

Appendix C: Residual Capacity Plots for Each Lifeline and Scenario Earthquake

Table of Contents

	<u>Page</u>
Air Transportation	306
Ports	318
Medical Care Centers.....	322
Fire Stations.....	334
Police Stations.....	346
Broadcast Stations.....	356
Railroads	369
Highways	373
Electric System	377
Water System.....	389
Crude Oil Pipelines.....	390
Refined Oil Pipelines	392
Natural Gas Pipelines.....	393
Upgraded Electric System.....	398

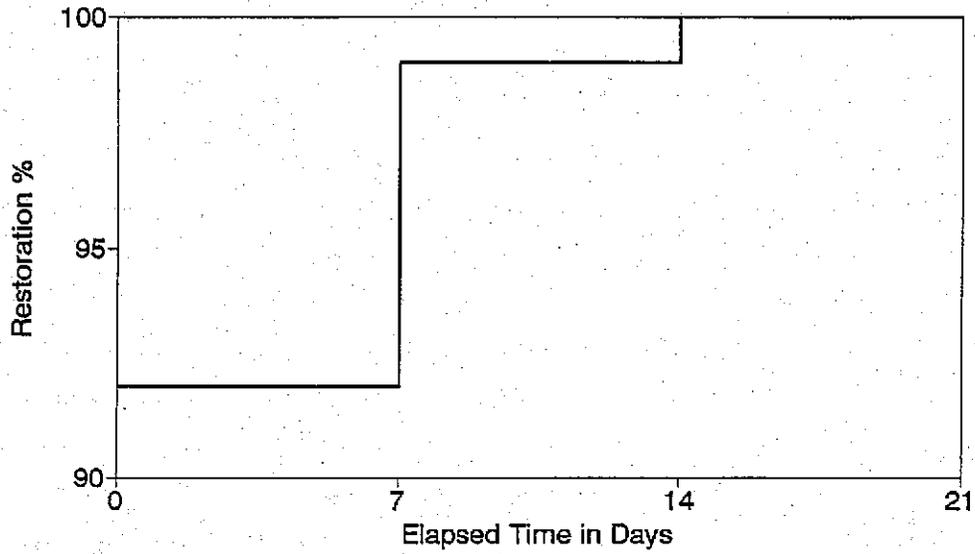


Figure C-1 Residual capacity of Illinois air transportation following New Madrid event (M=8).

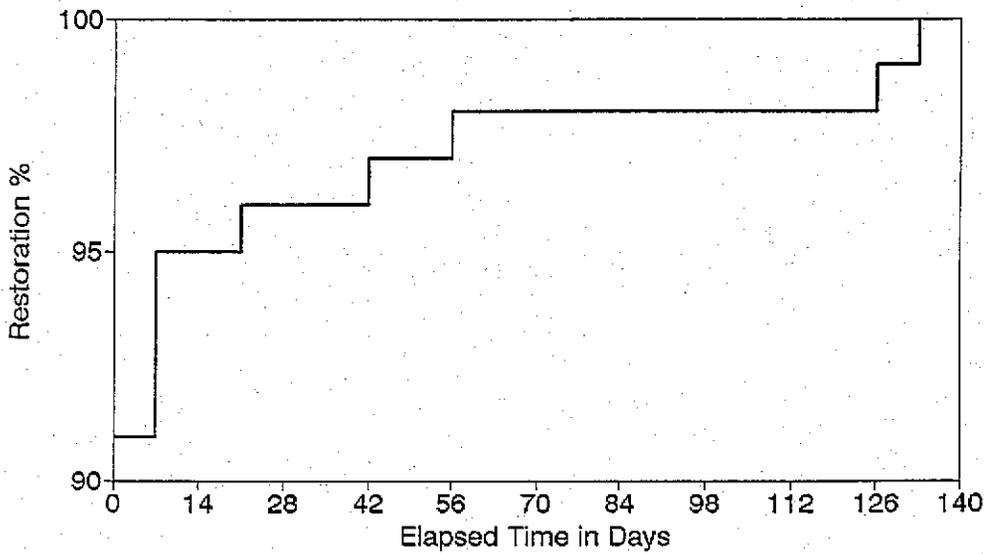


Figure C-2 Residual capacity of Missouri air transportation following New Madrid event (M=8).

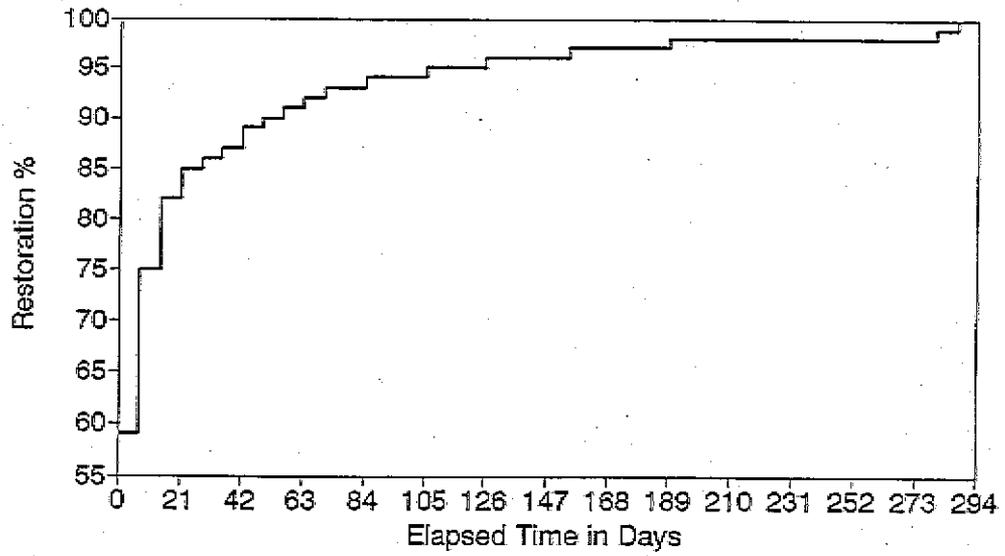


Figure C-3 Residual capacity of Arkansas air transportation following New Madrid event (M=8).

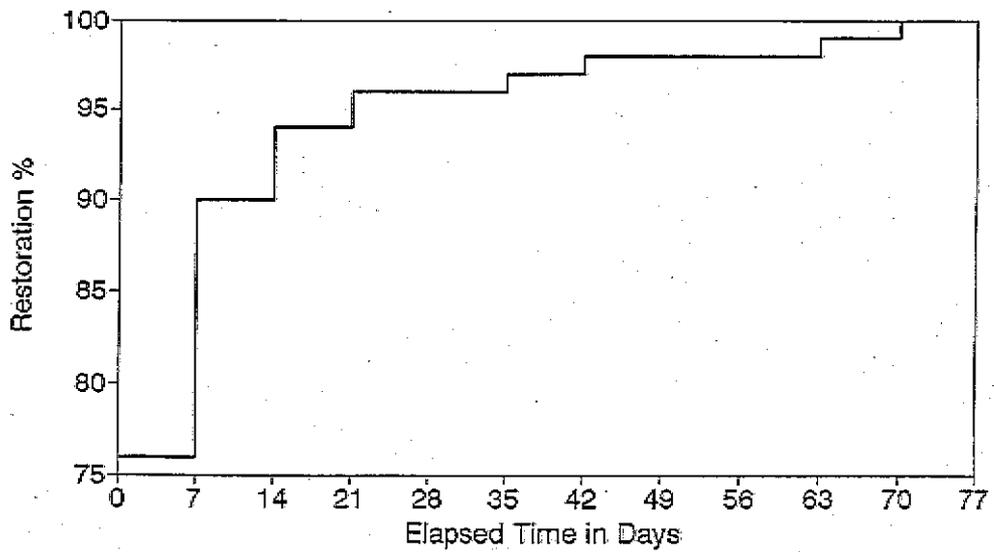


Figure C-4 Residual capacity of Tennessee air transportation following New Madrid event (M=8).

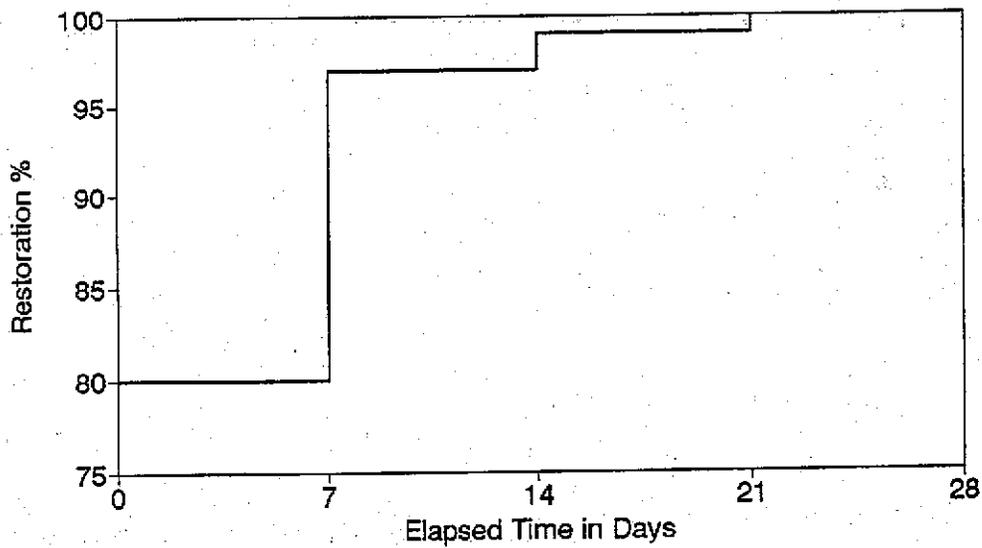


Figure C-5 Residual capacity of Kentucky air transportation following New Madrid event (M=8).

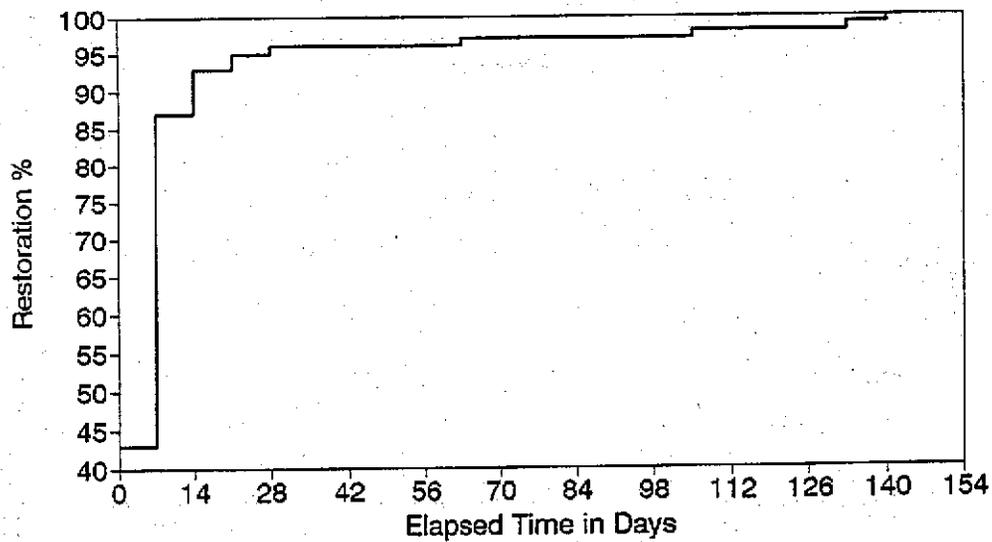


Figure C-6 Residual capacity of Mississippi air transportation following New Madrid event (M=8).

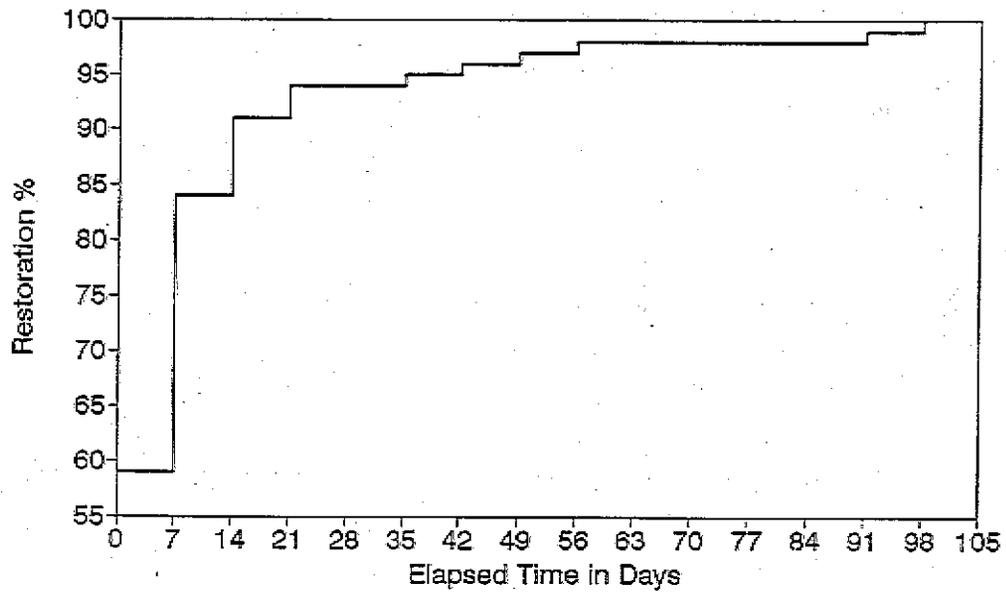


Figure C-7 Residual capacity of South Carolina air transportation following Charleston event (M=7.5).

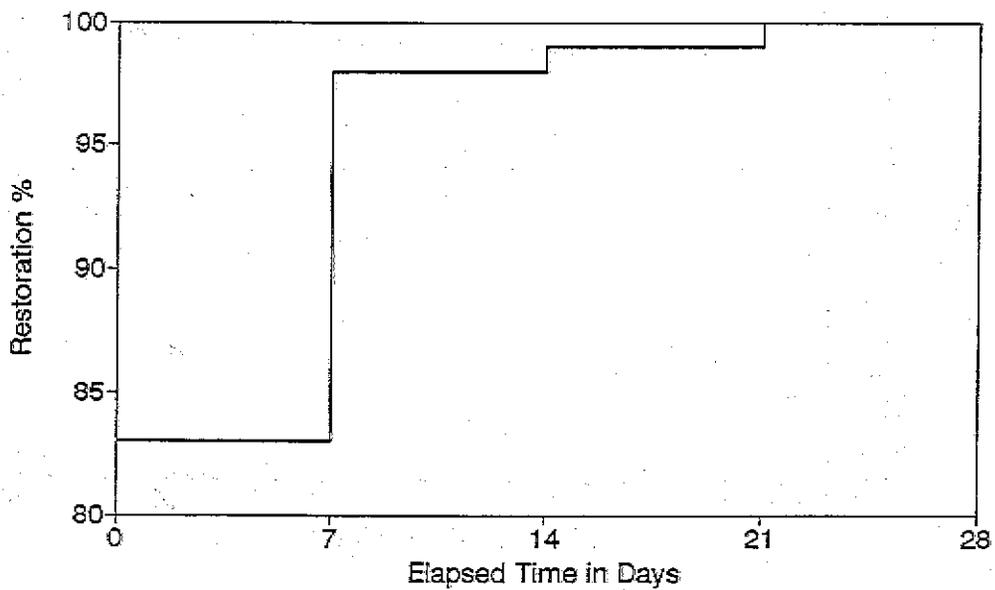


Figure C-8 Residual capacity of North Carolina air transportation following Charleston event (M=7.5).

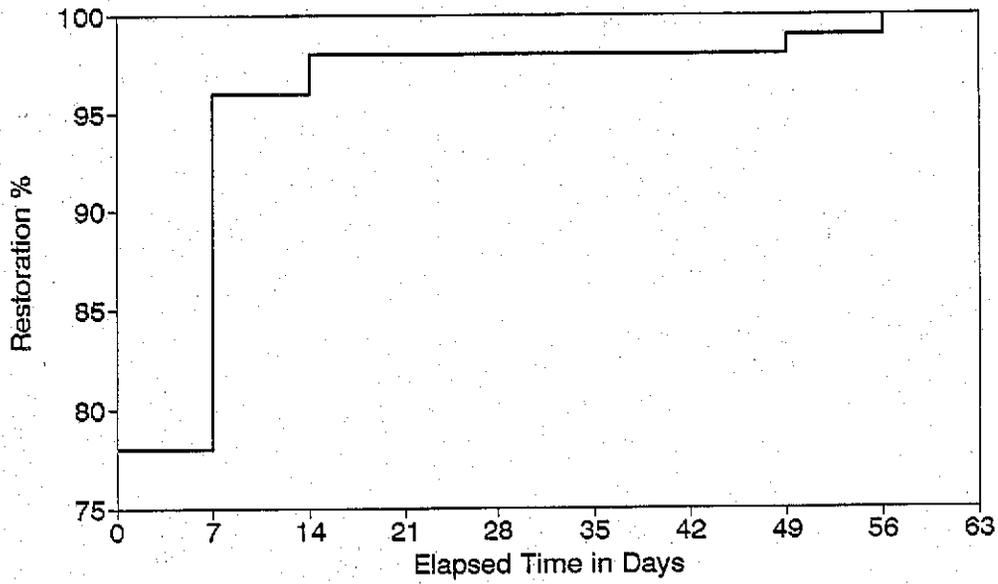


Figure C-9 Residual capacity of Georgia air transportation following Charleston event (M=7.5).

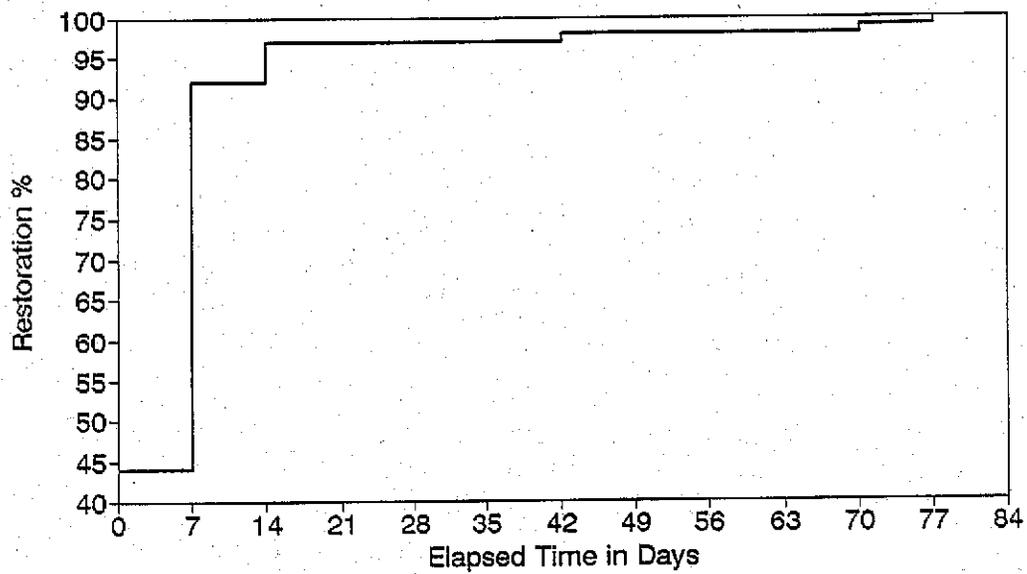


Figure C-10 Residual capacity of Massachusetts air transportation following Cape Ann event (M=7.0).

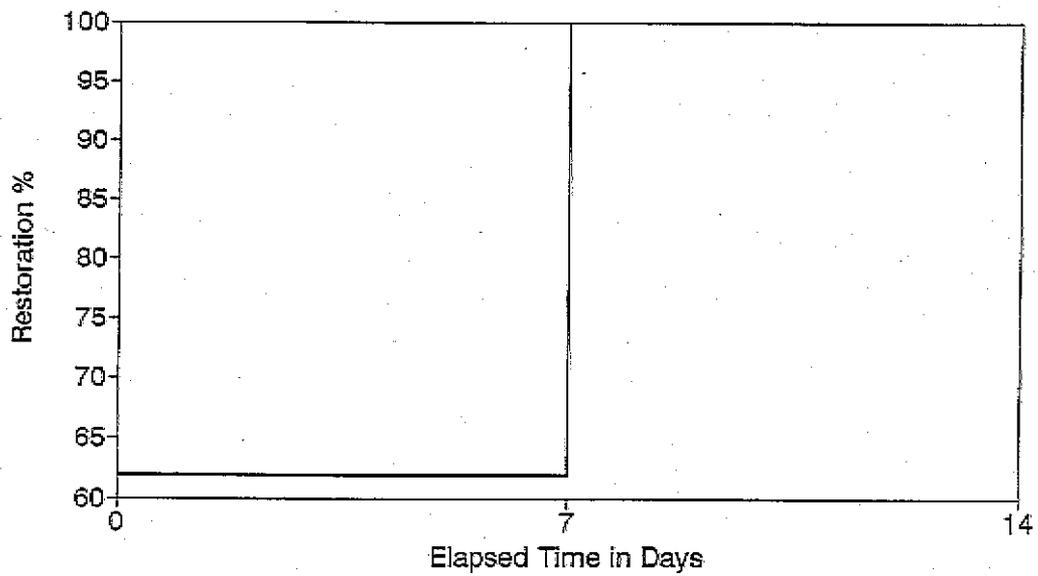


Figure C-11 Residual capacity of Connecticut air transportation following Cape Ann event (M=7.0).

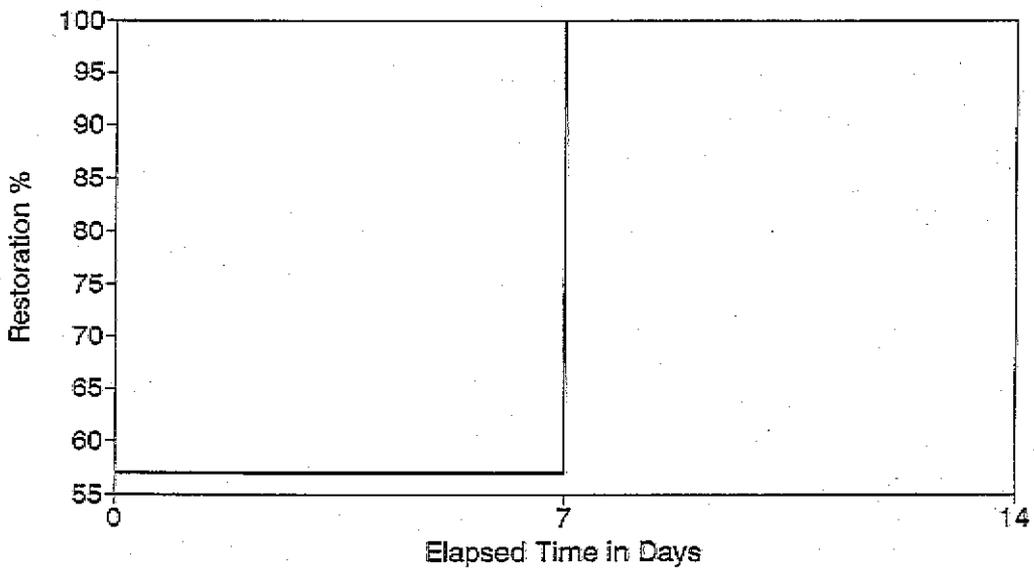


Figure C-12 Residual capacity of Delaware air transportation following Cape Ann event (M=7.0).

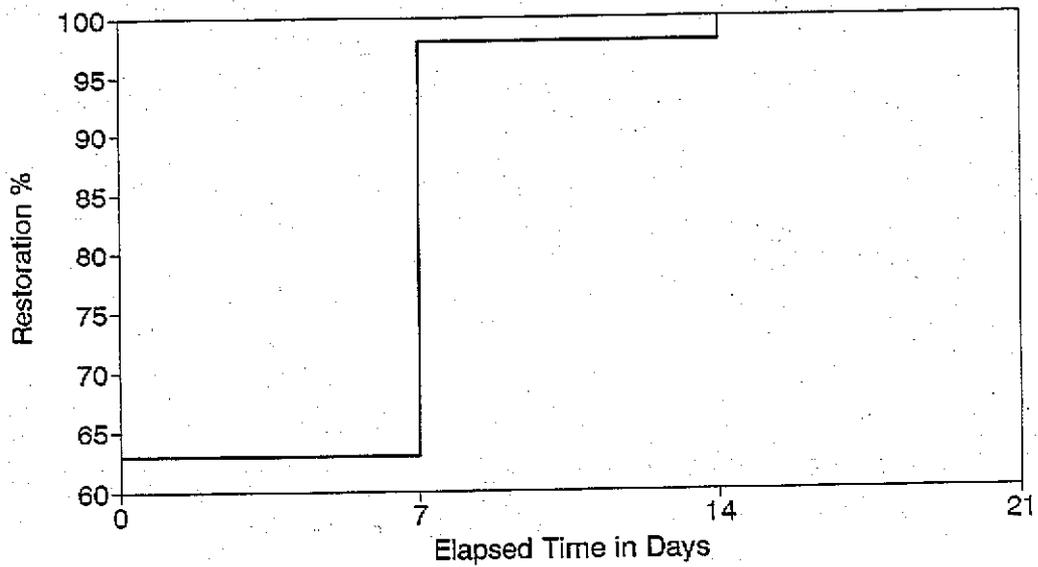


Figure C-13 Residual capacity of Rhode Island air transportation following Cape Ann event (M=7.0).

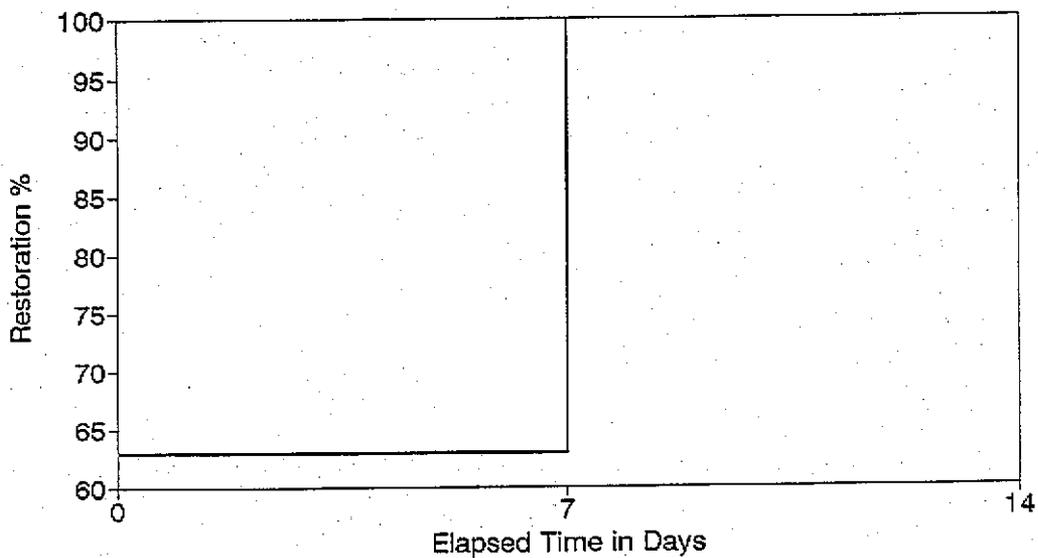


Figure C-14 Residual capacity of New Hampshire air transportation following Cape Ann event (M=7.0).

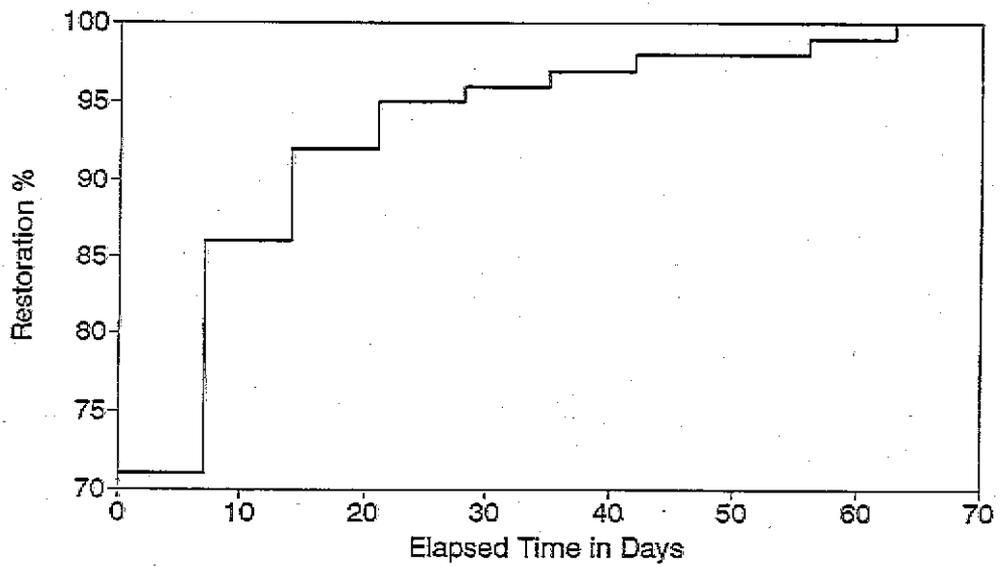


Figure C-15 Residual capacity of Utah air transportation following Wasatch Front event (M=7.5).

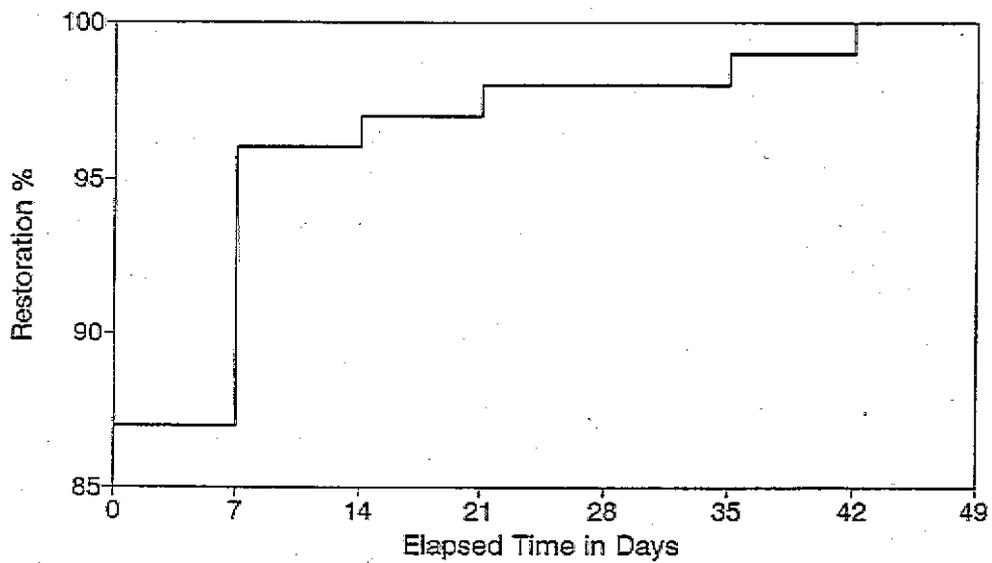


Figure C-16 Residual capacity of California air transportation following Hayward event (M=7.5).

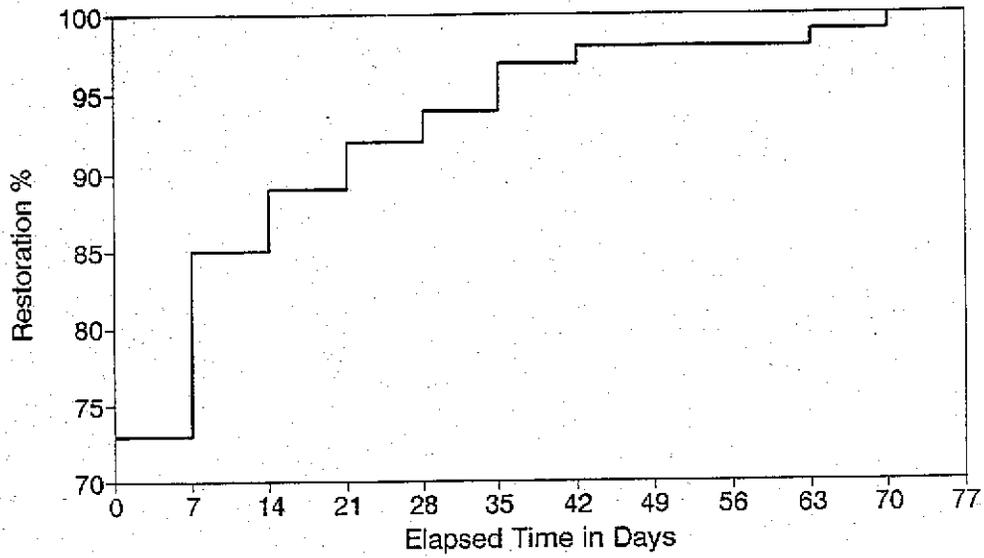


Figure C-17 Residual capacity of California air transportation following Fort Tejon event (M=8.0).

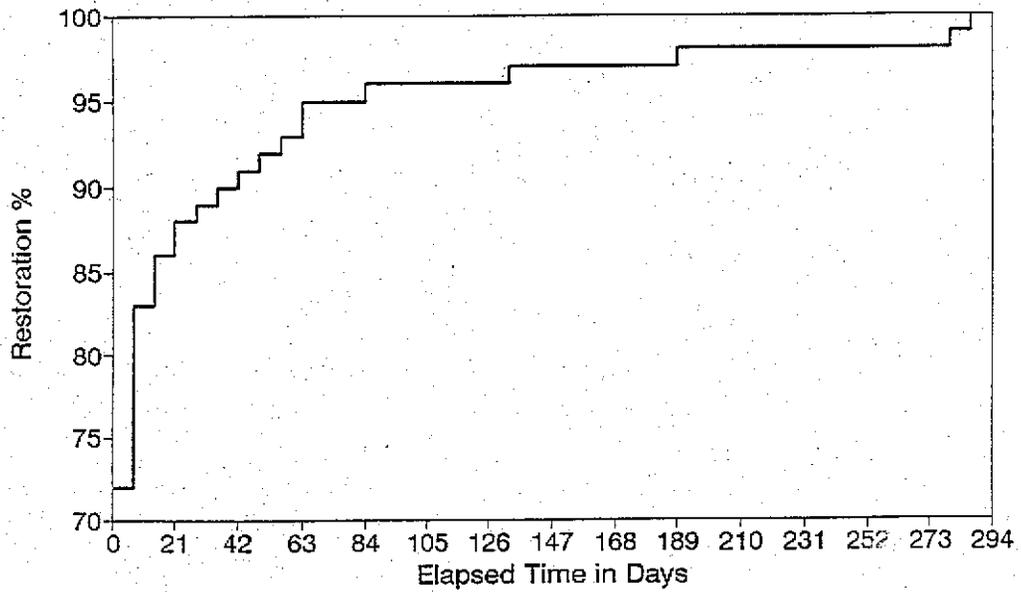


Figure C-18 Residual capacity of Washington air transportation following Puget Sound event (M=7.5).

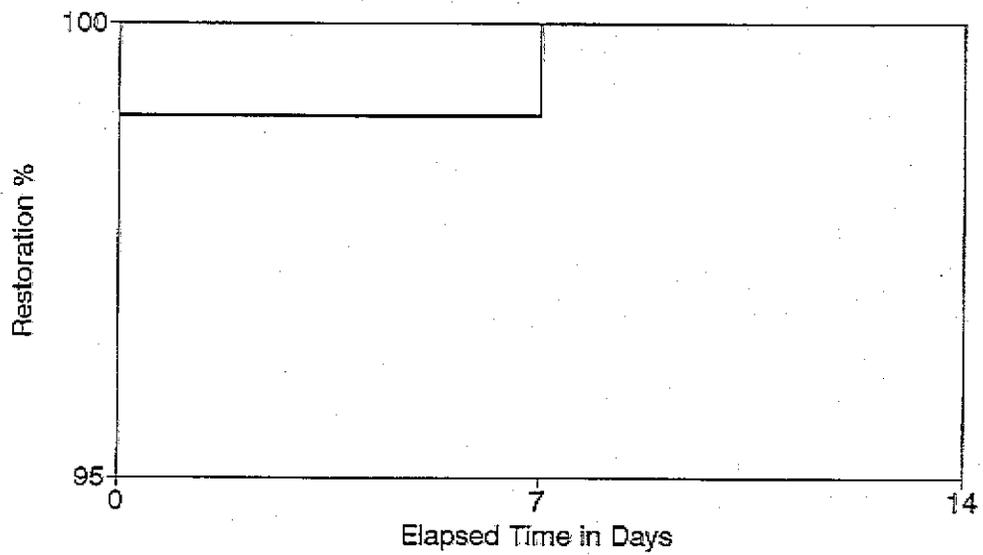


Figure C-19 Residual capacity of Illinois air transportation following New Madrid event ($M=7.0$).

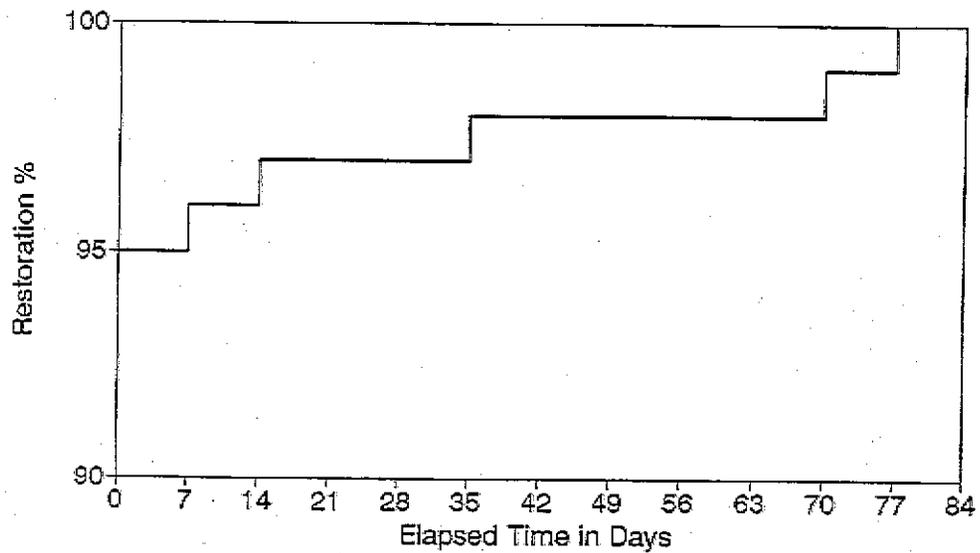


Figure C-20 Residual capacity of Missouri air transportation following New Madrid event ($M=7.0$).

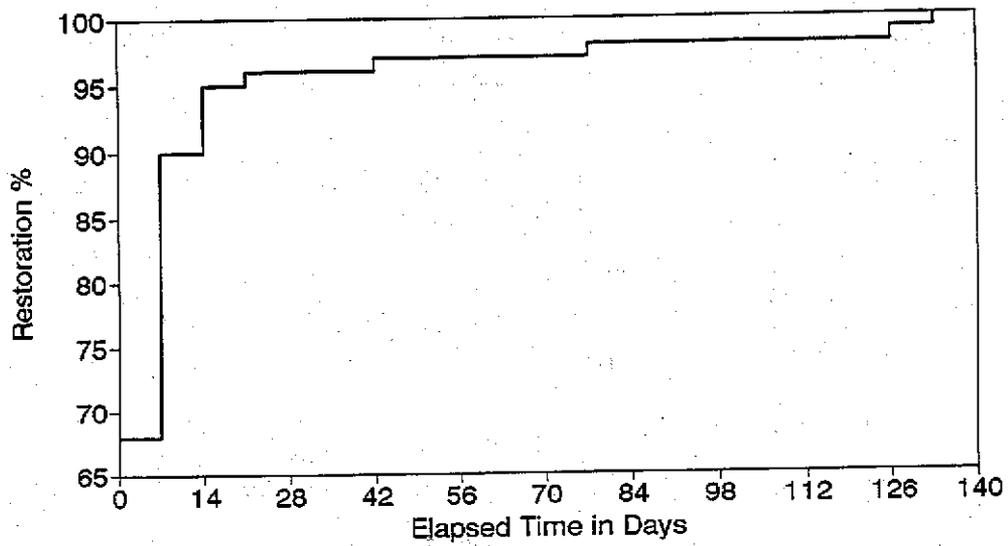


Figure C-21 Residual capacity of Arkansas air transportation following New Madrid event (M=7.0).

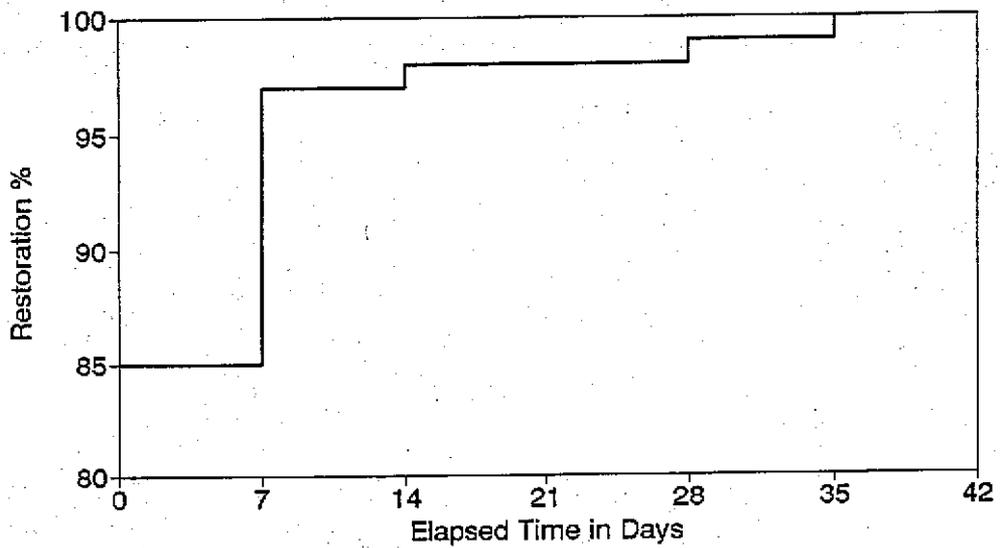


Figure C-22 Residual capacity of Tennessee air transportation following New Madrid event (M=7.0).

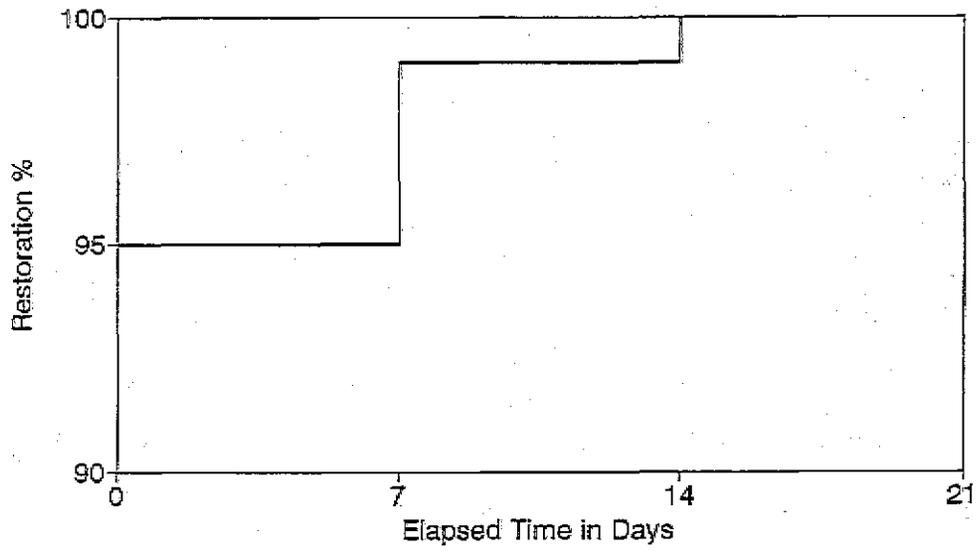


Figure C-23 Residual capacity of Kentucky air transportation following New Madrid event (M=7.0).

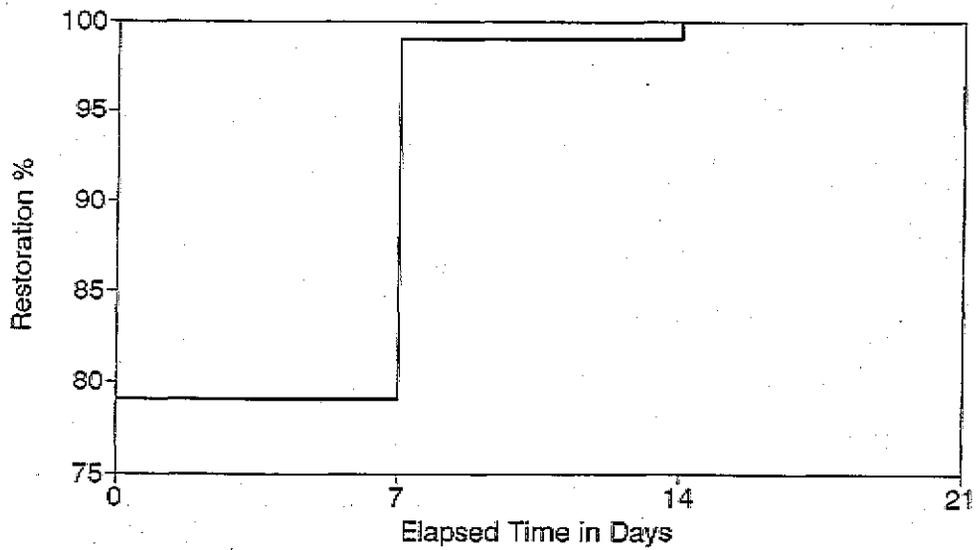


Figure C-24 Residual capacity of Mississippi air transportation following New Madrid event (M=7.0).

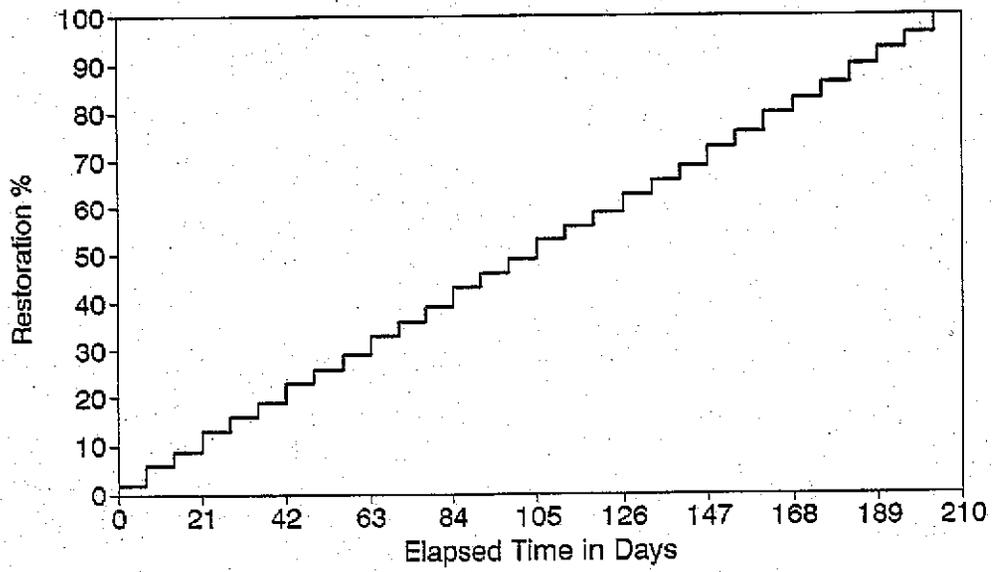


Figure C-25 Residual capacity of South Carolina ports following Charleston event (M=7.5).

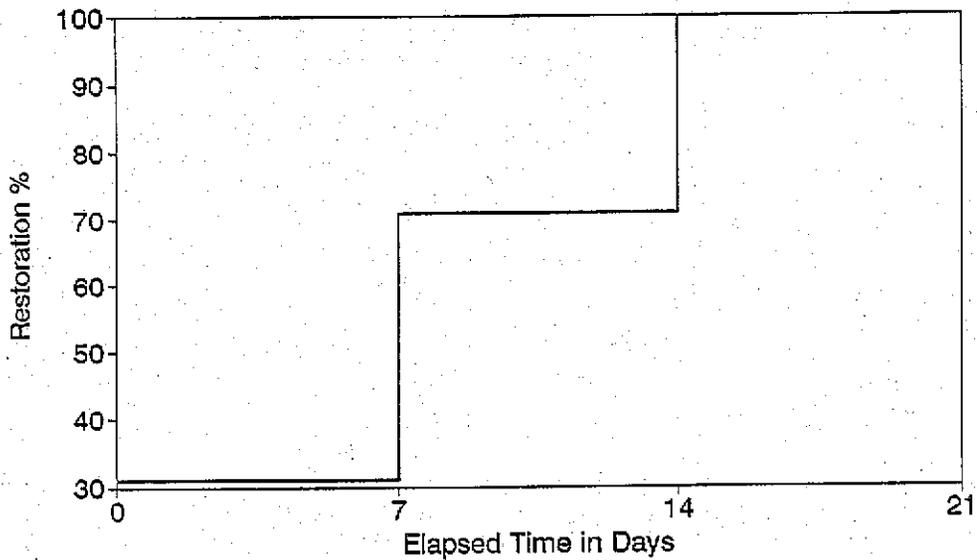


Figure C-26 Residual capacity of North Carolina ports following Charleston event (M=7.5).

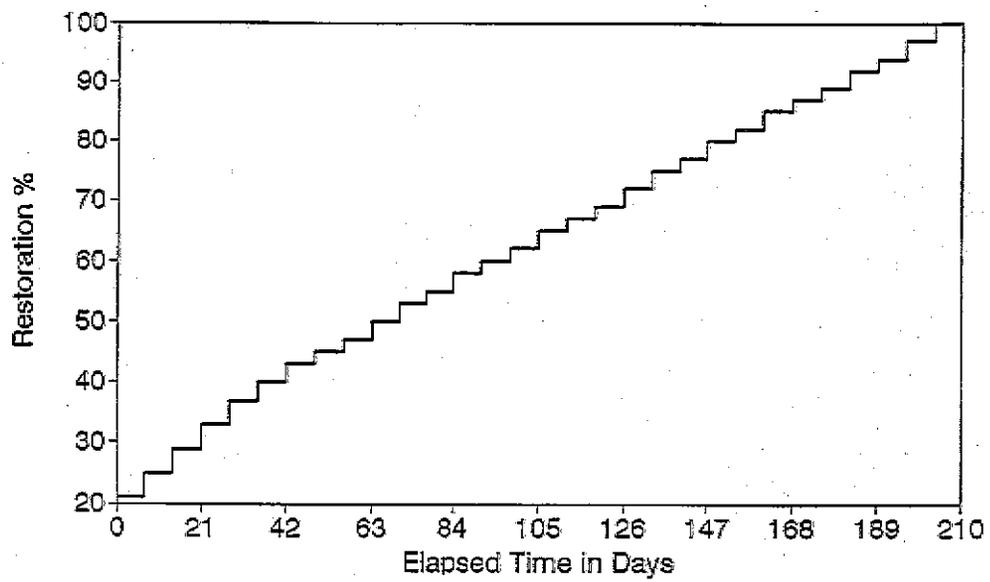


Figure C-27. Residual capacity of Georgia ports following Charleston event (M=7.5).

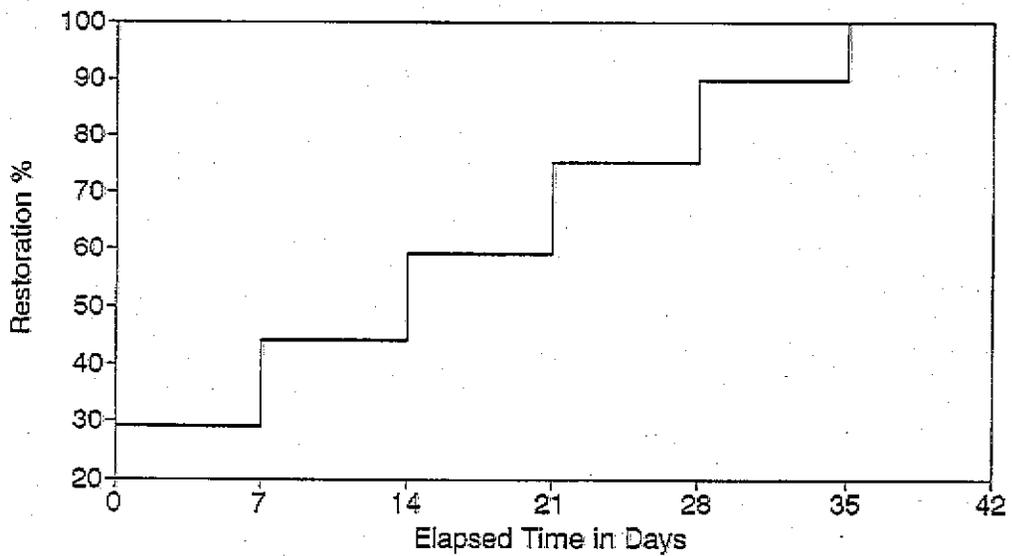


Figure C-28. Residual capacity of Massachusetts ports following Cape Ann event (M=7.0).

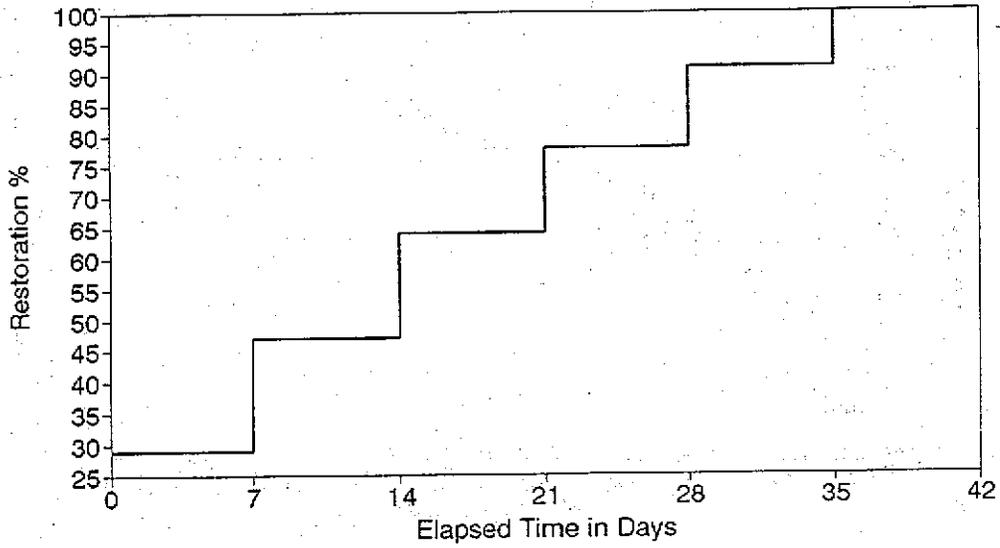


Figure C-29 Residual capacity of Rhode Island ports following Cape Ann event (M=7.0).

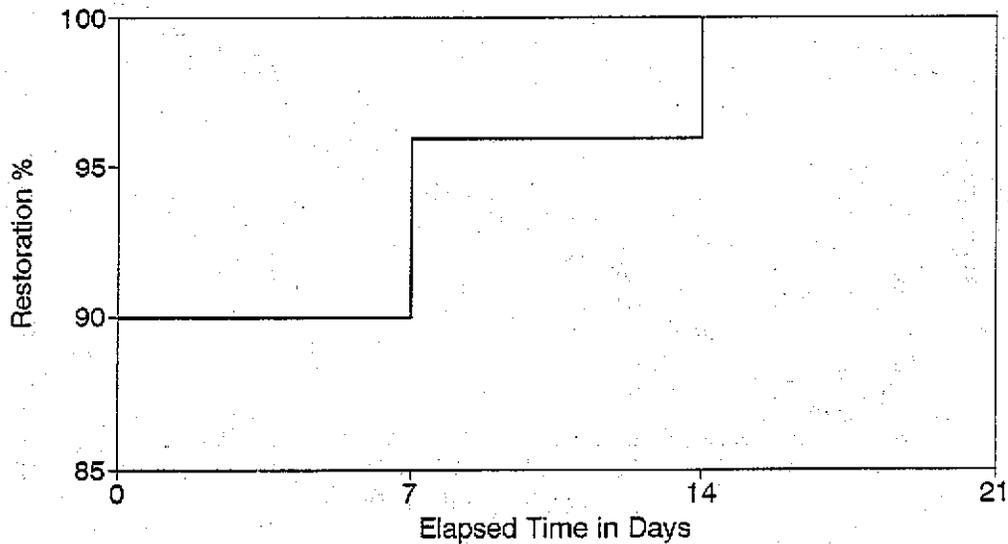


Figure C-30 Residual capacity of Connecticut ports following Cape Ann event (M=7.0).

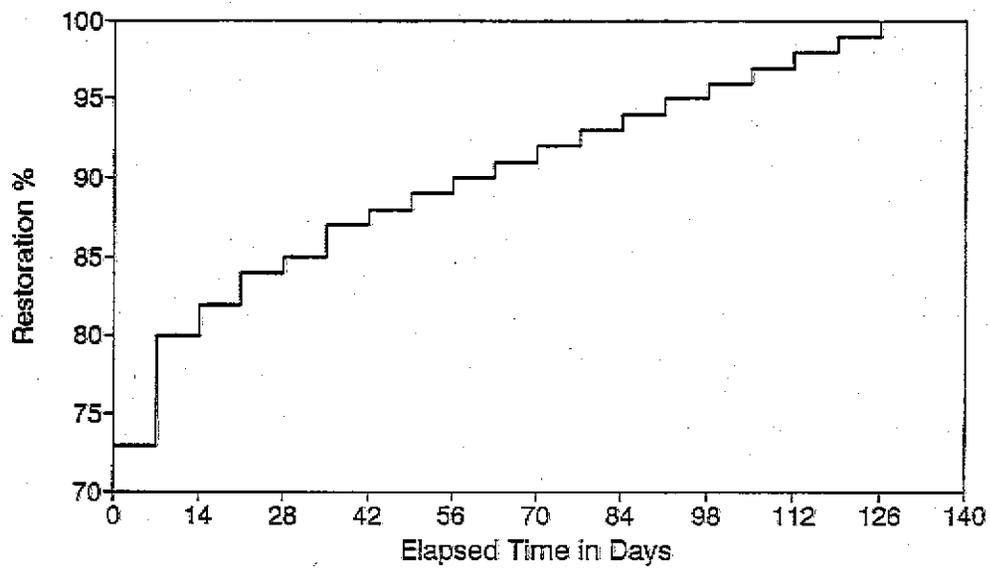


Figure C-31 Residual capacity of California ports following Hayward event (M=7.5).

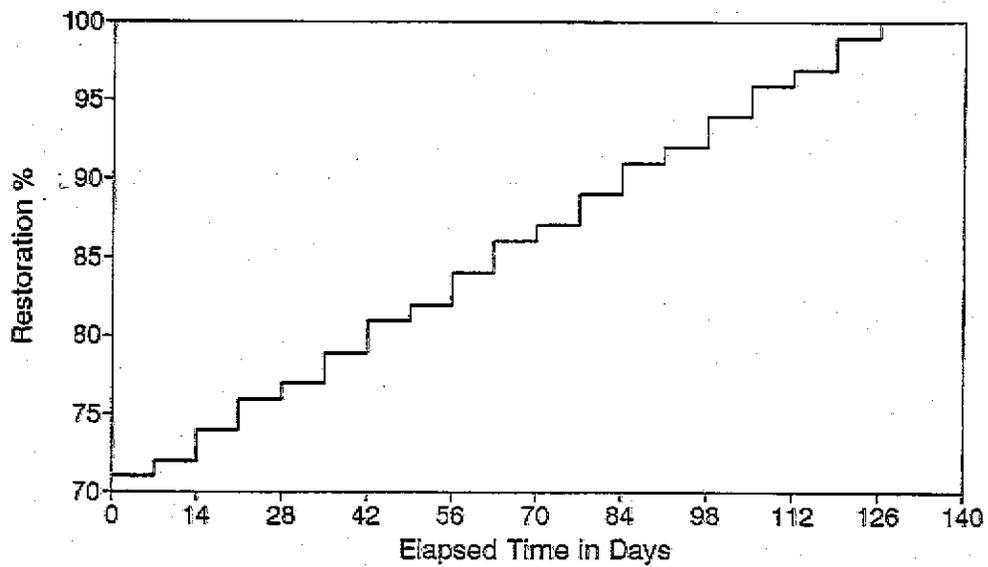


Figure C-32 Residual capacity of California ports following Fort Tejon event (M=8.0).

