	23,139	19,120	17,163	20,500	21,606
Berrien	2,122	2,542	3,183	3,905	4,098	4,302	4,697	4,800	4,998
Bertrand	1,072	1,342	1,969	2,259	2,235	2,369	2,228	2,373	2,542
Bridgman City ¹	na	na	na	na	na	2,235	2,140	2,244	2,368
Buchanan	1,237	1,655	2,410	3,182	3,406	3,571	3,402	3,584	3,799
Chickaming	1,711	2,318	3,476	4,051	4,086	4,302	3,717	3,800	3,885
Coloma	2,301	3,308	5,413	6,190	6,089	5,345	5,123	5,361	5,644
Coloma City ⁽¹⁾	na	na	na	na	na	1,833	1,679	1,837	2,021
Galien	1,190	1,380	1,685	1,671	1,692	1,786	1,591	1,787	2,018
Hagar	1,429	2,451	3,562	4,088	4,087	4,943	4,113	4,954	6,003
Lake	1,928	2,409	3,470	3,767	3,711	2,212	2,487	2,500	2,513
Lincoln	1,949	2,588	4,462	11,007	11,408	13,520	13,604	14,000	14,408
New Buffalo	2,175	2,879	4,196	5,367	5,358	2,878	2,419	2,500	2,795

¹ New entity since 1980.

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POPULATION TRENDS OF CITIES AND TOWNSHIPS IN BERRIEN COUNTY, MICHIGAN

City or Township	1940	1950	1960	1970	1975	1980	1990	2000	2037
New Buffalo City ⁽¹⁾	na	na	na	na	na	2,821	2,317	2,829	3,476
Niles	3,000	5,732	11,934	13,414	13,021	13,165	12,828	13,194	13,653
Oronoko	3,443	4,737	6,397	8,482	8,865	10,761	9,819	10,790	11,927
Pipestone	1,696	1,911	2,174	2,422	2,532	2,364	2,303	2,389	2,495
Royalton	1,188	1,414	1,744	2,513	2,508	3,046	3,135	4,100	6,900
St. Joseph	2,374	1,677	3,674	6,591	6,675	9,961	9,613	10,000	12,587
Sodus	1,626	2,092	2,575	2,504	2,507	2,260	2,065	2,700	3,476
Three Oaks	2,135	2,469	2,856	2,894	3,030	3,045	2,952	3,048	3,168
Watervliet	2,279	3,042	4,344	4,474	4,507	3,275	2,926	3,286	3,713
Watervliet City ⁽¹⁾	na	na	na	na	na	1,867	1,867	1,876	1,897
Weesaw	1,663	1,911	2,229	2,338	2,329	2,164	2,114	2,164	2,230
Total	89,017	115,702	149,865	163,940	165,188	171,276	161,378	172,771	187,556


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POPULATION CENTERS OF 25,000 OR MORE WITHIN 60 MILES OF THE DONALD C. COOK NUCLEAR PLANT SITE

City	Distance (mi)	Direction	1975 Population
Benton Harbor - St. Joseph, Michigan	11	NNE	26,925
Michigan City, Indiana	26	SW	38,937
South Bend, Indiana	26	SE	105,511
Mishawaka, Indiana	29	SE	37,133
Elkhart, Indiana	38	ESE	43,152
Gary, Indiana	48	WSW	171,282
Merrillville, Indiana	48	SW	27,174
Highland, Indiana	53	WSW	26,922
Portage, Michigan	54	ENE	39,067
East Chicago, Illinois	55	WSW	43,012
Hammond, Indiana	55	WSW	105,319
Calumet City, Illinois	56	WSW	39,591
Kalamazoo, Michigan	56	ENE	73,644
Lansing, Illinois	56	WSW	30,707
Chicago, Illinois	58	W	3,150,00
Evanston, Illinois	58	W	73,658
Wilmette, Illinois	59	W	32,545
Dolton, Illinois	59	WSW	26,390
Holland, Illinois	60	NNE	28,097
Skokie, Illinois	60	W	70,162


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POPULATION DISTRIBUTION (1975)

Direction	10-20 Miles	20-30 Miles	30-40 Miles	40-50 Miles	50-60 Miles	Total
N	0	0	0	0	0	0
NNE	16,425	2,777	13,609	6,462	18,131	57,404
NE	23,866	15,757	10,706	7,356	25,190	82,875
ENE	4,095	5,714	15,752	16,195	169,798	211,554
E	8,153	15,420	6,455	17,092	15,140	62,260
ESE	21,526	11,231	58,577	26,314	13,166	130,814
SE	20,384	176,762	35,853	36,094	15,297	284,390
SSE	5,214	22,132	14,974	21,597	11,718	75,635
S	5,217	7,480	9,844	12,641	12,472	47,654
SSW	6,231	32,134	11,242	9,531	8,475	67,613
SW	3,147	60,820	29,324	195,258	90,764	379,313
WSW	0	0	0	62,630	1,810,927	1,873,557
W	0	0	0	0	1,357,309	1,357,309
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
TOTAL	114,258	350,227	206,336	411,170	3,548,387	4,630,378

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POPULATION DISTRIBUTION (1990)

Direction	0-1 Miles	1-2 Miles	2-3 Miles	3-4 Miles	4-5 Miles	Total
N	3	0	0	0	0	3
NNE	15	11	58	441	977	1,502
NE	12	25	333	1,975	2,460	4,805
ENE	9	111	181	259	348	908
E	0	88	122	163	186	908
ESE	0	75	160	452	903	1,590
SE	3	107	259	161	199	729
SSE	5	169	866	295	234	1,569
S	8	86	937	277	238	1,546
SSW	4	33	104	60	31	232
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	59	705	3,020	4,083	5,576	13,443


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POPULATION DISTRIBUTION (1990)

Direction	0-5 Miles	5-10 Miles	10-20 Miles	20-30 Miles	30-40 Miles	46-50 Miles	50-60 Miles	Total
N	3	0	0	0	0	0	0	3
NNE	1,502	14,649	16,833	3,297	12,645	8,912	33,593	91,431
NE	4,805	12,634	20,189	16,571	10,659	11,876	30,608	107,342
ENE	908	2,489	4,295	5,618	17,126	27,209	183,270	240,915
E	559	1,302	12,339	14,532	7,322	20,825	16,610	73,489
ESE	1,590	1,318	18,843	18,920	69,710	31,639	16,366	158,386
SE	729	703	11,920	178,696	55,516	44,563	17,581	309,708
SSE	1,569	917	3,081	18,023	11,923	24,797	10,871	71,181
S	1,546	1,350	7,253	6,254	8,626	13,435	12,396	50,860
SSW	232	2,239	4,536	37,033	11,299	9,839	9,297	74,475
SW	0	0	3,993	42,892	25,429	186,622	157,635	416,571
WSW	0	0	0	0	0	17,298	1,182,109	1,199,407
W	0	0	0	0	0	0	1,279,601	1,279,601
WNW	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0
Total	13,443	37,601	103,282	341,836	230,255	397,015	2,949,937	4,073,369


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PROJECTED POPULATION DISTRIBUTION (2000)

Direction	0-1 Miles	1-2 Miles	2-3 Miles	3-4 Miles	4-5 Miles	Total
N	3	0	0	0	0	3
NNE	15	11	58	452	1,003	1,539
NE	12	25	340	2,017	2,518	4,912
ENE	9	111	184	264	356	924
E	0	88	121	156	181	546
ESE	0	75	160	441	871	1,547
SE	3	107	260	160	193	723
SSE	5	171	897	297	235	1,605
S	8	88	978	282	238	1,594
SSW	4	34	108	62	31	239
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	59	710	3,106	4,131	5,626	13,632

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PROJECTED POPULATION DISTRIBUTION (2000)

Direction	0-5 Miles	5-10 Miles	10-20 Miles	20-30 Miles	30-40 Miles	40-50 Miles	50-60 Miles	Total
N	3	0	0	0	0	0	0	3
NNE	1,539	14,873	17,912	3,829	14,574	9,981	37,198	99,906
NE	4,912	13,770	22,769	18,275	12,351	13,580	34,091	119,748
ENE	924	3,053	4,699	6,399	19,857	28,604	179,627	243,163
E	546	1,461	13,241	15,985	8,053	24,230	19,133	82,649
ESE	1,547	1,391	19,654	20,340	76,005	34,875	18,568	172,380
SE	723	703	12,280	184,094	58,265	48,499	19,032	323,596
SSE	1,605	922	3,254	18,563	12,349	26,036	11,463	74,192
S	1,594	1,359	7,396	6,320	8,829	13,869	12,762	52,129
SSW	239	2,254	4,634	37,403	11,439	10,056	9,566	75,591
SW	0	0	4,425	43,353	26,184	188,025	156,452	418,439
WSW	0	0	0	0	0	17,125	1,210,464	1,227,589
W	0	0	0	0	0	0	1,317,989	1,317,989
WNW	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0
Total	13,632	39,786	110,264	354,561	247,906	414,880	3,026,345	4,207,374

