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DAMAGE ASSESSMENTS OF BLAST RISK AREAS IN MISSOURI.(U)  
APR 79 E V SAGER, M O MARSHALL, C W HULBURT  
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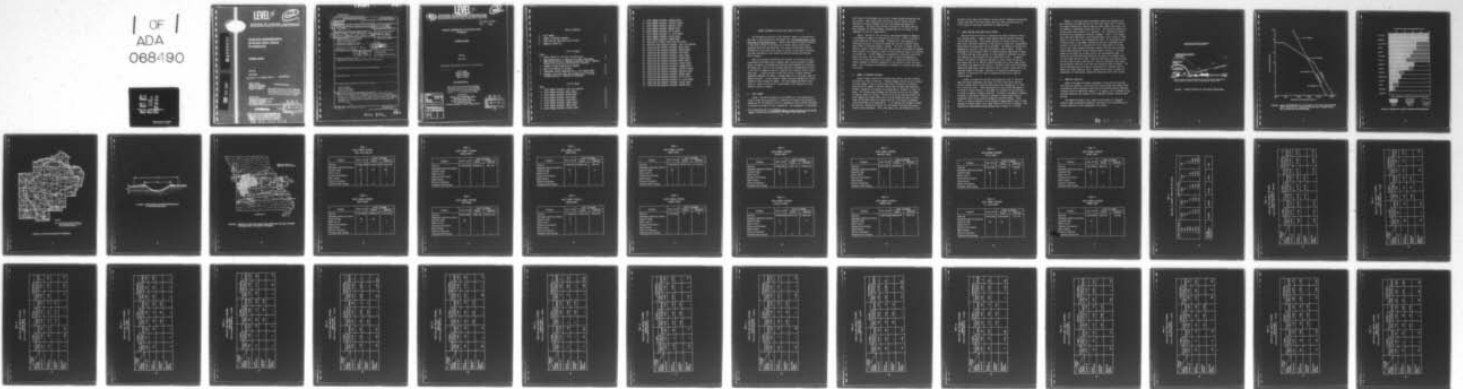
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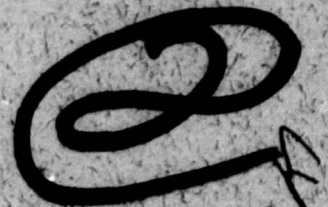
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**DAMAGE ASSESSMENTS  
OF BLAST-RISK AREAS  
IN MISSOURI**

**TECHNICAL REPORT**

**SPC 431**

**April 1979**

**APPROVED FOR PUBLIC RELEASE DISTRIBUTION**

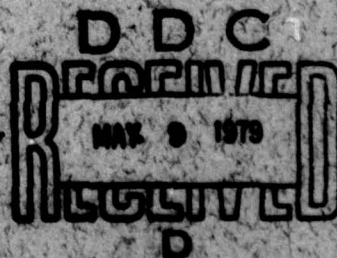
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Charles W. Hulburt  
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Defense Civil Preparedness Agency  
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Mr. Clifford E. McLain  
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## DAMAGE ASSESSMENTS OF BLAST-RISK AREAS IN MISSOURI

The information contained in this technical report is extracted from data used in the preparation of SPC Report 409, Civil-Defense Needs of High Risk Areas of the United States.<sup>1</sup> Whereas that report provided an analysis of the overall effect on the nation of a nuclear attack, particularly regarding fatalities and casualties, this report provides more detailed information on the "blast-risk" areas, by county, in the State of Missouri. The areas considered in this report are those surrounding the Whiteman Missile Complex.

Data are provided on fatalities and injuries in the blast-risk areas surrounding the Whiteman Missile Complex under varying programs of shelter and/or relocation; the assumptions governing these programs are outlined in SPC Report 409. Data are also provided that give a representative picture of the level of damage to specific categories of structures found in these same areas. It should be kept in mind that fallout, a highly variable phenomenon dependent on weather, although deadly to living things, does not damage structures. It may, however, render structures unusable for varying amounts of time, perhaps for months. The blast damage described in this report is similar to that which is anticipated to be incurred in all but the most limited of attacks.

### A. BLAST DAMAGE

Figure 1 provides information on the effects of a 1-MT surface burst. Figure 3 shows the overpressure as a function of distance from the point of detonation for 1-MT weapons, both for a groundburst and an airburst designed to maximize the range of 10-psi overpressure. The groundburst is considered

<sup>1</sup>R. J. Sullivan et al., Civil-Defense Needs of High Risk Areas of the United States, System Planning Corporation, SPC Report 409, March 1979.

most likely in the Whiteman area and has a higher maximum overpressure than the airburst. Most lightly built structures, such as houses, would be destroyed or severely damaged with only a few pounds-per-square-inch overpressure. The 55-psi blast shelters described in SPC Report 409 are quite adequate to withstand damage, assuming they are not located in the immediate vicinity of a weapon burst.

Tables 1 through 16 list, by county, the expected degree of damage to a representative sample of structures and facilities. Figure 3 provides a visual comparison of housing damage. Although only a few categories of structures are given, it should be assumed that similar structures nearby would suffer an equivalent amount of damage. The levels of damage that are used are "severe," which indicates that the structure is destroyed or rendered nearly useless, and "moderate," which indicates extensive repairs are required for further use. "Light" damage may be expected for some points within the blast-risk areas, but this category is highly variable and dependent on terrain and is not addressed in this report. It should be noted that the levels of damage to different categories do not necessarily track with each other. This is because of differences in "hardness" or distance from detonation points.

