27
12-4-78

SAND78-0557
Unlimited Release

MASTER

Correlations Between Wind Flow and Population Location at 67 Light Water Nuclear Power Plant Sites

Jeremy L. Sprung, George P. Steak, Ann W. Frazier

Office of Research and Development

SF 2900 Q(7-73)

Prepared for

U. S. NUCLEAR REGULATORY COMMISSION

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

CORRELATIONS BETWEEN WIND FLOW AND POPULATION
LOCATION AT 67 LIGHT WATER NUCLEAR POWER PLANT SITES

10.4.25

Sandia Laboratories
Albuquerque, New Mexico 87185
operated by
Sandia Corporation
for the
U.S. Department of Energy

NOTICE

This report was prepared as an official report sponsored by the United States Government. Neither the United States nor the United States Department of Energy, its agents or their employees, nor any of their contractors, subcontractors, or their employees make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or suitability of any information appearing hereon, or for the use of such information for purposes not intended by the contractor.

Prepared for
Office of Nuclear Regulatory Research
Probabilistic Analysis Staff
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Under Interagency Agreement DOE 40-550-75
NPC FIN No. A1042

ABSTRACT

Correlations between wind flow and population location have been sought by linear regression analysis at 67 light water nuclear power plant sites. These analyses show that, in general, reactor site wind and population distributions are not strongly correlated and that, to the degree that they are correlated, positive and negative correlations occur at different sites with nearly equal frequency. Since the slopes of these correlations (regression lines) are distributed symmetrically about zero, the effect of wind/population correlations upon the calculation of aggregate risk due to the operation of light water reactors would be largely self-cancelling. Thus, the neglect of wind/population correlations in the calculations of the Reactor Safety Study appears to be of little significance.

TABLE OF CONTENTS

Introduction	<u>Page</u> 9
Data Sources	9
Mathematical Methods	10
Results and Discussion	14
Conclusions	28
References	37
Appendix A: Linear Regression Equations	39
Appendix B: Wind Rose Data	40

CORRELATIONS BETWEEN WIND FLOW AND POPULATION
LOCATION AT 67 LIGHT WATER NUCLEAR POWER PLANT SITES

Introduction. Because wind flow and population location are both likely to be influenced by topography, it has been suggested [1] that wind distributions and population distributions ought to be correlated and that the neglect of these correlations in the calculations of the Reactor Safety Study [2] could have resulted in significant underestimates of accident consequences. This paper presents the results of an investigation of correlations between wind roses and population locations at 67 of the 68 power plant sites included in the Reactor Safety Study.

Data Sources. Site wind roses (fraction of time the wind blows into one of the sixteen compass sectors centered on the site) were taken from the Environmental Reports or from the Preliminary or Final Safety Analysis Reports submitted to the Nuclear Regulatory Commission as part of the licensing process for nuclear power plants [3]. For 50 of the 67 sites examined wind roses were available for each of the six Pasquill-Gifford atmospheric stability classes [4], which allowed wind/population correlations to be sought as a function of atmospheric stability. Appendix B tabulates the wind roses used in this study.

Site population distributions were taken from the Reactor Safety Study for which they had been constructed using 1970 U.S. Census Bureau data. All of the distributions had been constructed upon polar coordinate grids having sixteen, 22.5°

sectors centered on the compass directions and 34 unequal, radial spatial intervals.

Mathematical Methods. For any set of atmospheric conditions (Pasquill-Gifford stability classes A through F [4] and all classes combined) correlations between a site wind rose and the site's population distribution were sought by linear regression analysis using the wind rose as the dependent variable. Before performing an analysis the site's population distribution was converted to a population rose (the fraction of the site's population distribution contained within each of the 16 sectors of that distribution). To avoid having to terminate the population distribution at some arbitrary radial distance, before conversion to a population rose, the distribution was weighted for its susceptibility, as a function of radial distance, to early fatalities or to total latent cancer fatalities.

Weighting factors were set equal to the conditional probability per person, as a function of radial distance, of the occurrence of early fatalities or total latent cancer fatalities as calculated by the Consequence Model (CRAC) of the Reactor Safety Study using a uniform population density (100 people per square mile), a PWR1 release (core meltdown followed by overpressure failure of the containment followed by a steam explosion), and wind speeds appropriate for the seven classes (classes A-F and all classes combined) of wind data, for which weighting factors were calculated. Weighting factors appropriate for the six Pasquill-Gifford stability classes A through F were calculated using representative wind speeds (2,3,5,7,3, and 2 m/s,

respectively, for classes A-F), which were held constant throughout each CRAC calculation. For the case of all atmospheric stabilities combined, weighting factors were calculated using 91 weather sequences selected by stratified sampling from a one-year meteorological record for Indian Point. Table 1 presents the 14 sets of weighting factors developed by these calculations and Figure 1 presents the equations used to construct the population roses (weighted population fractions by compass sector), which were the independent variable in each linear regression analysis. Finally, Appendix A presents the equations used to perform the linear regression analysis. In Figure 1 and in Appendix A, $\{w_i\}$ denotes a wind rose and $\{P_i\}$ denotes a population rose.

Figure 1: Population Rose Equations

i = sector index ($i = 1, 16$)

j = spatial interval index ($j = 1, 34$)

P_{ij} = population of spatial interval j of sector i

f_j = weighting factor for spatial interval j

$$P_i = \frac{\sum_j f_j P_{ij}}{\sum_{ij} f_j P_{ij}} = \text{population rose value for sector } i$$

TABLE 1

POPULATION WEIGHTING FACTORS FOR EARLY FATALITIES

DISTANCE (MILES)	METEOROLOGICAL CONDITIONS (STABILITY CLASS, WIND SPEED)						(ALL, -)
	(A, 2 M/S)	(B, 3 M/S)	(C, 5 M/S)	(D, 7 M/S)	(E, 3 M/S)	(F, 2 M/S)	
.25	1.80E-01	1.67E-01	1.50E-01	1.35E-01	0.	0.	6.46E-02
.75	2.00E-02	1.30E-01	6.02E-02	4.50E-02	0.	0.	2.46E-02
1.25	0.	1.31E-01	5.35E-02	3.96E-02	2.32E-02	0.	2.29E-02
1.75	0.	5.21E-03	4.79E-02	3.67E-02	2.75E-02	4.66E-04	2.24E-02
2.25	0.	0.	4.03E-03	3.49E-02	2.59E-02	7.74E-03	2.13E-02
2.75	0.	0.	0.	3.37E-02	2.40E-02	1.93E-02	1.97E-02
3.25	0.	0.	0.	2.19E-02	2.40E-02	1.73E-02	1.73E-02
3.75	0.	0.	0.	8.91E-03	2.34E-02	1.60E-02	1.45E-02
4.25	0.	0.	0.	1.29E-03	2.29E-02	1.64E-02	1.22E-02
4.75	0.	0.	0.	1.10E-04	2.25E-02	1.60E-02	1.07E-02
5.50	0.	0.	0.	0.	2.20E-02	1.56E-02	8.41E-03
6.50	0.	0.	0.	0.	1.86E-02	1.51E-02	6.14E-03
7.75	0.	0.	0.	0.	9.99E-03	1.47E-02	4.80E-03
9.25	0.	0.	0.	0.	2.39E-03	1.43E-02	2.60E-03
11.25	0.	0.	0.	0.	1.33E-04	9.90E-03	8.20E-04
13.75	0.	0.	0.	0.	0.	4.05E-03	9.97E-05
16.25	0.	0.	0.	0.	0.	6.68E-04	4.51E-04
18.75	0.	0.	0.	0.	0.	1.04E-04	2.43E-04
22.50	0.	0.	0.	0.	0.	0.	4.24E-06
27.50	0.	0.	0.	0.	0.	0.	0.
32.50	0.	0.	0.	0.	0.	0.	0.
37.50	0.	0.	0.	0.	0.	0.	0.
42.50	0.	0.	0.	0.	0.	0.	0.
47.50	0.	0.	0.	0.	0.	0.	0.
52.50	0.	0.	0.	0.	0.	0.	0.
57.50	0.	0.	0.	0.	0.	0.	0.
62.50	0.	0.	0.	0.	0.	0.	0.
67.50	0.	0.	0.	0.	0.	0.	0.
77.50	0.	0.	0.	0.	0.	0.	0.
92.50	0.	0.	0.	0.	0.	0.	0.
125.00	0.	0.	0.	0.	0.	0.	0.
175.00	0.	0.	0.	0.	0.	0.	0.
275.00	0.	0.	0.	0.	0.	0.	0.
425.00	0.	0.	0.	0.	0.	0.	0.

TABLE 1 (continued)

POPULATION WEIGHTING FACTORS FOR TOTAL LATENT CANCER FATALITIES

DISTANCE (MILES)	METEOROLOGICAL CONDITIONS (STABILITY CLASS, WIND SPEED)						
	(A, 2 M/S)	(B, 3 M/S)	(C, 5 M/S)	(D, 7 M/S)	(E, 3 M/S)	(F, 2 M/S)	(ALL, -)
.25	0.	0.	3.	3.	1.40E-03	1.71E-33	1.37E-03
.5	3.27E-02	0.	0.	7.	3.23E-03	5.58E-34	3.81E-33
1.25	1.54E-02	0.	3.	3.	1.95E-03	1.68E-33	3.26E-03
1.75	1.02E-02	2.73E-02	8.36E-04	0.	0.	2.89E-33	2.32E-03
2.25	0.82E-03	0.07E-03	1.04E-02	0.	0.	2.52E-33	1.43E-03
2.75	6.64E-03	5.39E-03	7.99E-33	0.	0.	9.04E-34	1.39E-33
3.25	6.99E-03	3.83E-03	5.35E-03	3.51E-03	0.	0.	1.75E-03
3.	6.01E-03	2.92E-03	4.12E-33	6.21E-03	0.	0.	2.16E-03
4.25	5.33E-03	2.07E-03	3.27E-03	6.87E-03	0.	0.	2.37E-03
4.75	4.79E-03	2.36E-03	2.66E-03	6.06E-03	3.	3.	2.47E-03
5.50	4.16E-03	1.83E-03	2.02E-33	4.07E-03	0.	0.	2.63E-03
6.50	3.55E-03	1.36E-03	1.79E-03	3.53E-03	9.90E-04	0.	2.63E-03
7.75	1.68E-03	6.08E-04	1.29E-03	2.60E-03	3.33E-03	0.	2.62E-03
9.25	1.44E-03	5.13E-04	9.26E-04	2.84E-03	4.60E-03	3.	2.38E-03
11.25	1.26E-03	4.27E-04	3.81E-04	1.58E-03	4.04E-33	1.46E-03	1.96E-03
13.75	1.03E-03	3.55E-04	2.78E-04	1.33E-03	2.89E-03	2.83E-33	1.92E-03
16.25	8.64E-04	3.05E-04	2.15E-04	1.02E-03	2.23E-03	3.13E-33	1.17E-33
18.75	7.61E-04	2.69E-04	1.74E-04	8.06E-04	1.79E-03	2.59E-03	9.26E-04
22.50	6.49E-04	2.29E-04	1.48E-04	6.01E-04	1.32E-33	1.88E-33	7.34E-04
27.50	2.72E-04	1.93E-04	1.26E-04	2.49E-04	9.22E-04	1.26E-33	4.81E-04
32.50	2.35E-04	1.68E-04	1.11E-04	1.94E-04	8.16E-04	9.03E-04	3.61E-04
37.50	2.07E-04	1.50E-04	1.00E-04	1.57E-04	6.12E-04	6.38E-04	2.71E-04
42.50	1.86E-04	1.36E-04	9.19E-05	1.32E-04	4.71E-04	5.52E-04	1.99E-04
47.50	1.70E-04	1.24E-04	8.53E-05	1.13E-04	2.05E-04	3.99E-04	1.49E-04
52.50	1.57E-04	1.16E-04	7.98E-05	9.89E-05	1.67E-04	2.91E-04	1.31E-04
57.50	1.46E-04	1.08E-04	7.53E-05	9.78E-05	1.38E-04	1.20E-04	1.05E-04
62.50	1.36E-04	1.02E-04	7.15E-05	7.91E-05	1.15E-04	9.11E-05	8.98E-05
67.50	1.29E-04	9.66E-05	6.83E-05	7.21E-05	9.75E-05	7.15E-05	8.18E-05
77.50	1.16E-04	8.79E-05	6.29E-05	6.13E-05	7.13E-05	4.20E-05	7.51E-05
92.50	1.03E-04	7.86E-05	5.72E-05	5.10E-05	4.94E-05	2.39E-05	6.39E-05
125.00	8.46E-05	6.58E-05	4.91E-05	3.89E-05	2.77E-05	1.76E-07	4.65E-05
175.00	7.15E-05	5.68E-05	4.27E-05	3.09E-05	1.52E-05	9.29E-08	2.77E-05
275.00	2.64E-05	3.15E-05	2.98E-05	1.69E-05	7.07E-07	4.03E-08	1.50E-05
425.00	8.51E-06	1.44E-05	1.36E-05	8.07E-06	2.40E-08	1.96E-38	8.14E-10

Results and Discussion. Table 1 shows that under unstable or neutral atmospheric conditions (classes A-D), the probability of early fatalities decreases so rapidly with distance that people located more than 5 miles from a reactor are only minimally subject to early fatalities (conditional probability of early fatalities $< 10^{-4}$). Table 1 also shows that, at any distance where early fatalities are probable (conditional probability of early fatalities $> 10^{-2}$), total latent cancer fatalities are highly improbable (conditional probability of total latent cancer fatalities ~ 0). This relationship results from the fact that, at any distance where early fatalities are probable, few people would be likely to survive long enough to die later from latent effects.

Table 2 lists the number of correlations (regression lines) calculated for each stability-class/health-effect combination. Altogether, 934 regression lines were calculated. Because wind data for several years was available for a number of sites, the total number of regression lines calculated was greater than 50 for each of the Pasquill-Gifford stability classes and was greater than 67 for the case of all stability classes combined.

The statistical significance of a correlation (regression line) is given by three variables, $\hat{\beta}$, $t_{\hat{\beta}}$, and r^2 , which are defined in Appendix A. The quantity $\hat{\beta}$ is the best estimate of the slope of the assumed linear dependence of the wind rose upon the population rose. If $\hat{\beta} \approx 0$, the wind rose and population rose are essentially uncorrelated. The value of $t_{\hat{\beta}}$ is a measure of how statistically different from zero is the value of $\hat{\beta}$. A

TABLE 2
Number of Correlations Calculated for Each
Stability Class/Health Effect Combination

Stability Class	A	B	C	D	E	F	T ^a	Total
Weighting Factor:								
Early Fatalities	64	61	61	64	64	64	89	467
Total Latent Cancer Fatalities	64	61	61	64	64	64	89	<u>467</u>
TOTAL								934

a) T = all stability classes combined.

regression line which gives $|t_{\hat{\beta}}| \leq 1$ has a value of $\hat{\beta}$ that is statistically little different from zero. Thus, even if that regression line has $|\hat{\beta}| \gg 0$, the points are so scattered that the correlation is of little statistical significance. Conversely, a regression line which has $\hat{\beta} \approx 0$ and $t_{\hat{\beta}} \gg 0$ is statistically highly significant but is practically of no consequence because the small value of $\hat{\beta}$ means that the wind rose is nearly uniform. Finally, r^2 measures the portion of the variation in the wind rose which is accounted for by the variation in the population rose. Since r^2 is a monotone function of $|t_{\hat{\beta}}|$, regression lines which have slopes statistically different from zero will also have values of r^2 which are substantially larger than zero.

Tables 3 and 4 list the wind/population correlations which were found to be significant at the 1 percent level. The correlations presented in Table 3 were obtained using population distributions, which were weighted for their susceptibility to early fatalities. Those presented in Table 4 were obtained using total latent cancer fatality weighting factors.

Table 3 shows that, when calculated using early fatality weighting factors, 21 of 467 correlations had t-tests (values of $t_{\hat{\beta}}$) that were significant at the 1 percent level, 19 of these 21 correlations had r^2 values > 0.4 , and 9 of those 19 had absolute values of $\hat{\beta} > 0.3$. Table 3 also shows that when weighted for early fatalities, none of the 67 sites examined gave correlations significant at the 1 percent level for more than 3 of the 7 atmospheric stability classes.

TABLE 3

WIND/POPULATION CORRELATIONS SIGNIFICANT AT THE 1 PERCENT LEVEL (EARLY FATALITY WEIGHTING FACTORS)

SITE	TIME PERIOD ^a	CLASS ^b	$\bar{C}$	$\bar{B}$	r^2	$\bar{C}$	t_p
HELLESCOTE 1	1971	F	.27973	-.14391	.42866	.02819	-3.24132
HELVENWICK 1 + 2	9/25/71-1/5/73	F	.21633	.16370	.41160	.03226	3.12996
MYRON 1	6/1/73-5/31/74	B	.25378	-.16156	.49212	.56672	-2.68814
CALVERT CLIFF 1 + 2		F	.31972	-.50659	.50658	.59440	-1.79121
D. C. COOK 1 + 2	1968	B	.08934	.41617	.39761	.22422	3.13359
DAVIS-RE 1	8/4/74-8/3/75	E	.28751	-.38337	.49544	.36845	-3.73764
DAVIS-RE 1	8/4/74-8/3/75	F	.35197	-.65797	.71931	.07219	-6.93194
J. C. GINN 1	66-67	F	.29432	-.39396	.44954	.13276	-1.14136
F. I. HATCH 1 + 2	6/1/70-8/31/74	F	.27744	-.13182	.52241	.02246	-1.91153
F. I. HATCH 1 + 2	6/70-5/71	F	.26345	-.15329	.39769	.13733	-1.44134
INDIAN POINT 2 + 3	1/1/71-12/31/71	F	.12112	.51870	.47522	.16223	3.56142
MC VANCEE	7/67-4/68	F	.27514	-.19684	.46274	.14923	-3.47153
WILGRIEM 1		F	.29785	-.31128	.48835	.07391	-3.11245
OPATRIC 1 + 2	6/1/71-5/31/72	E	.14268	.43771	.45761	.13261	3.43679
RANCHO SEC0	67-69	F	.36121	-.25991	.42389	.04714	-3.24132
RANCHO SEC0	67-69	E	.27881	-.14718	.42306	.13949	-2.22193
RANCHO SEC0	67-69	F	.27688	-.11849	.57545	.15397	-4.55969
ST. LUCIE 1	1/1/73-12/31/73	F	.22686	.14289	.46404	.03641	1.45354
SHOREHAM	10/1/73-9/30/74	F	.30337	-.36410	.44657	.07627	-3.16114
WATFORD 1	5/72-4/73	G	.25854	-.22994	.51884	.07253	-3.94541
ZIMMER 1	3/1/72-2/28/74	F	.10629	.64123	.45241	.06229	3.40145

a) DURING WHICH THE WIND ROSE DATA WAS COLLECTED.

b) PASQUILL-GIFFORD ATMOSPHERIC STABILITY CLASS (T = ALL CLASSES COMBINED).