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PROJECTED POPULATION DISTRIBUTION (2037)

Direction	0-1 Miles	1-2 Miles	2-3 Miles	3-4 Miles	4-5 Miles	Total
N	3	0	0	0	0	3
NNE	15	11	60	464	1,032	1,582
NE	12	26	351	2,075	2,592	5,056
ENE	9	112	189	271	367	948
E	0	88	120	153	180	541
ESE	0	75	160	432	853	1,520
SE	3	108	261	159	190	721
SSE	5	174	943	297	235	1,654
S	8	91	1,033	290	238	1,660
SSW	4	35	115	65	31	250
SW	0	0	0	0	0	0
WSW	0	0	0	0	0	0
W	0	0	0	0	0	0
WNW	0	0	0	0	0	0
NW	0	0	0	0	0	0
NNW	0	0	0	0	0	0
Total	59	720	3,232	4,206	5,718	13,935


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PROJECTED POPULATION DISTRIBUTION (2037)

Direction	0-5 Miles	5-10 Miles	10-20 Miles	20-30 Miles	30-40 Miles	40-50 Miles	50-60 Miles	Total
N	3	0	0	0	0	0	0	3
NNE	1,582	16,425	19,095	4,219	16,060	12,120	47,104	116,605
NE	5,056	16,323	24,306	19,610	13,359	15,364	41,268	135,286
ENE	948	4,619	5,163	6,808	21,391	31,710	203,471	274,110
E	541	1,763	14,307	16,566	8,347	25,677	20,390	87,591
ESE	1,520	1,480	20,671	20,949	82,456	37,994	24,046	189,116
SE	721	724	12,859	186,055	60,449	53,012	21,556	335,376
SSE	1,654	944	3,484	18,743	12,818	28,764	12,747	79,154
S	1,660	1,392	7,617	6,443	9,102	14,759	13,765	54,738
SSW	250	2,308	4,918	38,143	11,582	9,894	9,689	76,784
SW	0	0	5,200	44,112	25,188	188,950	162,045	425,495
WSW	0	0	0	0	0	17,816	1,237,659	1,255,475
W	0	0	0	0	0	0	1,343,581	1,343,581
WNW	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0
Total	13,935	45,978	117,620	361,648	260,752	436,060	3,137,321	4,373,314

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TRANSIENT POPULATION DISTRIBUTION 1 MILE INCREMENTS (1971)

	0-1 Mi	1-2 Mi	2-3 Mi	3-4 Mi	4-5 Mi	5-6 Mi	6-7 Mi	7-8 Mi	Total
NNE	(0)	(108)	(60)	(0)	(0)	(0)	(0)	(0)	(168)
NNE	0	0	0	0	0	0	0	0	0
NE	0	1	9	9	25	31	36	44	155
ENE	0	7	15	22	27	34	41	47	193
E	0	9	16	22	28	35	41	46	197
ESE	0	8	15	20	20	34	41	47	185
SE	0	9	16	22	28	33	41	47	196
SSE	0	4	5	22	28	34	41	47	181
S	0	0	0	3	21	35	41	43	143
SSW	0	0	0	0	0	4	2	7	13
SSW	(53)	(78)	(300)	(2282)	(6505)	(5213)	(162)	(65)	(14,658)
TOTAL MIGRANT	0	38	76	120	177	240	284	328	1,263
TOTAL VACATIONISTS	(53)	(186)	(360)	(2282)	(6505)	(5213)	(162)	(65)	14,826
TOTAL TRANSIENT	(53)	224	436	2402	6682	5453	446	393	16,089

Legend: (No.) Summer Peak Vacationists
No. Yearly Average Migrant Crop Pickers

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AGRICULTURAL STATISTICS

(FIGURES TAKEN FROM U. S. CENSUS OF AGRICULTURE - 1974 LATEST DATA)

County:	Berrien	Van Buren	Cass
Total Farm Acreage	199,357	213,131	197,700
Percent of County in Farms	54.0	55.0	63.0
Number of Farms	2,118	1,782	1,179
Average Size of Farms (acres)	94.0	120	168.0
Average Value of Farms	\$72,762	\$73,519	\$90,317
Farm Population	6,884	5,740	3,648
Major Farm Products	Fruits	Fruits	Livestock
	Dairy Products	Dairy Products	Dairy Products
	Livestock	Livestock	
	(\$ millions)		
Value of Farm Products Sold	\$42.3	\$45.0	\$26.3
Value of Crops Sold	28.0	30.0	9.9
Fruits	28.0	30.0	9.9
Value of Livestock & Livestock			
Products Sold	14.3	15.0	16.4
Livestock	5.1	8.8	9.5
Dairy Products	1.3	2.6	2.6


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HOSPITALS IN BERRIEN COUNTY, 1997

Hospital	Location	Distance from Station, miles	Capacity
Lakeland Medical Center	Berrien Center	14	250
Lakeland Medical Center	St. Joseph	10	300
Lakeland Medical Center	Niles	18	174
Community	Watervliet	22	70


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DATA SUMMARY SHEET STATION 5-DATE 7/2/69

	WIND VELOCITIES						Bivane Angles		Turbulence Classes		Temperature (F)			Temperature Difference		Not Used				
	30FT		200 FT		SAT.															
Hour	DIR	SP	DIR	SP	DIR	SP	EL.	AZ	Satellite	Local Tower	0 Check	Dew Point	3oft Temp	DEL-T (200-30)	D	S	PCPN	PRES	RH	
1	999	99	85	12	80	6	999	999	0	4	1.0	48.9	61.3	5.00	0	0	0.00	29.46	0	
2	999	99	100	11	95	5	999	999	0	4	.8	48.2	61.2	4.80	0	0	0.00	29.46	0	
3	999	99	120	9	105	5	999	999	0	4	1.5	47.8	61.0	5.13	0	0	0.05	29.46	0	
4	999	99	135	10	120	9	999	999	0	4	1.2	46.7	61.3	5.45	0	0	0.00	29.45	0	
5	999	99	170	8	130	8	999	999	0	2	1.0	45.5	61.5	5.25	0	0	0.00	29.45	0	
6	999	99	195	7	170	4	999	999	0	2	1.0	46.1	61.6	5.50	0	0	0.00	29.45	0	
7	999	99	210	6	185	4	999	999	0	2	1.0	45.9	61.6	5.75	0	0	0.00	29.45	0	
8	999	99	200	2	185	2	999	999	0	2	1.0	46.0	61.0	.25	0	0	0.00	29.44	0	
9	999	99	220	3	203	2	999	999	0	2	.8	51.6	61.9	.20	0	0	0.00	29.43	0	
10	999	99	240	3	220	2	999	999	0	2	1.0	54.5	63.5	1.75	0	0	0.00	29.43	0	
11	999	99	230	3	220	2	999	999	0	2	.9	55.4	64.4	1.22	0	0	0.00	29.43	0	
12	999	99	275	2	250	2	999	999	0	1	1.1	58.0	66.0	3.77	0	0	0.00	29.43	0	
13	999	99	310	2	295	2	999	999	0	2	1.0	57.0	65.3	2.75	0	0	0.00	29.43	0	
14	999	99	315	3	305	2	999	999	0	2	1.0	59.1	67.9	3.75	0	0	0.00	29.41	0	
15	999	99	340	5	330	4	999	999	0	2	1.0	56.8	69.9	5.75	0	0	0.00	29.40	0	
16	999	99	345	4	350	4	999	999	0	2	1.0	57.5	69.2	4.50	0	0	0.00	29.39	0	


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DATA SUMMARY SHEET STATION 5-DATE 7/2/69

	WIND VELOCITIES						Bivane Angles		Turbulence Classes		Temperature (F)			Temperature Difference	Not Used				
	30FT		200 FT		SAT.														
Hour	DIR	SP	DIR	SP	DIR	SP	EL.	AZ	Satellite	Local Tower	0 Check	Dew Point	30ft Temp	DEL-T (200-30)	D	S	PCPN	PRES	RH
17	999	99	345	2	350	3	999	999	0	2	1.1	58.9	71.6	5.27	0	0	0.00	29.36	0
18	999	99	280	0	350	2	999	999	0	4	1.0	55.6	71.2	4.79	0	0	0.00	29.34	0
19	999	99	230	1	355	2	999	999	0	2	.9	52.3	73.0	2.97	0	0	0.00	29.34	0
20	999	99	280	2	350	2	999	999	0	2	1.1	53.4	73.9	.77	0	0	0.00	29.34	0
21	994	99	230	1	360	1	999	999	0	4	1.0	51.9	73.1	.50	0	0	0.00	29.33	0
22	999	99	125	7	100	5	999	999	0	4	.9	53.4	70.6	3.27	0	0	0.00	29.31	0
23	999	99	135	10	110	6	999	999	0	4	1.2	48.7	70.6	3.95	0	0	0.00	29.30	0
24	999	99	135	12	110	8	999	999	0	4	1.1	51.2	68.4	5.22	0	0	0.00	29.29	0