#### B. DAMAGE TO TRANSPORT NETWORKS

Figure 4 shows a portion of the major road arteries that pass through the blast-risk areas of Missouri. Although highway surfaces are only subject to direct damage if they lie within the crater produced by an explosion, there may be any number of indirect effects that can make them impassable. Bridges, overpasses, and tunnels can be destroyed or blocked as a result of blast. The limited access highways are particularly prone to such damage, and detour routes are limited. The missile silos are serviced primarily by state highways and county roads, and it can be assumed that many of these roads will be made useless by craters (see Fig. 5 for typical groundburst crater dimensions) or by heavy debris. It is expected that movement throughout the area, following an attack, will be sharply curtailed, which would inhibit rescue operations. Also, since power, gas, and communication lines

typically follow these road networks, service would be immediately terminated in many areas both inside and outside the blast zones and there would be little chance of short-term restoration of these services.

### C. SHORT-TERM AND LONG-TERM FALLOUT EFFECTS

Massive fallout will occur in the blast-risk areas of Missouri following a nuclear attack. Figure 6 shows possible fallout radiation contours for the affected areas. While proper shelters will permit survival in the short term, continuous habitation in the heavily hit areas for a considerable period after the attack would not be advisable. The effects of fallout vary, depending on a person's size, age, and general state of health. Current knowledge of the biological effects of radiation permit predictions of death or illness from short-term exposure to large amounts of radiation, but long-term exposure to small amounts has less predictable results. In general, however, the effects of radiation absorbed in a short period of time are more severe than for an identical amount absorbed over a much longer period. The effects also depend on the quality of radiation, which varies from deeply penetrating gamma rays to beta radiation, which is usually restricted to the epidermal organs of the body. Absorption of radioactive substances by ingestion or inhalation will tend to concentrate radiation in specific internal organs.

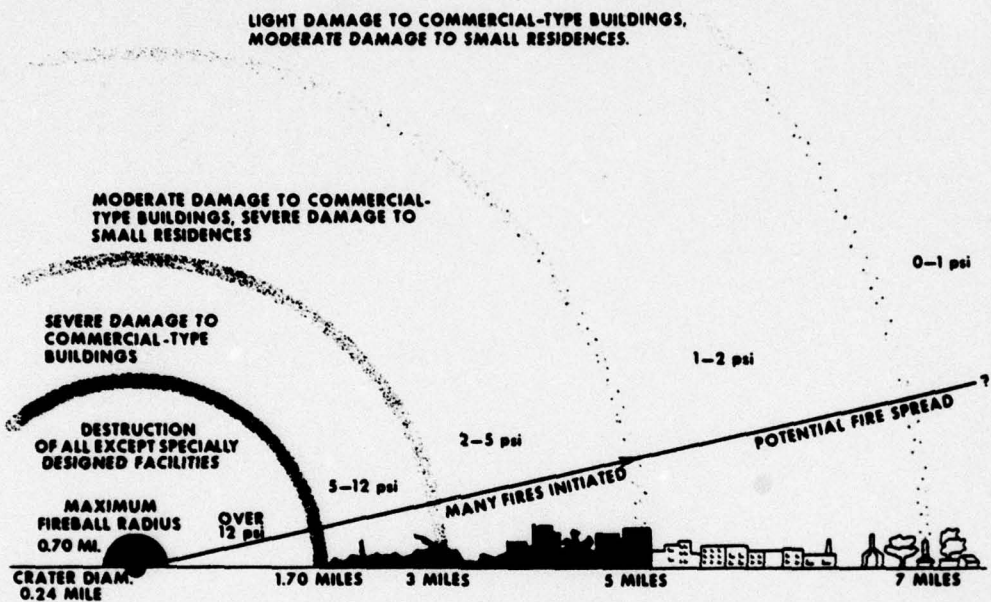
A number of authorities consider that almost any level of radiation above the normal background rate (about  $10^{-5}$  R/hr) from cosmic rays and natural radioactivity of the earth may produce some consequences, at least on a statistical basis. These consequences are very limited and appear in the form of slight increases in the number of incidences of various forms of cancer or perhaps in genetic mutations. Currently, the degree of exposure permitted in the nuclear industry is designed to reduce these risks to acceptable levels given current knowledge of radiation effects. These limits, in terms of exposure, are an average of approximately 5 R/yr (12 R/yr maximum) for mature adults, to an upper bound of 150 R over a lifetime. This represents an approximate average exposure rate of about  $6 \times 10^{-4}$  R/hr.

However, in the post-attack environment, people are expected to be more concerned with immediate survival than with longer term ill effects. With proper protection or shorter exposure times, people could work in an environment of considerably higher dose rates. This would be necessary to salvage usable food, materials, or machinery. The risk/benefit question would have to be answered by individual judgment. Table 17 lists sample dose rates that might occur in the attacked regions over a period of time. Column 1 of this table lists representative times. At the bottom of each following column is the number representing the total accumulated dose received in an area over a long period of time (many years) for various initial dose rates, assuming continuous exposure from the time of attack. These numbers denote the fallout contours shown in Figure 6. The other numbers in the table are the dose rates at the corresponding times. It should also be noted that high radiation "hot spots" will probably exist for even longer periods of time. These hot spots may arise from the early fallout or may be due to wind and rain, which as time goes on may reduce the radioactive particles in one area but concentrate them in another. The heavily affected areas will have to be monitored on a periodic basis to detect and isolate these hot spots. Vegetation and animal life may also concentrate, to some degree, radioactive substances within their tissue.