TABLE 4

WIND/POPULATION CORRELATIONS SIGNIFICANT AT THE 1 PERCENT LEVEL (TOTAL LATENT CANCER FATALITY WEIGHTING FACTORS)

STH	TIME PERIOD ^a	CLASS ^b	α	β	r^2	σ	t_s
HEAVER VALLEY 1 + 2	9/5/69-9/5/70	E	.09736	.61276	.61464	.05219	4.65774
HEAVER VALLEY 1 + 2	9/5/69-9/5/70	F	.13330	.40713	.41263	.05399	1.11011
HRAIRWOOD 1	11/1/73-12/31/74	B	.10731	.57512	.50715	.03954	4.68212
HRAIRWOOD 1	11/1/73-12/31/74	C	.12932	.52671	.51611	.03919	3.86424
HRAIRWOOD 1	11/1/73-12/31/74	D	.10213	.28698	.53456	.02612	4.61395
HRAIRWOOD 1	11/1/73-12/31/74	E	.10806	.30951	.55293	.04427	4.14352
HRAIRWOOD 1	11/1/73-12/31/74	F	.20233	.22950	.47999	.04113	3.59415
HRAIRWOOD 1	11/1/73-12/31/74	F	.10182	.27964	.72954	.02193	6.12971
CATAMNA 1	6/30/71-6/30/72	A	-.00230	1.24059	.45625	.17312	3.42513
D. C. COOK 1 + 2	1967	D	.34595	-.41854	.50013	.03715	3.74157
CRYSTAL RIVER	1/1/75-12/31/75	F	.34427	-.71066	.51341	.12111	3.32117
CRYSTAL RIVER	1/1/75-12/31/75	F	.36365	-.24655	.44168	.04793	3.32734
DWESDEN 2 + 3		F	.19159	.25263	-.13611	.04117	3.14441
FARLEY 1 + 2		A	.33955	-.30753	.43191	.04271	3.26249
R. E. GINNA	66-67	A	.17011	.36932	.66029	.04539	5.31213
C. T. HAYES 1 + 2	9/1/70-9/31/76	A	.32029	-.34167	.61759	.04149	3.16029
INDIAN POINT 2 + 3	1/1/71-12/31/71	E	.17197	.32693	.59351	.05271	4.71136
INDIAN POINT 2 + 3	1/1/71-12/31/71	F	.16761	.33980	.59374	.05142	4.76475
HILLSTONE 1 + 2	12/66-11/67	C	.37495	-.33314	.43654	.07711	3.23046
PRATER 1 + 2	6/1/71-5/31/72	D	.07425	.77114	.66187	.06169	5.23475
PRATER 1 + 2	6/1/71-5/31/72	F	.13550	.47116	.50439	.05348	4.44641
RANCHO SEC0	11/69-10/71	A	.36333	-.69419	.53941	.08667	4.41421
RANCHO SEC0	11/69-10/71	A	.36797	-.66625	.50271	.07513	3.79193
RANCHO SEC0	67-69	F	.31126	-.22930	.41485	.04766	3.15145
RANCHO SEC0	67-69	A	.39091	-.92716	.41485	.05212	3.16432
W. B. ROBINSON 2	4/14/67-4/19/68	A	.38766	-.59448	.47163	.04612	3.53947
ST. LUCIE 1	1/1/73-12/31/73	A	.16548	.37319	.39291	.05141	3.16432
ST. LUCIE 1	1/1/73-12/31/73	C	.19726	.26146	.55612	.04441	4.14441
SALEM 1 + 2	6/69-5/71	C	.31646	-.37234	.46273	.07317	3.15953
SQUOYAN 1 + 2	4/2/71-3/31/72	F	.13313	.57949	.40378	.08273	3.22215
STERLING, N. V.	5/13/73-5/13/74	E	.32169	-.43615	.53911	.07440	4.14662
STERLING, N. V.	5/13/73-5/13/74	F	.31064	-.44991	.51465	.06993	3.15215
STERLING, N. V.	5/13/73-5/13/74	F	.29130	-.22278	.39449	.04736	3.14211
TRUJAN	9/1/71-8/31/72	B	.03237	.70282	.45979	.12051	3.45191
TRUJAN	9/1/71-8/31/72	C	.04367	.75932	.43118	.12413	3.25795
TRUJAN	9/1/71-8/31/72	D	.06982	.70466	.50804	.08721	4.75111
TRUJAN	9/1/71-8/31/72	E	.12464	.49841	.46474	.11475	3.11153
TRUJAN	9/1/71-8/31/72	F	.09185	.63889	.63251	.07443	4.92977
WATTS BAR 1 + 2	7/1/73-6/30/75	F	.02801	.69061	.52206	.07706	3.91452
ZIMMER 1	5/1/72-2/20/74	E	.16733	.60380	.47763	.05045	3.79246
ZIMMER 1	5/1/72-2/20/74	F	.11031	.50362	.94475	.02614	1.47221
ZIMMER 1	5/1/72-2/20/74	F	.13250	.40531	.67046	.03883	3.33674

a) DURING WHICH THE WIND ROSE DATA WAS COLLECTED.

b) PASQUILL-GIFFORD ATMOSPHERIC STABILITY CLASS (T = ALL CLASSES COMBINED).

Table 4 shows that, when calculated using total latent cancer fatality weighting factors, 42 of 467 correlations had values of $t\beta$ which were significant at the 1 percent level, all but two of these 42 correlations had r^2 values >0.4 , and 34 had absolute values of $\beta > 0.3$. Table 4 also shows that, when weighted for total latent cancer fatalities, 5 sites (Braidwood, Rancho Seco, Sterling, Trojan and Zimmer) gave correlations significant at the 1 percent level for more than 2 atmospheric stability classes.

Figures 2 through 9 present plots of the population rose (weighted population fraction) and the wind rose versus compass sector for a number of sites which yielded wind/population correlations significant at the 1 percent level. As expected, some river valley sites have positive correlations because of wind channeling toward nearby populations, while some sites located on the shores of large bodies of water have negative correlations, because prevailing winds blow offshore away from nearby populations. However, all river valley sites did not yield positive correlations between wind flow and population locations, nor did all shoreline sites have negative correlations.

Figures 2 and 3 show that highly significant negative correlations occur under stable atmospheric conditions at the Sterling and Pilgrim reactor sites, which are located on large bodies of water, Lake Ontario and the Atlantic Ocean, respectively. Negative correlations occur because, under stable conditions, at both sites the predominate offshore winds blow

away from population centers located along the shoreline. However, Figure 4 shows that, at the R. E. Ginna site, under A stability along shore winds predominate, which causes wind and population to be positively correlated.

Figure 5 shows that under stable atmospheric conditions river valley wind channeling causes wind and population to be positively correlated at the Prairie power plant site, which is located on the Mississippi river southeast of Minneapolis. Similar results were obtained for Zimmer (Figure 6) and Indian Point (Figure 7) which are located in the Ohio and Hudson river valleys, respectively. The Zimmer correlation ($t_p = 15.5$) was the most significant correlation calculated. Positive correlations between wind and population are typical of Indian Point. However, those calculated for unstable atmospheric conditions have regression line slopes which differ little from zero.

Figure 8 shows that all river valley sites do not yield positive wind/population correlations. At the Waterford site the Mississippi river valley is so broad that no significant wind channeling occurs. Consequently, the very non-uniform population rose produced by the use of early fatality weighting factors correlates negatively with the nearly uniform, class C, wind rose.

Figure 9 shows that sites located on relatively flat topography can also give positive wind/population correlations. At Braidwood when the atmospheric stability is class B, the wind

Figure 2: Plot of weighted population fraction (total latent cancer fatality weighting factors) and E stability wind rose versus compass sector for the Sterling, New York, power plant site showing that for these conditions wind and population are negatively correlated ($\beta = 0.44$, $r^2 = 0.54$, $t\beta = -4.0$) at this great lakes shore site.

Figure 3: Plot of weighted population fraction (early fatality weighting factors) and F stability wind rose versus compass sector for the Pilgrim power plant site showing that for these conditions wind and population are negatively correlated ($\beta = -0.31$, $r^2 = 0.41$, $t\beta = -3.1$) at this Atlantic coast site.

Figure 4: Plot of weighted population fraction (total latent cancer fatality weighting factors) and A stability wind rose versus compass sector for the R. E. Ginna power plant site showing that positive correlations ($\beta = 0.37$, $r^2 = 0.67$, $t_0 = 5.3$) between wind and population do occur at some shoreline sites under some meteorological conditions.

Figure 5: Plot of weighted population fraction (early fatality weighting factors) and E stability wind rose versus compass sector for the Prairie power plant site showing that for these conditions wind and population are positively correlated ($\beta = 0.44$, $r^2 = 0.46$, $t\beta = 3.4$) at this river valley site.

Figure 6: Plot of weighted population fraction (total latent cancer fatality weighting factors) and F stability wind rose versus compass sector for the Zimmer power plant site showing the highly significant positive correlation ($\beta = 0.58$, $r^2 = 0.94$, $t\beta = 15.5$) which occurs at this river valley site under these meteorological conditions.

Figure 7: Plot of weighted population fraction (early fatality weighting factors) and F stability wind rose versus compass sector for the Indian Point power plant site that for these conditions wind and population are positively correlated ($\beta = 0.52$, $r^2 = 0.48$, $t\beta = 3.6$) at this river valley site.

Figure 8: Plot of weighted population fraction (early fatality weighting factors) and C stability wind rose versus compass sector for the Waterford power plant site showing that for broad river valley sites wind and population can be negatively correlated ($\beta = -0.22$, $r^2 = 0.52$, $t\beta = 3.9$) under some meteorological conditions.

Figure 9: Plot of weighted population fraction (total latent cancer fatality weighting factors) and B stability wind rose versus compass sector for the Braidwood power plant site showing that wind and population can be positively correlated ($\beta = 0.58$, $r^2 = 0.59$, $t\beta = 4.5$) for some Great Plains sites under some meteorological conditions.

frequently blows toward Chicago. Accordingly, when the population about the Braidwood site is weighted for its susceptibility to latent cancer fatalities, wind and population are found to be positively correlated. However, because early fatality weighting factors decrease rapidly with distance, should a release of radioactivity occur at Braidwood, the risk of early fatalities in Chicago is minimal.

In Tables 5 and 6, the number of regression lines significant at the 10, 5, 2, and 1 percent levels are tabulated by sign of regression line slope, atmospheric stability, and set of population weighting factors used in the regression calculation. These tables also present the number of significant correlations expected for each set of conditions (slope sign, atmospheric stability, weighting factors) on the basis of chance alone. Table 5 shows that, when calculated using early fatality weighting factors (1) for unstable or neutral atmospheric conditions (classes A-D) at each level of significance the number of correlations obtained was less than or about equal to the number expected on the basis of chance alone, and (2) for stable conditions (classes E and F) or for all conditions (class T) about four times as many significant correlations were obtained as would be predicted from chance alone. In addition, Table 5 shows that, when early fatality weighting factors were used, all stability conditions yielded approximately equal numbers of positive and negative correlations at each level of significance.

Table 6 shows that, when calculated using total latent cancer fatality weighting factors, all atmospheric conditions

TABLE 5

Number of Regression Slopes Calculated Using Early Fataility
Weighting Factors, Which Were Significant at the Indicated Percentage Level

<u>Sign of Slope</u>		<u>Positive</u>				<u>Negative</u>			
<u>Significance Level (Percent)</u>		<u>10</u>	<u>5</u>	<u>2</u>	<u>1</u>	<u>10</u>	<u>5</u>	<u>2</u>	<u>1</u>
<u>Stability Class</u>	<u>Number</u>								
A	If random	3.2	1.6	0.6	0.3	3.2	1.6	0.6	0.3
	Actual	1	1	0	0	0	0	0	0
B	If random	3.0	1.5	0.6	0.3	3.0	1.5	0.6	0.3
	Actual	2	1	1	1	3	1	1	1
C	If random	3.0	1.5	0.6	0.3	3.0	1.5	0.6	0.3
	Actual	1	1	1	1	1	1	1	0
D	If random	3.2	1.6	0.6	0.3	3.2	1.6	0.6	0.3
	Actual	3	2	1	0	2	2	0	0
E	If random	3.2	1.6	0.6	0.3	3.2	1.6	0.6	0.3
	Actual	6	3	3	2	6	3	1	1
F	If random	3.2	1.6	0.6	0.3	3.2	1.6	0.6	0.3
	Actual	12	9	6	6	9	7	5	3
T ^a	If random	4.4	2.2	0.9	0.4	4.4	2.2	0.9	0.4
	Actual	11	7	5	5	10	8	4	1

a) T = all stability classes combined.

TABLE 6

Number of Regression Slopes Calculated Using Total Latent Cancer Weighting Factors, Which Were Significant at the Indicated Percentage Level

<u>Sign of Slope</u>		<u>Positive</u>				<u>Negative</u>			
<u>Significance Level (Percent)</u>		<u>10</u>	<u>5</u>	<u>2</u>	<u>1</u>	<u>10</u>	<u>5</u>	<u>2</u>	<u>1</u>
<u>Stability Class</u>	<u>Number</u>								
A	If random Actual	3.2 11	1.6 9	0.6 5	0.3 5	3.2 16	1.6 11	0.6 7	0.3 3
B	If random Actual	3.0 8	1.5 6	0.6 2	0.3 1	3.0 6	1.5 4	0.6 3	0.3 2
C	If random Actual	3.0 4	1.5 4	0.6 2	0.3 2	3.0 5	1.5 4	0.6 3	0.3 3
D	If random Actual	3.2 6	1.6 3	0.6 2	0.3 1	3.2 9	1.6 9	0.6 6	0.3 3
E	If random Actual	3.2 10	1.6 8	0.6 5	0.3 1	3.2 9	1.6 8	0.6 8	0.3 5
F	If random Actual	3.2 9	1.6 9	0.6 5	0.3 2	3.2 11	1.6 8	0.6 5	0.3 4
T ^a	If random Actual	4.4 16	2.2 10	0.9 7	0.4 4	4.4 17	2.2 12	0.9 9	0.4 7

a) T = all stability classes combined.

yielded about four times more correlations at each level of significance than would be predicted from chance alone. Again at each level of significance approximately equal numbers of positive and negative correlations were obtained.

Figures 10 through 23 present histograms of $\hat{\beta}$ values for all 7 atmospheric stabilities and each set of population weighting factors. In general all of the histograms are approximately symmetric about zero. For unstable conditions, when early fatality weighting factors are used, narrow distributions of $\hat{\beta}$ values are obtained (Figures 17 through 20). Broader distributions are obtained in all of the remaining cases. However, even for the broader distributions most $\hat{\beta}$ values have absolute values >0.4 .

Conclusions. The preceding results suggest (1) that at most light water reactor sites wind flow and population location are not significantly correlated and (2) that, for those sites where significant correlations do occur, the numbers of positive and negative correlations are about equal and the distribution of the $\hat{\beta}$ values of the correlations (regression lines) is approximately symmetric about zero. Accordingly, were the Consequence Model (CRAC) of the Reactor Safety Study modified to reflect the occurrence of wind/population correlations at specific sites, the effects of wind/population correlations upon aggregate risk estimates would be largely self-cancelling at all consequence magnitudes. This conclusion is likely to be invalid only if most of the sites, which contributed to the aggregate risk calculated for a given consequence magnitude, had wind/population correlations with

the same sign. Since this does not seem to be true for the set of 68 sites examined by the Reactor Safety Study, the omission of wind/population correlations from the calculations of that study would appear to be of little significance.

Figure 10: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class A using total latent cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	0	0
-0.9	1	1
-0.8	1	0
-0.7	2	1
-0.6	3	1
-0.5	4	1
-0.4	5	1
-0.3	13	8
-0.2	14	1
-0.1	23	9
0.0	34	11
0.1	39	5
0.2	44	5
0.3	52	8
0.4	54	2
0.5	57	3
0.6	59	2
0.7	61	2
0.8	62	1
0.9	62	0
1.0	64	2

Figure 11: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class B using total latent cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	0	0
-0.9	0	0
-0.8	0	0
-0.7	1	1
-0.6	1	0
-0.5	1	0
-0.4	4	3
-0.3	11	7
-0.2	16	5
-0.1	27	11
0.0	39	12
0.1	44	5
0.2	53	9
0.3	55	2
0.4	56	1
0.5	59	3
0.6	59	0
0.7	59	0
0.8	60	1
0.9	60	0
1.0	60	0
	61	1

Figure 12: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class C using total latent cancer fatality weighting factors.

Figure 13. Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class D using total latent cancer fatality weighting factors.

