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An Analysis of Evacuation Time Estimates Around 52 Nuclear Power Plant Sites

Analysis and Evaluation

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ABSTRACT

On November 29, 1979, the NRC sent a letter to 52 nuclear power plants requesting evacuation time estimates for 10 sectors within a 10-mile radius of each plant. The requirements for these evacuation times are contained in NUREG-0654, Rev. 1, and include such factors as population density, weather conditions, warning time, response time and confirmation time. Fifty responses were received. The analysis of these findings are presented for review.

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INTRODUCTION

This report presents the findings of evacuation time estimates requested at 52 nuclear power plants by a November 29, 1979 letter from the Nuclear Regulatory Commission. The letter from Brian Grimes, Director of Emergency Preparedness Task Group, requested estimates of evacuation times for ten sectors within a radius of about ten miles. Factors to be considered in the analysis included population (permanent, transient and special facilities), weather conditions, warning time, response time, and confirmation time.

Planning for evacuation as a protective measure is not a new concept in emergency planning. NUREG-75/111 (1) contained as a planning objective an analysis of estimates of the time required to carry out evacuation procedures. The planning objectives also included the development of evacuation plans for the low population zones (generally about 2 miles). Subsequently, NUREG-0396 (2) recommended that NUREG-75/111 should be applied by responsible government officials in larger emergency planning zones (generally about 10 miles) (2). The requirements of the November 29, 1979 letter referenced above are currently included in NUREG-0654 (3) which is the current interim guidance. These requirements are currently under review and revision.

The 50 responses represented in this analysis include only 49 separate sites as James A. Fitzpatrick and Nine Mile Point plants both occupy the same site. Two plants did not provide estimates. The names of the 52 plants included in this study and the dates of the reports submitted are included in Table 1.

Volume II of this study contains summaries of the evacuation estimates and maps of the plume emergency planning zones around each reactor.

TABLE 1: NAMES OF PLANTS INCLUDED IN STUDY

1. Arkansas (1-31-80)	27. Millstone (3-1-80)
2. Beaver Valley (1-31-80)	28. Monticello (4-10-80)
3. Big Rock Point (6-1-80)	29. Nine Mile Point (1-31-80)
4. Browns Ferry (3-20-80)	30. North Anna (2-6-80)
5. Brunswick (no response)	31. Oconee (1-31-80)
6. Calvert Cliffs (1-29-80)	32. Oyster Creek (1-31-80)
7. Cooper (1-31-80)	33. Palisades (6-1-80)
8. Crystal River (1-31-80)	34. Peach Bottom (1-31-80)
9. Davis Besse (8-13-80)	35. Pilgrim (1-31-80)
10. D. C. Cook (4-1-80)	36. Point Beach (3-26-80)
11. Diablo Canyon (4-1-80)	37. Prairie Island (4-10-80)
12. Dresden (1-31-80)	38. Quad Cities (1-31-80)
13. Duane Arnold (1-31-80)	39. Rancho Seco (1-31-80)
14. Farley (2-4-80)	40. Robinson (no response)
15. Fitzpatrick (1-31-80)	41. Saint Lucie (7-17-80)
16. Ft. Calhoun (10-2-80)	42. Salem (1-30-80)
17. Ft. St. Vrain (2-80)	43. San Onofre (1-31-80)
18. Ginna (1-31-80)	44. Sequoyah (3-20-80)
19. Haddam Neck (3-1-80)	45. Surry (2-6-80)
20. Hatch (2-4-80)	46. Three Mile Island (1-31-80)
21. Indian Point (1-31-80)	47. Trojan (1-31-80)
22. Kewaunee (1-29-80)	48. Turkey Point (7-17-80)
23. LaCrosse (1-31-80)	49. Vermont Yankee (1-31-80)
24. LaSalle (1-31-80)	50. Yankee Rowe (1-31-80)
25. Maine Yankee (5-23-80)	51. Zimmer (8-18-80)
26. McGuire (1-31-80)	52. Zion (1-31-80)

NOTES: Date of report indicated in parentheses. Fitzpatrick and Nine Mile Point occupy the same site; estimates are only considered once in the analyses.

QUALITATIVE ANALYSIS

The first analysis conducted on each evacuation time estimate submittal was a qualitative assessment of the analysis. The standard for comparison was the model plan requirements developed in a separate report entitled "Analysis of Time Required for Evacuation in Emergency Planning Zones Around Nuclear Power Plants" (4).

The evaluation methology used was a four part (excellent, adequate, poor, none) subjective scale using the above mentioned criteria. Each of the items to be discussed subsequently were given a rating as follows. If the criterion was not addressed, the rating given would be none. If the criterion is addressed, but given inadequate consideration, a rating of poor would be assigned. Those submittals providing at least minimum acceptable consideration of the factor would be given an adequate rating. Finally, those analyses that are clearly of high quality and completeness would receive an excellent rating.

Table 2 presents the rating form used which lists the various items considered in the evaluation. The last criterion considered is an overall assessment of the evacuation time estimate. The overall rating is not a simple summation of the individual factor ratings because the importance of the items considered varies from item to item. Although this analysis requires professional judgement in determining ratings, the process does indicate the area or areas where the reviewer considers the plan to be strong or weak; therefore, a basis exists for resolving weaknesses in plans with poor ratings. Some analyses for which inadequate documentation existed received a poor rating based on the inability to adequately rate the analysis. Table 2 also presents the distribution of ratings by criteria.

TABLE 2: EVALUATION OF EVACUATION TIME ESTIMATE

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	6	30	3	11
B. Assumptions	11	25	9	5
C. Methodology	11	25	10	4
Demand Estimation				
A. Permanent Population	11	29	2	7
B. Transient Population	6	23	2	19
C. Special Population	8	33	3	6
Traffic Routing				
A. Map of Network	9	25	3	13
B. Capacity of Segment	7	22	3	18
Analysis				
A. Components Considered	6	34	8	2
B. Adverse Condition Considered	7	25	15	3
Overall	5	28	17	0

NOTE: The above numbers indicate the number of sites receiving the rating indicated. The two sites not providing estimates are not included.

Table 3 indicates the overall rating for each of the study sites. Appendix A presents the detailed analyses for each site.

It should be noted that plans receiving an excellent overall rating should not individually be considered as model approaches. Although an excellent response exceeded the average response, in all cases some portions of their approach could be improved upon. Taken as a group, however, the plans rated as excellent represent the state-of-the art in developing evacuation time estimates.

TABLE 3: RESULTS OF SUBJECTIVE EVALUATION

Overall Rating			
Excellent	Adequate	Poor	No Response
Diablo Canyon	Big Rock Point	Arkansas	Brunswick
Indian Point	Cooper	Beaver Valley	Robinson
Pilgrim	Crystal River	Browns Ferry	
Rancho Seco	D. C. Cook	Calvert Cliffs	
Trojan	Dresden	Davis Besse	
	Duane Arnold	Farley	
	Fitzpatrick	Ft. Calhoun	
	Ft. St. Vrain	Hatch	
	Ginna	Kewaunee	
	Haddam Neck	LaCrosse	
	LaSalle	North Anna	
	Maine Yankee	Oconee	
	McGuire	Salem*	
	Millstone	San Onofre	
	Monticello	Sequoyah	
	Nine Mile Point	Surry	
	Oyster Creek	Three Mile Island	
	Palisades		
	Peach Bottom		
	Point Beach		
	Prairie Island		
	Quad Cities		
	St. Lucie		
	Turkey Point		
	Vermont Yankee		
	Yankee Rowe		
	Zimmer		
	Zion		

*See footnote on page A-44.

QUANTITATIVE ANALYSIS

The number of plant sites evaluated in the quantitative analysis was 40. Fitzpatrick and Nine Mile Point were only considered once in the analysis. The two plants not providing estimates were not considered in the analysis. Four plants (Browns Ferry, Diablo Canyon, San Onofre and Three Mile Island) were not considered because the responses were not in a format compatible with the analysis. It should be noted that although Diablo Canyon received a an excellent rating, it's response was incompatible with the analysis format used. Five sites (Davis Besse, Ft. Calhoun, St. Lucie, Turkey Point, and Zimmer) were not included in the statistical analysis because their responses were received too late.

Table 4 is the form used to summarize the results found in each evacuation time report submitted. The completeness of data varied greatly among reports. As will subsequently be seen, some evacuation time components were omitted frequently in the estimates submitted. The individual summaries are presented in Appendix B.

It must be cautioned that the data submitted was not in the format shown in Table 4. In some cases adjustments or interpretations had to be made to put the data in the format shown. Furthermore, the assumptions underlying the data are not consistent. The following results must be considered as broad indicators of evacuation times at the various plants.

It is appropriate to note at this point that median rather than mean values are used for comparisons in this report. The reason for selecting median values is that in some cases extremely high estimates for a few sites results in a mean value that is not totally representative of the data.

TABLE 4: EVACUATION TIME ESTIMATES

SECTORS	WITHIN TWO MILES		WITHIN FIVE MILES				WITHIN TEN MILES			
Permanent Population										
Permanent Pop. Vehicles										
Transient Population										
Transient Pop. Vehicles										
Evacuation Capacity Per Hour										
Notification Time										
Preparation Time										
Permanent Pop. Response Normal Conditions										
Permanent Pop. Response Adverse Conditions										
Transient Pop. Response Normal Conditions										
Transient Pop. Response Adverse Conditions										
General Pop. Evac. Time Normal Conditions										
General Pop. Evac. Time Adverse Conditions										
Confirmation Time										
Special Pop. Evac. Time Normal Conditions										
Special Pop. Evac. Time Adverse Conditions										

The mean permanent resident population at 40 sites was 58,000. The median population was 30,000 with the range being 6000 to 282,000. It should be noted that eight plants used in the analysis did not report population estimates and NUREG 0348 (5) population values for 1970 were used.