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METEOROLOGICAL DATA FOR JUNE 1, 1992

Hour	DIR1 10 M	S	SPD1 10 M	S	DIR2 60 M	S	SPD2 60 M	S	DIR4 SHOR	S	SPD4 SHOR	S	STAB	TEM2 DEWP	S	TEM1 10 M	S	DTI 60 M	S	RAIN	S
100	308	0	2.2	0	276	0	8.7	0	213	0	3.1	0	6	45.2	0	52.9	0	2.8	0	0.00	0
200	324	0	1.4	0	327	0	10.4	0	51	0	1.6	0	7	44.5	0	52.9	0	7.1	0	0.00	0
300	301	0	2.6	0	320	0	11.8	0	292	0	1.1	0	7	43.2	0	51.8	0	5.4	0	0.00	0
400	316	0	1.4	0	341	0	10.6	0	13	0	3.8	0	7	41.7	0	51.8	0	4.0	0	0.00	0
500	28	0	2.8	0	10	0	11.0	0	38	0	3.7	0	6	42.3	0	51.4	0	1.5	0	0.00	0
600	199	0	2.2	0	37	0	4.7	0	92	0	2.3	0	7	40.7	0	47.9	0	3.9	0	0.00	0
700	285	0	2.9	0	293	0	4.0	0	260	0	2.5	0	7	41.0	0	47.3	0	3.8	0	0.00	0
800	307	0	2.0	0	324	0	5.7	0	0	0	2.7	0	5	44.4	0	51.4	0	0.3	0	0.00	0
900	339	0	1.7	0	26	0	2.1	0	3	0	4.6	0	2	47.4	0	56.9	0	-1.6	0	0.00	0
1000	309	0	3.0	0	319	0	3.8	0	359	0	4.7	0	1	46.9	0	58.3	0	-2.1	0	0.00	0
1100	313	0	3.6	0	318	0	4.0	0	351	0	5.1	0	1	49.3	0	62.8	0	-2.1	0	0.00	0
1200	283	0	5.4	0	308	0	7.0	0	337	0	4.6	0	1	46.8	0	60.2	0	-2.3	0	0.00	0
1300	319	0	5.6	0	318	0	9.7	0	352	0	4.7	0	1	47.3	0	61.3	0	-2.7	0	0.00	0
1400	344	0	4.3	0	326	0	8.0	0	324	0	4.5	0	1	50.0	0	64.2	0	-3.2	0	0.00	0
1500	354	0	5.9	0	336	0	9.5	0	320	0	3.6	0	1	50.1	0	62.4	0	-2.2	0	0.00	0
1600	351	0	5.7	0	344	0	9.6	0	350	0	6.0	0	1	49.7	0	61.9	0	-2.0	0	0.00	0
1700	358	0	6.2	0	351	0	10.5	0	353	0	6.3	0	1	46.7	0	62.0	0	-1.9	0	0.00	0
1800	355	0	4.9	0	357	0	9.7	0	5	0	7.9	0	4	46.2	0	60.5	0	-0.9	0	0.00	0
1900	356	0	3.9	0	4	0	7.6	0	13	0	10.8	0	4	45.5	0	61.2	0	-0.9	0	0.00	0
2000	2	0	3.3	0	18	0	7.4	0	15	0	8.2	0	5	44.2	0	60.7	0	-0.3	0	0.00	0
2100	29	0	2.4	0	28	0	5.9	0	37	0	2.2	0	5	41.4	0	59.0	0	0.4	0	0.00	0

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METEOROLOGICAL DATA FOR JUNE 1, 1992

Hour	DIR1 10 M	S	SPD1 10 M	S	DIR2 60 M	S	SPD2 60 M	S	DIR4 SHOR	S	SPD4 SHOR	S	STAB	TEM2 DEWP	S	TEM1 10 M	S	DTI 60 M	S	RAIN	S
2200	32	0	2.7	0	34	0	9.1	0	51	0	2.1	0	6	40.9	0	56.2	0	1.6	0	0.00	0
2300	6	0	1.6	0	37	0	9.0	0	97	0	1.5	0	6	41.1	0	54.5	0	2.0	0	0.00	0
2400	267	0	1.1	0	35	0	8.1	0	162	0	1.2	0	7	41.0	0	51.4	0	6.4	0	0.00	0

Status Code(S) Definition: 0 = Valid, 1 = Questionable, 2 = Invalid, 3 = Unsteady Direction, 5 = Flat Direction

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 INDIANA MICHIGAN POWER <small>An AEP Company</small>	INDIANA MICHIGAN POWER D. C. COOK NUCLEAR PLANT UPDATED FINAL SAFETY ANALYSIS REPORT	Revision: 23 Table: 2.2-3 Page: 1 of 1
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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS A

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	1	3	11	19	37	111	105	180	467
NNE	0	0	0	0	0	2	5	6	15	26	96	150
NE	0	0	0	1	4	7	8	5	1	1	0	27
ENE	0	0	0	0	1	2	5	4	2	0	0	14
E	0	0	0	0	0	6	3	6	1	0	0	16
ESE	0	0	0	0	1	13	11	18	26	14	7	90
SE	0	0	0	0	0	6	27	48	77	43	28	229
SSE	0	0	0	0	1	3	8	13	14	3	1	43
S	0	0	0	0	1	5	3	8	9	2	0	28
SSW	0	0	0	0	0	4	3	4	23	18	0	52
SW	0	0	0	0	2	8	15	34	73	37	16	185
WSW	0	0	0	0	5	28	25	16	22	18	39	153
W	0	0	0	2	16	17	12	7	10	12	41	117
WNW	0	0	1	3	16	6	9	9	18	16	55	133
NW	0	0	2	5	17	13	12	6	22	10	83	170
NNW	0	0	0	3	17	20	17	18	20	28	75	198
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	3	15	84	151	182	239	444	333	621	2072

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS B

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	0	0	3	5	4	3	4	17	36
NNE	0	0	0	0	1	2	2	1	8	5	13	32
NE	0	0	0	0	1	2	4	0	0	0	0	7
ENE	0	0	0	0	2	4	3	0	0	0	0	9
E	0	0	0	0	0	3	2	3	0	0	0	8
ESE	0	0	0	0	2	2	10	7	6	5	3	35
SE	0	0	0	1	1	4	7	14	20	8	2	57
SSE	0	0	0	0	1	3	1	3	4	0	0	12
S	0	0	0	0	0	2	3	3	0	0	0	8
SSW	0	0	0	0	0	0	2	0	8	7	0	17
SW	0	0	0	0	1	1	4	10	16	8	5	45
WSW	0	0	0	1	2	3	4	0	0	0	8	18
W	0	0	0	0	3	0	4	1	1	0	22	31
WNW	0	0	0	0	0	0	2	1	0	1	15	19
NW	0	0	0	0	5	0	1	1	2	3	18	30
NNW	0	0	0	0	6	2	3	0	1	0	17	29
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	2	25	31	57	48	69	41	120	393

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS C

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	0	4	3	1	1	5	2	24	40
NNE	0	0	0	1	2	1	2	4	7	9	24	50
NE	0	0	0	0	3	3	0	1	0	0	1	8
ENE	0	0	0	0	2	4	5	1	0	0	0	12
E	0	0	0	0	1	1	2	1	0	0	0	5
ESE	0	0	0	0	5	5	8	8	3	2	2	33
SE	0	0	0	0	2	4	5	11	17	7	11	57
SSE	0	0	0	0	1	1	5	2	2	0	0	11
S	0	0	0	0	0	0	7	5	2	0	0	14
SSW	0	0	0	0	0	1	2	2	9	3	0	17
SW	0	0	0	0	2	2	4	6	10	5	15	44
WSW	0	0	1	0	2	4	0	0	1	0	23	31
W	0	0	0	0	0	1	0	1	1	2	28	33
WNW	0	0	0	1	0	0	1	0	2	1	27	32
NW	0	0	0	0	2	0	1	1	2	4	26	36
NNW	0	0	0	1	2	0	0	1	2	1	40	47
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	1	3	28	30	43	45	63	36	221	470

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS D

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	1	1	5	7	12	10	7	176	219
NNE	0	0	1	1	9	15	10	18	31	34	65	184
NE	0	0	0	4	27	16	14	8	2	0	1	72
ENE	0	0	1	7	31	26	12	3	2	0	0	82
E	0	0	1	3	20	25	14	8	0	0	0	71
ESE	0	0	0	1	22	49	41	40	39	25	38	255
SE	0	0	0	1	5	13	36	51	81	61	84	332
SSE	0	0	0	0	1	12	12	8	17	9	0	59
S	0	0	0	1	1	6	5	15	20	22	7	77
SSW	0	0	0	0	1	1	7	23	62	33	28	155
SW	0	0	0	1	2	11	7	12	26	24	81	164
WSW	0	0	0	2	4	6	4	4	8	5	91	124
W	0	0	1	0	3	1	1	2	9	9	118	144
WNW	0	0	0	0	1	0	1	3	4	8	136	153
NW	0	0	3	0	0	0	1	1	10	9	179	203
NNW	0	0	1	0	1	3	1	2	4	9	136	157
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	8	22	129	189	173	210	325	255	1140	2451