Figure 14: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class E using total latent cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	1	1
-0.9	0	0
-0.8	0	0
-0.7	0	0
-0.6	1	1
-0.5	1	1
-0.4	2	1
-0.3	4	2
-0.2	14	10
-0.1	24	10
0.0	37	13
0.1	44	7
0.2	53	9
0.3	58	5
0.4	63	5
0.5	61	2
0.6	63	2
0.7	63	0
0.8	63	0
0.9	63	0
1.0	64	1

Figure 15: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class F using total latent cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	0	0
-0.9	1	1
-0.8	1	0
-0.7	1	0
-0.6	3	2
-0.5	3	0
-0.4	4	1
-0.3	4	0
-0.2	10	6
-0.1	17	7
0.0	34	17
0.1	43	9
0.2	49	6
0.3	53	4
0.4	60	7
0.5	63	3
0.6	63	0
0.7	63	0
0.8	63	0
0.9	64	1
1.0	64	0

Figure 16: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class T using total latent cancer fatality weighting factors.

Figure 17: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class A using total early cancer fatality weighting factors.

Figure 18: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class B using total early cancer fatality weighting factors.

Figure 19: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class C using total early cancer fatality weighting factors.

Figure 20: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class D using total early cancer fatality weighting factors.

Figure 21: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class E using total early cancer fatality weighting factors.

Figure 22: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class R using total early cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	0	0
-0.9	0	0
-0.8	0	0
-0.7	1	1
-0.6	1	0
-0.5	4	3
-0.4	7	3
-0.3	12	5
-0.2	16	4
-0.1	31	15
0.0	47	16
0.1	52	5
0.2	54	2
0.3	59	5
0.4	60	1
0.5	63	3
0.6	64	1
0.7	64	0
0.8	64	0
0.9	64	0
1.0	64	0

Figure 23: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class T using total early cancer fatality weighting factors.

INTERVAL MIDPOINT	CUMULATIVE NUMBER	NUMBER IN INTERVAL
-1.0	0	0
-0.9	0	0
-0.8	0	0
-0.7	0	0
-0.6	0	0
-0.5	0	0
-0.4	0	0
-0.3	1	1
-0.2	11	10
-0.1	30	19
0.0	53	23
0.1	61	8
0.2	64	3
0.3	64	0
0.4	64	0
0.5	64	0
0.6	64	0
0.7	64	0
0.8	64	0
0.9	64	0
1.0	64	0

Figure 20: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class D using total early cancer fatality weighting factors.

Figure 21: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class E using total early cancer fatality weighting factors.

Figure 22: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class F using total early cancer fatality weighting factors.

Figure 23: Histogram of $\hat{\beta}$ values for linear regressions of wind rose upon population fraction for stability class T using total early cancer fatality weighting factors.

References

1. Nuclear Power: Issues and Choices - Report of the Nuclear Energy Policy Study Group, S. M. Keeny, Jr., Chairman, Ford Foundation, 1977.
2. Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants, Appendix VI: Calculations of Reactor Accident Consequences, WASH-1400 (NUREG-75/014), U.S. Nuclear Regulatory Commission, Washington, DC, (1975).
3. All of the wind roses used in this study were taken from reports archived in the docket room of the NRC Library located in the Phillips Building, 7920 Norfolk Avenue, Bethesda, MD.
4. a) F. Pasquill, The Estimation of the Dispersion of Wind-borne Material, Meteorological Magazine, 90, 33 (1961);
b) F. Gifford, Use of Routine Meteorological Observations for Estimating Atmospheric Dispersion, Nuclear Safety 2, 47, (1961).

Appendix A: Linear Regression Equations

$\{w_i\}_n$ = wind rose

$$w_1 = \sin^{-1} w_1^{1/2}$$

$\{p_i\}_n$ = population rose

$$p_1 = \sin^{-1} p_1^{1/2}$$

$$n = 16$$

$$E(w_1) = \alpha + \beta p_1$$

$$\hat{\beta} = \frac{\sum_{i=1}^n (w_1 - \bar{w})(p_1 - \bar{p})}{\sum_{i=1}^n (p_1 - \bar{p})^2}$$

$$\hat{\alpha} = \bar{w} - \hat{\beta} \bar{p}$$

$$\hat{\sigma} = \left\{ \frac{n}{n-2} \left[\sigma_w^2 - \hat{\beta}^2 \sigma_p^2 \right] \right\}^{1/2}$$

$$\sigma_x^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2, \quad x = w \text{ or } p$$

$$t_{\hat{\beta}} = n^{1/2} \hat{\beta} \frac{\sigma_p}{\hat{\sigma}} = \hat{\beta} \sigma_p \left[\frac{n-2}{\sigma_w^2 - \hat{\beta}^2 \sigma_p^2} \right]^{1/2}$$

$$r^2 = \left[\hat{\beta} \frac{\sigma_p}{\sigma_w} \right]^2 = \frac{t_{\hat{\beta}}^2}{t_{\hat{\beta}}^2 + n - 2}$$

The transformation $y = \sin^{-1} x^{1/2}$ was used because it yields a transformed variable (w_1 or p_1) which has a variance approximately independent of its mean. The equations for $\hat{\alpha}$, $\hat{\beta}$, $\hat{\sigma}$, $t_{\hat{\beta}}$, and r^2 may be found in any standard statistics textbook which treats regression theory (see, for example, A. M. Mood, Introduction to the Theory of Statistics, McGraw Hill, 1950, p. 292).

Appendix B: Wind Rose Data

Explanation of Titles:

ARKA'ISAS 1 + 2

| |
| | reactors
| site name

```

190T      6/69-5/70
|          |
|          +----- stability
|          |         class (T=
|          |         all classes
|          |         combined)
|          |
|          +----- period of data
|          |         collection
|
+----- anemometer
        height (ft)

```

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

ARKANSAS 1 + 2

19CT 6/69-5/73

.0151	.0371	.0562	.0904	.0773	.0572	.0422	.1034
.0743	.0522	.0743	.1255	.0873	.0532	.0211	.0251

ARKANSAS 1 + 2

40A 2/7/72-2/6/73

.0127	.0163	.0410	.1212	.0934	.0615	.0579	.0398
.0367	.0524	.1193	.1971	.1121	.0181	.0103	.0181

ARKANSAS 1 + 2

40B 2/7/72-2/6/73

.0150	.0172	.0644	.2039	.1416	.1036	.0579	.0536
.0193	.0215	.0687	.0966	.0944	.0279	.0164	.0086

ARKANSAS 1 + 2

40C 2/7/72-2/6/73

.0163	.0236	.0966	.1884	.1105	.1014	.0797	.0489
.0399	.0386	.0381	.0873	.0996	.0272	.0091	.0139

ARKANSAS 1 + 2

40D 2/7/72-2/6/73

.0445	.0533	.1138	.1829	.1069	.0669	.0372	.0369
.0262	.0166	.0514	.1066	.0831	.0312	.0202	.0293

ARKANSAS 1 + 2

40E 2/7/72-2/6/73

.0516	.1218	.1687	.1364	.0883	.0621	.0435	.0342
.0368	.0225	.0352	.0582	.0553	.0235	.0259	.0323

ARKANSAS 1 + 2

40F 2/7/72-2/6/73

.0585	.1914	.2343	.1398	.0421	.0193	.0172	.0185
.0260	.0157	.0378	.0656	.0686	.0278	.0267	.0314

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

ARKANSAS 1 + 2

4LT 2/7/72-2/6/73

.0354	.0574	.1369	.1614	.0922	.0616	.0309	.0327
.0271	.0228	.0497	.0918	.0743	.0274	.0195	.0269

DUANE ARNOLD

165A 1971

.0114	.0338	.0228	.0076	.0266	.0380	.0184	.1293
.1445	.1369	.0546	.0266	.0190	.1293	.1217	.0494

DUANE ARNOLD

165B 1971

.0189	.0169	.0333	.0330	.0425	.0283	.0302	.1368
.1321	.0896	.0513	.0613	.0283	.0849	.0396	.0613

DUANE ARNOLD

165C 1971

.0323	.0099	.0246	.0345	.0591	.0567	.1567	.1404
.1158	.1640	.0419	.0591	.0271	.0887	.1281	.0616

DUANE ARNOLD

165D 1971

.0365	.0404	.0422	.0430	.0720	.0680	.0714	.1059
.0345	.0465	.0264	.0465	.0522	.0754	.1096	.0855

DUANE ARNOLD

165E 1971

.0327	.0262	.0241	.0384	.0515	.0523	.0426	.1656
.0723	.0556	.0397	.0474	.0809	.1014	.0711	.0545

DUANE ARNOLD

165F 1971

.0461	.0341	.0333	.0379	.0507	.0727	.0855	.1173
.0598	.0419	.0447	.0704	.0795	.0590	.0863	.0878

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

DUANE ARNOLO		16ST		1971			
.0340+	.0318	.0336	.0393	.0595	.0615	.0765	.1290
.0729	.0532	.0363	.0510	.0623	.0832	.0954	.0747

BAILLY S		23CT		12/4/51-12/3/57			
.0673	.0693	.0629	.0381	.0282	.0533	.0658	.0637
.1743	.0949	.0456	.0685	.0556	.0396	.0376	.0643

BEAVER VALLEY 1 + 2		150A		9/5/69-9/5/70			
.0000	.0000	.1531	.0769	.0385	.0385	.0769	.0769
.0769	.0385	.0385	.0769	.1531	.0769	.0385	.0385

BEAVER VALLEY 1 + 2		150B		9/5/69-9/5/70			
.0000	.0356	.1787	.1787	.0000	.0000	.1172	.0356
.0356	.0000	.0356	.0356	.1072	.0715	.1431	.0356

BEAVER VALLEY 1 + 2		150C		9/5/69-9/5/70			
.0682	.0682	.0355	.0591	.0545	.0500	.0545	.0500
.0455	.0318	.0364	.0409	.0591	.1500	.1136	.0227

BEAVER VALLEY 1 + 2		150D		9/5/69-9/5/70			
.0454	.0442	.0430	.0382	.0478	.0585	.0311	.0287
.0263	.0323	.0323	.0717	.1302	.2091	.0920	.0753

BEAVER VALLEY 1 + 2		150E		9/5/69-9/5/70			
.0222	.0195	.0183	.0430	.0628	.0638	.0575	.0667
.0411	.0338	.0441	.1000	.1731	.1372	.0504	.0658

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

BEAVER VALLEY 1 + 2

150F

9/5/69-9/5/70

.0065	.0000	.0032	.0179	.0487	.1071	.1299	.2305
.2127	.1136	.0357	.0455	.0195	.0130	.0081	.0081

BEAVER VALLEY 1 + 2

150T

9/5/69-9/5/70

.0233	.0206	.0229	.0396	.0592	.0669	.0640	.0871
.0780	.0514	.0405	.0827	.1365	.1229	.0496	.0550

BELLEFONTAINE 1

54T

1971

.0064	.0310	.0396	.0366	.0532	.0640	.0533	.0630
.0754	.0919	.0824	.0706	.0670	.0598	.0759	.0692

BRAIDWOOD 1

35T

7/77-6/72

.0358	.0574	.0570	.0611	.0823	.0588	.0498	.0851
.0762	.0515	.0419	.0787	.0935	.0761	.0426	.0321

BRAIDWOOD 1

30A

11/1/73-10/31/74

.0318	.0267	.0257	.0400	.0338	.0533	.0492	.0730
.0360	.0687	.0505	.0564	.1190	.1395	.0882	.0441

BRAIDWOOD 1

30B

11/1/73-10/31/74

.0389	.0622	.0466	.0337	.0130	.0363	.0363	.0648
.1011	.0777	.1011	.0907	.0881	.0855	.0596	.0608

BRAIDWOOD 1

30C

11/1/73-10/31/74

.0582	.0656	.0367	.0309	.0405	.0290	.0347	.1120
.1139	.0800	.0695	.0656	.0849	.0676	.0483	.0676

WIND POSSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

BRAIDWOOD 1			36D		11/1/73-10/31/74		
.0573	.0710	.0574	.0364	.0311	.0558	.0561	.0912
.1353	.0739	.0625	.0633	.0582	.0620	.0503	.0582

BRAIDWOOD 1			3CE		11/1/73-10/31/74		
.0452	.0323	.0364	.0434	.0518	.0559	.0882	.1452
.1349	.0869	.0573	.0473	.0544	.0500	.0265	.0507

BRAIDWOOD 1			36F		11/1/73-10/31/74		
.0214	.0238	.0403	.0648	.0733	.0696	.0599	.0941
.1179	.0612	.0745	.0751	.0849	.0495	.0342	.0354

BRAIDWOOD 1			36T		11/1/73-10/31/74		
.0483	.0478	.0447	.0429	.0437	.0557	.0629	.1052
.1132	.0771	.0647	.0613	.0700	.0654	.0451	.0518

BRUNNYS FERRY 1, 2, + 3			36GT		2/11/67-12/31/68		
.0669	.0564	.0384	.0319	.0722	.1012	.0989	.0717
.0661	.0581	.0373	.0322	.0672	.0553	.0539	.0524

BRUNSWICK 1 + 2			35CA		9/25/70-1/5/73		
.0337	.0471	.0640	.0741	.1111	.1044	.1236	.0741
.1279	.1684	.0168	.0370	.0303	.0007	.0303	.0505

BRUNSWICK 1 + 2			35CB		9/25/70-1/5/73		
.0424	.0716	.0422	.0564	.0875	.0531	.0371	.0822
.1406	.2122	.0100	.0186	.0186	.0133	.0265	.0451

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

BRUNSWICK 1 + 2

35CC

9/25/70-1/5/73

.0733	.0622	.1389	.0644	.0667	.0467	.0244	.0711
.0374	.1422	.0311	.0356	.0489	.0267	.0556	.0444

BRUNSWICK 1 + 2

35CD

9/25/70-1/5/73

.0774	.1346	.1349	.0517	.0355	.0419	.0257	.0419
.0713	.1495	.0755	.0378	.0340	.0294	.0464	.0725

BRUNSWICK 1 + 2

35CE

9/25/70-1/5/73

.0695	.0712	.0541	.0480	.0354	.0386	.0358	.0569
.0663	.1452	.1329	.0626	.0341	.0492	.0407	.0516

BRUNSWICK 1 + 2

35CF

9/25/70-1/5/73

.0446	.0772	.0591	.0552	.0438	.0635	.0726	.0629
.0719	.1036	.0385	.0862	.0484	.0416	.0313	.0545

BRUNSWICK 1 + 2

35CT

9/25/70-1/5/73

.0554	.1038	.0780	.0531	.0438	.0474	.0376	.0555
.0773	.1448	.0683	.0532	.0363	.0361	.0403	.0586

BYRON 1

36A

6/1/73-5/31/74

.0485	.0295	.0316	.0295	.0135	.0380	.0633	.0992
.0886	.1116	.0323	.0802	.0781	.0591	.0731	.0612

BYRON 1

36B

6/1/73-5/31/74

.0514	.0280	.0280	.0000	.0374	.0234	.0374	.1186
.0667	.0888	.1075	.0935	.0654	.1075	.0488	.0654

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

BYRON 1		3CC		6/1/73-5/31/74			
.0133	.0208	.0332	.0355	.0333	.0466	.0510	.0643
.1175	.1643	.0353	.0621	.0865	.1664	.0843	.0576

BYRON 1		3LD		6/1/73-5/31/74			
.0486	.0707	.0751	.0538	.0465	.0358	.0529	.0616
.0730	.0796	.0507	.0670	.0643	.0830	.0632	.0601

BYRON 1		3LE		6/1/73-5/31/74			
.0301	.0398	.0595	.0560	.0476	.0411	.0848	.1100
.0390	.0364	.0757	.0612	.0599	.0615	.0379	.0375

BYRON 1		3LF		6/1/73-5/31/74			
.0203	.0131	.0210	.0406	.0464	.0500	.1015	.1922
.1197	.0450	.0355	.0616	.0573	.0848	.0645	.0464

BYRON 1		3LT		6/1/73-5/31/74			
.0372	.0400	.0582	.0490	.0439	.0393	.0689	.0967
.0891	.0804	.0653	.0747	.0630	.0763	.0572	.0525

CALVERT CLIFF 1 + 2		33A					
.1176	.0614	.0346	.0458	.0329	.0295	.0407	.0424
.0285	.0311	.0450	.0701	.0510	.0926	.1142	.1635

CALVERT CLIFF 1 + 2		33B					
.0828	.0828	.0191	.0510	.0510	.0318	.0446	.0191
.0319	.0127	.0191	.0573	.0446	.1338	.1274	.1911

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

CALVERT CLIFF 1 + 2

33C

.0966	.0462	.0462	.0756	.0336	.0336	.0504	.0672
.0163	.0336	.0252	.0504	.0588	.1345	.1092	.1216

CALVERT CLIFF 1 + 2

33D

.0719	.0539	.0290	.0539	.0408	.0456	.0078	.0678
.0394	.0477	.0423	.0615	.0553	.1141	.0954	.1127

CALVERT CLIFF 1 + 2

33E

.0538	.0366	.0253	.0320	.0306	.0299	.1206	.1270
.0725	.0387	.0366	.0461	.0637	.1323	.1083	.0721

CALVERT CLIFF 1 + 2

33F

.0115	.0185	.0191	.0130	.0130	.0125	.0522	.1911
.1316	.1625	.0707	.1028	.0672	.0517	.0235	.0221

CALVERT CLIFF 1 + 2

33T

.0577	.0375	.0237	.0350	.0281	.0243	.0017	.1159
.0977	.0701	.0448	.0636	.0606	.1026	.0784	.0842

CATAWBA 1

30A

6/30/71-6/30/72

.0512	.0964	.0738	.0655	.0476	.0286	.0119	.0202
.0310	.0893	.0905	.0266	.0131	.0107	.0060	.0298

CATAWBA 1

30D

6/30/71-6/30/72

.0383	.0776	.0924	.0451	.0114	.0238	.0076	.0676
.0347	.0396	.0757	.0472	.0257	.0278	.0261	.0785