The evacuation estimates were requested to be provided for 2-, 5-, and 10-mile radii from the plant. The estimates were also requested for 90° sectors, except for the 2-mile radius in which 180° sectors were specified. The remainder of the analysis will center around the 10-mile emergency planning zone. In addition, the effect of distance will be examined by looking at the results by distance.

Median Times for 10-Mile Radius

The 40 respondents reported results for a total 138 sectors. Not all sites had 4 sectors due to a variety of reasons. Some sites did not report on all sectors due to multistate jurisdictions, some of which did not assist in the assessment. Some sites being adjacent to water bodies do not have 4 sectors on which to estimate land based evacuation. Those plants considering water based evacuations had their over-water evacuation times tallied with special populations so as not to distort land evacuation times.

A total of 109 of the 142 sectors had population data reported. The mean sector population was 17,000. However, the median population was 5000, and 75 percent of the sectors had populations less than 15,000. The range in sector population was 0 to 151,000.

Table 5 presents the results of the analysis of time components for the 10-mile radius evacuation. Appendix C defines the terms used. It should also be noted that separate estimates have been made for adverse weather conditions. In most cases, adverse weather conditions resulted in increased

TABLE 5: EVACUATION TIME (HOURS) STATISTICS BY COMPONENT FOR 10-MILE RADIUS

Time Component*	Minimum	25%	Median	75%	Maximum	#Sectors	Mean
NOTIFY	0.3	0.8	1.6	3.0	6.0	116	1.9
PPRNC	0.1	1.0	1.8	4.0	8.3	108	2.7
PPRAC	0.2	1.3	2.8	6.0	16.2	100	4.1
TPRNC	0.4	1.3	3.0	3.5	3.7	11	2.4
TPRAC	0.6	0.8	1.7	4.1	4.2	7	2.4
GPTNC	1.0	2.9	5.0	8.0	21.0	111	5.3
GPTAC	1.3	3.0	5.2	8.8	18.3	91	6.4
CONFIRM	0.6	1.0	2.0	4.0	24.0	75	3.5
SPRNC	0.3	1.3	2.7	4.9	24.0	44	3.7
SPRAC	0.6	2.4	3.2	3.0	10.2	28	4.7

*NOTIFY = NOTIFICATION TIME
PPRNC = PERMANENT POPULATION RESPONSE TIME NORMAL CONDITIONS
PPRAC = PERMANENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
TPRNC = TRANSIENT POPULATION RESPONSE TIME NORMAL CONDITIONS
TPRAC = TRANSIENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
GPTNC = GENERAL POPULATION EVACUATION TIME NORMAL CONDITIONS
GPTAC = GENERAL POPULATION EVACUATION TIME ADVERSE CONDITIONS
CONFIRM = CONFIRMATION TIME
SPRNC = SPECIAL POPULATION RESPONSE TIME NORMAL CONDITIONS
SPRAC = SPECIAL POPULATION RESPONSE TIME ADVERSE CONDITIONS

SEE APPENDIX C FOR DEFINITION.

response time. However, at some sites, the adverse weather alternative was assumed to occur only in the winter when transient populations would be low or nonexistent. Therefore, in some cases, adverse weather response time was estimated to be less than for normal conditions when large transient populations would be possible. Although this approach is not recommended, it nevertheless was the approach used by some. The proper approach would have been to consider other adverse conditions (e.g., rain) under peak demand.

Estimates for total notification time varied from 0.3 hours to a maximum of 6.0 hours. A few of the studies looked at the interaction between warning time and response time. A few studies estimated the distribution for warning and preparation in determining response times. Others added total warning time plus response time and indicated that the result overestimated the total time required because some people would begin evacuating before others are warned.

Further study is warranted in examining the interaction between components because of the uncertainty concerning the effect on total evacuation time. Improved notification systems may pose problems at some sites since they could induce traffic volumes that exceed the capacity of the roadway system. Thus, even though notification times were greatly reduced, evacuation times might be largely unaffected or even increase. Such situations would require careful traffic management in order to avoid massive traffic jams. One satisfactory solution for these sites might be immediate (15 minute) notification followed by phased evacuation in combination with an effective sheltering program.

The median response time for permanent residents was 1.8 hours for normal conditions and 2.8 hours for adverse conditions (see PPRNC and PPRAC

in Table 5). The upper limits were 8.3 and 16.2 hours for normal and adverse conditions respectively.

The median transient population response time was 3.0 hours for normal conditions and 1.7 hours for adverse conditions (see TPRNC and TPRAC in Table 5). Transient population response time was a time component in only 11 sectors under normal conditions and 7 sectors under adverse conditions. Maximum values were estimated at 3.7 hours under normal conditions and 4.2 under adverse conditions. As previously indicated, some estimates for adverse conditions were less because transient populations were expected to be smaller under adverse conditions which was assumed to be snow. Other adverse conditions such as rain were not considered.

The median special population response time was 2.7 hours (44 sectors) for normal conditions and 3.2 hours (28 sectors) for adverse conditions. Maximum values were 24 hours for normal conditions and 10.2 hours for adverse conditions. The lower maximum value for adverse conditions results from an adverse weather estimate not being made for the site reporting the maximum normal weather time.

As previously indicated, notification plus response time estimates were summed to estimate the time required (not including confirmation) to clear the sector after issuance of a warning. As previously indicated, most estimates include a simple summation of notification and response time which may overestimate the required time since some people will leave before all are notified. The median general population evacuation time was 5.0 hours (111 sectors) under normal conditions and 5.2 hours (91 sectors) under adverse conditions. Maximum times were 21.0 hours for normal conditions and 27.0 hours for adverse conditions.

Confirmation times ranged from 0.6 hours to 24.0 hours, with the median being 2.0 hours. Confirmation time estimates were based on many different assumptions. The effectiveness of confirmation seemed to be questioned by many. The accuracy of the estimates seems questionable because of the lack of good data on which to base an estimate.

Medians by Rating

In an earlier section of the report a subjective rating was made and each of the responses were rated poor, adequate, or excellent. In order to determine if the results differed by rating, the medians were separately calculated for each rating class. Fourteen sites (51 sectors) had a poor rating, 22 sites (73 sectors) had an adequate rating, and 4 sites (15 sectors) had an excellent rating. Table 6 summarizes the evacuation time means by rating for the various time components. The lower ratings appear to have generally higher estimates for general population evacuation times. However, subsequent analysis using the data segregated by rating did not appear to improve the results observed. The remaining analyses include all the data including responses receiving a poor rating.

Medians by Total Permanent Population

As indicated earlier, the population distribution while varying from 6000 to 282,000, has a median of only 30,000. A second stratification of the data, based on total permanent resident population, was therefore made. Five categories were established as follows:

1. 1 - 20,000
2. 20,000 - 50,000
3. 50,000 - 100,000

TABLE 6: MEDIAN EVACUATION TIME (HOURS) BY RATING FOR 10-MILE RADIUS

Component	Rating							
	Poor		Adequate		Excellent		Overall	
	dian	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors
NOTIFY	2.0	42	1.8	59	1.5	15	1.6	11f
PPRNC	3.0	38	1.5	55	1.4	15	1.8	108
PPRAC	5.0	38	2.0	47	2.1	15	2.8	100
TPRNC	3.0	7	2.3	1	3.1	3	3.0	11
TPRAC	2.7	6	0.8	1	---	--	1.7	7
GPTNC	6.0	40	5.0	56	4.7	15	5.0	111
GPTAC	7.3	39	4.9	37	4.4	15	5.2	91
CONFIRM	2.0	32	2.0	29	2.0	14	2.0	75
SPRNC	2.7	10	1.9	29	7.2	5	2.7	44
SPRAC	3.2	9	2.9	14	10.2	5	3.2	28

*NOTIFY = NOTIFICATION TIME
PPRNC = PERMANENT POPULATION RESPONSE TIME NORMAL CONDITIONS
PPRAC = PERMANENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
TPRNC = TRANSIENT POPULATION RESPONSE TIME NORMAL CONDITIONS
TPRAC = TRANSIENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
GPTNC = GENERAL POPULATION EVACUATION TIME NORMAL CONDITIONS
GPTAC = GENERAL POPULATION EVACUATION TIME ADVERSE CONDITIONS
CONFIRM = CONFIRMATION TIME
SPRNC = SPECIAL POPULATION RESPONSE TIME NORMAL CONDITIONS
SPRAC = SPECIAL POPULATION RESPONSE TIME ADVERSE CONDITIONS

SEE APPENDIX C FOR DEFINITIONS.

4. 100,000 - 200,000

5. 200,000 and up

There were 11 sites in category 1, 15 sites in category 2, 8 sites in category 3, 3 sites in category 4, and 3 sites in category 5.

Table 7 summarizes the evacuation time estimates for the five population groups. No clear trends appear in the data. Several other analyses were performed including deletion of data receiving a poor rating and use of mean instead of median values. These additional analyses also did not reveal any consistent trends.

Because the population density could vary by sector, and since no trends were found based on total population, it was determined that evacuation time components should be evaluated based on sector population. The following section examines the data based on sector population.

Medians by Sector Permanent Population

The sector populations were broken into groups for analysis as follows:

1. 1 - 5,000

2. 5,000 - 10,000

3. 10,000 - 25,000

4. 25,000 - 50,000

5. 50,000 - 100,000

6. 100,000 and up

Not all sites reported sector population so that the number of sectors analyzed is less than for the total population groups.