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS E

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	1	2	6	1	0	2	7	18	43	80
NNE	0	0	0	3	9	16	8	12	26	16	14	104
NE	0	0	0	4	27	25	19	10	5	1	0	91
ENE	0	0	1	6	20	19	5	2	2	0	0	55
E	0	0	3	6	48	26	8	0	0	0	0	91
ESE	0	0	0	2	34	44	56	35	50	36	23	280
SE	0	0	0	3	7	19	42	68	131	85	84	439
SSE	0	0	0	1	5	9	17	12	18	10	1	73
S	0	0	0	0	1	4	5	13	25	13	1	62
SSW	0	0	0	0	3	7	6	22	55	12	4	109
SW	0	0	0	2	3	9	16	14	16	15	11	86
WSW	0	0	2	0	2	1	2	3	10	8	18	46
W	0	0	1	1	0	1	1	1	6	6	23	40
WNW	0	0	0	0	0	1	2	0	5	5	23	36
NW	0	0	0	0	2	1	1	0	7	5	31	47
NNW	0	0	0	0	1	0	1	3	7	6	53	71
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	8	30	168	183	189	197	370	236	329	1710

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS F

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	1	1	1	1	3	3	2	4	16
NNE	0	0	1	2	6	5	4	2	1	2	5	28
NE	0	0	1	1	8	4	2	1	1	0	0	18
ENE	0	0	1	6	9	4	0	1	0	0	0	21
E	0	0	0	4	24	3	1	0	1	0	0	33
ESE	0	0	0	3	36	63	51	39	44	23	10	269
SE	0	0	0	0	8	17	43	56	76	37	12	249
SSE	0	0	0	1	1	3	11	5	2	2	0	25
S	0	0	1	0	1	2	2	3	3	3	0	15
SSW	0	0	1	1	1	2	4	13	11	0	1	34
SW	0	0	1	0	4	4	8	4	2	1	1	25
WSW	0	0	1	0	2	0	0	0	1	1	3	8
W	0	1	0	0	0	0	1	0	1	1	2	6
WNW	0	0	0	1	0	0	0	0	2	1	0	4
NW	0	0	0	0	0	0	0	0	1	2	1	4
NNW	0	0	0	0	0	0	0	0	1	2	4	7
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	7	20	101	108	128	127	150	77	43	762

Number of Calms: 0

Number of Missing Hours: 51

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ANNUAL JOINT FREQUENCY DISTRIBUTION – 2005 – 10 m SHORELINE TOWER – PASQUILL CLASS G

Compass Direction	<0.5 mph	0.5-1.0 mph	1.1-1.5 mph	1.6-2.0 mph	2.1-3.0 mph	3.1-4.0 mph	4.1-5.0 mph	5.1-6.0 mph	6.1-8.0 mph	8.1-10.0 mph	>10.0 mph	Total
N	0	0	0	1	0	1	1	1	1	0	0	5
NNE	0	0	0	0	5	2	3	0	1	0	0	11
NE	0	0	0	1	1	2	0	0	0	0	0	4
ENE	0	0	0	2	3	2	0	0	0	0	0	7
E	0	1	1	2	9	11	1	0	0	0	0	25
ESE	0	1	0	2	27	46	98	72	75	23	1	345
SE	0	1	0	3	9	31	61	87	109	20	0	321
SSE	0	1	2	2	7	7	18	8	1	0	0	46
S	0	0	0	0	4	5	8	3	1	0	1	22
SSW	0	0	1	2	2	1	4	18	11	0	0	39
SW	0	0	1	0	1	3	5	3	2	0	0	15
WSW	0	0	0	1	1	0	0	0	1	0	0	3
W	0	0	0	2	0	0	0	0	0	0	1	3
WNW	0	1	0	0	0	0	0	0	0	0	0	1
NW	0	1	0	0	0	1	0	0	0	0	0	2
NNW	0	0	1	0	0	0	0	0	0	0	1	2
VARIABLE	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	6	6	18	69	112	199	192	202	43	4	851

Number of Calms: 0

Number of Missing Hours: 51


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MEAN WIND SPEEDS

Smith and Singer Turbulence Class	200 foot Level Main Tower (mph)	50 foot Level Main Tower (mph)	50 foot Level Satellite (mph)
I	8	5	8
II	14	6	9
III	18	8	11
IV	8	4	3
Pasquill Turbulence Class	60 meter Level Primary Tower (mph)	10 meter Level Primary Tower (mph)	10 meter Level Shoreline Tower (mph)
A	11.2	6.1	9.2
B	11.8	6.4	9.7
C	13.2	6.7	11.5
D	14.3	6.7	11.8
E	11.7	4.4	7.4
F	10.2	2.5	5.5
G	9.2	1.6	5.2

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Offsite Atmospheric Dispersion Factors

Release Point ¹	Receptor Point	0-2 hour X/Q	2-8 hour X/Q	8-24 hour X/Q	1-4 days X/Q	4-30 days X/Q
U1 Plant Vent	EAB	5.69E ⁻⁰⁴				
U1 Plant Vent	LPZ	1.13E ⁻⁰⁴	5.28E ⁻⁰⁵	3.62E ⁻⁰⁵	1.64E ⁻⁰⁵	6.30E ⁻⁰⁶
U1 Containment Surface	EAB	6.04E ⁻⁰⁴				
U1 Containment Surface	LPZ	1.13E ⁻⁰⁴	5.32E ⁻⁰⁵	3.64E ⁻⁰⁵	1.66E ⁻⁰⁵	6.37E ⁻⁰⁶
U1 Turbine Building	EAB	8.62E ⁻⁰⁴				
U1 Turbine Building	LPZ	1.16E ⁻⁰⁴	5.45E ⁻⁰⁵	3.74E ⁻⁰⁵	1.74E ⁻⁰⁵	6.74E ⁻⁰⁶
West Main Steam Enclosure	EAB	5.87E ⁻⁰⁴				
West Main Steam Enclosure	LPZ	1.13E ⁻⁰⁴	5.29E ⁻⁰⁵	3.63E ⁻⁰⁵	1.65E ⁻⁰⁵	6.36E ⁻⁰⁶
U1 RWST	EAB	6.25E ⁻⁰⁴				
U1 RWST	LPZ	1.14E ⁻⁰⁴	5.35E ⁻⁰⁵	3.67E ⁻⁰⁵	1.65E ⁻⁰⁵	6.36E ⁻⁰⁶
North Auxiliary Building Supply	EAB	6.19E ⁻⁰⁴				
North Auxiliary Building Supply	LPZ	1.13E ⁻⁰⁴	5.31E ⁻⁰⁵	3.64E ⁻⁰⁵	1.67E ⁻⁰⁵	6.24E ⁻⁰⁶

¹ Only the most limiting source and receptor pairs are included.

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Control Room Atmospheric Dispersion Factors

Release Point ¹	Receptor Point	0-2 hour <i>X/Q</i>	2-8 hour <i>X/Q</i>	8-24 hour <i>X/Q</i>	1-4 days <i>X/Q</i>	4-30 days <i>X/Q</i>
U1 Plant Vent	U1 Normal	2.03E ⁻⁰³	1.37E ⁻⁰³	4.89E ⁻⁰⁴	3.84E ⁻⁰⁴	2.62E ⁻⁰⁴
U1 Plant Vent	U1 Emergency	2.17E ⁻⁰³	1.42E ⁻⁰³	5.18E ⁻⁰⁴	3.99E ⁻⁰⁴	2.72E ⁻⁰⁴
U2 Plant Vent	U2 Normal	2.10E ⁻⁰³	1.48E ⁻⁰³	5.52E ⁻⁰⁴	3.98E ⁻⁰⁴	3.17E ⁻⁰⁴
U2 Plant Vent	U2 Emergency	2.28E ⁻⁰³	1.59E ⁻⁰³	5.95E ⁻⁰⁴	4.46E ⁻⁰⁴	3.49E ⁻⁰⁴
U2 Containment Closest Point	U2 Normal	1.02E ⁻⁰²	8.41E ⁻⁰³	2.74E ⁻⁰³	2.66E ⁻⁰³	2.34E ⁻⁰³
U2 Containment Closest Point	U2 Emergency	1.24E ⁻⁰²	1.02E ⁻⁰²	3.32E ⁻⁰³	3.24E ⁻⁰³	2.84E ⁻⁰³
U2 PORV/MSSV	U2 Normal	1.09E ⁻⁰²	8.61E ⁻⁰³	2.87E ⁻⁰³	2.78E ⁻⁰³	2.50E ⁻⁰³
U2 PORV/MSSV	U2 Emergency	1.26E ⁻⁰²	9.72E ⁻⁰³	3.26E ⁻⁰³	3.71E ⁻⁰³	2.80E ⁻⁰³
U2 Turbine Building	U2 Normal	4.57E ⁻⁰²	3.14E ⁻⁰²	1.27E ⁻⁰²	8.30E ⁻⁰³	6.73E ⁻⁰³
U2 Turbine Building	U2 Emergency	2.91E ⁻⁰²	2.02E ⁻⁰²	8.14E ⁻⁰³	5.34E ⁻⁰³	4.32E ⁻⁰³
U2 RWST	U2 Normal	1.74E ⁻⁰³	1.44E ⁻⁰³	5.24E ⁻⁰⁴	4.42E ⁻⁰⁴	3.86E ⁻⁰⁴

¹ Only the most limiting source and receptor pairs are included.