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

CATAWBA 1

3CE 6/30/71-6/30/72

.0686	.2277	.0450	.0316	.0178	.0374	.0085	.0267
.0502	.2041	.1134	.0343	.0218	.0218	.0272	.0637

CATAWBA 1

3CF 6/30/71-6/30/72

.0766	.1022	.0392	.0285	.0299	.0530	.0373	.0327
.0396	.1928	.0691	.0509	.0308	.0299	.0317	.1088

CATAWBA 1

3CT 6/30/71-6/30/72

.0787	.1753	.0602	.0326	.0251	.0399	.0166	.0232
.0560	.2072	.0866	.0428	.0242	.0263	.0260	.0752

J. C. COOK 1 + 2

20CA 1967

.0299	.0330	.0403	.0313	.0647	.0544	.0513	.0511
.0546	.0419	.0612	.0780	.0844	.0732	.1122	.1365

D. C. COOK 1 + 2

20CB 1967

.0479	.0345	.0704	.0274	.0511	.0757	.0822	.0692
.0594	.0377	.0412	.0720	.0938	.0728	.0726	.0927

D. C. COOK 1 + 2

20CC 1967

.0481	.0492	.0729	.0511	.0651	.0646	.0766	.0665
.0759	.0336	.0496	.0716	.0952	.0599	.0484	.0718

D. C. COOK 1 + 2

20CD 1967

.0490	.0428	.0455	.0307	.0627	.0822	.0783	.1183
.1185	.0515	.0361	.0452	.0727	.0560	.0480	.0625

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

D. C. COOK 1 + 2

20GE 1967

.0496	.0427	.0342	.0336	.0561	.0706	.0971	.1389
.1313	.0726	.0313	.0297	.0375	.0442	.0337	.0469

D. C. COOK 1 + 2

20UF 1967

.0433	.0545	.0613	.0719	.0732	.0919	.0752	.1047
.1493	.0901	.0404	.0369	.0385	.0273	.0223	.0194

D. C. COOK 1 + 2

20BT 1967

.0425	.0419	.0496	.0399	.0634	.0719	.0728	.0907
.1154	.0584	.0451	.0557	.0691	.0567	.0622	.0777

D. C. COOK 1 + 2

20LA 1968

0.0000	0.0000	.0158	.0678	0.0000	.0416	.2497	0.0000
0.0000	.0470	.0366	.1248	.1199	.1352	.1199	.0416

D. C. COOK 1 + 2

20LB 1968

0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	.0378	.0647	.0975	0.0000

D. C. COOK 1 + 2

200C 1968

0.0000	0.0000	0.0000	.0810	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	.5000	0.0000	0.0000	0.0000

D. C. COOK 1 + 2

200D 1968

.0268	.0230	.0172	.0185	.0639	.0807	.1177	.0883
.0745	.0604	.0523	.0809	.1324	.0659	.0443	.0535

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

D. C. COOK 1 + 2			200E		1968		
.0189	.0331	.0235	.0386	.0771	.0679	.0695	.0609
.1173	.0900	.0659	.0945	.1104	.0653	.0324	.0277

D. C. COOK 1 + 2			200F		1968		
.0261	.0354	.0403	.0458	.0657	.0957	.0329	.0991
.1342	.0718	.0515	.0454	.0341	.0333	.0507	.0713

D. C. COOK 1 + 2			200T		1968		
.0243	.0314	.0303	.0372	.0665	.0860	.0959	.0479
.1134	.0723	.0545	.0647	.0762	.0522	.0461	.0531

D. C. COOK 1 + 2			200A		1969		
.0133	.0121	.0169	.0369	.0357	.0467	.0285	.0328
.0186	.0750	.0978	.0779	.0745	.0971	.1791	.1510

D. C. COOK 1 + 2			200B		1969		
.0163	.0123	.0245	.0238	.0253	.0460	.0474	.0729
.0782	.0920	.0459	.0598	.0690	.0813	.1434	.1166

D. C. COOK 1 + 2			200C		1969		
.0235	.0595	.0489	.0692	.0365	.0355	.0355	.0650
.0365	.0438	.0314	.0590	.0687	.1334	.1638	.0849

D. C. COOK 1 + 2			200D		1969		
.0387	.0600	.0707	.0570	.0866	.0537	.0656	.1031
.0674	.0387	.0255	.0707	.0935	.0423	.0451	.0716

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

D. C. COOK 1 + 2

200E 1969

.0469	.0441	.0472	.0634	.0633	.0631	.0851	.0658
.0782	.0615	.0530	.0721	.0962	.0571	.0426	.0574

J. C. COOK 1 + 2

200F 1969

.0393	.0422	.0436	.0643	.0685	.0684	.0706	.0839
.1558	.1565	.0668	.0330	.0201	.0111	.0305	.0454

J. C. COOK 1 + 2

200T 1969

.0381	.0426	.0473	.0577	.0614	.0617	.0701	.0720
.0781	.0723	.0545	.0666	.0807	.0570	.0666	.0729

D. C. COOK 1 + 2

200A 1970

.0479	.0300	.0255	.0982	.1441	.0867	.0663	.0523
.0363	.0313	.0676	.0842	.0555	.0816	.0536	.0370

D. C. COOK 1 + 2

200B 1970

.0317	.0433	.0366	.0400	.0933	.0817	.0384	.0167
.0350	.0450	.0384	.0900	.0550	.0633	.0884	.0433

D. C. COOK 1 + 2

200C 1970

.0117	.0568	.0379	.1060	.0492	.0398	.0454	.0379
.0777	.0171	.0285	.0777	.0587	.0322	.0739	.1496

D. C. COOK 1 + 2

200D 1970

.0529	.0530	.0553	.0771	.0567	.0833	.0885	.0661
.0475	.0632	.0632	.0534	.0515	.0314	.0716	.0746

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

D. C. COOK 1 + 2			206E	1976			
.0158	.0561	.0345	.0568	.0582	.0593	.0749	.0967
.0307	.0696	.0589	.0578	.0752	.0516	.0607	.0613

D. C. COOK 1 + 2			206F	1976			
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	.3762	.6238
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

D. C. COOK 1 + 2			206Y	1976			
.0386	.0567	.0534	.0591	.0535	.0612	.0711	.0928
.0365	.0675	.0588	.0588	.0732	.0514	.0615	.0618

COOPER S			318A	3/70-2/71			
.0499	.0147	.0188	.0073	.0179	.0463	.0742	.0925
.0052	.0663	.0293	.0279	.0632	.0802	.1727	.1516

COOPER S			3189	3/70-2/71			
.0429	.0173	.0260	.0260	.0173	.0303	.0303	.0693
.1255	.0775	.0260	.0303	.0260	.0390	.1255	.1905

COOPER S			318C	3/70-2/71			
.0702	.0351	.0175	.0351	.0175	.0307	.0833	.0677
.1404	.0633	.0307	.0132	.0044	.0482	.1272	.1754

COOPER S			318D	3/70-2/71			
.0306	.0344	.0497	.0372	.0448	.0608	.0827	.1077
.0359	.0552	.0330	.0250	.0337	.0618	.0854	.1077

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

COOPER S		316E		3/70-2/71			
.0659	.0288	.0323	.0348	.0438	.0659	.1126	.1445
.1295	.0741	.0307	.0198	.0348	.0573	.0741	.0505

COOPER S		318F		3/70-2/71			
.0212	.0155	.0149	.0200	.0269	.0647	.0956	.1231
.1700	.1385	.0658	.0487	.0441	.0395	.0570	.0446

COOPER S		318T		3/70-2/71			
.0607	.0248	.0310	.0267	.0342	.0582	.0999	.1156
.1173	.0750	.0371	.0296	.0414	.0599	.1002	.0944

COOPER S		318A		3/71-2/72			
.0681	.0217	.0122	.0223	.0233	.0424	.0620	.0954
.0396	.0612	.0437	.0419	.0469	.1023	.1230	.1437

COOPER S		3183		3/71-2/72			
.1263	.0211	.0456	.0351	.0526	.1193	.1018	.1088
.0456	.0175	.0105	.0175	.0456	.0456	.0877	.1193

COOPER S		318C		3/71-2/72			
.1100	.0500	.0200	.0900	.0600	.0667	.1433	.0900
.0500	.0100	.0167	.0267	.0200	.0167	.0567	.1433

COOPER S		318D		3/71-2/72			
.0389	.0416	.0465	.0478	.0623	.0943	.0814	.1284
.0735	.0262	.0163	.0199	.0328	.0723	.0735	.0852

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

COOPER S		318E		3/71-2/72			
.0307	.0255	.0169	.0186	.0336	.0887	.0777	.1357
.1247	.0560	.0471	.0499	.0458	.0928	.0957	.0586

COOPER S		318F		3/71-2/72			
.0139	.0111	.0076	.0132	.0306	.0591	.0869	.1186
.1230	.1265	.1056	.0688	.0556	.0667	.0681	.0445

COOPER S		318T		3/71-2/72			
.0024	.0262	.0219	.0209	.0376	.0684	.0767	.1140
.0345	.0588	.0453	.0407	.0437	.0840	.0353	.0996

COOPER S		318A		3/70-2/72			
.0001	.0186	.0151	.0155	.0207	.0440	.0675	.0942
.0376	.0643	.0373	.0359	.0541	.0925	.1452	.1473

COOPER S		318B		3/70-2/72			
.1339	.0197	.0354	.0276	.0354	.0719	.0630	.0866
.0946	.0472	.0197	.0236	.0354	.0433	.1102	.1575

COOPER S		318C		3/70-2/72			
.0377	.0430	.0155	.0625	.0391	.0469	.1133	.0898
.1116	.0469	.0234	.0195	.0117	.0313	.0338	.1642

COOPER S		318D		3/70-2/72			
.0335	.0359	.0484	.0410	.0514	.0734	.0820	.1155
.0676	.0443	.0275	.0257	.0332	.0659	.0312	.0995

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

COOPER S		318E		3/70-2/72			
.0549	.0281	.0281	.0299	.0404	.0729	.1314	.1418
.1282	.1629	.0361	.0290	.0382	.0685	.0808	.0531

COOPER S		318F		3/70-2/72			
.0165	.0142	.0123	.0173	.0284	.0629	.0925	.1215
.1323	.1338	.0801	.0561	.0481	.0499	.0672	.0450

COOPER S		318T		3/70-2/72			
.0613	.0265	.0273	.0275	.0356	.0624	.0843	.1150
.1079	.0704	.0406	.0341	.0423	.0730	.0882	.0967

CRYSTAL RIVER		33A		1/1/75-12/31/75			
.0300	.0400	.0844	.0875	.0350	.0181	.0225	.0387
.0562	.0267	.0625	.0061	.1425	.0544	.0131	.0381

CRYSTAL RIVER		33B		1/1/75-12/31/75			
.0101	.0380	.0758	.0808	.0303	.0354	.0606	.0505
.1111	.0606	.0960	.1061	.0657	.0606	.0253	.0354

CRYSTAL RIVER		33C		1/1/75-12/31/75			
.0224	.0762	.0831	.0658	.0740	.0336	.0493	.0493
.0740	.0830	.0852	.1054	.0650	.0673	.0224	.0448

CRYSTAL RIVER		33D		1/1/75-12/31/75			
.0302	.1055	.0618	.0552	.0387	.0547	.0472	.0502
.0763	.1266	.0723	.0608	.0527	.0678	.0291	.0628

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (NASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

CRYSTAL RIVER		33E		1/1/75-12/31/75			
.0479	.0347	.1274	.1123	.0740	.0849	.0383	.0597
.0366	.0278	.0370	.0610	.0383	.0320	.0494	.0698

CRYSTAL RIVER		33F		1/1/75-12/31/75			
.0347	.1050	.2353	.2239	.1133	.0859	.0165	.0108
.0051	.0013	0.0003	.0006	.0025	.0070	.0229	.0040

CRYSTAL RIVER		33T		1/1/75-12/31/75			
.0468	.0984	.1200	.1111	.0643	.0637	.0343	.0431
.0479	.0507	.0475	.0816	.0574	.0429	.0299	.0624

DAVIS-BE 1		35A		8/4/74-8/3/75			
.0100	.0323	.0967	.1208	.0537	.0323	.0215	.0752
.0205	.1102	.0438	.0323	.0108	.0429	.0215	.0108

DAVIS-BE 1		35B		8/4/74-8/3/75			
.0127	.0047	.1271	.1144	.0042	.0045	.0127	.0466
.0375	.1922	.1017	.0551	.0500	.0678	.0169	.0169

DAVIS-BE 1		35C		8/4/74-8/3/75			
.0209	.0693	.1293	.0865	.0261	.0201	.0086	.0281
.1109	.1413	.1154	.0433	.0577	.0693	.0577	.0231

DAVIS-BE 1		35D		8/4/74-8/3/75			
.0624	.0794	.0656	.0906	.0397	.0217	.0176	.0292
.0692	.1346	.1146	.0954	.0453	.0685	.0514	.0452

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLCMS(STARTING FROM NNE)**

DAVIS-BE 1

35E 8/4/74-8/3/75

.0118	.0308	.0303	.0504	.0423	.0666	.0603	.1026
.1723	.1555	.0885	.0634	.0334	.0370	.0190	.0137

DAVIS-BE 1

35F 8/4/74-8/3/75

.0384	.0118	.0101	.0335	.0557	.0676	.0946	.1436
.2028	.1629	.0653	.0948	.0185	.0152	.0094	.0034

DAVIS-BE 1

35T 8/4/74-8/3/75

.0391	.0581	.0574	.0767	.0404	.0379	.0387	.0645
.1160	.1245	.1022	.0806	.0390	.0526	.0368	.0299

DIABLO CANYON 1 + 2

25CA 10/69-9/70

.0883	.1178	.0623	.0430	.0238	.0521	.0487	.0396
.0204	.0215	.0263	.0374	.0487	.1314	.0974	.1416

DIABLO CANYON 1 + 2

25CB 10/69-9/70

.0571	.0888	.0335	.0375	.0197	.0434	.0493	.0414
.0295	.0335	.0256	.0434	.0572	.1381	.1538	.1381

DIABLO CANYON 1 + 2

25CC 10/69-9/70

.0687	.0483	.0254	.0216	.0153	.0522	.0662	.0293
.0216	.0242	.0254	.0318	.0394	.1947	.1807	.1552

DIABLO CANYON 1 + 2

25CD 10/69-9/70

.0354	.0287	.0125	.0118	.0228	.1319	.0796	.0413
.0147	.0133	.0147	.0332	.0295	.2469	.2119	.0847

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

DIABLO CANYON 1 + 2

25CE

10/69-9/70

.0377	.0093	.0363	.0059	.0167	.1501	.3781	.0239
.0372	.0390	.0393	.0216	.0320	.4545	.1583	.0108

DIABLO CANYON 1 + 2

25CF

10/69-9/70

.0310	.0325	.0341	.0023	.0035	.0982	.3987	.0278
.0351	.0111	.0111	.0187	.0734	.6025	.3425	.0035

DIABLO CANYON 1 + 2

25CT

10/69-9/70

.0295	.0545	.0166	.0135	.0149	.1031	.3749	.0397
.0121	.0143	.0143	.0261	.0446	.3633	.1284	.0596

DRESDEN 2 + 3

30CA

.0111	.0296	.0231	.0278	.0278	.0370	.0548	.0065
.0741	.0463	.0185	.0139	.0278	.0972	.0787	.1157

DRESDEN 2 + 3

30CB

.0195	.0583	.0534	.0339	.0534	.0971	.1262	.1213
.0262	.0563	.0195	.0291	.0291	.0922	.0388	.0437

DRESDEN 2 + 3

30CC

.0370	.0543	.0391	.0370	.0326	.0587	.0543	.0043
.0848	.0826	.0478	.0674	.0565	.0826	.0391	.1217

DRESDEN 2 + 3

30CD

.0280	.0342	.0321	.0433	.0311	.0428	.0530	.1219
.0333	.0898	.0586	.0793	.0729	.0714	.0683	.0831

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

DRESDEN 2 + 3

30CE

.0335	.0372	.0387	.0359	.0275	.0592	.0589	.0777
.1017	.1045	.0655	.1066	.0839	.0794	.0595	.0333

DRESDEN 2 + 3

300F

.0174	.0328	.0269	.0261	.0455	.0717	.0462	.0643
.0653	.1358	.0924	.1407	.1172	.0784	.0435	.0241

DRESDEN 2 + 3

30CT

.0306	.0388	.0333	.0356	.0335	.0601	.0552	.0803
.0698	.0963	.0665	.1011	.0852	.0801	.0561	.0494

FARLEY 1 + 2

33A

.0987	.1121	.0792	.0556	.0376	.0376	.0439	.0321
.0480	.0447	.0403	.0494	.0525	.1033	.0760	.0995

FARLEY 1 + 2

33B

.0714	.0923	.0749	.0575	.0470	.0436	.0470	.0645
.0597	.0900	.0675	.0557	.0543	.0784	.0523	.0436

FARLEY 1 + 2

33C

.0920	.1143	.0736	.0613	.0245	.0613	.0245	.0552
.0798	.0552	.0798	.0859	.0736	.0368	.0552	.0368

FARLEY 1 + 2

33D

.0371	.1146	.0733	.0491	.0367	.0363	.0594	.0867
.0353	.0735	.0397	.0355	.0290	.0513	.0688	.0636

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

FARLEY 1 + 2

33E

.0806	.0646	.0532	.0365	.0360	.0436	.0710	.0841
.0982	.0770	.0492	.0416	.0400	.0593	.0806	.0953

FARLEY 1 + 2

33F

.0734	.0486	.0387	.0293	.0287	.0398	.0480	.0779
.0370	.0453	.0381	.0464	.0687	.0723	.1507	.1645

FARLEY 1 + 2

33T

.0933	.0858	.0617	.0435	.0354	.0401	.0557	.0734
.0699	.0644	.0439	.0440	.0451	.0670	.0696	.0974