Table 8 summarizes the medians by sector population. One trend noted in the data is that permanent population response time (normal and adverse)

TABLE 7: MEDIAN EVACUATION TIME (HOURS) BY TOTAL POPULATION GROUPS FOR 10-MILE RADIUS

Component*	Total Population 1-20,000		Total Population 20,000-50,000		Total Population 50,000-100,000		Total Population 100,000-200,000		Total Population 200,000 and up		Overall	
	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors
NOTIFY	3.0	29	1.1	46	2.0	29	2.6	6	1.4	6	1.6	116
PPRNC	3.0	35	3.0	42	1.3	21	1.9	6	3.5	4	1.8	108
PPRAC	4.3	23	2.0	46	1.7	21	2.8	6	5.6	4	2.8	100
TPRNC	3.5	1	2.3	1	1.5	7	3.4	2	---	-	3.0	11
TPRAC	---	--	0.8	1	1.6	4	4.1	2	---	-	1.7	7
GPTNC	4.0	30	3.7	38	5.7	29	5.8	7	5.0	6	5.0	111
GPTAC	4.4	17	3.8	37	5.1	25	7.3	7	6.0	4	5.2	91
CONFIRM	4.4	16	2.0	31	1.0	21	2.0	4	3.0	3	2.0	75
SPRNC	0.8	10	2.4	20	4.0	7	2.8	1	7.2	6	2.7	44
SPRAC	3.0	5	3.2	13	5.0	5	2.8	1	10.2	4	3.2	28

*NOTIFY = NOTIFICATION TIME
PPRNC = PERMANENT POPULATION RESPONSE TIME NORMAL CONDITIONS
PPRAC = PERMANENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
TPRNC = TRANSIENT POPULATION RESPONSE TIME NORMAL CONDITIONS
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TABLE 8: MEDIAN EVACUATION TIME (HOURS) BY SECTOR
PERMANENT POPULATION GROUPS

Component*	Sector Population 0-5,000		Sector Population 5,000-10,000		Sector Population 10,000-25,000		Sector Population 25,000-50,000		Sector Population 50,000-100,000		Sector Population 100,000 and up	
	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors
NOTIFY	2.0	44	1.0	18	1.1	17	2.0	9	1.7	2	1.4	6
PPRNC	1.4	43	1.5	14	1.4	13	3.5	8	4.2	2	3.7	4
PPRAC	1.5	38	2.0	12	1.9	14	5.2	8	4.8	2	5.8	4
TPRNC	3.5	1	2.5	2	3.0	5	1.3	2	3.4	1	---	-
TPRAC	---	--	1.7	1	2.3	4	1.5	1	4.1	1	---	-
GPTNC	3.9	42	6.5	17	4.3	14	5.3	8	7.6	2	6.6	6
GPTAC	4.4	34	4.5	11	4.5	13	5.7	7	8.5	2	7.1	4
CONFIRM	2.2	31	2.0	10	1.0	11	3.5	7	2.0	1	2.0	3
SPRNC	0.8	8	1.9	10	2.7	7	4.0	5	3.7	1	7.2	6
SPRAC	2.0	4	3.1	4	3.1	4	5.0	4	4.7	1	10.2	4

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appears greater for sectors above 25,000 than below 25,000. Another trend is that special population response time (normal and adverse) appears to increase with increasing sector populations. In order to further evaluate these trends, the data was combined into two groups. Table 9 summarizes the medians with only two sector population groups: above 25,000 and below 25,000. The trend toward increased permanent population response time appears fairly strong. Figure 1 shows the actual distribution of responses for the two population groups. The under 25,000 group shows a long tail to the right distribution typical of the data in general. The over 25,000 population group shows an extremely strong tendency toward its median (and therefore mean value due to the symetrical distribution) value.

It should also be noted in Table 9 that the smaller difference between the GPTNC for the two groups may be explained in part by a higher transient population response time for the under 25,000 population group. The special population response times also continue to show a much larger value for the over 25,000 population group.

Median Times by Distance

Table 10 summarizes the median evacuation time components for the 2-, 5-, and 10-mile radii from the plants. As would be expected, the times increase with increasing distance. What is surprising is that permanent population response time increase is less than proportional to the distance and that general population evacuation time increase is nearly proportional to distance for the increase in area from five to ten miles. Further study of the effect of distance is warranted.

TABLE 9: MEDIAN EVACUATION TIME (HOURS) BY SECTOR PERMANENT POPULATION GROUPS

Component*	Sector Population 0-25,000		Sector Population 25,000 and up	
	Median	# of Sectors	Median	# of Sectors
NOTIFY	1.3	79	1.5	17
PPRNC	1.4	70	3.[illegible]	14
PPRAC	1.9	64	5.5	14
TPRNC	3.1	8	1.5	3
TPRAC	1.7	5	2.8	2
GPTNC	5.0	73	5.7	16
GPTAC	4.5	58	6.7	13
CONFIRM	2.0	52	2.0	11
SPRNC	1.9	25	6.1	12
SPRAC	3.1	12	5.0	9

*NOTIFY = NOTIFICATION TIME
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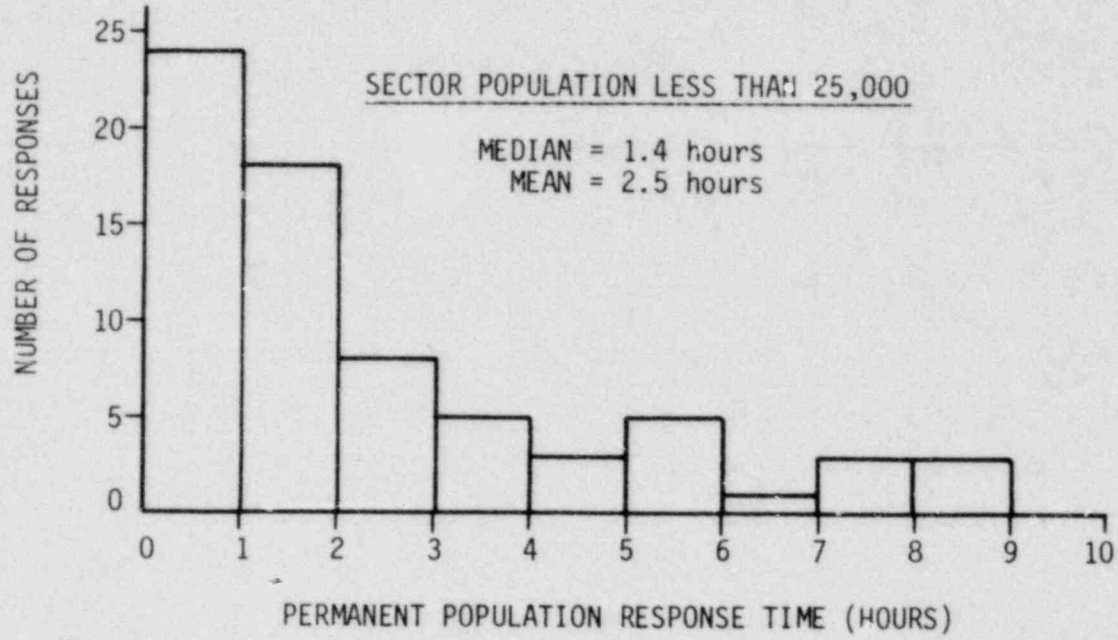
SPRAC = SPECIAL POPULATION RESPONSE TIME ADVERSE CONDITIONS

SEE APPENDIX C FOR DEFINITIONS.



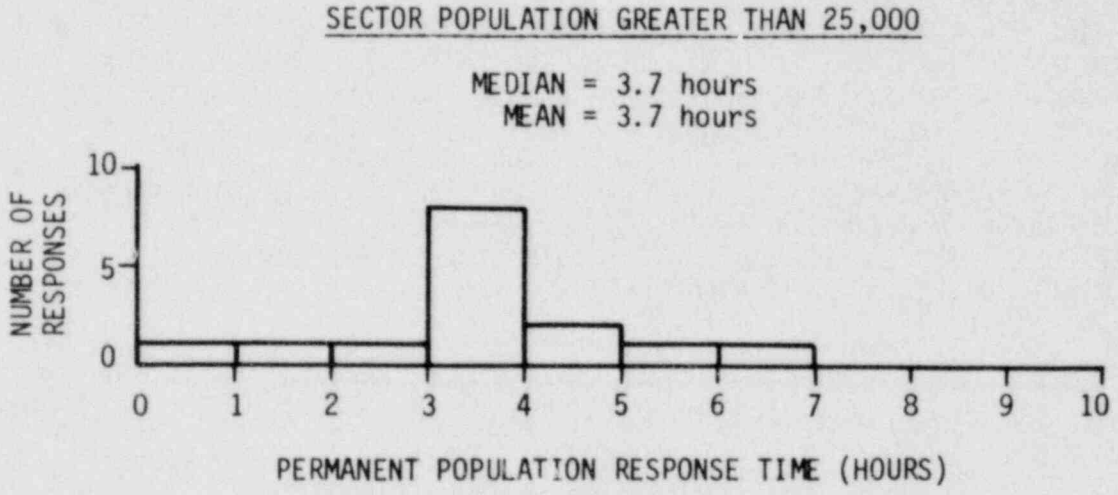


FIGURE 1: PERMANENT POPULATION RESPONSE TIME BY SECTOR POPULATION GROUP

TABLE 10: MEDIAN EVACUATION TIME (HOURS) BY DISTANCE

Component*	Radius = 2 mi.		Radius = 5 mi.		Radius = 10 mi.	
	Median	# of Sectors	Median	# of Sectors	Median	# of Sectors
NOTIFY	0.6	48	1.0	109	1.6	116
PPRNC	0.7	45	1.0	103	1.8	108
PPRAC	1.0	44	1.8	97	2.8	100
TPRNC	0.2	3	1.9	7	3.0	11
TPRAC	0.3	2	2.0	4	1.7	7
GPTNC	1.5	45	2.2	100	5.0	111
GPTAC	1.7	37	2.5	83	5.2	91
CONFIRM	0.8	37	1.0	74	2.0	75
SPRNC	1.5	9	2.5	24	2.7	44
SPRAC	2.0	8	2.3	18	3.2	28

*NOTIFY = NOTIFICATION TIME
PPRNC = PERMANENT POPULATION RESPONSE TIME NORMAL CONDITIONS
PPRAC = PERMANENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
TPRNC = TRANSIENT POPULATION RESPONSE TIME NORMAL CONDITIONS
TPRAC = TRANSIENT POPULATION RESPONSE TIME ADVERSE CONDITIONS
GPTNC = GENERAL POPULATION EVACUATION TIME NORMAL CONDITIONS
GPTAC = GENERAL POPULATION EVACUATION TIME ADVERSE CONDITIONS
CONFIRM = CONFIRMATION TIME
SPRNC = SPECIAL POPULATION RESPONSE TIME NORMAL CONDITIONS
SPRAC = SPECIAL POPULATION RESPONSE TIME ADVERSE CONDITIONS

SEE APPENDIX C FOR DEFINITIONS.