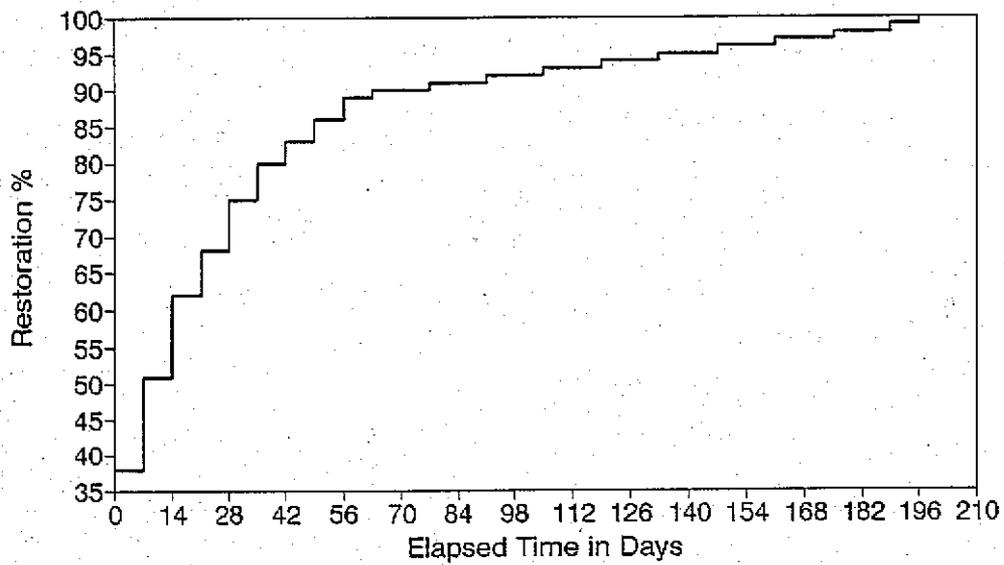


Figure C-33 Residual capacity of Washington ports following Puget Sound event (M=7.5).

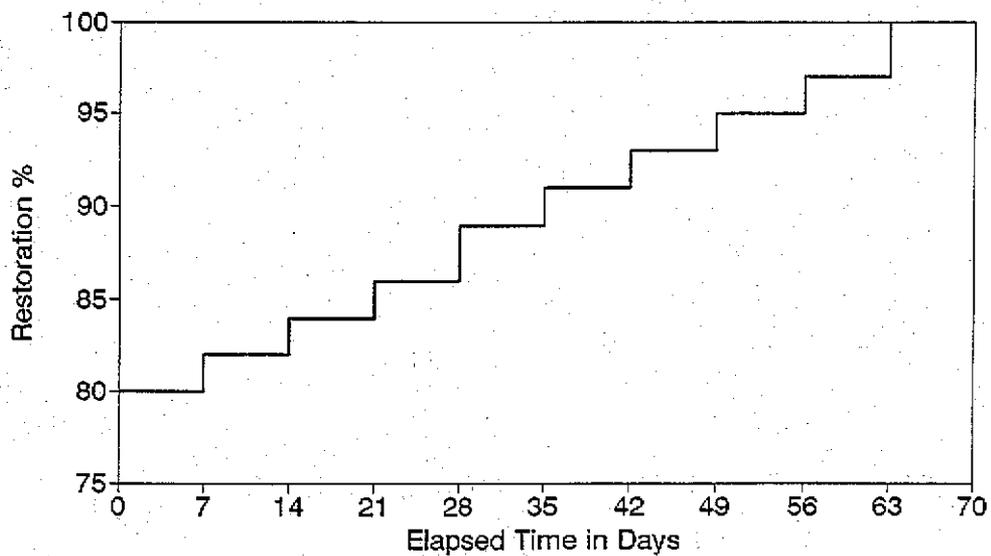


Figure C-34 Residual capacity of Illinois medical care centers following New Madrid event (M=8.0).

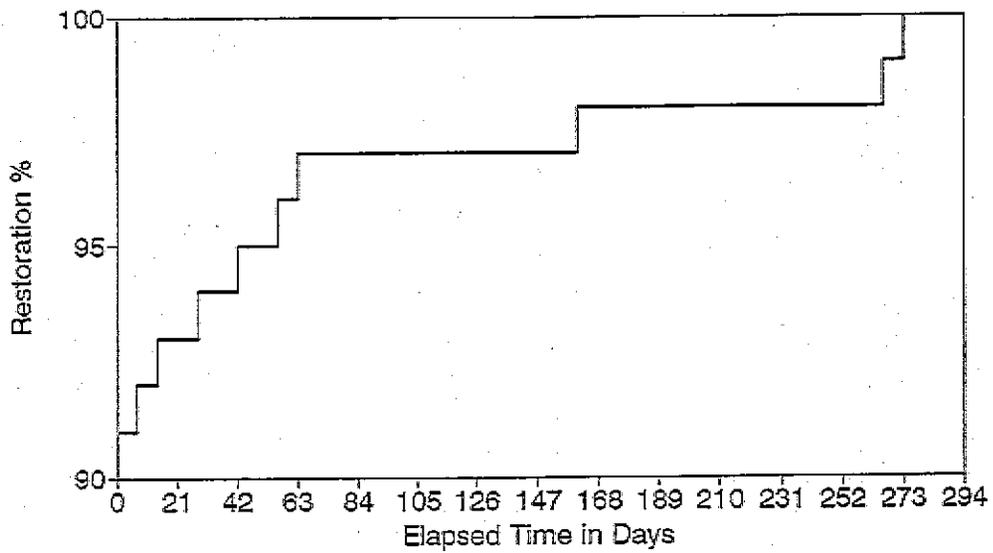


Figure C-35 Residual capacity of Missouri medical care centers following New Madrid event (M=8.0).

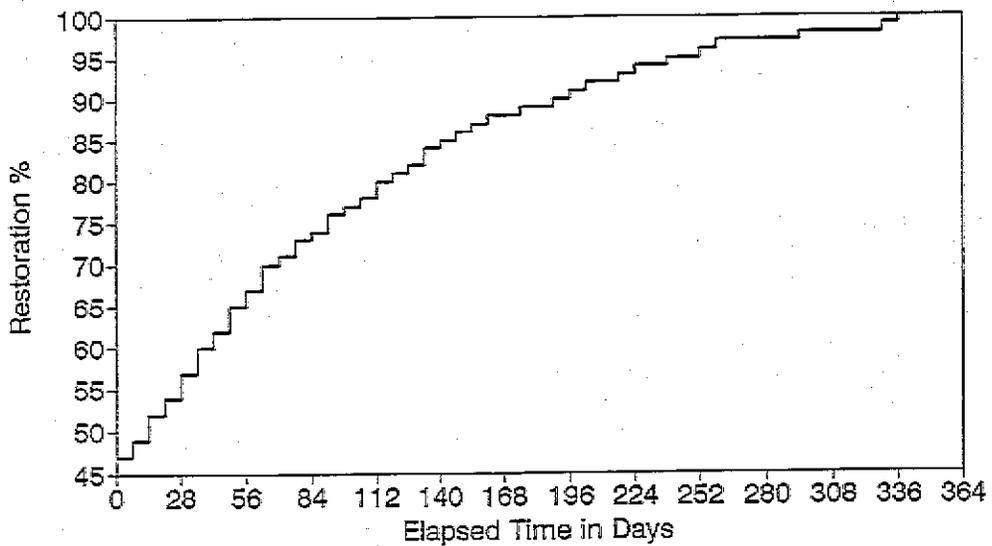


Figure C-36 Residual capacity of Arkansas medical care centers following New Madrid event (M=8.0).

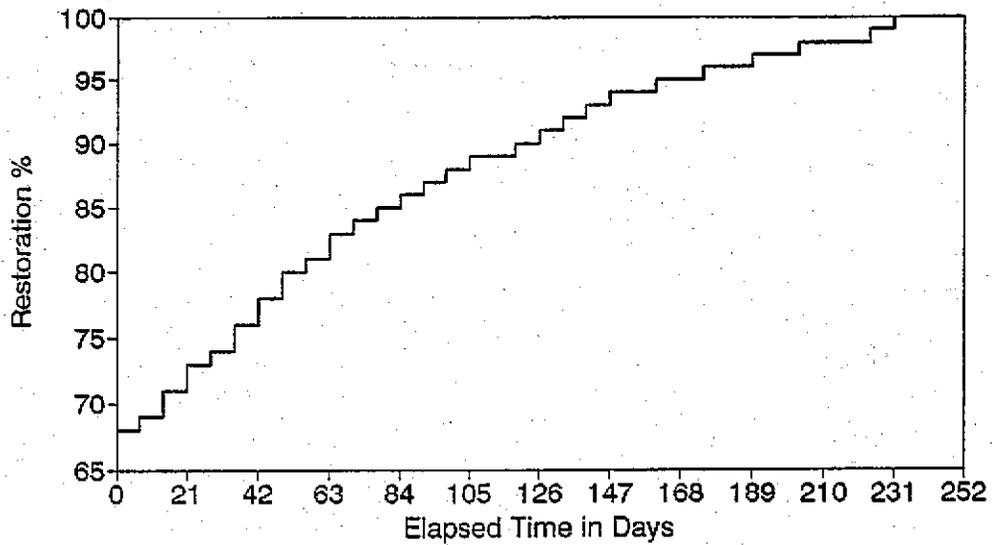


Figure C-37 Residual capacity of Tennessee medical care centers following New Madrid event (M=8.0).

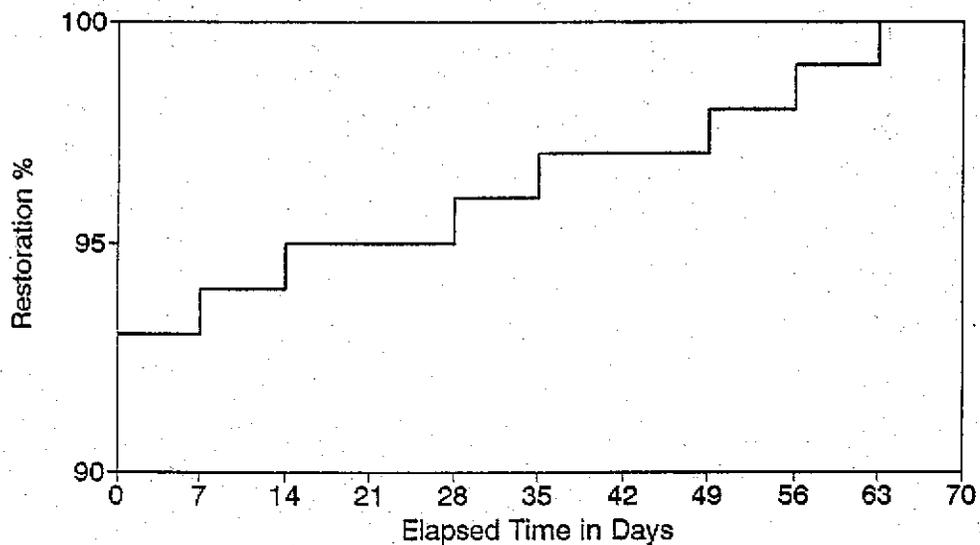


Figure C-38 Residual capacity of Indiana medical care centers following New Madrid event (M=8.0).

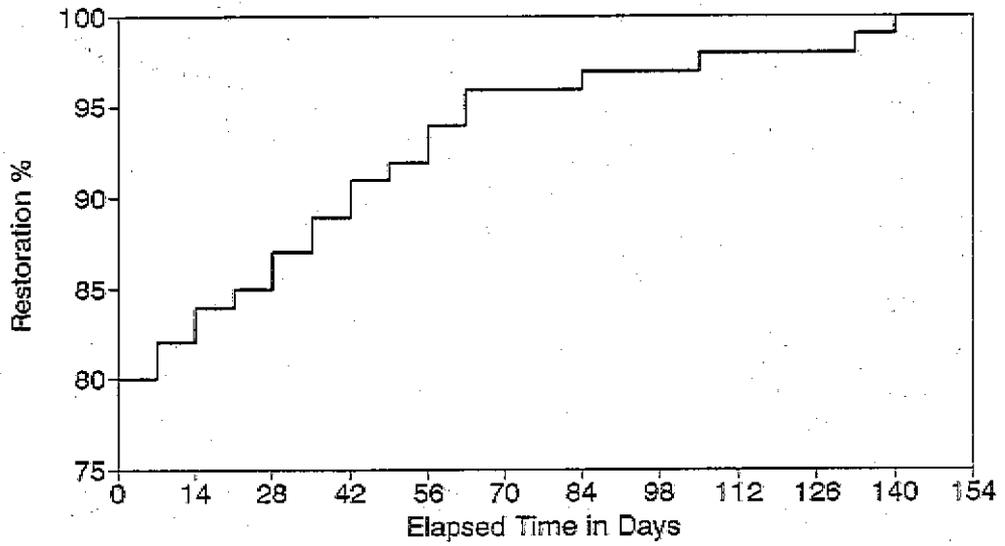


Figure C-39 Residual capacity of Kentucky medical care centers following New Madrid event (M=8.0).

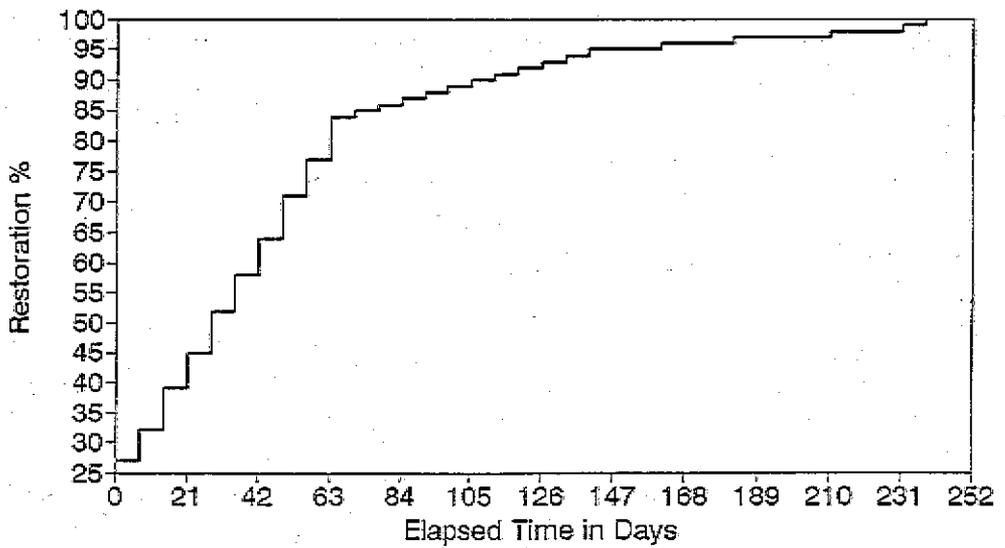


Figure C-40 Residual capacity of Mississippi medical care centers following New Madrid event (M=8.0).

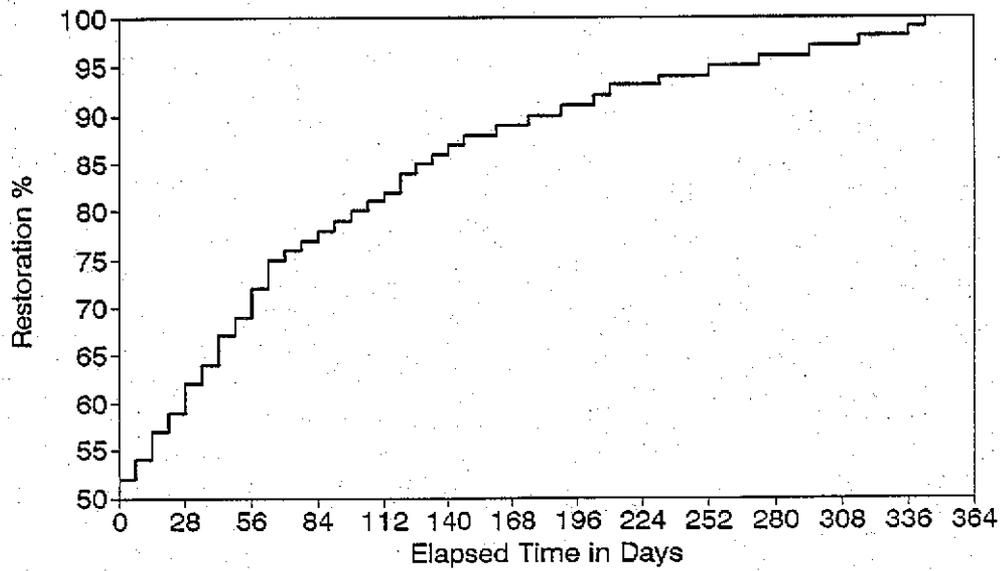


Figure C-41 Residual capacity of South Carolina medical care centers following Charleston event (M=7.5).

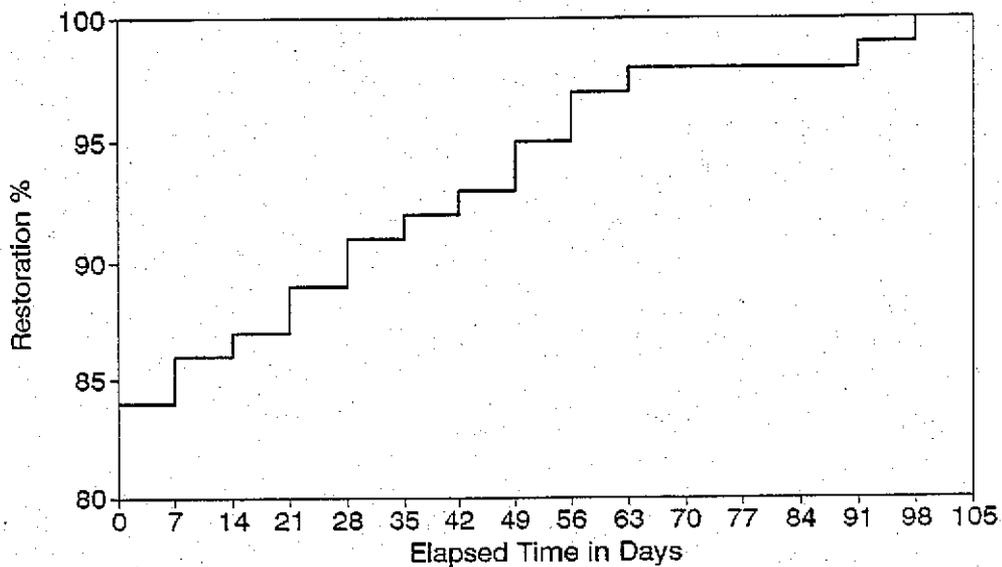


Figure C-42 Residual capacity of North Carolina medical care centers following Charleston event (M=7.5).

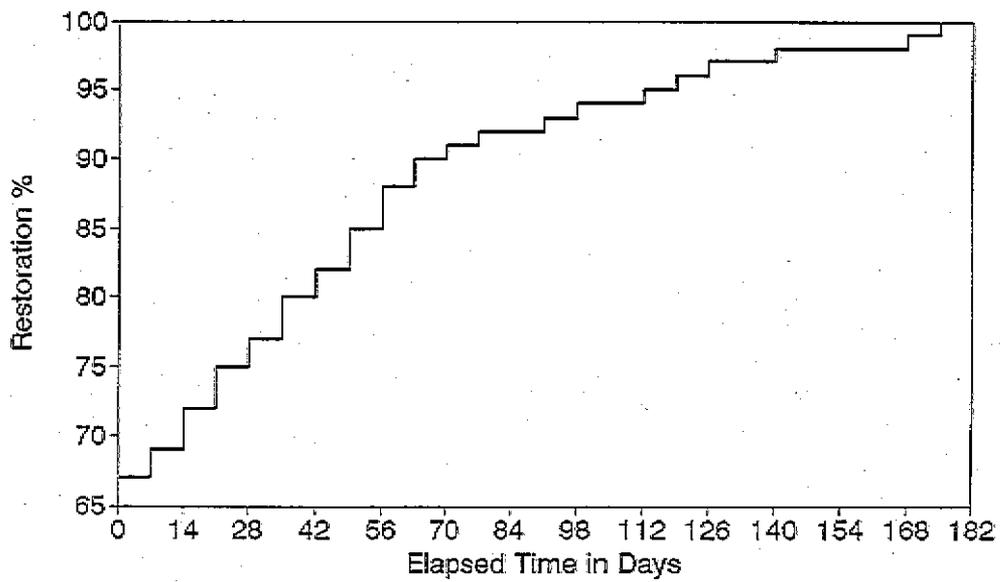


Figure C-43 Residual capacity of Georgia medical care centers following Charleston event (M=7.5).

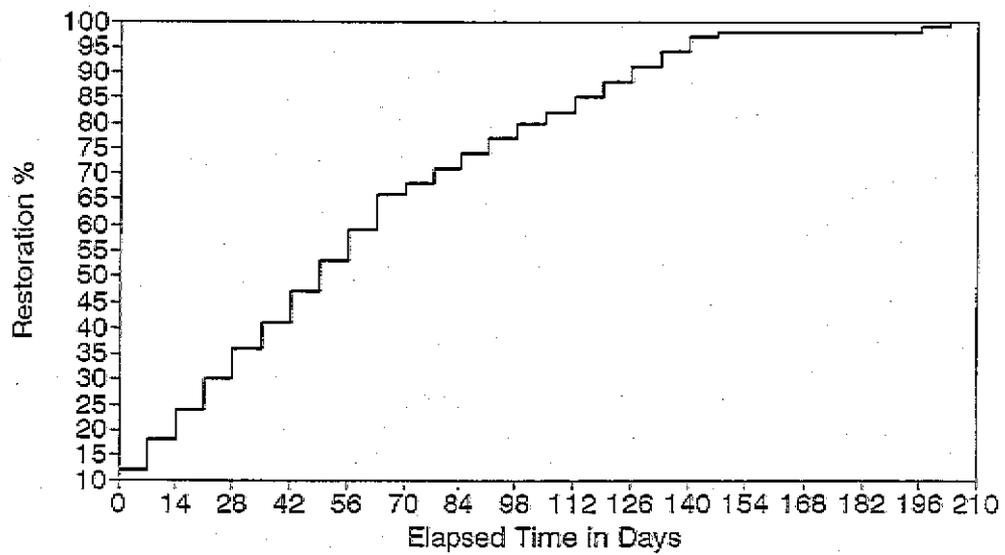


Figure C-44 Residual capacity of Massachusetts medical care centers following Cape Ann event (M=7.0).

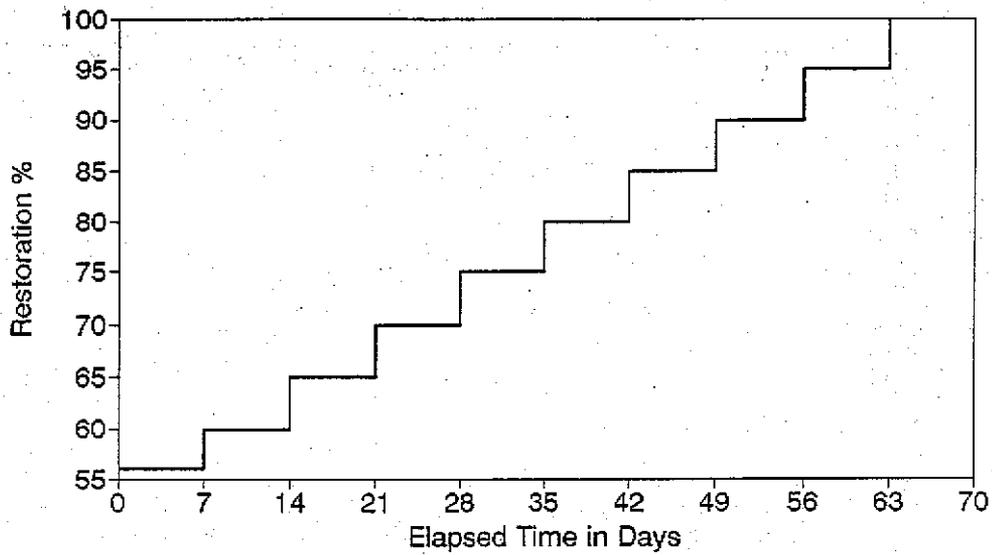


Figure C-45 Residual capacity of Connecticut medical care centers following Cape Ann event (M=7.0).

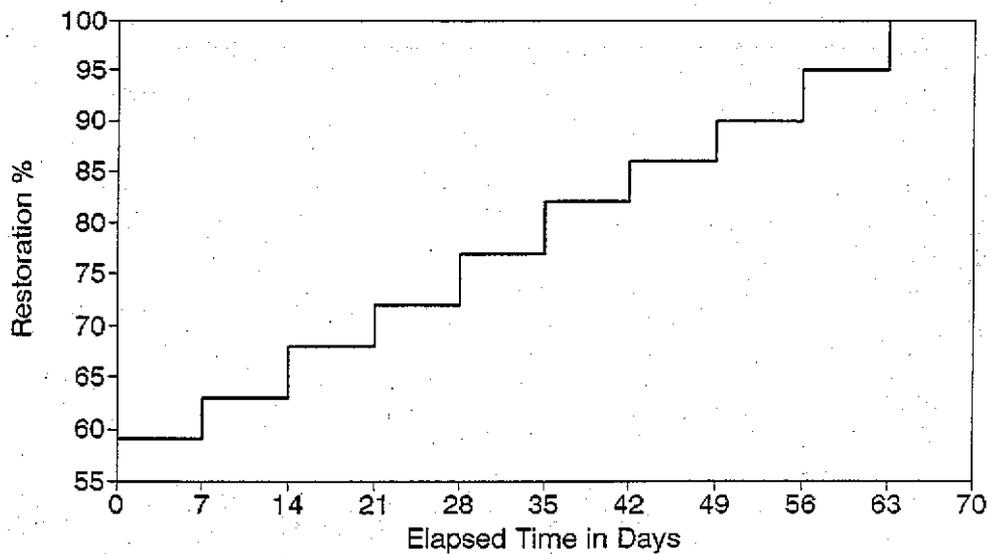


Figure C-46 Residual capacity of Delaware medical care centers following Cape Ann event (M=7.0).

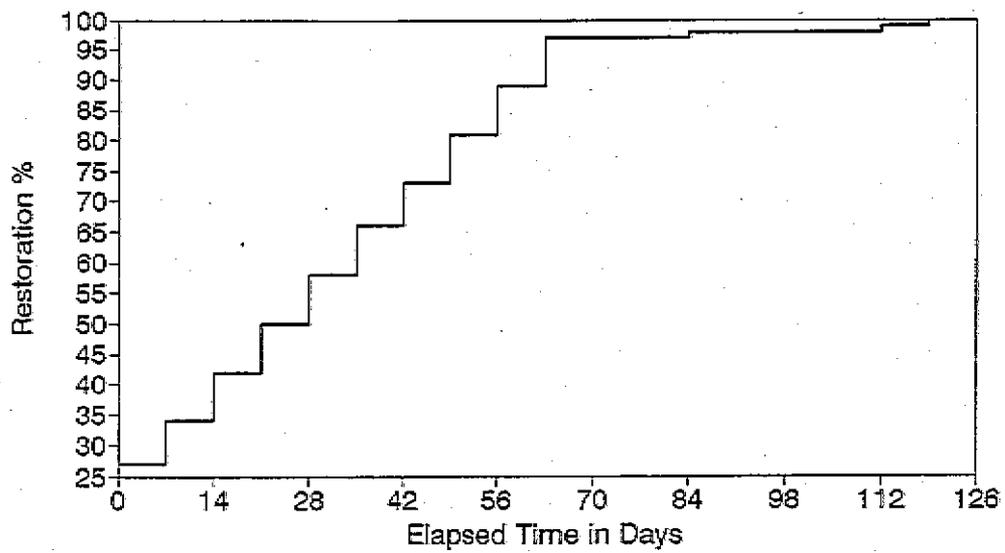


Figure C-47 Residual capacity of Rhode Island medical care centers following Cape Ann event (M=7.0).

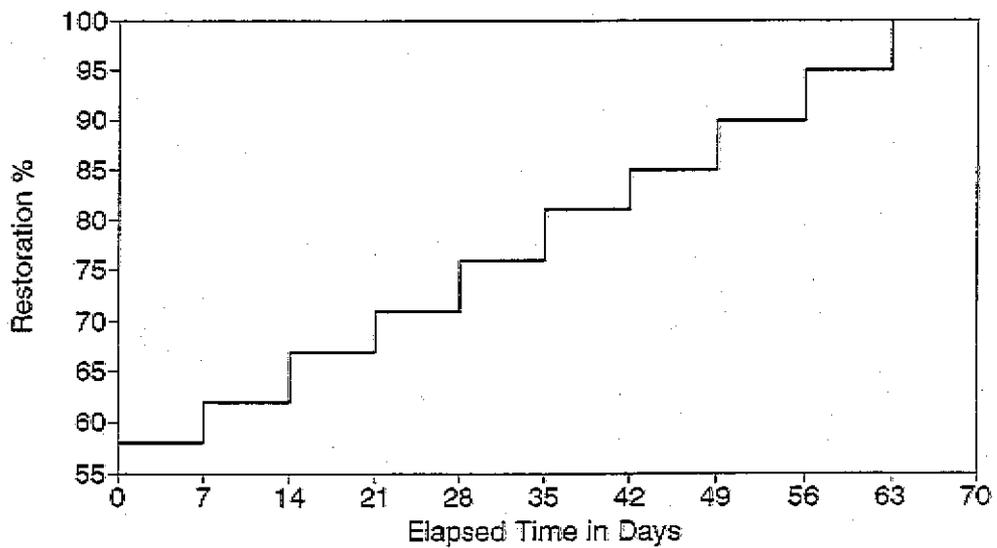


Figure C-48 Residual capacity of New Hampshire medical care centers following Cape Ann event (M=7.0).

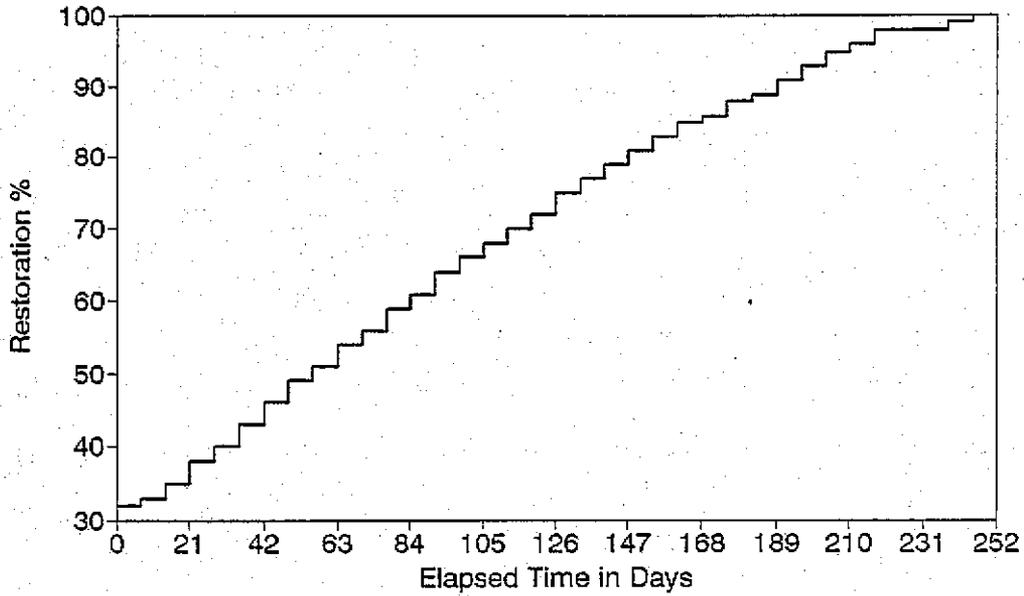


Figure C-49 Residual capacity of Utah medical care centers following Wasatch Front (M=7.5).

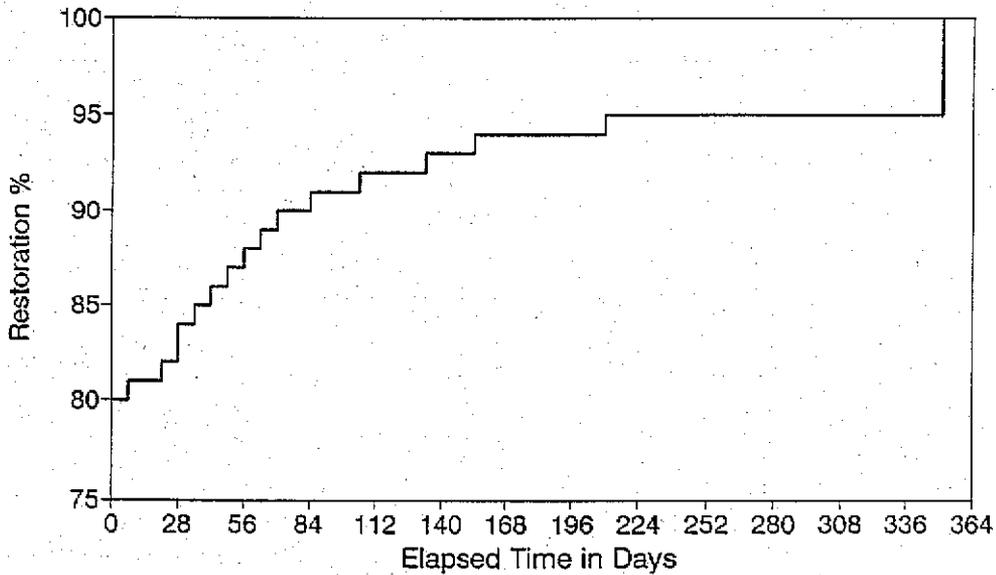


Figure C-50 Residual capacity of California medical care centers following Hayward event (M=7.5).

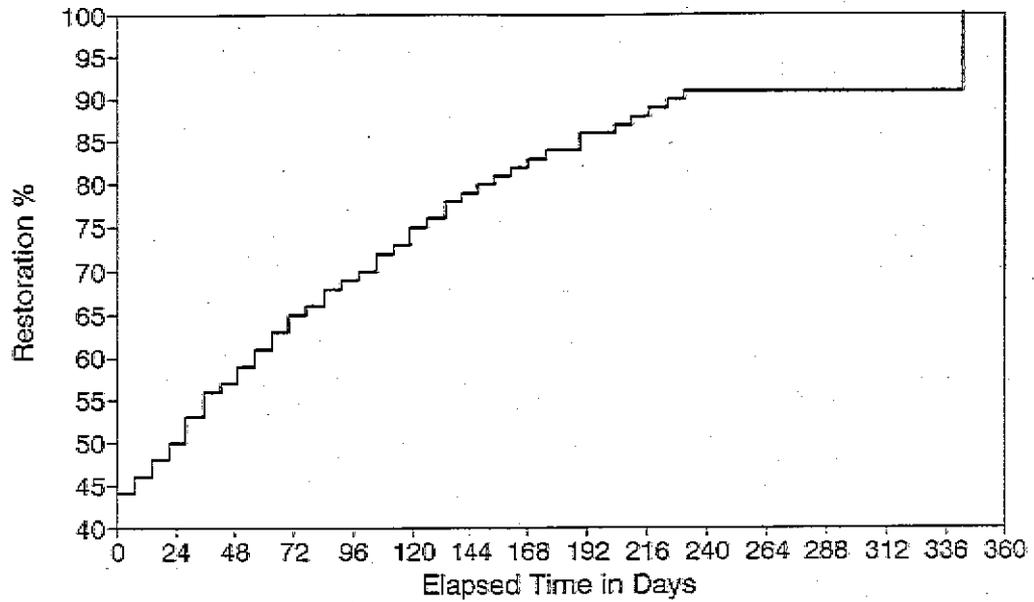


Figure C-51 Residual capacity of California medical care centers following Fort Tejon event (M=8.0).

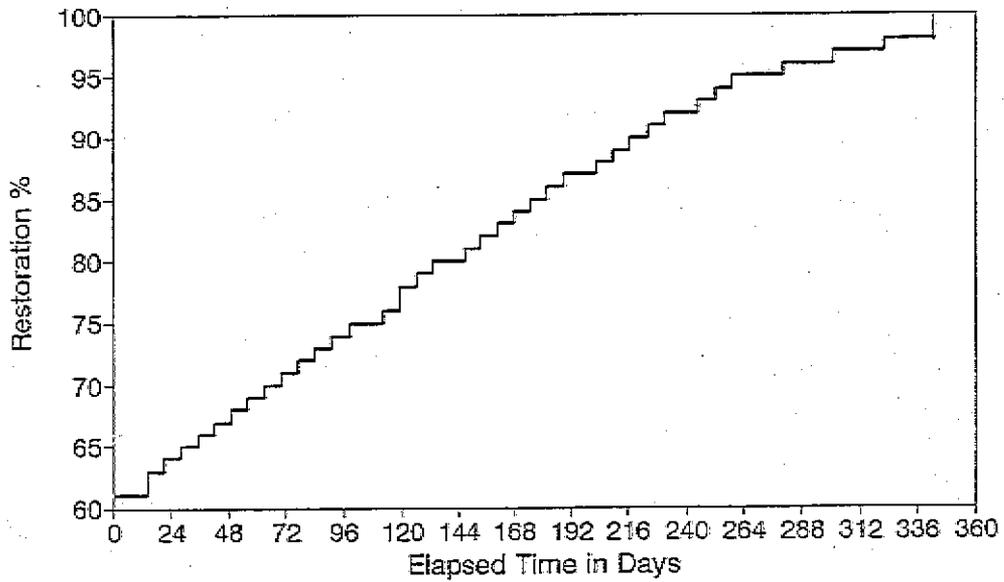


Figure C-52 Residual capacity of Washington medical care centers following Puget Sound event (M=7.5).

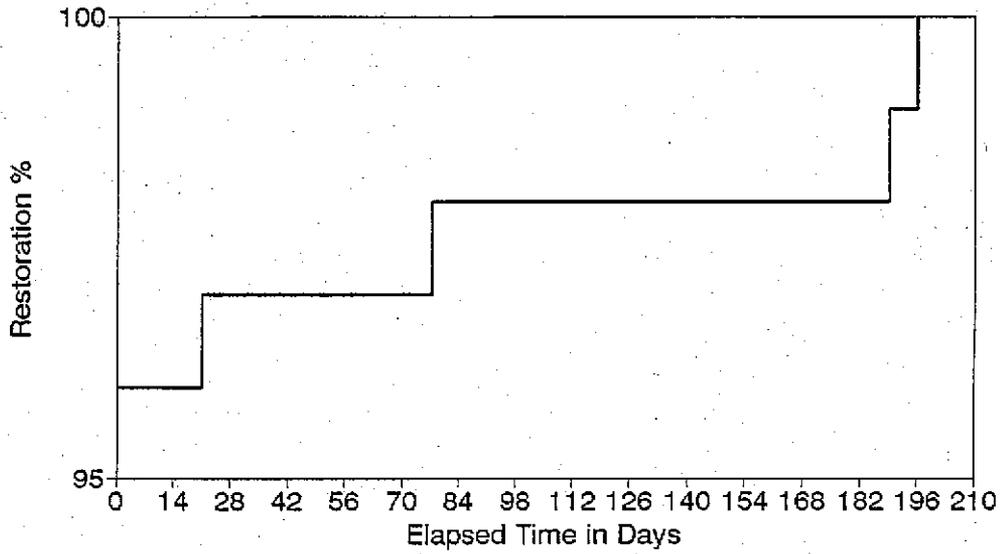


Figure C-53 Residual capacity of Missouri medical care centers following New Madrid event (M=7.0).

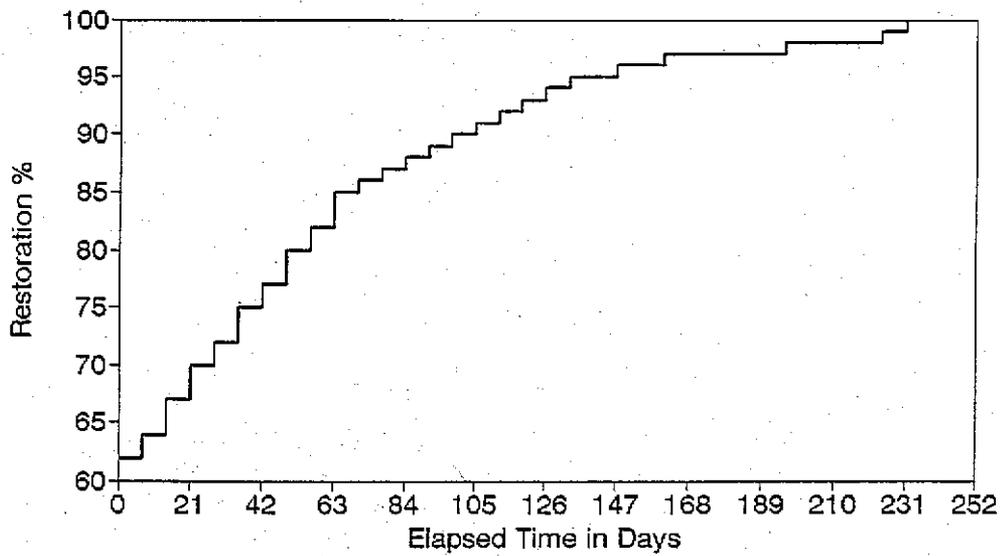


Figure C-54 Residual capacity of Arkansas medical care centers following New Madrid event (M=7.0).

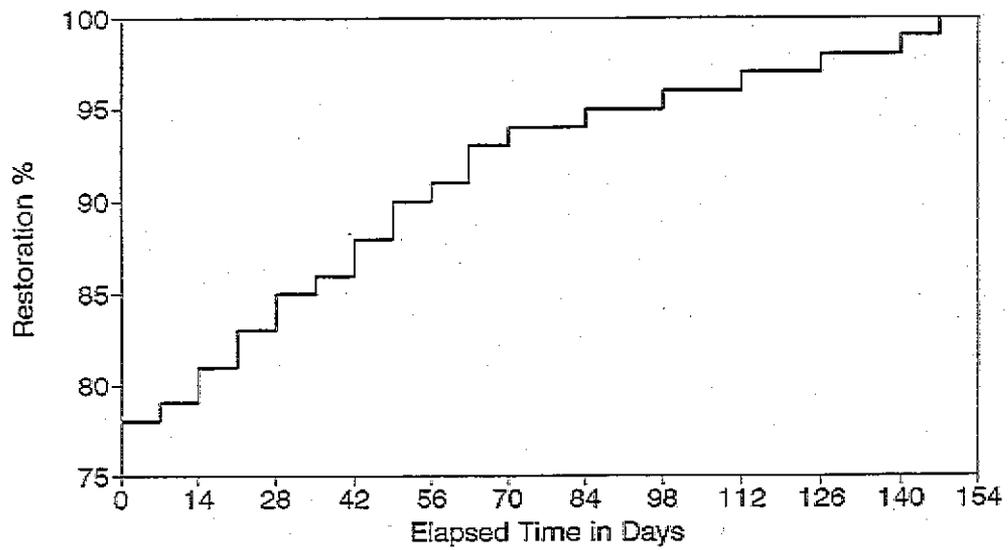


Figure C-55 Residual capacity of Tennessee medical care centers following New Madrid event (M=7.0).

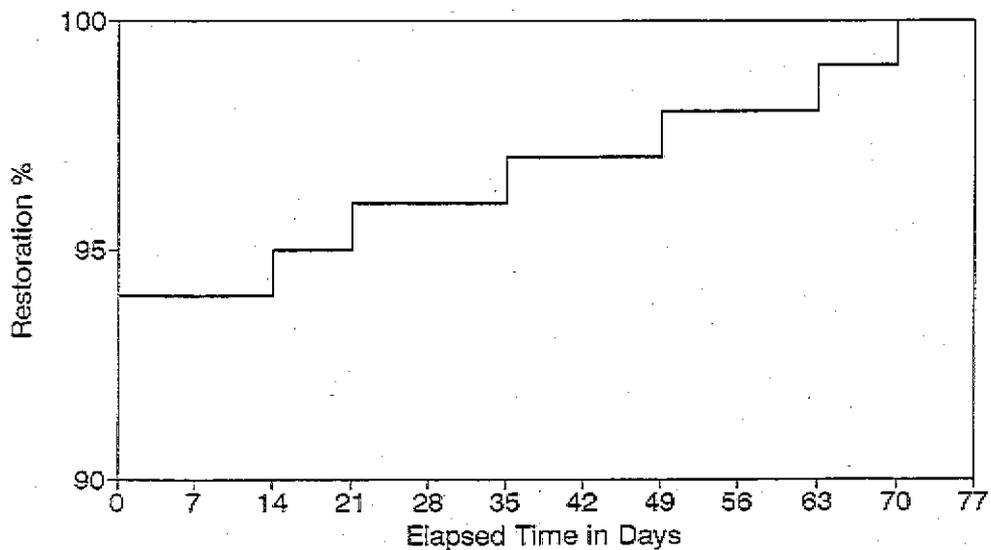


Figure C-56 Residual capacity of Kentucky medical care centers following New Madrid event (M=7.0).

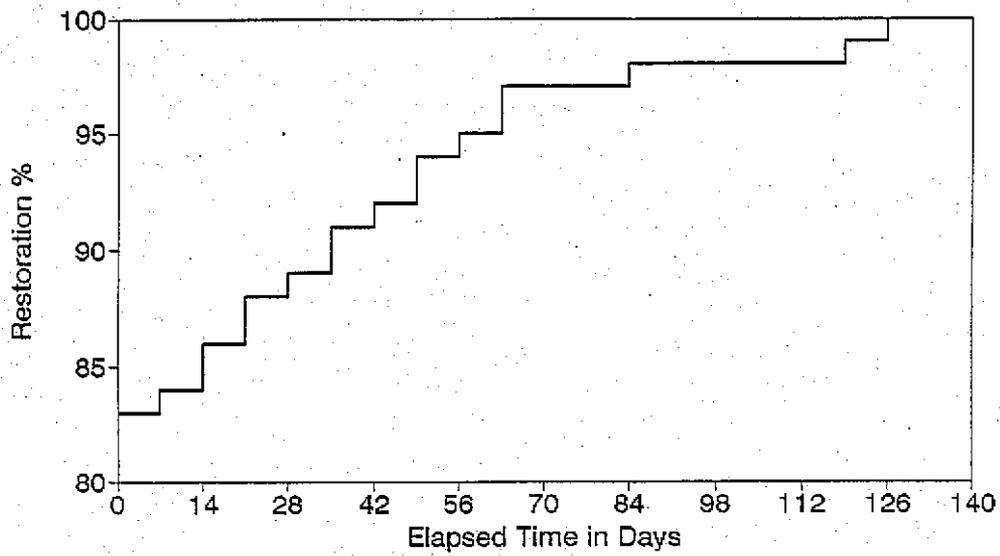


Figure C-57 Residual capacity of Mississippi medical care centers following New Madrid event (M=7.0).

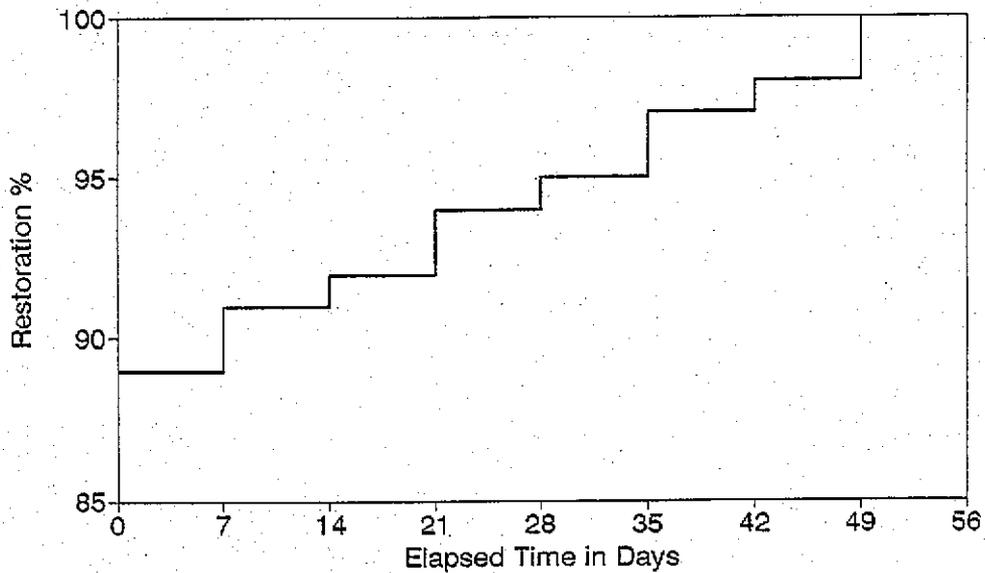


Figure C-58 Residual capacity of Illinois fire stations following New Madrid event (M=7.0).

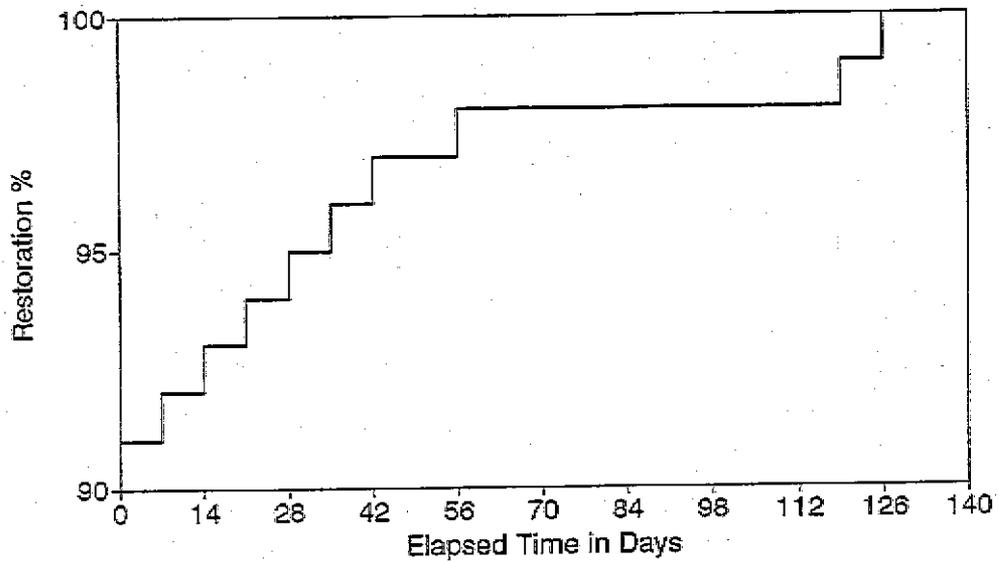


Figure C-59 Residual capacity of Missouri fire stations following New Madrid event (M=8.0).

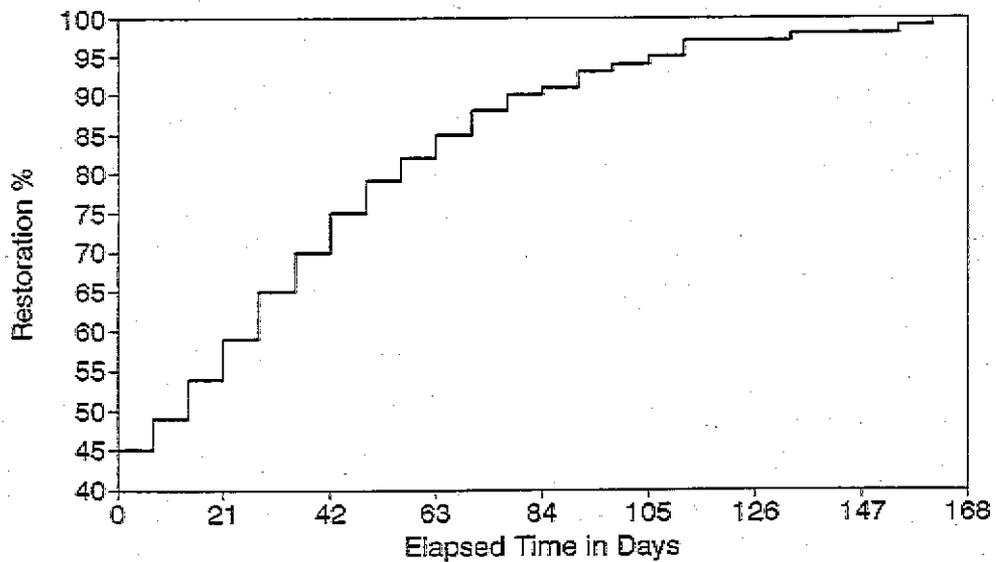


Figure C-60 Residual capacity of Arkansas fire stations following New Madrid event (M=8.0).

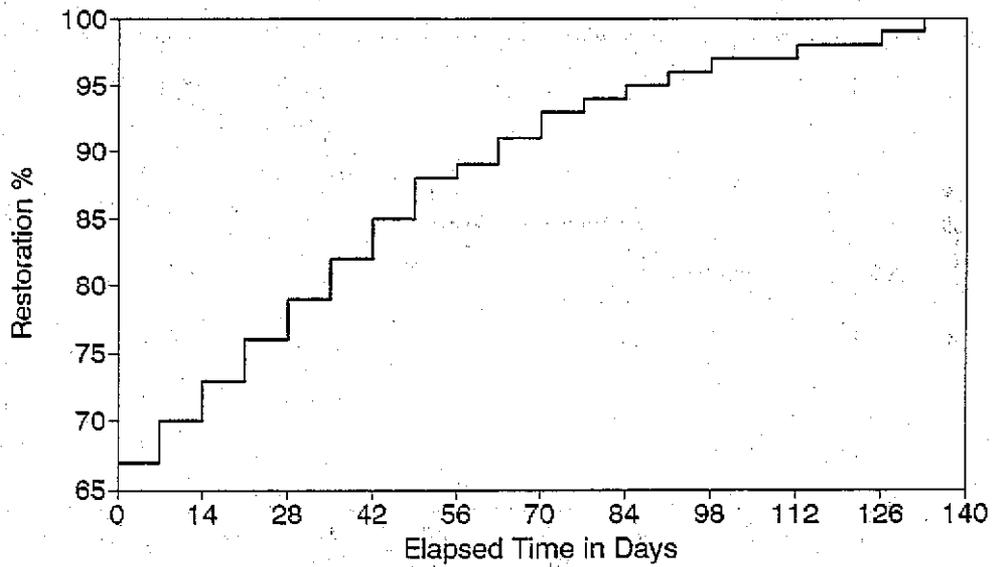


Figure C-61 Residual capacity of Tennessee fire stations following New Madrid event (M=8.0).

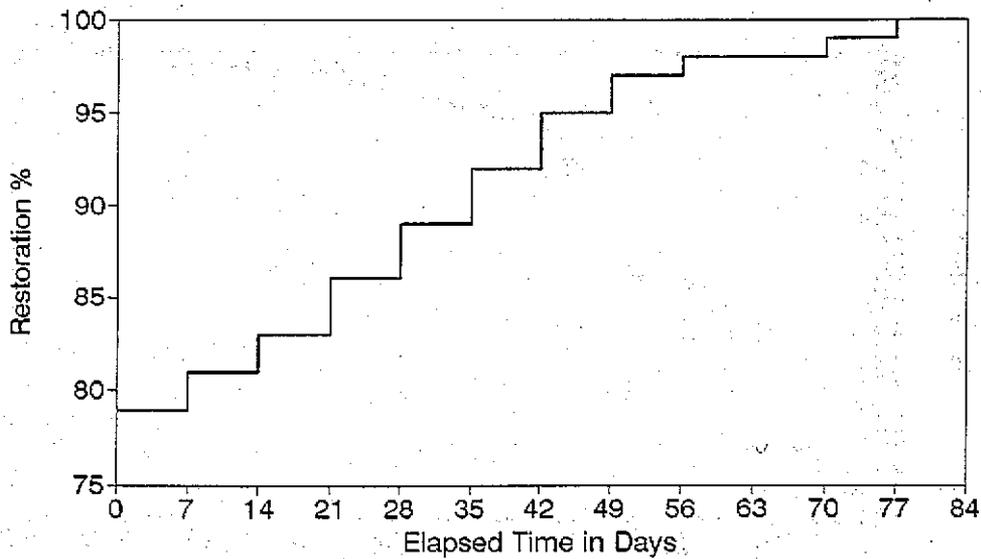


Figure C-62 Residual capacity of Indiana fire stations following New Madrid event (M=8.0).

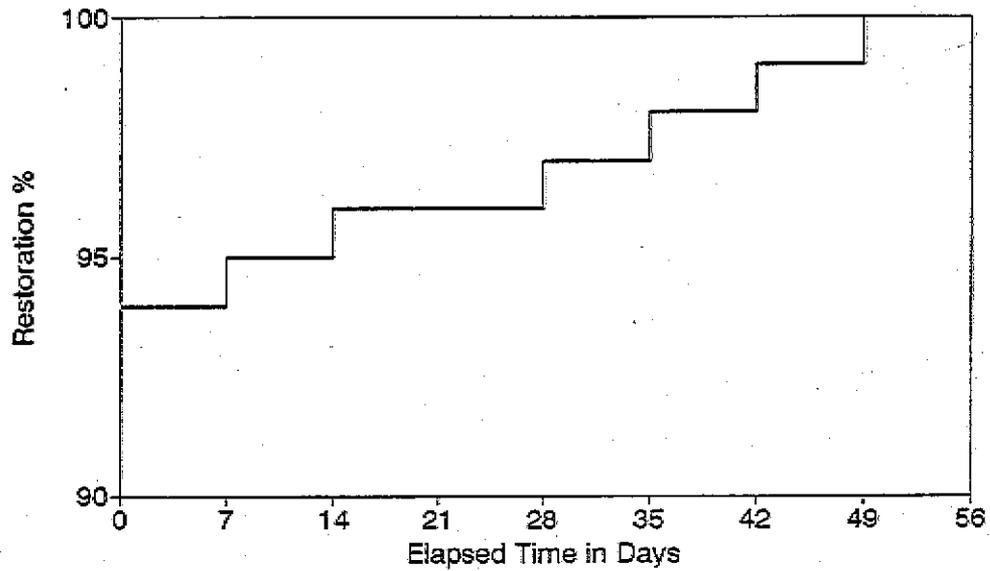


Figure C-63 Residual capacity of Kentucky fire stations following New Madrid event (M=8.0).

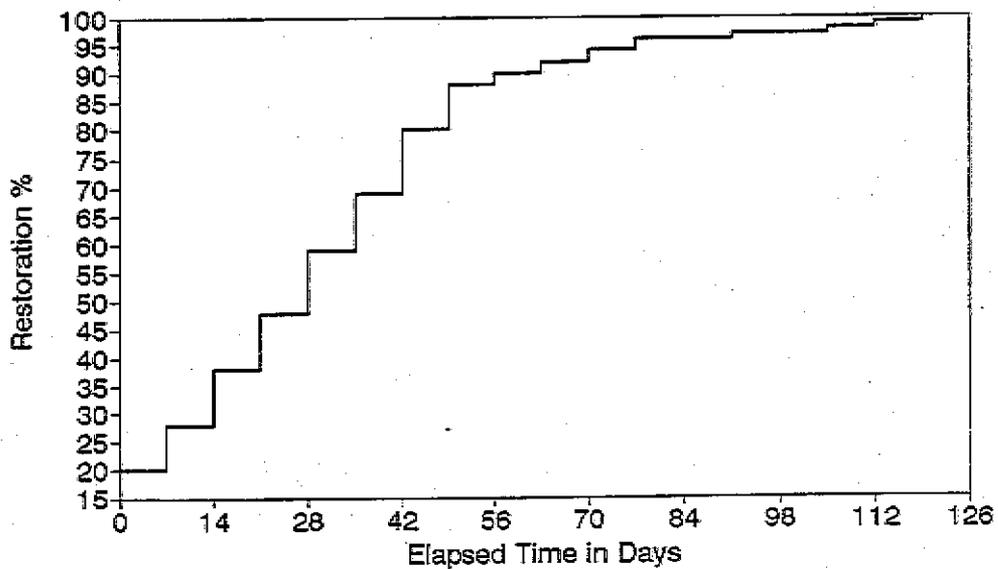


Figure C-64 Residual capacity of Mississippi fire stations following New Madrid event (M=8.0).

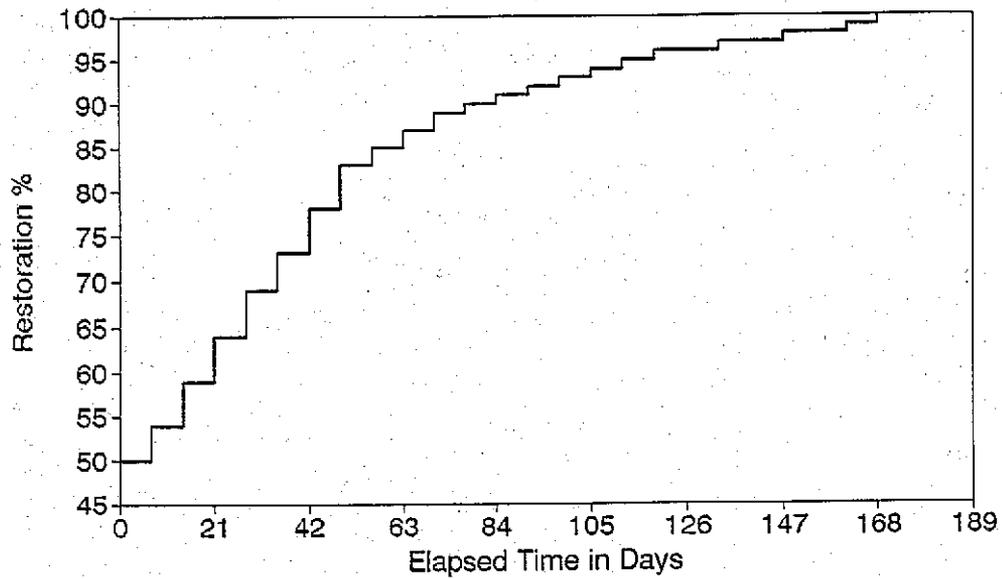


Figure C-65 Residual capacity of South Carolina fire stations following Charleston event (M=7.5).