² 0-2 hour value is from Unit 1 containment to Unit 1 emergency intake

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U2 RWST	U2 Emergency	1.81E ⁻⁰³	1.45E ⁻⁰³	5.43E ⁻⁰⁴	4.43E ⁻⁰⁴	3.86E ⁻⁰⁴
U2 Containment Surface	U2 Normal	2.51E ⁻⁰³	1.94E ⁻⁰³	6.66E ⁻⁰⁴	6.44E ⁻⁰⁴	5.61E ⁻⁰⁴
U2 Containment Surface	U2 Emergency	2.73E ⁻⁰³ 2	2.05E ⁻⁰³	7.04E ⁻⁰⁴	6.89E ⁻⁰⁴	5.95E ⁻⁰⁴
U1 SJAE	U1 Normal	8.50E ⁻⁰⁴				
South Auxiliary Building Intake	U2 Normal	7.91E ⁻⁰³	5.93E ⁻⁰³	2.12E ⁻⁰³	1.50E ⁻⁰³	1.01E ⁻⁰³

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: A DT/DZ

ELEVATION: SPEED: SPD10M DIRECTION: DIR10M LAPSE: DT60M
WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	5	161	153	15	0	0	334
NNE	3	21	15	2	0	0	41
NE	0	19	16	0	0	0	35
ENE	5	19	14	0	0	0	38
E	6	44	40	3	0	0	93
ESE	2	59	19	0	0	0	80
SE	10	50	17	0	0	0	77
SSE	5	69	29	0	0	0	103
S	1	75	49	19	1	0	145
SSW	2	17	20	10	1	0	50
SW	3	48	50	6	0	0	107
WSW	4	65	75	2	1	0	147
W	9	96	35	5	0	0	145
WNW	10	119	21	5	0	0	155
NW	12	117	17	1	0	0	147
NNW	15	169	95	6	0	0	285
TOTAL	92	1148	665	74	3	0	1982

Period Of Calm (Hours): 0

Variable Direction: 0

Hours Of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: B DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	12	29	18	6	0	0	65
NNE	2	19	7	0	0	0	28
NE	2	16	0	1	0	0	19
ENE	1	15	5	1	0	0	22
E	6	10	10	0	0	0	26
ESE	4	19	12	0	0	0	35
SE	10	15	6	0	0	0	31
SSE	3	12	5	0	0	0	20
S	4	23	18	4	0	0	49
SSW	3	16	18	3	0	0	40
SW	3	23	14	3	0	0	43
WSW	5	16	13	2	0	0	36
W	3	19	7	2	0	0	31
WNW	4	24	10	4	0	0	42
NW	15	19	20	2	0	0	56
NNW	6	22	15	1	0	0	44
TOTAL	83	297	178	29	0	0	587

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: C DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	6	36	37	3	1	0	83
NNE	2	15	6	1	0	0	24
NE	7	13	3	0	0	0	23
ENE	4	16	4	0	0	0	24
E	4	17	4	0	0	0	25
ESE	12	16	8	0	0	0	36
SE	12	24	9	0	0	0	45
SSE	7	13	12	1	0	0	33
S	4	21	19	4	0	0	48
SSW	2	24	22	6	0	0	54
SW	7	21	25	3	0	0	56
WSW	7	9	15	0	0	0	31
W	9	32	21	5	0	0	67
WNW	6	25	42	7	1	0	81
NW	9	23	29	4	0	0	65
NNW	9	27	15	2	0	0	53
TOTAL	107	332	271	36	2	0	748

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: D DT/DZ

ELEVATION: SPEED: SPD10M DIRECTION: DIR10M LAPSE: DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	37	152	44	4	0	0	237
NNE	29	70	22	3	0	0	124
NE	23	66	20	0	0	0	109
ENE	28	87	27	7	0	0	149
E	38	89	28	12	0	0	167
ESE	36	94	25	5	0	0	160
SE	33	103	51	3	0	0	190
SSE	33	68	48	8	0	0	157
S	40	138	69	22	0	0	269
SSW	18	85	95	23	1	0	222
SW	10	62	94	20	0	0	186
WSW	19	51	71	17	0	0	158
W	28	88	82	14	0	0	212
WNW	36	130	67	7	0	0	240
NW	33	90	40	2	0	0	165
NNW	45	92	45	4	0	0	186
TOTAL	486	1465	828	151	1	0	2931

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: E DT/DZ

ELEVATION: SPEED:SPD10M DIRECTION:DIR10M LAPSE:DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	46	34	2	0	0	0	82
NNE	28	27	0	0	0	0	55
NE	35	27	0	0	0	0	62
ENE	29	50	2	0	0	0	81
E	33	39	2	0	0	0	74
ESE	52	57	3	0	0	0	112
SE	55	47	15	1	0	0	118
SSE	39	52	16	1	0	0	108
S	47	145	23	1	0	0	216
SSW	15	74	28	0	0	0	117
SW	11	67	12	4	0	0	94
WSW	9	41	15	0	0	0	65
W	18	23	9	0	0	0	50
WNW	16	16	4	0	0	0	36
NW	22	11	2	0	0	0	35
NNW	29	21	0	0	0	0	50
TOTAL	484	731	133	7	0	0	1355

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: F DT/DZ

ELEVATION: SPEED: SPD10M DIRECTION: DIR10M LAPSE: DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	17	6	0	0	0	0	23
NNE	20	2	0	0	0	0	22
NE	30	6	0	0	0	0	36
ENE	32	13	0	0	0	0	45
E	40	10	0	0	0	0	50
ESE	55	16	0	0	0	0	71
SE	55	16	0	0	0	0	71
SSE	32	16	0	0	0	0	48
S	49	38	1	0	0	0	88
SSW	16	13	0	0	0	0	29
SW	6	5	1	0	0	0	12
WSW	6	6	1	0	0	0	13
W	9	1	0	0	0	0	10
WNW	6	2	0	0	0	0	8
NW	17	0	0	0	0	0	17
NNW	9	2	0	0	0	0	11
TOTAL	399	152	3	0	0	0	554

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: G DT/DZ

ELEVATION: SPEED: SPD10M DIRECTION: DIR10M LAPSE: DT60M

WIND SPEED (MPH)

Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	3	0	0	0	0	0	3
NNE	8	0	0	0	0	0	8
NE	15	1	0	0	0	0	16
ENE	52	9	0	0	0	0	61
E	95	3	0	0	0	0	98
ESE	80	1	0	0	0	0	81
SE	83	1	0	0	0	0	84
SSE	52	4	0	0	0	0	56
S	71	19	1	0	0	0	91
SSW	27	6	0	0	0	0	33
SW	14	1	0	0	0	0	15
WSW	8	2	0	0	0	0	10
W	8	1	0	0	0	0	9
WNW	8	0	0	0	0	0	8
NW	15	1	0	0	0	0	16
NNW	5	1	0	0	0	0	6
TOTAL	544	50	1	0	0	0	595

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD = 92010101 - 92123124

STABILITY CLASS: ALL DT/DZ

ELEVATION: SPEED: SPD10M DIRECTION: DIR10M LAPSE: DT60M

WIND SPEED (MPH)


Wind Direction	1-3	4-7	8-12	13-18	19-24	>24	Total
N	126	418	254	28	1	0	827
NNE	92	154	50	6	0	0	302
NE	112	148	39	1	0	0	300
ENE	151	209	52	8	0	0	420
E	222	212	84	15	0	0	533
ESE	241	262	67	5	0	0	575
SE	258	256	98	4	0	0	616
SSE	171	234	110	10	0	0	525
S	216	459	180	50	1	0	906
SSW	83	235	183	42	2	0	545
SW	54	227	196	36	0	0	513
WSW	58	190	190	21	1	0	460
W	84	260	154	26	0	0	524
WNW	86	316	144	23	1	0	570
NW	123	261	108	9	0	0	501
NNW	118	334	170	13	0	0	635
TOTAL	2195	4175	2079	297	6	0	8752