FEMA ASSESSMENTS

The Federal Emergency Management Agency (FEMA) was requested by the Nuclear Regulatory Commission to make several independent assessments of evacuation times around reactor sites which are located in proximity to high population densities. Initially, twelve assessments have been made by three contractors. Six of the assessments correspond to plant sites evaluated in this report. The six sites are Beaver Valley, Indian Point, Maine Yankee, Millstone, Three Mile Island, and Zion.

It should be noted that the evaluation framework prescribed by FEMA was more general than that required by the NRC. For example, the FEMA contractors were not required to follow the sector configuration specified by NRC. The zone configuration used by the FEMA contractors generally considered political subdivisions, demographic considerations and roadway locations. One contractor also used a radius of exactly 10 miles in developing time estimates. This was done to allow comparison of similar evacuation areas among the sites evaluated.

The principal difference between licensee submittals and the FEMA assessments is that the licensee submittals represented a much wider range of techniques. Nevertheless, some licensee submittals were in fact done by two of the FEMA contractors. The third FEMA contractor also used a subcontractor that had prepared a licensee estimate.

The methodologies used by the FEMA contractors follows closely the transportation planning techniques recommended in Reference 4. The primary difference in the FEMA estimates and the techniques used by many of the better licensee responses concerns the interaction between the various evacuation time components.

All the FEMA contractors elected to use distributions for the various time components and combine them statistically. Two things, however, are not completely clear-cut. First, little empirical data exists for developing the distributions and that data which does exist is very limited. Second, it is not completely clear whether using distributions increases or decreases the evacuation time estimate. The fact that distributions allow some evacuees to begin moving should reduce total evacution time. Furthermore, one FEMA contractor concluded that gradual loading of the street system reduced total evacuation time at one site studied due to the roadway configuration. However, in some cases gradual loading could increase total evacuation times due to assumed longer times to prepare and depart, thus underutilizing roadway capacity.

CONCLUSIONS

The results of the analysis of the evacuation time estimates provided by the various licensees defines the range of times that can reasonably be expected to occur during evacuations of the emergency planning zones. Given the variety of methodologies and assumptions used, it is ill-advised to draw any strong conclusions concerning the factors affecting evacuation time. For example, the variation in analytical methods may confound the trends observed for the effect of sector population and evacuation distance on evacuation times. However, with further refinement and consistent application of analysis techniques, it will be possible to ascertain the limiting factors in evacuation times.

REFERENCES

1. NUREG 75/111, Guide and Checklist for Development and Evaluation of State and Local Government Radiological Emergency Response Plans in Support of Fixed Nuclear Facilities, U.S. Nuclear Regulatory Commission, Revision 1, December 1974. *

2. NUREG-0396, Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants, U.S. Nuclear Regulatory Commission, December 1978. *

3. NUREG-C654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (for Interim Use and Comment), U.S. Nuclear Regulatory Commission, January 1980. (Presently available as NUREG-0654, Rev. 1)**

4. Thomas Urbanik, Arthur Desrosiers, Michael K. Lindell, and C. Richard Schuller, Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones, Battelle Human Affairs Research Centers, June 1980, BHARC-401/80-017.

5. NUREG-0348, Demographic Statistics Pertaining to Nuclear Power Reactor Sites, U.S. Nuclear Regulatory Commission, October 1979. *

*Available for purchase from the National Technical Information Service, Springfield, VA 22161.

**Available free upon written request to the Division of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

APPENDIX A

EVALUATION FORMS FOR INDIVIDUAL PLANTS

EVALUATION OF EVACUATION TIME ESTIMATE

Arkansas

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions				X
C. Methodology				X
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment				X
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Beaver Valley

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment				X
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered	X			
Overall			X	

*Lack of complete documentation makes it difficult to assess the accuracy of the plan. The overall methodology is excellent, there is no evaluation for 90° sectors.

EVALUATION OF EVACUATION TIME ESTIMATE

Big Rock Point

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment	X			
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Browns Ferry

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions				X
C. Methodology				X
Demand Estimation				
A. Permanent Population				X
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment				X
Analysis				
A. Components Considered				X
B. Adverse Condition Considered				X
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Brunswick*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	—	—	—
B. Assumptions	—	—	—	—
C. Methodology	—	—	—	—
Demand Estimation				
A. Permanent Population	—	—	—	—
B. Transient Population	—	—	—	—
C. Special Population	—	—	—	—
Traffic Routing				
A. Map of Network	—	—	—	—
B. Capacity of Segment	—	—	—	—
Analysis				
A. Components Considered	—	—	—	—
B. Adverse Condition Considered	—	—	—	—
Overall	—	—	—	—

*No Response

EVALUATION OF EVACUATION TIME ESTIMATE

Calvert Cliffs

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment			X	
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Cooper

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population	X			
B. Transient Population		X		
C. Special Population			X	
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered				X
Overall		*		

*Time estimates provided for Nebraska side only.

EVALUATION OF EVACUATION TIME ESTIMATE

Crystal River

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Davis Besse

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population		X		
B. Transient Population			X	
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered		X		
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Donald C. Cook

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Diablo Canyon

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered	X			
Overall	X			

EVALUATION OF EVACUATION TIME ESTIMATE

Dresden

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Duane Arnold

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population	X			
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Farley

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population				X
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network			X	
B. Capacity of Segment				X
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Fitzpatrick[1]

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				2
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

[1]Same location as Nine Mile Point.
[2]Adequate methodology, not actually reported.

EVALUATION OF EVACUATION TIME ESTIMATE

Ft Calhoun

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map			X	
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X*	

*Note: The rating is based on data submitted for Nebraska side. An estimate was provided for the Iowa side with little documentation. The Iowa rating would be poor for all items.

EVALUATION OF EVACUATION TIME ESTIMATE

Ft. St. Vrain

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	X	—	—
B. Assumptions	—	X	—	—
C. Methodology	—	X	—	—
Demand Estimation				
A. Permanent Population	—	X	—	—
B. Transient Population	—	X	—	—
C. Special Population	—	X	—	—
Traffic Routing				
A. Map of Network	—	X	—	—
B. Capacity of Segment	—	X	—	—
Analysis				
A. Components Considered	—	X	—	—
B. Adverse Condition Considered	—	—	X	—
Overall	—	X	—	—

EVALUATION OF EVACUATION TIME ESTIMATE

Ginna

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment			X	
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Haddam Neck

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology		X		
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered	X			
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Hatch

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		X
B. Assumptions			X	
C. Methodology				
Demand Estimation				
A. Permanent Population		X		X
B. Transient Population				
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		X
B. Capacity of Segment				
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Indian Point

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population		X		
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

EVALUATION OF EVACUATION TIME ESTIMATE

Kewaunee

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population				X
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

La Crosse

Item	Excel.	Adeq	Poor	None
Background				
A. Area Map			X	
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population			X	
B. Transient Population			X	
C. Special Population		X		
Traffic Routing				
A. Map of Network			X	
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

LaSalle

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	X	—	—
B. Assumptions	—	X	—	—
C. Methodology	—	X	—	—
Demand Estimation				
A. Permanent Population	—	X	—	—
B. Transient Population	—	X	—	—
C. Special Population	—	X	—	—
Traffic Routing				
A. Map of Network	—	X	—	—
B. Capacity of Segment	—	X	—	—
Analysis				
A. Components Considered	—	X	—	—
B. Adverse Condition Considered	—	—	X	—
Overall	—	X	—	—

EVALUATION OF EVACUATION TIME ESTIMATE

Maine Yankee

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	X	—	—
B. Assumptions	—	X	—	—
C. Methodology	—	X	—	—
Demand Estimation				
A. Permanent Population	—	X	—	—
B. Transient Population	—	X	—	—
C. Special Population	—	X	—	—
Traffic Routing				
A. Map of Network	—	X	—	—
B. Capacity of Segment	—	X	—	—
Analysis				
A. Components Considered	—	X	—	—
B. Adverse Condition Considered	—	X	—	—
Overall	—	X	—	—

Note: Data not reported in detail.

EVALUATION OF EVACUATION TIME ESTIMATE

McGuire

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

Note: Results not reported in cummulative format as requested.

EVALUATION OF EVACUATION TIME ESTIMATE

Millstone

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology		X		
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered	X			
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Monticello

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

Note: Some capacities reported appear high.

EVALUATION OF EVACUATION TIME ESTIMATE

Nine Mile Point[1]

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				2
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

[1]Same location as Fitzpatrick.

[2]Adequate methodology, not actually reported.

EVALUATION OF EVACUATION TIME ESTIMATE

North Anna

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions				X
C. Methodology				X
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall			X*	

*It is not possible to assess the overall validity of the estimates since there is no information on assumptions or methodology.

