

Robert Calderwood LLB Chief Executive

Chief Executive's Department
Strathclyde House
20 India Street
Charing Cross
Glasgow G2 4PF

An equal opportunities authority
A nuclear-free zone authority



Telephone: 041-227 3490
Switchboard: 041-204 2900
Our Ref: EPCD/150(Mr Guthrie)
Your Ref:
Date: 29 September 1988

See Distribution

Dear Sir,

**CIVIL DEFENCE -- PLANNING ASSUMPTIONS.
FURTHER CASUALTY CALCULATIONS.**

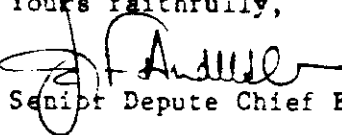
In June 1988 the first Strathclyde Planning Assumptions Study information pack was distributed to District Councils and regional departments. This showed the possible scale of casualties which might be expected in Strathclyde in two plausible nuclear attack scenarios. It will be remembered that the results shown in that pack assumed that no protective measures had been taken by or on behalf of the civil population.

Further research has been undertaken to establish how the implementation of one recommended protective measure, namely the construction of a makeshift improvised refuge inside the home, would affect the survival rate in the same two scenarios. The results of this work are shown in the second pack which is enclosed for your information.

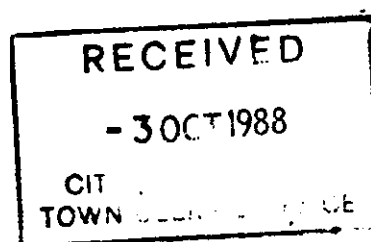
For Strathclyde in general, the revised results show increases in the "uninjured" category, in the range from 1% to 11%, i.e. up to 250,000, and these are distributed unevenly throughout the Region. Sub-regional and District results are shown so that local comparisons can be made.

Officers of Strathclyde Region's Emergencies Planning Unit and Planning Assumptions Study are available to discuss the contents of this second pack with your Civil Defence Liaison Officer/s if required..

Yours faithfully,


Senior Depute Chief Executive.

Enc.



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**LOCAL PLANNING ASSUMPTIONS
STUDY**

NUCLEAR ATTACK

REVISED CASUALTY CALCULATIONS

STRATHCLYDE LOCAL PLANNING ASSUMPTIONS STUDY

REVISED CASUALTY CALCULATION

The casualty calculation results detailed in "Nuclear Attack - Scenarios and Effects", presented casualty figures which reflected an assumption that the population had made no attempt to improve the protective factor (PF) of their dwellings by self-help measures pre-nuclear attack. In view of this Strathclyde Local Planning Assumptions Study (SLPAS) considered the following:-

Q...

' How would the casualty data be affected if the public were given advice by Central and Local government and acted upon it ? '.

In order to answer this question SLPAS had to initially consider what type of advice the public could expect to receive ?. Consequently it has been assumed by SLPAS that as soon as the outbreak of war is imminent, or during the early stages of war, the government of the day would issue advice to the public which would not be dissimilar to that detailed in the withdrawn government booklet ' Protect and Survive ' and which would advise householders to construct both a Fall-out Room and an Inner Refuge in their homes.

Given this assumption SLPAS decided that it would be appropriate to re-run the Nukecalc computer programme with the protective factor variables altered to reflect these recommendations.

PROTECT AND SURVIVE ADVICE

THE FALL-OUT ROOM

LOCATION : " Choose the place furthest from the outside walls and roof".
PROTECTIVE MEASURES : "Block up windows in the room and any other openings, make both the outside walls and the floor above you thicker".
RECOMMENDED MATERIALS : "Thick dense materials are the best, bricks concrete or building blocks, timber, boxes of earth/sand, books and furniture might all be used".

THE INNER REFUGE

Three IDEAS are presented :-

- (1). Make a 'Lean-to' with doors or strong boards rested against an inner wall. Secure firmly to the floor to prevent movement. Build further protection of bags or boxes of earth, sand, books, or even clothing on the slope of your refuge and anchor these against slipping. Partly close the open ends with boxes of earth/sand or heavy furniture.
- (2). Use tables and surround and cover with materials as described in (1).
- (3). Use the cupboard under the stairs, protect with materials as in (1) and strengthen the outside walls to a height of six feet.