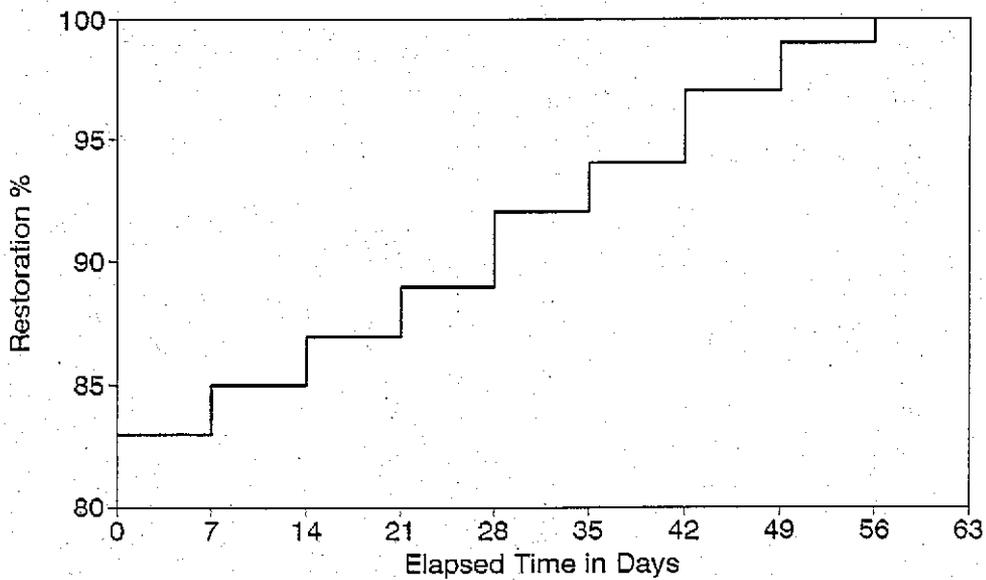


Figure C-66 Residual capacity of North Carolina fire stations following Charleston event (M=7.5).

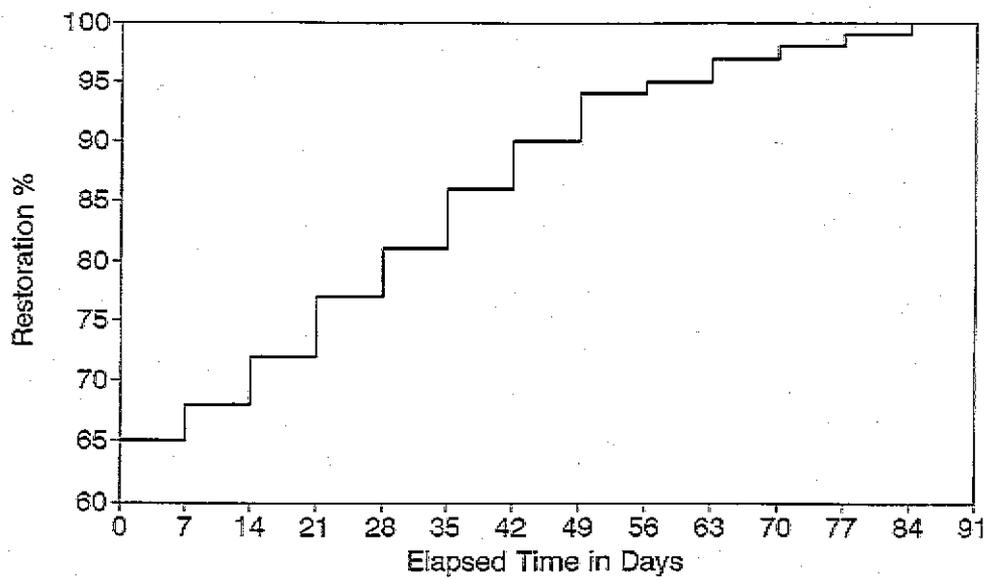


Figure C-67 Residual capacity of Georgia fire stations following Charleston event ($M=7.5$).

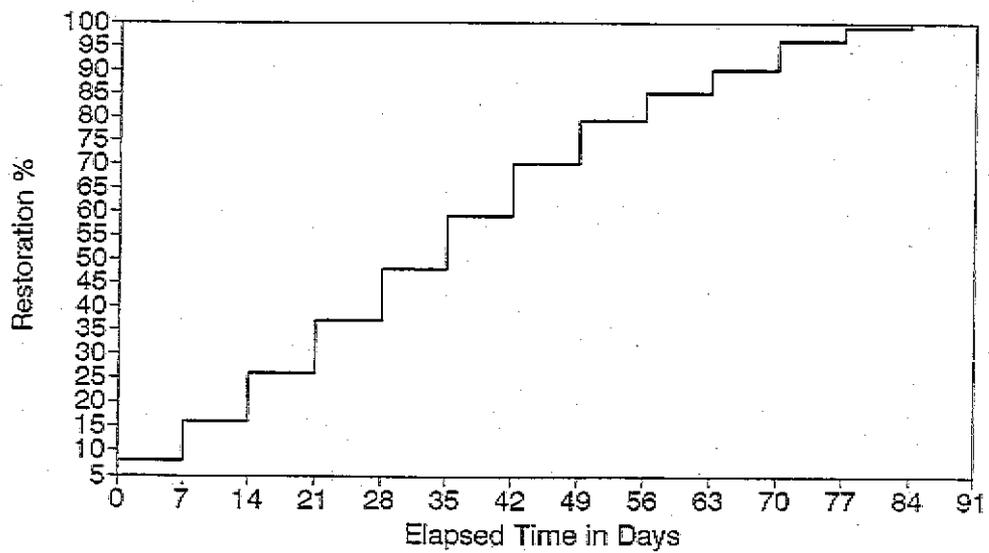


Figure C-68 Residual capacity of Massachusetts fire stations following Cape Ann event ($M=7.0$).

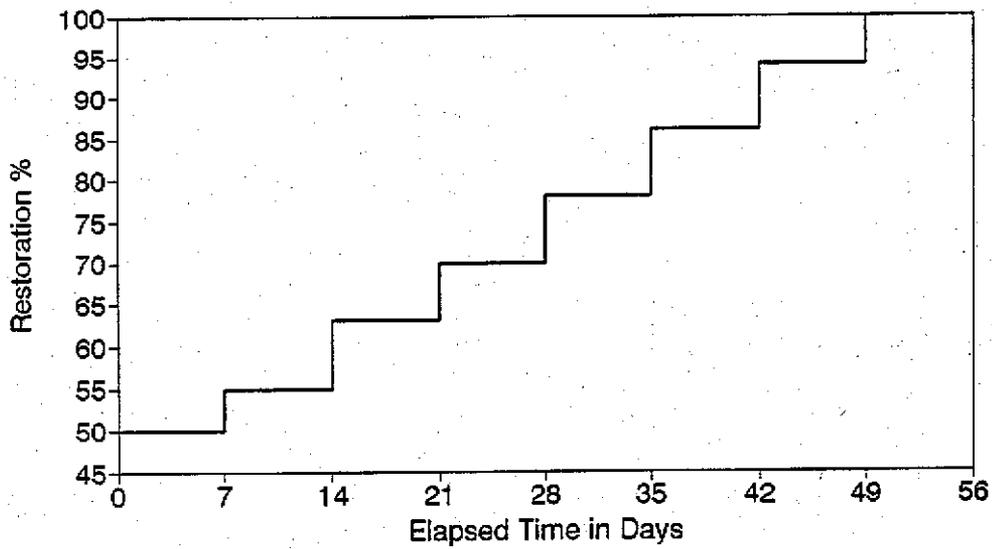


Figure C-69 Residual capacity of Connecticut fire stations following Cape Ann event (M=7.0).

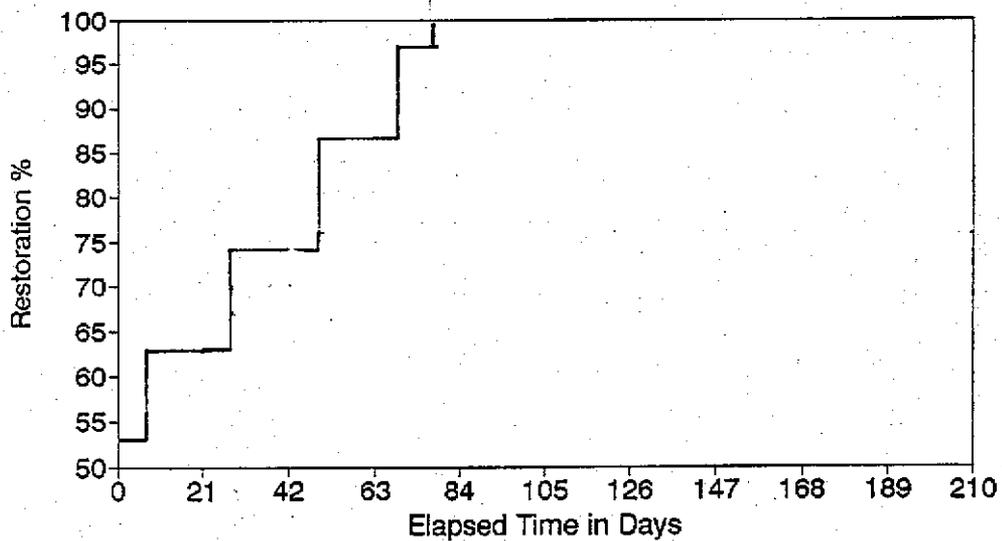


Figure C-70 Residual capacity of Delaware fire stations following Cape Ann event (M=7.0).

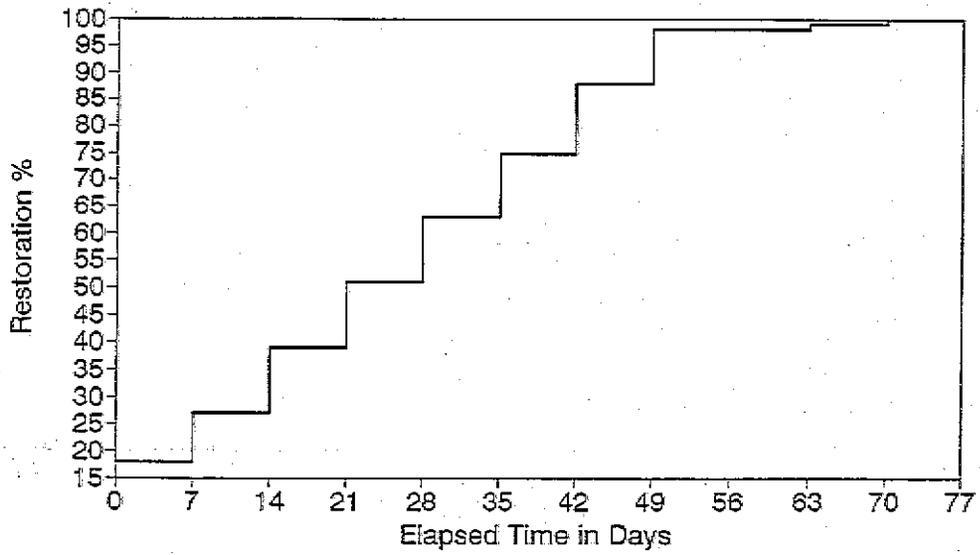


Figure C-71 Residual capacity of Rhode Island fire stations following Cape Ann event (M=7.0).

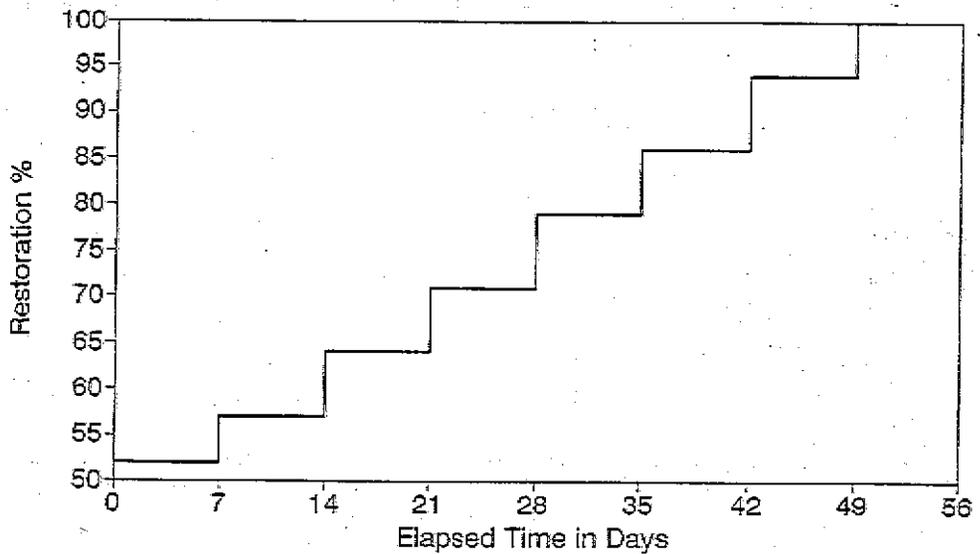


Figure C-72 Residual capacity of New Hampshire fire stations following Cape Ann event (M=7.0).

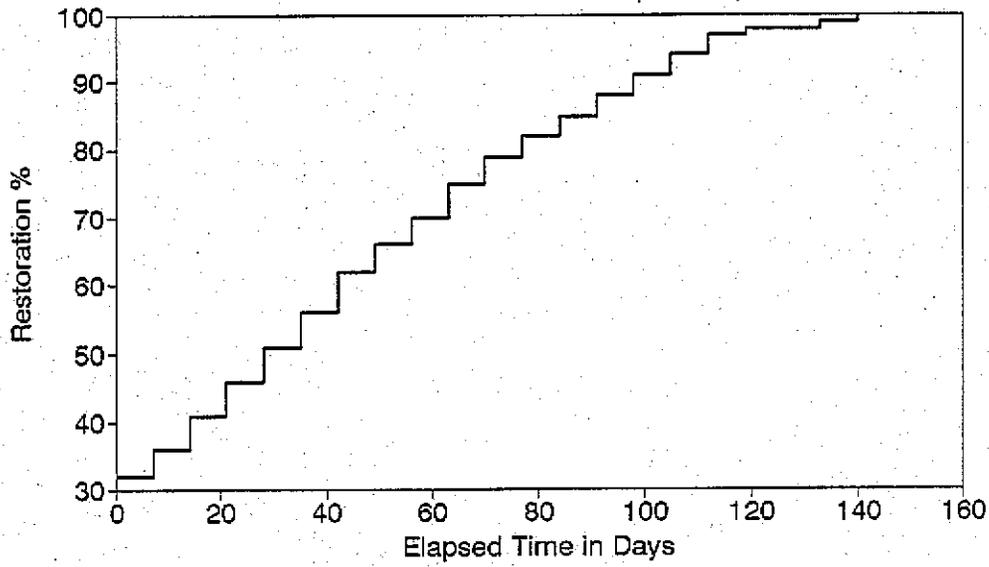


Figure C-73 Residual capacity of Utah fire stations following Wasatch Front event (M=7.5).

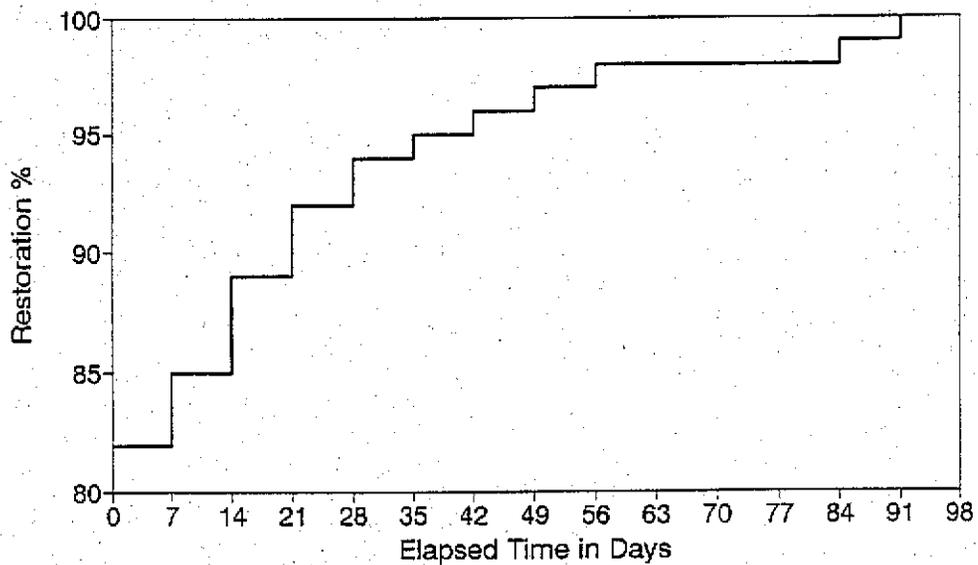


Figure C-74 Residual capacity of California fire stations following Hayward event (M=7.5).

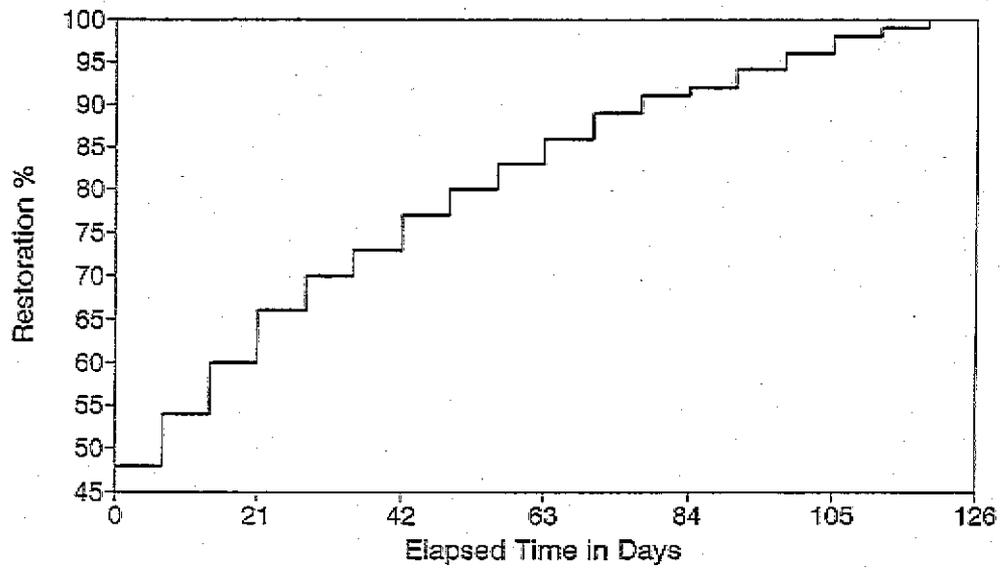


Figure C-75 Residual capacity of California fire stations following Fort Tejon event (M=8.0).

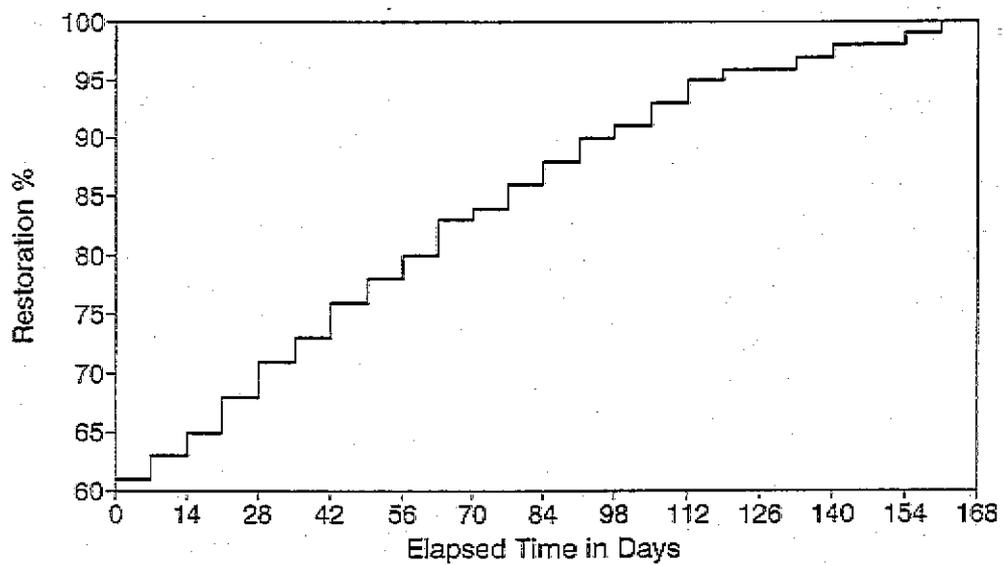


Figure C-76 Residual capacity of Washington fire stations following Puget Sound event (M=7.5).

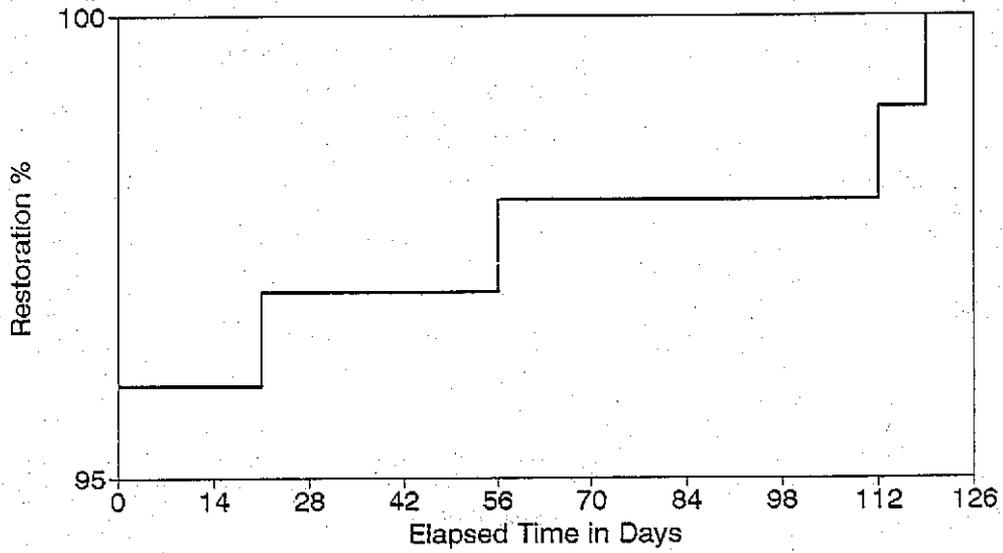


Figure C-77 Residual capacity of Missouri fire stations following New Madrid event (M=7.0).

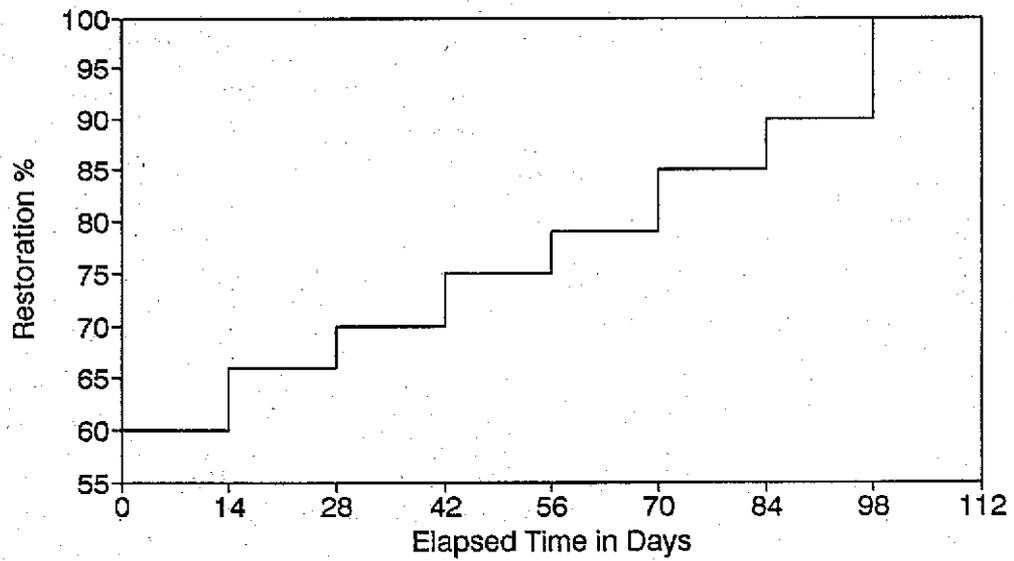


Figure C-78 Residual capacity of Arkansas fire stations following New Madrid event (M=7.0).

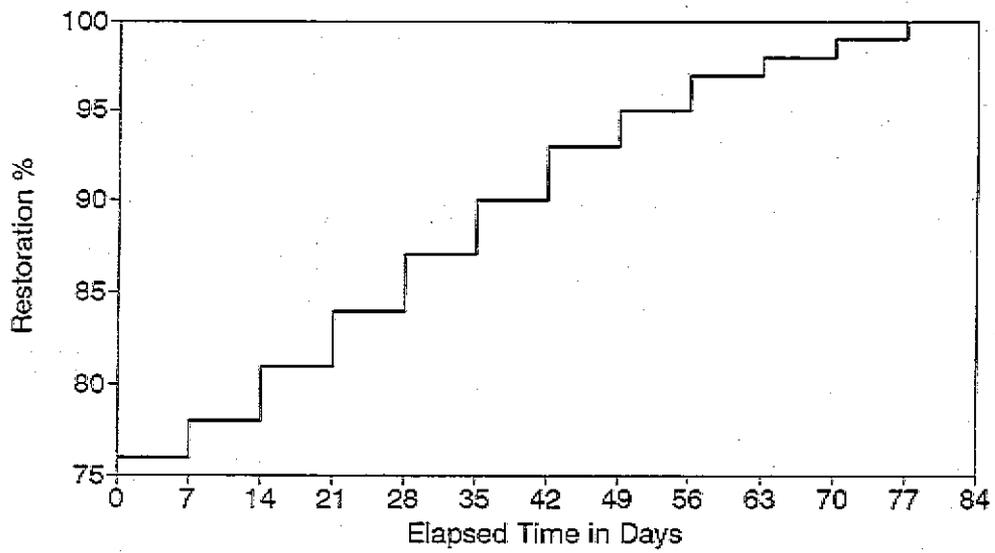


Figure C-79 Residual capacity of Tennessee fire stations following New Madrid event (M=7.0).

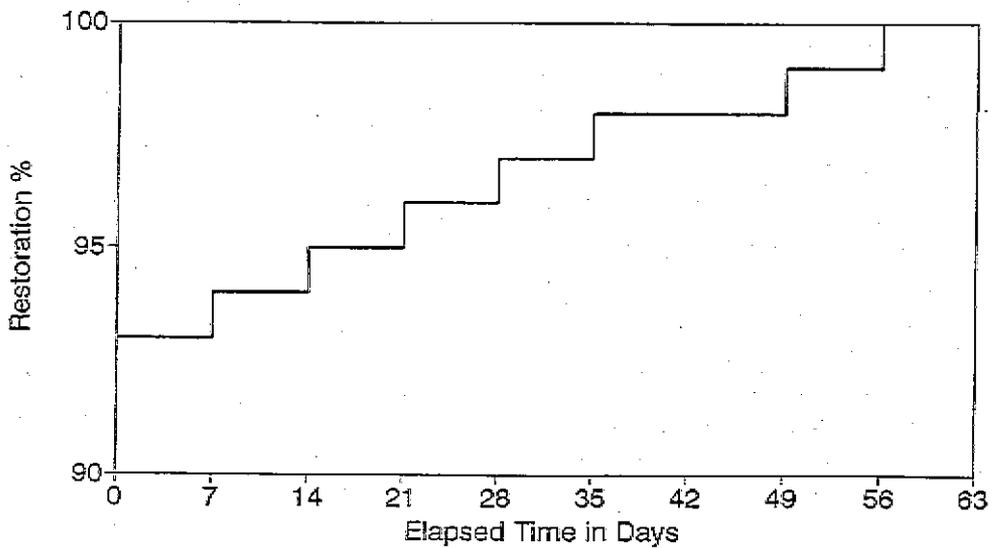


Figure C-80 Residual capacity of Kentucky fire stations following New Madrid event (M=7.0).

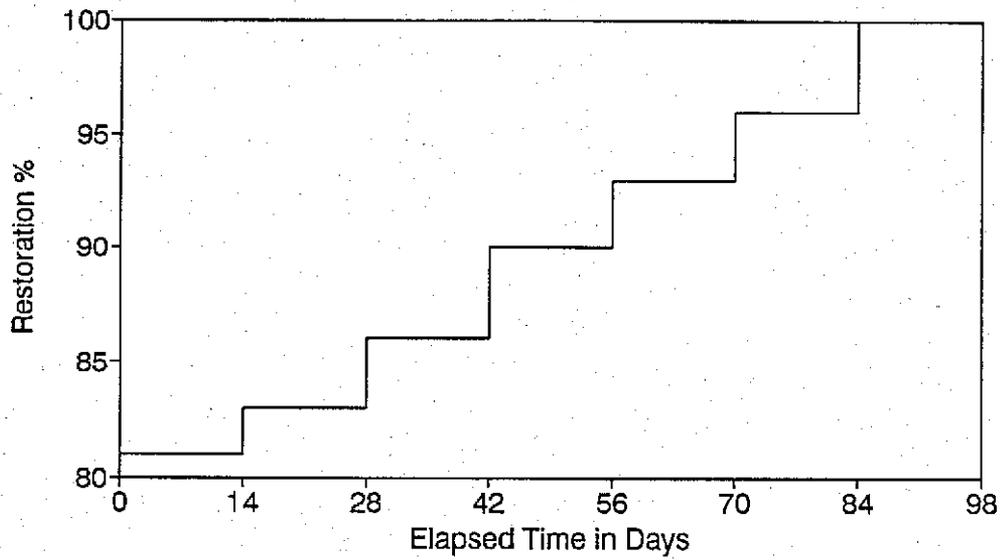


Figure C-81 Residual capacity of Mississippi fire stations following New Madrid event (M=7.0).

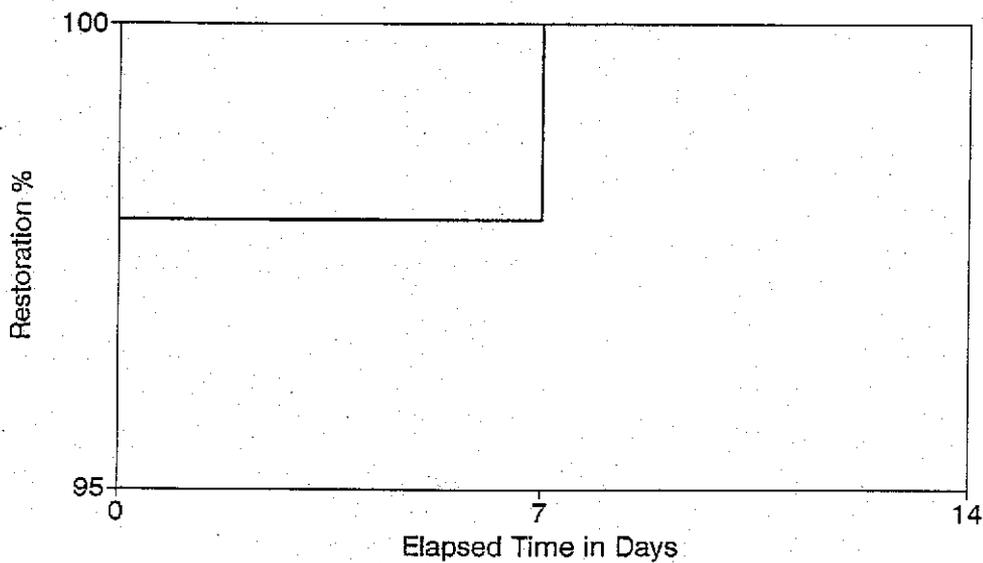


Figure C-82 Residual capacity of Illinois police stations following New Madrid event (M=8.0).

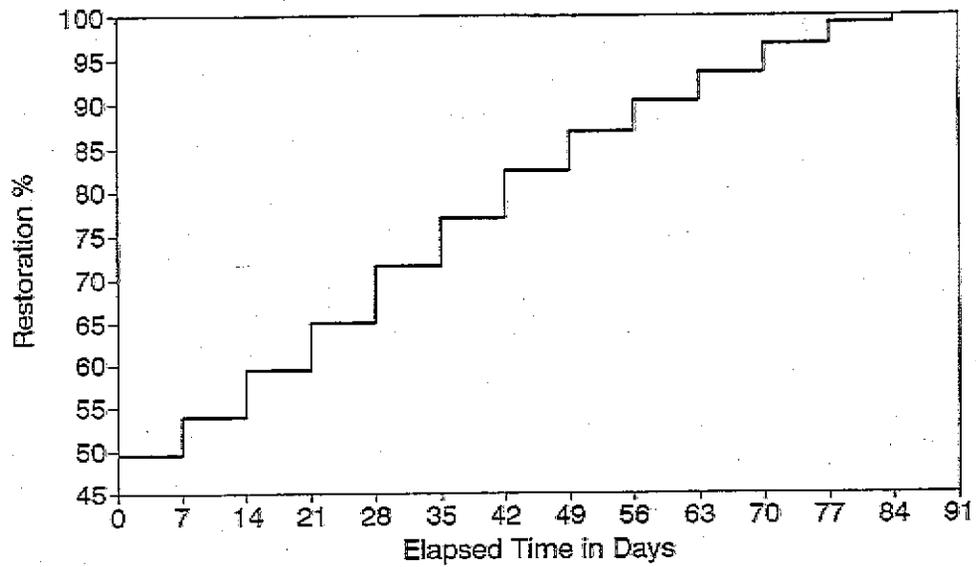


Figure C-83 Residual capacity of Arkansas police stations following New Madrid event (M=8.0).

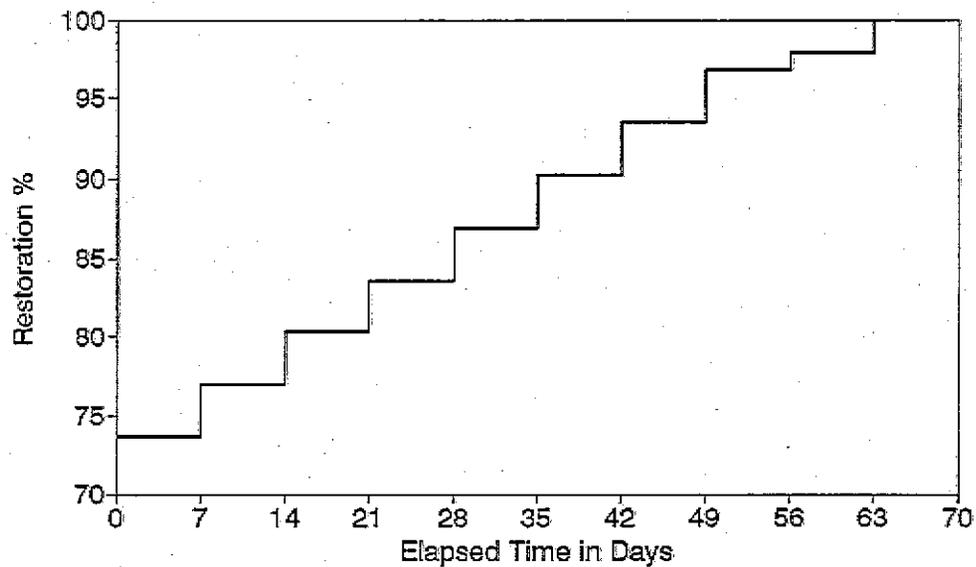


Figure C-84 Residual capacity of Tennessee police stations following New Madrid event (M=8.0).

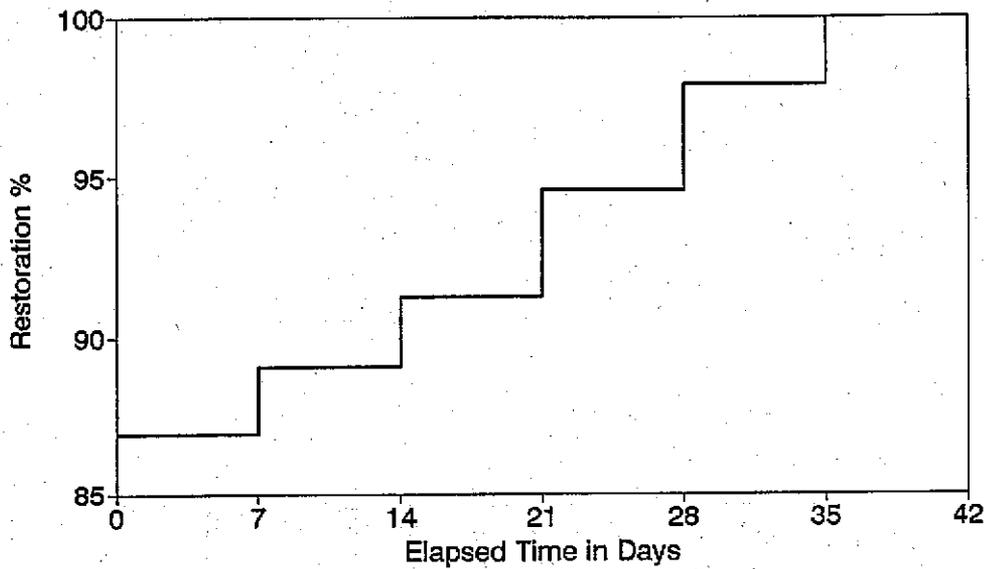


Figure C-85 Residual capacity of Kentucky police stations following New Madrid event (M=8.0).

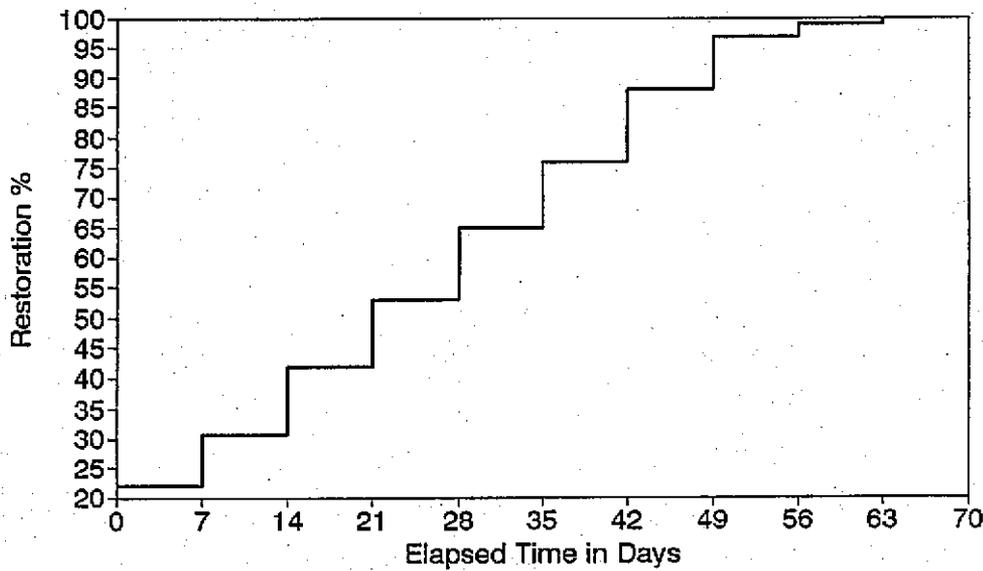


Figure C-86 Residual capacity of Mississippi police stations following New Madrid event (M=8.0).

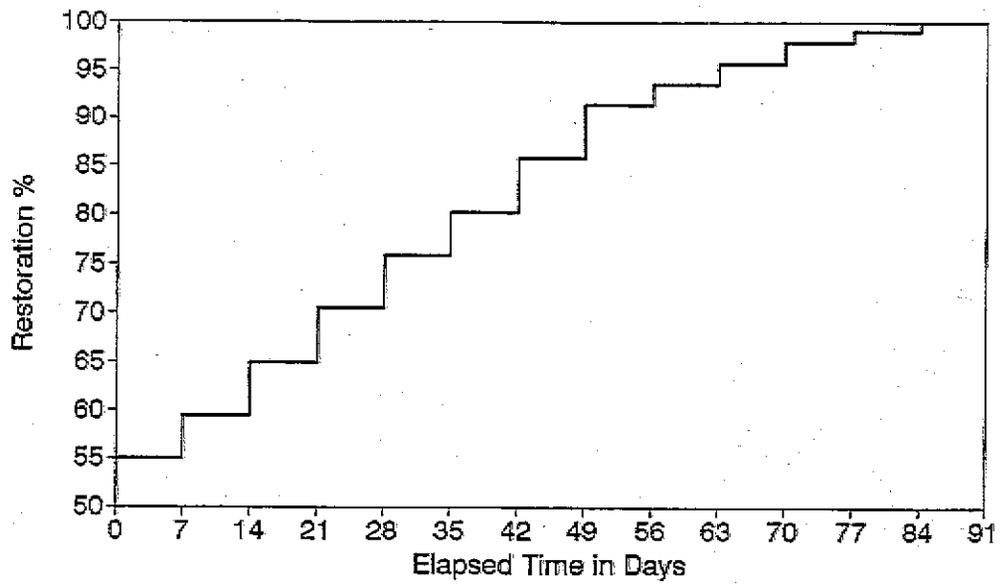


Figure C-87 Residual capacity of South Carolina police stations following Charleston event ($M=7.5$).

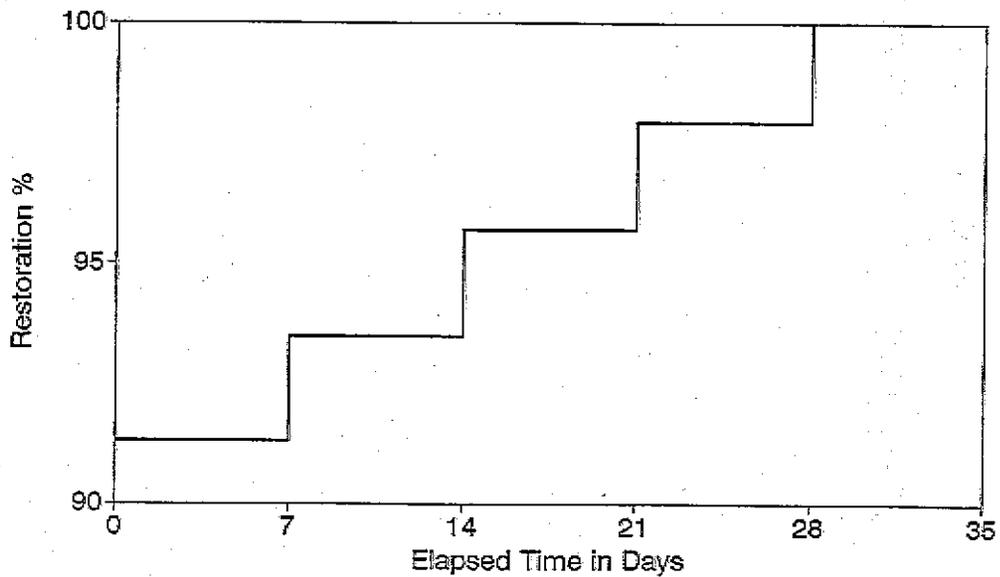


Figure C-88 Residual capacity of North Carolina police stations following Charleston event ($M=7.5$).

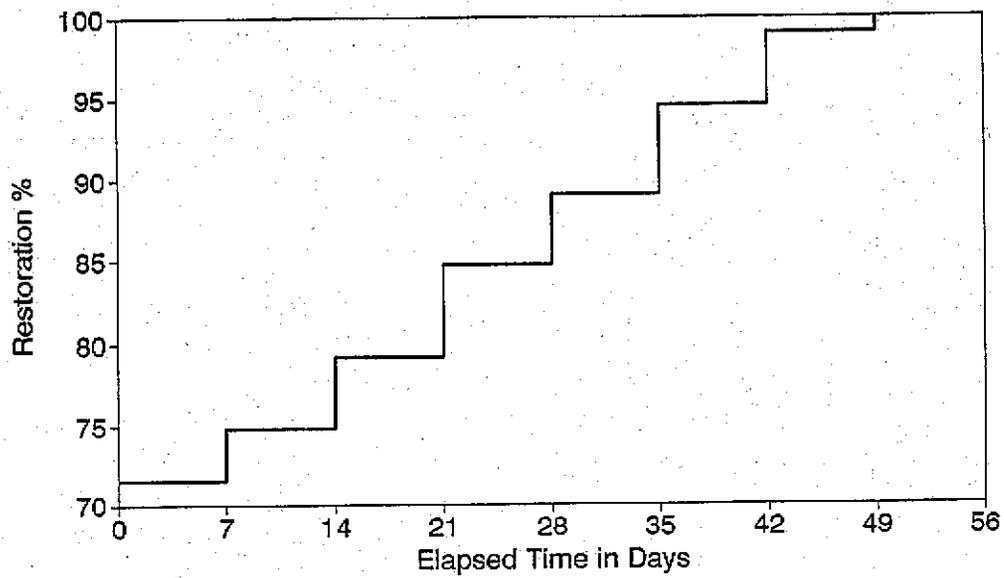


Figure C-89 Residual capacity of Georgia police stations following Charleston event (M=7.5)

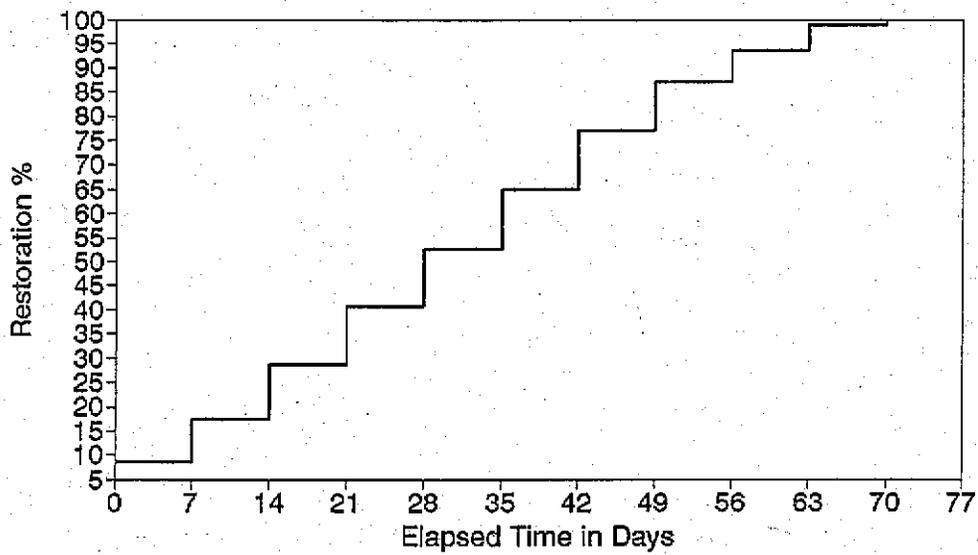


Figure C-90 Residual capacity of Massachusetts police stations following Cape Ann event (M=7.0)

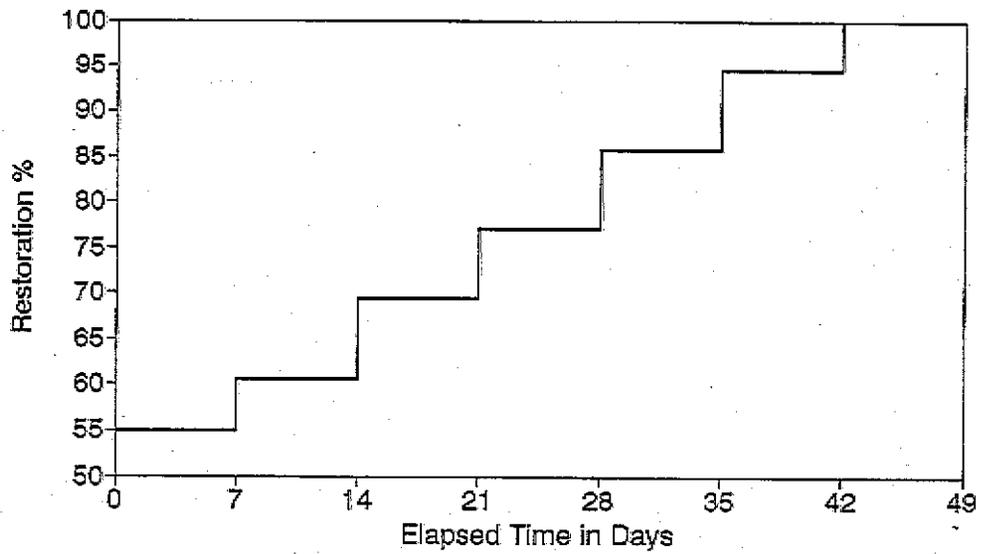


Figure C-91 Residual capacity of Connecticut police stations following Cape Ann event (M=7.0).

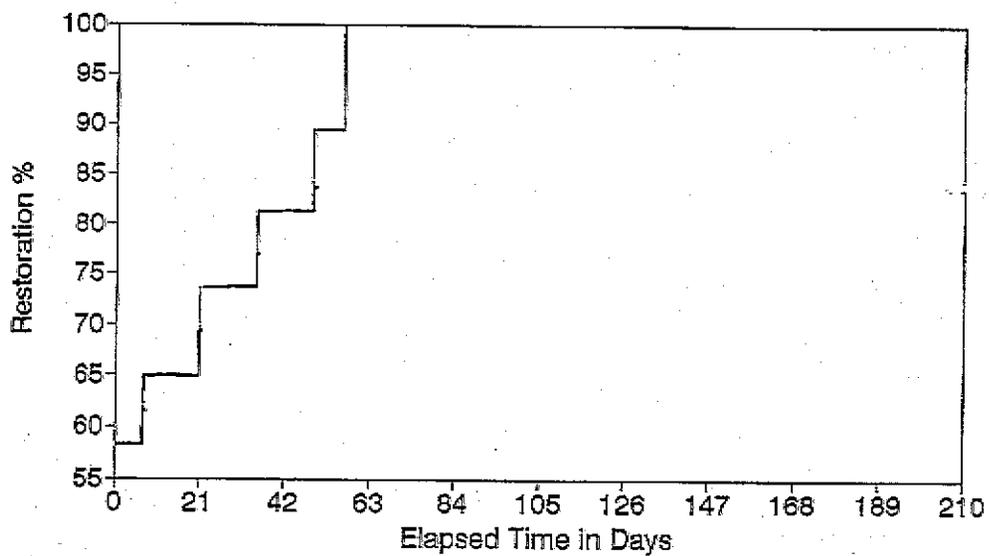


Figure C-92 Residual capacity of Delaware police stations following Cape Ann event (M=7.0).

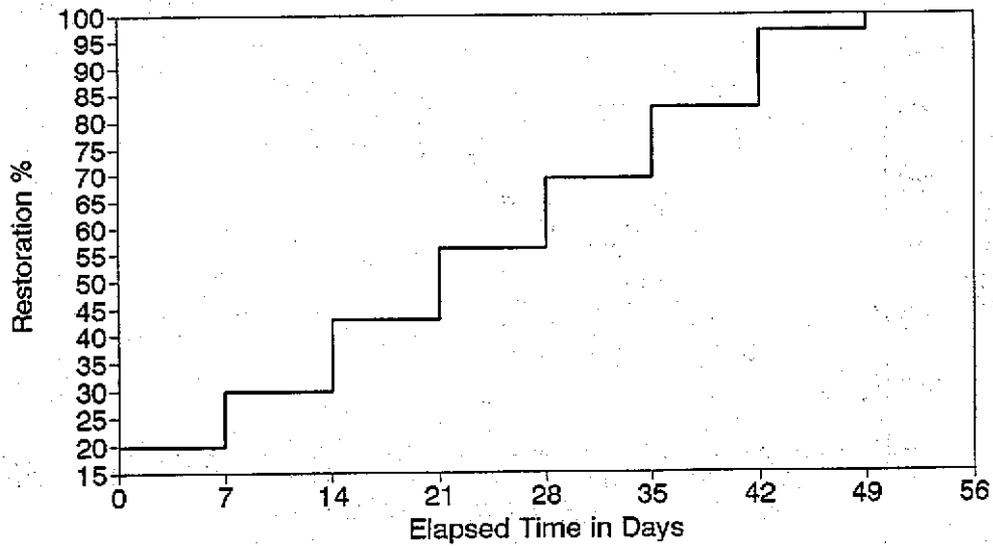


Figure C-93 Residual capacity of Rhode Island police stations following Cape Ann event (M=7.0).

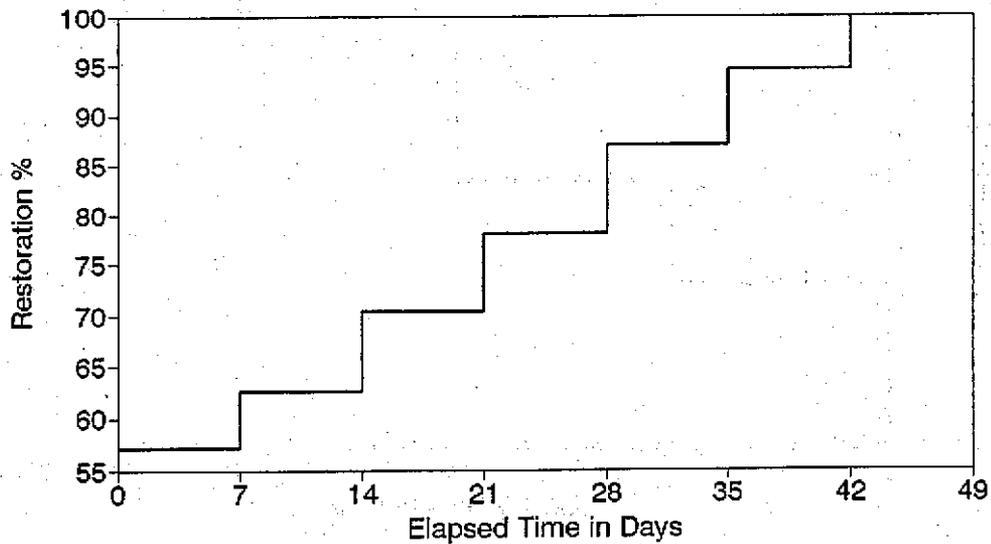


Figure C-94 Residual capacity of New Hampshire police stations following Cape Ann event (M=7.0).

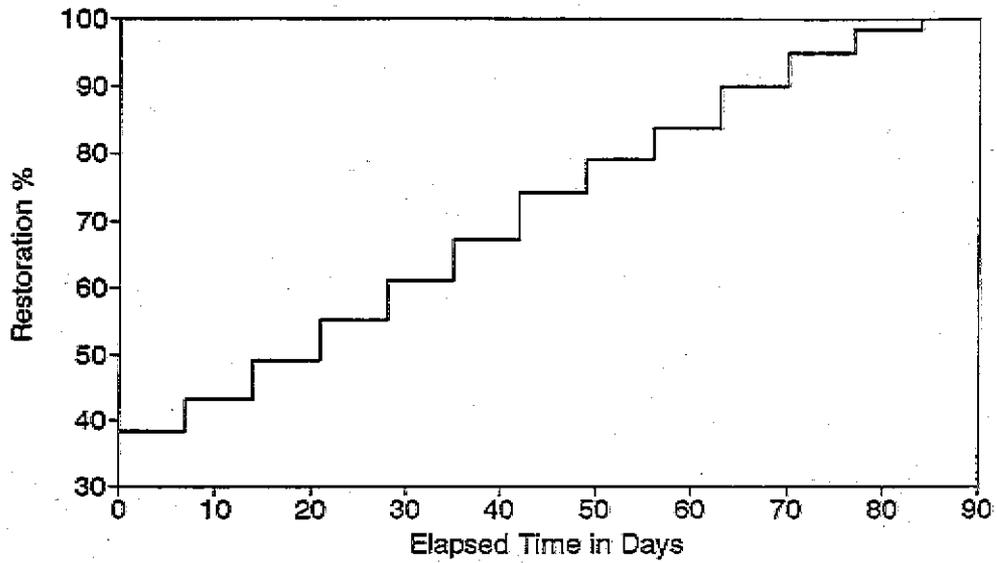


Figure C-95 Residual capacity of Utah police stations following Wasatch Front event (M=7.5).

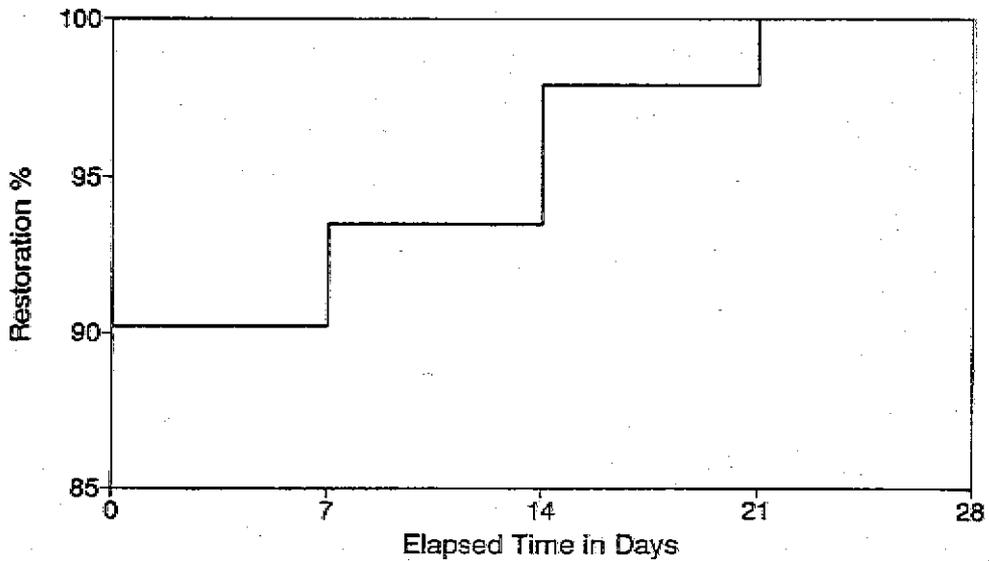


Figure C-96 Residual capacity of California police stations following Hayward event (M=7.5).

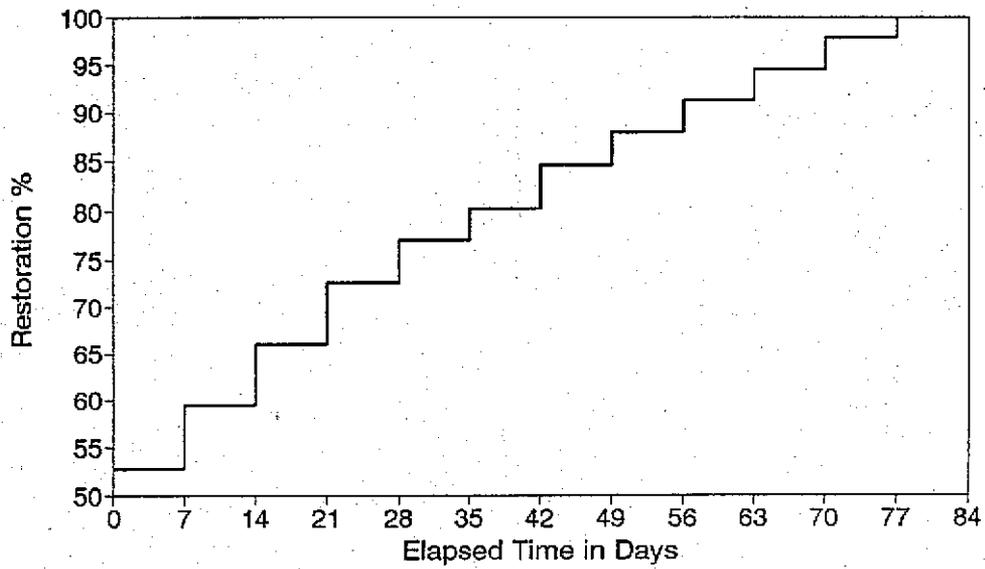


Figure C-97 Residual capacity of California police stations following Fort Tejon event (M=8.0).

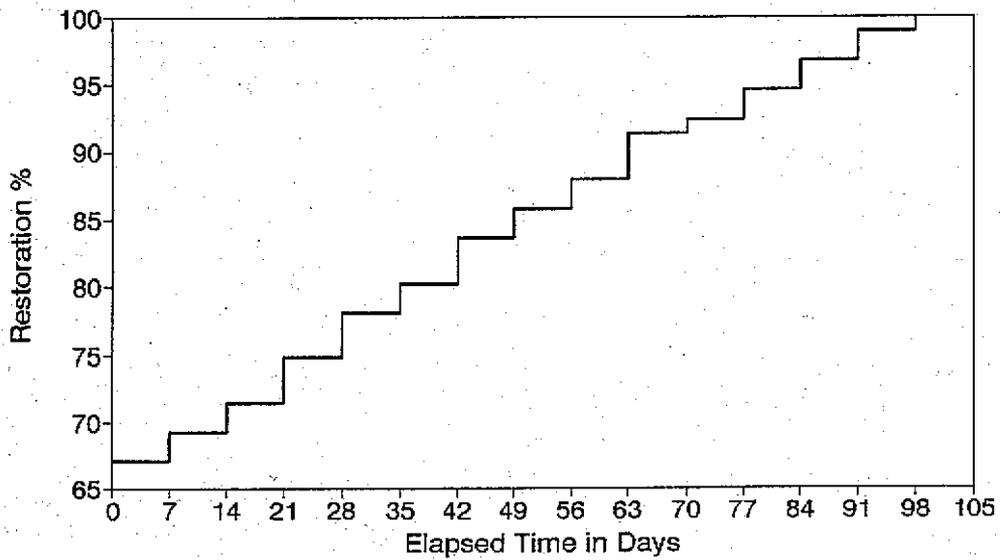


Figure C-98 Residual capacity of Washington police stations following Puget Sound event (M=7.5).