EVALUATION OF EVACUATION TIME ESTIMATE

Oconee

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Oyster Creek

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population				*
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

* Population data considered, but not reported.

EVALUATION OF EVACUATION TIME ESTIMATE

Palisades

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population			X	
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Peach Bottom

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population				*
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

*Not reported, although considered in analysis.

EVALUATION OF EVACUATION TIME ESTIMATE

Pilgrim Station

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map			X	
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered	X			
Overall	X			

EVALUATION OF EVACUATION TIME ESTIMATE

Point Beach

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	X	—	—
B. Assumptions	—	X	—	—
C. Methodology	—	X	—	—
Demand Estimation				
A. Permanent Population	—	X	—	—
B. Transient Population	—	X	—	—
C. Special Population	—	X	—	—
Traffic Routing				
A. Map of Network	—	X	—	—
B. Capacity of Segment	—	—	—	X
Analysis				
A. Components Considered	—	X	—	—
B. Adverse Condition Considered	—	X	—	—
Overall	—	X	—	—

EVALUATION OF EVACUATION TIME ESTIMATE

Prairie Island

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Quad Cities

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Rancho Seco

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered	X			
Overall	X			

EVALUATION OF EVACUATION TIME ESTIMATE

Robinson*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	___	___	___	___
B. Assumptions	___	___	___	___
C. Methodology	___	___	___	___
Demand Estimation				
A. Permanent Population	___	___	___	___
B. Transient Population	___	___	___	___
C. Special Population	___	___	___	___
Traffic Routing				
A. Map of Network	___	___	___	___
B. Capacity of Segment	___	___	___	___
Analysis				
A. Components Considered	___	___	___	___
B. Adverse Condition Considered	___	___	___	___
Overall	___	___	___	___

*No Response

EVALUATION OF EVACUATION TIME ESTIMATE

Saint Lucie

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE*

Salem

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions			X	
C. Methodology			X	
Demand Estimation				
A. Permanent Population	X			
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network			X	
B. Capacity of Segment				X
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X	

*A revised evacuation time estimate, which was received after the deadline for inclusion in this analysis, has been evaluated and rated excellent.

EVALUATION OF EVACUATION TIME ESTIMATE

San Onofre

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population			X	
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered				X
B. Adverse Condition Considered				X
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Sequoyah

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions			X	
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population				X
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment			X	
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Surry

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions				X
C. Methodology				X
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment				X
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall			X	

*It is not possible to assess the overall validity of the estimates since there is no information on assumptions or methodology.

EVALUATION OF EVACUATION TIME ESTIMATE

Three Mile Island

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology			X	
Demand Estimation				
A. Permanent Population				X
B. Transient Population				X
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment				X
Analysis				
A. Components Considered			X	
B. Adverse Condition Considered			X	
Overall			X	

EVALUATION OF EVACUATION TIME ESTIMATE

Trojan

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population				X
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered	X			
Overall	X			

EVALUATION OF EVACUATION TIME ESTIMATE

Turkey Point

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map				X
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network				X
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Vermont Yankee

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions		X		
C. Methodology	X			
Demand Estimation				
A. Permanent Population				X
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

EVALUATION OF EVACUATION TIME ESTIMATE

Yankee Rowe

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	X			
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population				*
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered		X		
Overall		X		

*Not reported, but obviously considered.

EVALUATION OF EVACUATION TIME ESTIMATE

Zimmer

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map	—	X	—	—
B. Assumptions	—	X	—	—
C. Methodology	—	X	—	—
Demand Estimation				
A. Permanent Population	—	X	—	—
B. Transient Population	—	X	—	—
C. Special Population	—	X	—	—
Traffic Routing				
A. Map of Network	—	X	—	—
B. Capacity of Segment	—	X	—	—
Analysis				
A. Components Considered	—	X	—	—
B. Adverse Condition Considered	—	X	—	—
Overall	—	X	—	—

EVALUATION OF EVACUATION TIME ESTIMATE

Zion

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology		X		
Demand Estimation				
A. Permanent Population		X		
B. Transient Population		X		
C. Special Population		X		
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered		X		
B. Adverse Condition Considered			X	
Overall		X		

APPENDIX B

SUMMARY OF EVACUATION TIME ESTIMATES FOR INDIVIDUAL PLANTS

EVACUATION TIME ESTIMATES

Arkansas

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N	624					30			60				90	60		
S	31					30			60				90	60		
WITHIN FIVE MILES																
NE	1288					60			60				120	90		
SE	5623					60			120				180	90	360	
SW	421					60			60				180	90		
NW	1023					60			60				120	90		
WITHIN TEN MILES																
NE	3956					120			60				180	120		
SE	19858					120			60				180	120	360	
SW	1365					120			60				180	120		
NW	2163					120			60				180	120		

EVACUATION TIME ESTIMATES

Beaver Valley

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
All	17304											225	270			
WITHIN TEN MILES																
All	155594											345	435			

EVACUATION TIME ESTIMATES

Big Rock Point

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WSW-NE								12	14							
WITHIN FIVE MILES																
WSW-S								83	76							
SSE-NE								37	26							
WITHIN TEN MILES																
WSW-S								95	75							
SSE-NE								71	32							

EVACUATION TIME ESTIMATES

Browns Ferry

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
All								120	240					600		
WITHIN FIVE MILES																
All								360	600					600		
WITHIN TEN MILES																
All								600	840			90		600		

EVACUATION TIME ESTIMATES

Brunswick*

SECTORS	WITHIN TWO MILES	WITHIN FIVE MILES	WITHIN TEN MILES
Permanent Population			
Permanent Pop. Vehicles			
Transient Population			
Transient Pop. Vehicles			
Evacuation Capacity Per Hour			
Notification Time			
Preparation Time			
Permanent Pop. Response Normal Conditions			
Permanent Pop. Response Adverse Conditions			
Transient Pop. Response Normal Conditions			
Transient Pop. Response Adverse Conditions			
General Pop. Evac. Time Normal Conditions			
General Pop. Evac. Time Adverse Conditions			
Confirmation Time			
Special Pop. Evac. Time Normal Conditions			
Special Pop. Evac. Time Adverse Conditions			

*No Response

EVACUATION TIME ESTIMATES

Calvert Cliffs

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time *	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time *	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N	137					15/30		273	546			288	576	15/30		
S	773					15/30		285	570			300	600	15/30		
WITHIN FIVE MILES																
NW	2192					30/60		366	722			396	782	30/60		
SW	1431					30/60		348	696			378	756	30/60		
NE	0															
SE	934					30/60		354	708			384	768	30/60		
WITHIN TEN MILES																
NW	4903					60/120		456	912			516	1032	60/120		
SW	6363					60/120		486	972			546	1096	60/120		
SE	10260					60/120		486	972			546	1096	60/120		
NE	601					60/120		456	912			516	1032	60/120		

Notes: * Normal (Top)/Adverse (Bottom)

EVACUATION TIME ESTIMATES

Cooper

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A - G	5	8														
H - R	26	8						7								
WITHIN FIVE MILES																
A - D	308	100														
E - G	167	55														
N - R	243	80						29								
H - M	363	120						29								
WITHIN TEN MILES																
A - D	3045	1015														
E - G	455	150	3000							210						
N - R	1940	632				15		64								
H - M	1122	366				15		52								

EVACUATION TIME ESTIMATES

Crystal River

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A-H	0															
J-R	0														60	120
WITHIN FIVE MILES																
A-D	1522					15		150	210			165	225			
E-H	100					15		45	105			60	120			
J-M	0														240	360
N-R	60					15		60	120			75	135		240	360
WITHIN TEN MILES																
A-D	2940					15		165	345			180	360			
E-H	9000					15		165	345			180	360		105	180
J-M	0														360	480
N-R	60					15		60	120			75	135		360	480

EVACUATION TIME ESTIMATES

Davis Besse

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
180°	800							40	30					120		
WITHIN FIVE MILES																
Left	1600							70	140					120		
Right	1800							75	150					120		
WITHIN TEN MILES																
Left	6600							120	240					120		
Right	11800							210	420					120		

EVACUATION TIME ESTIMATES

D. C. Cook

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time *	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time *	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
B-J						210 230	20	15	20			245	270	230 440		
WITHIN FIVE MILES																
BCDE						160 295	20	15	30			195	345	420 840		
FGHJ						140 210	20	20	30			180	260	300 525		
WITHIN TEN MILES																
BCDE						300 360	20	35	75			355	455	1020 1590		
FGHJ						300 360	20	20	45			340	425	720 1095		

Note: * Normal (Top)/Adverse (Bottom)

EVACUATION TIME ESTIMATES

Diablo Canyon

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
QRA-F	5															
WITHIN FIVE MILES																
RAB	35															
COE	28															
EF	0															
WITHIN TEN MILES																
RAB	11763															
COE	4965															
EF	917															
ALL	63489	29785										255	300			

Note: This study slected to use a 6-mile rather than a 5-mile radius and 67.5 degree sectors to better reflect natural boundaries. The 10-mile radius was expanded up to 12 miles so as not to divide population centers.

EVACUATION TIME ESTIMATES

Dresden

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Contitions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
I	80	30	830	660		45	20					240				
II	580	200	980	750		45	20					360				
WITHIN FIVE MILES																
I, III	4280	1430	1280	960		45	20					300				
I, VII	760	255	1010	810		45	20					480			60	
II, IV	1840	615	980	755		60	20					420			60	
II, V	710	240	980	755		60	20					480				
II, VI	1690	570	980	750		45	20					480				
WITHIN TEN MILES																
I, III, VIII	12340	4110	1580	1210		45	20					360			60	
I, VII, XII	10840	3560	1010	865		45	20					360			120	
II, IV, IX	9410	3140	1280	995		60	20					420			180	
II, V, X	3400	1135	980	755		60	20					480			60	
II, VI, XI	6870	2290	1050	810		45	20					480			60	

Note: Evacuation times shown are in some cases less for 10 mile radius than for evacuation of a smaller part of the same sectors. This is not reasonable, although possible from methodology used.