Q...

' If the public had the type and quantities of materials, manpower and ability to complete the construction of both a Fall-out Room and an Inner Refuge would they have increased their chances of survival ?'.

In an attempt to answer this question SLPAS made the following assumption: An increase in PF means that an individual would have gained more protection against the effects of radiation (fall-out), however, damage resulting from blast would remain the same. Subsequently SLPAS decided that :-

(1). The PF variables assigned to blast rings A B & C in the first computer run should be used for the revised computer run.

(2). In respect of blast rings D & E an increase in PF could produce a variance in the casualty results data.

In the absence of a PF survey covering properties located within Strathclyde Region , SLPAS have opted to assign the undernoted PF values in the revised computer run. For the purposes of easy comparison the PF values used in the revised computer run are noted within parentheses.

BLAST RING	A	B	C	D	E
PF	1	1	2	5	8
	(1)	(1)	(2)	(10)	(15)

SLPAS accept that properties located within any of the blast rings could attain either a higher or lower PF value, however, the values as detailed above have been used only to highlight the possible variance in respect of prospective casualties and should only be used for the purposes of a comparison between the computer runs.

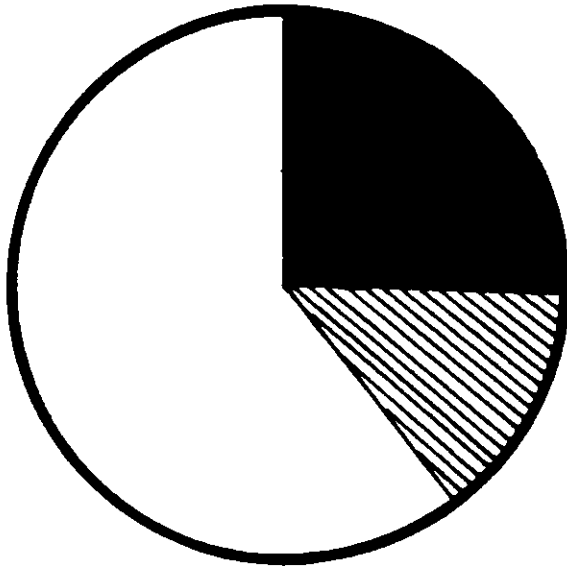
STRATHCLYDE REGION

SUMMARY OF CASUALTIES (PERCENTAGE)