#### D. IMMEDIATE CASUALTIES

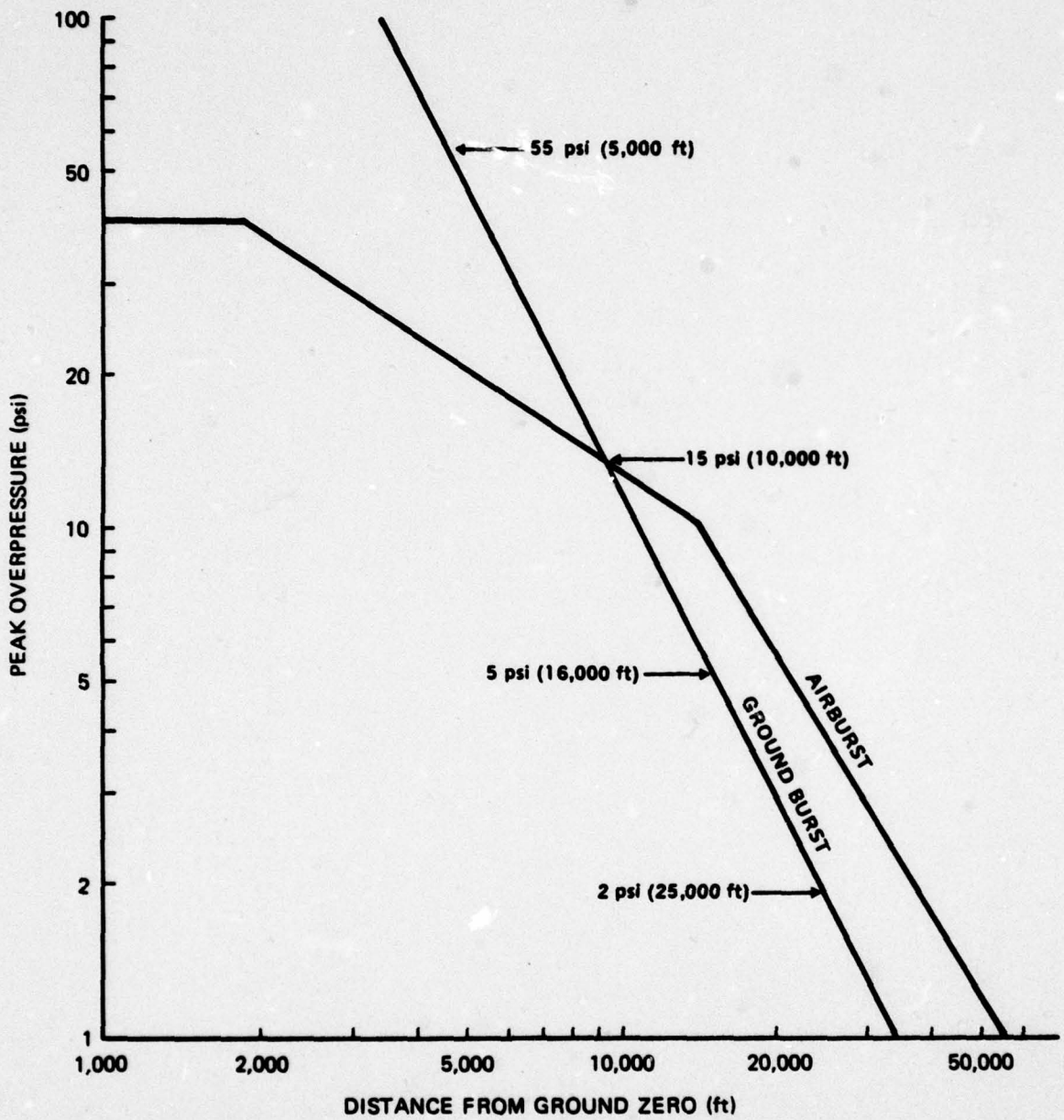
Tables 18 through 33 provide a breakdown of fatalities and injuries from blast and radiation in the blast-risk counties under the various levels of protection and/or evacuation associated with different warning times and different levels of population response. For example, only 10 percent of the affected population was assumed to build expedient shelters, given 24 hours warning.

The numbers provided in this report are the result of a computer analysis based on educated assumptions; they should not be considered as a precise prediction of the consequences of an attack.



IF BURST IS ELEVATED TO ALTITUDE MAXIMIZING THE REACH OF BLAST DAMAGE, MODERATE DAMAGE FROM BLAST AND INITIAL FIRES ON A CLEAR DAY ARE EXTENDED FROM 5 MILES TO 8 MILES.