EVACUATION TIME ESTIMATES

Duane Arnold

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
NW	129	43				10		45	106			55	116	60		
SE	198	66				10		42	96			52	106	60		
WITHIN FIVE MILES																
NW	522	174				30		58	119			88	149	60		
NE	777	259				40		56	110			96	150	60		
SE	1002	334				51		69	123			120	174	60		
SW	1323	441				70		61	115			131	185	60		
WITHIN TEN MILES																
NW	4473	1491				160		138	192			298	352	120		
NE	2649	883				107		84	138			191	245	120		
SE	151002	50334				231		402	420			633	651	120	165	192
SW	3525	1175				149		90	144			239	293	120		

EVACUATION TIME ESTIMATES

Farley

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
E								45	60					30	0	0
W								45	60					30	0	0
WITHIN FIVE MILES																
NE								120	180					60	0	0
SE								120	180					60	0	0
SW								120	180					60	0	0
NW								120	180					60	0	0
WITHIN TEN MILES																
NE								240	360					90	0	0
SE								360	480					120	0	0
SW								360	480					150	0	0
NW								360	480					150	0	0

EVACUATION TIME ESTIMATES

Fitzpatrick*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
S	1088					60		70	90			130	150	90		
WITHIN FIVE MILES																
SW	3733					60		70	100			130	160	150		
SE	2824					60		70	100			130	160	150		
WITHIN TEN MILES																
SW	35973					60		170	280			230	340	210	130	210
SE	9575					60		90	120			150	180	210		
Lake															45	
All	43772					60		170	280			230	340	360	130	210

* Same location as Nine Mile Point.

EVACUATION TIME ESTIMATES

Ft. Calhoun

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
G-R	187	62				15	180	10				205				
Iowa																
WITHIN FIVE MILES																
N-R	7382	2077				15	180	42				237				
G-M	892	274				15	180	20				215				
Iowa																
WITHIN TEN MILES																
N-R	8317					15	180	56				251				
G-M	2374					15	180	40				235				
Iowa						15	90	20	40			125	145			

EVACUATION TIME ESTIMATES

Ft. St. Vrain

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
I	140	64	350	315	5000	126	20	94				240				
II	76	35			3000	36	20	64				120				
WITHIN FIVE MILES																
I & V	554	252	350	315	4000	360	20	40				420				
I & VI	744	338	350	315	4000	180	20	280				480				
II & III	374	170			3000	150	20	130				300				
II & IV	1802	819			1500	144	20	316				480				
WITHIN TEN MILES																
I, V, IX	4099	1863	350	315	7000	336	20	184				540			60	
I, VI, X	5121	2328	350	315	7000	246	20	274				540			18	
II,III,VII	1736	774			3500	282	20	238				540			18	
II,IV,VIII	2244	1020			3500	246	20	334				600			18	

EVACUATION TIME ESTIMATES

Ginna

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time *	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
S	867	237				120	20	39	60					45/90		
N	0									30	45			60/90	270	285
WITHIN FIVE MILES																
SE	4820	1197				120	20	92	117					60/120		
SW	4820	1198				120	20	92	117					180/360	120	
NW	0													75/113	390	420
NE	0													75/113	390	420
WITHIN TEN MILES																
SE	12064	3414				120	20	114	236					135/270		
SW	36803	10868				120	20	312	384					360/720		
NW	0													105/158	550	595
NE	0													105/158	550	595

Note: All north sectors are Lake Ontario, and time estimates for lake sectors are for evacuating boaters. Evacuation time shown under Special Population.

* Normal (Top)/Adverse (Bottom)

EVACUATION TIME ESTIMATES

Haddam Neck

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
AB	1304	869	0	0	2040	20						67	79			
CD	1616	1077	407	271	2325	22						73	96			
WITHIN FIVE MILES																
A	3540	2361	4317	2878	3489	57						178	209			
B	4025	2683	0	0	1571	59						155	192			
C	2636	1757	0	0	2623	65						124	139			
D	2635	1757	1872	1248	6290	65						96	109			
WITHIN TEN MILES																
A	38316	25544	5992	3995	6169	175						477	593		240	300
B	7982	5321	7503	5002	3877	325						486	527			
C	15890	10593	10866	7444	7384	260						495	354			
D	10326	6884	5054	3369	8791	208						281	307			

EVACUATION TIME ESTIMATES

Kewaunee

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
1-9						75		60				135		15		
WITHIN FIVE MILES																
1-5						90		60				150		30		
6-9						90		60				150		30		
WITHIN TEN MILES																
1-5						180		60				240		120		
6-9						180		60				240		120		

EVACUATION TIME ESTIMATES

LaCrosse

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
E						15		15	45			30	60	60		
W						-		-	-					-		
WITHIN FIVE MILES																
NE						15		15	45			30	60	60		
SE						15		30	75			45	90	60		
NW						15		30	75			45	90	60		
SW						15		30	75			45	90	60		
WITHIN TEN MILES																
NE						15		105	165			120	180	120		
SE						15		105	225			120	240	90		
NW						15		105	225			120	240	120		
SW						15		105	225			120	240	120		

EVACUATION TIME ESTIMATES

LaSalle

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
I	30	10	520	520								120				
II	50	15										60				
WITHIN FIVE MILES																
I, III	505	170	520	520		95	20	5				120				
I, VI	245	80	520	520		90	20	10				120				
II, IV	215	70				65	20	35				120				
II, V	195	65				65	20	35				120				
WITHIN TEN MILES																
I,III,VII	4250	1415	1275	1275		135	20	385				540				
I,VI,X	7635	2545	2070	2070		165	20	295				480			120	
II,IV,VIII	1905	635	75	75		85	20	495				600				
II,V,IX	2870	935	230	230		110	20	470				600				

Note: Transients included in permanent population response time

EVACUATION TIME ESTIMATES

Maine Yankee

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
1						66						78	90	60		
2						66						78	84	60		
WITHIN FIVE MILES																
3						66						90	108	60		
4						66						108	132	60		
5						66						90	180	60		
6						66						102	120	60		
WITHIN TEN MILES																
7						66						108	126	60		
8						66						120	144	60	72	78
9						66						174	444	60	216	480
10						66						228	270	60	270	312

EVACUATION TIME ESTIMATES

McGuire

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WSW-E	318		0			15		20	35	0	0	35	50	50		
ENE-W	240		3525			30		45	60	0	0	75	90	45		
WITHIN FIVE MILES																
SSE-E	1731		0			15		30	45			45	60	30		
ENE-N	1374		12456			30		55	70			85	100	45		
NNW-W	1225		4336			30		55	70			85	100	45		
WSW-S	1147		0			15		30	45			45	60	30		
WITHIN TEN MILES																
SSE-E	19697		3738			15		45	65			60	80	60	105	135
ENE-N	13368		19618			15		45	65			60	80	45		
NNW-W	6496		7159			15		45	65			60	80	45		
WSW-S	25119		663			15		60	80			60	80	60		

Note: An apparent error exists as evacuation times are less for 10 mile radius than for 5 mile radius.

EVACUATION TIME ESTIMATES

Millstone

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N	6087	3044	1096	731	3494	8						90	107			
WITHIN FIVE MILES																
NW	12660	6330	15721	10481	7076	33						227	266			
NE	41778	20889	12242	8161	4618	21						408	484		300	
WITHIN TEN MILES																
NW	23669	11835	24287	16191	8056	163						466	527			
NE	94956	47478	56742	37828	11405	121						576	667			
Fischers I.	400		2100									540	622			
Plum I.												45	52			

EVACUATION TIME ESTIMATES

Monticello

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
NW-ESE	266							10	15					30		
SE-WNW	509							15	20					40		
WITHIN FIVE MILES																
NW-NNE	1099							30	40					80		
NE-ESE	1766							35	45					90		
SE-SSW	4573							45	54					110		
SW-WNW	1133							30	40					80		
WITHIN TEN MILES																
NW-NNE	2855							60	80					160		
NE-ESE	6609							75	100					200		
SE-SSW	8890							90	120					240	200	
SW-WNW	3620							65	85					170		

EVACUATION TIME ESTIMATES

Nine Mile Point

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
S	1088					60		70	90			130	150	90		
WITHIN FIVE MILES																
SW	3733					60		70	100			130	160	150		
SE	2824					60		70	100			130	160	150		
WITHIN TEN MILES																
SW	35973					60		170	280			230	340	210	130	210
SE	9575					60		90	120			150	180	210		
lake															45	
All	43772					60		170	280			230	340	350	130	210

Note: Same location as Fitzpatrick

EVACUATION TIME ESTIMATES

North Anna

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A - H	72					45		45	60			90	105	60	0	0
J - R	50					120		180	300			300	420	360	0	0
WITHIN FIVE MILES																
A - D	839					90		90	135			180	225	135	30	45
E - H	278					60		90	150			150	210	240	0	0
J - M	1860					120		180	420			300	540	720	0	0
N - R	1976					120		240	420			360	540	720	0	0
WITHIN TEN MILES																
A - D	2966					180		180	260			360	440	260	24	36
E - H	3104					180		180	270			360	450	480	30	45
J - M	2800					240		180	720			420	960	1440	0	0
N - R	3754					240		240	720			480	960	1440	0	0

EVACUATION TIME ESTIMATES

Oconee

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
NNE-S	225		445			15						60	80	20		
SSW-N	63		2711			20						60	70	20		
WITHIN FIVE MILES																
NNE-E	1961		264			45						180	240	30	210	300
ESE-S	1444		546			35						90	120	30		
SSW-W	1086		1775			45						90	120	30		
WNW-N	500		3923			30						90	120	20		
WITHIN TEN MILES																
NNE-E	7822		588			75						210	270	50		
ESE-S	23888		3283			60						180	250	50		
SSW-W	17495		3670			75						210	270	50	500	590
WNW-N	4279		5483			75						210	270	50		

Note: Data may not be cumulative for evacuation times.