FARLEY 1 + 2

33A 4/72-3/73

.0735	.0693	.1087	.0956	.0527	.0444	.0249	.0277
.0388	.0748	.0492	.0534	.0367	.0686	.0679	.1157

FARLEY 1 + 2

33B 4/72-3/73

.0531	.0464	.0705	.0686	.0785	.0371	.0631	.0538
.0371	.0612	.0612	.0557	.0798	.0928	.0375	.0816

FARLEY 1 + 2

33C 4/72-3/73

.0347	.0423	.0635	.0635	.0794	.0582	.0370	.0635
.03476	.0952	.0582	.0688	.0370	.0582	.0688	.0741

FARLEY 1 + 2

330 4/72-3/73

.0776	.0580	.0696	.0766	.0512	.0346	.0541	.0546
.0839	.1010	.0366	.0288	.0376	.0688	.0390	.0678

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

FARLEY 1 + 2				33E 4/72-3/73			
.0515	.0635	.0513	.0759	.0593	.0526	.0456	.0685
.0086	.0729	.0427	.0417	.0372	.0689	.1146	.0858

FARLEY 1 + 2				33F 4/72-3/73			
.0829	.0747	.0579	.0496	.0364	.0339	.0458	.0552
.0521	.0502	.0301	.0439	.0370	.0734	.1111	.1657

FARLEY 1 + 2				33T 4/72-3/73			
.0729	.0637	.0710	.0736	.0525	.0416	.0451	.0535
.0559	.0757	.0414	.0425	.0401	.0711	.1962	.1023

FERMI 2				A 9/1/73-8/31/74			
.0467	.0700	.1051	.0441	.0156	.0480	.0402	.0376
.0545	.0532	.0674	.0947	.1167	.1107	.0636	.0259

FERMI 2				B 9/1/73-8/31/74			
.0326	.0741	.1163	.0512	.0279	.0372	.0233	.0279
.0605	.1023	.0651	.0651	.1070	.0791	.0744	.0512

FERMI 2				C 9/1/73-8/31/74			
.0447	.0935	.0976	.0569	.0285	.0407	.00300	.0285
.0013	.0732	.0894	.1732	.1016	.0650	.0691	.0569

FERMI 2				D 9/1/73-8/31/74			
.0257	.0700	.0735	.1044	.0578	.0455	.0246	.0235
.0593	.0794	.0347	.0835	.0973	.0835	.0403	.0332

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

FERMI 2				E	9/1/73-8/31/74		
.0247	.0560	.0633	.0644	.0542	.0605	.0580	.0435
.1002	.1009	.1222	.0803	.0680	.0406	.1392	.0238

FERMI 2				F	9/1/73-8/31/74		
.0130	.0237	.0186	.0395	.0485	.0818	.0323	.0722
.1261	.0922	.0029	.0074	.0953	.0620	.0626	.0197

FERMI 2				T	9/1/73-8/31/74		
.0253	.0531	.0633	.0686	.0500	.0583	.0499	.0413
.0880	.0090	.1113	.0830	.0661	.0630	.0469	.0263

FITZPATRICK				200A	1963-1964		
.0048	.0333	.0024	.0010	.0088	.0539	.0608	.0676
.0191	.0225	.0253	.1715	.0946	.0936	.0407	.0372

FITZPATRICK				200B	1963-1964		
.0586	.0617	.0093	.0039	.0162	.0532	.0486	.0578
.0293	.0470	.1303	.1503	.1195	.1049	.0547	.0648

FITZPATRICK				200C	1963-1964		
.0374	.0428	.0158	.0056	.0236	.0552	.0529	.0552
.0039	.0721	.1509	.1554	.0698	.0845	.0719	.0439

FITZPATRICK				200D	1963-1964		
.0006	.0303	.0113	.0153	.0438	.0913	.0529	.0790
.0533	.1133	.1141	.1386	.0683	.0553	.0329	.0332

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

FITZPATRICK

200E

1963-1964

.0326	.0231	.0172	.0229	.0445	.1267	.0684	.1082
.0315	.1298	.1298	.0943	.0296	.0314	.0262	.0339

FITZPATRICK

200F

1963-1964

.0422	.0338	.0231	.0349	.0467	.1441	.1055	.1050
.0319	.1300	.0367	.0511	.0236	.0253	.0298	.0414

FITZPATRICK

200T

1963-1964

.0468	.0332	.0144	.0181	.0371	.1005	.0683	.0870
.0394	.1023	.1323	.1193	.0563	.0534	.0353	.0404

FORKED RIVER 1

401T

2/66-2/67

.0371	.0525	.0343	.0391	.0395	.0474	.0398	.0748
.0364	.0873	.0579	.0869	.0933	.0754	.0635	.0443

FORT CALHOUN

40A

10/68-9/70

.0128	.0128	.0138	.0372	.0712	.1631	.0967	.0755
.0553	.0414	.0313	.0329	.0638	.1392	.1477	.0648

FORT CALHOUN

40B

10/68-9/70

.0347	.0154	.0232	.0154	.0927	.1429	.0463	.0895
.0341	.0502	.0463	.0347	.0618	.0965	.1622	.0541

FORT CALHOUN

40C

10/68-9/70

.0090	.0135	.0090	.0195	.0390	.0721	.1156	.1306
.0761	.0556	.0363	.0556	.0488	.1351	.1096	.0736

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

FORT CALHOUN		4CD		10/68-9/70			
.0174	.0235	.0284	.0351	.0541	.0764	.1225	.1252
.0721	.0348	.0183	.0269	.0489	.1133	.1118	.0916

FORT CALHOUN		4CE		10/68-9/70			
.0208	.0176	.0242	.0284	.0618	.0825	.1139	.0817
.0631	.0336	.0268	.0388	.0881	.1229	.1099	.0919

FORT CALHOUN		4CF		10/68-9/70			
.0151	.0118	.0184	.0229	.0751	.1971	.1578	.0746
.0429	.0260	.0181	.0377	.1036	.0910	.0334	.0315

FORT CALHOUN		4CT		10/68-9/70			
.0176	.0165	.0221	.0284	.0639	.1153	.1259	.0926
.0595	.0336	.0213	.0417	.0793	.1129	.0979	.0715

FORT CALHOUN		4CT		6/1/67-5/31/68			
.0204	.0118	.0207	.0229	.0511	.0983	.1147	.1108
.0634	.0377	.0268	.0453	.0949	.1121	.1194	.0568

FORT CALHOUN		36A		1/1/74-12/31/74			
.0542	.0290	.0275	.0344	.0387	.0497	.0815	.1274
.0318	.0612	.0284	.0397	.0303	.0756	.1255	.1146

FORT CALHOUN		36B		1/1/74-12/31/74			
.0121	.0229	.0167	.0337	.0485	.0782	.0303	.1253
.0445	.0633	.0377	.0414	.0256	.1146	.1631	.0930

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (HASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

FORT CALHOUN		36C 1/1/74-12/31/74					
.0552	.0087	.0174	.0465	.0581	.0727	.1192	.1628
.0840	.0552	0.0303	.0262	.0465	.0931	.0814	.0959

FORT CALHOUN		36D 1/1/74-12/31/74					
.0204	.0269	.0204	.0478	.0398	.0961	.1210	.1698
.0852	.0548	.0173	.0244	.0354	.0876	.0946	.0588

FORT CALHOUN		36E 1/1/74-12/31/74					
.0130	.0186	.0193	.0462	.0439	.1096	.1337	.1173
.1073	.0862	.0226	.0290	.0734	.0969	.0639	.0539

FORT CALHOUN		36F 1/1/74-12/31/74					
.0107	.0134	.0201	.0348	.0650	.1728	.0324	.1052
.0936	.0456	.0315	.0864	.1259	.0810	.0208	.0368

FORT CALHOUN		36T 1/1/74-12/31/74					
.0259	.0215	.0159	.0359	.0438	.0917	.0330	.1263
.0760	.0557	.0233	.0401	.0608	.1005	.1013	.0941

FORT CALHOUN		36A 1/1/75-12/31/75					
.0360	.0271	.0222	.0512	.0568	.0577	.0305	.1021
.0515	.0200	.0253	.0439	.0706	.1385	.1163	.0914

FORT CALHOUN		36B 1/1/75-12/31/75					
.0252	.0147	.0165	.0484	.1293	.0736	.1514	.1073
.0999	.0347	.0184	.0179	.0568	.1241	.0934	.0473

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

FORT CALHOUN

36C 1/1/75-12/31/75

.0147	.0126	.0120	.0379	.1360	.0947	.1510	.1326
.0074	.0526	.0211	.0253	.0526	.0960	.0463	.0442

FORT CALHOUN

36D 1/1/75-12/31/75

.0158	.0123	.0178	.0431	.0811	.1032	.1566	.1198
.0447	.0332	.0253	.0324	.0850	.1151	.0822	.0324

FORT CALHOUN

36E 1/1/75-12/31/75

.0140	.0095	.0126	.0520	.0894	.1169	.1404	.1147
.0605	.0352	.0275	.0781	.1043	.0718	.0429	.0293

FORT CALHOUN

36F 1/1/75-12/31/75

.0121	.0172	.0191	.0692	.1522	.1336	.0834	.0701
.0471	.0541	.0522	.0936	.1197	.0369	.0230	.0242

FORT CALHOUN

36T 1/1/75-12/31/75

.0193	.0150	.0161	.0497	.0935	.1038	.1229	.1056
.0523	.0351	.0287	.0569	.0882	.0985	.0721	.0445

R. E. GINNA

5CA 66-67

.0673	.0785	.0937	.0673	.0168	.0166	.0331	.0404
.0299	.0510	.0443	.0589	.1498	.1406	.0589	.0489

R. E. GINNA

5CB 66-67

.1003	.0619	.0560	.0796	.0265	.0354	.0590	.0354
.0295	.0442	.0590	.0708	.1327	.0708	.1093	.0303

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

R. E. GINNA		51C 66-67					
.0263	.0350	.0546	.0676	.0538	.0334	.0326	.0522
.0383	.0546	.0587	.1174	.1165	.0880	.0799	.0570

R. E. GINNA		50D 66-67					
.0248	.1159	.0217	.0321	.0493	.0346	.0520	.0814
.0431	.0621	.1122	.1670	.1328	.0731	.0542	.0337

R. E. GINNA		50E 66-67					
.0111	.0119	.0126	.0258	.0326	.0328	.1654	.1353
.1031	.1216	.1107	.1320	.0784	.0664	.1330	.1182

R. E. GINNA		50F 66-67					
.0112	.0118	.0183	.0504	.0416	.0365	.1626	.1065
.1742	.2243	.1407	.0683	.0325	.0230	.0195	.0098

R. E. GINNA		50T 66-67					
.0324	.0308	.0382	.0455	.0355	.0302	.0521	.0902
.0307	.1016	.0383	.1123	.1012	.0785	.1439	.0300

GRAND GULF 1		T 1951-1960					
.0596	.0607	.0401	.0401	.0444	.0832	.1170	.1008
.0737	.0618	.0433	.0358	.0433	.0714	.1639	.0650

HADDEN NECK		129T 1963					
.0062	.0085	.0131	.0351	.0915	.0554	.1554	.0479
.0056	.0420	.0384	.0702	.1597	.2647	.0518	.0134

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

E. I. HATCH 1 + 2		15GA		6/1/70-8/31/74			
.0425	.0568	.0673	.0974	.0667	.0412	.0242	.0280
.0468	.0543	.0686	.0854	.1068	.1027	.0629	.0484

E. I. HATCH 1 + 2		15GB		6/1/70-8/31/74			
.0447	.0555	.0659	.0911	.0736	.0591	.0441	.0435
.0573	.0654	.0763	.0736	.0682	.0748	.0495	.0537

E. I. HATCH 1 + 2		15GC		6/1/70-8/31/74			
.0474	.0498	.0707	.0843	.0627	.0378	.0353	.0482
.0675	.0940	.0771	.0763	.0675	.0715	.0554	.0546

E. I. HATCH 1 + 2		15GD		6/1/70-8/31/74			
.0433	.0597	.0832	.0845	.0668	.0561	.0429	.0519
.0744	.0921	.0723	.0575	.0623	.0656	.0464	.0416

E. I. HATCH 1 + 2		15GE		6/1/70-8/31/74			
.0272	.0435	.0572	.0692	.0804	.0745	.0662	.0852
.0312	.0993	.0661	.0669	.0603	.0510	.0385	.0244

E. I. HATCH 1 + 2		15GF		6/1/70-8/31/74			
.0324	.0463	.0523	.0612	.0554	.0664	.0520	.0687
.0723	.0854	.0894	.0936	.0796	.0622	.0459	.0384

E. I. HATCH 1 + 2		15GT		6/1/70-8/31/74			
.0377	.0515	.0666	.0811	.0684	.0574	.0444	.0552
.0593	.0819	.0729	.0746	.0772	.0723	.0495	.0401

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

E. I. MATCH 1 + 2

150T 6/70-5/71

.0323	.0444	.0588	.0667	.0537	.0575	.0472	.0661
.0754	.0921	.0320	.0843	.0821	.0834	.0420	.0321

INDIAN POINT 2 + 3

100A 1/1/70-12/31/70

.0622	.0402	.0190	.0674	.0485	.0288	.1584	.1324
.0667	.0368	.0194	.0464	.0814	.0922	.0843	.1256

INDIAN POINT 2 + 3

100B 1/1/70-12/31/70

.0884	.0829	.0331	.0110	.0552	.0276	.1160	.1271
.0552	.0166	.0552	.0166	.0552	.1271	.0442	.0884

INDIAN POINT 2 + 3

100C 1/1/70-12/31/70

.0436	.0473	.0218	.0109	.0436	.0509	.1491	.0909
.0364	.0549	.0213	.0545	.1455	.0655	.0909	.0734

INDIAN POINT 2 + 3

100D 1/1/70-12/31/70

.1430	.0526	.0168	.0193	.0215	.0445	.0970	.0693
.0350	.0215	.0142	.0295	.0883	.0094	.0364	.1500

INDIAN POINT 2 + 3

100E 1/1/70-12/31/70

.1524	.0667	.0226	.0241	.0306	.0431	.0692	.0667
.0697	.0506	.0401	.0451	.0812	.0857	.0637	.0667

INDIAN POINT 2 + 3

100F 1/1/70-12/31/70

.1608	.1178	.0429	.0227	.0262	.0303	.0732	.0758
.0901	.0892	.0530	.0387	.0286	.0236	.0396	.0934

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

INDIAN POINT 2 + 3			10CT	1/1/70-12/31/70			
.1323	.0664	.1227	.J100	.0220	.0302	.1139	.0077
.J598	.0422	.0263	.J364	.0704	.0045	.J745	.1145

INDIAN POINT 2 + 3			100A	1/1/71-12/31/71			
.0576	.0101	.0174	.0016	.J090	.0345	.1151	.0430
.0419	.0247	.0570	.J765	.1192	.1135	.1161	.1234

INDIAN POINT 2 + 3			100B	1/1/71-12/31/71			
.0461	.0207	.0115	.0003	.0172	.0402	.1494	.0632
.J962	.0345	.0402	.0575	.1092	.1207	.0632	.1322

INDIAN POINT 2 + 3			100C	1/1/71-12/31/71			
.J794	.0317	.J053	.0263	.0370	.0476	.J690	.1217
.0317	.0423	.0523	.0529	.1035	.0847	.J047	.1323

INDIAN POINT 2 + 3			100D	1/1/71-12/31/71			
.1165	.0512	.J297	.0235	.0201	.0512	.J320	.0477
.0353	.0443	.0505	.0670	.1079	.0775	.J567	.1303

INDIAN POINT 2 + 3			100E	1/1/71-12/31/71			
.1049	.0602	.0293	.0193	.J200	.0555	.J733	.0641
.0443	.0244	.0397	.0539	.0835	.0750	.J403	.1200

INDIAN POINT 2 + 3			100F	1/1/71-12/31/71			
.1362	.0992	.J369	.J206	.J191	.0375	.J595	.0816
.J794	.0017	.J523	.0419	.0353	.0272	.J405	.1037

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

INJIAN POINT 2 + 3

100T 1/1/71-12/31/71

.1353	.0655	.0270	.0105	.0194	.0414	.0828	.0757
.1345	.1380	.0392	.0527	.0786	.0774	.3699	.1237

KEWAUNEE

100A 8/13/68-3/25/70

.0544	.0574	.0418	.1392	.0627	.0548	.0444	.0313
.0553	.0888	.1118	.1253	.0783	.0574	.0436	.0470

KEWAUNEE

100B 8/13/68-3/25/70

.0703	.0542	.0511	.0192	.0351	.0287	.0479	.0671
.0575	.1123	.0958	.1023	.1119	.0862	.0224	.0479

KEWAUNEE

100C 8/13/68-3/25/70

.0572	.0316	.0280	.0341	.0341	.0334	.0341	.0292
.0754	.0827	.1183	.1326	.0949	.0839	.0620	.0815

KEWAUNEE

100D 8/13/68-3/25/70

.0532	.0260	.0293	.0298	.0349	.0311	.0295	.0398
.0707	.0753	.0845	.1033	.1035	.0645	.0883	.1562

KEWAUNEE

100E 8/13/68-3/25/70

.0739	.0371	.0273	.0252	.0291	.0301	.0362	.0664
.0908	.0715	.0707	.0923	.1083	.0871	.0912	.0575

KEWAUNEE

100F 8/13/68-3/25/70

.0542	.0507	.0321	.0203	.0171	.0281	.0331	.1081
.0365	.0534	.0842	.0828	.1208	.0835	.0807	.0522

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

KENAUWEE

180T 8/13/68-3/25/73

.0348	.0423	.0296	.0221	.0231	.0263	.0496	.0816
.0303	.0636	.0753	.0935	.1174	.0622	.0801	.0664

LASALLE 1 + 2

30CA

.1111	.1266	.0231	.0278	.0278	.0370	.0648	.1065
.0741	.1463	.0185	.0139	.0278	.0972	.0787	.1157