FIGURE 1. DIRECT EFFECTS OF 1-MT BLAST (Surface Burst)



**FIGURE 2. PEAK OVERPRESSURE AS A FUNCTION OF DISTANCE FROM GROUND ZERO** (Curves are for a 1-megaton ground burst and a 1-megaton airburst set to maximize the 10-psi area coverage)

COUNTY HOUSING UNITS DAMAGED (percent)

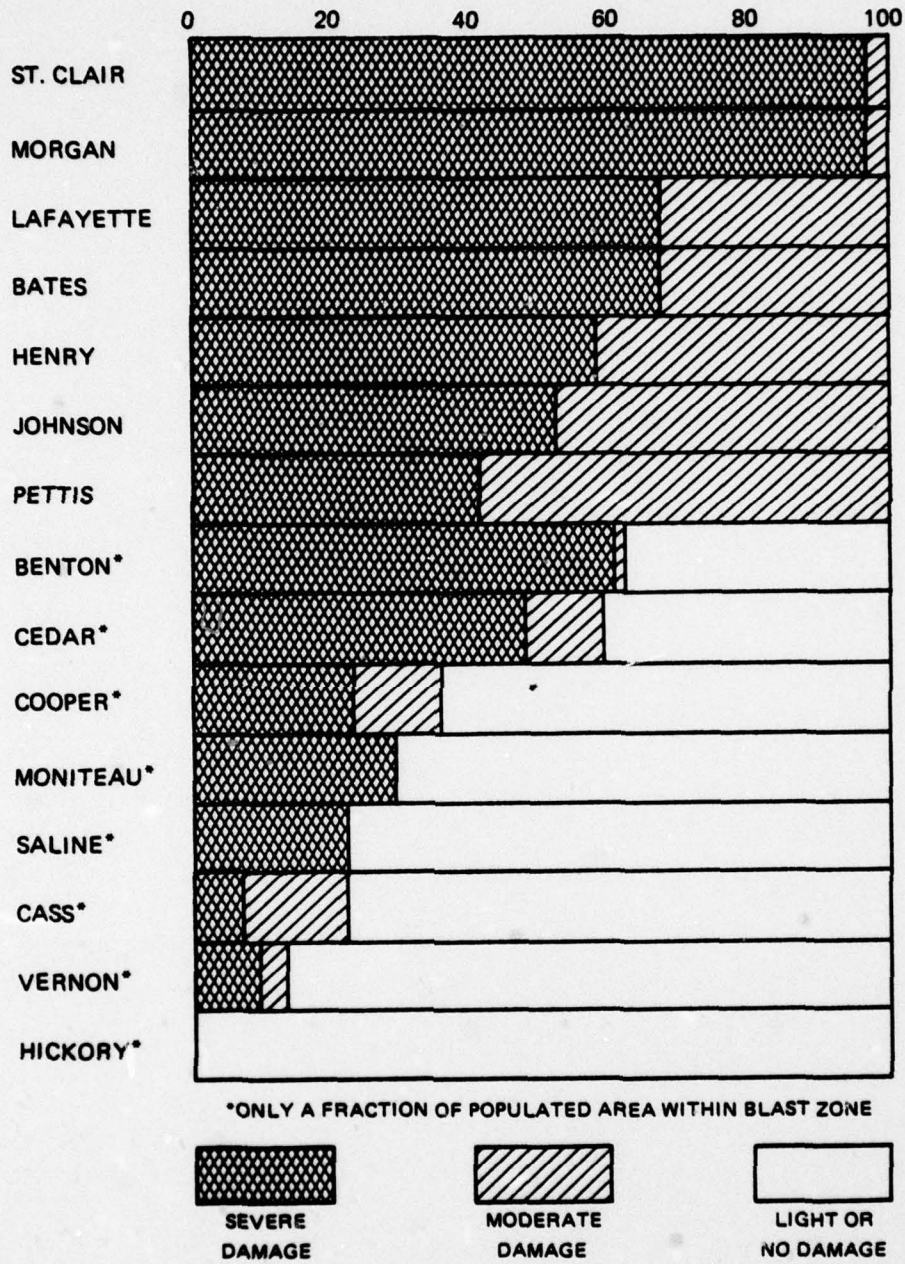
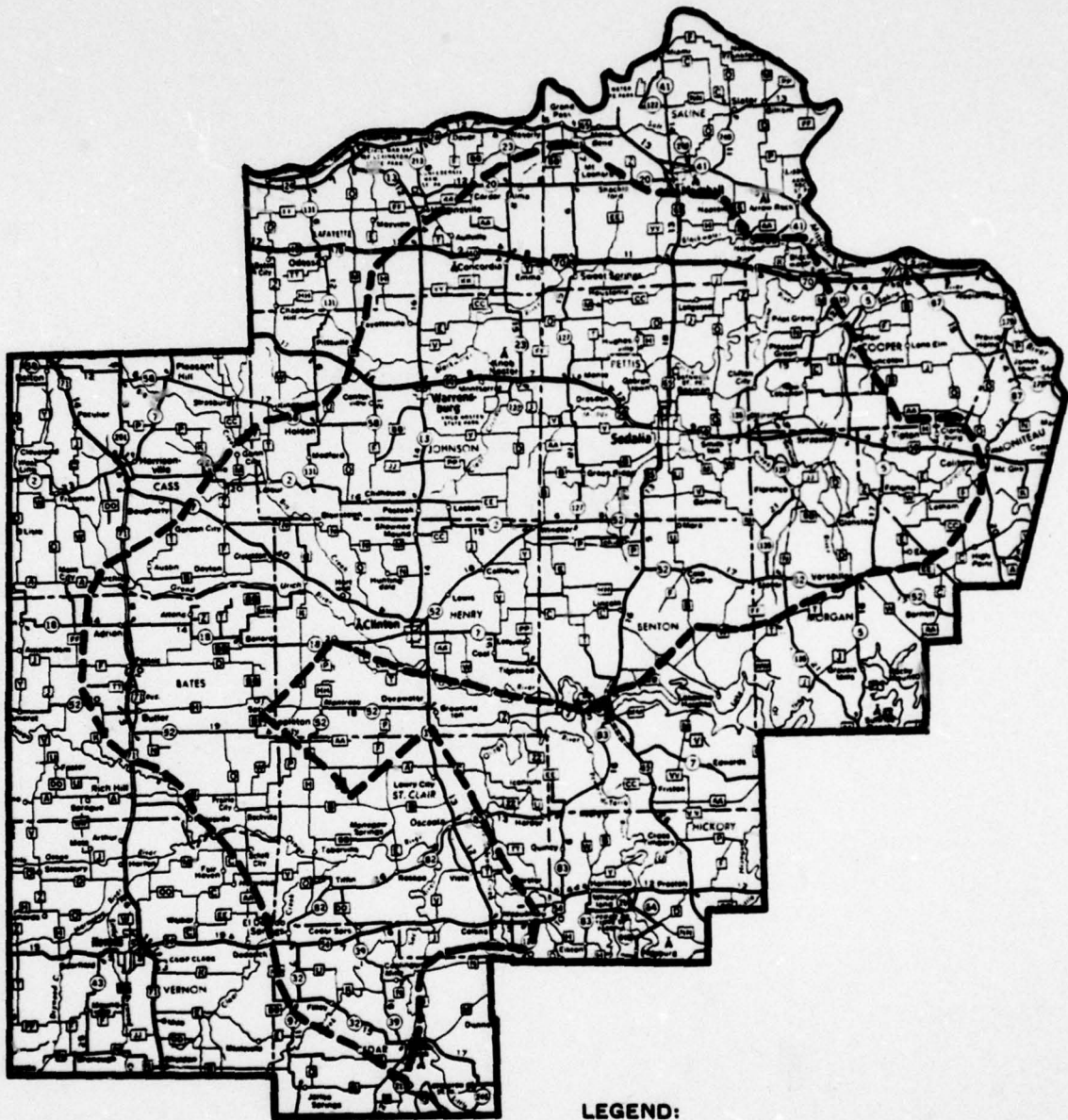