Periods of Calm (Hours): 0

Variable Direction: 0

Hours of Missing Data: 32

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EARTHQUAKES WITH EPICENTERS LOCATED WITHIN 200 MILES OF PLANT SITE

(Intensity V or Greater)

Year	Date	Time	Intensity	Location (Remarks)	N. Lat.	W. Long	Distance From Site (miles)	Felt Area (square miles)
1804	August 24	14:10	VI	Fort Dearborn, Illinois (Chicago	42.0	87.8	70	30,000
1872	February 6	08:00	V	Weonona, Michigan (three shocks lasting 30 seconds)	43.5	83.8	165	Local
1875	June 18	07:43	VII	Ohio - most severe at Urbana and Sidney	40.2	84.0	185	40,000
1877	August 17	10:50	IV-V	Southeastern Michigan, near Detroit	42.3	83.3	160	200
1882	February 9	14:00	V	Ohio - felt at Swandors and Bodkins, near Anna	40.5	84	165	
1883	February 4	05:00	VI	Indiana and Michigan, felt at Kalamazoo, Michigan (possibly invalid see section 2.5.1)	42.3	85.6	50	8,000
1884	September 19	14:14	V	near Lima, Ohio	40.7	84.1	155	125,000
1909	May 26	08:42	VII	Northern Illinois	42.5	89.0	135	500,000
1912	January 2	10:21	VI	Northern Illinois	41.5	88.5	115	40,000
1929	March 8	04:06	V	near Bellefontaine, Ohio	40.4	84.2	165	5,000
1930	September 30	14:40	VII	Ohio, strongest at Anna	40.3	84.3	165	-
1931	September 20	17:05	VII	Ohio, felt at Anna, Sidney and Houston	40.2	84.3	175	40,000
1937	March 2	09:48	VII	Western Ohio, maximum intensity at Anna and Sidney	40.7	84.0	160	90,000
	March 3	03:50	V	Ohio, felt at Sidney, Anna, Jackson Center and Botkins	40.50	84	165	
	March 8	23:45	VII-VIII	Western Ohio, near Anna	40.6	84.0	165	150,000
1947	May 6	15:25	V	Milwaukee, Wisconsin	43	88	90	3,000
	August 9	20:47	VI	South Central Michigan	42.0	85.0	75	50,000
1956	January 27	06:03	V	West Central Ohio	40.50	84	165	
1961	February 22	03:45	V	North Western Ohio, felt at Amsden and Arcadia	41. 2	83.4	170	

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SUMMARY OF PLUME AREAS, WIDTHS AND VOLUMES


<u>AUGUST-SEPTEMBER, 1978</u>											
Date	8/23	8/25	8/25	9/5	9/5	9/6	9/6	9/7	9/7	9/8	9/8
Area (acres)	24	193	311	237	80	287	117	336	568	549	740
Width (feet)	984	2394	2362	2230	1148	2165	1673	4100	4838	5642	4264
Volume (acre-ft.)	413	2327	2771	1720	1342	1732	1537	1996	4029	3678	4852

Average area	-	313 acres
Average width	-	2890 feet
Average volume	-	2400+ acre-ft

<u>NOVEMBER-DECEMBER, 1978</u>								
Date	11/1	11/1	11/2	11/2	11/3	11/3	11/7	11/7
Area (acres)	154	389	142	200	655	631	294	515
Width (feet)	1771	2854'	2394	1705	3838	4648	2066	6724
Volume (acre-ft)	2414	3747	1105	1520	5197	5615	2883	4103

Average area	-	372 acres
Average width	-	3250 feet
Average volume	-	3323+ acre-ft

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<u>JULY, 1979</u>										
Date	7/24	7/24	7/25	7/25	7/26	7/26	7/27	7/27	7/28	7/28
Area (acres)	297	450	109	161	149	269	30	21	171	342
Width (feet)	2034	3182	2296	3116	1804	2821	918	886	2624	2755
Volume (acre-ft)	2363	3295	951	1551	1190	1625	540	173	1494	2412

Average area	-	200 acres
Average width	-	2244 feet
Average volume	-	1559+ acre-ft

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COMMON AND SCIENTIFIC NAMES OF FISH SPECIES COLLECTED FROM COOK PLANT STUDY AREAS, SOUTHEASTERN LAKE MICHIGAN, 1973-1982

Common name	Scientific name
Alewife	<i>Alosa pseudoharengus</i>
Banded killifish	<i>Fundulus diaphanus</i>
Black bullhead	<i>Ictalurus melas</i>
Blackchin shiner	<i>Notropis heterodon</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Blacknose dace	<i>Rhinichthys atratulus</i>
Blacknose shiner	<i>Notropis heterolepis</i>
Bloater	<i>Coregonus hoyi</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Brook silverside	<i>Labidesthes sicculus</i>
Brown trout	<i>Salmo trutta</i>
Burbot	<i>Lota lota</i>
Central mudminnow	<i>Umbra limi</i>
Channel catfish	<i>Ictalurus punctatus</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>
Coho salmon	<i>Oncorhynchus kisutch</i>
Common carp	<i>Cyprinus carpio</i>
Common shiner	<i>Notropis cornutus</i>
Creek chub	<i>Semotilus atromaculatus</i>
Emerald shiner	<i>Notropis atherinoides</i>
Fathead minnow	<i>Pimephales promelas</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Golden redhorse	<i>Moxostoma erythrurum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Grass pickerel	<i>Esox americanus vermiculatus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Johnny darter	<i>Etheostoma nigrum</i>
Lake chub	<i>Couesius plumbeus</i>


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COMMON AND SCIENTIFIC NAMES OF FISH SPECIES COLLECTED FROM COOK PLANT STUDY AREAS, SOUTHEASTERN LAKE MICHIGAN, 1973-1982

Common name	Scientific name
Lake herring	<i>Coregonus artedii</i>
Lake sturgeon	<i>Acipenser fulvescens</i>
Lake trout	<i>Salvelinus namaycush</i>
Lake whitefish	<i>Coregonus clupeaformis</i>
Largemouth bass	<i>Micropterus salmoides</i>
Logperch	<i>Percina caprodes</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Longnose sucker	<i>Catostomus catostomus</i>
Mottled sculpin	<i>Cottus bairdi</i>
Ninespine stickleback	<i>Pungitius pungitius</i>
Northern pike	<i>Esox lucius</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Quillback	<i>Carpionodes cyprinus</i>
Rainbow smelt	<i>Osmerus mordax</i>
Rainbow trout	<i>Salmo gairdner</i>
Rock bass	<i>Ambloplites rupestris</i>
Round whitefish	<i>Prosopium cylindraceum</i>
Sand shiner	<i>Notropis stramineus</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Silver redhorse	<i>Moxostoma anisurum</i>
Slimy sculpin	<i>Cottus cognatus</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Spotfin shiner	<i>Netropis spilopterus</i>
Spottail shiner	<i>Notropis hudsonius</i>
Trout-perch	<i>Percopsis omiscomaycus</i>
Walleye	<i>Stizostedion vitreum vitreum</i>
White crappie	<i>Pomoxis annularis</i>
White sucker	<i>Catostomus commersoni</i>
Yellow perch	<i>Perca flavescens</i>

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COMMON NAMES * AND TOTAL NUMBER OF EACH SPECIES IMPINGED DURING 1975-1982 AT THE D. C. COOK NUCLEAR PLANT SOUTHEASTERN LAKE MICHIGAN

(WEIGHT IS IN KG)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Alewife	174,341	114,958	31,498	238,133	330,709	1,815,490	1,415,821	831,051
Black bullhead	35	45	16	12	4	9	35	68
Black crappie	11	4	7	2	5	6	5	9
Bloater	49	63	302	23,085	2,456	21,448	3,144	212
Bluegill	48	23	10	11	-	12	73	37
Brown bullhead	-	-	-	11	4	-	7	6
Brown Trout	-	37	24	61	95	120	166	176
Bur bot	37	75	51	108	575	1,248	876	1,018
Central mudminnow	9	9	-	-	5	24	43	66
Channel catfish	50	70	27	26	50	87	175	87
Chestnut lamprey	4	-	-	5	-	-	-	-
Chinook salmon	7	16	-	59	729	875	22	34
Coho salmon	8	22	22	78	165	63	44	530
Common carp	2	6	-	5	34	33	18	12
Deepwater sculpin	1	5	-	-	-	27	80	33

* ACCORDING TO ROBINS ET AL 1980

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COMMON NAMES * AND TOTAL NUMBER OF EACH SPECIES IMPINGED DURING 1975-1982 AT THE D. C. COOK NUCLEAR PLANT SOUTHEASTERN LAKE MICHIGAN