LASALLE 1 + 2

30CB

.0195	.0563	.0534	.0339	.0534	.0971	.1262	.1213
.1262	.0583	.0195	.0291	.0291	.0922	.0388	.0437

LASALLE 1 + 2

30CC

.0373	.0543	.0391	.0373	.0326	.0587	.0543	.1043
.0848	.0826	.0478	.0674	.0565	.0826	.0391	.1217

LASALLE 1 + 2

30CD

.0283	.0342	.0321	.0433	.0311	.0428	.0530	.1219
.0333	.0898	.0566	.0790	.0723	.0714	.0683	.0801

LASALLE 1 + 2

30CE

.0335	.0372	.0387	.0359	.0275	.0592	.0589	.0777
.1017	.1045	.0655	.1066	.0839	.0794	.0595	.0323

LASALLE 1 + 2

30CF

.0174	.0328	.0288	.0261	.0455	.0717	.0462	.0643
.0350	.1058	.0324	.1407	.1172	.0784	.0435	.0241

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

LASALLE 1 + 2

30CT

.0306	.0360	.0333	.0356	.0335	.0601	.1552	.0883
.0698	.0963	.1665	.1011	.0852	.0811	.0561	.0494

LIMERICK 1

27CT

1/72-12/74

.0393	.0350	.0461	.0603	.0397	.0365	.0405	.0709
.0677	.0516	.0506	.0901	.1496	.1092	.0548	.0541

ME YANKEE

149T

7/67-6/68

.0983	.0617	.0303	.0230	.0270	.0336	.1443	.1191
.1240	.0819	.0412	.0406	.0550	.0877	.0890	.0747

MCQUIRE 1 + 2

13CA

10/17/70-10/16/71

.0550	.1594	.0886	.0669	.1043	.0807	.0472	.0315
.0453	.0551	.0453	.0630	.0531	.0217	.0394	.0335

MCQUIRE 1 + 2

13CO

10/17/70-10/16/71

.0730	.0692	.0494	.0520	.0349	.0362	.0198	.0573
.0949	.0759	.0713	.0725	.0497	.0356	.0375	.0715

MCQUIRE 1 + 2

13CE

10/17/70-10/16/71

.0524	.0814	.0360	.0331	.0293	.0388	.0274	.0927
.1268	.1580	.0562	.0634	.0312	.0454	.0341	.0738

MCQUIRE 1 + 2

13CF

10/17/70-10/16/71

.0323	.0331	.0239	.0218	.0274	.0527	.0731	.1568
.1663	.1596	.0724	.0464	.0387	.0408	.0253	.0352

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

MCQUIRE 1 + 2

13CT 10/17/70-10/16/71

.0500	.1120	.0777	.0560	.0372	.0378	.0297	.0712
.0931	.1225	.0913	.0543	.0424	.0424	.0404	.0574

MCQUIRE 1 + 2

13CA 11/24/69-11/23/70

.1166	.0720	.0410	.0410	.0336	.0700	.0700	.0420
.0940	.0410	.0902	.0756	.0466	.0280	.0121	.0448

MCQUIRE 1 + 2

13CD 11/24/69-11/23/70

.1082	.1213	.0456	.0169	.0117	.0156	.0313	.0378
.1030	.1030	.0320	.0326	.0261	.0587	.0492	.1173

MCQUIRE 1 + 2

13CE 11/24/69-11/23/70

.1043	.0844	.0229	.0385	.0278	.0450	.0516	.0500
.1556	.0811	.0401	.0532	.0344	.0680	.0549	.0876

MCQUIRE 1 + 2

13CF 11/24/69-11/23/70

.0560	.0501	.0313	.0493	.0384	.0606	.0539	.0631
.1412	.1015	.0569	.0673	.0618	.0627	.0497	.0660

MCQUIRE 1 + 2

13CY 11/24/69-11/23/70

.0862	.0723	.0334	.0407	.0314	.0526	.0534	.0524
.1405	.1051	.0543	.0609	.0433	.0565	.0433	.0739

MIDLAND 2

V 1962-1965

.0458	.0615	.0427	.0448	.0240	.0281	.1323	.0604
.0823	.1229	.1063	.1240	.0656	.0635	.0510	.0440

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

MILLSTONE 1 + 2			152F	8/65-9/67			
.0601	.0356	.0346	.0583	.0346	.0255	.0437	.0377
.0361	.0764	.1701	.0784	.0733	.0784	.0733	.0662

MILLSTONE 1 + 2			152A	12/65-11/66			
.0361	.0191	.0198	.0679	.0679	.0573	.0361	.0587
.0481	.0715	.1267	.0885	.0880	.1069	.0736	.0419

MILLSTONE 1 + 2			152B	12/65-11/66			
.0473	.0000	.0053	.0710	.0765	.0355	.0296	.0710
.0355	.0355	.0828	.1693	.0592	.1302	.0710	.0592

MILLSTONE 1 + 2			152C	12/65-11/66			
.0349	.0465	.0349	.1512	.0349	.0465	.0233	.0541
.0233	.0233	.1977	.1163	.0349	.0930	.0233	.0541

MILLSTONE 1 + 2			152D	12/65-11/66			
.0587	.0594	.0475	.1145	.0492	.0297	.0284	.0509
.0356	.0492	.0551	.1162	.0755	.0738	.0729	.0814

MILLSTONE 1 + 2			152E	12/65-11/66			
.0594	.0460	.0493	.0920	.0317	.0203	.0223	.0534
.0465	.0664	.1163	.0925	.0663	.0681	.0757	.0841

MILLSTONE 1 + 2			152F	12/65-11/66			
.0293	.0213	.0184	.0373	.0217	.0170	.0175	.0675
.0911	.1072	.1728	.1506	.0543	.0746	.0504	.0660

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

MILLSTONE 1 + 2		152T		12/65-11/66			
.0466	.0339	.0323	.0738	.0398	.0287	.0233	.0582
.0593	.0736	.1224	.1151	.0661	.0861	.0713	.0635
MILLSTONE 1 + 2		152A		12/66-11/67			
.0440	.0136	.0147	.0178	.0545	.0440	.0189	.0241
.0273	.0618	.1237	.1184	.0901	.1719	.1184	.0566
MILLSTONE 1 + 2		152B		12/66-11/67			
.0491	.0245	.0123	.0123	.0364	.0184	.0123	.0307
.0364	.0798	.1350	.1902	.1472	.0736	.0736	.0675
MILLSTONE 1 + 2		152C		12/66-11/67			
.0111	.0213	.0266	.0266	.0168	.0266	.0213	.0319
.0106	.0479	.1011	.1223	.1436	.1011	.1311	.1911
MILLSTONE 1 + 2		152D		12/66-11/67			
.0203	.0631	.0477	.0416	.0231	.0246	.0169	.0185
.0246	.0708	.0773	.0747	.1293	.0847	.0810	.1308
MILLSTONE 1 + 2		152E		12/66-11/67			
.0986	.0712	.0448	.0438	.0403	.0329	.0324	.0314
.0443	.0777	.0961	.0632	.0577	.1065	.0961	.0722
MILLSTONE 1 + 2		152F		12/66-11/67			
.0463	.0262	.0215	.0237	.0219	.0241	.0353	.0432
.0688	.1542	.1433	.1189	.1662	.0638	.0693	.0376

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

HILLSTONE 1 + 2

152T

12/66-11/67

.0773	.0453	.0330	.0321	.0339	.0300	.0203	.0309
.0451	.0969	.1230	.0962	.0819	.0947	.0872	.0643

MOITICELLO

140T

2/3/67-2/10/68

.0468	.0291	.0513	.0315	.0548	.0524	.0653	.0886
.0909	.0629	.0548	.0303	.0886	.1037	.1109	.0361

NINE M. PT. 1 + 2

204T

1963-1964

.0485	.0339	.0131	.0176	.0366	.0969	.0685	.0818
.0603	.1037	.1313	.1180	.0585	.0541	.0366	.0406

NORTH ANNA 1, 2, + 3

150A

9/16/71-9/15/72

.0376	.0150	.0254	.0319	.0235	.0254	.0300	.1570
.0359	.0696	.0639	.0535	.0451	.0799	.0987	.1146

NORTH ANNA 1, 2, + 3

150B

9/16/71-9/15/72

.0352	.0302	.0352	.0201	.0201	.0131	.0452	.2111
.1250	.0804	.0503	.0603	.0402	.0352	.0905	.1136

NORTH ANNA 1, 2, + 3

150C

9/16/71-9/15/72

.0704	.0202	.0335	.0504	.0235	.0369	.0474	.1074
.1376	.0739	.0504	.0369	.0269	.0637	.0839	.1376

NORTH ANNA 1, 2, + 3

150D

9/16/71-9/15/72

.0614	.0636	.0354	.0448	.0390	.0381	.0426	.1161
.0935	.0404	.0322	.0494	.0336	.0646	.1462	.1308

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (HASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

NORTH ANNA 1, 2, + 3

15CE

9/16/71-9/15/72

.0444	.0472	.0472	.0350	.0369	.0482	.0546	.1667
.1118	.0607	.0467	.0434	.0513	.0780	.0654	.0724

NORTH ANNA 1, 2, + 3

15CF

9/16/71-9/15/72

.0308	.0304	.0176	.0383	.0335	.0655	.0734	.1325
.0798	.0623	.0511	.0911	.0783	.0862	.0623	.0607

NORTH ANNA 1, 2, + 3

15CT

9/16/71-9/15/72

.0480	.0436	.0355	.0408	.0345	.0418	.0545	.1411
.0948	.0585	.0467	.0549	.0467	.0740	.0843	.1002

OCONEE 1, 2 + 3

T

6/19/68-6/19/69

.0339	.0998	.0584	.0602	.0377	.0364	.0191	.0205
.0360	.0748	.0514	.0621	.0431	.0610	.0811	.1744

OYSTER CREEK

40CT

2/66-2/67

.0371	.0525	.0544	.0391	.0395	.0474	.0398	.0748
.0964	.0873	.0679	.0869	.0933	.0754	.0635	.0443

PALISADE

55T

9/67-8/68

.0330	.0131	.0115	.0520	.0384	.0485	.0926	.2038
.1129	.0274	.0296	.0581	.0461	.0722	.0818	.0797

PALO VERDE 1

20CA

8/13/73-8/13/74

.0278	.0123	.0062	.0017	.0432	.0401	.0556	.0895
.1481	.2959	.0957	.0617	.0399	.0339	.0494	.0378

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

PALO VERDE 1

2008

8/13/73-8/13/74

.5276	.1161	.0130	.0621	.0920	.1011	.1149	.1034
.0943	.1356	.0351	.0460	.0230	.0360	.0138	.0345

PALO VERDE 1

2000

8/13/73-8/13/74

.0294	.0331	.0349	.0956	.0974	.1103	.0699	.1029
.0772	.1397	.0694	.0349	.0349	.0257	.0184	.0257

PALO VERDE 1

2000

8/13/73-8/13/74

.0292	.0354	.0402	.0969	.0886	.0946	.0584	.0725
.0906	.1305	.0313	.0652	.0389	.0224	.0190	.0282

PALO VERDE 1

2000

8/13/73-8/13/74

.0284	.0373	.0365	.0511	.0333	.0373	.0251	.0406
.0368	.2360	.1046	.0754	.0697	.0779	.0260	.0341

PALO VERDE 1

2000

8/13/73-8/13/74

.0772	.1115	.0626	.0646	.0423	.0286	.0223	.0340
.0477	.1149	.0757	.0760	.0500	.0686	.0323	.0717

PALO VERDE 1

2000

8/13/73-8/13/74

.0497	.0675	.0482	.0726	.0591	.0555	.0414	.0554
.0731	.1439	.0325	.0682	.0470	.0522	.0354	.0485

PEACH BOTTOM 2 + 3

3200

8/67-7/69

.0433	.0315	.0324	.0338	.0462	.0545	.0642	.0852
.0036	.0460	.0519	.0687	.0949	.1145	.1190	.0602

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

PEACH BOTTOM 2 + 3			32CA	8/67-7/70			
.0526	.0674	.1357	.1464	.1899	.1084	.0499	.0338
.0236	.0124	.0252	.0263	.0193	.0333	.0499	.0360

PEACH BOTTOM 2 + 3			32CB	8/67-7/70			
.0821	.0534	.0829	.0955	.1053	.1411	.0527	.0618
.0232	.0106	.0330	.0674	.0449	.0463	.0674	.0323

PEACH BOTTOM 2 + 3			32CC	8/67-7/70			
.0403	.0239	.0222	.0321	.0822	.0822	.0518	.0510
.0428	.0518	.0806	.0699	.1225	.1028	.1102	.0337

PEACH BOTTOM 2 + 3			32CD	8/67-7/70			
.0445	.0313	.0291	.0280	.0438	.0638	.0612	.0785
.0529	.0339	.0372	.0604	.0980	.1278	.1417	.0679

PEACH BOTTOM 2 + 3			32CE	8/67-7/70			
.0325	.0236	.0235	.0284	.0434	.0462	.0724	.0869
.0329	.0619	.0608	.0767	.1142	.1097	.0867	.0514

PEACH BOTTOM 2 + 3			32CF	8/67-7/70			
.0375	.0348	.0292	.0219	.0200	.0298	.0307	.0445
.0651	.1079	.1179	.1013	.0964	.1030	.0920	.0651

PEACH BOTTOM 2 + 3			32CT	8/67-7/70			
.0399	.0297	.0285	.0298	.0431	.0557	.0621	.0774
.0642	.0507	.0536	.0699	.1024	.1166	.1155	.0610

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

PERRY 1			200A	5/1/72-4/30/73			
.0453	.1111	.0336	.0233	.0181	.0336	.0724	.0775
.0517	.1435	.0827	.0964	.0620	.0439	.0698	.1008

PERRY 1			200B	5/1/72-4/30/73			
.0387	.0669	.0423	.0246	.0106	.0634	.1232	.0528
.0493	.0563	.1232	.1092	.0563	.0599	.0634	.0599

PERRY 1			200C	5/1/72-4/30/73			
.0313	.0547	.0313	.0260	.0391	.0391	.0547	.0607
.0599	.0807	.1198	.1276	.1094	.0703	.0417	.0339

PERRY 1			200D	5/1/72-4/30/73			
.0321	.0677	.0434	.0398	.0248	.0380	.0537	.0555
.0733	.0901	.0369	.1123	.0733	.0873	.0549	.0570

PERRY 1			200E	5/1/72-4/30/73			
.0200	.0312	.0361	.0347	.0435	.0687	.0960	.1926
.1442	.1112	.0736	.0435	.0268	.0249	.0249	.0283

PERRY 1			200F	5/1/72-4/30/73			
.0098	.0326	.0423	.0879	.0554	.1140	.0112	.1808
.1674	.0961	.0537	.0195	.0261	.0065	.0098	.0065

PERRY 1			200T	5/1/72-4/30/73			
.0301	.0570	.0452	.0478	.0374	.0539	.0732	.1053
.0351	.0919	.0336	.0812	.0544	.0568	.0421	.0452

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

PILGRIM 1

72A

.0520	.0630	.0530	.0470	.0280	.0270	.0100	.0290
.1040	.0660	.0910	.1210	.0820	.0890	.0640	.3740

PILGRIM 1

72B

.0420	.0571	.0361	.0490	.0470	.0521	.0260	.0651
.1382	.0991	.0361	.0571	.0360	.0551	.0440	.0671

PILGRIM 1

72C

.0760	.0699	.0390	.0599	.0180	.0300	.0330	.2539
.2537	.0809	.0899	.0539	.0210	.0270	.0509	.0430

PILGRIM 1

72D

.0350	.0380	.0270	.0420	.0360	.0430	.0370	.0771
.2303	.1091	.0711	.0581	.0410	.0280	.0340	.0430

PILGRIM 1

72E

.0250	.0230	.0380	.0390	.0280	.0410	.0460	.0789
.2567	.1149	.0899	.0799	.0440	.0360	.0480	.0360

PILGRIM 1

72F

.0248	.0279	.0310	.0526	.0310	.0279	.0402	.0464
.1734	.1796	.0867	.1022	.0619	.0433	.0341	.0372

PILGRIM 1

72F

.0380	.0420	.0350	.0400	.0310	.0330	.0300	.0510
.1850	.1180	.0350	.0940	.0600	.0530	.0460	.0510

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

POINT BEACH 1 + 2

15GA 4/67-4/68

.0723	.0904	.0482	.0422	.0181	.0482	.0542	.0904
.1506	.0783	.0663	.0422	.0482	.0723	.0301	.0482

POINT BEACH 1 + 2

15GB 4/67-4/68

.0000	.0240	.0362	.0120	.0120	.0362	.1204	.0362
.0722	.0362	.0362	.0722	.1566	.2290	.0722	.0482

POINT BEACH 1 + 2

15GC 4/67-4/68

.0050	.0161	.0064	.0209	.0139	.0126	.0153	.0636
.0363	.0265	.0161	.0558	.0124	.0291	.0460	.0153

POINT BEACH 1 + 2

15GD 4/67-4/68

.0280	.0295	.0144	.0155	.0133	.0218	.0400	.1686
.1307	.0490	.0467	.0931	.1324	.0825	.1061	.0344

POINT BEACH 1 + 2

15GE 4/67-4/68

.1326	.0962	.0302	.0212	.0239	.0334	.0334	.0344
.1480	.0962	.0530	.0773	.0259	.0169	.0291	.1444

POINT BEACH 1 + 2

15GF 4/67-4/68

.0902	.0511	.0289	.0264	.0238	.0519	.0357	.0323
.0328	.0332	.0523	.0681	.0434	.0298	.0494	.1702

POINT BEACH 1 + 2

15GT 4/67-4/68

.0699	.0548	.0217	.0196	.0184	.0306	.0359	.0882
.0210	.0872	.0473	.0800	.0967	.0752	.0555	.0961