EVACUATION TIME ESTIMATES

Oyster Creek

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A						60		30	75			90	135		90	120
B						60		102	183			162	243			
WITHIN FIVE MILES																
NE						60		150	255			210	315		90	120
SE						60		60	120			120	180			
SW						60		30	75			90	135		120	120
NW						60		48	102			108	162			
WITHIN TEN MILES																
NE						120		240	420			360	540		90	120
SE						120		84	186			204	306			
SW						120		30	105			150	225		90	120
NW						120		96	204			216	324		90	120

EVACUATION TIME ESTIMATES

Palisades

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N-SSW								31	11							
WITHIN FIVE MILES																
ESE-SSW								28	29							
N-E								58	135							
WITHIN TEN MILES																
ESE-SSW								120	124							
N-E								158	165							

EVACUATION TIME ESTIMATES

Peach Bottom

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
NE								60	120							
SW								60	120							
WITHIN FIVE MILES																
N								120	240							
E								120	240							
S								120	240							
W								120	240							
WITHIN TEN MILES																
N						180		180	540			360	720			
E						180		180	540			360	720			
S						180		120	360			300	540			
W						180		120	360			300	540			

EVACUATION TIME ESTIMATES

Pilgrim Station

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population *	Transient Pop. Vehicles *	Evacuation Capacity Per Hour	Notification Time**	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time**	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
SE-NW	2235	894	4690 2959	1173 987		35/45		44	75	106		185	120	35/45		
WITHIN FIVE MILES																
NNW-NW	2241	897	5748 2959	1437 987		35/45		32	120	88		155	165	35/45		
WNW-SW	10938	4160	5165 15014	1292 5005		45/60		86	170	129		360	230	45/60		
SSW-SE	5619	2248	9525 5210	2382 1737		35/45		100	100	185		320	145	35/45		
WITHIN TEN MILES																
NNW-NW	21414	8566	9219 13054	2305 5018		35/45		218	265	187		440	310	35/45		
WNW-SW	35394	14158	9862 25009	2466 8337		45/60		119	175	91		255	235	45/60		
SSW-SE	6625	2650	14302 11639	3576 3880		35/45		79	125	221		335	170	35/45		

Notes: * Transient includes seasonal (Top) and transient (Bottom)
** Normal (Top)/Adverse (Bottom)

EVACUATION TIME ESTIMATES

Point Beach

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions **	General Pop. Evac. Time Adverse Conditions **	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
LPZ	265	90				25/60*		52	110			55	120	15/30*		
WITHIN FIVE MILES ***																
NW - N	338	97				25/50*		50	110			55	120	15/30*		
SW-WNW	519	150				40/90*		65	140			75	150	25/50*		
SSE-SSW	388	110				25/60*		30	110			55	120	15/30*		
WITHIN TEN MILES ***																
NW-N	1613	447				60/130*		65	180			100	200	40/60*		
SW-WNW	4339	1500				140/280*		165	330			210	390	70/120*		
SSE-SSW	15738	4610	1200	250		120/200*		210	450	135	50	240	480	120/120*		

Notes: * Normal (Top)/Adverse (Bottom)
** Total General Population Evacuation Time estimated to be non-cumulative
*** Estimates for 5 and 10-mile radius maybe non-cumulative

EVACUATION TIME ESTIMATES

Prairie Island

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
NW-ESE	238	119						15	20			30	35	40		
SE-WNW	111	56						15	20			30	35	40		
WITHIN FIVE MILES																
NW-NNE	370	185						30	40			45	55	80		
NE-ESE	610	305						30	40			45	55	80		
SE-SSW	2302	1151						40	52			55	67	100		
SW-WNW	378	189						30	40			45	55	80		
WITHIN TEN MILES																
NW-NNE	2153	1077						60	80			75	95	160		
NE-ESE	4355	2178						50	65			65	80	130		
SE-SSW	14016	7008						90	120			105	135	240		
SW-WNW	1790	895						60	80			75	95	160		

Note: Notification time assumed to be 15 minutes to compute total general population evacuation time

EVACUATION TIME ESTIMATES

Quad Cities

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
I	45	15	0	0		35	20					180				
II	145	50	850	680		75	20					300				
WITHIN FIVE MILES																
I,V	1350	450	0	0		105	20					420				
I,VI	2815	940	300	240		85	20					480				
II,III	700	235	885	710		100	20					480				
II,IV	1350	450	850	680		115	20					420				
WITHIN TEN MILES																
I,V,IX	5310	1770	0	0		115	20					540				
I,VI,X	42240	14080	10300	8240		115	20					720			300	
II,III,VII	1510	505	885	710		125	20					540				
II,IV,VIII	7265	2420	850	680		100	20					480			60	

EVACUATION TIME ESTIMATES

Rancho Seco

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
R - G	14	9	2234			35	*	3	6			38	41	16	**	**
H - Q	87	56				40	*	3	6			43	46	22	**	**
WITHIN FIVE MILES																
R - C	55	35				35	*	9	24			44	59	30	**	**
D - G	35	22				35	*	9	24			44	59	27	**	**
M - Q	478	306				70	*	9	12			79	82	98	**	**
H - L	229	147				55	*	11	28			66	83	132	**	**
WITHIN TEN MILES																
R - C	303	194				155	*	20	66			175	221	270	**	**
D - G	2491	1594				200	*	20	66			220	266	343	**	**
M - Q	3674	2351				200	*	20	64			220	264	652	**	**
H - L	1816	1162				200	*	20	64			220	264	760	**	**

* Preparation time included in warning time
** Less time than for the general population

EVACUATION TIME ESTIMATES

Robinson*

SECTORS	WITHIN TWO MILES		WITHIN FIVE MILES				WITHIN TEN MILES			
Permanent Population										
Permanent Pop. Vehicles										
Transient Population										
Transient Pop. Vehicles										
Evacuation Capacity Per Hour										
Notification Time										
Preparation Time										
Permanent Pop. Response Normal Conditions										
Permanent Pop. Response Adverse Conditions										
Transient Pop. Response Normal Conditions										
Transient Pop. Response Adverse Conditions										
General Pop. Evac. Time Normal Conditions										
General Pop. Evac. Time Adverse Conditions										
Confirmation Time										
Special Pop. Evac. Time Normal Conditions										
Special Pop. Evac. Time Adverse Conditions										

*No Response

EVACUATION TIME ESTIMATES

Saint Lucie

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N-SSE						30						110	125	30		
WITHIN FIVE MILES																
N-NW						30						170	185	30		
WNW-SW						30						170	185	30		
SSW-SE						30						210	225	30		
WITHIN TEN MILES																
N-NW						30						380	395	30		
WNW-SW						30						305	320	30		
SSW-SE						30						325	340	30		

EVACUATION TIME ESTIMATES

Salem

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
E	0					0		0	0			0	0			
WITHIN FIVE MILES																
W	0					0		0	0			0	0			
NE	468															
SE	0															
SW	89					15		105	165			120	180			
NW	741					15		105	165			120	180			
WITHIN TEN MILES																
NE	11451															
SE	1574															
SW	3112					30		330	510			360	540			
NW	7775					30		330	510			360	540			

EVACUATION TIME ESTIMATES

San Onofre

SECTORS	WITHIN TWO MILES		WITHIN FIVE MILES				WITHIN TEN MILES			
										All
Permanent Population										
Permanent Pop. Vehicles										
Transient Population										
Transient Pop. Vehicles										
Evacuation Capacity Per Hour										
Notification Time										
Preparation Time										
Permanent Pop. Response Normal Conditions										
Permanent Pop. Response Adverse Conditions										
Transient Pop. Response Normal Conditions										
Transient Pop. Response Adverse Conditions										
General Pop. Evac. Time Normal Conditions										300
General Pop. Evac. Time Adverse Conditions										
Confirmation Time										
Special Pop. Evac. Time Normal Conditions										
Special Pop. Evac. Time Adverse Conditions										

EVACUATION TIME ESTIMATES

Sequoyah

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A & D	774	219				15	30	9	39			54	84	120	90	110
B & C	1560	1452				15	30	18	48			63	93	120	115	135
WITHIN FIVE MILES																
A	4833	1372				15	30	31	61			76	96	120	115	135
B	1950	553				15	30	18	48			63	93	120	115	135
C	3341	948				15	30	24	54			69	99	120	115	135
D	3173	1039				15	30	26	56			71	91	120	115	135
WITHIN TEN MILES																
A	6840	1941				15	30	88	118			133	163	180	160	190
B	2730	775				15	30	28	58			73	103	180	160	190
C	8900	2526				15	30	29	59			74	104	180	160	190
D	19020	5398				15	30	82	112			127	157	180	160	190

EVACUATION TIME ESTIMATES

Surry

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
A-H	0		0			0		0	0	0	0	0	0	0	0	0
J-R	24		0			30		60	90	0	0	90	120	60	0	0
WITHIN FIVE MILES																
A-O	1074		0			135		195	360	0	0	330	495	70	0	0
E-H	3624		0			90		120	240	0	0	210	330	120	180	240
J-M	664		0			90		120	180	0	0	210	270	120	0	0
N-R	138		0			60		60	120	0	0	120	180	60	0	0
WITHIN TEN MILES																
A-O	27940		10000			240		300	540	80	140	540	780	480	240	300
E-H	44736		0			120		240	300	0	0	360	420	240	0	0
J-M	4548		0			240		360	450	0	0	600	690	360	0	0
N-R	5283		0			120		270	360	0	0	390	480	240	0	0