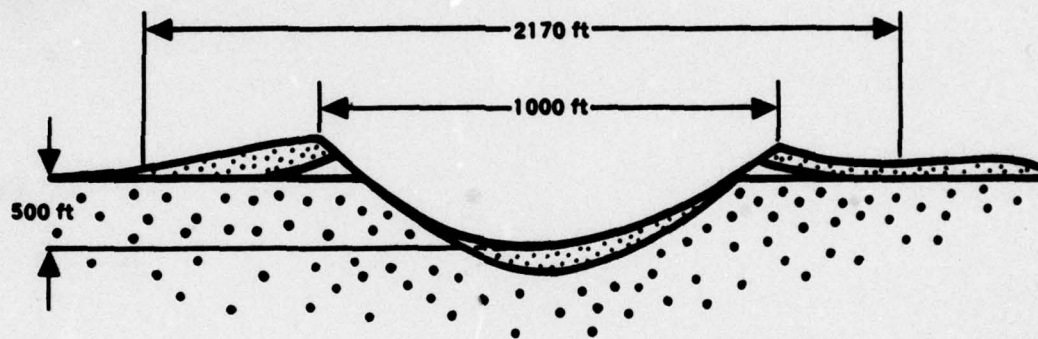
FIGURE 3. PERCENT OF COUNTY HOUSING UNITS DAMAGED