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

POINT BEACH 1 + 2			150A		4/19/67-4/18/69		
.0261	.0348	.0261	.0522	.0174	.0696	.0348	.0522
.0096	.0696	.0783	.1304	.1643	.1334	.0522	.0522

POINT BEACH 1 + 2			150B		4/19/67-4/18/69		
.0000	.0372	.0372	.0286	.0213	.0213	.0745	.0638
.0338	.0532	.0479	.0798	.2374	.1968	.0426	.0266

POINT BEACH 1 + 2			150C		4/19/67-4/18/69		
.0374	.0170	.0103	.0192	.0126	.0141	.0207	.0643
.0384	.0340	.0244	.0569	.3687	.2962	.0591	.0170

POINT BEACH 1 + 2			150D		4/19/67-4/18/69		
.0265	.0263	.0141	.0155	.0119	.0233	.0516	.1589
.0335	.0441	.0504	.0830	.1298	.0804	.1020	.0467

POINT BEACH 1 + 2			150E		4/19/67-4/18/69		
.0196	.0762	.0358	.0336	.0283	.0444	.0422	.0392
.0515	.0915	.0454	.0754	.0283	.0189	.0296	.1281

POINT BEACH 1 + 2			150F		4/19/67-4/18/69		
.0739	.0472	.0278	.0278	.0234	.0523	.0351	.0249
.0992	.0676	.0553	.0802	.0512	.0315	.0106	.1915

POINT BEACH 1 + 2			150T		4/19/67-4/18/69		
.0055	.0475	.0243	.0249	.0207	.0356	.0425	.0813
.1265	.0932	.0473	.0777	.0974	.0719	.0546	.0992

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

PRAIRIE 1 + 2

14CA 6/1/71-5/31/72

.0280	.0373	.0397	.0612	.1160	.1128	.0755	.0810
.0556	.0508	.0635	.0866	.1548	.0397	.1532	.0429

PRAIRIE 1 + 2

14CB 6/1/71-5/31/72

.0194	.0392	.0484	.1156	.1147	.0763	.1522	.0693
.0522	.0446	.0474	.0914	.0639	.0747	.0532	.0414

PRAIRIE 1 + 2

14CC 6/1/71-5/31/72

.0196	.0230	.0393	.1017	.1121	.1114	.1499	.0920
.0483	.0435	.0614	.1054	.0753	.0671	.0299	.0211

PRAIRIE 1 + 2

14CD 6/1/71-5/31/72

.0255	.0159	.0374	.0343	.1254	.1505	.1310	.0550
.0237	.0144	.0159	.0615	.1156	.1335	.0749	.0454

PRAIRIE 1 + 2

14CE 6/1/71-5/31/72

.0206	.0090	.0357	.0164	.0308	.1496	.1022	.0292
.0336	.0104	.0147	.0399	.1276	.2390	.1038	.0958

PRAIRIE 1 + 2

14CF 6/1/71-5/31/72

.0133	.0240	0.0000	0.0000	.0133	.0907	.1387	.0400
.0324	.0187	0.0000	.1067	.1600	.1520	.1360	.1367

PRAIRIE 1 + 2

14CT 6/1/71-5/31/72

.0229	.0154	.0191	.0554	.1177	.1337	.0001	.0646
.0316	.0248	.0368	.0733	.1019	.1291	.0551	.0459

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

QUAD CITIES 1 & 2

WCT

4/68-9/69

.0511	.0420	.0284	.0367	.0332	.0753	.0629	.0717
.1284	.0901	.0493	.0445	.0687	.0829	.0669	.0683

RANCHO SECO

SCA

11/69-10/71

.0109	.0397	.0183	.0157	.0242	.0291	.0387	.0569
.0372	.0896	.1937	.2409	.0932	.0508	.0291	.0133

RANCHO SECO

SCB

11/69-10/71

.0114	.0385	.0371	.0114	.0213	.0299	.0327	.0643
.0396	.0725	.2005	.2546	.0768	.0693	.0228	.0185

RANCHO SECO

SCC

11/69-10/71

.0363	.0076	.0061	.0061	.0192	.0311	.0539	.0630
.0774	.0789	.1713	.2739	.0668	.0858	.0410	.0129

RANCHO SECO

SCD

11/69-10/71

.0193	.0090	.0104	.0198	.0337	.0519	.0877	.0840
.0321	.1877	.1421	.1472	.0568	.0844	.0585	.0292

RANCHO SECO

SC E

11/69-10/71

.0282	.0292	.0233	.0322	.0589	.1418	.1337	.0657
.0634	.0716	.1211	.0539	.0368	.0479	.1683	.0384

RANCHO SECO

SC F

11/69-10/71

.0409	.0648	.0515	.0818	.1566	.1354	.0691	.0444
.0289	.0329	.0663	.0313	.0388	.0543	.0550	.0480

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

RANCHO SECO		SCT 67-63					
.0343	.0265	.0214	.0285	.0389	.0572	.0624	.0659
.0751	.0652	.1063	.1136	.0778	.0937	.0738	.0486

RANCHO SECO		SCA 67-69					
.0082	.0382	.0000	.0000	.0000	.0000	.0164	.0328
.0164	.0574	.2131	.4016	.0994	.1266	.0246	.0104

RANCHO SECO		SCB 67-63					
.0185	.0129	.0062	.0099	.0068	.0032	.0154	.0339
.0434	.0459	.1517	.2571	.1165	.1449	.0938	.0401

RANCHO SECO		SLC 67-63					
.0362	.0153	.0084	.0111	.0111	.0265	.0376	.0390
.0503	.0529	.1323	.1671	.1100	.1525	.0919	.0571

RANCHO SECO		SCD 67-63					
.0293	.0194	.0163	.0221	.0416	.0948	.0932	.0796
.1043	.0404	.0913	.0633	.0521	.0866	.0761	.0482

RANCHO SECO		SCE 67-63					
.0364	.0412	.0197	.0412	.0675	.0703	.0853	.0909
.0710	.0703	.1153	.0497	.0609	.0815	.0515	.0450

RANCHO SECO		SCF 67-63					
.0462	.0491	.0437	.0510	.0634	.0637	.0673	.0779
.0750	.0766	.0743	.0608	.0681	.0644	.0670	.0524

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

RANCHO SecO		SLT 11/69-10/71					
.0225	.0239	.0207	.0345	.0537	.0877	.0867	.0659
.0591	.0729	.1383	.1340	.0542	.0649	.0541	.0309

RIVERBEND 1		135A 10/1/72-9/30/73					
.0424	.0628	.0440	.0298	.0534	.0534	.0769	.0863
.0785	.0754	.0075	.0722	.0345	.1020	.0848	.0361

RIVERBEND 1		135B 10/1/72-9/30/73					
.0404	.0547	.0547	.0740	.0410	.0338	.0675	.0547
.0543	.0611	.00740	.0965	.0595	.0563	.0788	.0482

RIVERBEND 1		135C 10/1/72-9/30/73					
.0561	.0459	.0587	.0944	.0651	.0587	.0829	.0599
.0472	.0434	.0599	.0536	.0599	.0714	.0702	.0727

RIVERBEND 1		135D 10/1/72-9/30/73					
.0574	.0511	.0629	.0874	.1064	.0828	.0743	.0511
.0452	.0355	.0351	.0435	.0477	.0731	.0760	.0735

RIVERBEND 1		135E 10/1/72-9/30/73					
.0643	.0762	.0631	.0840	.1116	.0972	.0630	.0604
.0670	.0341	.0236	.0446	.0466	.0479	.0506	.0656

RIVERBEND 1		135F 10/1/72-9/30/73					
.0847	.0913	.0623	.0645	.0563	.0628	.0593	.0508
.0634	.0650	.0639	.0557	.0454	.0437	.0552	.0847

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

RIVERBEND 1		135T		10/1/72-9/30/73			
.0657	.0662	.0661	.0762	.0819	.0721	.0673	.0569
.0583	.0483	.0473	.0542	.0480	.0612	.0665	.0693

H. B. ROBINSON 2		120A		4/14/67-4/19/68			
.0642	.0536	.0651	.0623	.0441	.0374	.0220	.0269
.0278	.0489	.0387	.0561	.0757	.0696	.0728	.0757

H. B. ROBINSON 2		120B		4/14/67-4/19/68			
.0795	.0922	.0716	.0550	.0412	.0246	.0000	.0216
.0304	.0756	.0266	.0669	.0579	.0520	.0471	.0769

H. B. ROBINSON 2		120C		4/14/67-4/19/68			
.0610	.0357	.0517	.0311	.0317	.0311	.0176	.0458
.0717	.0834	.0945	.0499	.0253	.0323	.0300	.0210

H. B. ROBINSON 2		120D		4/14/67-4/19/68			
.0328	.0650	.0366	.0334	.0398	.0571	.0430	.0750
.0219	.0686	.0552	.0338	.0180	.0199	.0398	.0225

H. B. ROBINSON 2		120E		4/14/67-4/19/68			
.0369	.0355	.0134	.0265	.0644	.0355	.0648	.0510
.0320	.0909	.0510	.0288	.0179	.0044	.0443	.0347

H. B. ROBINSON 2		120F		4/14/67-4/19/68			
.0327	.0000	.0131	.0065	.0136	.0065	.0654	.0065
.0242	.0523	.0131	.0665	.0600	.0665	.0300	.0471

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

H. B. ROBINSON 2

120T

4/14/67-4/19/68

.1139	.0947	.0495	.0404	.0353	.0376	.0286	.0453
.0737	.0719	.0311	.0726	.0366	.0360	.0433	.1413

ST. LUCIE 1

5CA

3/1/71-2/29/72

.0506	.0660	.0357	.1702	.1250	.1865	.0446	.0223
.0223	.0407	.0253	.0183	.0233	.0278	.0189	.0625

ST. LUCIE 1

5LB

3/1/71-2/29/72

.0583	.0764	.0364	.1045	.0602	.0764	.0644	.0482
.0482	.0883	.0563	.0320	.0120	.0362	.0401	.0922

ST. LUCIE 1

5CC

3/1/71-2/29/72

.0540	.0560	.0321	.0701	.0799	.0680	.0823	.0680
.0340	.1180	.0381	.0321	.0400	.0340	.0359	.0599

ST. LUCIE 1

5CD

3/1/71-2/29/72

.0435	.0602	.0803	.1046	.0636	.0502	.0674	.1132
.1017	.0927	.0561	.0244	.0335	.0473	.0339	.0589

ST. LUCIE 1

5CE

3/1/71-2/29/72

.0261	.0438	.0803	.0739	.1096	.1082	.0889	.0789
.0493	.0921	.0554	.0372	.0423	.0668	.0336	.0246

ST. LUCIE 1

5CF

3/1/71-2/29/72

.0288	.0274	.0259	.0471	.0346	.0883	.0777	.0502
.0343	.0899	.0502	.0624	.1019	.1021	.0532	.1259

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

ST. LUCIE 1

5CT 3/1/71-2/29/72

.0596	.0644	.0754	.1043	.0958	.1077	.0697	.0701
.0316	.0786	.0420	.0369	.0394	.0524	.0326	.0462

ST. LUCIE 1

5CA 1/1/72-12/31/72

.0510	.0345	.1234	.1852	.1123	.1531	.0423	.0064
.0102	.0374	.0379	.0089	.0224	.0306	.0199	.0476

ST. LUCIE 1

5CB 1/1/72-12/31/72

.0680	.0982	.0697	.1202	.0702	.0996	.0601	.0346
.0447	.0943	.0590	.0149	.0246	.0399	.0447	.0596

ST. LUCIE 1

5CC 1/1/72-12/31/72

.0548	.0984	.0666	.1161	.0901	.0381	.0558	.0645
.0414	.0946	.0384	.0302	.0256	.0256	.0302	.0776

ST. LUCIE 1

5CD 1/1/72-12/31/72

.0388	.0713	.0457	.1270	.0726	.0486	.0668	.1805
.0110	.0693	.0313	.0186	.0321	.0465	.0305	.0594

ST. LUCIE 1

5CE 1/1/72-12/31/72

.0243	.0518	.0796	.0921	.1123	.1137	.0914	.0669
.0474	.0642	.0584	.0410	.0430	.0578	.0242	.0259

ST. LUCIE 1

5CF 1/1/72-12/31/72

.0337	.0175	.0285	.0256	.0273	.0383	.0444	.0813
.0732	.0907	.0733	.0622	.1335	.1418	.0764	.0528

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

ST. LUCIE 1 5C7 1/1/72-12/31/72

.0377	.0698	.0877	.1209	.0931	.0981	.0674	.0621
.0564	.0627	.0463	.0299	.0407	.0529	.0295	.0448

ST. LUCIE 1 5C8 1/1/73-12/31/73

.0499	.0908	.0460	.1028	.1335	.1768	.0625	.0126
.0378	.0168	.0151	.0126	.0307	.0397	.0337	.0577

ST. LUCIE 1 5C9 1/1/73-12/31/73

.0337	.0411	.1197	.1320	.1135	.1258	.1276	.0276
.0337	.0461	.0276	.0091	.0123	.0399	.0428	.0675

ST. LUCIE 1 5C0 1/1/73-12/31/73

.0240	.0796	.0710	.0876	.0678	.1196	.0758	.0400
.0359	.0598	.0240	.0278	.0400	.0598	.0556	.1314

ST. LUCIE 1 5C1 1/1/73-12/31/73

.0325	.0437	.0594	.0319	.0735	.0724	.0639	.0746
.1122	.0993	.0572	.0191	.0219	.0516	.0802	.0465

ST. LUCIE 1 5C2 1/1/73-12/31/73

.0287	.0532	.0600	.0895	.1195	.0916	.0332	.0756
.0576	.0576	.0395	.0389	.0524	.0763	.0363	.0300

ST. LUCIE 1 5C3 1/1/73-12/31/73

.0265	.0330	.0273	.1324	.0338	.0633	.0575	.0737
.1031	.0648	.0583	.0707	.1617	.1428	.0649	.0442

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

ST. LUCIE 1

SLE 1/1/73-12/31/73

.0469	.0456	.0649	.0942	.1051	.1058	.0764	.0610
.0624	.0596	.0397	.0312	.0445	.0685	.0489	.0452

SALEM 1 + 2

30LA 6/69-5/71

.0754	.0803	.0856	.0456	.0322	.0321	.0781	.0520
.0290	.0337	.0462	.0305	.0671	.0373	.0931	.0816

SALEM 1 + 2

30LB 6/69-5/71

.0520	.0270	.0253	.0250	.0133	.0203	.0937	.0540
.0437	.0390	.0547	.0817	.0787	.0730	.0220	.0967

SALEM 1 + 2

30LC 6/69-5/71

.0368	.0344	.0241	.0235	.0063	.0393	.0904	.0411
.0335	.0429	.0585	.0732	.0094	.0863	.0196	.0817

SALEM 1 + 2

30CD 6/69-5/71

.0409	.0538	.0335	.0244	.0155	.0389	.0783	.0757
.0573	.0507	.0477	.0776	.0136	.0490	.0384	.0532

SALEM 1 + 2

30CE 6/69-5/71

.0497	.0408	.0376	.0330	.0325	.0502	.0644	.0614
.0773	.0798	.0899	.0717	.0704	.0989	.0991	.0660

SALEM 1 + 2

30CF 6/69-5/71

.0393	.0237	.0194	.0209	.0237	.0258	.0348	.0459
.0805	.0444	.0888	.0750	.0805	.0875	.0598	.0315

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

SALEM 1 + 2

30CT 6/69-5/71

.0460	.0487	.0369	.0295	.0226	.0420	.0739	.0669
.1622	.0600	.0565	.0728	.0946	.1323	.0945	.0620

SEABROOK 1

30A 11/71-10/72

.0078	.0313	.1133	.0781	.0547	.1256	.0352	.0000
.0039	.0313	.0625	.0742	.1719	.1563	.1430	.0117

SEABROOK 1

30B 11/71-10/72

.0164	.0328	.0615	.0769	.0615	.0697	.0533	.0000
.0041	.0451	.0597	.0820	.1967	.1844	.0574	.0287

SEABROOK 1

30C 11/71-10/72

.0187	.0214	.0267	.0455	.0829	.0775	.0455	.0053
.0107	.0401	.0336	.1096	.1711	.1845	.0535	.0134

SEABROOK 1

30D 11/71-10/72

.0348	.0562	.0733	.0444	.0559	.0503	.0430	.0303
.0334	.0567	.0607	.0694	.1120	.1488	.0657	.0654

SEABROOK 1

30E 11/71-10/72

.0196	.0171	.0236	.0338	.0254	.0335	.0331	.0396
.0610	.0926	.1122	.1544	.1656	.1308	.0366	.0247

SEABROOK 1

30F 11/71-10/72

.0125	.0081	.0096	.0246	.0162	.0213	.0235	.0272
.0375	.0765	.1242	.1381	.0357	.1625	.0779	.0147

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

SEABROOK 1

30T 11/71-10/72

.0243	.0330	.0460	.0380	.0411	.0432	.0368	.0299
.0462	.0687	.0491	.0155	.0669	.0448	.0487	.0393

SEQUOYAH 1 + 2

33A 4/2/71-3/31/72

.0343	.0075	0.0000	0.0000	.0189	.0189	0.0000	.0132
.0303	.0887	.0189	.0189	.0189	.0566	.0566	.0377

SEQUOYAH 1 + 2

33B 4/2/71-3/31/72

.0205	.0446	.0120	.0120	0.0000	0.0000	.0120	.0723
.0328	.0317	.0361	.0241	0.0000	.0632	.0000	.0241

SEQUOYAH 1 + 2

33C 4/2/71-3/31/72

.0400	.0979	.0209	.0104	.0156	.0208	.0208	.0469
.0719	.0198	.0417	.0156	.0156	.0417	.0677	.0521

SEQUOYAH 1 + 2

33D 4/2/71-3/31/72

.0390	.0566	.0181	.0037	.0043	.0104	.0132	.0433
.0570	.0555	.0433	.0261	.0249	.0439	.0645	.0470

SEQUOYAH 1 + 2

33E 4/2/71-3/31/72

.0401	.0608	.0171	.0093	.0059	.0109	.0228	.0895
.0539	.0791	.0584	.0268	.0283	.0399	.0850	.0620

SEQUOYAH 1 + 2

33F 4/2/71-3/31/72

.0105	.0530	.0595	.0290	.0163	.0210	.0295	.0540
.0165	.0355	.0375	.0150	.0160	.0130	.0475	.0715

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

SEQUOYAH 1 + 2

33T 4/2/71-3/31/72

.1587	.1163	.0265	.0114	.0577	.0130	.0183	.0661
.1506	.1613	.0484	.0239	.0241	.0350	.0703	.0583

SHOREHAM

15CA 10/1/73-9/30/74

.0569	.1658	.0454	.0102	.0595	.0190	.0366	.0542
.0983	.0441	.0332	.0875	.1600	.1200	.0861	.0732

SHOREHAM

15CB 10/1/73-9/30/74

.0254	.0332	.0391	.0117	.0215	.0352	.0332	.0684
.1406	.0859	.0410	.0859	.1496	.0957	.0723	.0703

SHOREHAM

15CC 10/1/73-9/30/74

.0202	.0376	.0521	.0521	.0202	.0434	.0549	.0434
.1301	.0491	.0283	.1214	.1272	.1214	.0578	.0405

SHOREHAM

15CD 10/1/73-9/30/74

.0573	.0690	.0623	.0512	.0351	.0438	.0368	.0529
.1359	.0711	.0293	.0615	.0958	.0967	.0570	.0492

SHOREHAM

15CE 10/1/73-9/30/74

.0459	.0381	.0313	.0271	.0276	.0363	.0417	.0548
.1596	.1033	.0553	.0756	.0777	.0975	.0814	.0464

SHOREHAM

15CF 10/1/73-9/30/74

.0182	.0130	.0156	.0312	.0398	.0381	.0337	.0900
.1582	.2173	.1152	.0944	.0623	.0424	.0355	.0251

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

SHOREHAM

156T

10/1/73-9/30/74

.0449	.0488	.0423	.0321	.0275	.0358	.0410	.0597
.1291	.0955	.0500	.0799	.1429	.0943	.0663	.0505

STERLING, N. Y.