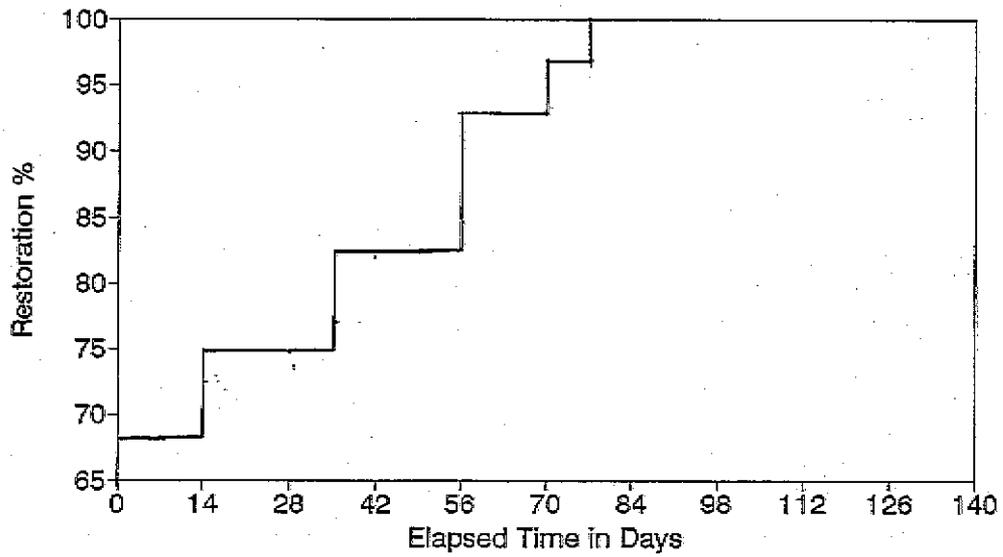


Figure C-99 Residual capacity of Arkansas police stations following New Madrid event (M=7.0).

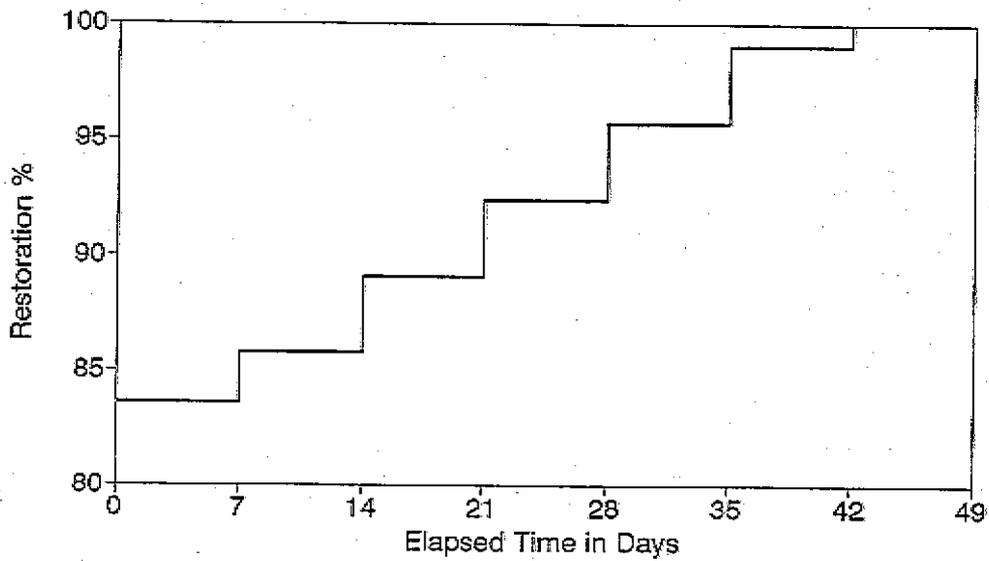


Figure C-100 Residual capacity of Tennessee police stations following New Madrid event (M=7.0).

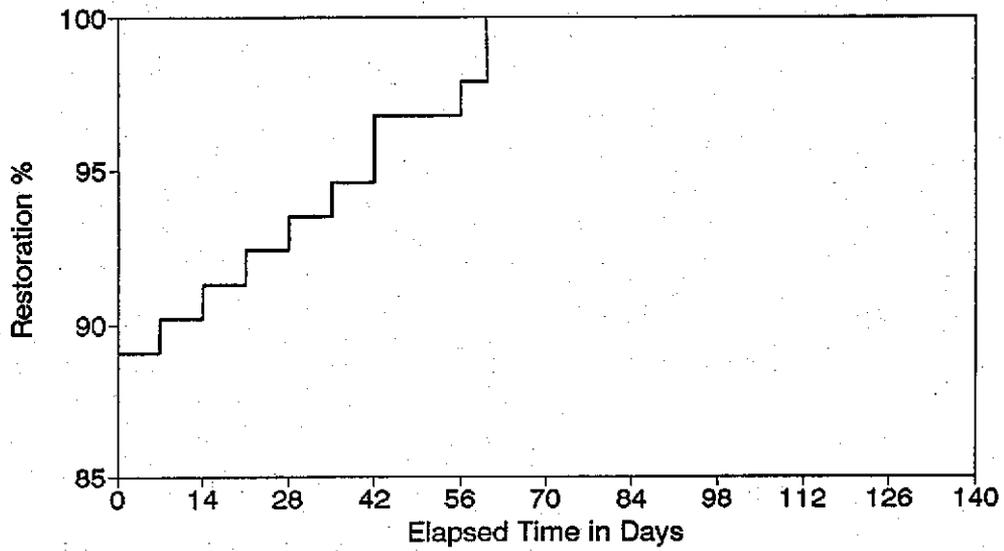


Figure C-101 Residual capacity of Mississippi police stations following New Madrid event (M=7.0).

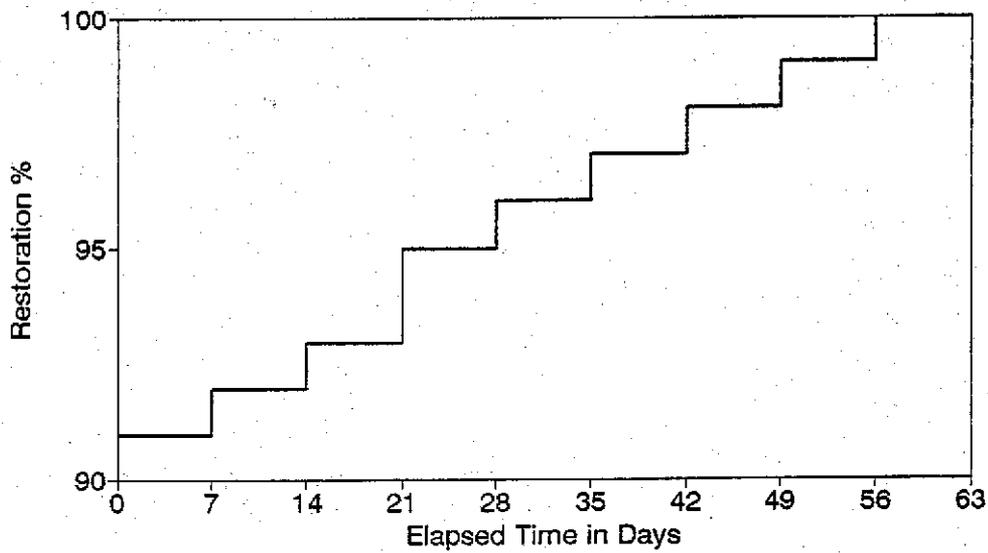


Figure C-102 Residual capacity of Illinois broadcast stations following New Madrid event (M=8.0).

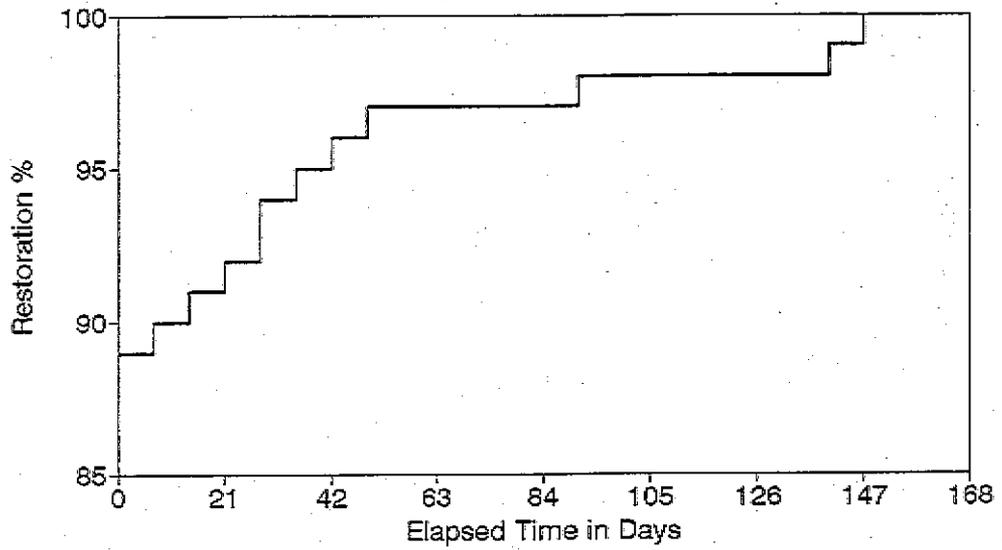


Figure C-103 Residual capacity of Missouri broadcast stations following New Madrid event (M=8.0).

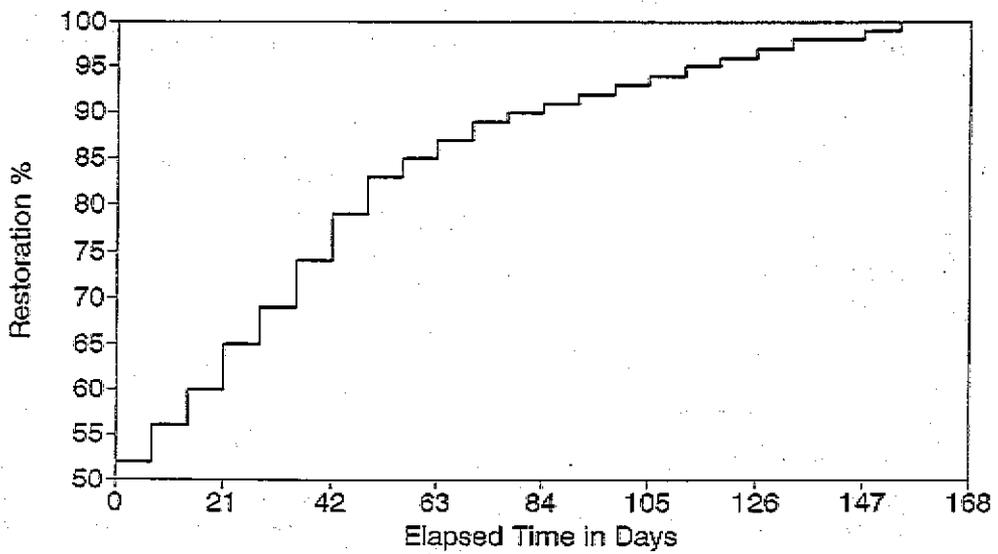


Figure C-104 Residual capacity of Arkansas broadcast stations following New Madrid event (M=8.0).

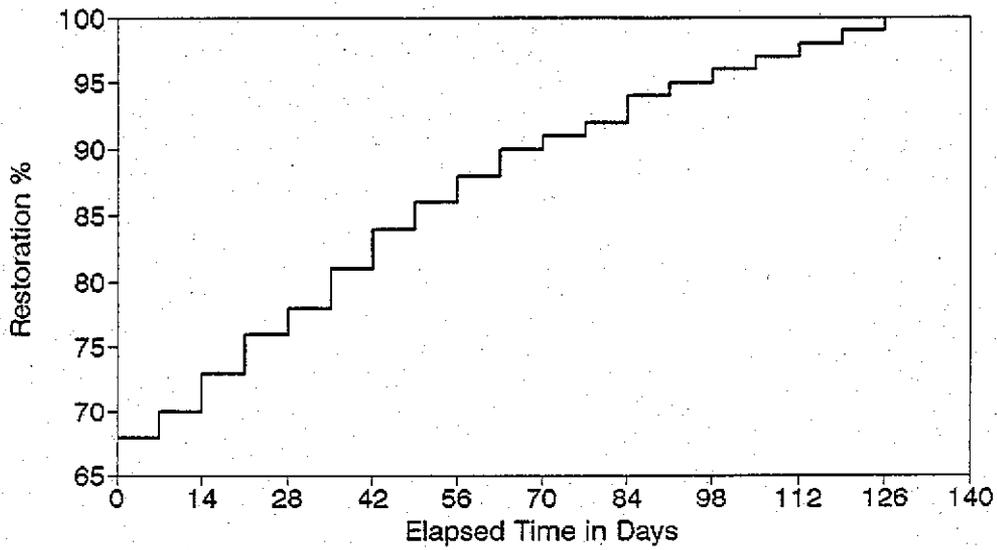


Figure C-105 Residual capacity of Tennessee broadcast stations following New Madrid event (M=8.0).

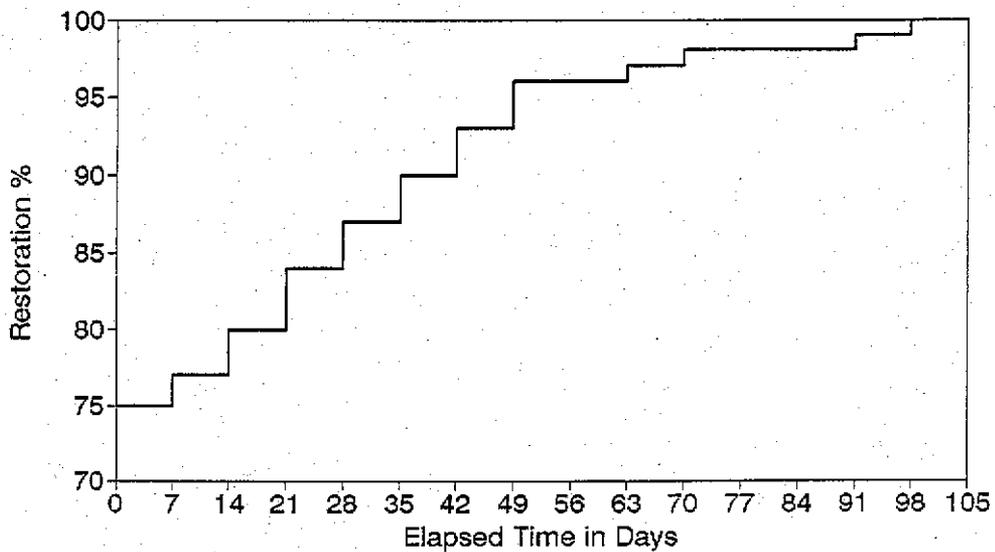


Figure C-106 Residual capacity of Kentucky broadcast stations following New Madrid event (M=8.0).

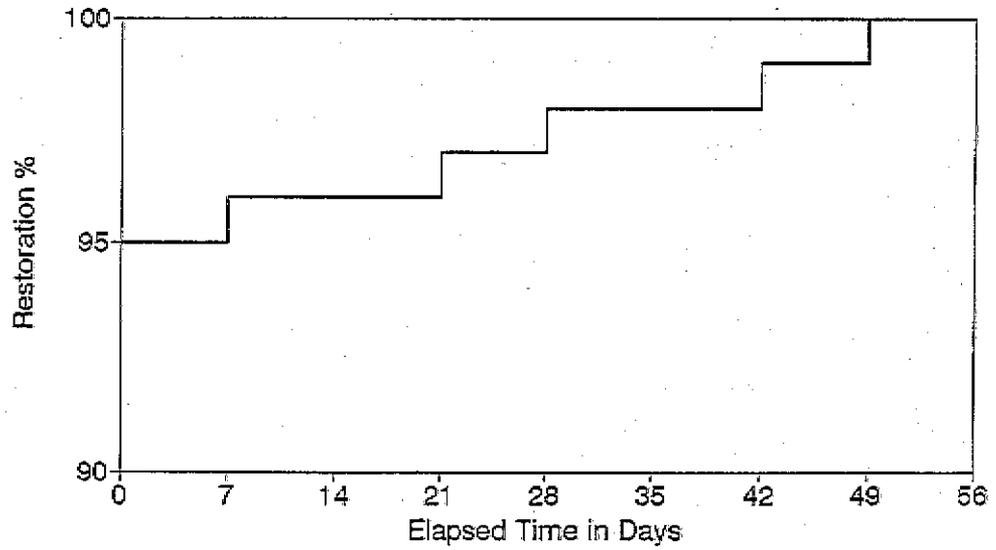


Figure C-107 Residual capacity of Indiana broadcast stations following New Madrid event ($M=8.0$).

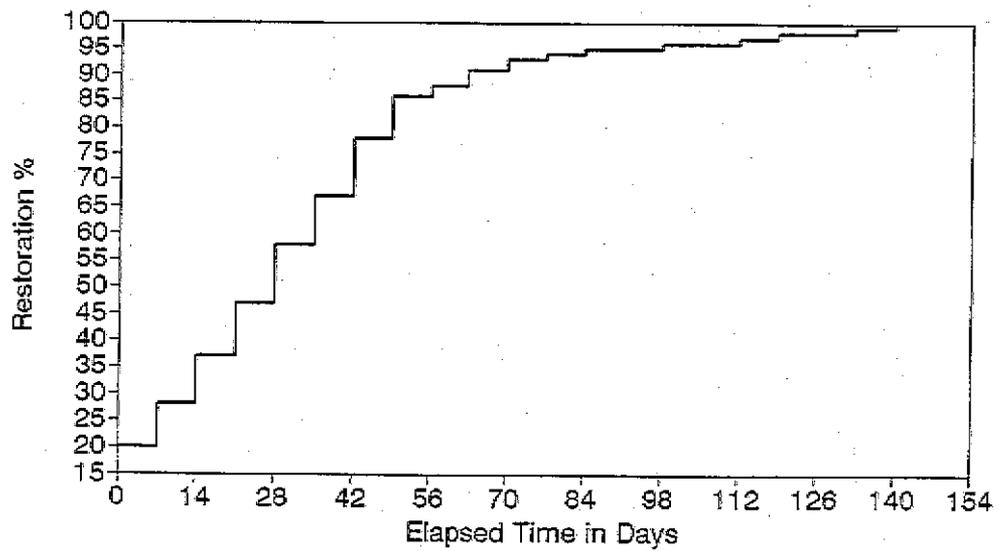


Figure C-108 Residual capacity of Mississippi broadcast stations following New Madrid event ($M=8.0$).

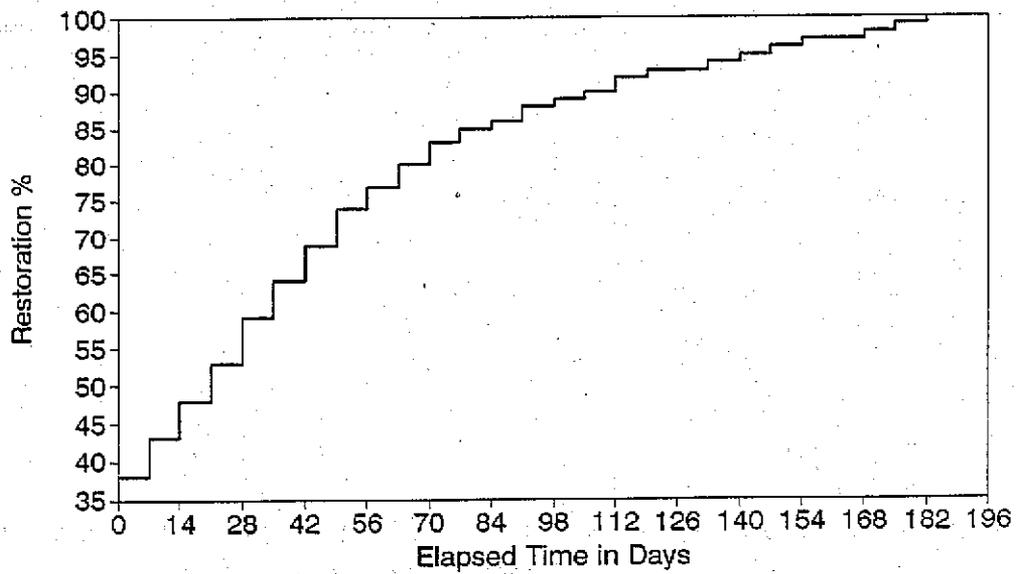


Figure C-109 Residual capacity of South Carolina broadcast stations following Charleston event (M=7.5).

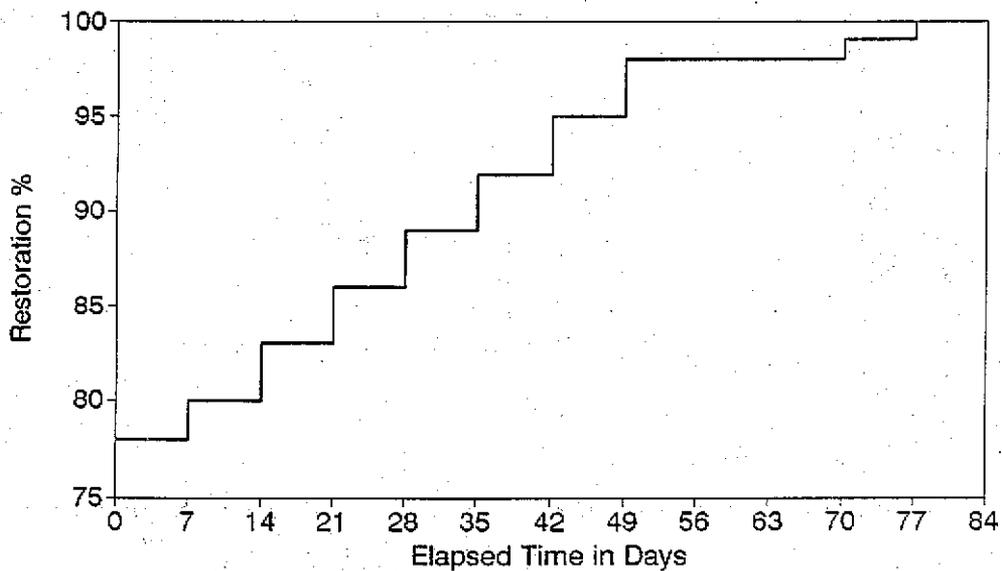


Figure C-110 Residual capacity of North Carolina broadcast stations following Charleston event (M=7.5).

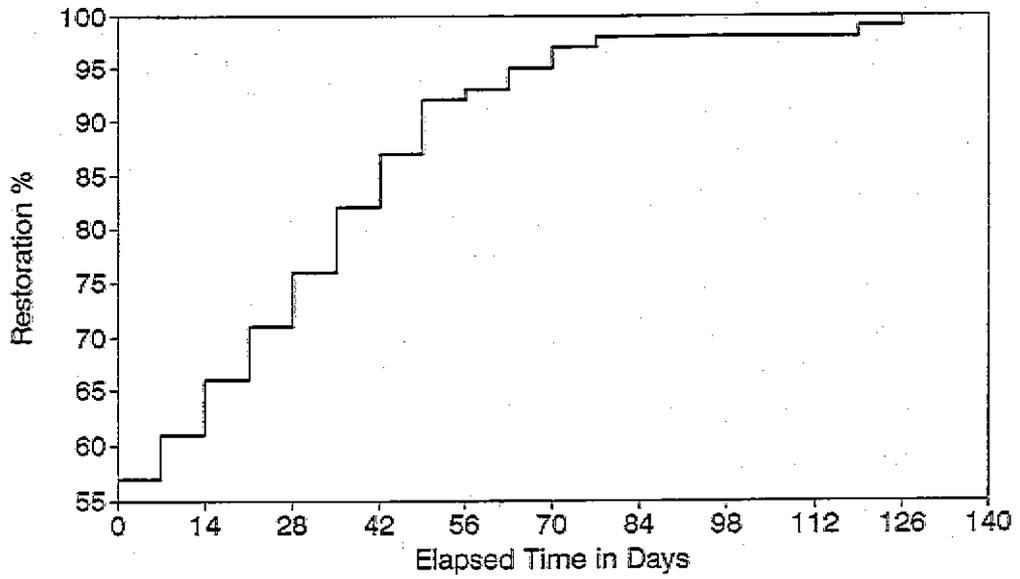


Figure C-111 Residual capacity of Georgia broadcast stations following Charleston event (M=7.5).

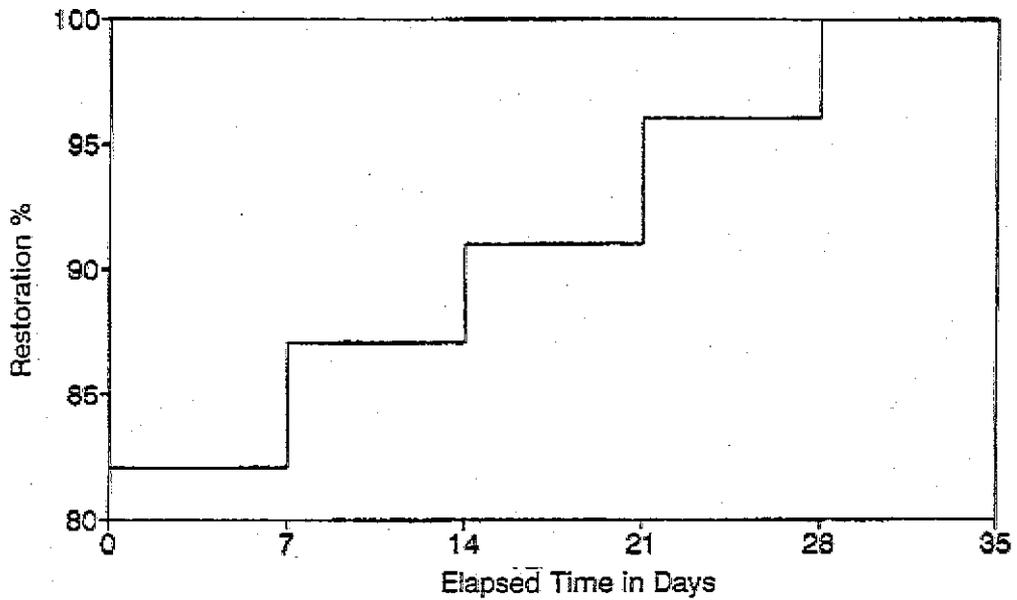


Figure C-112 Residual capacity of Florida broadcast stations following Charleston event (M=7.5).

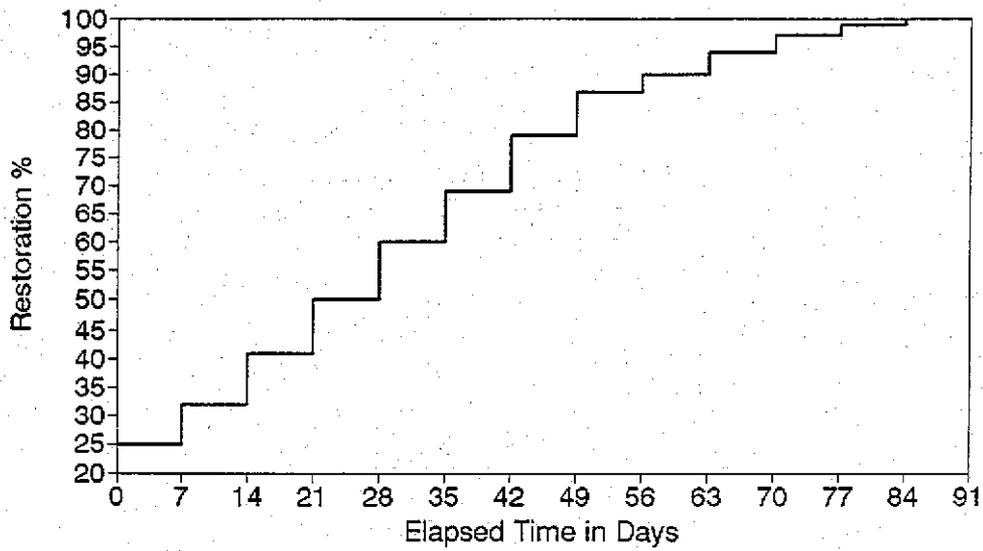


Figure C-113 Residual capacity of Massachusetts broadcast stations following Cape Ann event (M=7.0).

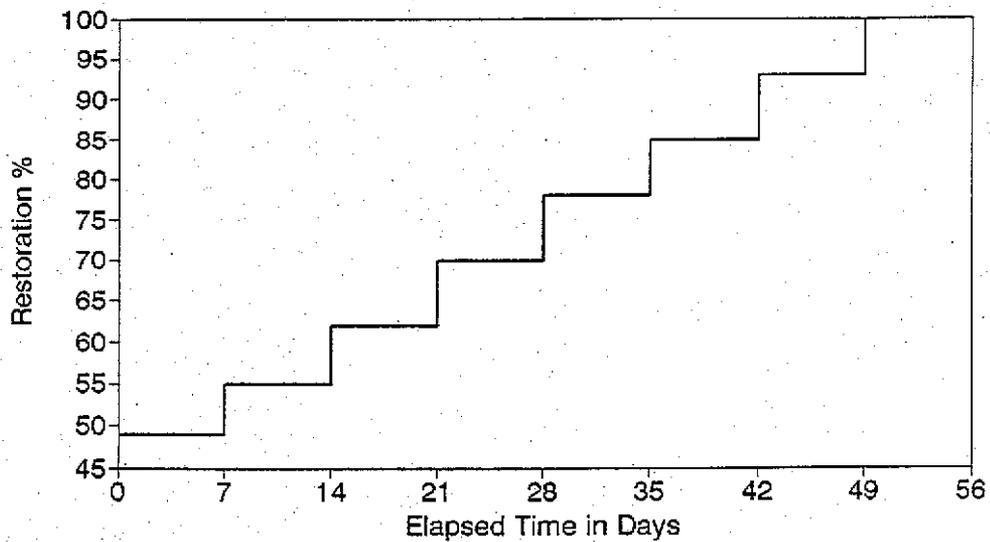


Figure C-114 Residual capacity of Connecticut broadcast stations following Cape Ann event (M=7.0).

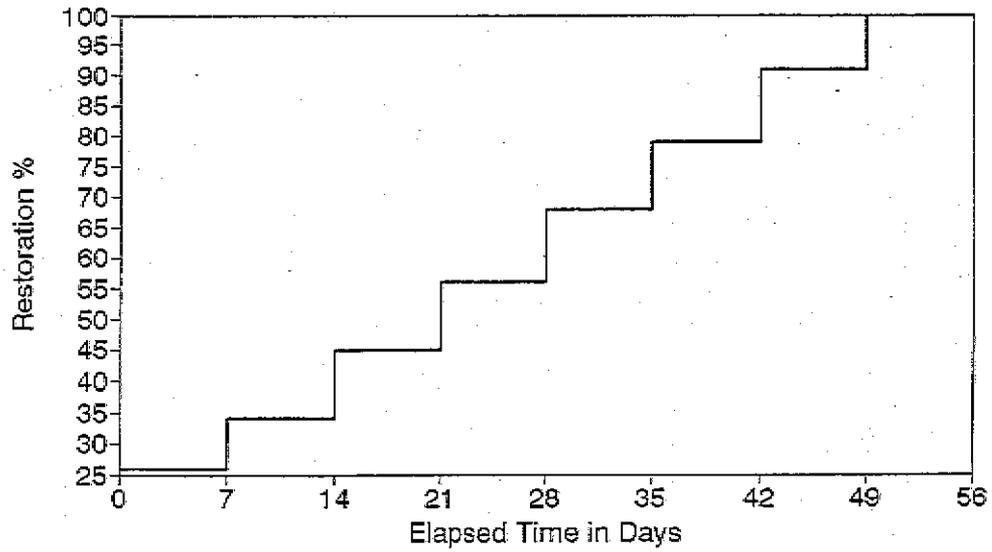


Figure C-115 Residual capacity of Delaware broadcast stations following Cape Ann event (M=7.0).

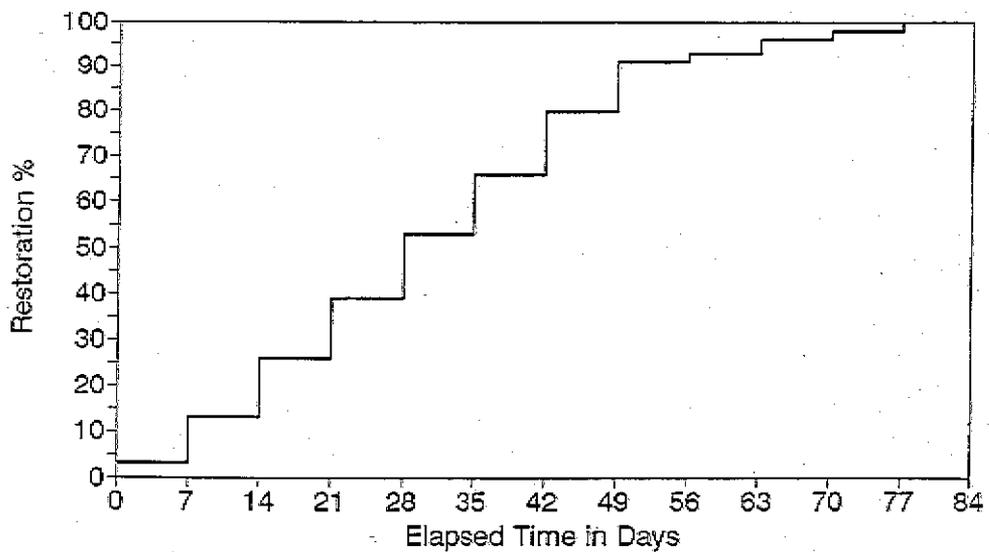


Figure C-116 Residual capacity of Rhode Island broadcast stations following Cape Ann event (M=7.0).

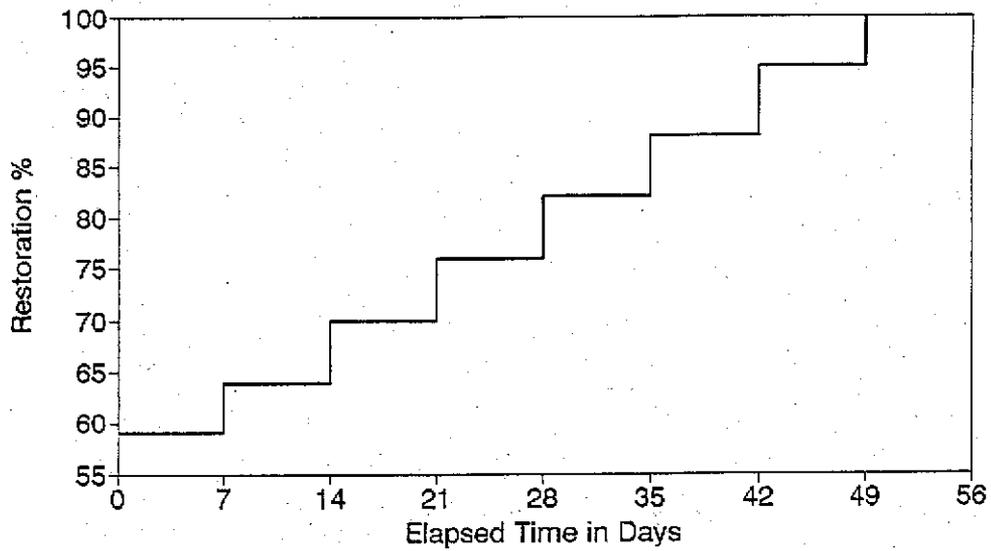


Figure C-117 Residual capacity of New Hampshire broadcast stations following Cape Ann event (M=7.0).

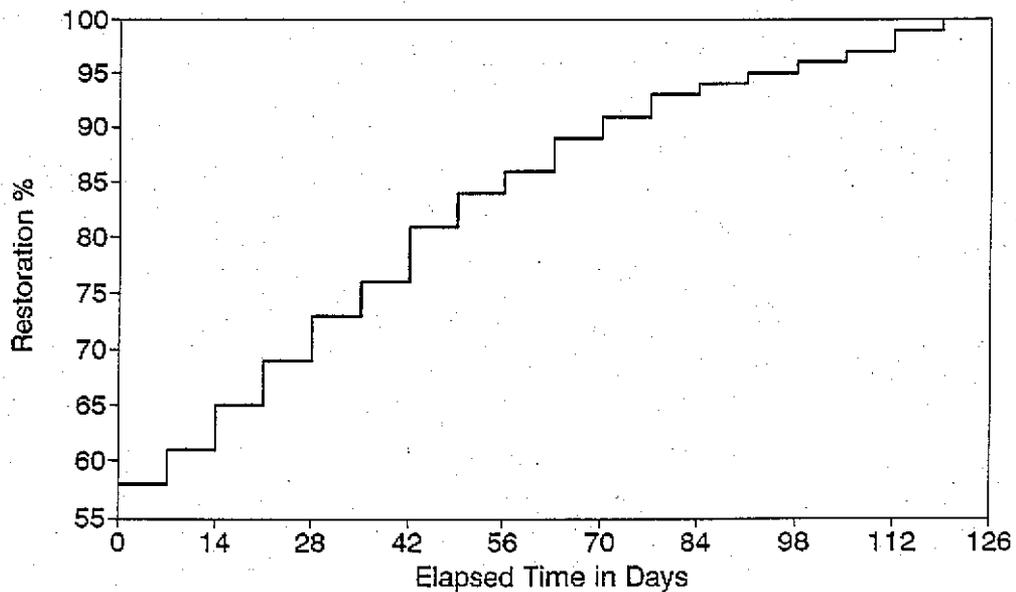


Figure C-118 Residual capacity of Utah broadcast stations following Wasatch Front event (M=7.5).

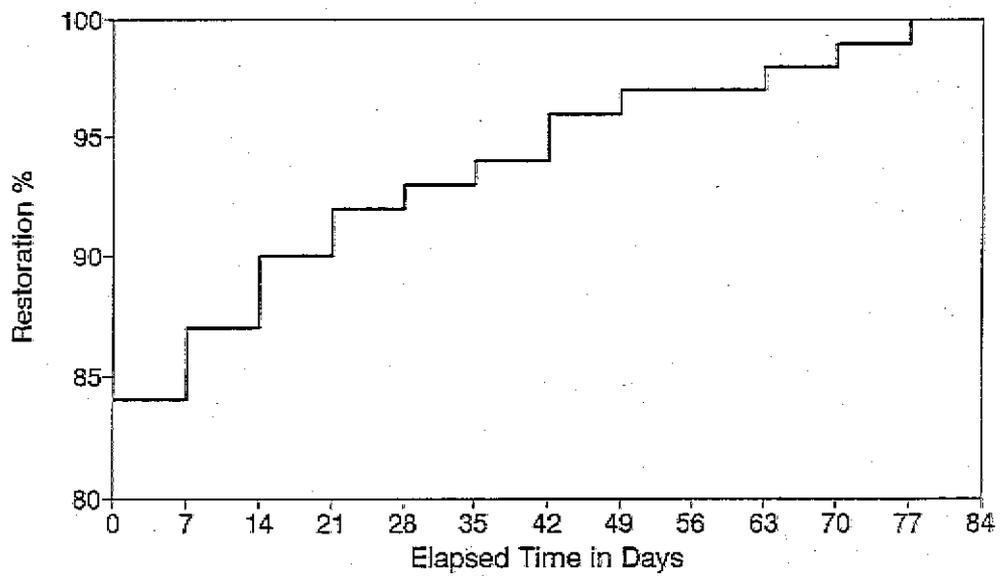


Figure C-119 Residual capacity of California broadcast stations following Hayward event (M=7.5).

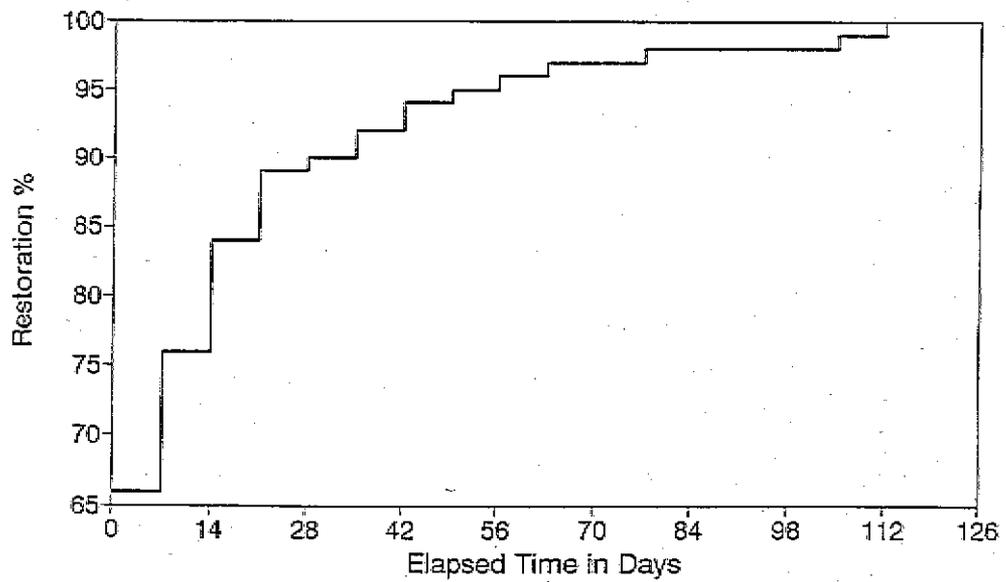


Figure C-120 Residual capacity of California broadcast stations following Fort Tejon event (M=8.0).

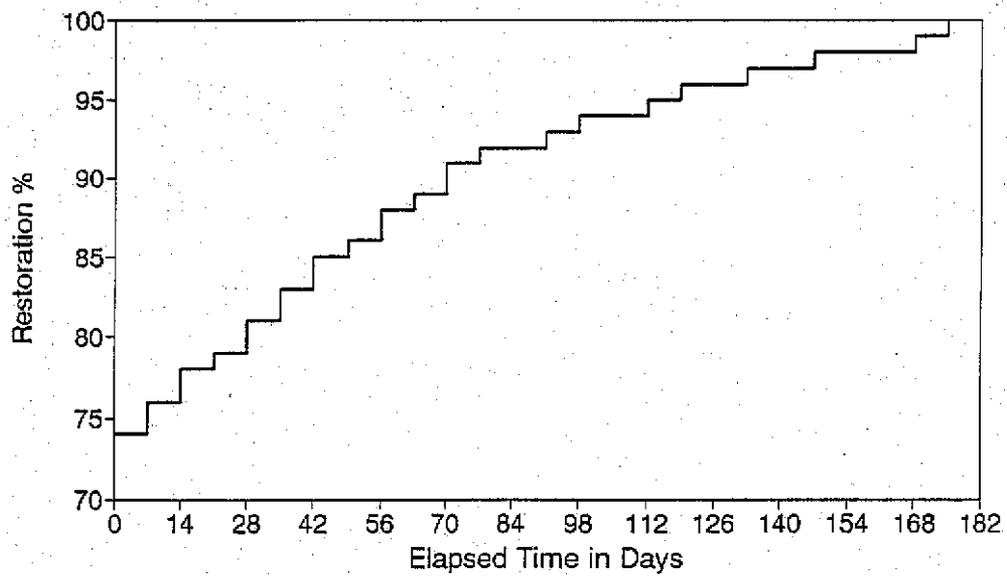


Figure C-121 Residual capacity of Washington broadcast stations following Puget Sound event (M=7.5).

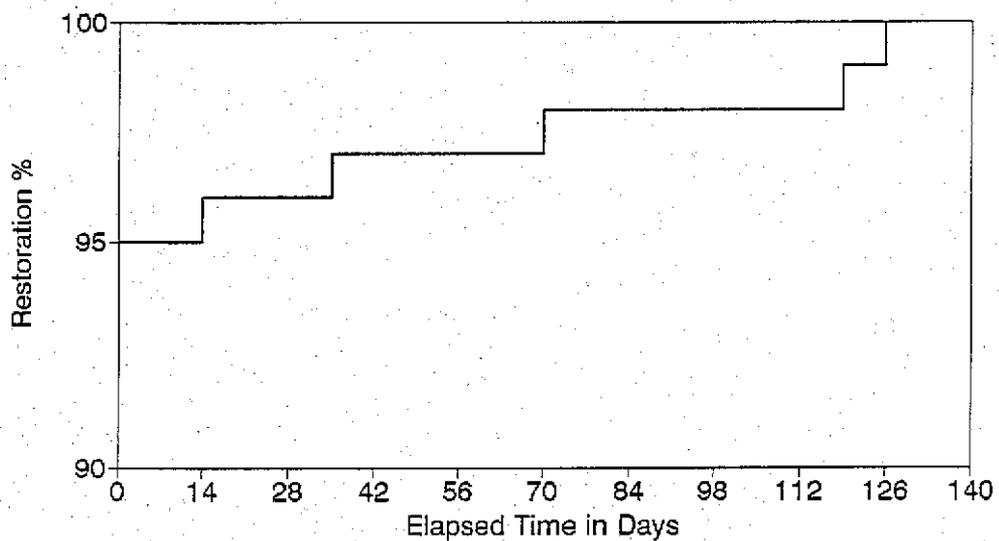


Figure C-122 Residual capacity of Missouri broadcast stations following New Madrid event (M=7.0).

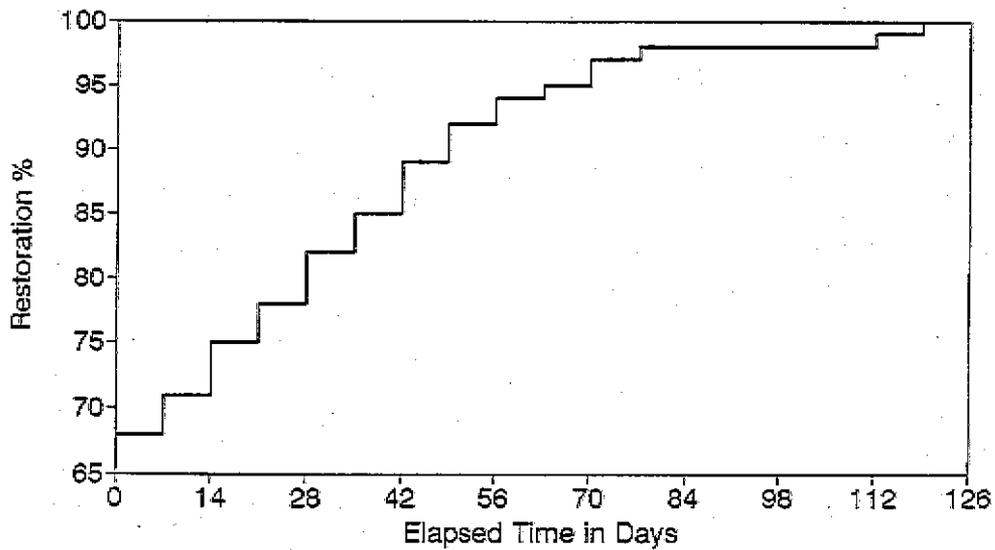


Figure C-123 Residual capacity of Arkansas broadcast stations following New Madrid event (M=7.0).

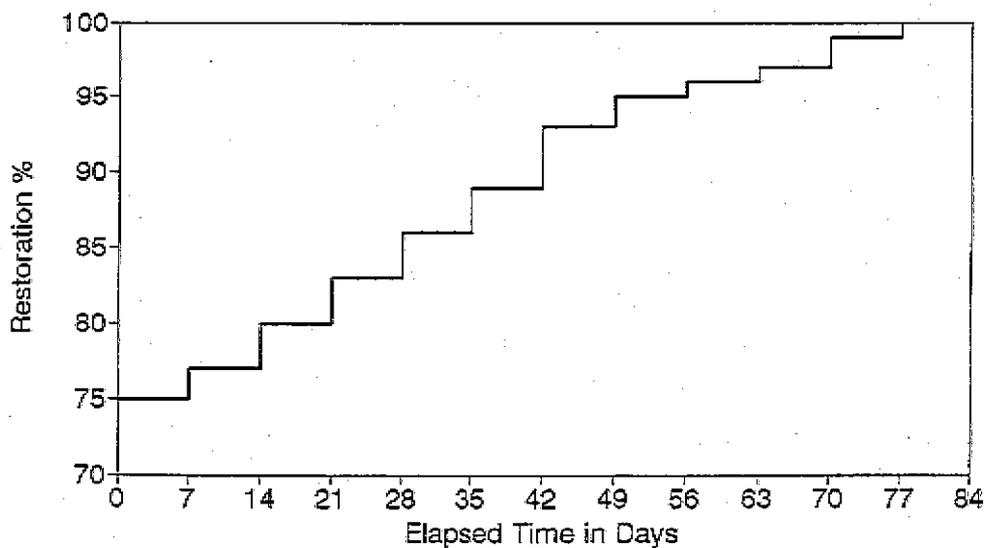


Figure C-124 Residual capacity of Tennessee broadcast stations following New Madrid event (M=7.0).

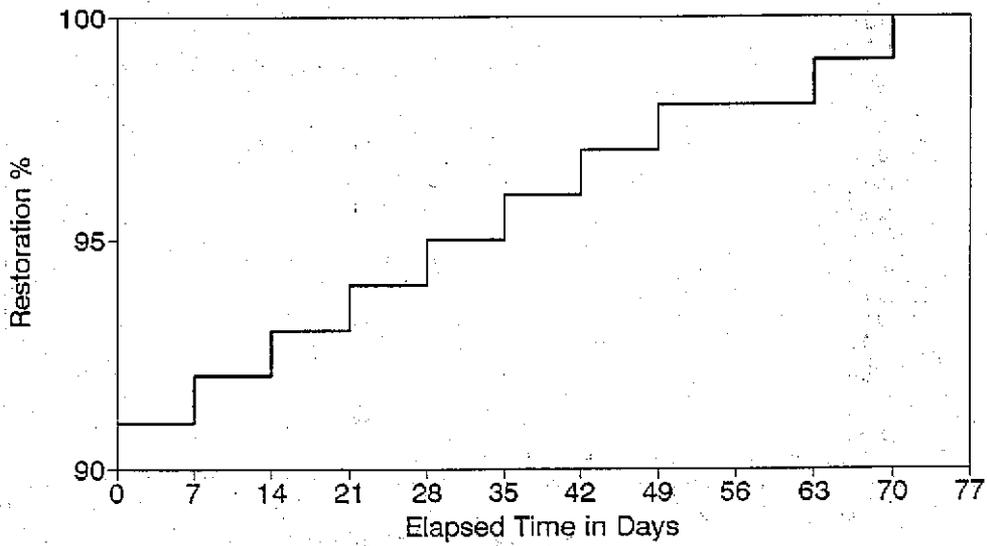


Figure C-125 Residual capacity of Kentucky broadcast stations following New Madrid event (M=7.0).

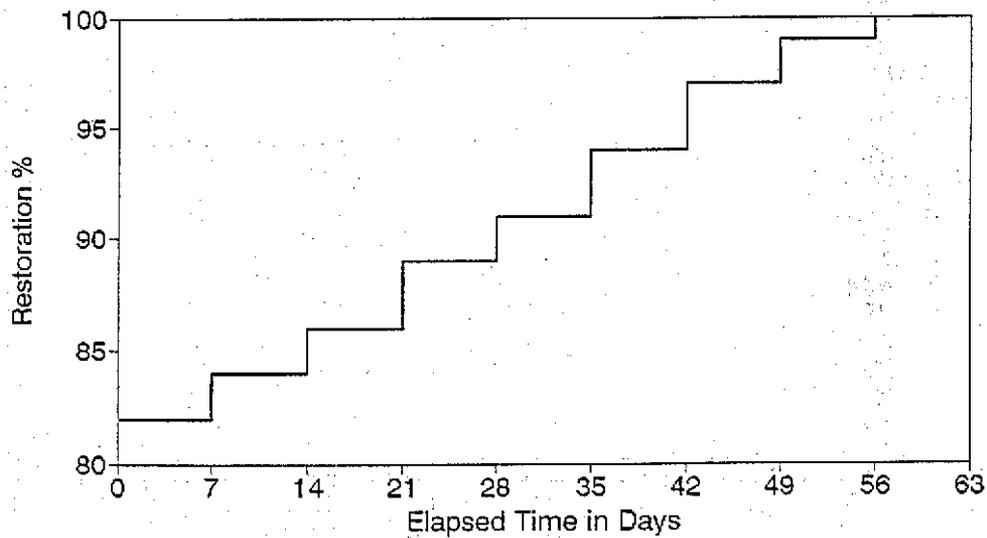


Figure C-126 Residual capacity of Mississippi broadcast stations following New Madrid event (M=7.0).

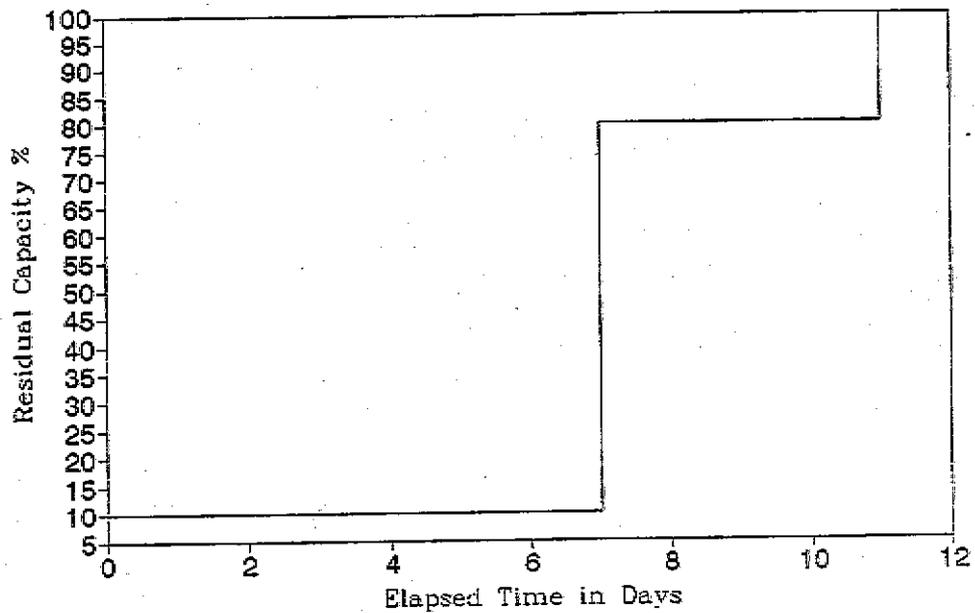


Figure C-127 Residual capacity of railroad system serving epicentral region following New Madrid event (M=8.0).

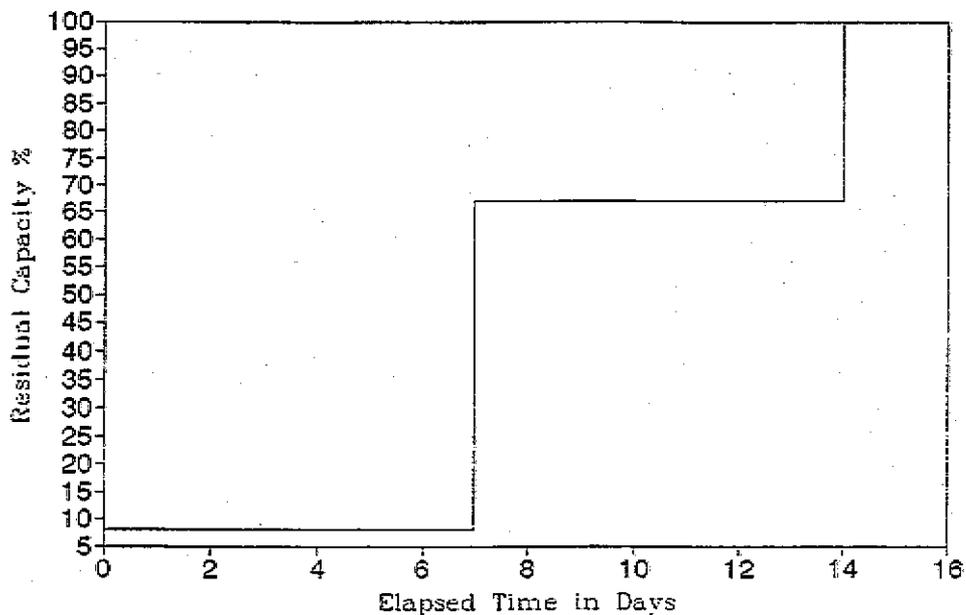


Figure C-128 Residual capacity of railroad system serving Charleston, South Carolina following Charleston event (M=7.5).

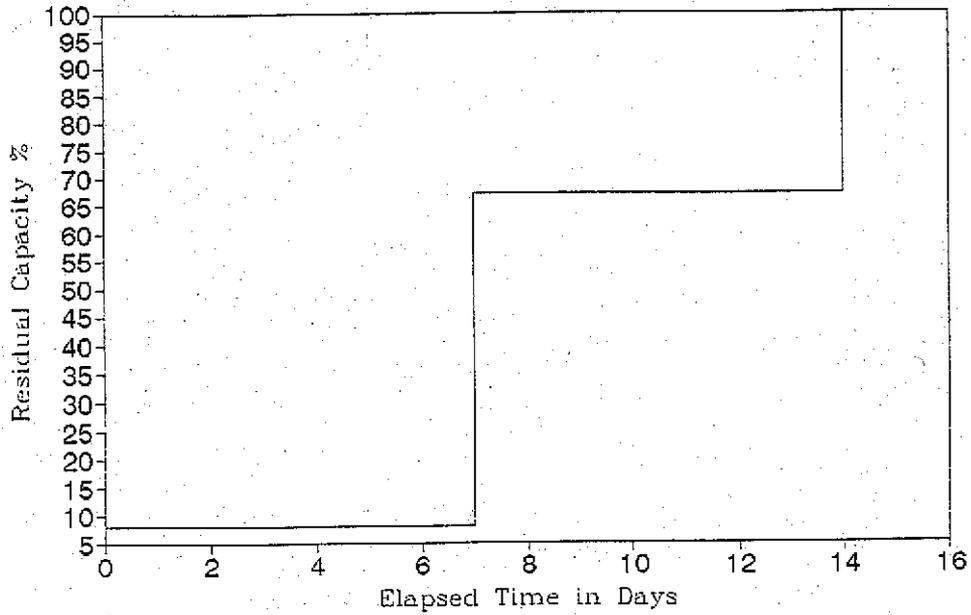


Figure C-129 Residual capacity of railroad system serving Cape Ann region following Cape Ann event (M=7.0).

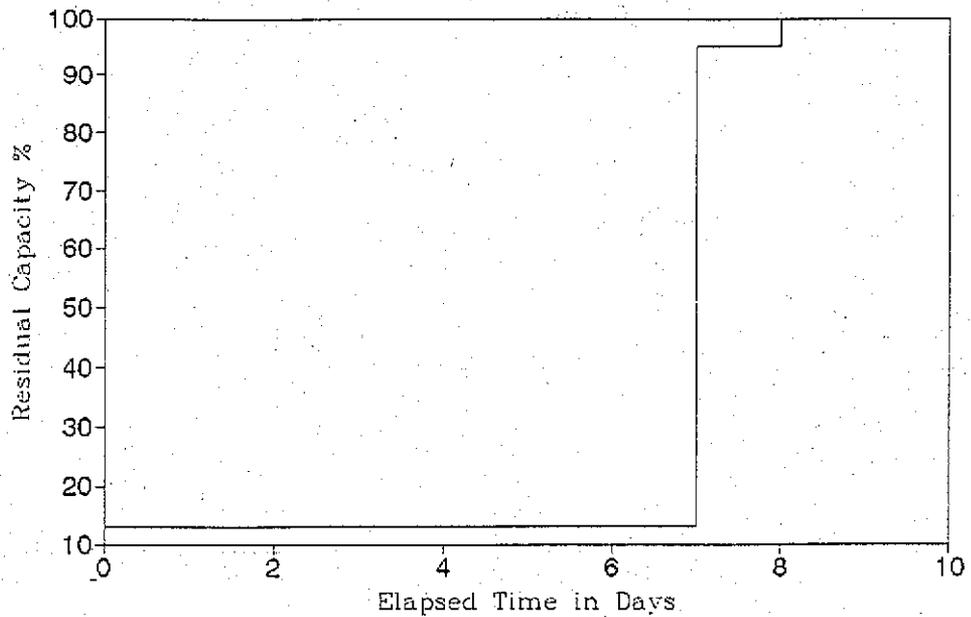


Figure C-130 Residual capacity of railroad system serving Salt Lake City following Wasatch Front event (M=7.5).