RESULTS FROM FIRST COMPUTER RUN

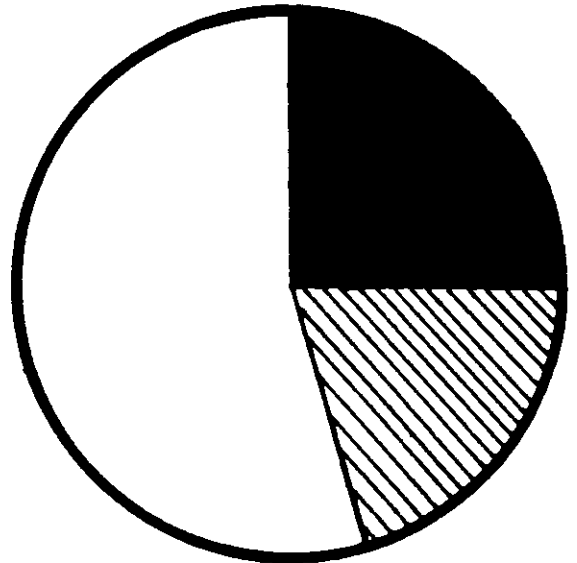
SCENARIO: 1 WIND: VSW

KILLED	INJURED	UNINJURED
26%	14%	60%



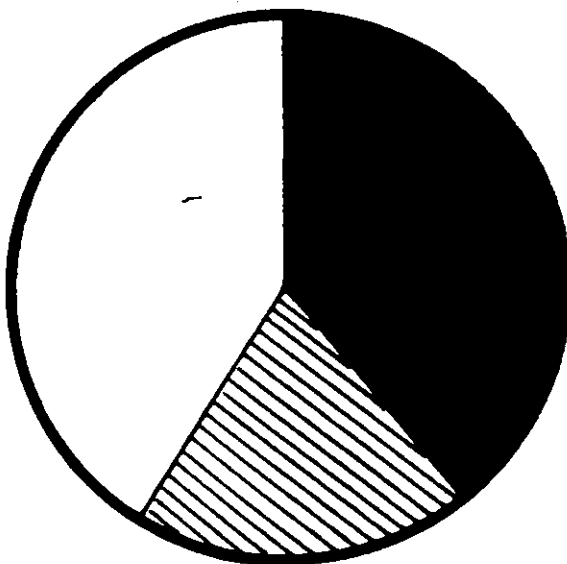
SCENARIO: 1 WIND: ENE

KILLED	INJURED	UNINJURED
25%	22%	53%



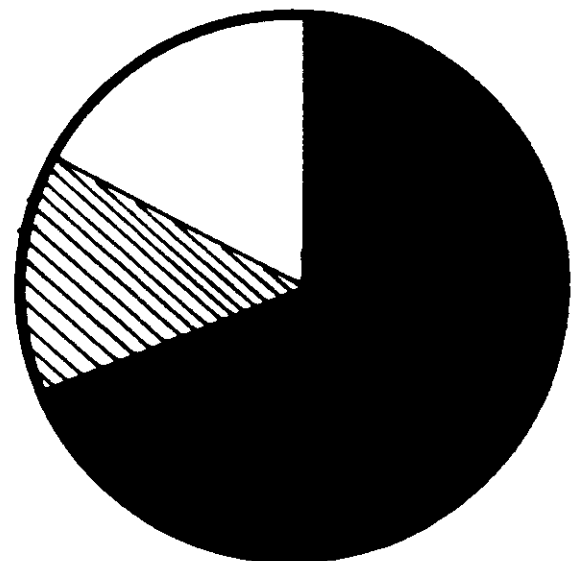
SCENARIO: 2 WIND: VSW

KILLED	INJURED	UNINJURED
39%	21%	40%



SCENARIO: 2 WIND: ENE

KILLED	INJURED	UNINJURED
69%	14%	17%



KEY

KILLED



INJURED



UNINJURED



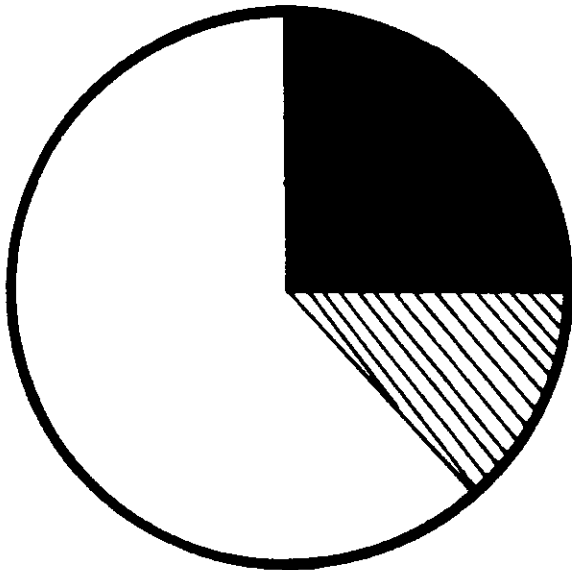
STRATHCLYDE REGION

SUMMARY OF CASUALTIES (PERCENTAGE)