(WEIGHT IS IN KG)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Emerald shiner	1	-	-	5	-	-	-	-
Flathead catfish	-	-	-	-	-	31	-	-
Freshwater drum	-	-	-	18	2	4	3	8
Gizzard shad	278	1,780	35	692	252	669	1,682	1,925
Golden shiner	5	-	-	-	-	-	-	9
Goldfish	2	-	-	-	5	4	-	-
Grass pickerel	-	1	-	-	-	-	-	-
Green sunfish	13	6	4	6	-	6	14	-
Johnny darter	180	346	103	108	59	107	682	13
Lake chub	-	5	6	6	-	13	-	32
Lake chubsucker	-	-	4	-	4	-	-	-
Lake herring	-	-	-	-	-	-	-	5
Lake sturgeon	-	-	-	-	-	8	-	-
Like trout	101	115	115	243	282	320	517	342
Lake whitefish	1	-	-	-	10	15	7	8
Largemouth bass	13	4	8	-	11	5	-	-
Logperch	1	-	-	-	-	-	-	-

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COMMON NAMES * AND TOTAL NUMBER OF EACH SPECIES IMPINGED DURING 1975-1982 AT THE D. C. COOK NUCLEAR PLANT SOUTHEASTERN LAKE MICHIGAN

(WEIGHT IS IN KG)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Longnose dace	6	8	19	43	-	5	8	8
Longnose gar	-	-	-	-	-	-	-	3
Longnose sucker	23	43	20	165	210	490	266	629
Mottled sculpin	-	-	14	392	532	1,078	1,364	373
Ninespine suckleback	194	107	95	288	65	429	111	71
Northern pike	3	17	-	5	-	-	17	7
Pirate perch	1	-	-	-	-	-	-	-
Pumpkinseed	23	32	2	15	-	-	5	9
Quillback	2	-	-	-	-	-	-	-
Rainbow smelt	3,746	2,772	1,488	51,013	35,398	149,085	112,837	13,863
Rainbow trout	4	17	-	6	14	20	37	24
Rock bass	3	1	4	8	5	3	14	3
Round whitefish	-	-	-	-	-	-	39	-
Sea lamprey	-	-	-	-	5	9	8	30
Shorthead redhorse	-	-	5	30	68	-	14	5
Silver redhorse	-	-	-	5	11	-	-	-
Slimy sculpin	8,136	7,402	2,232	1,034	2,622	8,371	6,974	5,820

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COMMON NAMES * AND TOTAL NUMBER OF EACH SPECIES IMPINGED DURING 1975-1982 AT THE D. C. COOK NUCLEAR PLANT SOUTHEASTERN LAKE MICHIGAN

(WEIGHT IS IN KG)

Species	1975	1976	1977	1978	1979	1980	1981	1982
Smallmouth bass	5	21	10	3	5	15	8	
Spottail shiner	9,985	24,104	5,032	178,009	52,761	106,009	86,260	33,842
Spotted sucker	1	-	-	-	-	-	3	-
Stonecat	-	-	-	-	-	11	-	-
Tadpole madtom	-	5	-	-	-	-	-	6
Trout-perch	15,373	10,357	4,826	88,692	15,002	31,063	23,711	1,998
Walleye	-	-	-	-	-	-	-	6
Warmouth	-	-	-	-	-	2	-	-
White crappie	6	-	-	11	2	5	18	-
White sucker	16	27	14	186	271	173	141	584
Yellow bullhead	5	1	2	-	-	-	3	6
Yellow perch	12,006	21,309	7,195	32,811	38,349	170,262	391,983	38,811
Total number	224,735	183,813	53,190	615,390	480,776	2,307,654	1,947,235	913,768
Total weight	6,131	4,927	1,833	10,475	9,480	71,209	17,395	25,173

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ESTIMATES (IN MILLIONS) OF ANNUAL ENTRAINMENT LOSSES OF FISH LARVAE AND FISH AT THE D.C. COOK NUCLEAR PLANT, SOUTHEASTERN LAKE MICHIGAN, 1975 - 1982.

CALCULATIONS USE ACTUAL REPORTED FLOW RATES OF THE CIRCULATING WATER SYSTEM

	YEAR OF ESTIMATE									
Taxon	1975	1976	1977	1978	1979	1980	1981	1982	Total	% Total
Alewife	63.708	53.7550	27.3888	31.098	125.6180	49.35	111.54	92.425	554.8828	74.34
Spottail shiner	3.41	0.9361	2.760	1.681	1.8228	21.06	7.257	28.2297	67.1566	9.00
Rainbow smelt	1.3608	0.4145	0.1795	0.3496	0.3726	11.954	2.6265	18.5233	35.7808	4.79
Yellow perch	0.17554	0.03807	1.3224	3.0655	0.3840	0.8971	2.506	4.9700	13.3586	1.79
Trout-perch	1.079	0.2509	0.1456	0.0194	0.6288	0.4858	0.5394	1.3749	4.5238	0.61
Johnny darter	0.0440	0.210	0.707	0.772	0.8105		0.153	0.7046	3.4011	0.46
Slimy sculpin	0.2431	0.06092	0.0256	0.130		0.553	1.002	0.4887	2.5033	0.34
Mottled sculpin	0.152	0.146	0.0483		0.131		0 143	0.4870	1.1073	0.15
Common carp		0.0912	0.0235	0. 175	0.3603	0.0513	0 187		0.8883	0.12
Ninespine stickleback				0.124		0.379	0.156	0.0112	0.6702	0.09
Quillback			0.0628				0.534		0.5968	0.08

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ESTIMATES (IN MILLIONS) OF ANNUAL ENTRAINMENT LOSSES OF FISH LARVAE AND FISH AT THE D.C. COOK NUCLEAR PLANT, SOUTHEASTERN LAKE MICHIGAN, 1975 - 1982.

CALCULATIONS USE ACTUAL REPORTED FLOW RATES OF THE CIRCULATING WATER SYSTEM

	YEAR OF ESTIMATE									
Taxon	1975	1976	1977	1978	1979	1980	1981	1982	Total	% Total
Burbot		0.0202		0.102				0.3428	0.4650	0.06
Deepwater sculpin				0.178	0.0141				0.1921	0.03
Unidentified sculpins	0.1899	0.0892	0.0918	0.175	0.0905	0.607	0.5953	0.5744	2.4731	0.33
Unidentified minnows			0.1248		0.8138	0.2846	0.1714	1.0280	2.4226	0.32
Unidentified coregonines			0.0850						0.0850	0.01
Unidentified darters			0.0276						0.0276	<0.01
Poor condition	0.555	2.8642	0.4274	3.352	5.9935	6.4765	11.859	17.9458	55.4734	7.43
Unidentified larvae	0.1693	0.0349	0.0887	0.100					0.3929	0.05
Total larvae	77.08664	58.91119	33.5088	41.3215	137.0399	92.1583	139.2696	167.1054	746.4013	
Total eggs	743.1879	2,269.4543	1,320.301	5,840.8138	1,392.5408	3,334.692	995.94	7,005.26	22,902.1898	

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**ESTIMATES (IN MILLIONS) OF ANNUAL ENTRAINMENT LOSSES OF FISH LARVAE AND FISH AT THE D.C.
COOK NUCLEAR PLANT, SOUTHEASTERN LAKE MICHIGAN, 1975 - 1982.**

CALCULATIONS USE ACTUAL REPORTED FLOW RATES OF THE CIRCULATING WATER SYSTEM

	YEAR OF ESTIMATE									
Taxon	1975	1976	1977	1978	1979	1980	1981	1982	Total	% Total
Total Cook Plant Flow (millions of m ³)	1,298	1,292	1,138	2,370	2,476	2,830	2,753	2,749.		

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CONDITIONS/EFFECTS CONSIDERED

CONDITIONS ¹	EFFECTS CONSIDERED
1 NORMAL	Deadweight, Thermal, Pressure (Pressure is considered for vessel and pipe stress only)
2 UPSET	Same as 1, OBE
3 EMERGENCY	Same as 1, DBE (Thermal is considered for supports loads only)
4 FAULTED	Same as 1, Postulated Pipe Rupture (Thermal is considered for supports loads only)
5 FAULTED (Including DBE) ²	Same as 3, Postulated Pipe Rupture

NOTES

The Operating Load Combination categories are defined as follows:		
1	NORMAL Condition	Any condition in the course of system startup, operation in the design power range and system shutdown, in the absence of Upset, Emergency or Faulted Conditions.
2	UPSET Condition	Any deviations from Normal Conditions anticipated to occur often enough that design should include a capability to withstand the conditions without operational impairment. The Upset Condition includes those transients caused by a fault in a system component requiring its isolation from the system, transients due to a loss of load or power and any system upset not resulting in a forced outage. The Upset Conditions include - the effect of the specified earthquake for which the system must remain operational or must regain its operational status.
3	EMERGENCY Condition	Any deviations from normal conditions which require shutdown for correction of the conditions or repair of damage in the system. The conditions have a low probability of occurrence but are included to provide assurance that no gross loss or structural integrity will result as a concomitant effect of any damage developed in the system. The total number of postulated occurrences for such events shall not exceed twenty-five (25). Among the Emergency Conditions may be a specified earthquake for which safe shutdown is required.
4	FAULTED Condition	Those combinations of conditions associated with extremely low probability postulated events whose consequences are such that the integrity and operability of the nuclear energy system may be impaired to the extent where considerations of public health and safety are involved. Such considerations require compliance with safety criteria as may be specified by jurisdictional authorities.