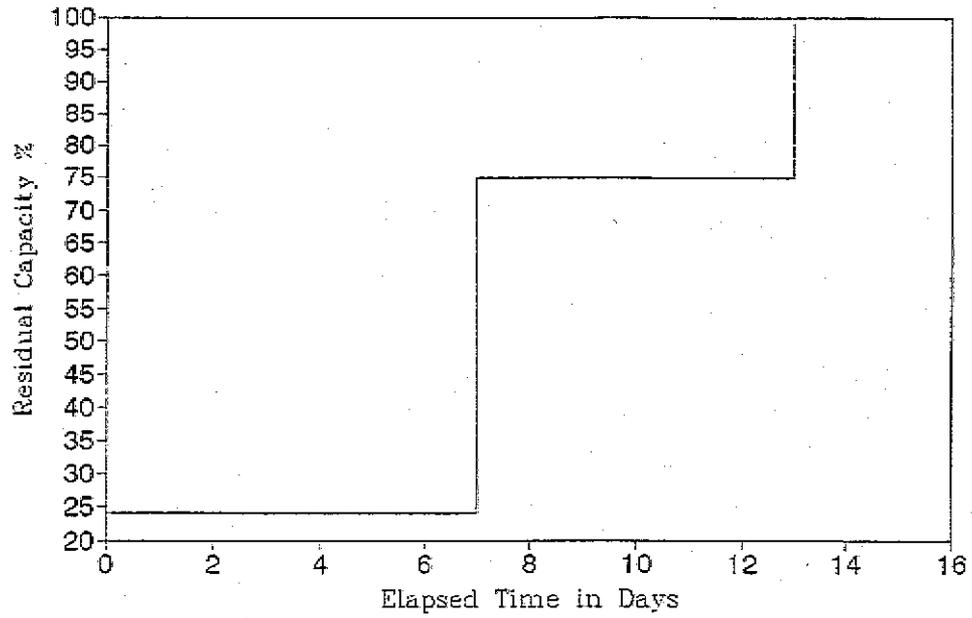


Figure C-131 Residual capacity of railroad system serving San Francisco County, Alameda County, and Contra Costa County following Hayward event ($M=7.5$).

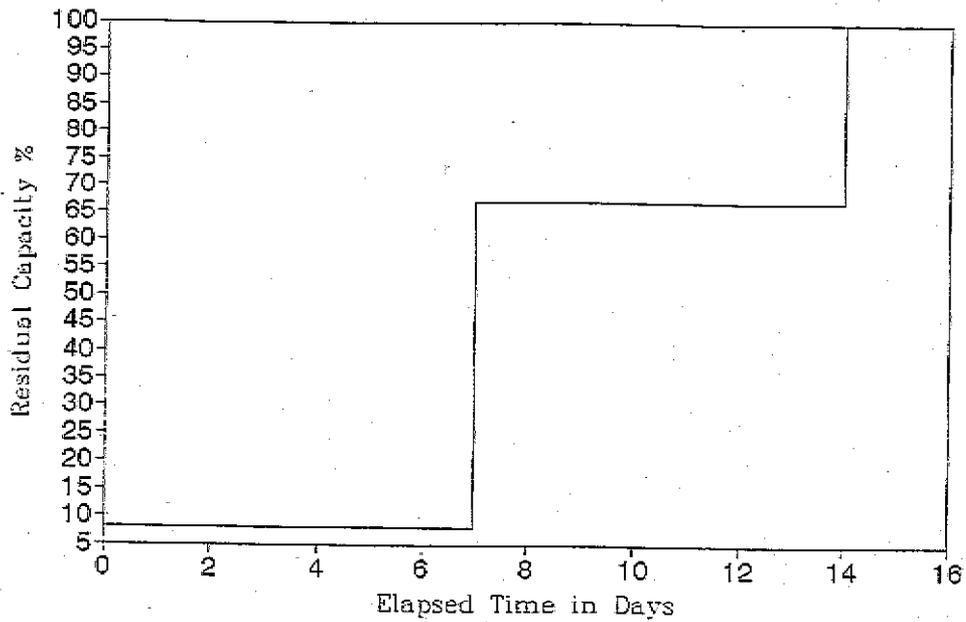


Figure C-132 Residual capacity of railroad system serving California following Fort Tejon event ($M=8.0$).

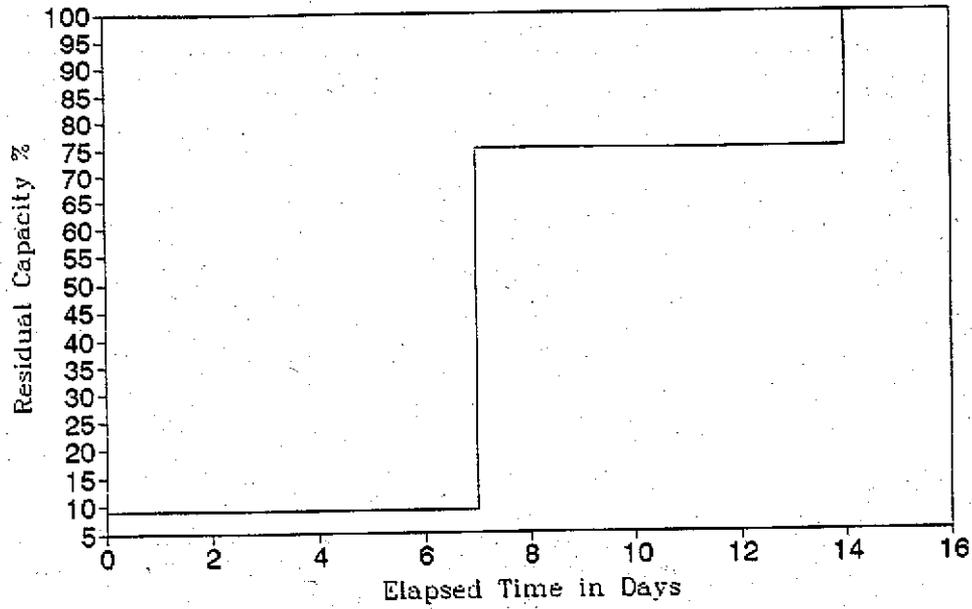


Figure C-133 Residual capacity of railroad system serving Seattle following Puget Sound event (M=7.5).

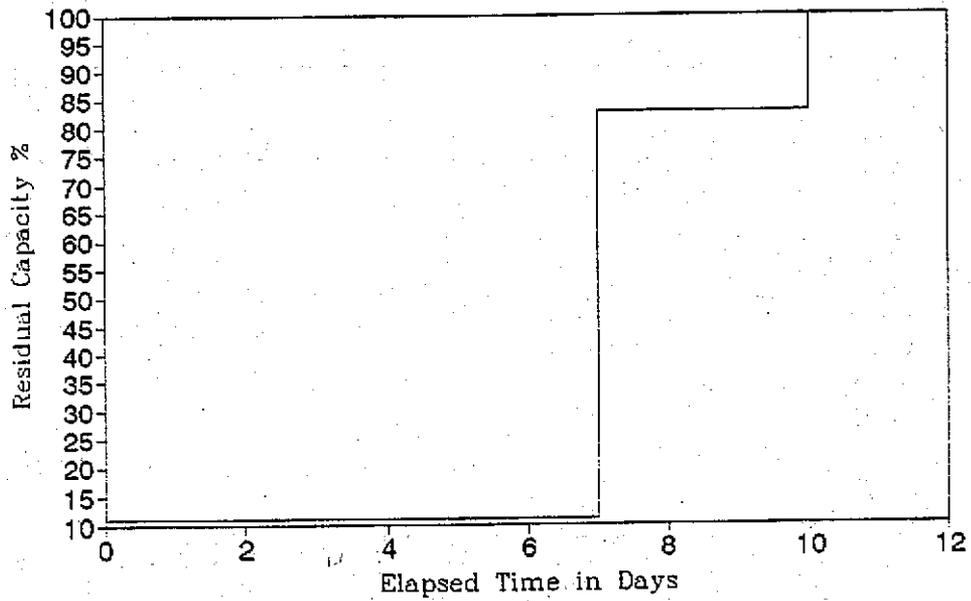


Figure C-134 Residual capacity of railroad system serving epicentral region following New Madrid event (M=7.0).

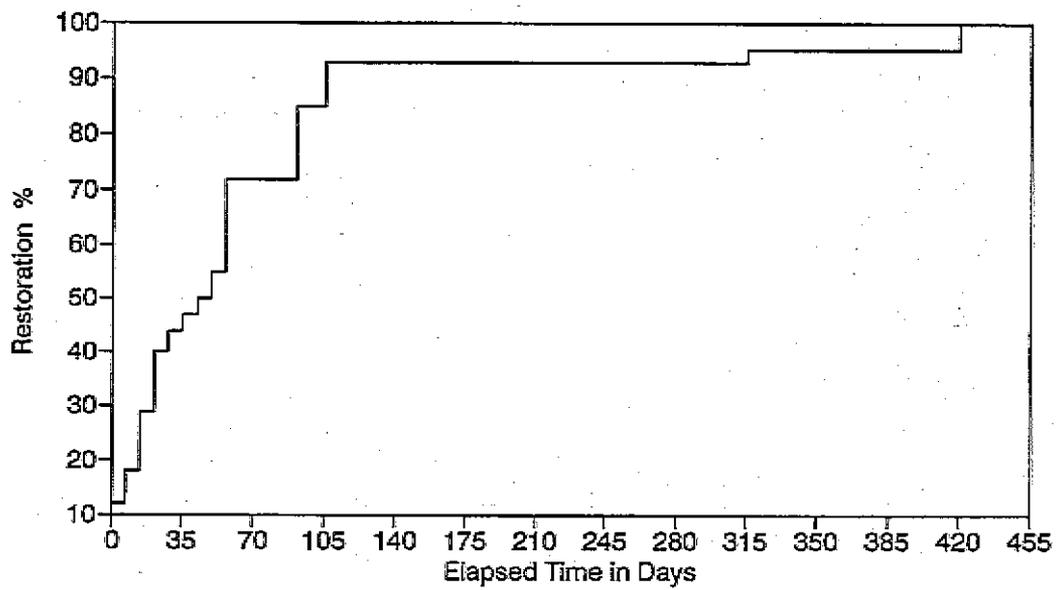


Figure C-135 Residual capacity of epicentral region highways following New Madrid event (M=8.0).

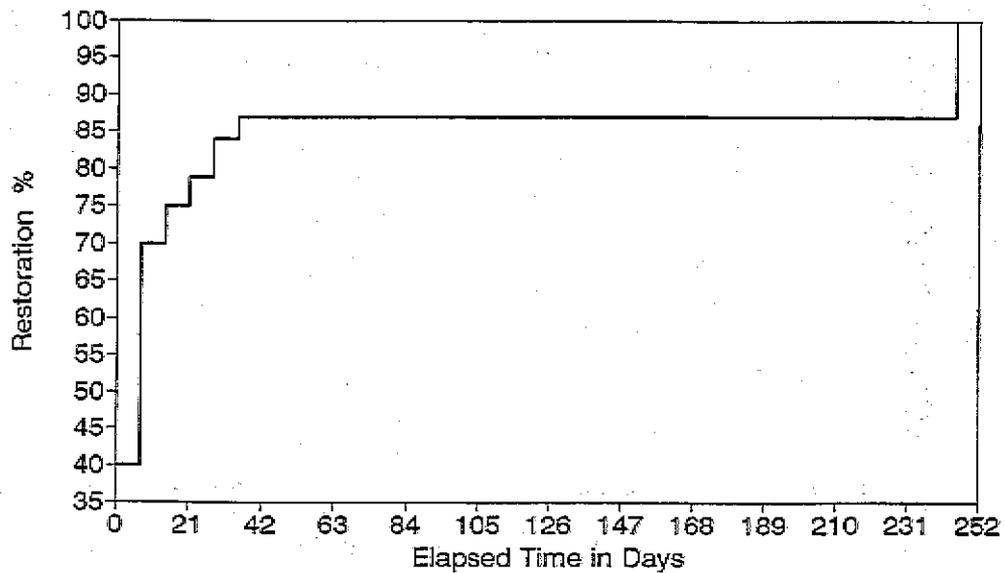


Figure C-136 Residual capacity of epicentral region highways following Charleston event (M=7.5).

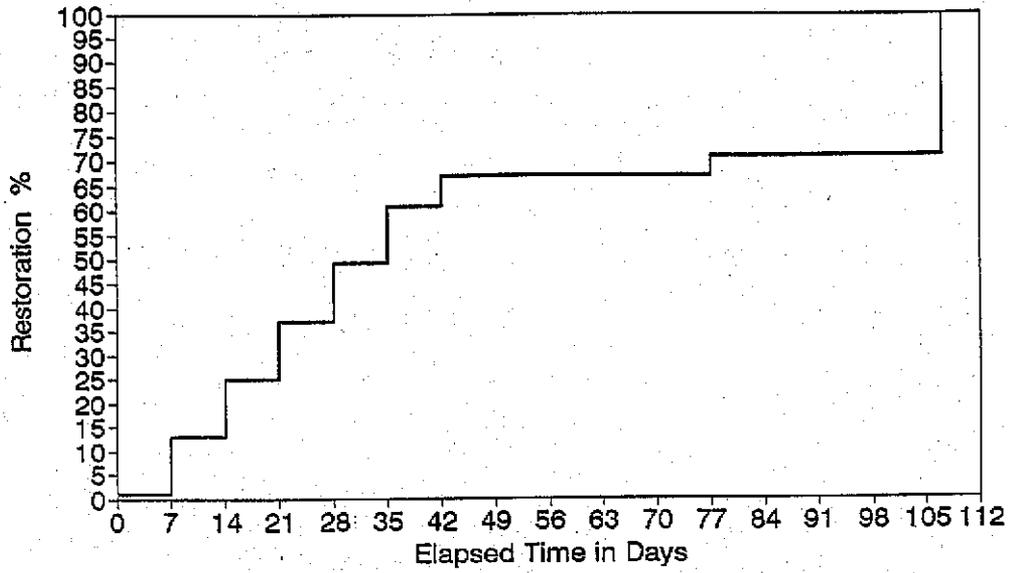


Figure C-137 Residual capacity of epicentral region highways following Cape Ann event (M=7.0).

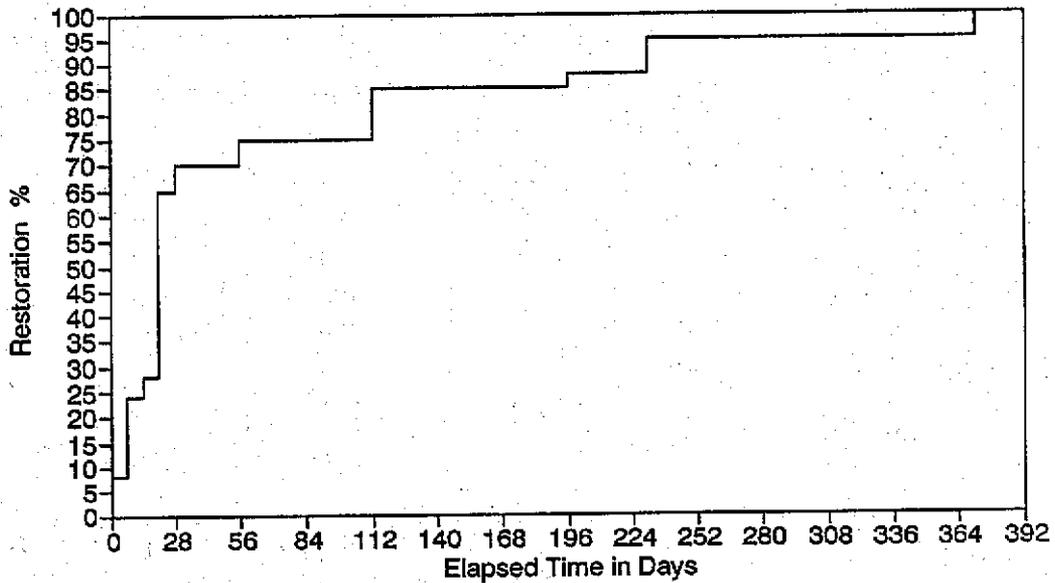


Figure C-138 Residual capacity of epicentral region highways following Wasatch Front event (M=7.5).

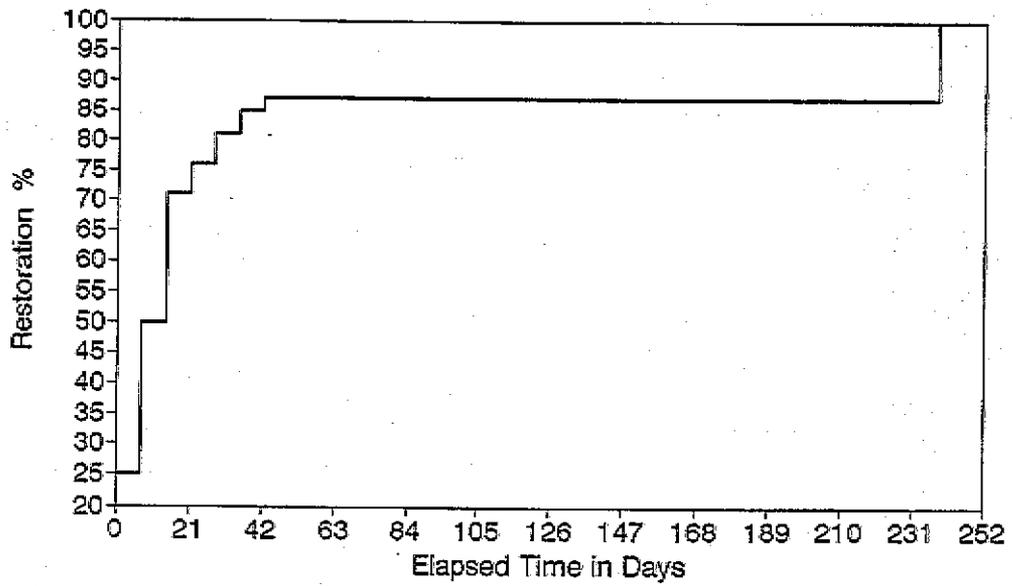


Figure C-139 Residual capacity of epicentral region highways following Hayward event (M=7.5).

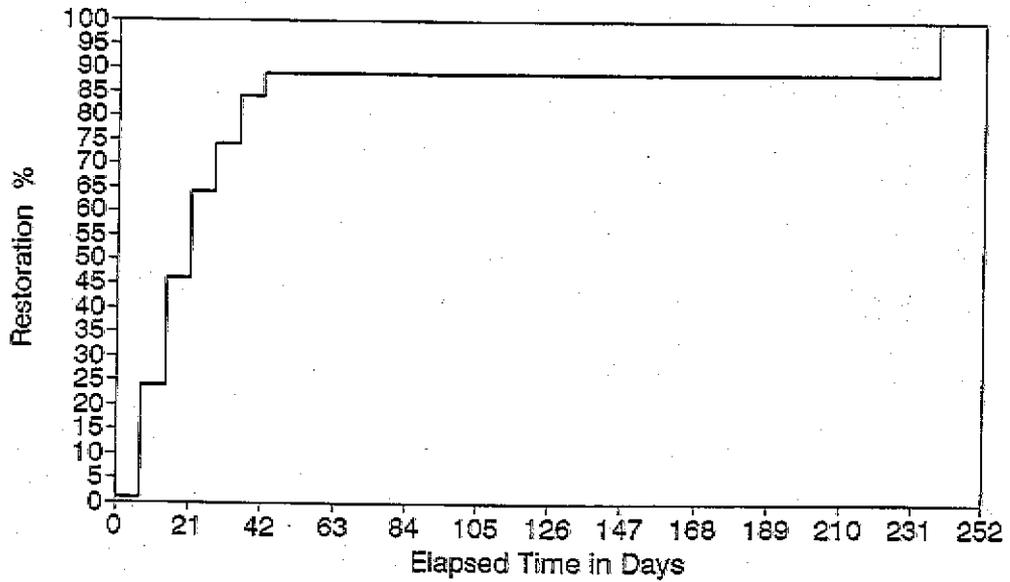


Figure C-140 Residual capacity of epicentral region highways following Fort Tejon event (M=8.0)

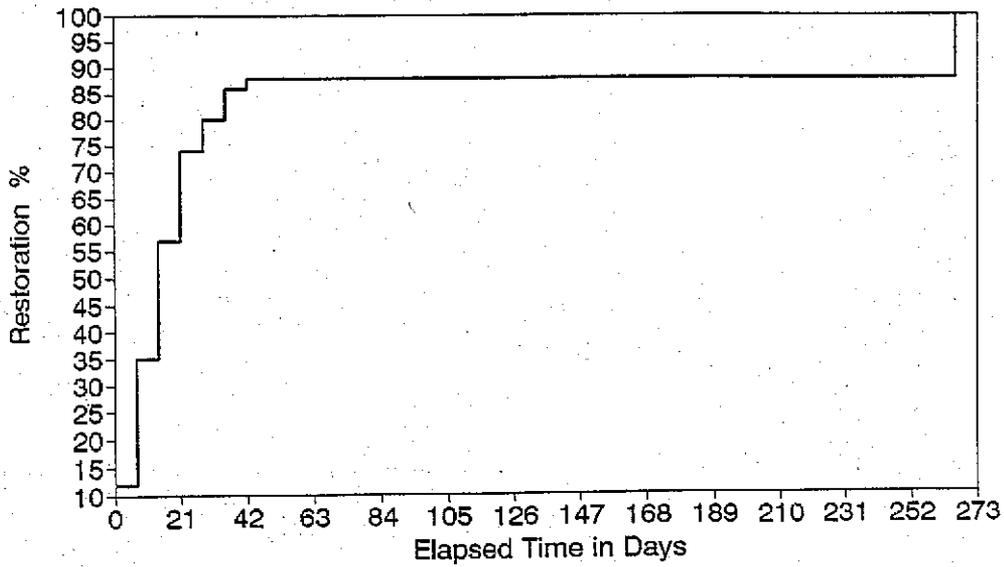


Figure C-141 Residual capacity of epicentral region highways following Puget Sound event (M=7.5).

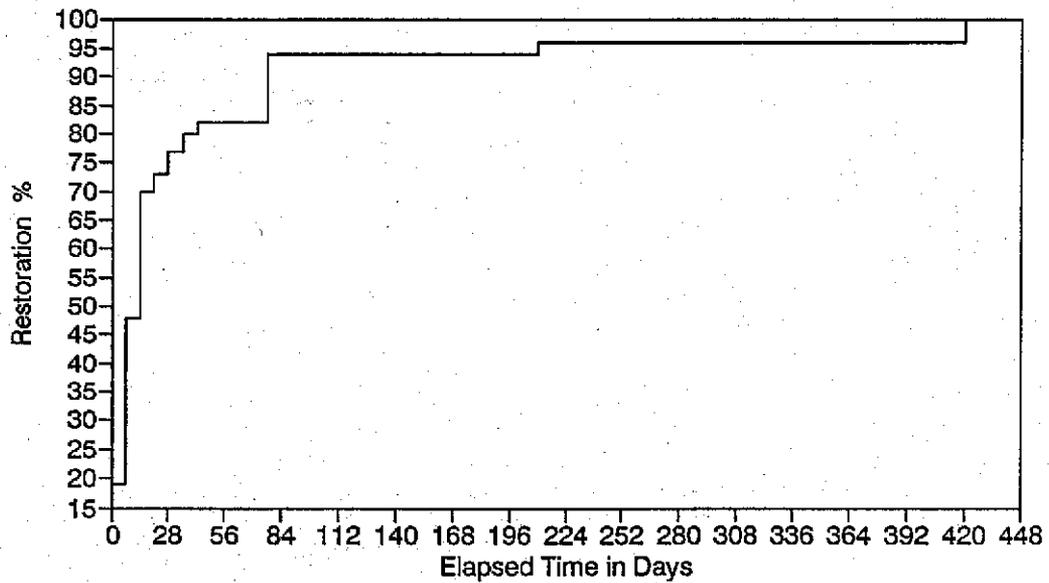


Figure C-142 Residual capacity of epicentral region highways following New Madrid event (M=7.0)

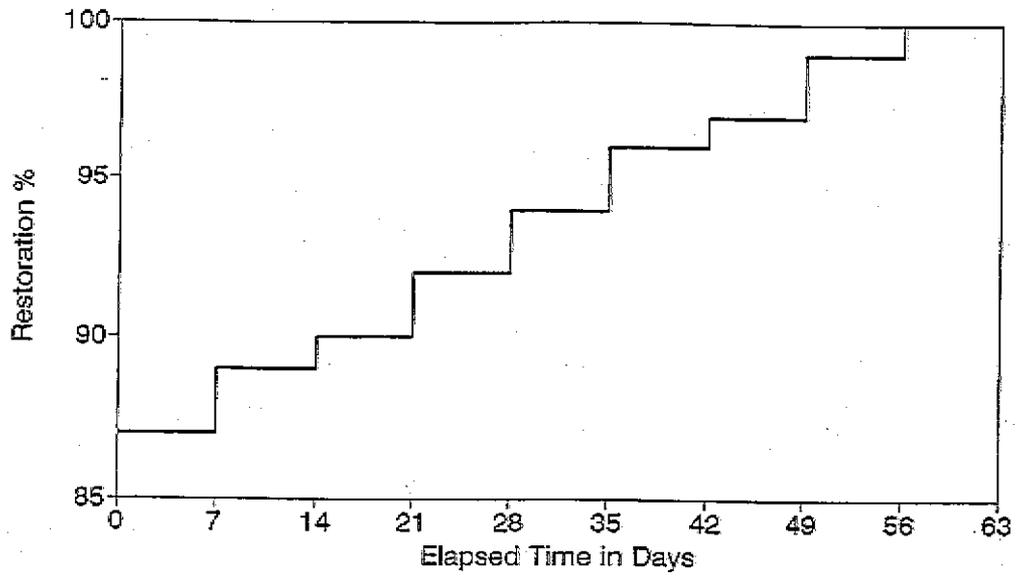


Figure C-143 Residual capacity of Illinois electric power following New Madrid event (M=8.0).

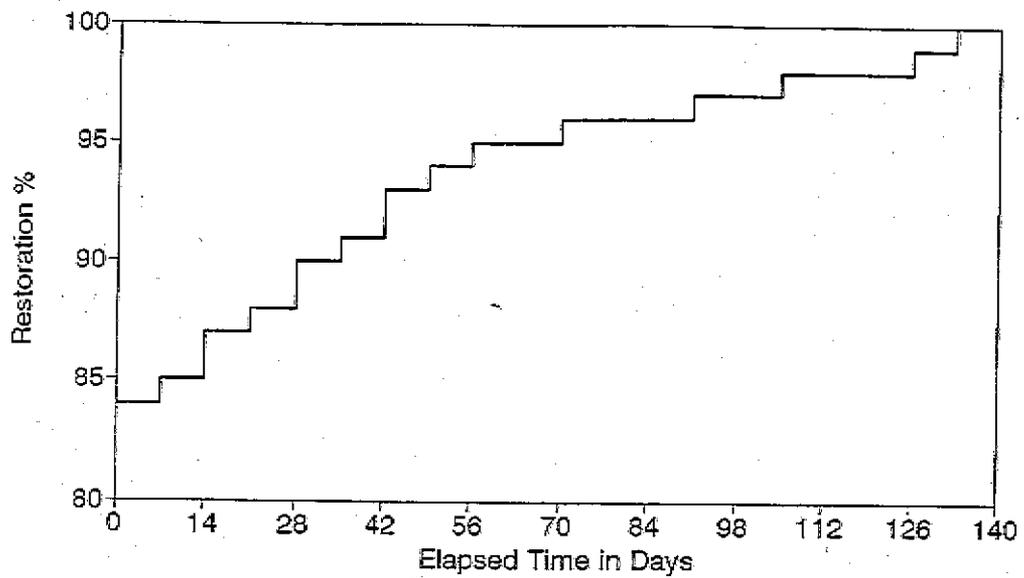


Figure C-144 Residual capacity of Missouri electric power following New Madrid event (M=8.0)

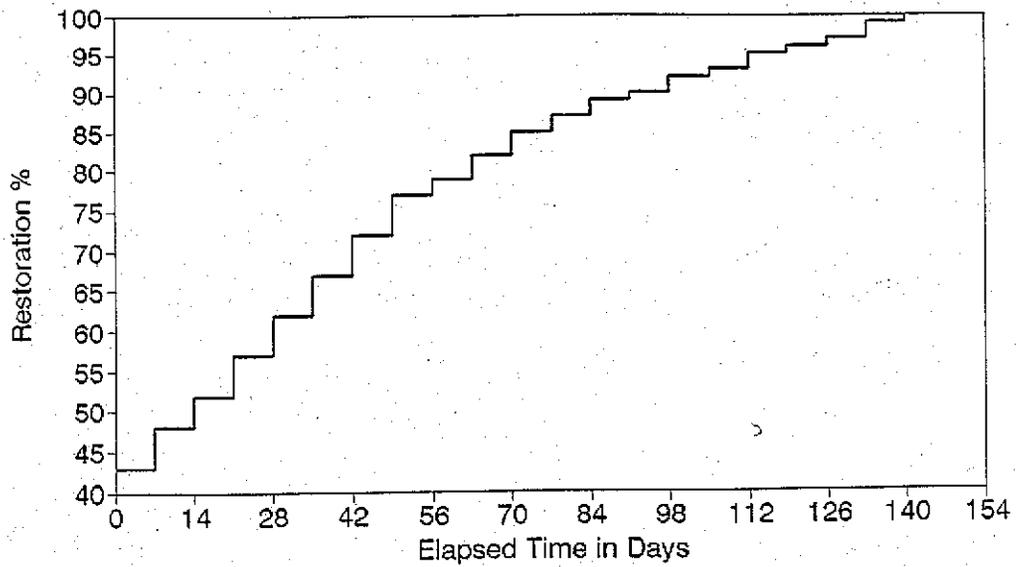


Figure C-145 Residual capacity of Arkansas electric power following New Madrid event (M=8.0).

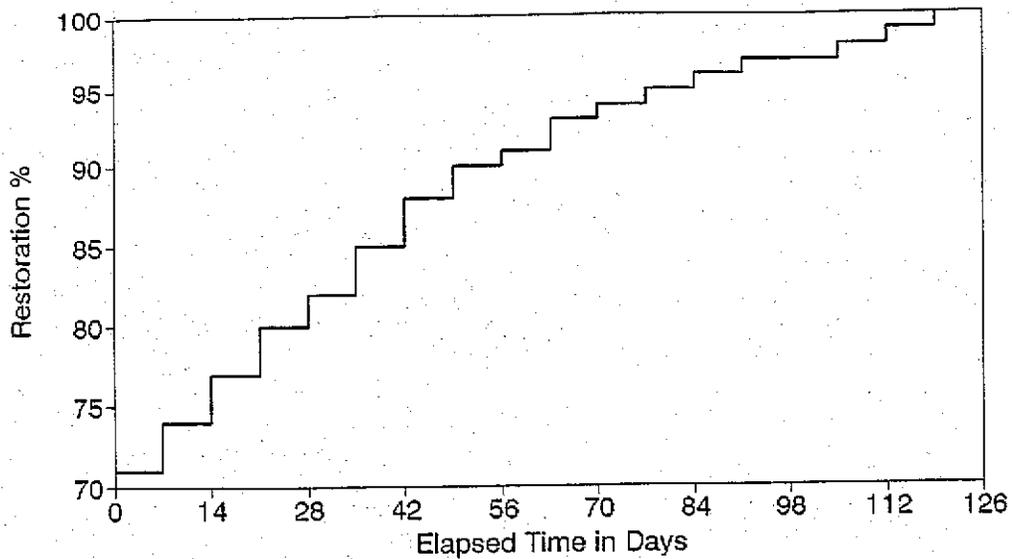


Figure C-146 Residual capacity of Tennessee electric power following New Madrid event (M=8.0)

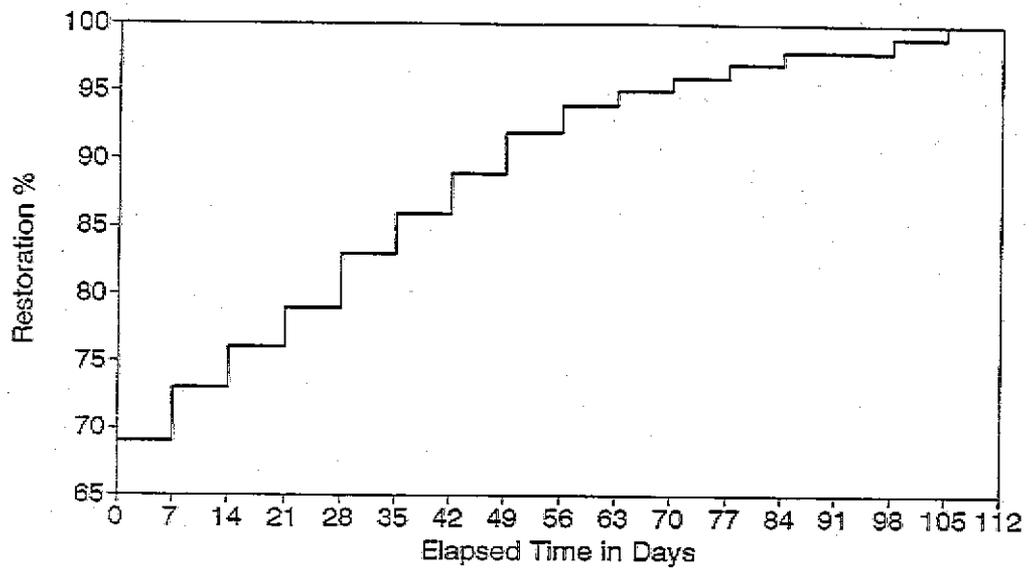


Figure C-147 Residual capacity of Kentucky electric power following New Madrid event (M=8.0).

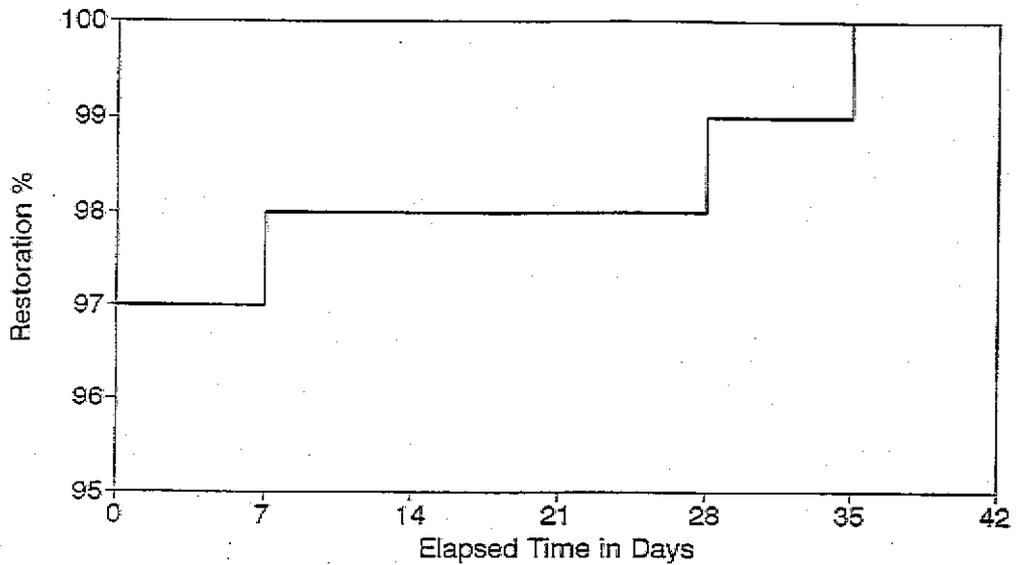


Figure C-148 Residual capacity of Indiana electric power following New Madrid event (M=8.0)

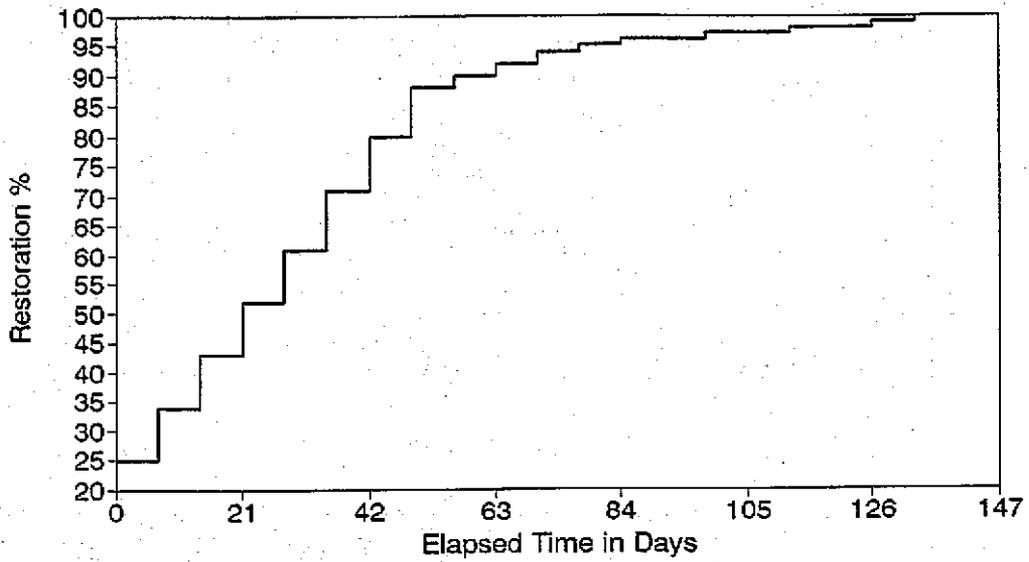


Figure C-149 Residual capacity of Mississippi electric power following New Madrid event (M=8.0).

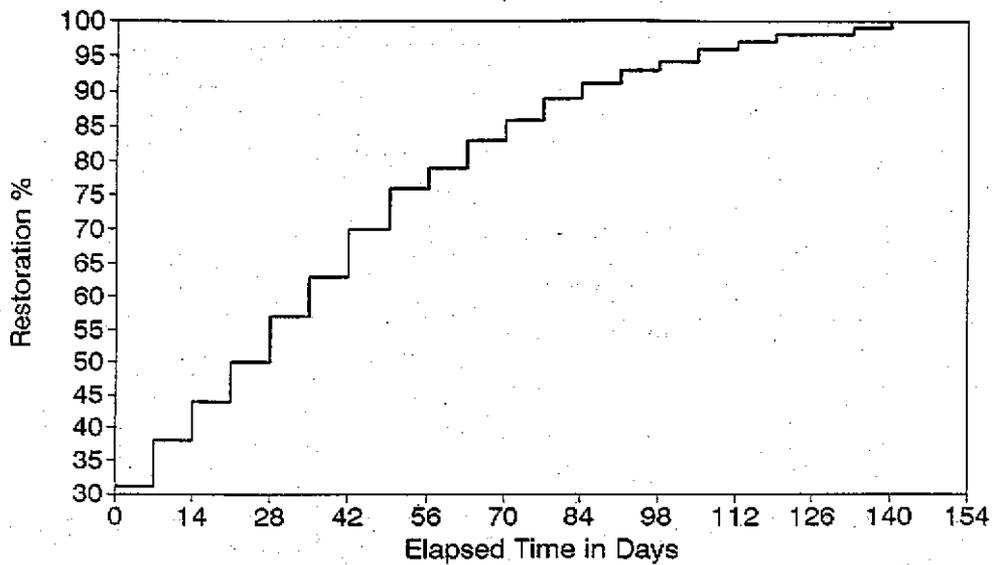


Figure C-150 Residual capacity of South Carolina electric power following Charleston event (M=7.5).

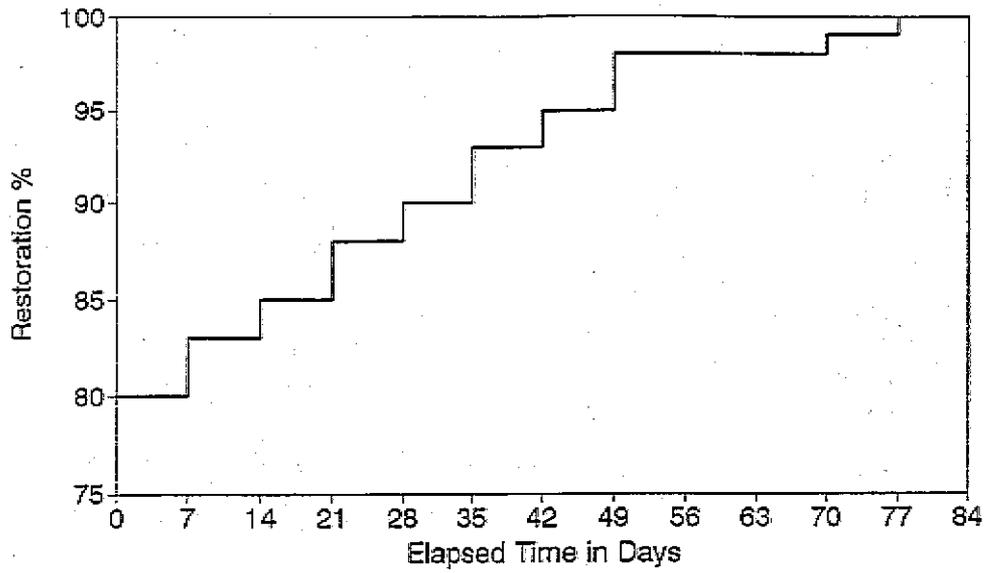


Figure C-151 Residual capacity of North Carolina electric power following Charleston event (M=7.5).

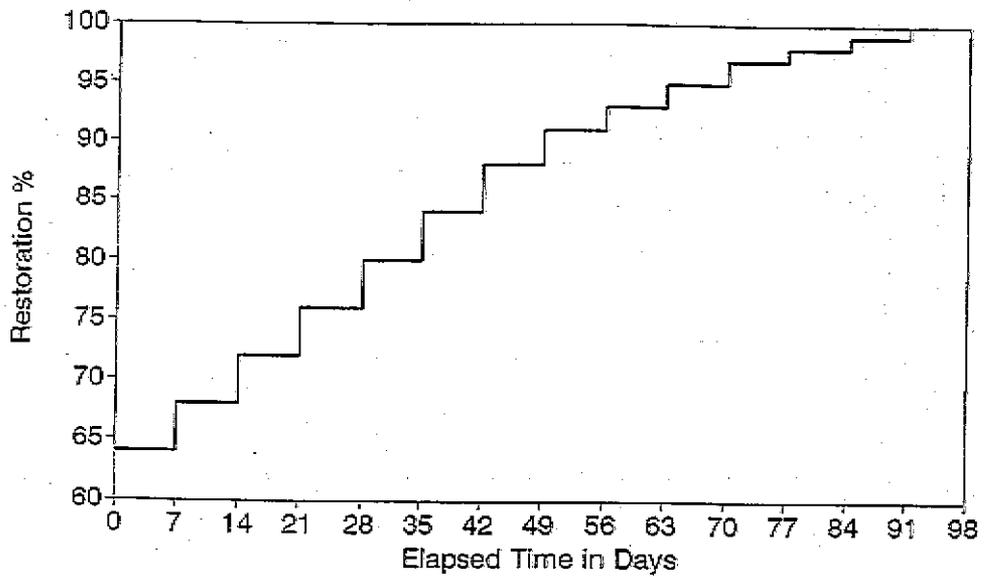


Figure C-152 Residual capacity of Georgia electric power following Charleston event (M=7.5).

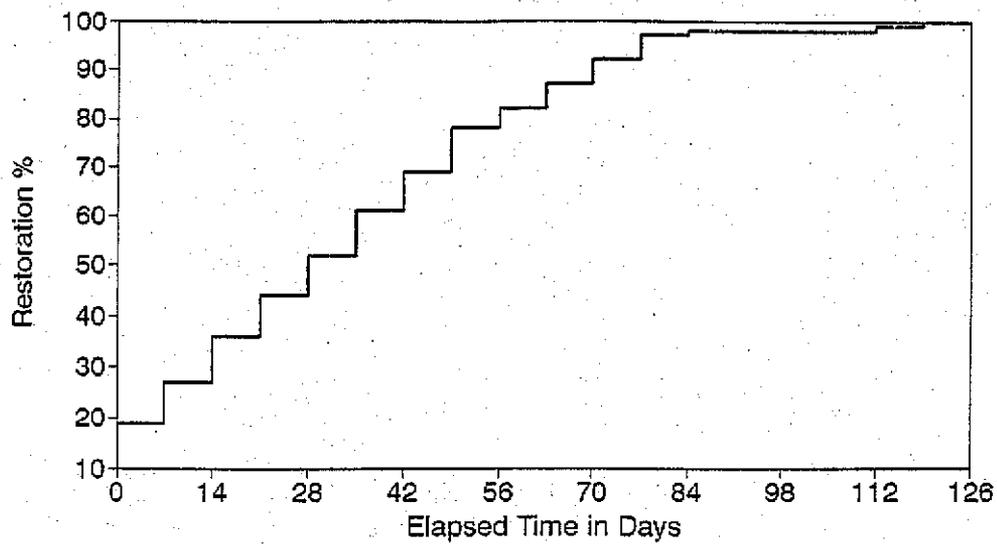


Figure C-153 Residual capacity of Massachusetts electric power following Cape Ann event (M=7.0).

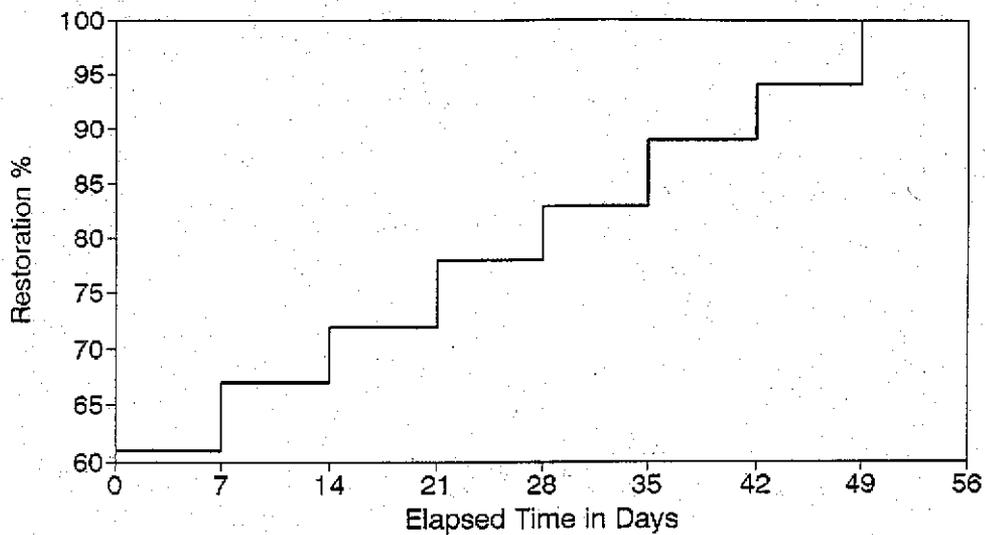


Figure C-154 Residual capacity of Connecticut electric power following Cape Ann event (M=7.0).

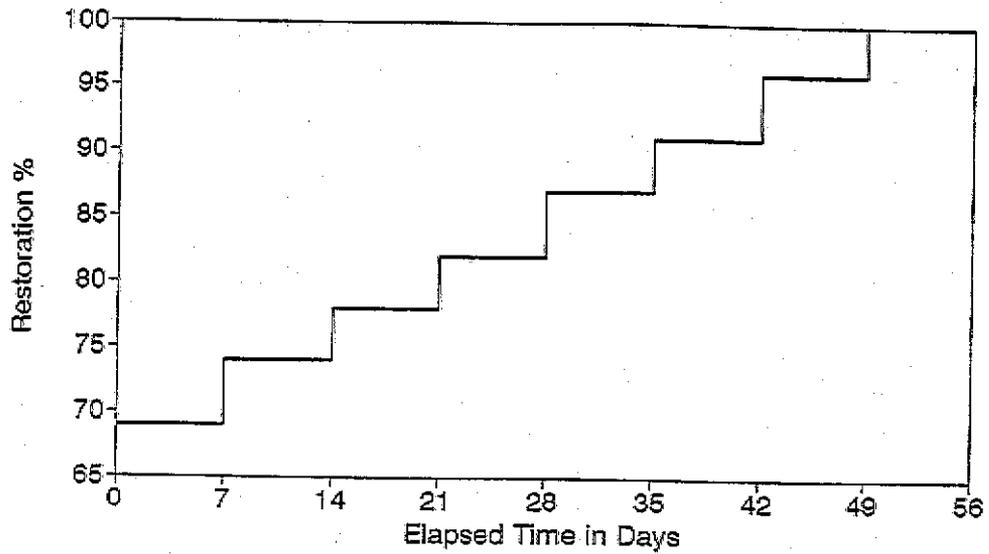


Figure C-155 Residual capacity of Delaware electric power following Cape Ann event (M=7.0).

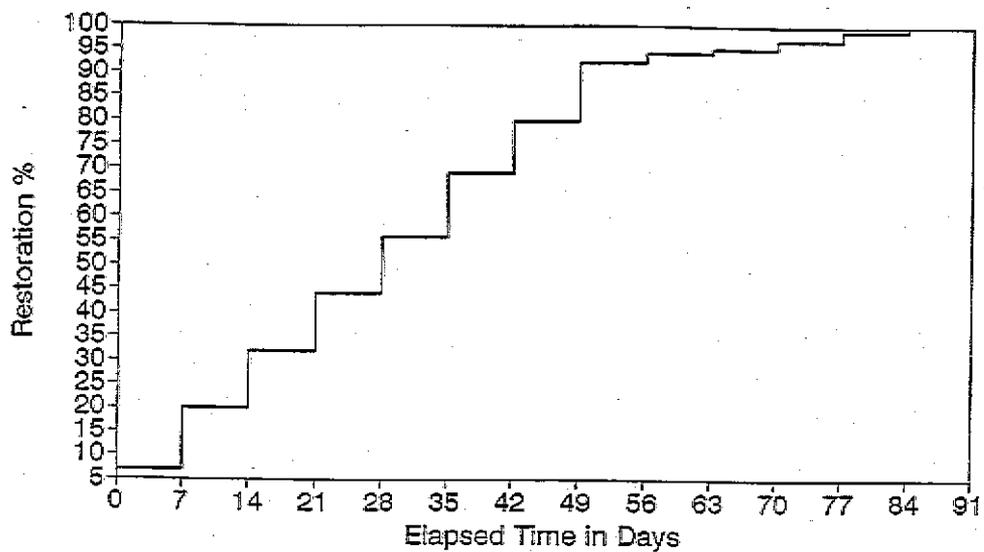


Figure C-156 Residual capacity of Rhode Island electric power following Cape Ann event (M=7.0).

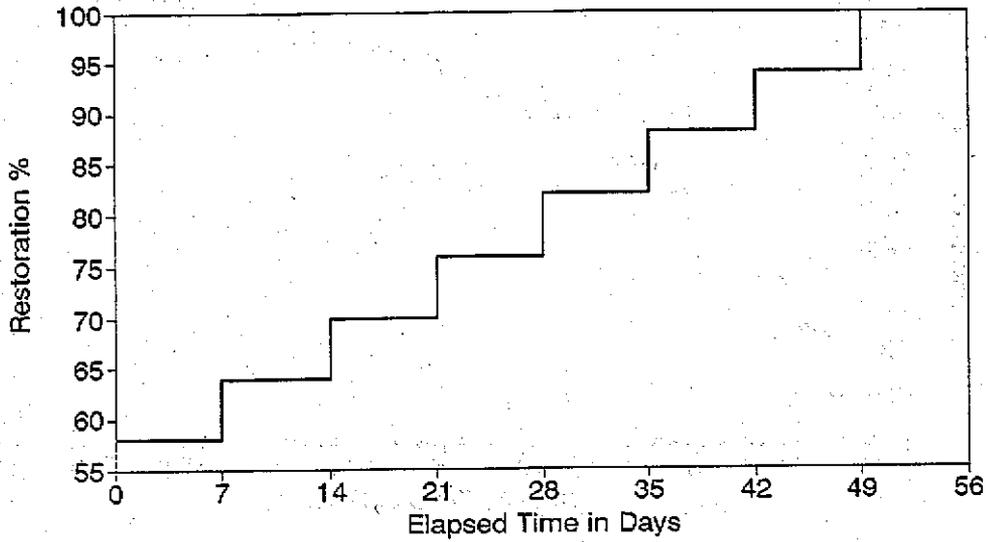


Figure C-157 Residual capacity of New Hampshire electric power following Cape Ann event (M=7.0).

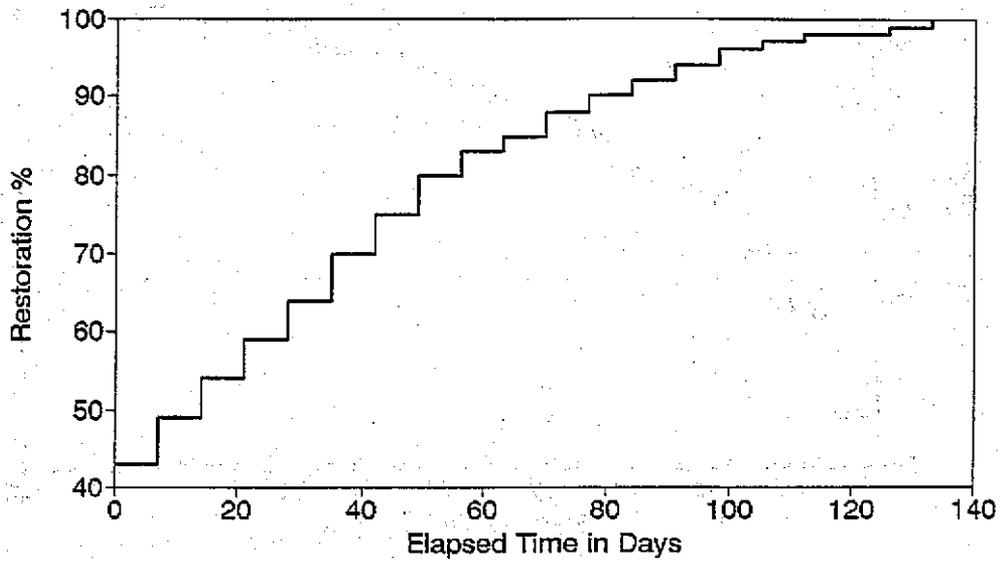


Figure C-158 Residual capacity of Utah electric power following Wasatch Front event (M=7.5).

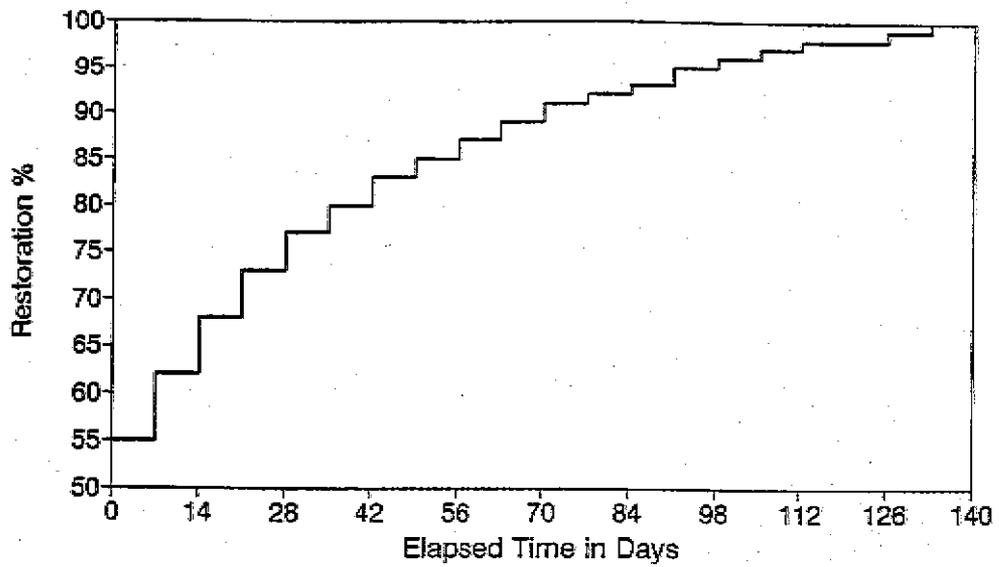


Figure C-159 Residual capacity of California electric power following Hayward event (M=7.5).

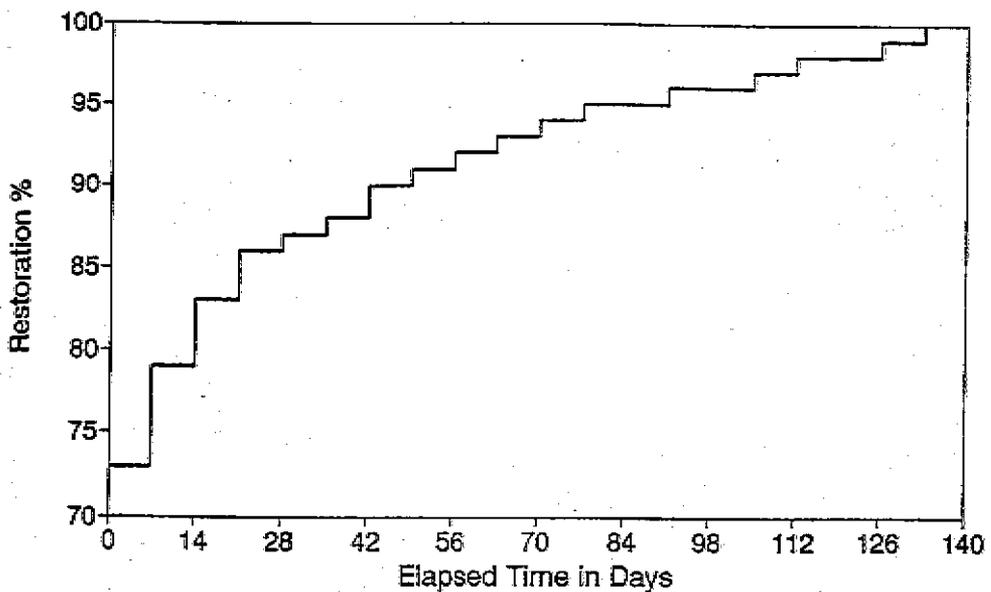


Figure C-160 Residual capacity of California electric power following Fort Tejon event (M=8.0).

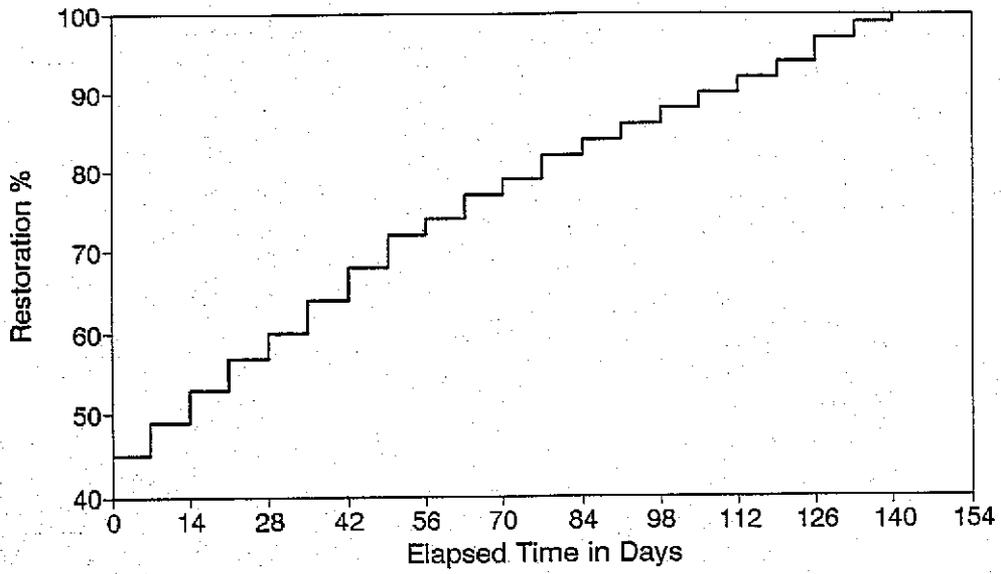


Figure C-161 Residual capacity of Washington electric power following Puget Sound event (M=7.5).

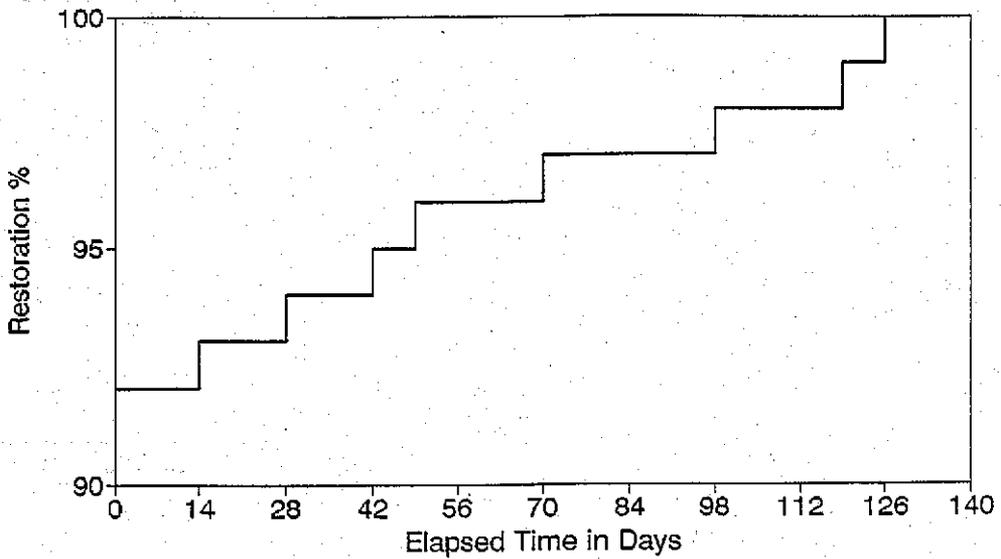


Figure C-162 Residual capacity of Missouri electric power following New Madrid event (M=7.0).