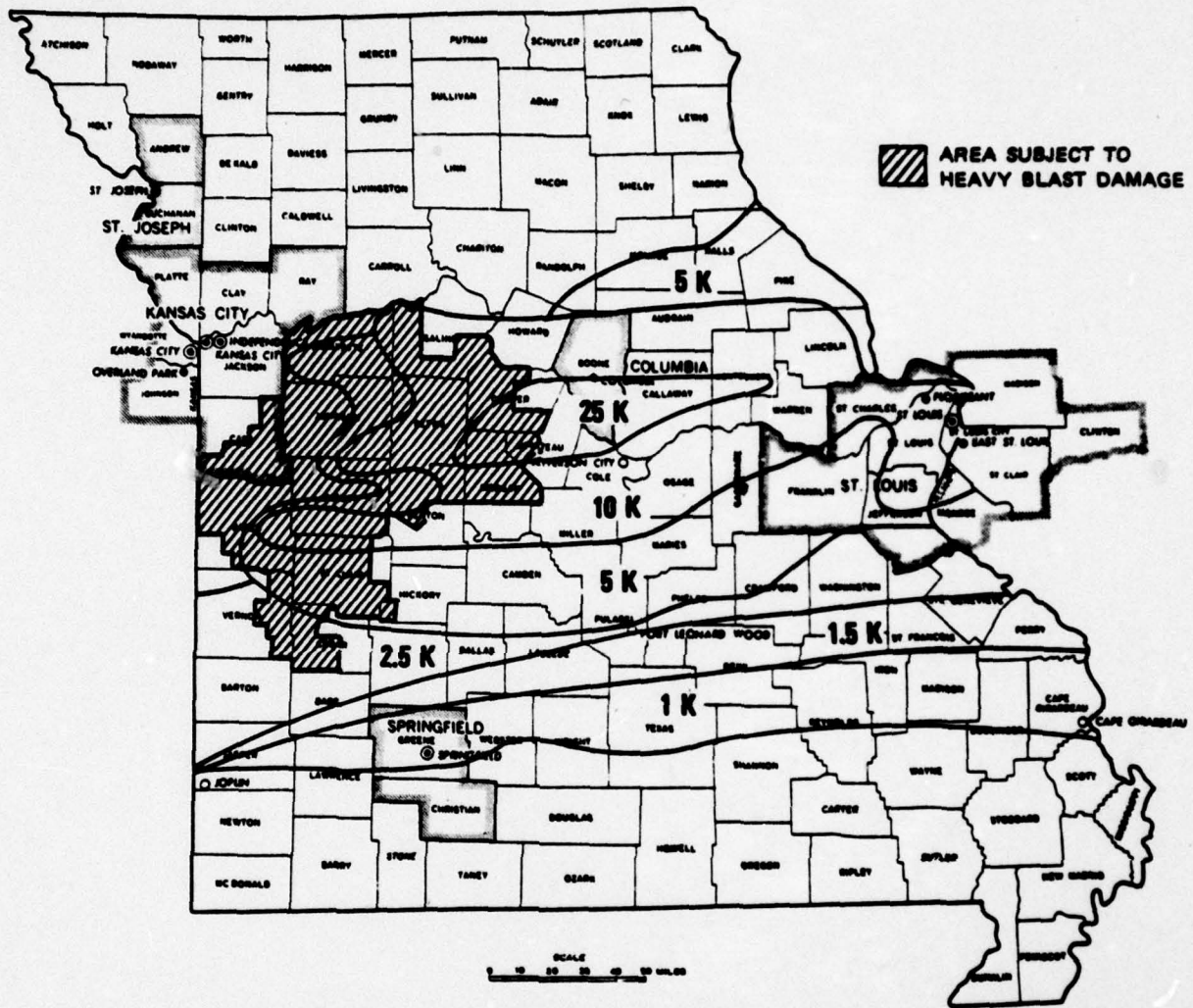
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**—** ZONE IN WHICH ROAD TRAFFIC  
MAY BE DISRUPTED BY CRATERS  
AND DAMAGED BRIDGES

**FIGURE 4. BLAST-RISK COUNTIES OF MISSOURI**



**FIGURE 5. APPROXIMATE CRATER DIMENSIONS FOR  
A 1.2-MT SURFACE BURST**



**FIGURE 6. MISSOURI, BLAST-RISK AREAS AND ESTIMATED FALLOUT PATTERN (Accumulated Dose in thousands of Roentgens)**

TABLE 1  
BLAST DAMAGE--MISSOURI  
TOTAL RISK COUNTIES

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	113,882(100%)	49,370(43.4%)	25,720(22.6%)
Emergency Operating Centers	4	1	2
Hospital Beds	979	187	359
Radio and TV	21		2
Grocery Distributors	8		4
Meat Packers	4	1	
Poultry Processors	3		
Prepared Feed Storage	39	19	7

TABLE 2  
BLAST DAMAGE--MISSOURI  
BATES COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	6,321(100%)	4,204(66.5%)	2,117(33.5%)
Emergency Operating Centers			
Hospital Beds	90	90	
Radio and TV	2		2
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	1	1	

**TABLE 3**  
**BLAST DAMAGE--MISSOURI**  
**BENTON COUNTY**

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	7,183(100%)	4,370(60.8%)	89(1.2%)
Emergency Operating Centers			
Hospital Beds			
Radio and TV			
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	1	1	

**TABLE 4**  
**BLAST DAMAGE--MISSOURI**  
**CASS COUNTY**

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	15,947(100%)	1,108(6.9%)	2,263(14.2%)
Emergency Operating Centers			
Hospital Beds			
Radio and TV			
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	7	1	2

TABLE 5  
BLAST DAMAGE--MISSOURI  
CEDAR COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	4,199(100%)	2,008(47.8%)	462(11%)
Emergency Operating Centers			
Hospital Beds	34		34
Radio and TV	2		
Grocery Distributors	1		1
Meat Packers			
Poultry Processors			
Prepared Feed Storage	1		1

TABLE 6  
BLAST DAMAGE--MISSOURI  
COOPER COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	5,108(100%)	1,150(22.5%)	659(12.9%)
Emergency Operating Centers	1		
Hospital Beds	70		
Radio and TV	2		
Grocery Distributors	1		
Meat Packers			
Poultry Processors			
Prepared Feed Storage	3	1	1

TABLE 7  
BLAST DAMAGE--MISSOURI  
HENRY COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	7,500(100%)	4,329(57.7%)	3,171(42.3%)
Emergency Operating Centers	1		1
Hospital Beds	100		
Radio and TV	1		
Grocery Distributors	1		1
Meat Packers	1		
Poultry Processors			
Prepared Feed Storage	2	2	

TABLE 8  
BLAST DAMAGE--MISSOURI  
HICKORY COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	2,573(100%)	0%	0%
Emergency Operating Centers			
Hospital Beds			
Radio and TV			
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage			

TABLE 9  
BLAST DAMAGE--MISSOURI  
JOHNSON COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	11,960(100%)	6,178(51.7%)	5,782(48.3%)
Emergency Operating Centers	1	1	
Hospital Beds	100		100
Radio and TV	2		
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	2	1	1

TABLE 10  
BLAST DAMAGE--MISSOURI  
LAFAYETTE COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	9,859(100%)	6,661(67.6%)	3,198(32.4%)
Emergency Operating Centers			
Hospital Beds	131		77
Radio and TV	3		
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	6	4	2