¹ Definition of Terms based on the Summer 1968 Addenda to the ASME Boiler and Pressure Vessel Code, Section III.

² The Westinghouse Nuclear Steam Supply System Equipment (piping and equipment) was designed for the faulted (including Design Basis Earthquake) condition by using the methodology presented in WCAP 5890 Rev. 1, which includes combining LOCA (Reactor Coolant Pipe Break) and Design Basis Earthquake (DBE) via Square Root Sum of Squares (SRSS).

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(PART A)

LOADING CONDITIONS AND STRESS LIMITS: PRESSURE VESSELS

LOADING CONDITIONS		STRESS INTENSITY LIMITS	NOTE
1.	Normal Conditions	(a) $P_m \leq S_m$	
		(b) $P_m \text{ (or } P_L) + P_B \leq 1.5S_m$	1
		(c) $P_m \text{ (or } P_L) + P_B + Q \leq 3.0S_m$	2
2.	Upset Condition	(a) $P_m \leq S_m$	
		(b) $P_m \text{ (or } P_L) + P_B \leq 1.5S_m$	1
		(c) $P_m \text{ (or } P_L) + P_B + Q \leq 3.0S_m$	2
3.	Emergency Condition	(a) $P_m \leq 1.2S_m$ or S_y whichever is larger	
		(b) $P_m \text{ (or } P_L) + P_B \leq 1.5(1.2S_m)$ or $1.5S_y$ whichever is larger	3
4.	Faulted Condition	See Note 4	

KEY:

P_m = primary general membrane stress intensity

P_L = primary local membrane stress intensity

P_B = primary bending stress intensity

Q = secondary stress intensity

S_m = stress intensity value from ASME B&PV Code, Section III, Nuclear Vessels - 1968 Edition, Table N-421

S_y = minimum specified material yield (ASME B&PV Code, Section III, Nuclear Vessels - 1968 Edition, Table N-424)

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(PART B)

LOADING CONDITIONS AND STRESS LIMITS: PRESSURE PIPING

LOADING CONDITIONS		STRESS LIMITS
1.	Normal Conditions	(a) $P_m \leq S_h$
		(b) $P_L + P_B \leq S_h$
		(c) $S_E \leq S_A$
2.	Upset Conditions	(a) $P_m \leq 1.2S_h$
		(b) $P_L + P_B \leq 1.2S_h$
		(c) $S_E \leq S_A$
3.	Emergency Conditions	(a) $P_m \leq 1.2S_h$
		(b) $P_L + P_B \leq 1.5(1.2 S_h)$
4.	Faulted Conditions	See Notes 4 & 5

WHERE:

P_m = primary hoop membrane stress (pressure)

P_L = primary longitudinal membrane stress (pressure)

P_B = primary longitudinal bending stress (deadweight, seismic)

S_h = allowable stress at temperature from USAS B31.1 Code for Pressure Piping, 1967 Edition

S_C = allowable stress at 70°F from USAS B31.1 Code for Pressure Piping, 1967 Edition

S_E = computed expansion stresses

S_A = allowable stress range for expansion stresses (fatigue criteria) = $(1.25 S_C + 0.25 S_h) f$
(See Note 5)

F = stress range reduction factor for cycling per USAS B 31.1 Code for pressure piping, 1967 Edition

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(PART C)

LOADING CONDITIONS AND STRESS LIMITS: EQUIPMENT SUPPORTS

	LOADING CONDITIONS	STRESS INTENSITY LIMITS
1.	Normal Condition	Working Stresses or Applicable Factored Load Design Values
2.	Upset Condition	Working Stresses or Applicable Factored Load Design Values
3.	Emergency Condition	Within yield after load redistribution
4.	Faulted Condition	Permanent Deflection of Supports Limited to Maintain Supported Equipment Within Design Limits. See Note 4

Support loads are combined by algebraic summation, in plus and minus directions of the three orthogonal planes, so as to obtain the maximum positive or maximum negative value of design load.

The thermal load component is not considered when algebraic summation with this load would lessen the support design load.

The seismic load component is considered to have both a positive and a negative sign. The sign of the seismic component is chosen so as to maximize the absolute value of the support design load.

NOTES

Note 1: The limits on local membrane stress intensity ($P_L \leq 1.5S_m$) and primary membrane plus primary bending stress intensity (P_m (or P_L) + $P_B \leq 1.5S_m$) need not be satisfied at a specific location if it can be shown by means of limit analysis or by tests that the specified loading's do not exceed 2/3 or the lower bound collapse load as per paragraph N417.6(b) of the ASME B&PV Code, Section III, Nuclear Vessels - 1968 Edition.

Note 2: In lieu of satisfying the specific requirements for the local membrane ($P_L \leq 1.5S_m$) or the primary plus secondary stress intensity ($P_L + P_B + Q \leq 3S_m$) at a specific location, the structural action may be calculated on a plastic basis and the design will be considered to be acceptable if shake-down occurs, as opposed to continuing deformation, and if the deformations which occur prior to shakedown do not exceed specified limits, as per paragraph N417.6(a) (2) of the ASME B&PV Code, Section III, Nuclear Vessels - 1968 Edition.

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- Note 3: The limits on local membrane stress intensity ($P_L \leq 1.5S_m$) and primary membrane plus primary bending stress intensity (P_m (or P_L) + $P_B \leq 1.5S_m$) need not be satisfied at a specific location if it can be shown by means of limit analysis or by tests that the specified loading do not exceed 120 percent of 2/3 of the lower bound collapse load as per paragraph N417.10(c) of the ASME B&PV Code, Section III, Nuclear Vessels - 1968 Edition.
- Note 4: A plastic instability analysis may be performed for specific cases considering the actual strain-hardening characteristics of the material, but with yield strength adjusted to correspond to the tabulated value at the appropriate temperature in Table N-424 or N-425, as per paragraph N-417.11(c) of the ASME B&PV Code, Section III, Nuclear Vessel - 1968 Edition.
- Note 5: Where the sum of P_L and P_B stresses due to pressure, deadweight and other sustained loads is less than S_h , the difference between S_h and this sum may be added to the term $0.25 S_h$ in the formula for S_A stated above for determining the allowable stress range S_A . (see Para. 102.3.2 of the USAS B31.1 Code for pressure piping, 1967 Edition.)

The following segments of piping systems and components have been analyzed to ASME III, Appendix F for faulted conditions:

1. RCP seal leak-off return line penetration piping between inside and outside containment isolation valves (CPN 37) and
2. Piping from the RCP seal bypass line check valves to the normally closed QRV-150 valve in the common discharge header (no CPN).
3. Piping from normally closed PRT drain line isolation valve and the RCDT drain line check valve inside containment to the normally closed isolation valve outside containment (CPN 40).
4. Accumulator fill line piping from outside containment isolation valve to the normally closed inlet valves at each accumulator and the normally closed valves in the flow path to the low head SI hot leg loops (CPN 32).
5. U-1 only: Piping between Primary Water supply line isolation valve outside containment to isolation valves inside containment. (CPN 33).
6. U-1 only: Piping between Demineralized Water supply line isolation valve outside containment to manual isolation valves for hose connections inside containment. (CPN 36).
7. U-1 only: Piping between sump pump discharge check valves inside containment and discharge isolation valve outside containment. (CPN 41).
8. U-1 only: NESW Supply to and Return from Lower Containment Ventilation Units (CPN-17, -18, -19, & -20 for NESW supply; CPN-21, -22, -23,-24 for NESW return).

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9. U-1 only: NESW Supply to and Return from Upper Containment Ventilation Units (CPN-26, -27, -84, & -85 for NESW supply and return).
10. U-1 only: NESW Supply and Return to Instrumentation Room Ventilation Units (CPN-73 for both ventilation units NESW supply and return).
11. U-1 only: NESW Supply to and Return from the RCP Motor Air Coolers (CPN-26, -27, -84, & -85 for NESW supply and return).
12. U-1 only: Reactor Vessel Head Vent Piping from Reactor Head to Anchor 1-ARC-R626 (analyzed to Appendix F for post-accident head vent valve operation).
13. The Seismic Class 1 Enhanced Service Structure Components, including the lift rig assembly (without tripod), CRDM seismic platform, safety related pipe supports and safety class cable trays, bridges and associated supports are designed to Section III, subsection NF, of the 1995 ASME Boiler and Pressure Vessel Code, through 1996 Addenda.
14. U-2 only: Reactor Vessel Head Vent Piping from the Reactor Head to Anchor 2-ARC-R665 (analyzed to Appendix F for post-accident head vent valve operation).