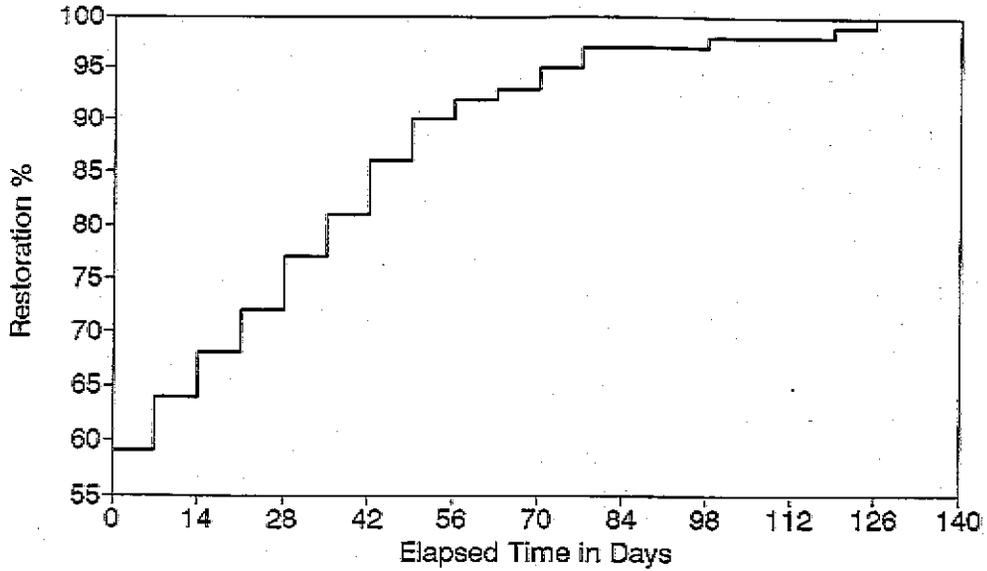


Figure C-163 Residual capacity of Arkansas electric power following New Madrid event (M=7.0).

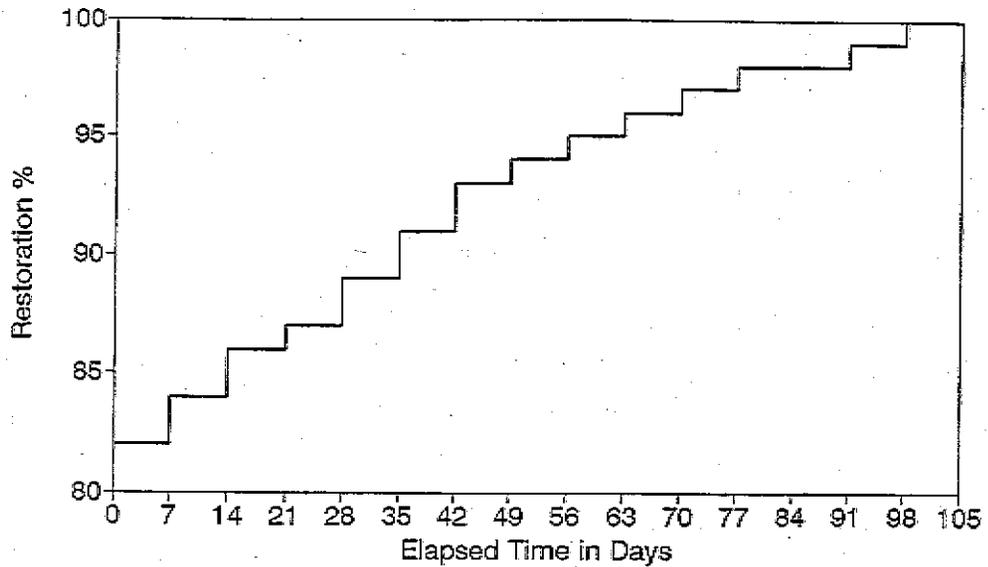


Figure C-164 Residual capacity of Tennessee electric power following New Madrid event (M=7.0).

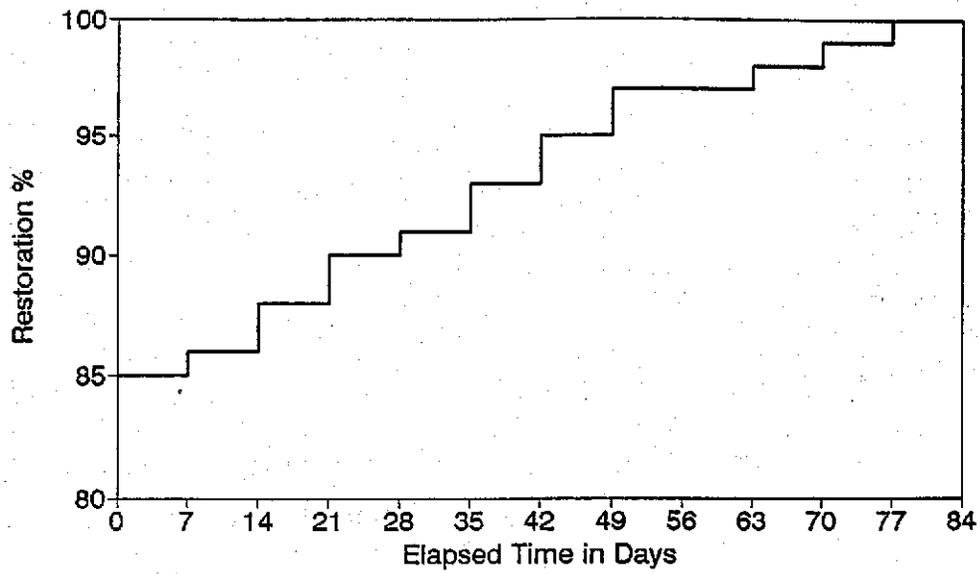


Figure C-165 Residual capacity of Kentucky electric power following New Madrid event (M=7.0).

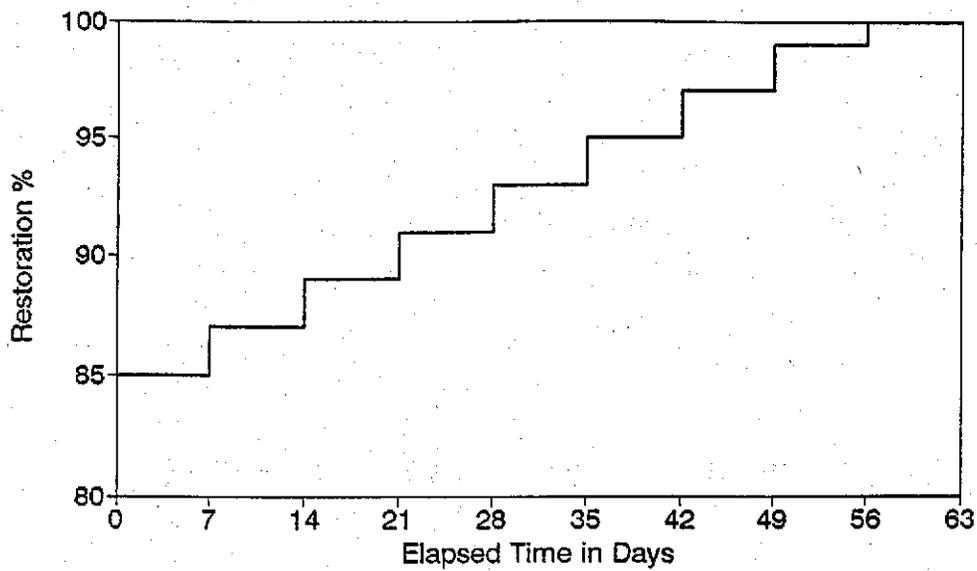


Figure C-166 Residual capacity of Mississippi electric power following New Madrid event (M=7.0).

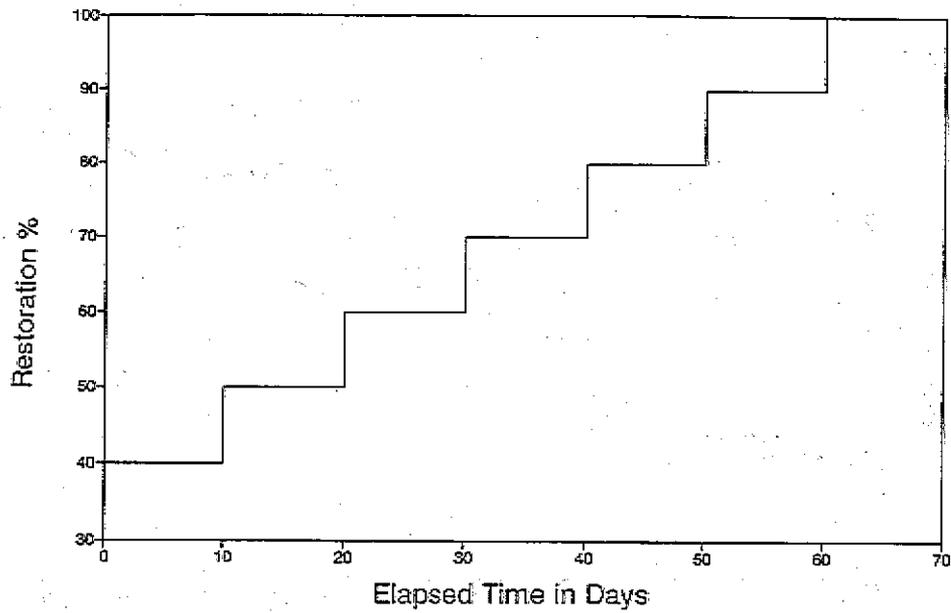


Figure C-167 Residual capacity of epicentral region water system following Fort Tejon event (M=8.0).

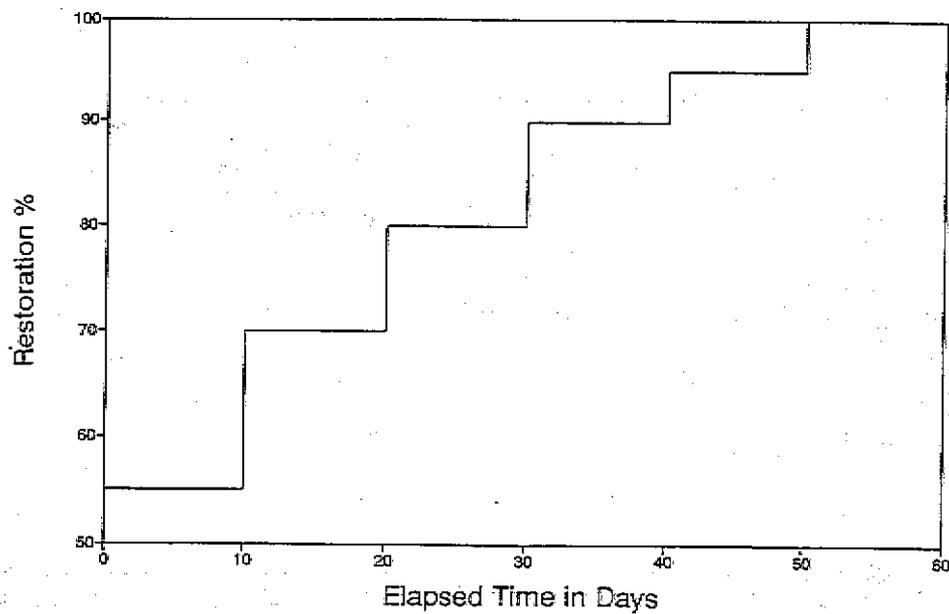


Figure C-168 Residual capacity of San Francisco Bay area water system following Hayward event (M=7.5).

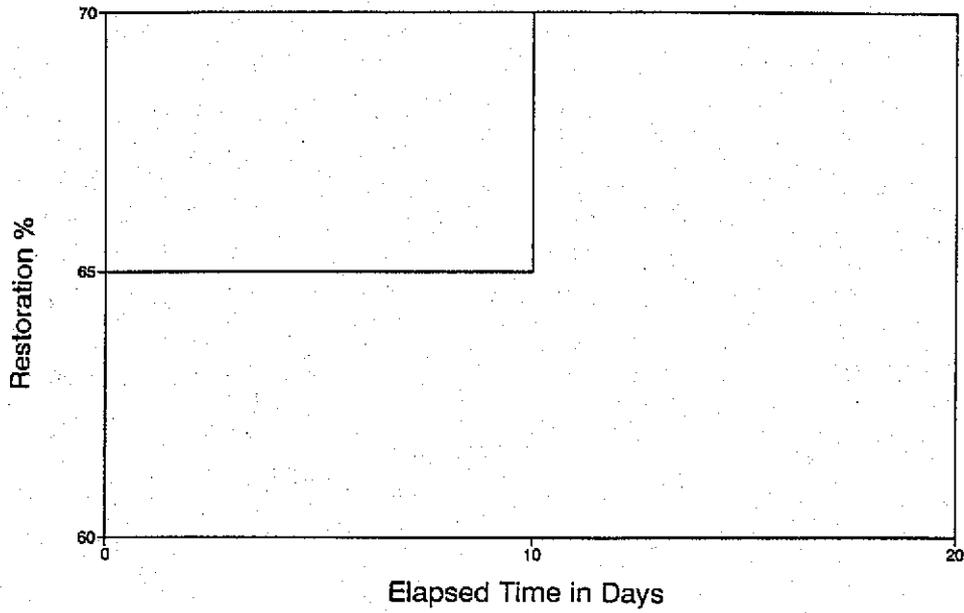


Figure C-169 Residual capacity of epicentral region water system following Puget Sound event (M=7.5).

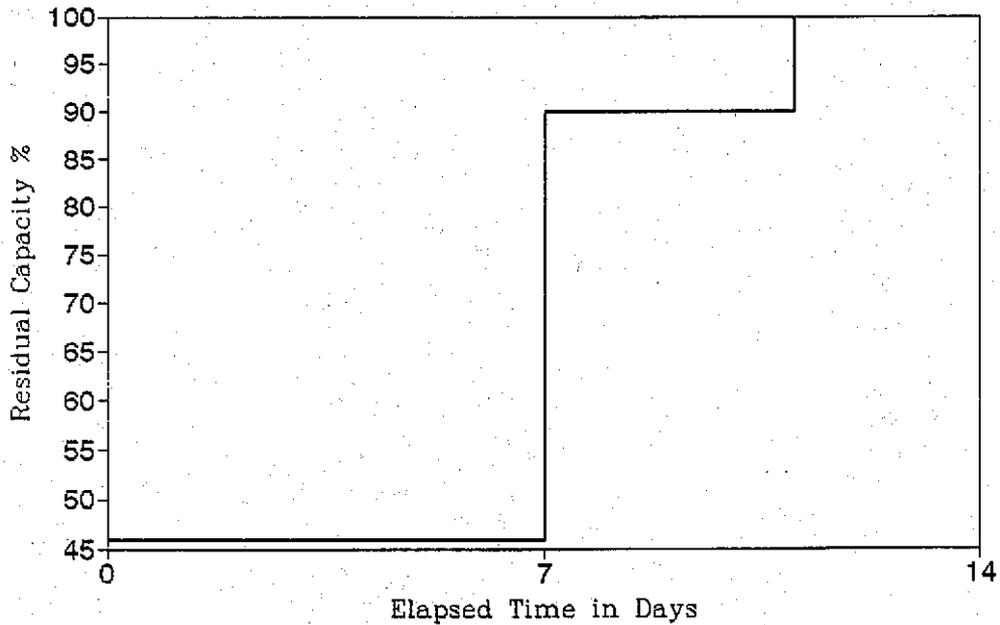


Figure C-170 Residual capacity of crude-oil delivery from Texas and Louisiana to Chicago following New Madrid event (M=8.0).

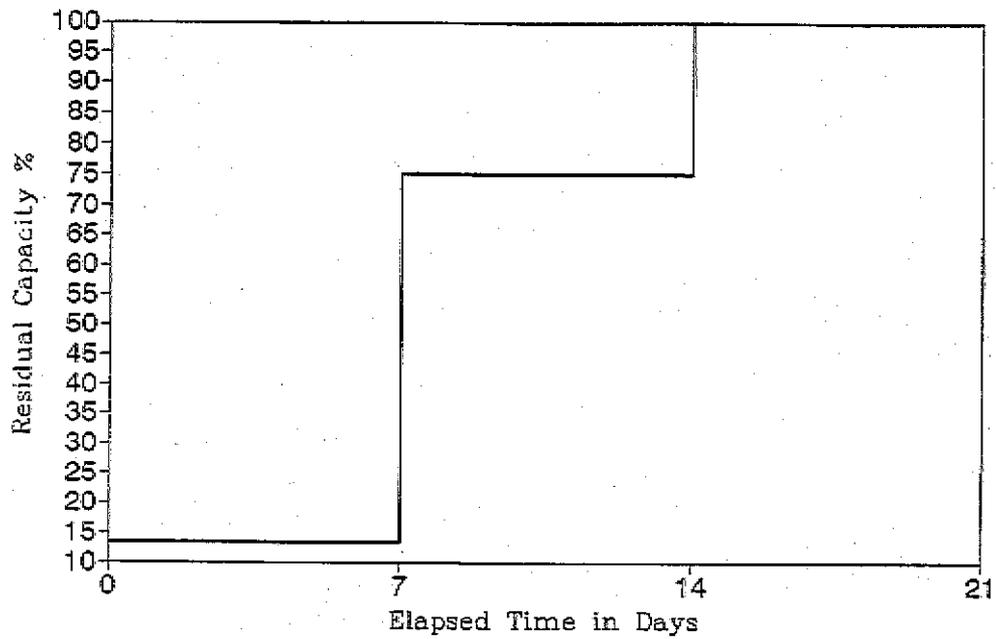


Figure C-171 Residual capacity of crude oil delivery from Texas to Southern California following Fort Tejon event (M=8.0).

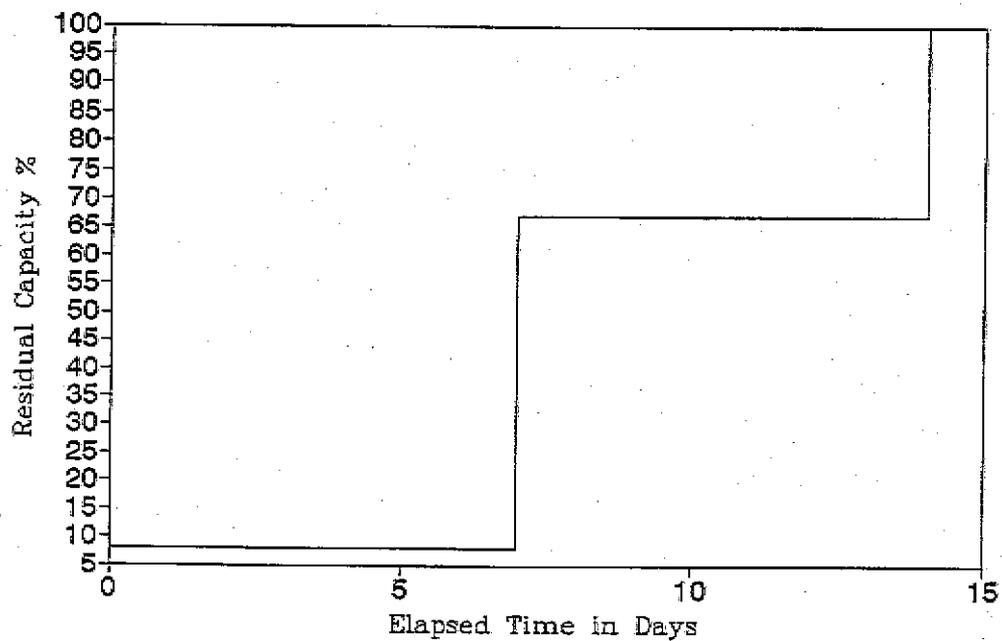


Figure C-172 Residual capacity of crude oil delivery from Texas to Northern California following Fort Tejon event (M=8.0).

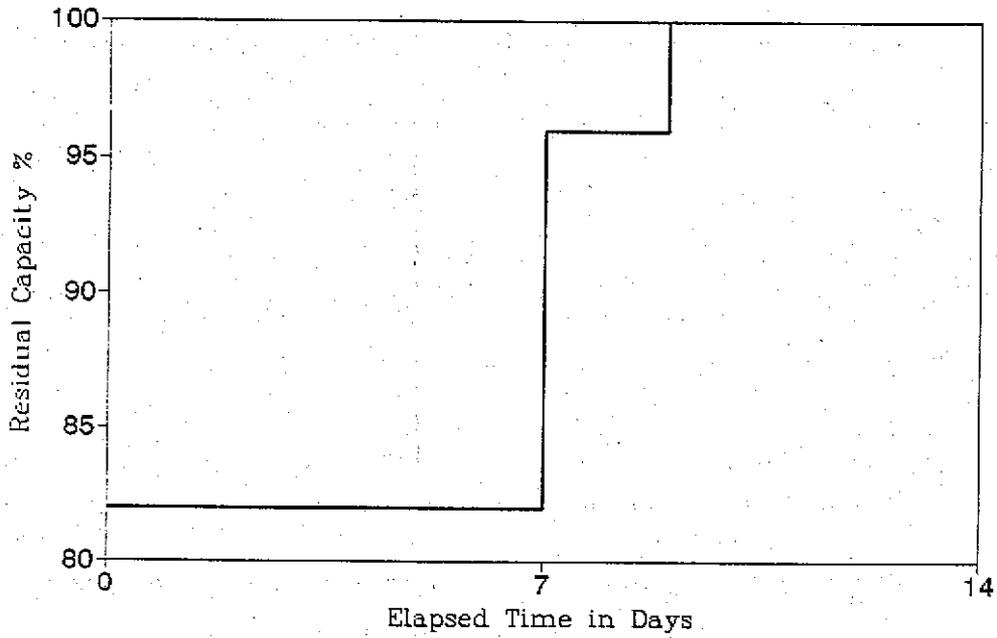


Figure C-173 Residual capacity of crude oil delivery from Texas and Louisiana to Chicago following New Madrid event (M=7.0).

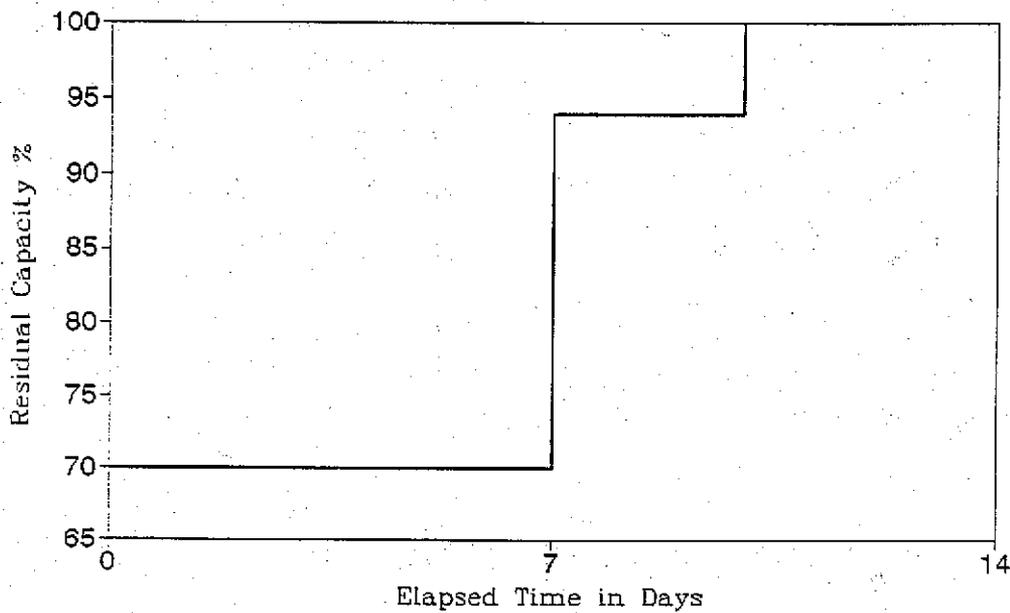


Figure C-174 Residual capacity of refined oil delivery from Texas to Chicago following New Madrid event (M=8.0).

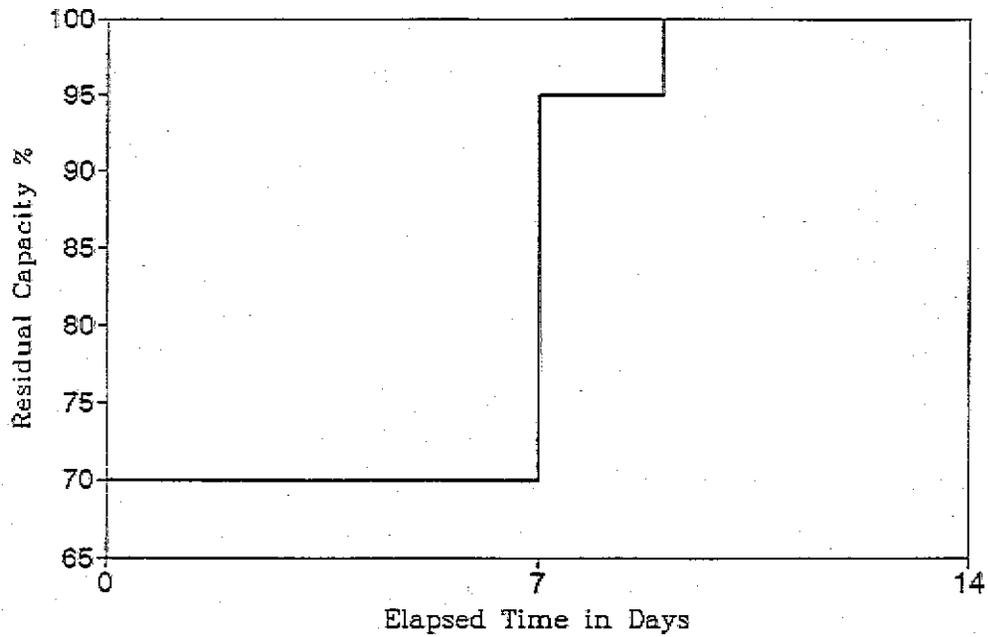


Figure C-175 Residual capacity of refined oil delivery from Texas to Chicago following New Madrid event (M=7.0).

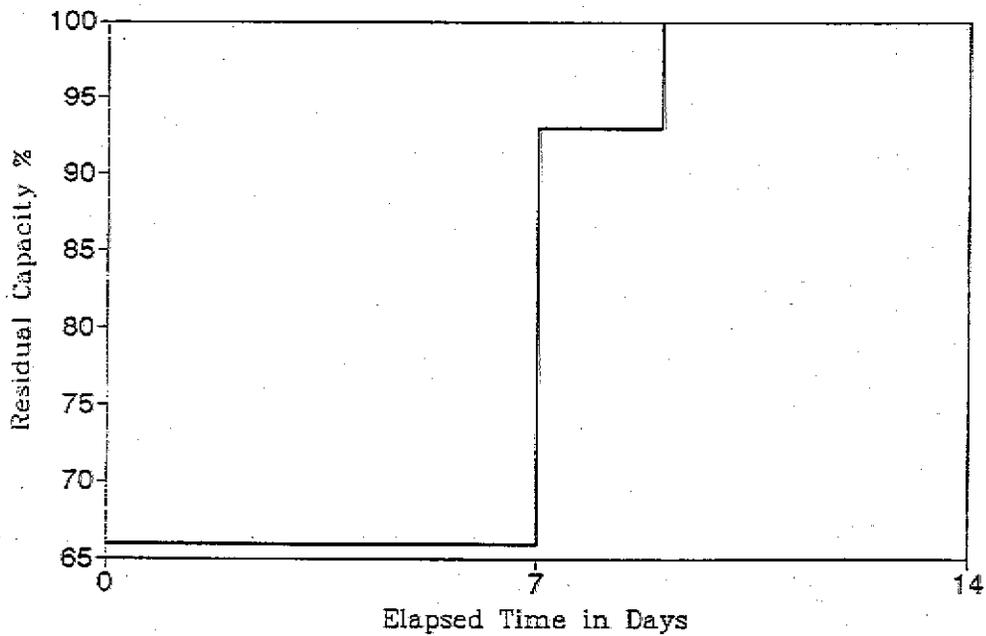


Figure C-176 Residual capacity of natural gas delivery from Texas and Louisiana to Chicago following New Madrid event (M=8.0).

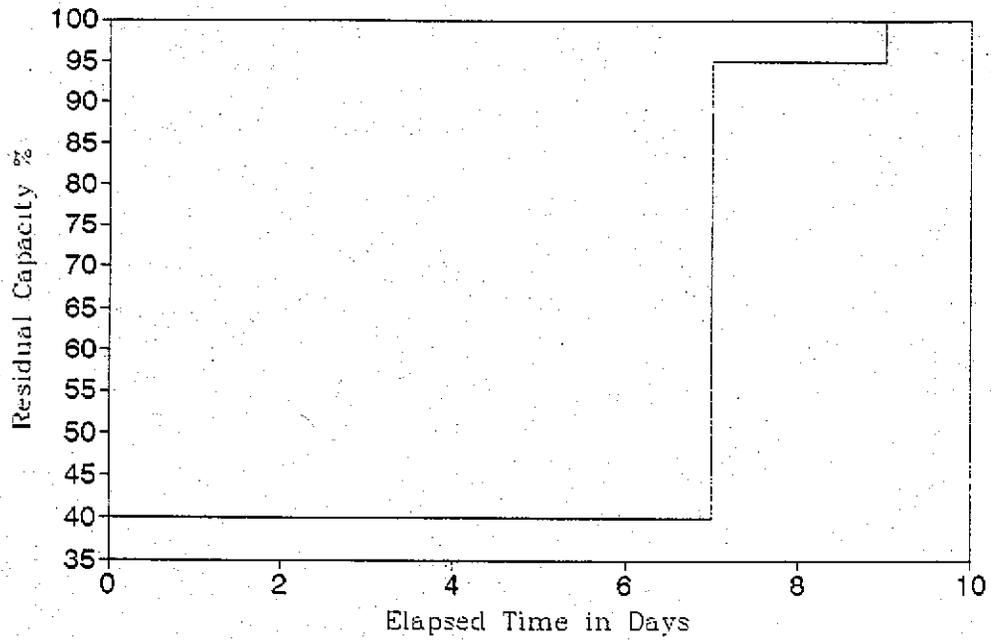


Figure C-177 Residual capacity of natural gas delivery from Texas and Louisiana to northeast region following New Madrid event (M=8.0).

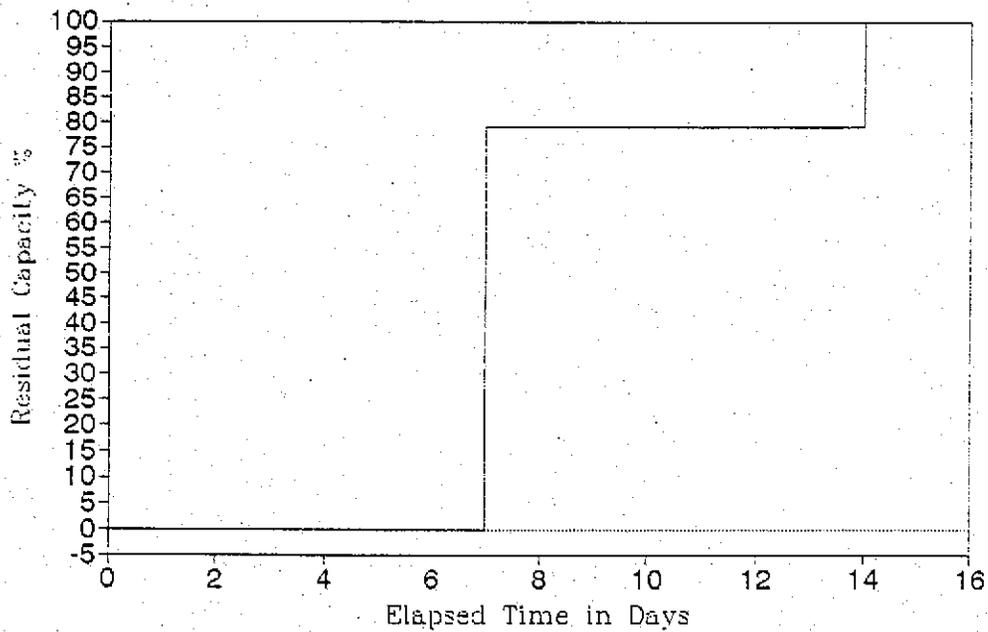


Figure C-178 Residual capacity of natural gas delivery from Texas to Northern California following Hayward event (M=7.5).

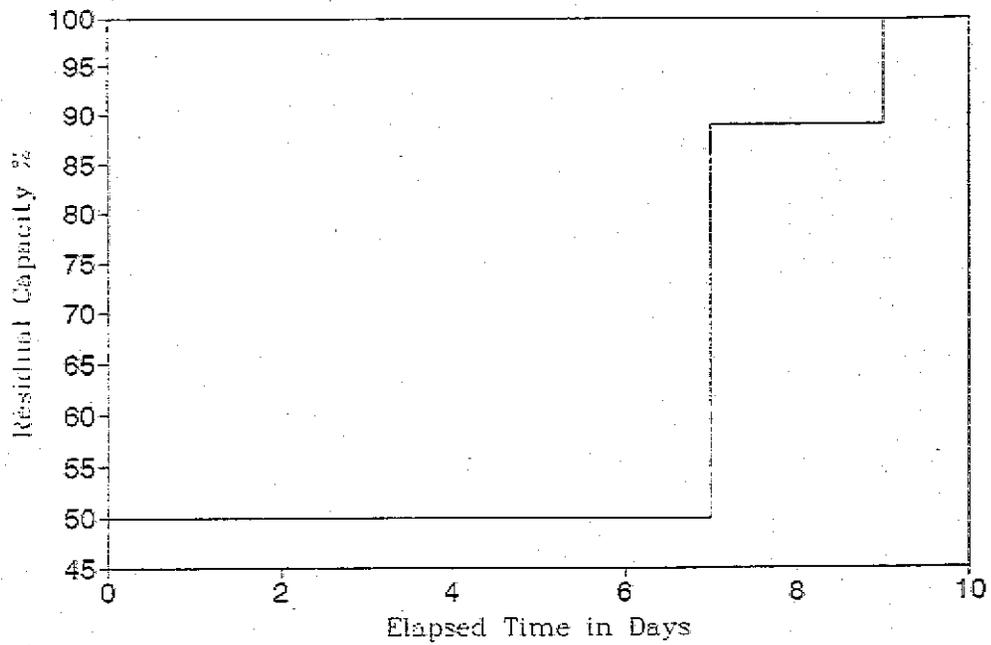


Figure C-179 Residual capacity of natural gas delivery from Texas to Washington following Hayward event (M=7.5).

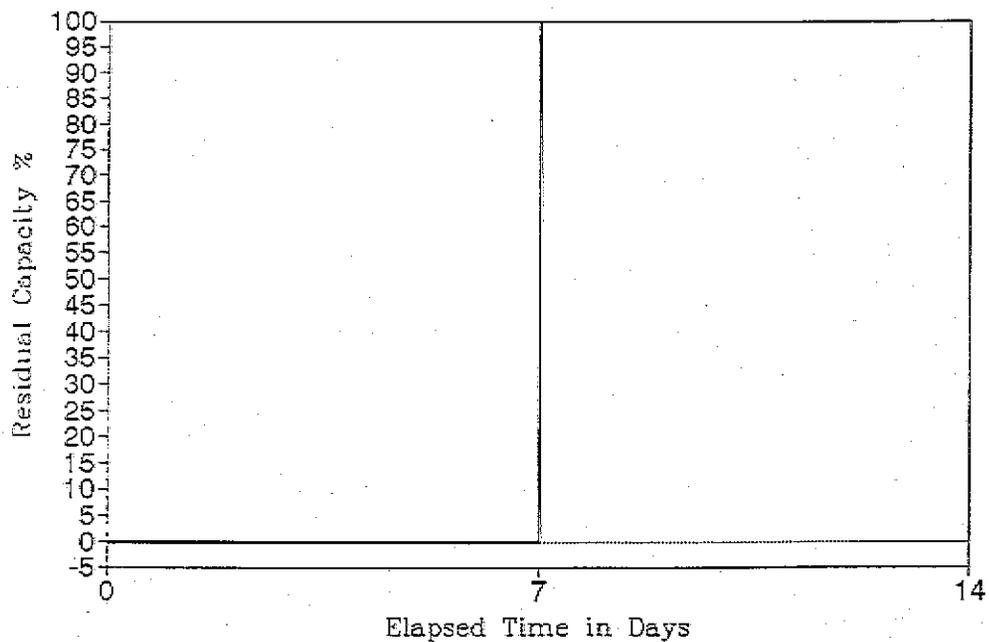


Figure C-180 Residual capacity of natural gas delivery in Utah following Wasatch Front event (M=7.5).

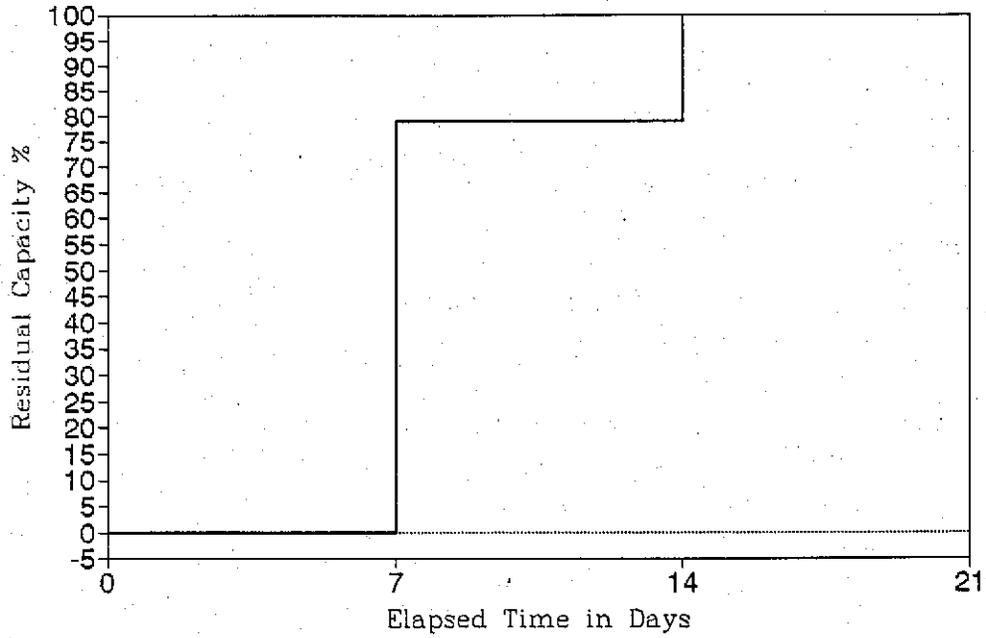


Figure C-181 Residual capacity of natural gas delivery from Texas to California following Fort Tejon event (M=8.0).

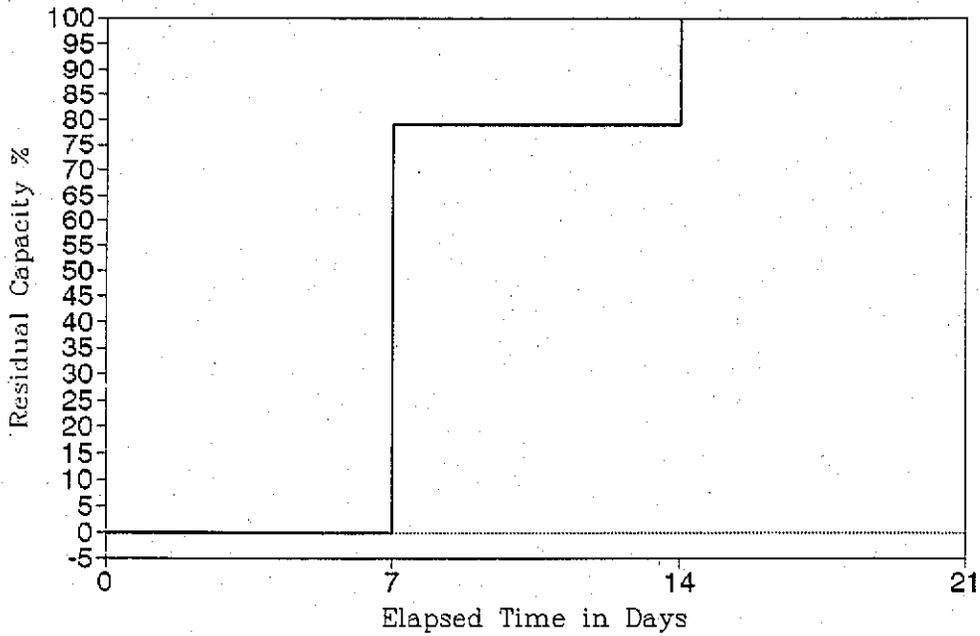


Figure C-182 Residual capacity of natural gas delivery from Texas to Seattle following Puget Sound event (M=7.5).

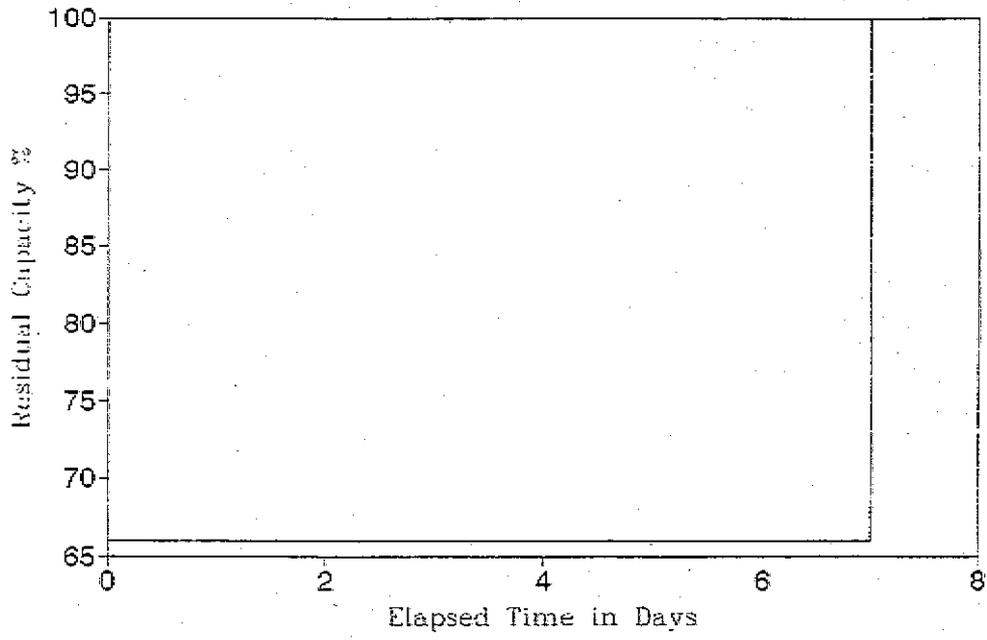


Figure C-183 Residual capacity of natural gas delivery from Texas and Louisiana to Chicago following New Madrid event (M=7.0).

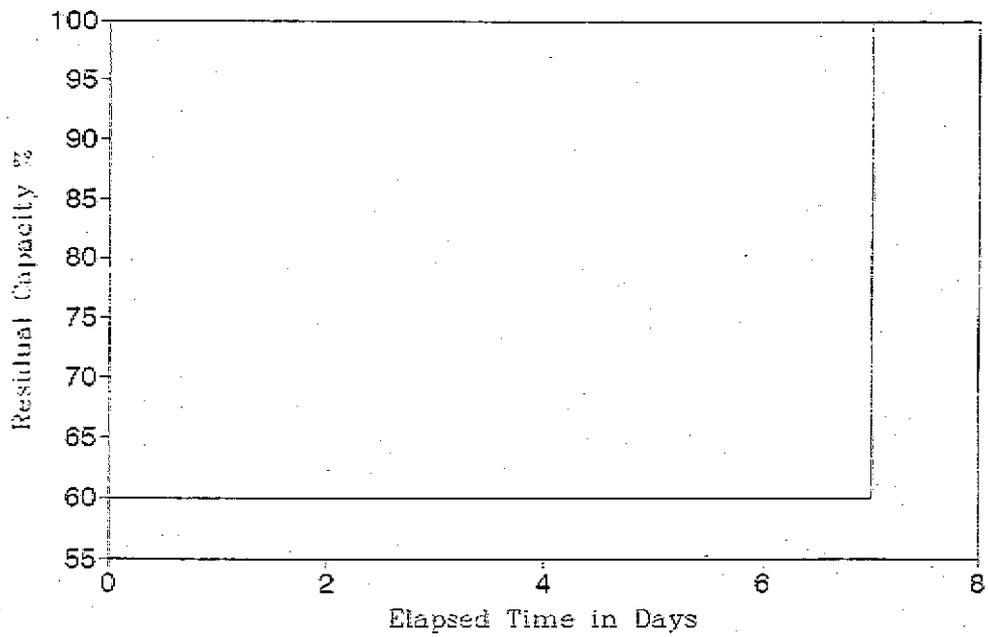


Figure C-184 Residual capacity of natural gas delivery from Texas and Louisiana to northeast region following New Madrid event (M=7.0).

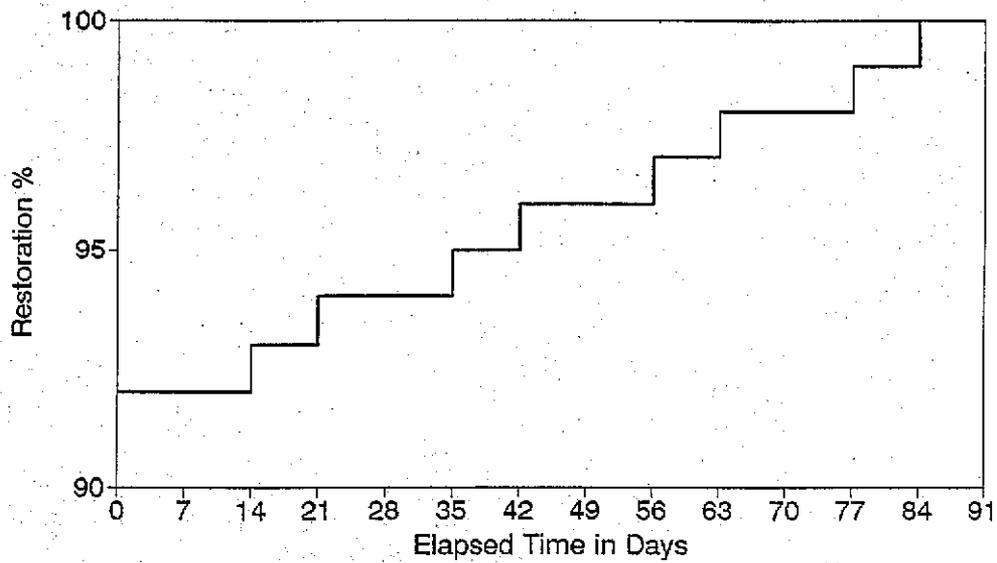


Figure C-185 Residual capacity of Missouri upgraded electric system following New Madrid event (M=8.0).

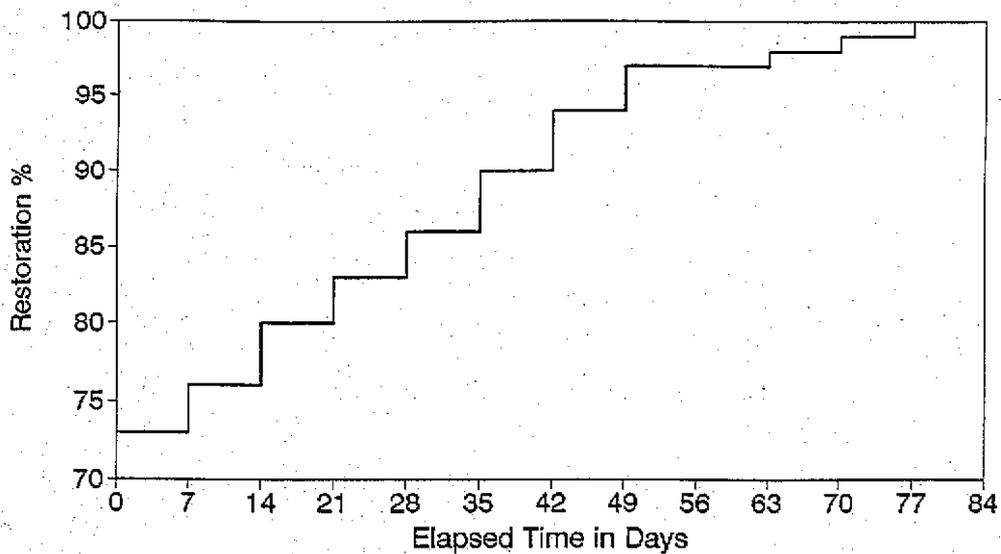


Figure C-186 Residual capacity of Arkansas upgraded electric system following New Madrid event (M=8.0).

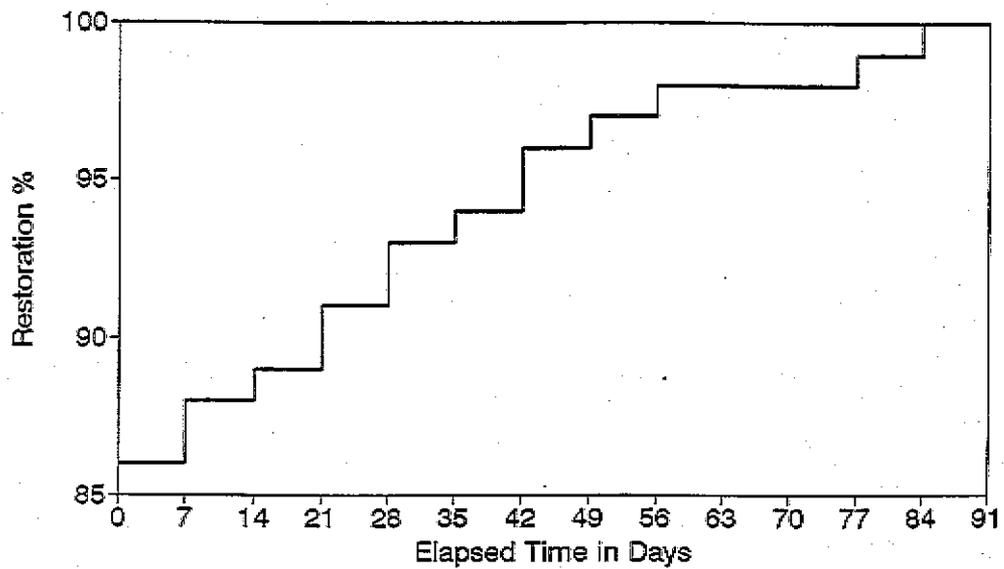


Figure C-187 Residual capacity of Tennessee upgraded electric system following New Madrid event (M=8.0).

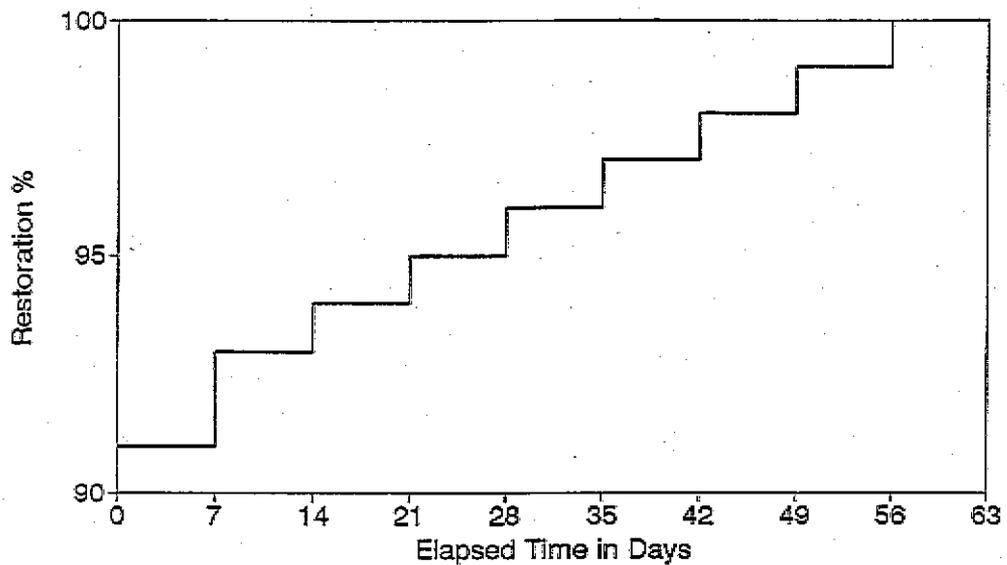


Figure C-188 Residual capacity of Kentucky upgraded electric system following New Madrid event (M=8.0).

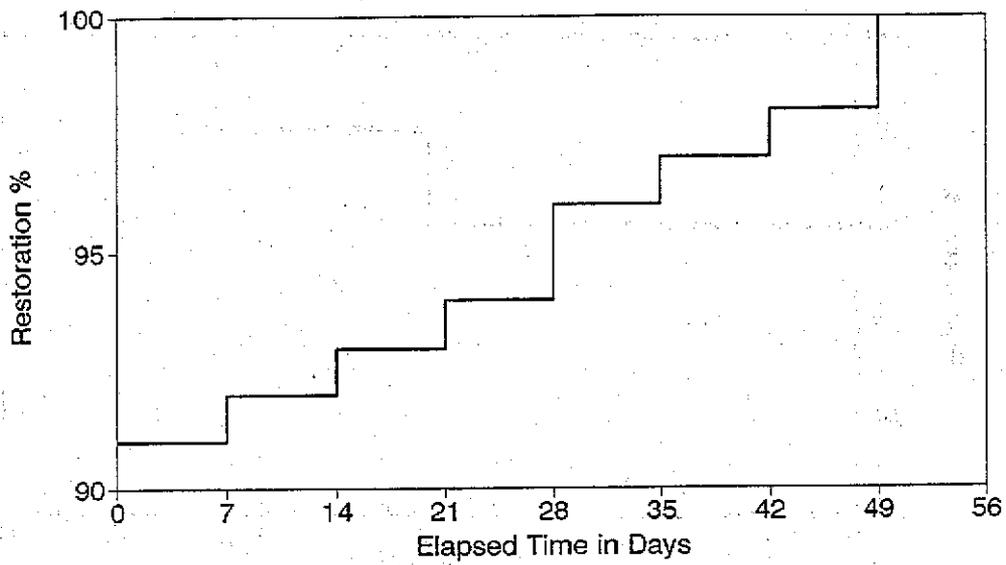


Figure C-189 Residual capacity of Mississippi upgraded electric system following New Madrid event (M=8.0).

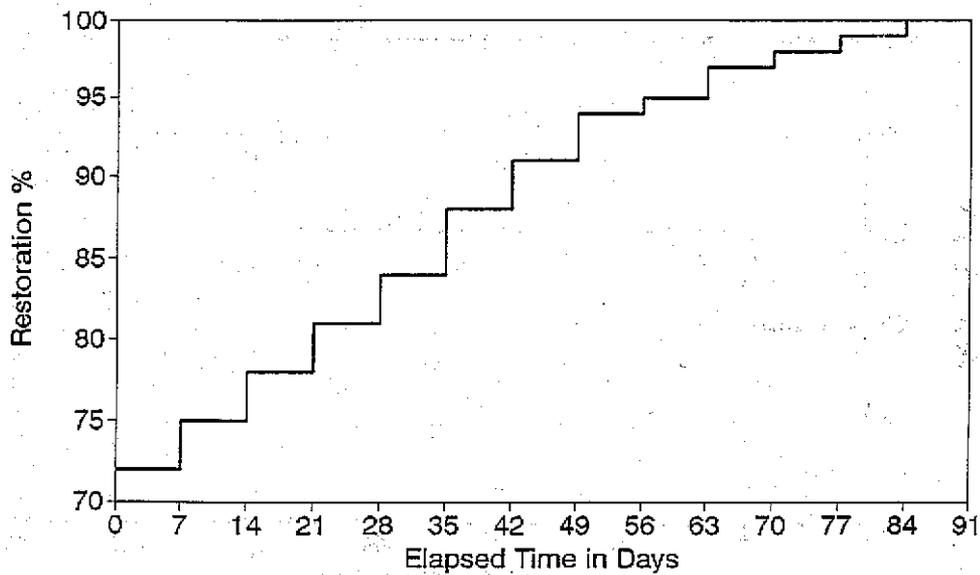


Figure C-190 Residual capacity of South Carolina upgraded electric system following Charleston event (M=7.5).

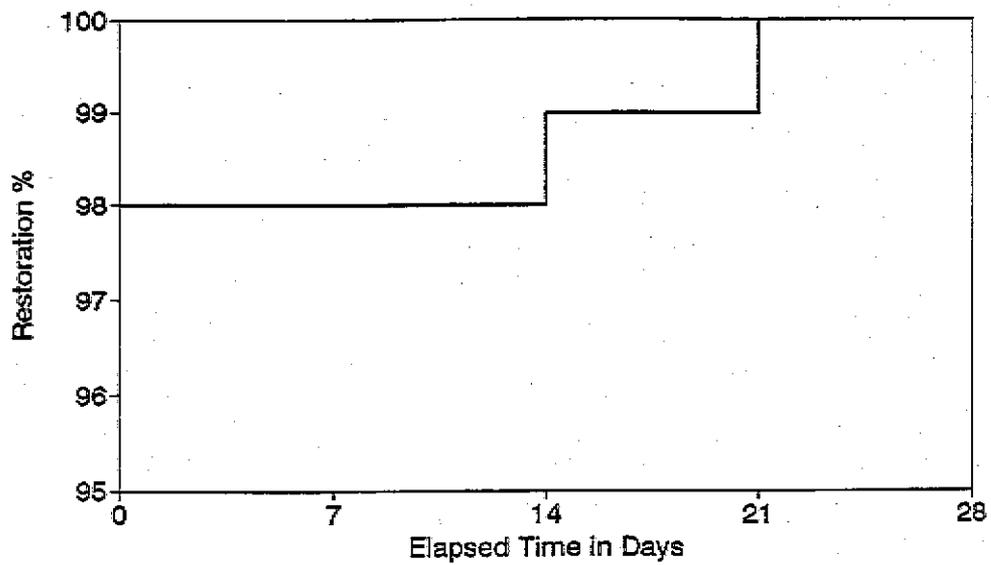


Figure C-191 Residual capacity of North Carolina upgraded electric system following Charleston event (M=7.5).

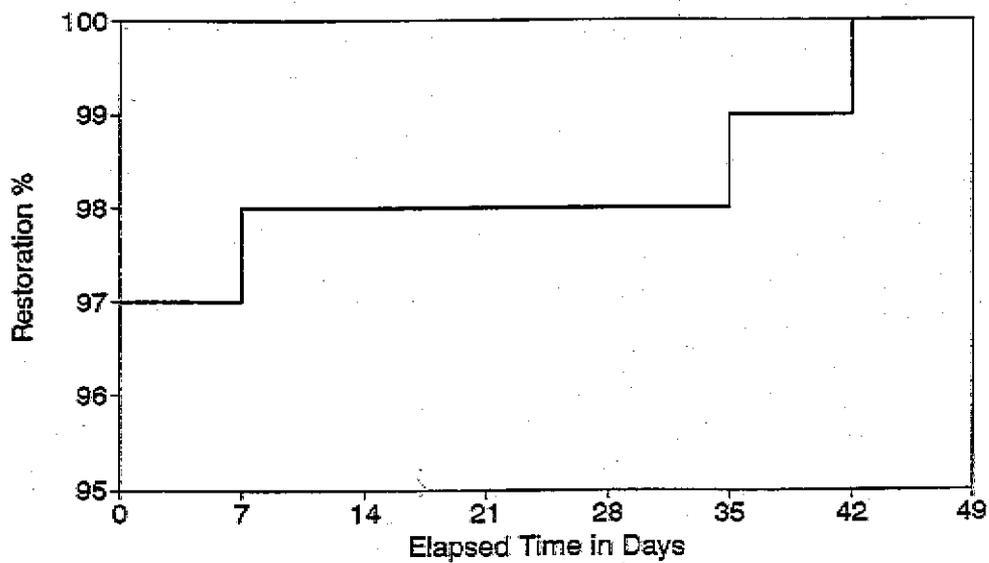


Figure C-192 Residual capacity of Georgia upgraded electric system following Charleston event (M=7.5).

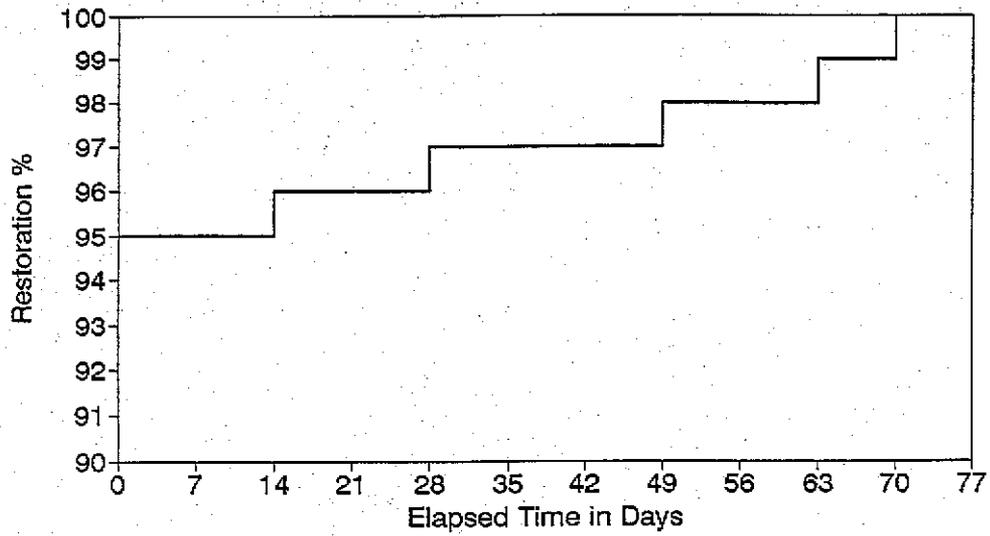


Figure C-193 Residual capacity of Massachusetts upgraded electric system following Cape Ann event (M=7.0).