TABLE 11  
BLAST DAMAGE--MISSOURI  
MONITEAU COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	4,201(100%)	1,214(28.9%)	0%
Emergency Operating Centers			
Hospital Beds			
Radio and TV			
Grocery Distributors			
Meat Packers	1	1	
Poultry Processors	1		
Prepared Feed Storage	5	2	

TABLE 12  
BLAST DAMAGE--MISSOURI  
MORGAN COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	7,082(100%)	6,844(96.6%)	238(3.4%)
Emergency Operating Centers			
Hospital Beds			
Radio and TV			
Grocery Distributors	1		1
Meat Packers			
Poultry Processors			
Prepared Feed Storage	2	1	

TABLE 13  
BLAST DAMAGE--MISSOURI  
PETTIS COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	12,581(100%)	5,156(41%)	7,425(59%)
Emergency Operating Centers	1		1
Hospital Beds	148		148
Radio and TV	5		
Grocery Distributors	1		1
Meat Packers	1		
Poultry Processors	2		
Prepared Feed Storage	1	1	

TABLE 14  
BLAST DAMAGE--MISSOURI  
ST. CLAIR COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	3,746(100%)	3,631(96.9%)	115(3.1%)
Emergency Operating Centers			
Hospital Beds	66	66	
Radio and TV			
Grocery Distributors			
Meat Packers			
Poultry Processors			
Prepared Feed Storage	1	1	

TABLE 15  
BLAST DAMAGE--MISSOURI  
SALINE COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	8,969(100%)	1,882(21%)	0(0%)
Emergency Operating Centers			
Hospital Beds	128	31	
Radio and TV	2		
Grocery Distributors	1		
Meat Packers	1		
Poultry Processors			
Prepared Feed Storage	6	2	

TABLE 16  
BLAST DAMAGE--MISSOURI  
VERNON COUNTY

Category	Total Units	Level of Damage	
		Severe	Moderate
Housing	6,653(100%)	635(9.5%)	201(3%)
Emergency Operating Centers			
Hospital Beds	62		
Radio and TV	1		
Grocery Distributors	2		
Meat Packers			
Poultry Processors			
Prepared Feed Storage	1	1	

TABLE 17

DOSE RATE AT VARIOUS TIMES AFTER THE ATTACK

Time Since Attack	Dose Rate (R/hr)					
	10,000	5,000	2,000	1,000	200	
1 hour	200	100	40	20	4	
1 day	20	10	4	2	0.4	
1 week	3.8	1.9	0.73	0.38	0.07	
1 month	0.18	0.09	0.036	0.018	0.0036	
1 year	0.027	0.013	0.005	0.0027	0.0005	
5 years	0.012	0.06	0.0024	0.0012	0.00024	
10 years						

Maximum Accumulated Dose (R)	50,000	25,000	10,000	5,000	1,000
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TABLE 18

FATALITIES AND INJURIES--MISSOURI  
 TOTAL RISK COUNTIES  
 (1976 Estimated Population: 299,581)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	52,620	83,510	41,140	57,150	94,210	39,650	67,870	134,500	25,290
Current CD	8,040	11,180	16,840	20,990	42,330	17,550	64,370	84,690	33,030
Crisis Relocation		---		53,210	83,260	38,930		---	
Expedient Shelter	6,380	11,970	8,730		---		12,750	18,660	9,150
Dedicated Blast Shelter									

TABLE 19

FATALITIES AND INJURIES--MISSOURI  
 BATES COUNTY  
 (1976 Estimated Population: 15,924)

Warning Time	1-2 weeks		24 hours		15-30 minutes		
	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured	
Civil Defense Program	5,830	4,040	6,320	500	7,370	1,360	4,120
Current CD	820	540	2,300	120	7,020	670	3,360
Crisis Relocation	---	---	5,880	270	---	---	---
Expedient Shelter	150	100	---	---	300	0	230
Dedicated Blast Shelter							



TABLE 21

FATALITIES AND INJURIES--MISSOURI  
 CASS COUNTY  
 (1976 Estimated Population: 47,627)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	1,090	190	2,540	1,230	280	2,740	1,660	970	2,830
Current CD	130	0	340	480	100	1,050	1,530	440	2,990
Crisis Relocation									
Expedient Shelter		---		1,060	190	2,490		---	
Dedicated Blast Shelter	0	0	0		---		0	0	0

TABLE 22

FATALITIES AND INJURIES--MISSOURI  
 CEDAR COUNTY  
 (1976 Estimated Population: 10,564)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	490	1,400	2,240	590	2,060	2,160	1,120	3,850	4,370
Current CD									
Crisis Relocation	30	0	230	160	410	1,830	850	2,510	1,940
Expedient Shelter		---		460	360	3,140		---	
Dedicated Blast Shelter	0	0	10		---		0	200	50

TABLE 23

FATALITIES AND INJURIES--MISSOURI  
 COOPER COUNTY  
 (1976 Estimated population: 14,572)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	2,080	10,160	640	2,250	11,050	380	2,610	11,960	0
Current CD									
Crisis Relocation	310	1,370	980	850	3,640	0	2,530	8,630	0
Expedient Shelter		---		2,140	10,530	10		---	
Dedicated Blast Shelter	180	990	540		---		350	1,290	390

TABLE 24

FATALITIES AND INJURIES--MISSOURI  
HENRY COUNTY  
(1976 Estimated Population: 18,780)