EVACUATION TIME ESTIMATES

Three Mile Island

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
Dauphin County							60	60	120			120	180			
WITHIN FIVE MILES																
Dauphin County							180	240	480			420	660		300	600
WITHIN TEN MILES																
Dauphin County							360	420	1260			780	1620		1440	2880

EVACUATION TIME ESTIMATES

Trojan

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Ev. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
W-ENE	606	205			2100	57		41	61			98	118	60		
E-WSW	852	227			2100	45		37	56			82	101	60		
WITHIN FIVE MILES																
WNW-N	3266	1179			2100	120		103	123			223	243	60		
NNE-E	1637	623			2400	82		56	71			138	153	60		
ESE-S	2245	950			2100	106		52	70			158	176	60		
SSW-W	1171	562			1800	43		56	76			99	116	60		
WITHIN TEN MILES																
WNW-N	54040	18105			3600	86		255	272			341	358	120	220	281
NNE-E	3850	1363			2400	277		82	120			359	397	120		
ESE-S	4522	1611			2100	103		73	92			176	195	120		
SSW-W	2214	912			2400	66		62	81			128	147	120		

EVACUATION TIME ESTIMATES

Turkey Point

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
N-SSE						30						90	105	60		
WITHIN FIVE MILES																
N-NW						30						100	115	60		
WNW-SW						30						95	110	60		
SSW-SE						30						90	105	60		
WITHIN TEN MILES																
N-NW						30						255	270	60		
WNW-SW						30						365	380	60		
SSW-SE						30						90	105	60		

EVACUATION TIME ESTIMATES

Vermont Yankee

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time *	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
P-E	2060	687				35/45									69	78
F-N		218				35/45									70	80
WITHIN FIVE MILES																
C-F	2240	1160				35/45									76	92
G-K	850	460				35/45									74	84
L-P	500	360				35/45		18	36			53	81			
Q-B	3400	1640		1200		35/45									70	85
WITHIN TEN MILES																
C-F	3100	2360				35/45		32	64			67	109			
G-K	6800	3180				35/45									111	162
L-P	1150	820				35/45		26	52			61	97			
Q-B	14450	6106		1200		35/45									180	180

Note: Evacuation times only reported for controlling condition, either general population evacuation or special facilities evacuation

* Normal (Top)/Adverse (Bottom)

EVACUATION TIME ESTIMATES

Yankee Rowe

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time *	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
Q-F		9			2790	35/45		7	13							
G-P	225	90			2790	35/45		7	13							
WITHIN FIVE MILES																
B-E	425	192			2790	35/45		13	26							
F-J	315	154			2790	35/45		18	37							
K-N	240	114			2790	35/45		19	37							
P-A	530	114			2790	35/45		21	41							
WITHIN TEN MILES																
B-E	1650	660			2790	35/45		41	82							
F-J	1400	560			2790	35/45		37	75							
K-N	13175	5270			2790	35/45		55	110							
P-A	700	280			2790	35/45		32	64							

* Normal Conditions Top Figure - Adverse Conditions Bottom Figure

EVACUATION TIME ESTIMATES

Zimmer

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time*	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions*	General Pop. Evac. Time Adverse Conditions*	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
E	609	185	25	20		15 65						60 110	65 115	65		
W	359	109	80	64		15 65						60 110	65 115	65		
WITHIN FIVE MILES																
N	1876	510	25	20		15 80						100 160	125 185	80		
E	1417	431	25	20		15 80						100 160	125 185	80		
S	858	260	80	64		15 120						100 205	125 230	120		
W	1246	379	80	64		15 70						100 155	125 180	70		
WITHIN TEN MILES																
N	12788	3887	475	380		45 140						175 265	235 325	140		
E	6515	1980	25	20		45 280						155 385	205 430	280		
S	2303	700	580	189		45 300						155 410	205 455	300		
W	4774	1451	580	189		45 110						155 216	205 265	110		

* Prompt (Top)/Without Prompt Notification System (Bottom)

EVACUATION TIME ESTIMATES

Zion

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
I	28700	8735	435	350		30	20					300			720	
WITHIN FIVE MILES																
I,II	38355	11750	660	530		30	20					360			720	
I,III	49100	15640	6140	4915		45	20					360			720	
WITHIN TEN MILES																
I,II,IV	118700	38530	27095	21700		45	20					1260			720	
I,III,V	150000	48790	39090	31275		60	20					480			1440	

APPENDIX C

DEFINITION OF EVACUATION TIME COMPONENTS

The term "evacuation time" is used by different analysts to represent different components of the time between detection of an incident and the completion of an evacuation. For the purpose of this study, evacuation time is divided into several components. This allows comparison of the same components among the various sites.

The components of evacuation time are defined as follows:

Notification Time = The time required to get the evacuation notification to all individuals in the specified area.

Preparation Time = The time required for individuals to prepare to evacuate the specified area.

Response Time = The time required for all individuals to physically move out of an area. This time component is shown separately for permanent residents (PPR) and for transients (TPR). Furthermore, separate estimates are also possible for normal (NC) and adverse conditions (AC). The four possible response time components are: PPRNC, PPRAC, TPRNC and TPRAC.

General Population Evacuation Time = The sum of notification, preparation and response (both permanent and transient populations) times. Separate totals would be made for normal (GPTNC) and adverse (GPTAC) weather conditions. In most cases the total is an arithmetic sum of component times; in a few cases the total is a statistical sum of component distributions.

Special Population Respone Time = The time required to evacuate institutions and the time required by other special conditions that are largely independent of general population evacuation times. An example of a special condition is the evacuation time required for recreational

pleasure boats at sites adjacent to bodies of water. Separate estimates are possible for normal (SPRNC) and adverse (SPRAC) weather conditions.

In addition to the above evacuation time components, confirmation time estimates have also been required.

Confirmation Time = The period of time required to verify that the affected population has departed. It may occur concurrently or subsequent to evacuation. It is not considered an evacuation time component.

APPENDIX D

EVALUATION FORMS FOR FEMA ASSESSMENTS

EVALUATION OF EVACUATION TIME ESTIMATE

Beaver Valley*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population			X	
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

*Estimate prepared by FEMA contractor.

EVALUATION OF EVACUATION TIME ESTIMATE

Indian Point*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population	X			
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment	X			
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

*Estimate prepared by FEMA contractor.

EVALUATION OF EVACUATION TIME ESTIMATE

Maine Yankee*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population			X	
Traffic Routing				
A. Map of Network	^			
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

*Estimate prepared by FEMA contractor.

EVALUATION OF EVACUATION TIME ESTIMATE

Millstone*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions				
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population	X			
C. Special Population			X	
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

*Estimate prepared by FEMA contractor.

EVALUATION OF EVACUATION TIME ESTIMATE

Three Mile Island*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions	X			
C. Methodology	X			
Demand Estimation				
A. Permanent Population	X			
B. Transient Population				X
C. Special Population			X	
Traffic Routing				
A. Map of Network	X			
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall	X			

*Estimate prepared by FEMA contractor.

EVALUATION OF EVACUATION TIME ESTIMATE

Zion*

Item	Excel.	Adeq.	Poor	None
Background				
A. Area Map		X		
B. Assumptions		X		
C. Methodology	X			
Demand Estimation				
A. Permanent Population		X		
B. Transient Population				X
C. Special Population	X			
Traffic Routing				
A. Map of Network		X		
B. Capacity of Segment		X		
Analysis				
A. Components Considered	X			
B. Adverse Condition Considered		X		
Overall		X		

*Estimate prepared by FEMA contractor.

APPENDIX E

SUMMARY OF EVACUATION TIME ESTIMATES FOR FEMA ASSESSMENTS

EVACUATION TIME ESTIMATES

Beaver Valley*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Evacuation Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
WITHIN TEN MILES																
All	142900					20						243	252			

*Estimate prepared by FEMA contractor.

EVACUATION TIME ESTIMATES

Indian Point*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
WITHIN TEN MILES																
All	284078											510	520			

*Estimate prepared by FEMA contractor.

EVACUATION TIME ESTIMATES

Maine Yankee*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
WITHIN TEN MILES																
All	27874	13701										315	380			

*Estimate prepared by FEMA contractor.

EVACUATION TIME ESTIMATES

Millstone*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
WITHIN TEN MILES																
All	[illegible]500					20						319	204			

*Estimate prepared by FEMA contractor.

EVACUATION TIME ESTIMATES

Three Mile Island*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
WITHIN FIVE MILES																
WITHIN TEN MILES																
All	195500					20						180	202			

*Estimate prepared by FEMA contractor.

EVACUATION TIME ESTIMATES

Zion*

SECTORS	Permanent Population	Permanent Pop. Vehicles	Transient Population	Transient Pop. Vehicles	Evacuation Capacity Per Hour	Notification Time	Preparation Time	Permanent Pop. Response Normal Conditions	Permanent Pop. Response Adverse Conditions	Transient Pop. Response Normal Conditions	Transient Pop. Response Adverse Conditions	General Pop. Evac. Time Normal Conditions	General Pop. Evac. Time Adverse Conditions	Confirmation Time	Special Pop. Evac. Time Normal Conditions	Special Pop. Evac. Time Adverse Conditions
WITHIN TWO MILES																
All												220				
WITHIN FIVE MILES																
All												220				
WITHIN TEN MILES																
All	240000											285	350			

*Estimate prepared by FEMA contractor.

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On November 29, 1979, the NRC sent a letter to 52 nuclear power plants requesting evacuation time estimates for 10 sectors within a 10-mile radius of each plant. The requirements for these evacuation times are contained in NUREG-0654, Rev. 1, and include such factors as population density, weather conditions, warning time, response time and confirmation time. Fifty responses were received. The analysis of these findings are presented for review.

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