RESULTS FROM REVISED COMPUTER RUN

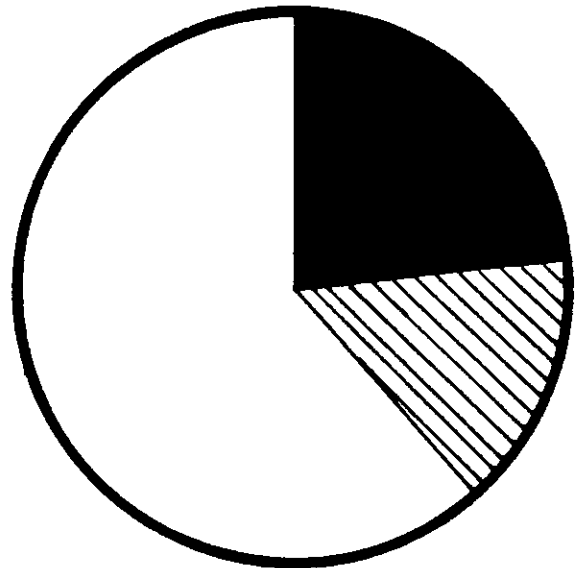
SCENARIO: 1 WIND: WSW

KILLED	INJURED	UNINJURED
25%	13%	62%



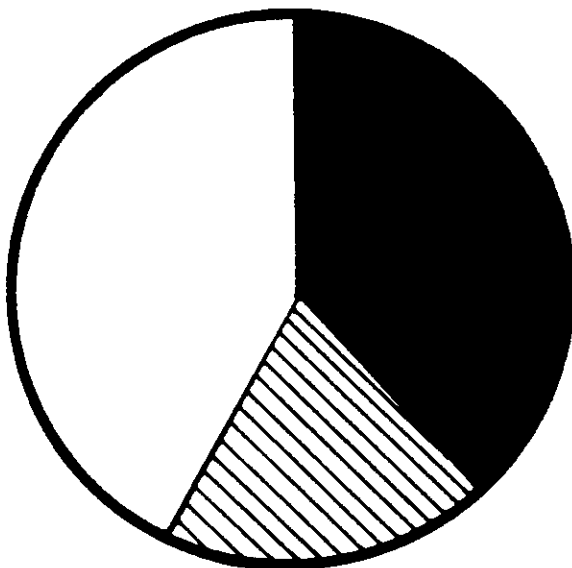
SCENARIO: 1 WIND: ENE

KILLED	INJURED	UNINJURED
23%	15%	62%



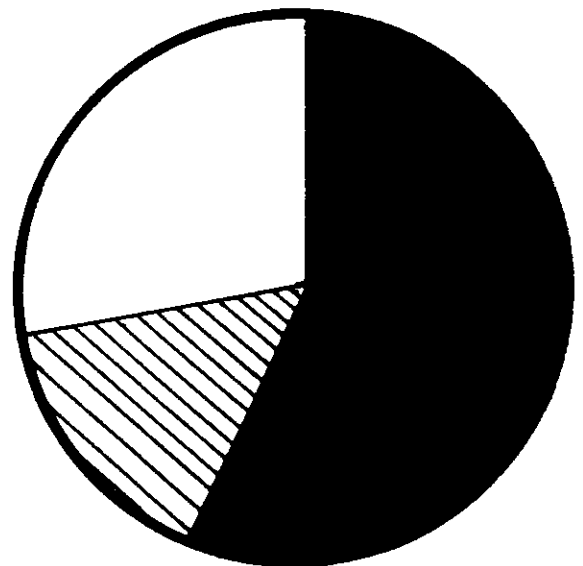
SCENARIO: 2 WIND: WSW

KILLED	INJURED	UNINJURED
38%	20%	42%



SCENARIO: 2 WIND: ENE

KILLED	INJURED	UNINJURED
57%	15%	28%



KEY

KILLED



INJURED



UNINJURED



STRATHCLYDE REGION

(TOTAL POPULATION : 2,371,313)

SUMMARY OF CASUALTIES (THOUSANDS)