Warning Time	1-2 weeks		24 hours		15-30 minutes						
	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured					
Civil Defense Program	3,890	4,990	2,160	2,160	4,220	6,100	1,950	1,950	5,130	10,280	3,360
Current CD											
Crisis Relocation	590	190	680	680	1,590	1,940	780	780	4,870	6,730	1,360
Expedient Shelter					3,980	4,940				---	
Dedicated Blast Shelter	420	0	40	40		---			840	0	70

TABLE 25  
 FATALITIES AND INJURIES--MISSOURI  
 HICKORY COUNTY  
 (1976 Estimated Population: 6,040)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	0	2,150	3,120	0	2,400	3,110	10	6,020	0
Current CD	0	30	330	0	4,380	1,090	10	2,660	3,110
Crisis Relocation		---		0	2,030	3,110		---	
Expedient Shelter	0	270	1,500		---		0	1,260	2,800
Dedicated Blast Shelter									

TABLE 26

FATALITIES AND INJURIES--MISSOURI  
 JOHNSON COUNTY  
 (1976 Estimated Population: 34,185)

Warning Time	1-2 weeks		24 hours		15-30 minutes				
	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured			
Civil Defense Program	11,230	3,440	7,880	12,030	5,080	7,530	13,660	17,520	2,560
Current CD									
Crisis Relocation	2,110	0	820	4,470	1,620	2,190	13,280	5,830	5,740
Expedient Shelter		---		11,590	4,060	7,330		---	
Dedicated Blast Shelter	3,770	0	20		---		7,550	0	30

TABLE 27

FATALITIES AND INJURIES--MISSOURI  
LAFAYETTE COUNTY  
(1976 Estimated Population: 28,303)

Warning Time	1-2 weeks		24 hours		15-30 minutes				
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	9,190	1,060	5,840	9,930	1,390	6,080	11,270	4,570	3,970
Current CD	1,340	0	890	3,500	330	2,240	10,710	1,570	5,770
Crisis Relocation				9,200	860	5,940		---	
Expedient Shelter									
Dedicated Blast Shelter	570	0	280		---		1,130	0	570

TABLE 28

FATALITIES AND INJURIES--MISSOURI  
 MONITEAU COUNTY  
 (1976 Estimated Population: 11,475)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	850	8,710	520	960	10,020	290	1,290	10,190	0
Current CD									
Crisis Relocation	100	7,560	960	380	9,010	10	1,200	10,250	30
Expedient Shelter		---		830	9,350	60		---	
Dedicated Blast Shelter	60	7,390	750		---		120	7,820	330

TABLE 29

FATALITIES AND INJURIES--MISSOURI  
MORGAN COUNTY  
(1976 Estimated Population: 12,165)

Warning Time	1-2 weeks		24 hours		15-30 minutes				
	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured	Killed by Blast	Killed by Fallout Injured			
Civil Defense Program	2,870	7,480	530	3,150	7,950	390	3,870	8,300	0
Current CD	390	470	2,940	1,210	4,830	70	3,690	8,280	200
Crisis Relocation	---	---	---	2,910	7,600	210	---	---	---
Expedient Shelter	0	1,040	1,560	---	---	---	0	2,260	490
Dedicated Blast Shelter									

TABLE 30

FATALITIES AND INJURIES--MISSOURI  
 PETTIS COUNTY  
 (1976 Estimated Population: 35,310)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	5,320	21,510	3,760	5,880	23,740	3,200	7,780	27,530	0
Current CD	750	430	2,140	2,120	6,780	740	7,040	20,030	2,050
Crisis Relocation									
Expedient Shelter		---		5,350	22,800	2,370		---	
Dedicated Blast Shelter	510	0	80		---		1,020	0	150

TABLE 31

FATALITIES AND INJURIES--MISSOURI  
ST. CLAIR COUNTY  
(1976 Estimated Population: 9,419)

Warning Time	1-2 weeks		24 hours		15-30 minutes				
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	3,370	1,520	3,100	3,650	1,880	2,990	4,300	4,900	220
Current CD									
Crisis Relocation	530	10	470	1,370	1,000	1,000	4,140	2,080	2,830
Expedient Shelter				3,410	1,670	2,890		---	
Dedicated Blast Shelter	450	20	140		---		900	90	220

TABLE 32

FATALITIES AND INJURIES--MISSOURI  
 SALINE COUNTY  
 (1976 Estimated Population: 23,790)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	2,210	13,520	1,850	2,430	14,080	1,810	2,800	16,030	230
Current CD	290	300	2,660	870	2,880	960	2,660	6,390	1,150
Crisis Relocation		---		2,130	13,140	1,680		---	
Expedient Shelter	80		1,820		---		150	2,080	2,760
Dedicated Blast Shelter									

TABLE 33

FATALITIES AND INJURIES--MISSOURI  
 VERNON COUNTY  
 (1976 Estimated Population: 19,978)

Warning Time	1-2 weeks			24 hours			15-30 minutes		
	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured	Killed by Blast	Killed by Fallout	Injured
Civil Defense Program	1,080	1,800	1,220	1,190	2,040	1,250	1,370	3,210	3,630
Current CD									
Crisis Relocation	170	0	290	460	380	3,930	1,340	2,530	1,040
Expedient Shelter		---		1,060	230	1,950		---	
Dedicated Blast Shelter	190	0	120		---		380	850	250