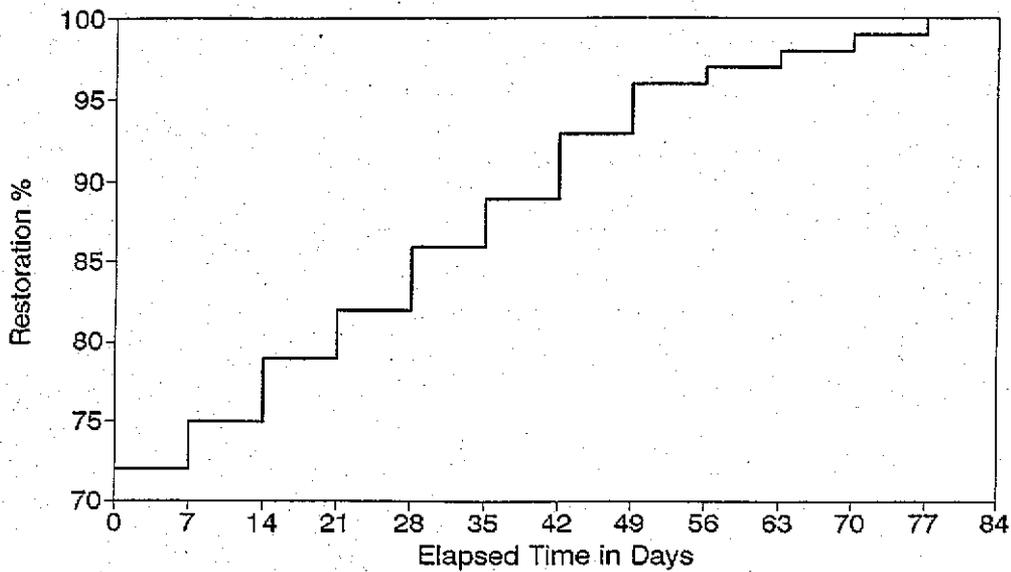


Figure C-194 Residual capacity of Utah upgraded electric system following Wasatch Front event (M=7.5).

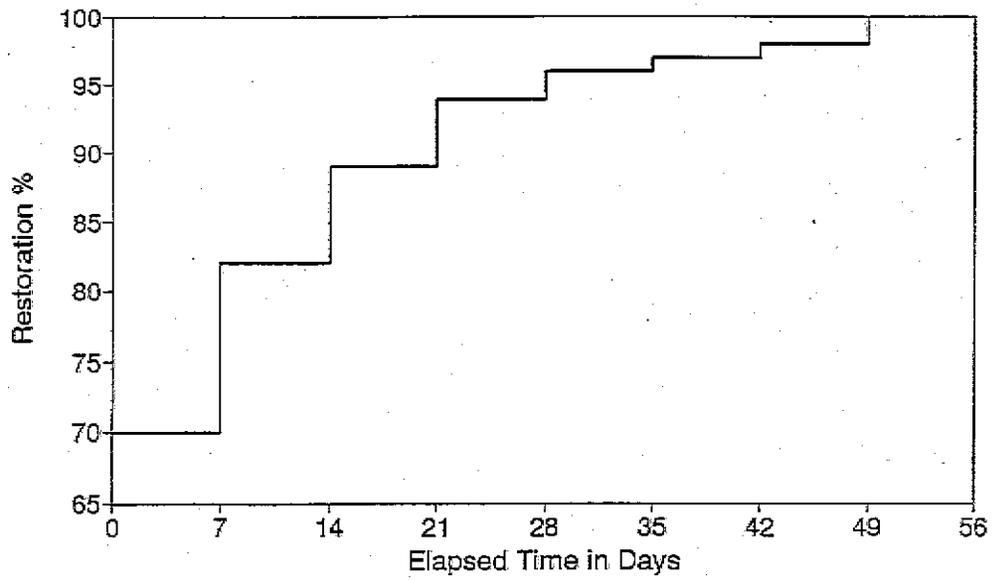


Figure C-195 Residual capacity of California upgraded electric system following Hayward event (M=7.5).

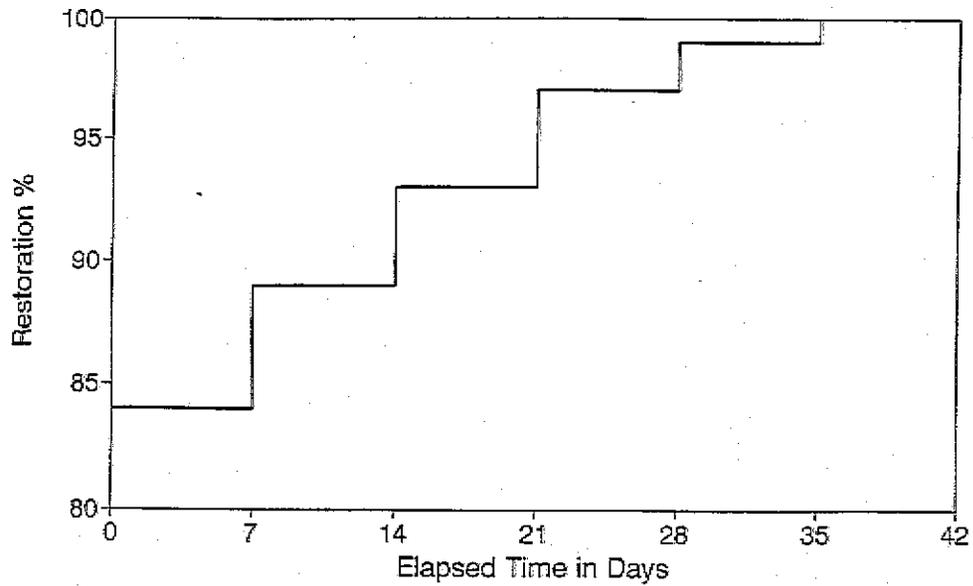


Figure C-196 Residual capacity of California upgraded electric system following Fort Tejon event (M=8.0).

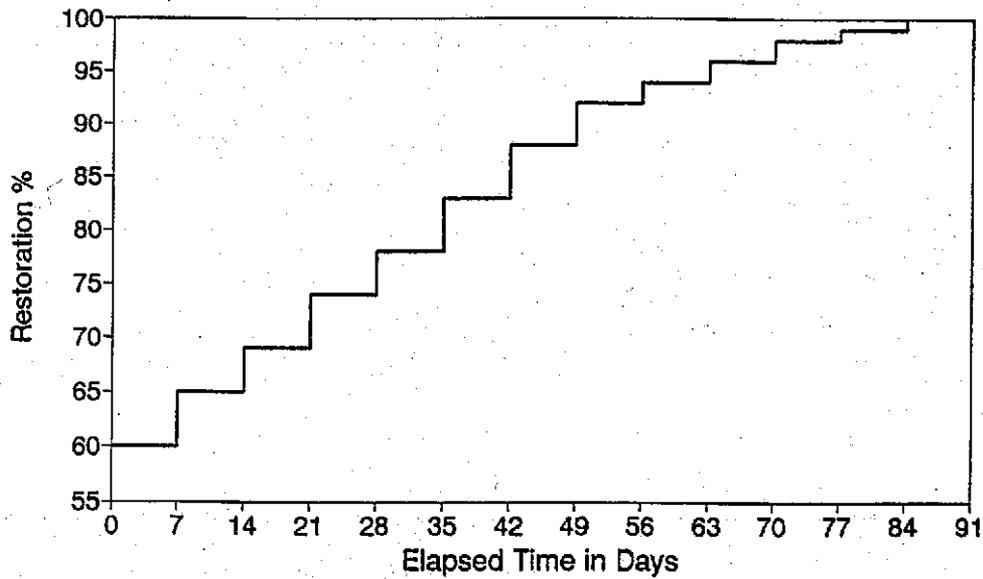


Figure C-197 Residual capacity of Washington upgraded electric system following Puget Sound event (M=7.5).

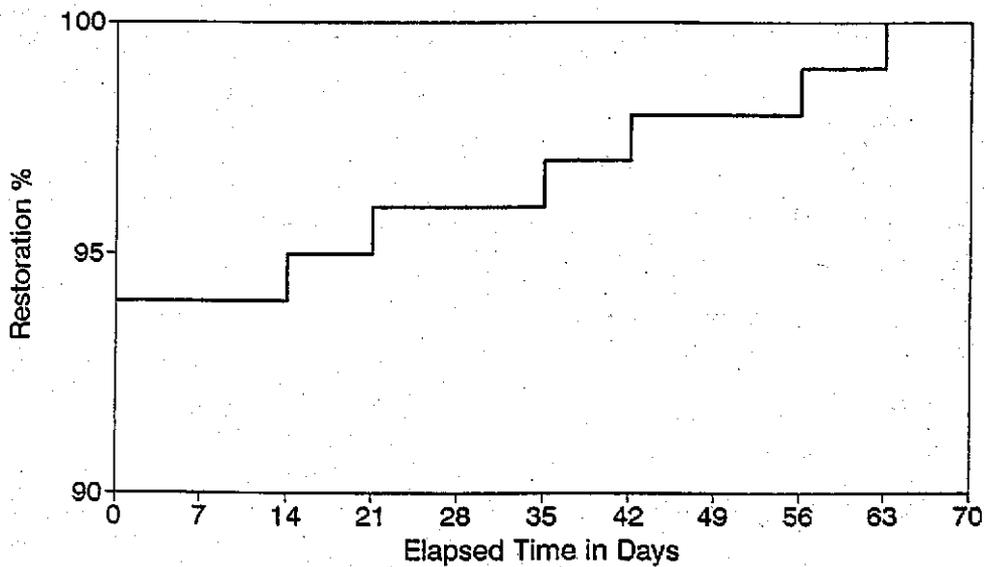


Figure C-198 Residual capacity of Missouri upgraded electric system following New Madrid event (M=7.0).

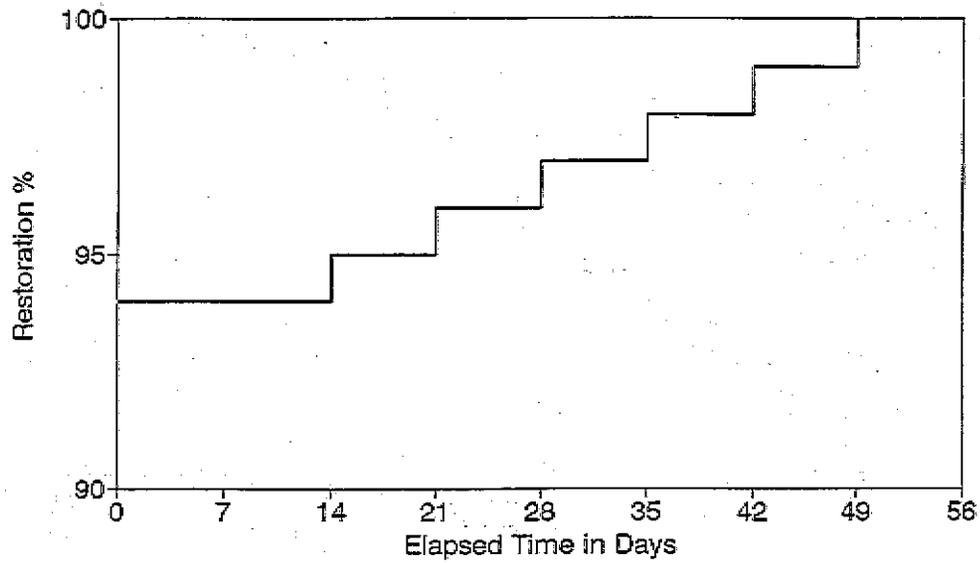


Figure C-199 Residual capacity of Arkansas upgraded electric system following New Madrid event (M=7.0).

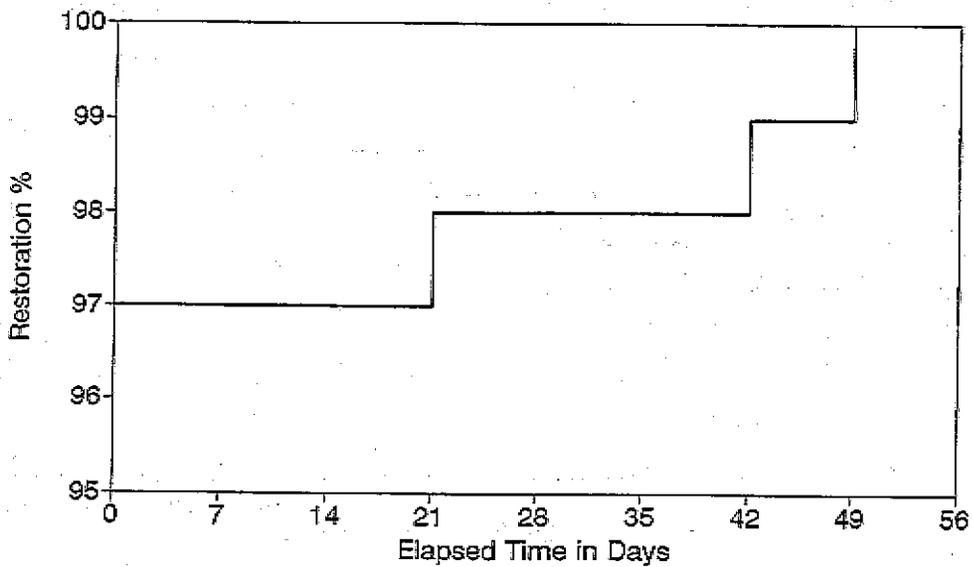


Figure C-200 Residual capacity of Tennessee upgraded electric system following New Madrid event (M=7.0).

Appendix D: Economic Analysis Data

Table of Contents

	<u>Page</u>
Percent Value Added Lost Due to Specified Percent Loss Tables.....	408
Table D.1 Water Supply.....	408
Table D.2 Electric.....	409
Table D.3 Oil Supply.....	410
Table D.4 Natural Gas Supply.....	411
Table D.5 Highways.....	412
Table D.6 Railroads.....	413
Table D.7 Sanitary Sewer.....	414
Table D.8 Air Transportation.....	415
Table D.9 Ports.....	416
Table D.10 Telephone.....	417
Residual Value Added After Loss of Capacity Tables.....	418
Table D.11 Water Supply.....	418
Table D.12 Electric.....	419
Table D.13 Water Supply.....	420
Table D.14 Natural Gas Supply.....	421
Table D.15 Highways.....	422
Table D.16 Railroads.....	423
Table D.17 Sanitary Sewer.....	424
Table D.18 Air Transportation.....	425
Table D.19 Ports.....	426
Table D.20 Telephone.....	427
Residual Value Added as a Function of Lifeline Capacity Figures.....	428
Figure D.1 Oil Supply.....	428
Figure D.2 Natural Gas Supply.....	428
Figure D.3 Telephone.....	429
Figure D.4 Air Transportation.....	429
Figure D.5 Water Supply.....	430
Figure D.6 Electric.....	430
Figure D.7 Highways.....	431
Figure D.8 Railroads.....	431
Figure D.9 Sanitary Sewer.....	432

Table D-1 Percent Value-Added Lost Due to Specified Percent Loss of Water Supply Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)										
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
2 Agr. Prod.	1.06%	3.68%	11.05%	18.42%	25.79%	33.16%	40.53%	47.89%	55.26%	62.63%	70.00%
3 AgServ For. Fish	0.11%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
4 Mining	3.89%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
5 Construction	5.52%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
6 Food Tobacco	2.41%	3.68%	11.05%	18.42%	25.79%	33.16%	40.53%	47.89%	55.26%	62.63%	70.00%
7 Textile Goods	0.37%	3.68%	11.05%	18.42%	25.79%	33.16%	40.53%	47.89%	55.26%	62.63%	70.00%
8 Misc Text. Prod.	0.73%	3.68%	11.05%	18.42%	25.79%	33.16%	40.53%	47.89%	55.26%	62.63%	70.00%
9 Lumber & Wood	0.52%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
10 Furniture	0.34%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
11 Pulp & Paper	0.87%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
12 Print & Publish	1.31%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
13 Chemical & Drugs	1.40%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
14 Petrol. Refining	0.96%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
15 Rubber & Plastic	1.03%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
16 Leather Prods.	0.12%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
17 Glass Stone Clay	0.62%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
18 Prim. Metal Prod.	1.04%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
19 Fab. Metal Prod.	1.64%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
20 Mach. Exc. Elec.	1.56%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
21 Elec. & Electron	2.52%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
22 Transport Eq.	2.62%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
23 Instruments	0.68%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
24 Misc. Manufact.	0.69%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
25 Transp & Whse.	3.46%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
26 Utilities	5.89%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
27 Wholesale Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
28 Retail Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
29 F.I.R.E.	16.64%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
30 Pers./Prof. Serv.	8.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
31 Eating Drinking	2.12%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
32 Auto Serv.	1.09%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
33 Amuse & Rec.	0.70%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
34 Health Ed. Soc.	6.30%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
35 Govt & Govt ind.	11.79%	1.32%	3.95%	6.58%	9.21%	11.84%	14.47%	17.11%	19.74%	22.37%	25.00%
36 Households	0.25%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
TOTAL	100.00%	2.70%	8.11%	13.52%	18.93%	24.34%	29.75%	35.16%	40.57%	45.98%	51.39%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-2 Percent Value-Added Lost Due to Specified Percent Loss of Electric Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
2 Agr. Prod.	1.06%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
3 AgServ For. Fish	0.11%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
4 Mining	3.89%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
5 Construction	5.52%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
6 Food Tobacco	2.41%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
7 Textile Goods	0.37%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
8 Misc Text. Prod.	0.73%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
9 Lumber & Wood	0.52%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
10 Furniture	0.34%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
11 Pulp & Paper	0.87%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
12 Print & Publish	1.31%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
13 Chemical & Drugs	1.40%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
14 Petrol. Refining	0.96%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
15 Rubber & Plastic	1.03%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
16 Leather Prods.	0.12%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
17 Glass Stone Clay	0.62%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
18 Prim. Metal Prod.	1.04%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
19 Fab. Metal Prod.	1.64%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
20 Mach. Exc. Elec.	1.56%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
21 Elec. & Electron	2.52%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
22 Transport Eq.	2.62%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
23 Instruments	0.68%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
24 Misc. Manufact.	0.69%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
25 Transp & Whse.	3.46%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
26 Utilities	5.89%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
27 Wholesale Trade	5.63%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
28 Retail Trade	5.63%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
29 F.I.R.E.	16.64%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
30 Pers./Prof. Serv.	8.03%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
31 Eating Drinking	2.12%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
32 Auto Serv.	1.09%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
33 Amuse & Rec.	0.70%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
34 Health Ed. Soc.	6.30%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
35 Govt & Govt Ind.	11.79%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
36 Households	0.25%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
TOTAL	100.00%	4.52%	13.55%	22.59%	31.62%	40.66%	49.69%	58.73%	67.76%	76.80%	85.83%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-3 Percent Value-Added Lost Due to Specified Percent Loss of Oil Supply Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
2 Agr. Prod.	1.06%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
3 AgServ For. Fish	0.11%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
4 Mining	3.89%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
5 Construction	5.52%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
6 Food Tobacco	2.41%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
7 Textile Goods	0.37%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
8 Misc Text. Prod.	0.73%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
9 Lumber & Wood	0.52%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
10 Furniture	0.34%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
11 Pulp & Paper	0.87%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
12 Print & Publish	1.31%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
13 Chemical Drugs	1.40%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
14 Petrol. Refining	0.96%	5.26%	15.79%	26.32%	36.84%	47.37%	57.89%	68.42%	78.95%	89.47%	100.00%
15 Rubber & Plastic	1.03%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
16 Leather Prods.	0.12%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
17 Glass Stone Clay	0.62%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
18 Prim. Metal Prod.	1.04%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
19 Fab. Metal Prod.	1.64%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
20 Mach. Exc. Elec.	1.56%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
21 Elec. & Electron	2.52%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
22 Transport Eq.	2.62%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
23 Instruments	0.68%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
24 Misc. Manufact.	0.69%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
25 Transp & Whse.	3.46%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
26 Utilities	5.89%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
27 Wholesale Trade	5.63%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
28 Retail Trade	5.63%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
29 F.I.R.E.	16.64%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
30 Pers./Prof. Serv.	8.03%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
31 Eating Drinking	2.12%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
32 Auto Serv.	1.09%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
33 Amuse & Rec.	0.70%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
34 Health Ed. Soc.	6.30%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
35 Govt & Govt Ind.	11.79%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
36 Households	0.25%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
TOTAL	100.00%	3.25%	9.74%	16.23%	22.72%	29.21%	35.70%	42.19%	48.68%	55.18%	61.67%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-4 Percent Value-Added Lost Due to Specified Percent Loss of Natural Gas Supply Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)										
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
2 Agr. Prod.	1.06%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
3 AgServ For. Fish	0.11%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
4 Mining	3.89%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
5 Construction	5.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6 Food Tobacco	2.41%	1.32%	3.95%	6.58%	9.21%	11.84%	14.47%	17.11%	19.74%	22.37%	25.00%
7 Textile Goods	0.37%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
8 Misc Text. Prod.	0.73%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
9 Lumber & Wood	0.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
10 Furniture	0.34%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
11 Pulp & Paper	0.87%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
12 Print & Publish	1.31%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
13 Chemical & Drugs	1.40%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
14 Petrol. Refining	0.96%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
15 Rubber & Plastic	1.03%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
16 Leather Prods.	0.12%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
17 Glass Stone Clay	0.62%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
18 Prim. Metal Prod.	1.04%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
19 Fab. Metal Prod.	1.64%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
20 Mach. Exc. Elec.	1.56%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
21 Elec. & Electron	2.52%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
22 Transport Eq.	2.62%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
23 Instruments	0.68%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
24 Misc. Manufact.	0.89%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
25 Transp & Whse.	3.46%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
26 Utilities	5.89%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
27 Wholesale Trade	5.63%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
28 Retail Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
29 F.I.R.E.	16.64%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
30 Pers./Prof Serv.	8.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
31 Eating Drinking	2.12%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
32 Auto Serv.	1.09%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
33 Amuse & Rec.	0.70%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
34 Health Ed. Soc.	6.30%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
35 Govt & Govt Ind.	11.79%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
36 Households	0.25%	1.84%	5.53%	9.21%	12.89%	16.58%	20.26%	23.95%	27.63%	31.32%	35.00%
TOTAL	100.00%	1.68%	5.04%	8.41%	11.77%	15.13%	18.49%	21.86%	25.22%	28.58%	31.94%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-5 Percent Value-Added Lost Due to Specified Percent Loss of Highways Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)										
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
2 Agr. Prod/	1.06%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
3 AgServ For. Fish	0.11%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
4 Mining	3.89%	1.84%	5.53%	9.21%	12.89%	16.58%	20.26%	23.95%	27.63%	31.32%	35.00%
5 Construction	5.52%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
6 Food Tobacco	2.41%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
7 Textile Goods	0.37%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
8 Misc.Text. Prod.	0.73%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
9 Lumber & Wood	0.52%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
10 Furniture	0.34%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
11 Pulp & Paper	0.87%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
12 Print & Publish	1.31%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
13 Chemical & Drugs	1.40%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
14 Petrol. Refining	0.96%	4.74%	14.21%	23.68%	33.16%	42.63%	52.11%	61.58%	71.05%	80.53%	90.00%
15 Rubber & Plastic	1.03%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
16 Leather Prods.	0.12%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
17 Glass Stone Clay	0.62%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
18 Prim. Metal Prod.	1.04%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
19 Fab. Metal Prod.	1.64%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
20 Mach. Exc. Elec.	1.56%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
21 Elec. & Electron	2.52%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
22 Transport Eq.	2.62%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
23 Instruments	0.68%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
24 Misc. Manufact.	0.69%	3.95%	11.84%	19.74%	27.63%	35.53%	43.42%	51.32%	59.21%	67.11%	75.00%
25 Transp & Whse.	3.46%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
26 Utilities	5.89%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
27 Wholesale Trade	5.63%	3.68%	11.05%	18.42%	25.79%	33.16%	40.53%	47.89%	55.26%	62.63%	70.00%
28 Retail Trade	5.63%	2.89%	8.68%	14.47%	20.26%	26.05%	31.84%	37.63%	43.42%	49.21%	55.00%
29 F.I.R.E.	16.64%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
30 Pers./Prof. Serv.	8.03%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
31 Eating Drinking	2.12%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
32 Auto Serv.	1.09%	2.89%	8.68%	14.47%	20.26%	26.05%	31.84%	37.63%	43.42%	49.21%	55.00%
33 Amuse & Rec.	0.70%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
34 Health Ed. Soc.	6.30%	2.89%	8.68%	14.47%	20.26%	26.05%	31.84%	37.63%	43.42%	49.21%	55.00%
35 Govt & Govt Ind.	11.79%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
36 Households	0.25%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
TOTAL	100.00%	3.50%	10.50%	17.51%	24.51%	31.51%	38.52%	45.52%	52.52%	59.52%	66.53%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-6 Percent Value-Added Lost Due to Specified Percent Loss of Railroads Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)										
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
2 Agr. Prod.	1.06%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
3 AgServ For. Fish	0.11%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
4 Mining	3.89%	1.84%	5.53%	9.21%	12.89%	16.58%	20.26%	23.95%	27.63%	31.32%	35.00%
5 Construction	5.52%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
6 Food Tobacco	2.41%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
7 Textile Goods	0.37%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
8 Misc Text. Prod.	0.73%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
9 Lumber & Wood	0.52%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
10 Furniture	0.34%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
11 Pulp & Paper	0.87%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
12 Print & Publish	1.31%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
13 Chemical	1.40%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
14 Petrol. Refining	0.96%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
15 Rubber & Plastic	1.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
16 Leather Prods.	0.12%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
17 Glass Stone Clay	0.62%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
18 Prim. Metal Prod.	1.04%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
19 Fab. Metal Prod.	1.64%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
20 Mach. Exc. Elec.	1.56%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
21 Elec. & Electron	2.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
22 Transport Eq.	2.62%	2.37%	7.11%	11.84%	16.58%	21.32%	26.05%	30.79%	35.53%	40.26%	45.00%
23 Instruments	0.68%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
24 Misc. Manufact.	0.69%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
25 Transp & Whse.	3.46%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
26 Utilites	5.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
27 Wholesale Trade	5.63%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
28 Retail Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
29 F.I.R.E.	16.64%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
30 Pers./Prof. Serv.	8.03%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
31 Eating Drinking	2.12%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
32 Auto Serv.	1.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33 Amuse & Rec.	0.70%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
34 Health Ed. Soc.	6.90%	0.26%	0.79%	1.32%	1.84%	2.37%	2.89%	3.42%	3.95%	4.47%	5.00%
35 Govt & Govt Ind.	11.79%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
36 Households	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	100.00%	1.18%	3.53%	5.88%	8.24%	10.59%	12.95%	15.30%	17.65%	20.01%	22.36%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-7 Percent Value-Added Lost Due to Specified Percent Loss of Sanitary Sewer Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
2 Agr. Prod.	1.06%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
3 AgServ For. Fish	0.11%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
4 Mining	3.89%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%
5 Construction	5.52%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
6 Food Tobacco	2.41%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%
7 Textile Goods	0.37%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%
8 Misc Text. Prod.	0.73%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%	-3.68%
9 Lumber & Wood	0.52%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
10 Furniture	0.34%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
11 Pulp & Paper	0.87%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
12 Print & Publish	1.31%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%	-1.58%
13 Chemical & Drugs	1.40%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
14 Petrol. Refining	0.96%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
15 Rubber & Plastic	1.03%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
16 Leather Prods.	0.12%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
17 Glass Stone Clay	0.62%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%	-2.63%
18 Prim. Metal Prod.	1.04%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
19 Fab. Metal Prod.	1.64%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
20 Mach. Exc. Elec.	1.56%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
21 Elec. & Electron	2.52%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%	-4.74%
22 Transport Eq.	2.62%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
23 Instruments	0.68%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%
24 Misc. Manufact.	0.69%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%	-3.16%
25 Transp & Whse.	3.46%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%
26 Utilities	5.89%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%	-1.26%
27 Wholesale Trade	5.63%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%	-0.53%
28 Retail Trade	5.63%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
29 F.I.R.E.	16.64%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
30 Pers./Prof Serv.	8.03%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
31 Eating Drinking	2.12%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
32 Auto Serv.	1.09%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
33 Amuse & Rec.	0.70%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
34 Health Ed. Soc.	6.30%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%	-4.21%
35 Govt & Govt Ind.	11.79%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%	-1.05%
36 Households	0.25%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%	-3.95%
TOTAL	100.00%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%	-2.69%
		Avg.	Total V.A Pct. V.A.								

Table D-8 Percent Value-Added Lost Due to Specified Percent Loss of Air Transportation Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	Percent Value-Added Lost									
		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
2 Agr. Prod.	1.06%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
3 AgServ For. Fish	0.11%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
4 Mining	3.89%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
5 Construction	5.52%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6 Food Tobacco	2.41%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
7 Textile Goods	0.37%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
8 Misc Text. Prod.	0.73%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
9 Lumber & Wood	0.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
10 Furniture	0.34%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
11 Pulp & Paper	0.87%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
12 Print & Publish	1.31%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
13 Chemical & Drugs	1.40%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
14 Petrol. Refining	0.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15 Rubber & Plastic	1.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
16 Leather Prods.	0.12%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
17 Glass Stone Clay	0.62%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
18 Prim. Metal Prod.	1.04%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
19 Fab. Metal Prod.	1.64%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
20 Mach. Exc. Elec.	1.56%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
21 Elec. & Electron	2.52%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
22 Transport Eq.	2.62%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
23 Instruments	0.68%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
24 Misc. Manufact.	0.69%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
25 Transp & Whse.	3.46%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
26 Utilities	5.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
27 Wholesale Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
28 Retail Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
29 F.I.R.E.	16.64%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
30 Pers./Prof Serv.	8.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
31 Eating Drinking	2.12%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
32 Auto Serv.	1.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33 Amuse & Rec.	0.70%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
34 Health Ed. Soc.	6.30%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
35 Govt & Govt. Ind.	11.79%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
36 Households	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	100.00%	0.92%	2.76%	4.61%	6.45%	8.29%	10.13%	11.97%	13.82%	15.66%	17.50%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-9 Percent Value-Added Lost Due to Specified Percent Loss of Water Transportation Lifeline (Ports)

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
2 Agr. Prod.	1.06%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
3 AgServ For. Fish	0.11%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
4 Mining	3.89%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
5 Construction	5.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
6 Food Tobacco	2.41%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
7 Textile Goods	0.37%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
8 Misc Text. Prod.	0.73%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
9 Lumber & Wood	0.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
10 Furniture	0.34%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
11 Pulp & Paper	0.87%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
12 Print & Publish	1.31%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
13 Chemical & Drugs	1.40%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
14 Petrol. Refining	0.96%	4.21%	12.63%	21.05%	29.47%	37.89%	46.32%	54.74%	63.16%	71.58%	80.00%
15 Rubber & Plastic	1.03%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
16 Leather Prods.	0.12%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
17 Glass Stone Clay	0.62%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
18 Prim. Metal Prod.	1.04%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
19 Fab. Metal Prod.	1.64%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
20 Mach. Exc. Elec.	1.56%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
21 Elec. & Electron	2.52%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
22 Transport Eq.	2.62%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
23 Instruments	0.68%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
24 Misc. Manufact.	0.69%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
25 Transp & Whse.	3.46%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
26 Utilities	5.89%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
27 Wholesale Trade	5.63%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
28 Retail Trade	5.63%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
29 F.I.R.E.	16.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
30 Pers./Prof. Serv.	8.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
31 Eating Drinking	2.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
32 Auto Serv.	1.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33 Amuse & Rec.	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
34 Health Ed. Soc.	6.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
35 Govt & Govt Ind.	11.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
36 Households	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOTAL	100.00%	0.99%	2.98%	4.97%	6.96%	8.95%	10.94%	12.92%	14.91%	16.90%	18.89%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A. Pct. V.A.

Table D-10 Percent Value-Added Lost Due to Specified Percent Loss of Telephone Lifeline

L/L Capacity Loss-->	U.S. Econ. Value Added (Percent)	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1 Livestock	0.45%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
2 Agr. Prod.	1.06%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
3 AgServ For. Fish	0.11%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
4 Mining	3.89%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
5 Construction	5.52%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
6 Food Tobacco	2.41%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
7 Textile Goods	0.37%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
8 Misc Text. Prod.	0.73%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
9 Lumber & Wood	0.52%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
10 Furniture	0.34%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
11 Pulp & Paper	0.87%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
12 Print & Publish	1.31%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
13 Chemical & Drugs	1.40%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
14 Petrol. Refining	0.96%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
15 Rubber & Plastic	1.03%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
16 Leather Prods.	0.12%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
17 Glass Stone Clay	0.62%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
18 Prim. Metal Prod.	1.04%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
19 Fab. Metal Prod.	1.64%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
20 Mach. Exc. Elec.	1.56%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
21 Elec. & Electron	2.52%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
22 Transport Eq.	2.62%	0.53%	1.58%	2.63%	3.68%	4.74%	5.79%	6.84%	7.89%	8.95%	10.00%
23 Instruments	0.68%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
24 Misc. Manufact.	0.69%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
25 Transp & Whse.	3.46%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
26 Utilities	5.89%	1.58%	4.74%	7.89%	11.05%	14.21%	17.37%	20.53%	23.68%	26.84%	30.00%
27 Wholesale Trade	5.63%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
28 Retail Trade	5.63%	2.63%	7.89%	13.16%	18.42%	23.68%	28.95%	34.21%	39.47%	44.74%	50.00%
29 F.I.R.E.	16.64%	3.16%	9.47%	15.79%	22.11%	28.42%	34.74%	41.05%	47.37%	53.68%	60.00%
30 Pers./Prof. Serv.	8.03%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
31 Eating Drinking	2.12%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
32 Auto Serv.	1.09%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
33 Amuse & Rec.	0.70%	2.11%	6.32%	10.53%	14.74%	18.95%	23.16%	27.37%	31.58%	35.79%	40.00%
34 Health Ed. Soc.	6.30%	0.79%	2.37%	3.95%	5.53%	7.11%	8.68%	10.26%	11.84%	13.42%	15.00%
35 Govt & Govt Ind.	11.79%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
36 Households	0.25%	1.05%	3.16%	5.26%	7.37%	9.47%	11.58%	13.68%	15.79%	17.89%	20.00%
TOTAL	100.00%	1.15%	3.46%	5.77%	8.08%	10.39%	12.70%	15.01%	17.32%	19.63%	21.94%
		Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Total V.A Pct. V.A.

Table D-11 Residual Value-Added After Loss of Capacity--Water Supply Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.40%	0.38%	0.36%	0.34%	0.31%	0.29%	0.27%	0.25%
1.06%	1.02%	0.94%	0.86%	0.79%	0.71%	0.63%	0.55%	0.47%	0.40%	0.32%
0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.08%	0.08%	0.07%	0.07%	0.06%
3.89%	3.86%	3.80%	3.74%	3.67%	3.61%	3.55%	3.49%	3.43%	3.37%	3.31%
5.52%	5.37%	5.08%	4.79%	4.50%	4.21%	3.92%	3.63%	3.34%	3.05%	2.76%
2.41%	2.32%	2.14%	1.96%	1.79%	1.61%	1.43%	1.25%	1.08%	0.90%	0.72%
0.37%	0.36%	0.33%	0.30%	0.28%	0.25%	0.22%	0.19%	0.17%	0.14%	0.11%
0.73%	0.70%	0.65%	0.59%	0.54%	0.49%	0.43%	0.38%	0.33%	0.27%	0.22%
0.52%	0.50%	0.48%	0.45%	0.42%	0.39%	0.37%	0.34%	0.31%	0.29%	0.26%
0.34%	0.33%	0.31%	0.29%	0.28%	0.26%	0.24%	0.22%	0.21%	0.19%	0.17%
0.87%	0.84%	0.79%	0.73%	0.68%	0.62%	0.57%	0.51%	0.46%	0.40%	0.35%
1.31%	1.29%	1.25%	1.21%	1.17%	1.13%	1.08%	1.04%	1.00%	0.96%	0.92%
1.40%	1.34%	1.23%	1.11%	0.99%	0.87%	0.75%	0.64%	0.52%	0.40%	0.28%
0.96%	0.94%	0.89%	0.84%	0.79%	0.73%	0.68%	0.63%	0.58%	0.53%	0.48%
1.03%	1.00%	0.95%	0.89%	0.84%	0.79%	0.73%	0.68%	0.62%	0.57%	0.51%
0.12%	0.12%	0.11%	0.11%	0.10%	0.09%	0.09%	0.08%	0.07%	0.07%	0.06%
0.82%	0.60%	0.57%	0.54%	0.50%	0.47%	0.44%	0.41%	0.37%	0.34%	0.31%
1.04%	0.99%	0.89%	0.79%	0.70%	0.60%	0.50%	0.40%	0.30%	0.20%	0.10%
1.64%	1.57%	1.43%	1.30%	1.16%	1.02%	0.88%	0.74%	0.60%	0.47%	0.33%
1.56%	1.51%	1.41%	1.31%	1.22%	1.12%	1.02%	0.92%	0.82%	0.72%	0.62%
2.52%	2.40%	2.16%	1.92%	1.69%	1.45%	1.21%	0.97%	0.73%	0.49%	0.25%
2.62%	2.54%	2.37%	2.21%	2.04%	1.87%	1.71%	1.54%	1.38%	1.21%	1.05%
0.68%	0.65%	0.58%	0.52%	0.45%	0.39%	0.33%	0.26%	0.20%	0.13%	0.07%
0.69%	0.67%	0.62%	0.58%	0.54%	0.49%	0.45%	0.41%	0.36%	0.32%	0.27%
3.46%	3.42%	3.35%	3.28%	3.21%	3.13%	3.06%	2.99%	2.91%	2.84%	2.77%
5.89%	5.76%	5.51%	5.27%	5.02%	4.77%	4.52%	4.28%	4.03%	3.78%	3.53%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
16.64%	16.47%	16.12%	15.77%	15.42%	15.07%	14.72%	14.36%	14.01%	13.66%	13.31%
8.03%	7.95%	7.78%	7.61%	7.44%	7.27%	7.10%	6.93%	6.76%	6.59%	6.42%
2.12%	2.03%	1.85%	1.67%	1.50%	1.32%	1.14%	0.96%	0.78%	0.60%	0.42%
1.09%	1.09%	1.08%	1.07%	1.05%	1.04%	1.03%	1.02%	1.01%	1.00%	0.99%
0.70%	0.67%	0.61%	0.55%	0.49%	0.43%	0.37%	0.32%	0.26%	0.20%	0.14%
6.30%	6.17%	5.90%	5.64%	5.37%	5.11%	4.84%	4.57%	4.31%	4.04%	3.78%
11.79%	11.64%	11.33%	11.02%	10.70%	10.39%	10.08%	9.77%	9.46%	9.15%	8.84%
0.25%	0.25%	0.24%	0.22%	0.21%	0.20%	0.19%	0.18%	0.17%	0.16%	0.15%
100.00%	98.06%	94.18%	90.30%	86.43%	82.55%	78.67%	74.79%	70.91%	67.04%	63.16%
100%	98%	94%	90%	86%	83%	79%	75%	71%	67%	63%

Table D-12 Residual Value-Added After Loss of Capacity--Electric Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.39%	0.37%	0.35%	0.32%	0.30%	0.27%	0.25%	0.23%
1.06%	1.03%	0.98%	0.92%	0.86%	0.81%	0.75%	0.70%	0.64%	0.59%	0.53%
0.11%	0.11%	0.10%	0.10%	0.09%	0.08%	0.08%	0.07%	0.07%	0.06%	0.06%
3.89%	3.70%	3.34%	2.97%	2.60%	2.23%	1.86%	1.49%	1.13%	0.76%	0.39%
5.52%	5.40%	5.17%	4.94%	4.71%	4.47%	4.24%	4.01%	3.78%	3.54%	3.31%
2.41%	2.29%	2.06%	1.84%	1.61%	1.38%	1.15%	0.92%	0.70%	0.47%	0.24%
0.37%	0.35%	0.31%	0.27%	0.24%	0.20%	0.16%	0.12%	0.08%	0.04%	0.00%
0.78%	0.69%	0.61%	0.54%	0.46%	0.38%	0.31%	0.23%	0.15%	0.08%	0.00%
0.52%	0.49%	0.43%	0.38%	0.33%	0.27%	0.22%	0.16%	0.11%	0.05%	0.00%
0.34%	0.32%	0.29%	0.25%	0.21%	0.18%	0.14%	0.11%	0.07%	0.04%	0.00%
0.87%	0.83%	0.73%	0.64%	0.55%	0.46%	0.37%	0.28%	0.18%	0.09%	0.00%
1.31%	1.24%	1.10%	0.97%	0.83%	0.69%	0.55%	0.41%	0.28%	0.14%	0.00%
1.40%	1.34%	1.20%	1.07%	0.94%	0.81%	0.67%	0.54%	0.41%	0.27%	0.14%
0.96%	0.91%	0.81%	0.71%	0.61%	0.51%	0.41%	0.30%	0.20%	0.10%	0.00%
1.03%	0.98%	0.87%	0.76%	0.65%	0.54%	0.43%	0.33%	0.22%	0.11%	0.00%
0.12%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%	0.03%	0.01%	0.00%
0.62%	0.59%	0.52%	0.46%	0.39%	0.33%	0.26%	0.20%	0.13%	0.07%	0.00%
1.04%	0.99%	0.89%	0.79%	0.70%	0.60%	0.50%	0.40%	0.30%	0.20%	0.10%
1.64%	1.55%	1.38%	1.21%	1.04%	0.86%	0.69%	0.52%	0.36%	0.17%	0.00%
1.56%	1.48%	1.31%	1.15%	0.99%	0.82%	0.66%	0.49%	0.33%	0.16%	0.00%
2.52%	2.39%	2.12%	1.86%	1.59%	1.33%	1.06%	0.80%	0.53%	0.27%	0.00%
2.62%	2.48%	2.21%	1.93%	1.65%	1.38%	1.10%	0.83%	0.55%	0.28%	0.00%
0.68%	0.64%	0.57%	0.50%	0.43%	0.36%	0.29%	0.21%	0.14%	0.07%	0.00%
0.69%	0.65%	0.58%	0.51%	0.43%	0.36%	0.29%	0.22%	0.14%	0.07%	0.00%
3.46%	3.41%	3.30%	3.19%	3.08%	2.97%	2.86%	2.75%	2.64%	2.53%	2.42%
5.89%	5.64%	5.14%	4.65%	4.15%	3.66%	3.16%	2.66%	2.17%	1.67%	1.18%
5.63%	5.37%	4.83%	4.30%	3.77%	3.23%	2.70%	2.16%	1.63%	1.10%	0.56%
5.63%	5.37%	4.83%	4.30%	3.77%	3.23%	2.70%	2.16%	1.63%	1.10%	0.56%
16.64%	15.85%	14.28%	12.70%	11.12%	9.55%	7.97%	6.39%	4.82%	3.24%	1.66%
8.03%	7.65%	6.89%	6.13%	5.37%	4.61%	3.85%	3.09%	2.32%	1.56%	0.80%
2.12%	2.03%	1.85%	1.67%	1.50%	1.32%	1.14%	0.96%	0.78%	0.60%	0.42%
1.09%	1.04%	0.94%	0.84%	0.73%	0.63%	0.52%	0.42%	0.32%	0.21%	0.11%
0.70%	0.67%	0.61%	0.55%	0.49%	0.43%	0.37%	0.32%	0.26%	0.20%	0.14%
6.30%	6.03%	5.50%	4.97%	4.44%	3.91%	3.38%	2.85%	2.32%	1.79%	1.26%
11.79%	11.42%	10.67%	9.93%	9.18%	8.44%	7.70%	6.95%	6.21%	5.46%	4.72%
0.25%	0.24%	0.22%	0.20%	0.18%	0.16%	0.13%	0.11%	0.09%	0.07%	0.05%
100.00%	95.73%	87.19%	78.66%	70.12%	61.58%	53.04%	44.50%	35.97%	27.43%	18.89%
100%	96%	87%	79%	70%	62%	53%	45%	36%	27%	19%

Table D-13 Residual Value-Added After Loss of Capacity--Oil Supply Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.39%	0.37%	0.35%	0.32%	0.30%	0.27%	0.25%	0.23%
1.06%	1.01%	0.93%	0.84%	0.75%	0.66%	0.57%	0.48%	0.39%	0.30%	0.21%
0.11%	0.11%	0.10%	0.09%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%	0.02%
3.89%	3.70%	3.34%	2.97%	2.60%	2.23%	1.86%	1.49%	1.13%	0.76%	0.39%
5.52%	5.26%	4.73%	4.21%	3.69%	3.17%	2.64%	2.12%	1.60%	1.07%	0.55%
2.41%	2.34%	2.22%	2.09%	1.96%	1.84%	1.71%	1.58%	1.46%	1.33%	1.20%
0.37%	0.36%	0.34%	0.32%	0.30%	0.28%	0.26%	0.25%	0.23%	0.21%	0.19%
0.73%	0.71%	0.67%	0.63%	0.59%	0.55%	0.52%	0.48%	0.44%	0.40%	0.36%
0.52%	0.50%	0.48%	0.45%	0.42%	0.39%	0.37%	0.34%	0.31%	0.29%	0.26%
0.34%	0.33%	0.31%	0.29%	0.28%	0.26%	0.24%	0.22%	0.21%	0.19%	0.17%
0.87%	0.85%	0.80%	0.76%	0.71%	0.66%	0.62%	0.57%	0.53%	0.48%	0.44%
1.31%	1.28%	1.21%	1.14%	1.07%	1.00%	0.93%	0.86%	0.79%	0.72%	0.66%
1.40%	1.37%	1.29%	1.22%	1.15%	1.07%	1.00%	0.92%	0.85%	0.78%	0.70%
0.96%	0.91%	0.81%	0.71%	0.61%	0.51%	0.41%	0.30%	0.20%	0.10%	0.00%
1.03%	1.00%	0.95%	0.89%	0.84%	0.79%	0.73%	0.68%	0.62%	0.57%	0.51%
0.12%	0.12%	0.11%	0.11%	0.10%	0.09%	0.09%	0.08%	0.07%	0.07%	0.06%
0.62%	0.60%	0.57%	0.54%	0.50%	0.47%	0.44%	0.41%	0.37%	0.34%	0.31%
1.04%	0.99%	0.89%	0.79%	0.70%	0.60%	0.50%	0.40%	0.30%	0.20%	0.10%
1.64%	1.60%	1.51%	1.42%	1.34%	1.25%	1.17%	1.08%	0.99%	0.91%	0.82%
1.56%	1.52%	1.44%	1.35%	1.27%	1.19%	1.11%	1.03%	0.94%	0.86%	0.78%
2.52%	2.46%	2.32%	2.19%	2.06%	1.92%	1.79%	1.66%	1.53%	1.39%	1.26%
2.62%	2.49%	2.25%	2.00%	1.75%	1.50%	1.25%	1.01%	0.76%	0.51%	0.26%
0.68%	0.66%	0.63%	0.59%	0.55%	0.52%	0.48%	0.45%	0.41%	0.38%	0.34%
0.69%	0.67%	0.63%	0.60%	0.56%	0.52%	0.49%	0.45%	0.42%	0.38%	0.34%
3.46%	3.30%	2.97%	2.64%	2.31%	1.99%	1.66%	1.33%	1.00%	0.67%	0.35%
5.89%	5.73%	5.42%	5.11%	4.80%	4.49%	4.18%	3.87%	3.56%	3.25%	2.94%
5.63%	5.49%	5.19%	4.89%	4.60%	4.30%	4.00%	3.71%	3.41%	3.11%	2.82%
5.63%	5.37%	4.83%	4.30%	3.77%	3.23%	2.70%	2.16%	1.63%	1.10%	0.56%
16.64%	16.12%	15.07%	14.01%	12.96%	11.91%	10.86%	9.81%	8.76%	7.71%	6.66%
8.03%	7.78%	7.27%	6.76%	6.26%	5.75%	5.24%	4.73%	4.23%	3.72%	3.21%
2.12%	2.03%	1.85%	1.67%	1.50%	1.32%	1.14%	0.96%	0.78%	0.60%	0.42%
1.09%	1.04%	0.94%	0.84%	0.73%	0.63%	0.52%	0.42%	0.32%	0.21%	0.11%
0.70%	0.66%	0.60%	0.53%	0.47%	0.40%	0.33%	0.27%	0.20%	0.14%	0.07%
6.30%	6.23%	6.10%	5.97%	5.83%	5.70%	5.57%	5.44%	5.30%	5.17%	5.04%
11.79%	11.67%	11.42%	11.17%	10.92%	10.67%	10.43%	10.18%	9.93%	9.68%	9.43%
0.25%	0.24%	0.23%	0.22%	0.21%	0.19%	0.18%	0.17%	0.15%	0.14%	0.13%
100.00%	96.94%	90.83%	84.71%	78.60%	72.48%	66.37%	60.25%	54.14%	48.02%	41.91%
100%	97%	91%	85%	79%	72%	66%	60%	54%	48%	42%

Table D-14 Residual Value-Added After Loss of Capacity--Natural Gas Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.45%	0.45%	0.44%	0.44%	0.43%	0.43%	0.42%	0.42%	0.41%	0.41%
1.06%	1.04%	1.01%	0.98%	0.94%	0.91%	0.88%	0.84%	0.81%	0.77%	0.74%
0.11%	0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.09%	0.08%	0.08%	0.08%
3.89%	3.87%	3.83%	3.73%	3.75%	3.70%	3.66%	3.62%	3.58%	3.54%	3.50%
5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%
2.41%	2.37%	2.31%	2.25%	2.18%	2.12%	2.06%	1.99%	1.93%	1.87%	1.80%
0.37%	0.37%	0.36%	0.35%	0.35%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%
0.73%	0.72%	0.70%	0.69%	0.67%	0.66%	0.64%	0.63%	0.61%	0.60%	0.58%
0.52%	0.51%	0.50%	0.49%	0.48%	0.47%	0.46%	0.45%	0.43%	0.42%	0.41%
0.34%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%	0.29%	0.29%	0.28%	0.27%
0.87%	0.85%	0.82%	0.78%	0.74%	0.71%	0.67%	0.63%	0.60%	0.56%	0.52%
1.31%	1.30%	1.27%	1.24%	1.22%	1.19%	1.16%	1.13%	1.10%	1.08%	1.05%
1.40%	1.34%	1.20%	1.07%	0.94%	0.81%	0.67%	0.54%	0.41%	0.27%	0.14%
0.96%	0.94%	0.89%	0.84%	0.79%	0.73%	0.68%	0.63%	0.58%	0.53%	0.48%
1.03%	1.00%	0.95%	0.89%	0.84%	0.79%	0.73%	0.68%	0.62%	0.57%	0.51%
0.12%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%	0.10%	0.10%	0.10%
0.62%	0.60%	0.57%	0.54%	0.50%	0.47%	0.44%	0.41%	0.37%	0.34%	0.31%
1.04%	1.01%	0.96%	0.90%	0.85%	0.79%	0.74%	0.68%	0.63%	0.58%	0.52%
1.64%	1.60%	1.51%	1.42%	1.34%	1.25%	1.17%	1.08%	0.99%	0.91%	0.82%
1.56%	1.52%	1.44%	1.35%	1.27%	1.19%	1.11%	1.03%	0.94%	0.86%	0.78%
2.52%	2.46%	2.32%	2.19%	2.06%	1.92%	1.79%	1.66%	1.53%	1.39%	1.26%
2.62%	2.55%	2.41%	2.27%	2.14%	2.00%	1.86%	1.72%	1.59%	1.45%	1.31%
0.68%	0.65%	0.60%	0.55%	0.49%	0.44%	0.38%	0.33%	0.28%	0.22%	0.17%
0.69%	0.67%	0.63%	0.60%	0.56%	0.52%	0.49%	0.45%	0.42%	0.38%	0.34%
3.46%	3.46%	3.46%	3.46%	3.46%	3.46%	3.46%	3.46%	3.46%	3.46%	3.46%
5.89%	5.76%	5.51%	5.27%	5.02%	4.77%	4.52%	4.28%	4.03%	3.78%	3.53%
5.63%	5.60%	5.54%	5.49%	5.43%	5.37%	5.31%	5.25%	5.19%	5.13%	5.07%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
16.64%	16.47%	16.12%	15.77%	15.42%	15.07%	14.72%	14.36%	14.01%	13.66%	13.31%
8.03%	7.95%	7.78%	7.61%	7.44%	7.27%	7.10%	6.93%	6.76%	6.59%	6.42%
2.12%	2.08%	1.99%	1.90%	1.81%	1.72%	1.63%	1.54%	1.45%	1.36%	1.27%
1.09%	1.09%	1.09%	1.08%	1.07%	1.07%	1.06%	1.06%	1.05%	1.05%	1.04%
0.70%	0.68%	0.65%	0.62%	0.59%	0.56%	0.54%	0.51%	0.48%	0.45%	0.42%
6.30%	6.23%	6.10%	5.97%	5.83%	5.70%	5.57%	5.44%	5.30%	5.17%	5.04%
11.79%	11.67%	11.42%	11.17%	10.92%	10.67%	10.43%	10.18%	9.93%	9.68%	9.43%
0.25%	0.25%	0.24%	0.23%	0.22%	0.21%	0.20%	0.19%	0.18%	0.17%	0.16%
100.00%	98.72%	96.15%	93.58%	91.01%	88.45%	85.88%	83.31%	80.74%	78.17%	75.61%
100%	99%	96%	94%	91%	88%	86%	83%	81%	78%	76%

Table D-15 Residual Value-Added After Loss of Capacity--Highways Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.39%	0.37%	0.35%	0.32%	0.30%	0.27%	0.25%	0.23%
1.06%	1.01%	0.93%	0.84%	0.75%	0.66%	0.57%	0.48%	0.39%	0.30%	0.21%
0.11%	0.11%	0.10%	0.09%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%	0.02%
3.89%	3.82%	3.67%	3.53%	3.39%	3.24%	3.10%	2.96%	2.81%	2.67%	2.53%
5.52%	5.40%	5.17%	4.94%	4.71%	4.47%	4.24%	4.01%	3.78%	3.54%	3.31%
2.41%	2.31%	2.10%	1.90%	1.70%	1.49%	1.29%	1.09%	0.89%	0.68%	0.48%
0.37%	0.36%	0.33%	0.30%	0.27%	0.24%	0.21%	0.18%	0.15%	0.12%	0.09%
0.73%	0.70%	0.64%	0.58%	0.53%	0.47%	0.41%	0.35%	0.30%	0.24%	0.18%
0.52%	0.49%	0.44%	0.39%	0.34%	0.30%	0.25%	0.20%	0.15%	0.10%	0.05%
0.34%	0.33%	0.30%	0.27%	0.25%	0.22%	0.19%	0.16%	0.14%	0.11%	0.08%
0.87%	0.83%	0.76%	0.69%	0.61%	0.54%	0.47%	0.39%	0.32%	0.25%	0.17%
1.31%	1.26%	1.16%	1.05%	0.95%	0.85%	0.74%	0.64%	0.54%	0.43%	0.33%
1.40%	1.34%	1.23%	1.11%	0.99%	0.87%	0.75%	0.64%	0.52%	0.40%	0.28%
0.96%	0.92%	0.83%	0.73%	0.64%	0.55%	0.46%	0.37%	0.28%	0.19%	0.10%
1.03%	0.99%	0.91%	0.83%	0.75%	0.66%	0.58%	0.50%	0.42%	0.34%	0.26%
0.12%	0.12%	0.11%	0.10%	0.09%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
0.62%	0.59%	0.54%	0.50%	0.45%	0.40%	0.35%	0.30%	0.25%	0.20%	0.15%
1.04%	1.00%	0.91%	0.82%	0.73%	0.65%	0.56%	0.47%	0.38%	0.30%	0.21%
1.64%	1.57%	1.43%	1.30%	1.16%	1.02%	0.88%	0.74%	0.60%	0.47%	0.33%
1.56%	1.49%	1.36%	1.23%	1.10%	0.97%	0.84%	0.71%	0.57%	0.44%	0.31%
2.52%	2.42%	2.22%	2.02%	1.83%	1.63%	1.43%	1.23%	1.03%	0.83%	0.63%
2.62%	2.51%	2.29%	2.07%	1.85%	1.63%	1.41%	1.19%	0.96%	0.74%	0.52%
0.68%	0.65%	0.59%	0.54%	0.48%	0.42%	0.36%	0.31%	0.25%	0.19%	0.14%
0.69%	0.66%	0.61%	0.55%	0.50%	0.44%	0.39%	0.33%	0.28%	0.23%	0.17%
3.46%	3.31%	3.02%	2.73%	2.44%	2.15%	1.86%	1.57%	1.27%	0.98%	0.69%
5.89%	5.76%	5.51%	5.27%	5.02%	4.77%	4.52%	4.28%	4.03%	3.78%	3.53%
5.63%	5.43%	5.01%	4.60%	4.18%	3.77%	3.35%	2.94%	2.52%	2.11%	1.69%
5.63%	5.47%	5.14%	4.82%	4.49%	4.17%	3.84%	3.51%	3.19%	2.86%	2.54%
16.64%	16.25%	15.46%	14.67%	13.88%	13.09%	12.31%	11.52%	10.73%	9.94%	9.15%
8.03%	7.84%	7.46%	7.08%	6.70%	6.32%	5.94%	5.56%	5.18%	4.80%	4.42%
2.12%	2.06%	1.95%	1.84%	1.73%	1.62%	1.51%	1.40%	1.28%	1.17%	1.06%
1.09%	1.06%	1.00%	0.94%	0.87%	0.81%	0.75%	0.68%	0.62%	0.56%	0.49%
0.70%	0.68%	0.64%	0.60%	0.57%	0.53%	0.49%	0.46%	0.42%	0.38%	0.35%
6.30%	6.12%	5.75%	5.39%	5.02%	4.66%	4.29%	3.93%	3.56%	3.20%	2.83%
11.79%	11.60%	11.23%	10.86%	10.49%	10.12%	9.74%	9.37%	9.00%	8.63%	8.25%
0.25%	0.25%	0.24%	0.22%	0.21%	0.20%	0.19%	0.18%	0.17%	0.16%	0.15%
100.00%	97.16%	91.47%	85.79%	80.10%	74.41%	68.73%	63.04%	57.36%	51.67%	45.98%
100%	97%	91%	86%	80%	74%	69%	63%	57%	52%	46%

Table D-16 Residual Value-Added After Loss of Capacity--Railroads Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.41%	0.39%	0.37%	0.35%	0.33%	0.31%	0.29%	0.27%
1.06%	1.04%	0.99%	0.95%	0.90%	0.86%	0.81%	0.77%	0.72%	0.68%	0.64%
0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.08%	0.08%	0.08%	0.07%	0.07%
3.89%	3.82%	3.67%	3.53%	3.39%	3.24%	3.10%	2.96%	2.81%	2.67%	2.53%
5.52%	5.50%	5.48%	5.45%	5.42%	5.39%	5.36%	5.33%	5.30%	5.27%	5.24%
2.41%	2.38%	2.33%	2.28%	2.23%	2.18%	2.13%	2.08%	2.03%	1.98%	1.93%
0.37%	0.37%	0.36%	0.35%	0.35%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%
0.73%	0.72%	0.70%	0.69%	0.67%	0.66%	0.64%	0.63%	0.61%	0.60%	0.58%
0.52%	0.50%	0.48%	0.46%	0.44%	0.42%	0.40%	0.37%	0.35%	0.33%	0.31%
0.34%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%	0.29%	0.29%	0.28%	0.27%
0.87%	0.85%	0.81%	0.77%	0.73%	0.69%	0.64%	0.60%	0.56%	0.52%	0.48%
1.31%	1.30%	1.27%	1.24%	1.22%	1.19%	1.16%	1.13%	1.10%	1.08%	1.05%
1.40%	1.39%	1.36%	1.33%	1.30%	1.27%	1.24%	1.21%	1.18%	1.15%	1.12%
0.96%	0.94%	0.90%	0.86%	0.82%	0.78%	0.74%	0.70%	0.66%	0.62%	0.58%
1.03%	1.02%	1.00%	0.98%	0.95%	0.93%	0.91%	0.89%	0.87%	0.85%	0.82%
0.12%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%	0.10%	0.10%	0.10%
0.62%	0.61%	0.60%	0.59%	0.57%	0.56%	0.55%	0.53%	0.52%	0.51%	0.49%
1.04%	1.01%	0.96%	0.90%	0.85%	0.79%	0.74%	0.68%	0.63%	0.58%	0.52%
1.64%	1.60%	1.52%	1.45%	1.37%	1.29%	1.21%	1.14%	1.06%	0.98%	0.90%
1.56%	1.52%	1.45%	1.38%	1.30%	1.23%	1.15%	1.08%	1.01%	0.93%	0.86%
2.52%	2.50%	2.44%	2.39%	2.34%	2.28%	2.23%	2.18%	2.12%	2.07%	2.02%
2.62%	2.56%	2.43%	2.31%	2.18%	2.06%	1.94%	1.81%	1.69%	1.56%	1.44%
0.68%	0.68%	0.67%	0.67%	0.67%	0.66%	0.66%	0.66%	0.65%	0.65%	0.65%
0.69%	0.68%	0.67%	0.65%	0.64%	0.62%	0.61%	0.59%	0.58%	0.56%	0.55%
3.46%	3.41%	3.30%	3.19%	3.08%	2.97%	2.86%	2.75%	2.64%	2.53%	2.42%
5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%
5.63%	5.59%	5.50%	5.41%	5.32%	5.23%	5.14%	5.06%	4.97%	4.89%	4.79%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
16.64%	16.55%	16.38%	16.20%	16.03%	15.85%	15.68%	15.50%	15.33%	15.15%	14.98%
8.03%	7.99%	7.90%	7.82%	7.74%	7.65%	7.57%	7.48%	7.40%	7.31%	7.23%
2.12%	2.12%	2.10%	2.09%	2.08%	2.07%	2.06%	2.05%	2.04%	2.03%	2.01%
1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%
0.70%	0.69%	0.69%	0.69%	0.68%	0.68%	0.68%	0.67%	0.67%	0.67%	0.66%
6.30%	6.28%	6.25%	6.22%	6.18%	6.15%	6.12%	6.08%	6.05%	6.02%	5.98%
11.79%	11.73%	11.60%	11.48%	11.36%	11.23%	11.11%	10.98%	10.86%	10.74%	10.61%
0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
100.00%	99.17%	97.50%	95.83%	94.16%	92.49%	90.82%	89.15%	87.48%	85.81%	84.14%
100%	99%	97%	96%	94%	92%	91%	89%	87%	86%	84%