33A

5/13/73-5/13/74

.0061	.0079	.0109	.0205	.0315	.0408	.0614	.0472
.0340	.0409	.1039	.1890	.0961	.1039	.0756	.0535

STERLING, N. Y.

33B

5/13/73-5/13/74

.1137	.0134	.0103	.0134	.0360	.0468	.0435	.0936
.0360	.0435	.1137	.1639	.0669	.1602	.0335	.0602

STERLING, N. Y.

33C

5/13/73-5/13/74

.1104	.0177	.0122	.0110	.0375	.0353	.0574	.0574
.0464	.0530	.1062	.1589	.0773	.0949	.0640	.0684

STERLING, N. Y.

33D

5/13/73-5/13/74

.0031	.0301	.0167	.0337	.0460	.0587	.0574	.0846
.0971	.0538	.1275	.1011	.0799	.0725	.0504	.0399

STERLING, N. Y.

33E

5/13/73-5/13/74

.0269	.0288	.0283	.0413	.0608	.1334	.0804	.1542
.1375	.0901	.0969	.0590	.0186	.0130	.0088	.0209

STERLING, N. Y.

33F

5/13/73-5/13/74

.0192	.0192	.0445	.0657	.0809	.1881	.1517	.1193
.1658	.0586	.0374	.0172	.0091	.0071	.0061	.0101

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

STERLING, N. Y.

33T 5/13/73-5/13/74

.0533	.0283	.0223	.0367	.0527	.0931	.0749	.1034
.0885	.0779	.1132	.0927	.0472	.0526	.0383	.0349

VIRGIL C. SUMMER

202A 1975

.0493	.0987	.0769	.0835	.0559	.0559	.0461	.1086
.0724	.1382	.0461	.0559	.0461	.0395	.0132	.0399

VIRGIL C. SUMMER

202B 1975

.0588	.0765	.0471	.0529	.0529	.0647	.0235	.0588
.0765	.1412	.0471	.0235	.0765	.0765	.0118	.0118

VIRGIL C. SUMMER

202C 1975

.0450	.0600	.1306	.0535	.0407	.0557	.0385	.0578
.0435	.0964	.0771	.0471	.0407	.1113	.0535	.0365

VIRGIL C. SUMMER

202D 1975

.0469	.0884	.0766	.0529	.0288	.0398	.0402	.0505
.0736	.1141	.1131	.0793	.0549	.0616	.0509	.0295

VIRGIL C. SUMMER

202E 1975

.0390	.0791	.0557	.0557	.0449	.0516	.0690	.0791
.1210	.1307	.0724	.0572	.0349	.0449	.0364	.0286

VIRGIL C. SUMMER

202F 1975

.0360	.0709	.0635	.0648	.0529	.0693	.0693	.0767
.0783	.1048	.0804	.0577	.0476	.0450	.0471	.0312

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

VIRGIL C. SUMMER

202T 1975

.0021	.0862	.0701	.0586	.0413	.0519	.0556	.0680
.0903	.1176	.0372	.0637	.0462	.0548	.0434	.0290

SURRY ST 1 + 2

15CA 11/67-12/69

.0790	.0809	.0718	.0741	.0503	.0377	.0225	.0437
.0353	.0812	.0382	.0571	.0619	.0662	.0630	.0867

SURRY ST 1 + 2

15LB 11/67-12/69

.0937	.0654	.0628	.0564	.0397	.0350	.0199	.0385
.1107	.0989	.0426	.0432	.0546	.0524	.0673	.1288

SURRY ST 1 + 2

15LC 11/67-12/69

.0587	.0497	.0446	.0537	.0435	.0426	.0335	.0516
.0518	.0973	.0047	.0693	.0734	.0653	.0988	.0917

SURRY ST 1 + 2

15CD 11/67-12/69

.0272	.0281	.0302	.0538	.0555	.0674	.0501	.0770
.0863	.0652	.0705	.0607	.0612	.1410	.0890	.0369

SURRY ST 1 + 2

15LE 11/67-12/69

.0227	.0316	.0405	.0685	.0742	.0905	.0961	.1196
.0365	.0736	.0685	.0682	.0357	.0714	.0412	.0312

SURRY ST 1 + 2

15CF 11/67-12/69

.0284	.0420	.0325	.0599	.1071	.1882	.0924	.0662
.1165	.0882	.0796	.0399	.0231	.0546	.0264	.0137

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)

SURRY ST 1 + 2

15LT 11/67-12/69

.0514	.0459	.0443	.0573	.0517	.0549	.1432	.0641
.0420	.0824	.0613	.0591	.0610	.0674	.0810	.0719

SUSQUEHANNA 1

7 1956-1961

.0383	.0491	.0542	.0399	.0624	.0337	.0286	.0368
.0495	.1247	.1253	.0440	.0593	.1032	.0900	.0460

THREE MILE ISLAND

10LA 4/71-3/72

.0287	.0526	.0610	.0809	.0897	.0613	.0477	.0596
.0484	.0448	.0484	.0568	.0575	.1128	.0362	.0589

THREE MILE ISLAND

10CB 4/71-3/72

.0314	.0209	.0733	.0681	.0838	.0830	.0681	.0471
.0838	.0524	.0681	.0628	.0628	.0942	.0745	.0157

THREE MILE ISLAND

10CC 4/71-3/72

.0157	.0236	.0354	.0945	.0866	.0630	.0717	.0512
.0394	.0512	.0591	.0827	.1220	.1063	.0631	.0276

THREE MILE ISLAND

10CD 4/71-3/72

.0199	.0269	.0621	.0789	.0663	.0537	.0564	.0460
.0338	.0551	.0768	.1271	.1301	.0876	.0516	.0368

THREE MILE ISLAND

10CE 4/71-3/72

.0327	.0332	.0436	.0866	.0901	.0698	.0526	.0599
.0495	.0579	.0614	.0842	.0782	.0832	.0792	.0386

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

THREE MILE ISLAND			10GF	4/71-3/72			
.0321	.0428	.0735	.0949	.0989	.0709	.0735	.0548
.0469	.0521	.0465	.0722	.0682	.0709	.0682	.0428

THREE MILE ISLAND			10CT	4/71-3/72			
.0270	.0356	.0573	.0852	.0823	.0622	.0565	.0538
.0445	.0535	.0586	.0912	.0917	.0949	.0700	.0398

TROJAN			3CA	9/1/71-8/31/72			
.0378	.0355	.0358	.0029	.0130	.0420	.0501	.0645
.0165	.0043	.0122	.0065	.0051	.0464	.0465	.0119

TROJAN			3CB	9/1/71-8/31/72			
.0301	.0226	.0375	.0000	.0226	.0677	.0526	.1654
.0301	.0000	.0000	.0153	.0226	.0451	.0205	.0083

TROJAN			3CC	9/1/71-8/31/72			
.0620	.0233	.0078	.0000	.0078	.0310	.0000	.1163
.0233	.0233	.0000	.0078	.0465	.0465	.0217	.0088

TROJAN			3CD	9/1/71-8/31/72			
.0326	.0129	.0168	.0099	.0091	.0030	.1101	.1625
.0018	.0175	.0168	.0144	.0296	.0607	.1534	.0088

TROJAN			3CE	9/1/71-8/31/72			
.0423	.0116	.0346	.0092	.0468	.0419	.1554	.2628
.0009	.0001	.0122	.0174	.0330	.0595	.1089	.1174

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

TROJAN		3CF 9/1/71-8/31/72					
.0248	.0126	.0165	.0116	.0111	.0465	.0371	.0872
.0365	.0355	.0258	.0501	.0733	.1214	.1113	.0946

TROJAN		3LT 9/1/71-8/31/72					
.0535	.0157	.0155	.0067	.0091	.0459	.1204	.0326
.0697	.0261	.0125	.0219	.0368	.0788	.1320	.1715

TURKEY POINT 1 + 2		3LT 1969					
.0283	.0475	.0104	.0359	.0350	.0996	.0425	.0378
.0407	.0472	.0274	.0274	.0473	.0537	.0771	.0352

TURKEY POINT 1 + 2		3LT 1970					
.0315	.0597	.0126	.0692	.0373	.0924	.0622	.0426
.0361	.0329	.0193	.0229	.0366	.0424	.0745	.0379

VERMONT YANKEE 1		14LT 3/67-7/63					
.0251	.0160	.0192	.0245	.0662	.0850	.0857	.0717
.0271	.0177	.0231	.0690	.0860	.1172	.1956	.0703

WATERFORD 3		30A 5/72-4/73					
.1961	.1466	.0437	.0165	.0612	.0553	.0573	.0214
.0408	.0466	.0272	.0738	.0393	.0942	.0595	.0272

WATERFORD 3		30B 5/72-4/73					
.1387	.1272	.0289	.0520	.0636	.0636	.0857	.0289
.0578	.0520	.0347	.0528	.0405	.0839	.0839	.0116

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)**

WATERFORD 3

30C 5/72-4/73

.1059	.1678	.0342	.03000	.0466	.0720	.1144	.0254
.1378	.1678	.0424	.0720	.0805	.0847	.1314	.0169

WATERFORD 3

30D 5/72-4/73

.1163	.1003	.0446	.0263	.0983	.0776	.0694	.0316
.0459	.0354	.0282	.0378	.0585	.0793	.0939	.0561

WATERFORD 3

30E 5/72-4/73

.0725	.1912	.0949	.0417	.1210	.0831	.0546	.0390
.0548	.0322	.0302	.0315	.0529	.0542	.0881	.0620

WATERFORD 3

30F 5/72-4/73

.0377	.0467	.0467	.0240	.1025	.1017	.1139	.0664
.0572	.0660	.0376	.0691	.0609	.0408	.0314	.0291

WATERFORD 3

30T 5/72-4/73

.0916	.0803	.0588	.0293	.0999	.0827	.0766	.0415
.0531	.0446	.0471	.0488	.0557	.0636	.0722	.0462

WATTS BAR 1 + 2

30GA 7/1/73-6/30/75

.0303	.1364	.0606	.0455	.0455	.0455	.0152	.0000
.0758	.0273	.1212	.0616	.0000	.0152	.0152	.0455

WATTS BAR 1 + 2

30GB 7/1/73-6/30/75

.1286	.1214	.0929	.0286	.0357	.0143	.0286	.0143
.0929	.0429	.0786	.0214	.0071	.0143	.0214	.0571

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

WATTS BAR 1 + 2		30GC 7/1/73-6/30/75						
.1133	.1317	.0714	.0536	.0179	.0134	.0134	.0223	
.0982	.2198	.0737	.0357	.0112	.0357	.0402	.0580	

WATTS BAR 1 + 2		30GD 7/1/73-6/30/75						
.0933	.1169	.0629	.0433	.0214	.0142	.0178	.0331	
.1167	.1926	.0819	.0405	.0415	.0455	.0412	.0484	

WATTS BAR 1 + 2		30GE 7/1/73-6/30/75						
.1053	.1355	.0543	.0349	.0158	.0129	.0219	.0359	
.1247	.1962	.0935	.0398	.0259	.0313	.0331	.0539	

WATTS BAR 1 + 2		30GF 7/1/73-6/30/75						
.1393	.1671	.0496	.0378	.0151	.0161	.0217	.0382	
.1195	.1638	.0779	.0293	.0263	.0222	.0326	.0595	

WATTS BAR 1 + 2		30LT 7/1/73-6/30/75						
.1164	.1320	.0589	.0405	.0186	.0142	.0187	.0334	
.1185	.1831	.0889	.0398	.0398	.0352	.0374	.0534	

ZIAMER 1		30A 3/1/72-2/28/74						
.1144	.1120	.0144	.0156	.0096	.0228	.0492	.0683	
.0339	.1879	.1199	.1123	.1379	.1139	.0755	.0444	

ZIAMER 1		30B 3/1/72-2/28/74						
.0369	.0103	.0103	.0180	.0180	.0335	.0464	.0825	
.1211	.1469	.1103	.0876	.0902	.0825	.0644	.0464	

WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY (WASH-1403)
DIRECTION FROM WHICH THE WIND BLOWS (STARTING FROM NNE)

ZIEMER 1

30C

3/1/72-2/28/74

.0297	.0227	.0157	.0245	.0315	.0350	.0542	.1119
.1331	.1189	.1314	.0629	.0979	.0594	.0664	.0647

ZIEMER 1

30D

3/1/72-2/28/74

.0267	.0225	.0191	.0207	.0375	.0690	.1116	.1346
.0314	.0660	.0610	.0646	.0692	.0478	.0731	.0726

ZIEMER 1

30E

3/1/72-2/28/74

.0362	.0353	.0262	.0390	.0825	.2067	.1775	.1021
.0443	.0266	.0273	.0212	.0273	.0279	.0542	.0610

ZIEMER 1

30F

3/1/72-2/28/74

.0304	.0383	.0313	.0461	.0878	.2522	.1826	.0917
.0201	.0313	.0278	.0270	.0278	.0261	.0393	.0452

ZIEMER 1

30T

3/1/72-2/28/74

.0307	.0273	.0226	.0296	.0544	.1271	.1292	.1080
.0662	.0677	.0358	.0511	.0593	.0468	.0423	.0617

ZION 1 + 2

35A

1970

.0517	.0621	.0402	.0425	.0302	.0358	.0627	.0919
.0502	.0578	.0344	.1063	.0805	.0768	.0526	.0734

ZION 1 + 2

35B

1970

.0352	.0683	.0228	.0290	.0269	.0269	.0766	.1314
.1429	.1118	.0600	.1014	.0393	.0663	.0293	.0621

**WIND ROSES FOR SITES USED IN THE REACTOR SAFETY STUDY(WASH-1400)
DIRECTION FROM WHICH THE WIND BLOWS(STARTING FROM NNE)**

ZION 1 + 2		35C		1970			
.0374	.0072	.0302	.0391	.0534	.0170	.0996	.1229
.0819	.1050	.0694	.0872	.0320	.0320	.0302	.0747

ZION 1 + 2		35D		1970			
.0377	.0596	.0340	.0189	.0309	.0445	.0551	.0901
.0747	.0200	.0300	.0000	.0242	.0423	.0415	.0900

ZION 1 + 2		35E		1970			
.0352	.0390	.0320	.0300	.0260	.0375	.0397	.0886
.0372	.0819	.0300	.0354	.0704	.0543	.0203	.0673

ZION 1 + 2		35F		1970			
.0400	.0143	.0132	.0504	.0290	.0221	.0331	.0027
.0761	.0915	.0073	.0400	.0047	.0135	.0500	.0474

ZION 1 + 2		35T		1970			
.0450	.0594	.0372	.0391	.0353	.0345	.0600	.0957
.0713	.0778	.0700	.0125	.0691	.0695	.0400	.0707

Distribution:

**United States Nuclear Regulatory Commission (2)
Probabilistic Analysis Staff
Office of Nuclear Regulatory Research
Washington, DC 20555**

**Attn: A. R. Buhl
R. M. Blond**

4400 A. W. Snyder
4410 D. J. McCloskey
Attn: J. W. Hickman, 4412
G. B. Varnado, 4414
4413 N. R. Ortiz
Attn: J. E. Campbell
R. M. Cranwell
B. S. Langkopf
4413 D. C. Aldrich
4413 S. J. Niemczyk
4413 L. T. Ritchie (5)
4415 D. A. Dahlgren
Attn: A. R. DuCharme
M. Rios
4415 J. L. Sprung (30)
3141 T. L. Werner (5)
3151 W. L. Garner (3)
for DOE/TIC (Unlimited Release)
3171-1 R. P. Campbell (25)
for DOE/TIC
8266 E. A. Aas