Table D-17 Residual Value-Added After Loss of Capacity--Sanitary Sewer Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.46%	0.46%	0.46%	0.46%	0.46%	0.46%	0.46%	0.46%	0.46%	0.46%
1.06%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%
0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.11%
3.89%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%	3.91%
5.52%	5.58%	5.58%	5.58%	5.58%	5.58%	5.58%	5.58%	5.58%	5.58%	5.58%
2.41%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%	2.50%
0.37%	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%
0.73%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%	0.75%
0.52%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%
0.34%	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%	0.35%
0.87%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%	0.91%
1.31%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%	1.33%
1.40%	1.46%	1.46%	1.46%	1.46%	1.46%	1.46%	1.46%	1.46%	1.46%	1.46%
0.96%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%	0.99%
1.03%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%	1.06%
0.12%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%
0.62%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%	0.63%
1.04%	1.08%	1.08%	1.08%	1.08%	1.08%	1.08%	1.08%	1.08%	1.08%	1.08%
1.64%	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%	1.71%
1.56%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%	1.63%
2.52%	2.64%	2.64%	2.64%	2.64%	2.64%	2.64%	2.64%	2.64%	2.64%	2.64%
2.62%	2.73%	2.73%	2.73%	2.73%	2.73%	2.73%	2.73%	2.73%	2.73%	2.73%
0.68%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
0.69%	0.71%	0.71%	0.71%	0.71%	0.71%	0.71%	0.71%	0.71%	0.71%	0.71%
3.46%	3.48%	3.48%	3.48%	3.48%	3.48%	3.48%	3.48%	3.48%	3.48%	3.48%
5.89%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%	5.96%
5.63%	5.66%	5.66%	5.66%	5.66%	5.66%	5.66%	5.66%	5.66%	5.66%	5.66%
5.63%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%	5.69%
16.64%	16.82%	16.82%	16.82%	16.82%	16.82%	16.82%	16.82%	16.82%	16.82%	16.82%
8.03%	8.12%	8.12%	8.12%	8.12%	8.12%	8.12%	8.12%	8.12%	8.12%	8.12%
2.12%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%	2.21%
1.09%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%	1.11%
0.70%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%
6.30%	6.56%	6.56%	6.56%	6.56%	6.56%	6.56%	6.56%	6.56%	6.56%	6.56%
11.79%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%
0.25%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%	0.26%
100.00%	101.88%	101.88%	101.88%	101.88%	101.88%	101.88%	101.88%	101.88%	101.88%	101.88%
100%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%

Table D-18 Residual Value-Added After Loss of Capacity--Air Transportation Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.45%	0.45%	0.44%	0.44%	0.43%	0.43%	0.42%	0.42%	0.41%	0.41%
1.06%	1.05%	1.04%	1.03%	1.02%	1.01%	1.00%	0.99%	0.98%	0.96%	0.95%
0.11%	0.11%	0.11%	0.11%	0.11%	0.11%	0.10%	0.10%	0.10%	0.10%	0.10%
3.89%	3.87%	3.83%	3.79%	3.75%	3.70%	3.66%	3.62%	3.58%	3.54%	3.50%
5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%	5.52%
2.41%	2.38%	2.33%	2.28%	2.23%	2.18%	2.13%	2.08%	2.03%	1.98%	1.93%
0.37%	0.37%	0.36%	0.35%	0.35%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%
0.73%	0.72%	0.70%	0.69%	0.67%	0.66%	0.64%	0.63%	0.61%	0.60%	0.58%
0.52%	0.51%	0.50%	0.49%	0.48%	0.47%	0.46%	0.45%	0.43%	0.42%	0.41%
0.34%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%	0.29%	0.29%	0.28%	0.27%
0.87%	0.87%	0.86%	0.85%	0.84%	0.83%	0.82%	0.81%	0.80%	0.79%	0.78%
1.31%	1.30%	1.27%	1.24%	1.22%	1.19%	1.16%	1.13%	1.10%	1.08%	1.05%
1.40%	1.39%	1.36%	1.33%	1.30%	1.27%	1.24%	1.21%	1.18%	1.15%	1.12%
0.96%	0.96%	0.96%	0.96%	0.96%	0.96%	0.96%	0.96%	0.96%	0.96%	0.96%
1.03%	1.02%	1.00%	0.98%	0.95%	0.93%	0.91%	0.89%	0.87%	0.85%	0.82%
0.12%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%	0.11%	0.10%	0.10%
0.62%	0.61%	0.60%	0.59%	0.57%	0.56%	0.55%	0.53%	0.52%	0.51%	0.49%
1.04%	1.04%	1.02%	1.01%	1.00%	0.99%	0.98%	0.97%	0.96%	0.95%	0.94%
1.64%	1.63%	1.61%	1.60%	1.58%	1.56%	1.55%	1.53%	1.51%	1.49%	1.48%
1.56%	1.54%	1.51%	1.48%	1.45%	1.41%	1.38%	1.35%	1.31%	1.28%	1.25%
2.52%	2.48%	2.40%	2.32%	2.24%	2.16%	2.08%	2.00%	1.92%	1.85%	1.77%
2.62%	2.58%	2.49%	2.41%	2.33%	2.25%	2.16%	2.08%	2.00%	1.92%	1.83%
0.68%	0.66%	0.64%	0.61%	0.58%	0.55%	0.52%	0.49%	0.46%	0.44%	0.41%
0.69%	0.68%	0.67%	0.65%	0.64%	0.62%	0.61%	0.59%	0.58%	0.56%	0.55%
3.46%	3.41%	3.30%	3.19%	3.08%	2.97%	2.86%	2.75%	2.64%	2.53%	2.42%
5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
16.64%	16.47%	16.12%	15.77%	15.42%	15.07%	14.72%	14.36%	14.01%	13.66%	13.31%
8.03%	7.95%	7.78%	7.61%	7.44%	7.27%	7.10%	6.93%	6.76%	6.59%	6.42%
2.12%	2.08%	1.99%	1.90%	1.81%	1.72%	1.63%	1.54%	1.45%	1.36%	1.27%
1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%
0.70%	0.68%	0.65%	0.62%	0.59%	0.56%	0.54%	0.51%	0.48%	0.45%	0.42%
6.30%	6.27%	6.20%	6.13%	6.07%	6.00%	5.93%	5.87%	5.80%	5.73%	5.67%
11.79%	11.67%	11.42%	11.17%	10.92%	10.67%	10.43%	10.18%	9.93%	9.68%	9.43%
0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
100.00%	99.09%	97.27%	95.45%	93.63%	91.81%	90.00%	88.18%	86.36%	84.54%	82.72%
100%	99%	97%	95%	94%	92%	90%	88%	86%	85%	83%

Table D-19 Residual Value-Added After Loss of Capacity--Water Transportation Lifeline (Ports)

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.44%	0.42%	0.41%	0.39%	0.37%	0.35%	0.33%	0.31%	0.29%	0.27%
1.06%	1.04%	0.99%	0.95%	0.90%	0.86%	0.81%	0.77%	0.72%	0.68%	0.64%
0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.08%	0.08%	0.08%	0.07%	0.07%
3.89%	3.85%	3.77%	3.68%	3.60%	3.52%	3.44%	3.36%	3.27%	3.19%	3.11%
5.52%	5.46%	5.34%	5.23%	5.11%	5.00%	4.88%	4.76%	4.65%	4.53%	4.42%
2.41%	2.38%	2.33%	2.28%	2.23%	2.18%	2.13%	2.08%	2.03%	1.98%	1.93%
0.37%	0.37%	0.36%	0.35%	0.35%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%
0.73%	0.72%	0.70%	0.69%	0.67%	0.66%	0.64%	0.63%	0.61%	0.60%	0.58%
0.52%	0.51%	0.50%	0.49%	0.48%	0.47%	0.46%	0.45%	0.43%	0.42%	0.41%
0.34%	0.34%	0.33%	0.32%	0.31%	0.31%	0.30%	0.29%	0.29%	0.28%	0.27%
0.87%	0.86%	0.83%	0.80%	0.77%	0.75%	0.72%	0.69%	0.66%	0.64%	0.61%
1.31%	1.30%	1.27%	1.24%	1.22%	1.19%	1.16%	1.13%	1.10%	1.08%	1.05%
1.40%	1.39%	1.36%	1.33%	1.30%	1.27%	1.24%	1.21%	1.18%	1.15%	1.12%
0.96%	0.92%	0.84%	0.76%	0.68%	0.60%	0.52%	0.44%	0.35%	0.27%	0.19%
1.03%	1.02%	1.00%	0.98%	0.95%	0.93%	0.91%	0.89%	0.87%	0.85%	0.82%
0.12%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%	0.11%	0.10%	0.10%
0.62%	0.61%	0.60%	0.59%	0.57%	0.56%	0.55%	0.53%	0.52%	0.51%	0.49%
1.04%	1.03%	1.01%	0.99%	0.96%	0.94%	0.92%	0.90%	0.88%	0.85%	0.83%
1.64%	1.61%	1.56%	1.51%	1.46%	1.41%	1.36%	1.30%	1.25%	1.20%	1.15%
1.56%	1.54%	1.49%	1.44%	1.39%	1.34%	1.29%	1.24%	1.19%	1.14%	1.09%
2.52%	2.50%	2.44%	2.39%	2.34%	2.28%	2.23%	2.18%	2.12%	2.07%	2.02%
2.62%	2.58%	2.49%	2.41%	2.33%	2.25%	2.16%	2.08%	2.00%	1.92%	1.83%
0.68%	0.68%	0.67%	0.66%	0.65%	0.65%	0.64%	0.63%	0.63%	0.62%	0.61%
0.69%	0.68%	0.67%	0.65%	0.64%	0.62%	0.61%	0.59%	0.58%	0.56%	0.55%
3.46%	3.41%	3.30%	3.19%	3.08%	2.97%	2.86%	2.75%	2.64%	2.53%	2.42%
5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%	5.89%
5.63%	5.57%	5.46%	5.34%	5.22%	5.10%	4.98%	4.86%	4.74%	4.63%	4.51%
5.63%	5.63%	5.63%	5.63%	5.63%	5.63%	5.63%	5.63%	5.63%	5.63%	5.63%
16.64%	16.64%	16.64%	16.64%	16.64%	16.64%	16.64%	16.64%	16.64%	16.64%	16.64%
8.03%	8.03%	8.03%	8.03%	8.03%	8.03%	8.03%	8.03%	8.03%	8.03%	8.03%
2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%	2.12%
1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%	1.09%
0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
6.30%	6.30%	6.30%	6.30%	6.30%	6.30%	6.30%	6.30%	6.30%	6.30%	6.30%
11.79%	11.79%	11.79%	11.79%	11.79%	11.79%	11.79%	11.79%	11.79%	11.79%	11.79%
0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
100.00%	99.47%	98.40%	97.33%	96.26%	95.19%	94.12%	93.05%	91.98%	90.91%	89.84%
100%	99%	98%	97%	96%	95%	94%	93%	92%	91%	90%

Table D-20 Residual Value-Added After Loss of Capacity--Telephone Lifeline

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0.45%	0.45%	0.44%	0.43%	0.42%	0.41%	0.40%	0.39%	0.38%	0.37%	0.36%
1.06%	1.05%	1.03%	1.00%	0.98%	0.96%	0.94%	0.91%	0.89%	0.87%	0.85%
0.11%	0.11%	0.11%	0.10%	0.10%	0.10%	0.10%	0.10%	0.09%	0.09%	0.09%
3.89%	3.87%	3.83%	3.79%	3.75%	3.70%	3.66%	3.62%	3.58%	3.54%	3.50%
5.52%	5.49%	5.43%	5.37%	5.32%	5.26%	5.20%	5.14%	5.08%	5.03%	4.97%
2.41%	2.39%	2.35%	2.31%	2.27%	2.24%	2.20%	2.16%	2.12%	2.08%	2.05%
0.37%	0.37%	0.36%	0.36%	0.35%	0.35%	0.34%	0.33%	0.33%	0.32%	0.32%
0.73%	0.72%	0.71%	0.70%	0.69%	0.67%	0.66%	0.65%	0.64%	0.63%	0.62%
0.52%	0.51%	0.50%	0.50%	0.49%	0.48%	0.47%	0.46%	0.45%	0.45%	0.44%
0.34%	0.34%	0.33%	0.33%	0.32%	0.31%	0.31%	0.30%	0.30%	0.29%	0.29%
0.87%	0.87%	0.86%	0.85%	0.84%	0.83%	0.82%	0.81%	0.80%	0.79%	0.78%
1.31%	1.30%	1.28%	1.26%	1.24%	1.22%	1.20%	1.18%	1.16%	1.14%	1.12%
1.40%	1.39%	1.37%	1.35%	1.33%	1.30%	1.28%	1.26%	1.24%	1.22%	1.19%
0.96%	0.96%	0.95%	0.94%	0.93%	0.92%	0.91%	0.90%	0.89%	0.88%	0.87%
1.03%	1.02%	1.01%	0.99%	0.97%	0.96%	0.94%	0.92%	0.91%	0.89%	0.88%
0.12%	0.12%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%	0.11%	0.10%
0.62%	0.61%	0.60%	0.59%	0.58%	0.57%	0.56%	0.55%	0.54%	0.54%	0.53%
1.04%	1.03%	1.02%	1.00%	0.98%	0.97%	0.95%	0.93%	0.92%	0.90%	0.88%
1.64%	1.63%	1.61%	1.60%	1.58%	1.56%	1.55%	1.53%	1.51%	1.49%	1.48%
1.56%	1.55%	1.54%	1.52%	1.50%	1.49%	1.47%	1.45%	1.44%	1.42%	1.40%
2.52%	2.50%	2.46%	2.42%	2.38%	2.34%	2.30%	2.26%	2.22%	2.18%	2.14%
2.62%	2.61%	2.58%	2.55%	2.52%	2.49%	2.47%	2.44%	2.41%	2.38%	2.36%
0.68%	0.67%	0.65%	0.63%	0.60%	0.58%	0.56%	0.54%	0.52%	0.50%	0.48%
0.69%	0.68%	0.67%	0.66%	0.65%	0.64%	0.63%	0.62%	0.61%	0.60%	0.58%
3.46%	3.41%	3.30%	3.19%	3.08%	2.97%	2.86%	2.75%	2.64%	2.53%	2.42%
5.89%	5.79%	5.61%	5.42%	5.24%	5.05%	4.86%	4.68%	4.49%	4.31%	4.12%
5.63%	5.49%	5.19%	4.89%	4.60%	4.30%	4.00%	3.71%	3.41%	3.11%	2.82%
5.63%	5.49%	5.19%	4.89%	4.60%	4.30%	4.00%	3.71%	3.41%	3.11%	2.82%
16.64%	16.12%	15.07%	14.01%	12.96%	11.91%	10.86%	9.81%	8.76%	7.71%	6.66%
8.03%	7.86%	7.52%	7.19%	6.85%	6.51%	6.17%	5.83%	5.49%	5.16%	4.82%
2.12%	2.08%	1.99%	1.90%	1.81%	1.72%	1.63%	1.54%	1.45%	1.36%	1.27%
1.09%	1.07%	1.03%	0.98%	0.93%	0.89%	0.84%	0.80%	0.75%	0.70%	0.66%
0.70%	0.68%	0.65%	0.62%	0.59%	0.56%	0.54%	0.51%	0.48%	0.45%	0.42%
6.30%	6.25%	6.15%	6.05%	5.95%	5.85%	5.75%	5.65%	5.55%	5.45%	5.35%
11.79%	11.67%	11.42%	11.17%	10.92%	10.67%	10.43%	10.18%	9.93%	9.68%	9.43%
0.25%	0.25%	0.24%	0.24%	0.23%	0.23%	0.22%	0.22%	0.21%	0.21%	0.20%
100.00%	98.38%	95.14%	91.91%	88.67%	85.43%	82.20%	78.96%	75.72%	72.48%	69.25%
100%	98%	95%	92%	89%	85%	82%	79%	76%	72%	69%

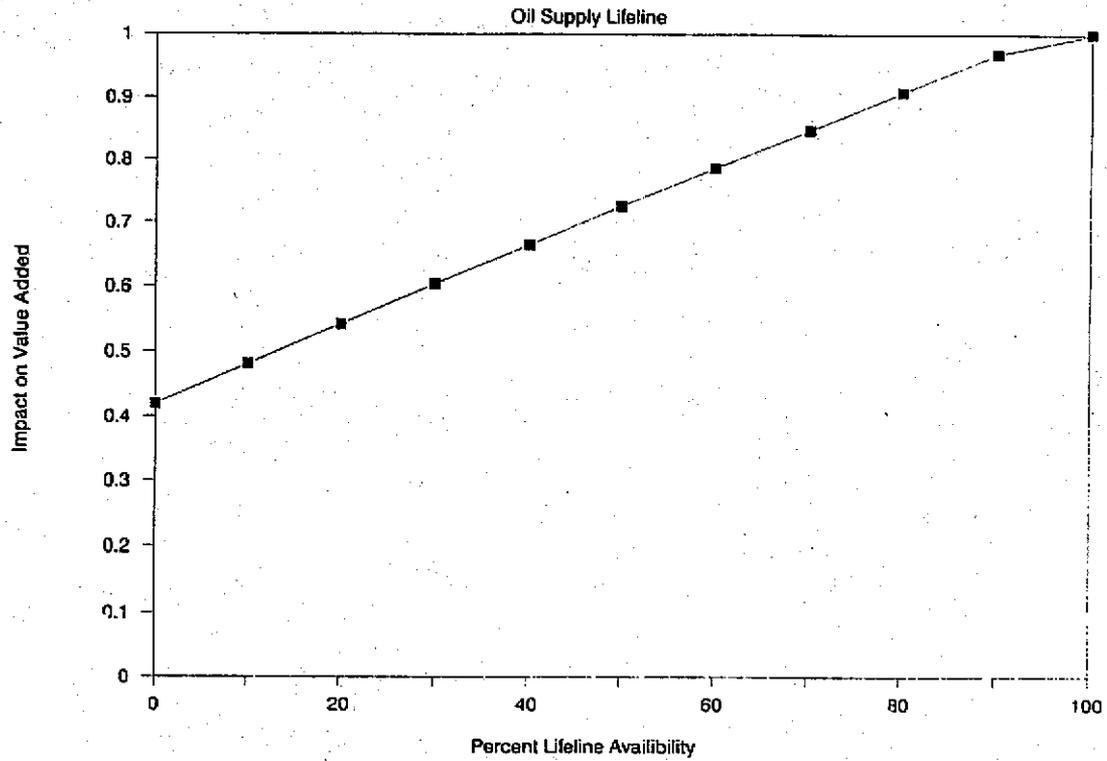


Figure D-1 Residual Value Added as a Function of Oil Supply Lifeline Residual Capacity.

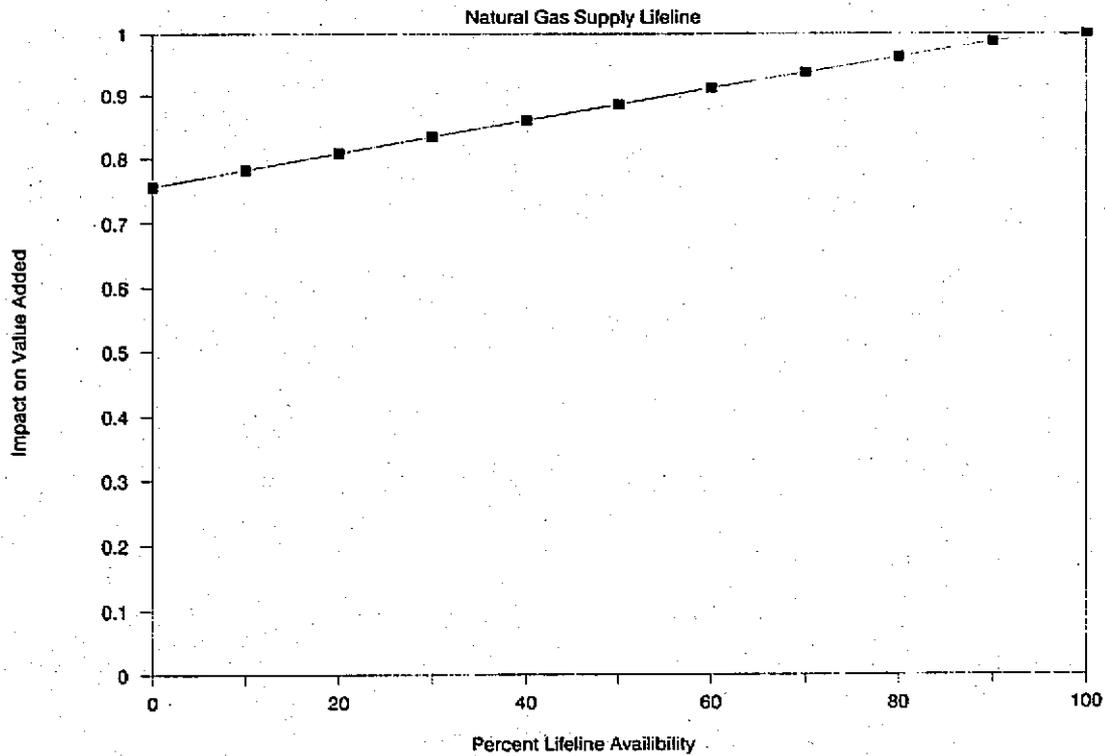


Figure D-2 Residual Value Added as a Function of Natural Gas Supply Lifeline Residual Capacity.

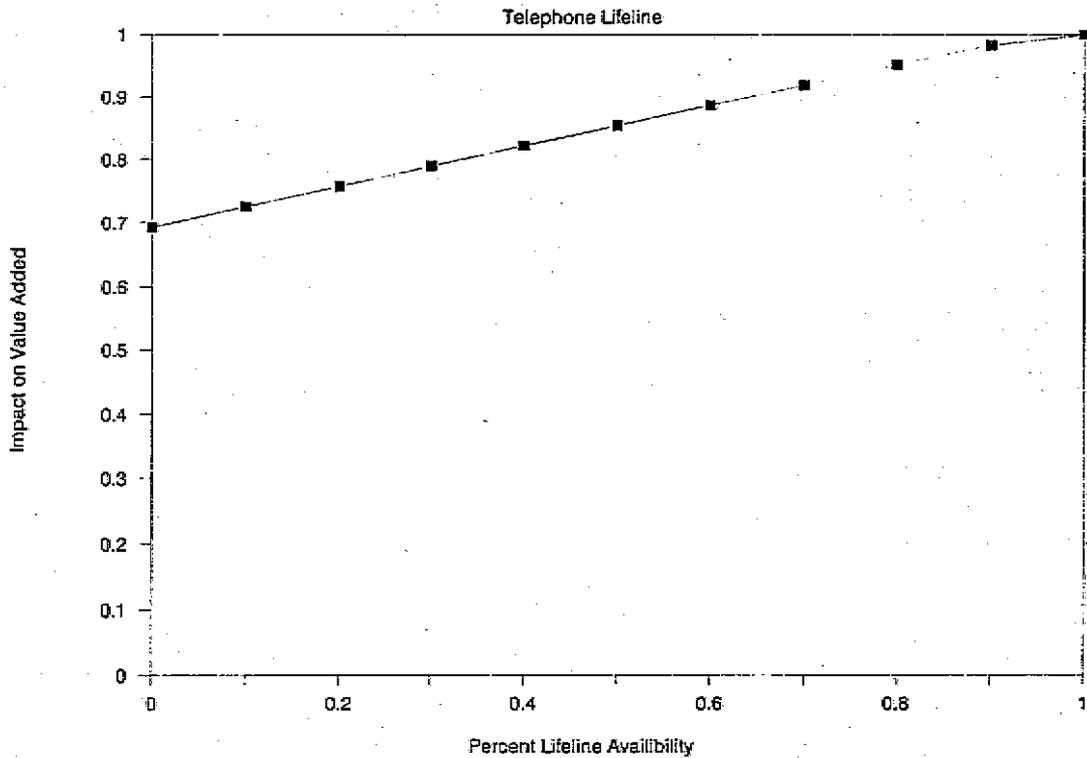


Figure D-3 Residual Value Added as a Function of Telephone Lifeline Residual Capacity.

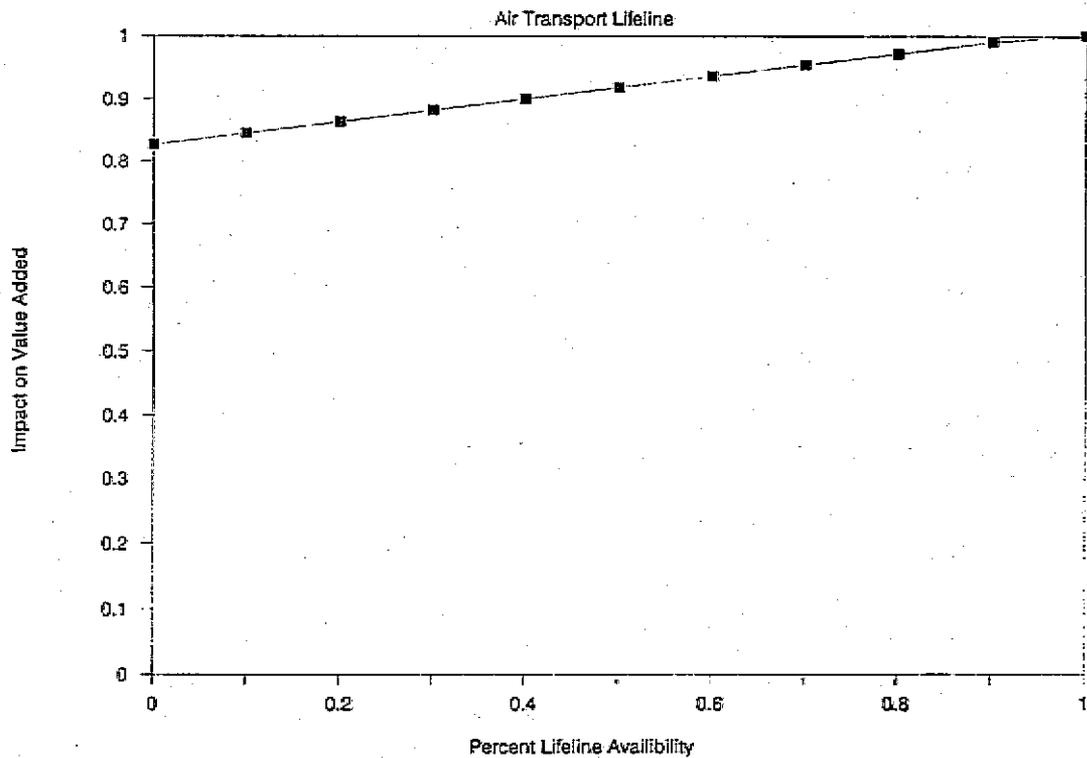


Figure D-4 Residual Value Added as a Function of Air Transportation Lifeline Residual Capacity.

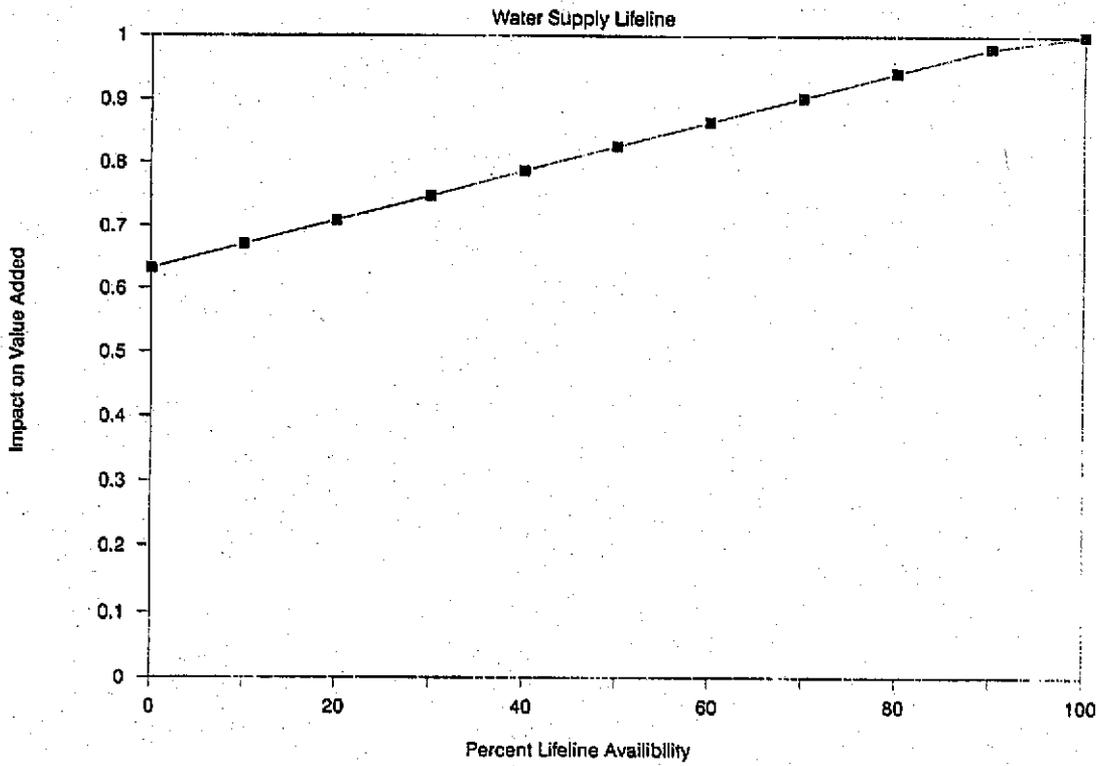


Figure D-5 Residual Value Added as a Function of Water Supply Lifeline Residual Capacity.

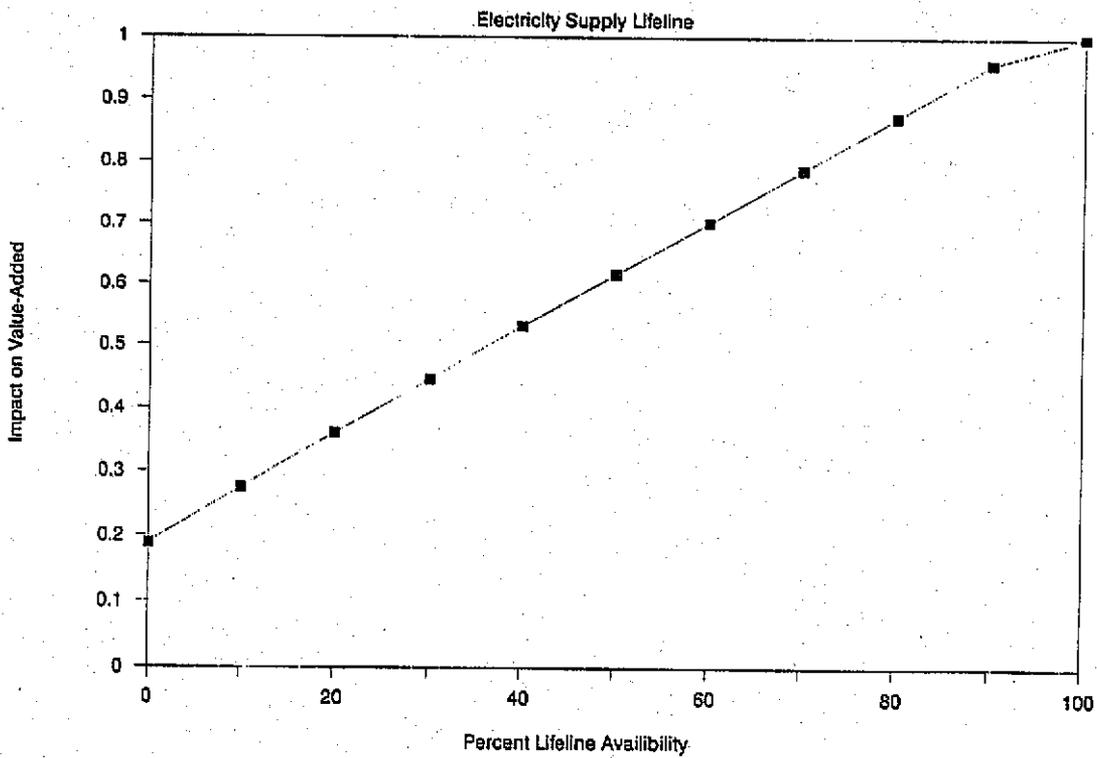


Figure D-6 Residual Value Added as a Function of Electric Lifeline Residual Capacity.

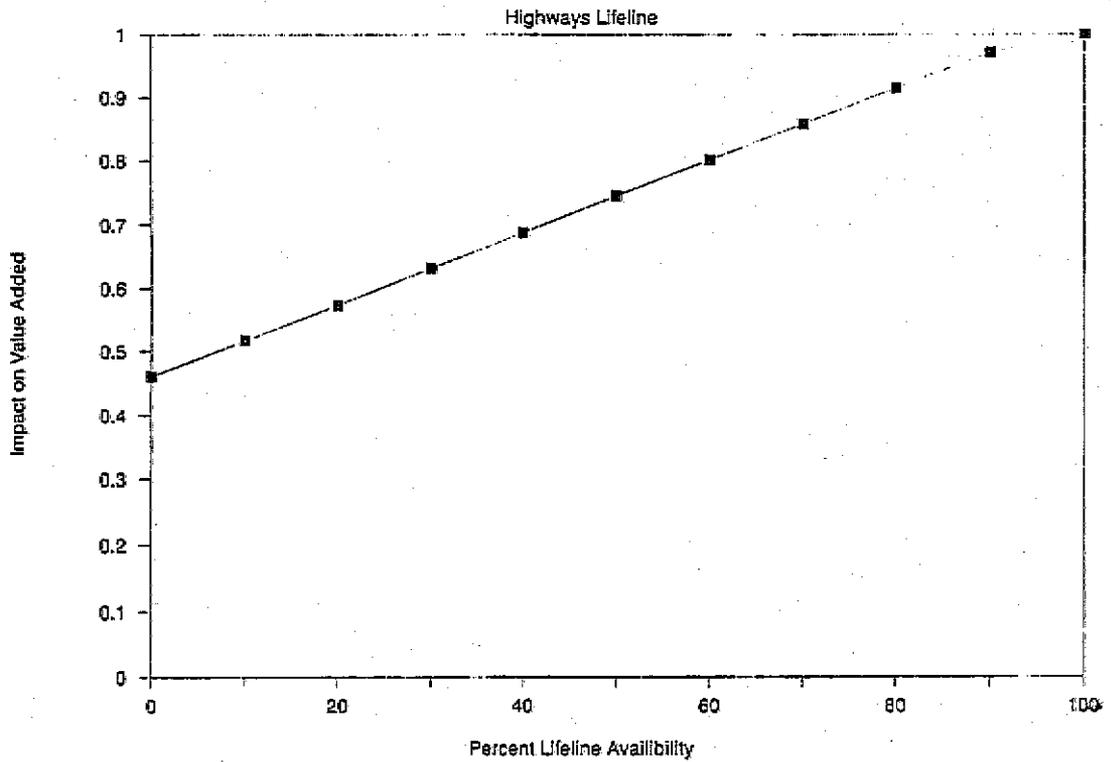


Figure D-7 Residual Value Added as a Function of Highway Lifeline Residual Capacity.

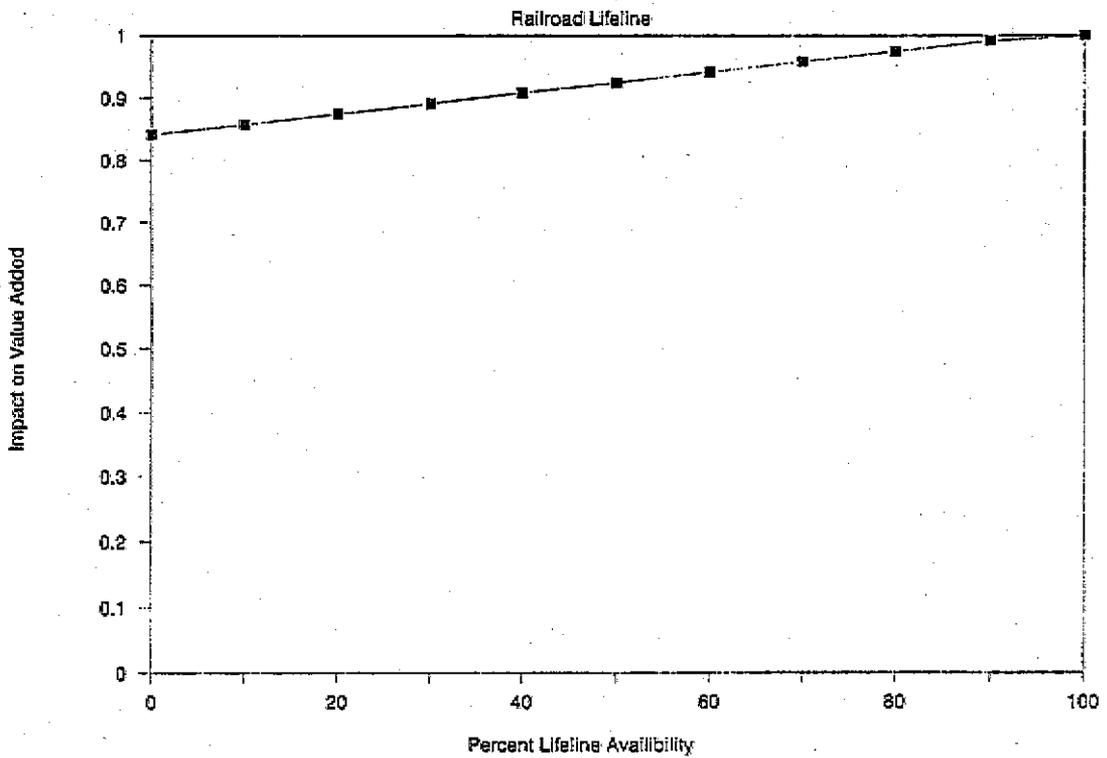


Figure D-8 Residual Value Added as a Function of Railroad Lifeline Residual Capacity.

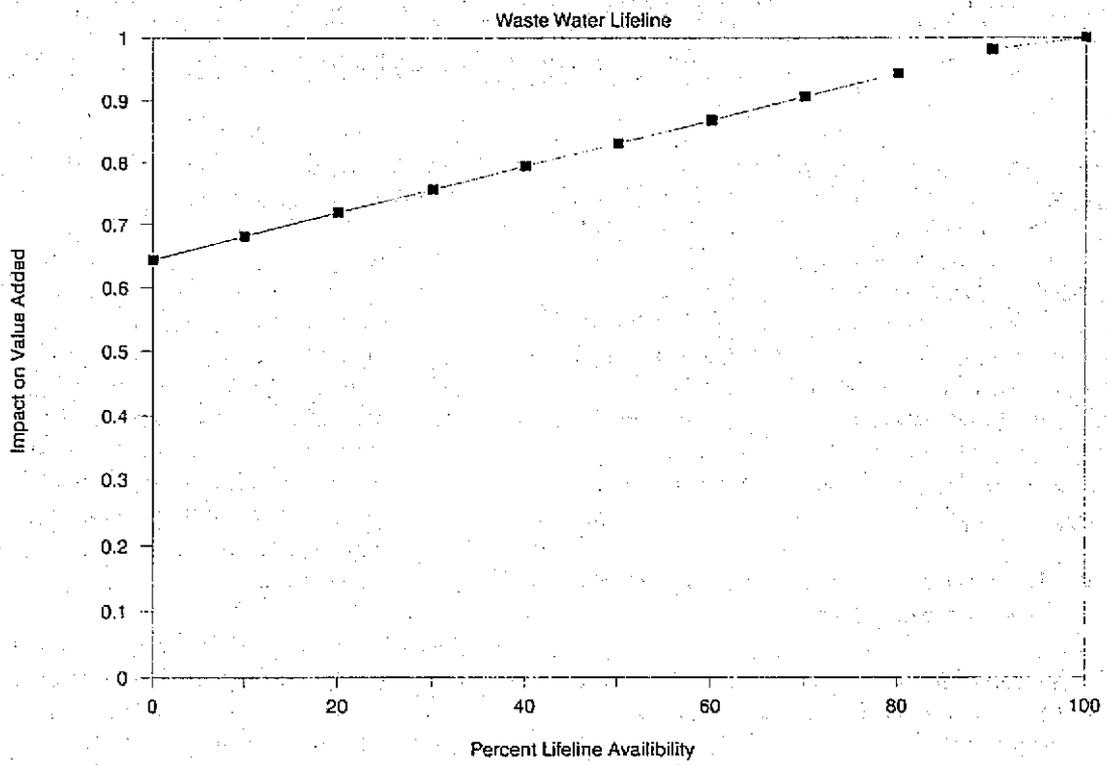


Figure D-9 Residual Value Added as a Function of Sanitary Sewer Lifeline Residual Capacity.

Appendix E: Applied Technology Council Projects and Report Information

One of the primary purposes of Applied Technology Council is to develop resource documents that translate and summarize useful information to practicing engineers. This includes the development of guidelines and manuals, as well as the development of research recommendations for specific areas determined by the profession. ATC is not a code development organization, although several of the ATC project reports serve as resource documents for the development of codes, standards and specifications.

Applied Technology Council conducts projects that meet the following criteria:

1. The primary audience or benefactor is the design practitioner in structural engineering.
2. A cross section or consensus of engineering opinion is required to be obtained and presented by a neutral source.
3. ATC is requested to conduct the project by the project sponsor.

A brief description of several major completed projects and reports, is given in the following section. Funding for projects is obtained from government agencies and tax-deductible contributions from the private sector.

ATC-1: This project resulted in five papers which were published as part of Building Practices for Disaster Mitigation, Building Science Series 46, proceedings of a workshop sponsored by the National Science Foundation (NSF) and the National Bureau of Standards (NBS). Available through the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22151, as NTIS report No. COM-73-50188.

ATC-2: The report, *An Evaluation of a Response Spectrum Approach to Seismic Design of Buildings*, was funded by NSF and NBS and was conducted as part of the Cooperative Federal Program in Building Practices for

Disaster Mitigation. Available through the ATC office. (270 Pages)

Abstract: This study evaluated the applicability and cost of the response spectrum approach to seismic analysis and design that was proposed by various segments of the engineering profession. Specific building designs, design procedures and parameter values were evaluated for future application. Eleven existing buildings of varying dimensions were redesigned according to the procedures.

ATC-3: The report, *Tentative Provisions for the Development of Seismic Regulations for Buildings (ATC-3-06)*, was funded by NSF and NBS. The second printing of this report, which included proposed amendments, is available through the ATC office. (505 pages plus proposed amendments)

Abstract: The tentative provisions in this document represent the result of a concerted effort by a multi-disciplinary team of 85 nationally recognized experts in earthquake engineering. The project involved representation from all sections of the United States and had wide review by affected building industry and regulatory groups. The provisions embodied several new concepts that were significant departures from existing seismic design provisions. The second printing of this document contains proposed amendments prepared by a joint committee of the Building Seismic Safety Council (BSSC) and the NBS; the proposed amendments were published separately by BSSC and NBS in 1982.

ATC-3-2: The project, *Comparative Test Designs of Buildings Using ATC-3-06 Tentative Provisions*, was funded by NSF. The project consisted of a study to develop and plan a program for making comparative test designs of the ATC-3-06 Tentative Provisions. The project report was written to be used by the Building

Seismic Safety Council in its refinement of the ATC-3-06 Tentative Provisions.

ATC-3-4: The report, *Redesign of Three Multistory Buildings: A Comparison Using ATC-3-06 and 1982 Uniform Building Code Design Provisions*, was published under a grant from NSF. Available through the ATC office. (112 pages)

Abstract: This report evaluates the cost and technical impact of using the 1978 ATC-3-06 report, *Tentative Provisions for the Development of Seismic Regulations for Buildings*, as amended by a joint committee of the Building Seismic Safety Council and the National Bureau of Standards in 1982. The evaluations are based on studies of three existing California buildings redesigned in accordance with the ATC-3-06 Tentative Provisions and the 1982 Uniform Building Code. Included in the report are recommendations to code implementing bodies.

ATC-3-5: This project, Assistance for First Phase of ATC-3-06 Trial Design Program Being Conducted by the Building Seismic Safety Council, was funded by the Buildings Seismic Safety Council and provided the services of the ATC Senior Consultant and other ATC personnel to assist the BSSC in the conduct of the first phase of its Trial Design Program. The first phase provided for trial designs conducted for buildings in Los Angeles, Seattle, Phoenix, and Memphis.

ATC-3-6: This project, Assistance for Second Phase of ATC-3-06 Trial Design Program Being Conducted by the Building Seismic Safety Council, was funded by the Building Seismic Safety Council and provided the services of the ATC Senior Consultant and other ATC personnel to assist the BSSC in the conduct of the second phase of its Trial Design Program. The second phase provided for trial designs conducted for buildings in New York, Chicago, St. Louis, Charleston, and Fort Worth.

ATC-4: The report, *A Methodology for Seismic Design and Construction of Single-Family Dwellings*, was published under a contract with the Department of Housing and Urban

Development (HUD). Available through the ATC office. (576 pages)

Abstract: This report presents the results of an in-depth effort to develop design and construction details for single-family residences that minimize the potential economic loss and life-loss risk associated with earthquakes. The report: (1) discussed the ways structures behave when subjected to seismic forces, (2) sets forth suggested design criteria for conventional layouts of dwellings constructed with conventional materials, (3) presents construction details that do not require the designer to perform analytical calculations, (4) suggests procedures for efficient plan-checking, and (5) present recommendations including details and schedules for use in the field by construction personnel and building inspectors.

ATC-4-1: The report, *The Home Builders Guide for Earthquake Design*, was published under a contract with HUD. Available through the ATC office. (57 pages)

Abstract: This report is a 57-page abridged version of the ATC-4 report. The concise, easily understood text of the Guide is supplemented with illustrations and 46 construction details. The details are provided to ensure that houses contain structural features which are properly positioned, dimensioned and constructed to resist earthquake forces. A brief description is included on how earthquake forces impact on houses and some precautionary constraints are given with respect to site selection and architectural designs.

ATC-5: The report, *Guidelines for Seismic Design and Construction of Single-Story Masonry Dwellings in Seismic Zone 2*, was developed under a contract with HUD. Available through the ATC office. (38 pages)

Abstract: The report offers a concise methodology for the earthquake design and construction of single-story masonry dwellings in Seismic Zone 2 of the United States, as defined by the 1973 Uniform

Building Code. The guidelines are based in part on shaking table tests of masonry construction conducted at the University of California at Berkeley Earthquake Engineering Research Center. The report is written in simple language and includes basic house plans, wall evaluations, detail drawings, and material specifications.

ATC-6: The report, *Seismic Design Guidelines for Highway Bridges*, was published under a contract with the Federal Highway Administration (FHWA). Available through the ATC office. (210 pages)

Abstract: The Guidelines are the recommendations of a team of sixteen nationally recognized experts that included consulting engineers, academics, state and federal agency representatives from throughout the United States. The Guidelines embody several new concepts that are significant departures from existing design provisions. An extensive commentary and an example demonstrating the use of the Guidelines are included. A draft of the Guidelines was used to seismically redesign 21 bridges and a summary of the redesigns is also included.

ATC-6-1: The report, *Proceedings of a Workshop on Earthquake Resistance of Highway Bridges*, was published under a grant from NSF. Available through the ATC office. (625 pages)

Abstract: The report includes 23 state-of-the-art and state-of-practice papers on earthquake resistance of highway bridges. Seven of the twenty-three papers were authored by participants from Japan, New Zealand and Portugal. The Proceedings also contain recommendations for future research that were developed by the 45 workshop participants.

ATC-6-2: The report, *Seismic Retrofitting Guidelines for Highway Bridges*, was published under a contract with FHWA. Available through the ATC office. (220 pages)

Abstract: The Guidelines are the recommendations of a team of thirteen

nationally recognized experts that included consulting engineers, academics, state highway engineers, and federal agency representatives. The Guidelines, applicable for use in all parts of the U.S., include a preliminary screening procedure, methods for evaluating an existing bridge in detail, and potential retrofitting measures for the most common seismic deficiencies. Also included are special design requirements for various retrofitting measures.

ATC-7: The report, *Guidelines for the Design of Horizontal Wood Diaphragms*, was published under a grant from NSF. Available through the ATC office. (190 pages)

Abstract: Guidelines are presented for designing roof and floor systems so these can function as horizontal diaphragms in a lateral force resisting system. Analytical procedures, connection details and design examples are included in the Guidelines.

ATC-7-1: The report, *Proceedings of a Workshop of Design of Horizontal Wood Diaphragms*, was published under a grant from NSF. Available through the ATC office. (302 pages)

Abstract: The report includes seven papers on state-of-the-practice and two papers on recent research. Also included are recommendations for future research that were developed by the 35 participants.

ATC-8: This report, *Proceedings of a Workshop on the Design of Prefabricated Concrete Buildings for Earthquake Loads*, was funded by NSF. Available through the ATC office. (400 pages)

Abstract: The report includes eighteen state-of-the-art papers and six summary papers. Also included are recommendations for future research that were developed by the 43 workshop participants.

ATC-9: The report, *An Evaluation of the Imperial County Services Building Earthquake Response and Associated Damage*, was published

under a grant from NSF. Available through the ATC office. (231 pages)

Abstract: The report presents the results of an in-depth evaluation of the Imperial County Services Building, a 6-story reinforced concrete frame and shear wall building severely damaged by the October 15, 1979 Imperial Valley, California, earthquake. The report contains a review and evaluation of earthquake damage to the buildings; a review and evaluation of the seismic design; a comparison of the requirements of various building codes as they relate to the building; and conclusions and recommendations pertaining to future building code provisions and future research needs.

ATC-10: This report, *An Investigation of the Correlation Between Earthquake Ground Motion and Building Performance*, was funded by the U.S. Geological Survey (USGS). Available through the ATC office. (114 pages)

Abstract: The report contains an in-depth analytical evaluation of the ultimate or limit capacity of selected representative building framing types, a discussion of the factors affecting the seismic performance of buildings, and a summary and comparison of seismic design and seismic risk parameters currently in widespread use.

ATC-10-1: This report, *Critical Aspects of Earthquake Ground Motion and Building Damage Potential*, was co-funded by the USGS and the NSF. Available through the ATC office. (259 pages)

Abstract: This document contains 19 state-of-the-art papers on ground motion, structural response, and structural design issues presented by prominent engineers and earth scientists in an ATC seminar. The main theme of the papers is to identify the critical aspects of ground motion and building performance that currently are not being considered in building design. The report also contains conclusions and recommendations of working groups convened after the Seminar.

ATC-11: The report, *Seismic Resistance of Reinforced Concrete Shear Walls and Frame Joints: Implications of Recent Research for Design Engineers*, was published under a grant from NSF. Available through the ATC office. (184 pages)

Abstract: This document presents the results of an in-depth review and synthesis of research reports pertaining to cyclic loading of reinforced concrete shear walls and cyclic loading of joint reinforced concrete frames. More than 125 research reports published since 1971 are reviewed and evaluated in this report. The preparation of the report included a consensus process involving numerous experienced design professionals from throughout the United States. The report contains reviews of current and past design practices, summaries of research developments, and in-depth discussions of design implications of recent research results.

ATC-12: This report, *Comparison of United States and New Zealand Seismic Design Practices for Highway Bridges*, was published under a grant from NSF. Available through the ATC office. (270 pages)

Abstract: The report contains summaries of all aspects and innovative design procedures used in New Zealand as well as comparison of United States and New Zealand design practice. Also included are research recommendations developed at a 3-day workshop in New Zealand attended by 16 U.S. and 35 New Zealand bridge design engineers and researchers.

ATC-12-1: This report, *Proceedings of Second Joint U.S.-New Zealand Workshop on Seismic Resistance of Highway Bridges*, was published under a grant from NSF. Available through the ATC office. (272 pages)

Abstract: This report contains written versions of the papers presented at this 1985 Workshop as well as a list and prioritization of workshop recommendations. Included are summaries of research projects currently being conducted in both countries as well

as state-of-the-practice papers on various aspects of design practice. Topics discussed include bridge design philosophy and loadings; design of columns, footings, piles, abutments and retaining structures; geotechnical aspects of foundation design; seismic analysis techniques; seismic retrofitting; case studies using base isolation; strong-motion data acquisition and interpretation; and testing of bridge components and bridge systems.

ATC-13: The report, *Earthquake Damage Evaluation Data for California*, was developed under a contract with the Federal Emergency Management Agency (FEMA). Available through the ATC office. (492 pages)

Abstract: This report presents expert-opinion earthquake damage and loss estimates for existing industrial, commercial, residential, utility and transportation facilities in California. Included are damage probability matrices for 78 classes of structures and estimates of time required to restore damaged facilities to pre-earthquake usability. The report also describes the inventory information essential for estimating economic losses and the methodology used to develop the required data.

ATC-14: The report, *Evaluating the Seismic Resistance of Existing Buildings*, was developed under a grant from the NSF. Available through the ATC office. (370 pages)

Abstract: This report, written for practicing structural engineers, describes a methodology for performing preliminary and detailed building seismic evaluations. The report contains a state-of-practice review; seismic loading criteria; data collection procedures; a detailed description of the building classification system; preliminary and detailed analysis procedures; and example case studies, including non-structural considerations.

ATC-15: This report, *Comparison of Seismic Design Practices in the United States and Japan*, was published under a grant from NSF. Available through the ATC office. (317 pages)

Abstract: The report contains detailed technical papers describing current design practices in the United States and Japan as well as recommendations emanating from a joint U.S.-Japan workshop held in Hawaii in March, 1984. Included are detailed descriptions of new seismic design methods for buildings in Japan and case studies of the design of specific buildings (in both countries). The report also contains an overview of the history and objectives of the Japan Structural Consultants Association.

ATC-15-1: The report, *Proceedings of Second U.S.-Japan Workshop on Improvement of Building Seismic Design and Construction Practices*, was published under a grant from NSF. Available through the ATC office. (412 pages)

Abstract: This report contains 23 technical papers presented at this San Francisco workshop in August, 1986, by practitioners and researchers from the U.S. and Japan. Included are state-of-the-practice papers and case studies of actual building designs and information on regulatory, contractual, and licensing issues.

ATC-15-2: The report, *Proceedings of Third U.S.-Japan Workshop on Improvement of Building Structural Design and Construction Practices*, was published jointly by TAC and the Japan Structural Consultants Association. Available through the ATC office.

Abstract: This report contains 21 technical papers presented at this Tokyo, Japan, workshop in July, 1988, by practitioners and researchers from the U.S., Japan, China, and New Zealand. Included are state-of-the-practice papers on various topics, including braced steel frame buildings, beam-column joints in reinforced concrete buildings, summaries of comparative U. S. and Japanese design, and base isolation and passive energy dissipation devices.

ATC-16: This project, *Development of a 5-Year Plan for Reducing the Earthquake Hazards Posed by Existing Nonfederal Buildings*, was

funded by FEMA and was conducted by a joint venture of ATC, the Building Seismic Safety Council and the Earthquake Engineering Research Institute. The project involved a workshop in Phoenix, Arizona, where approximately 50 earthquake specialists met to identify the major tasks and goals for reducing the earthquake hazards posed by existing nonfederal buildings nationwide. The plan was developed on the basis of nine issue papers presented at the workshop and workshop working group discussions. The Workshop Proceedings and Five-Year Plan are available through the Federal Emergency Management Agency, 500 "C" Street, S.W., Washington, DC 20472.

ATC-17: This report, *Proceedings of a Seminar and Workshop on Base Isolation and Passive Energy Dissipation*, was published under a grant from NSF. Available through the ATC office. (478 pages)

Abstract: The report contains 42 papers describing the state-of-the-art and state-of-the-practice in base-isolation and passive energy-dissipation technology. Included are papers describing case studies in the United States, applications and developments worldwide, recent innovations in technology development, and structural and ground motion issues. Also included is a proposed 5-year research agenda that addresses the following specific issues: (1) strong ground motion; (2) design criteria; (3) materials, quality control, and long-term reliability; (4) life cycle cost methodology; and (5) system response.

ATC-20: The report, *Procedures for Postearthquake Safety Evaluation of Buildings*, was developed under a contract from the California Office of Emergency Services (OES), California Office of Statewide Health Planning and Development (OSHPD) and FEMA. Available through the ATC office (152 pages)

Abstract: This report provides procedures and guidelines for making on-the-spot evaluations and decisions regarding continued use and occupancy of earthquake damaged buildings. Written specifically for volunteer structural

engineers and building inspectors, the report includes rapid and detailed evaluation procedures for inspecting buildings and posting them as "inspected" (apparently safe), "limited entry" or "unsafe". Also included are special procedures for evaluation of essential buildings (e.g., hospitals), and evaluation procedures for nonstructural elements, and geotechnical hazards.

ATC-20-1: The report, *Field Manual: Postearthquake Safety Evaluation of Buildings*, was developed under a contract from OES and OSHPD. Available through the ATC office (114 pages)

Abstract: This report, a companion Field Manual for the ATC-20 report, summarizes the postearthquake safety evaluation procedures in brief concise format designed for ease of use in the field.

ATC-21: The report, *Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook*, was developed under a contract from FEMA. Available through the ATC office. (185 pages)

Abstract: This report describes a rapid visual screening procedure for identifying those buildings that might pose serious risk of loss of life and injury, or of severe curtailment of community services, in case of a damaging earthquake. The screening procedure utilizes a methodology based on a "sidewalk survey" approach that involves identification of the primary structural load resisting system and building materials, and assignment of a basic structural hazards score and performance modification factors based on observed defects. Application of the methodology identifies those buildings that are potentially hazardous and should be analyzed in more detail by a professional engineer experienced in seismic design.

ATC-21-1: The report, *Rapid Visual Screening of Buildings for Potential Seismic Hazards: Supporting Documentation*, was developed

under a contract from FEMA. Available through the ATC office. (137 pages)

Abstract: Included in this report are (1) a review and evaluation of existing procedures; (2) a listing of attributes considered ideal for a rapid visual screening procedures; and (3) a technical discussion of the recommended rapid visual screening procedure that is documented in the ATC-21 report.

ATC-21-2: The report, *Earthquake Damaged Buildings: An Overview of Heavy Debris and Victim Extrication*, was developed under a contract from FEMA. Available through the ATC office. (95 pages)

Abstract: Included in this report, a companion volume to the ATC-21 and ATC-21-1 reports, is state-of-the-art information on (1) the identification of those buildings that might collapse and trap victims in debris or generate debris of such a size that its handling would require special or heavy lifting equipment; (2) guidance in identifying these types of buildings, on the basis of their major exterior features, and (3) the types and life capacities of equipment required to remove the heavy portion of the debris that might result from the collapse of such buildings.

ATC-22: The report, *A Handbook for Seismic Evaluation of Existing Buildings (Preliminary)*, was developed under a contract from FEMA. Available through the ATC office. (169 pages)

Abstract: This handbook provides methodology for seismic evaluation of existing buildings of different types and occupancies in areas of different seismicity throughout the United States. The methodology, which has been field tested in several programs nationwide, utilizes the information and procedures developed for and documented in the ATC-14 report. The handbook includes checklists, diagrams, and sketches designed to assist the user.

ATC-22-1: The report, *Seismic Evaluation of Existing Buildings: Supporting Documentation*,

was developed under a contract from FEMA. Available through the ATC office. (160 pages)

Abstract: Included in this report, a companion volume to the ATC-22 report, are (1) a review and evaluation of existing buildings seismic evaluation methodologies; (2) results from field tests of the ATC-14 methodology; and (3) summaries of evaluations of ATC-14 conducted by the National Center for Earthquake Engineering Research (State University of New York at Buffalo) and the City of San Francisco.