	Scenario : 1 Wind : VSV			Scenario : 1 Wind : ENE		
SUB-REGION	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
ARGYLL & BUTE	14.1 (14.1)	3.6 (3.6)	45.1 (45.1)	17.0 (15.9)	5.4 (3.9)	40.4 (43.0)
AYR	57.8 (57.1)	28.3 (24.9)	288.0 (292.1)	64.7 (63.1)	25.6 (24.4)	283.8 (286.6)
DUNBARTON	69.6 (60.0)	53.2 (58.8)	190.8 (194.8)	27.1 (27.0)	63.7 (62.8)	222.8 (223.8)
GLASGOW	252.3 (235.9)	192.4 (168.3)	310.3 (350.8)	256.0 (224.8)	261.3 (193.3)	237.7 (336.9)
LANARK	0.1 (0.0)	3.1 (0.8)	500.9 (503.3)	4.7 (0.4)	95.2 (14.9)	404.2 (488.8)
RENFREW	224.4 (224.4)	60.8 (60.7)	76.5 (76.6)	226.6 (221.8)	66.9 (59.3)	68.2 (80.6)
TOTALS	618.3 (591.5)	341.4 (317.1)	1411.6 (1462.7)	596.1 (553.0)	518.1 (358.6)	1257.1 (1459.7)

NOTE : In the following casualty summaries, data within parentheses denotes the casualty results for the revised computer-run.

STRATHCLYDE REGION

(TOTAL POPULATION : 2,371,313)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 2 Wind : VSW Scenario : 2 Wind : ENE

SUB-REGION	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
ARGYLL & BUTE	14.4 (14.4)	5.1 (5.2)	43.3 (43.2)	19.6 (18.0)	6.5 (5.2)	36.7 (39.6)
AYR	140.6 (139.7)	67.0 (64.9)	166.5 (169.5)	190.8 (181.9)	46.7 (46.2)	136.6 (146.0)
DUMBARTON	70.0 (60.1)	54.7 (59.9)	188.9 (193.6)	164.4 (95.9)	69.4 (87.8)	79.8 (129.9)
GLASGOW	277.0 (257.0)	227.6 (207.4)	250.4 (290.6)	610.6 (451.9)	128.2 (144.6)	16.2 (158.5)
LANARK	200.1 (196.8)	90.1 (86.1)	213.9 (221.2)	348.3 (326.0)	47.1 (35.4)	108.7 (142.7)
RENFREW	225.0 (225.0)	60.7 (60.7)	76.0 (76.0)	294.9 (281.3)	40.9 (32.9)	25.9 (47.5)
TOTALS	927.1 (893.0)	505.2 (484.2)	939.0 (994.1)	1628.6 (1355.0)	338.8 (352.1)	403.9 (664.2)

ARGYLL & BUTE SUB-REGION

(TOTAL POPULATION : 62,786)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 1 Wind : WSW Scenario : 1 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
ARGYLL & BUTE	14.1 (14.1)	3.6 (3.6)	45.1 (45.1)	17.0 (15.9)	5.4 (3.9)	40.4 (43.0)
TOTALS	14.1 (14.1)	3.6 (3.6)	45.1 (45.1)	17.0 (15.9)	5.4 (3.9)	40.4 (43.0)

Scenario : 2 Wind : WSW Scenario : 2 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
ARGYLL & BUTE	14.4 (14.4)	5.2 (5.2)	43.2 (43.2)	19.6 (18.0)	6.5 (5.2)	36.7 (39.6)
TOTALS	14.4 (14.4)	5.2 (5.2)	43.2 (43.2)	19.6 (18.0)	6.5 (5.2)	36.7 (39.6)

AYR SUB-REGION

(TOTAL POPULATION : 374,122)

SUMMARY OF CASUALTIES (THOUSANDS)

	Scenario : 1 Wind : WSV			Scenario : 1 Wind : ENE		
DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
CUMNOCK & DOON VALLEY	0.5 (0.3)	3.2 (1.8)	40.8 (42.4)	0.1 (0.1)	1.3 (1.3)	43.1 (43.1)
CUNNINGHAME	7.1 (6.8)	4.7 (3.5)	123.6 (125.1)	11.7 (10.1)	4.5 (3.4)	119.2 (121.9)
KILMARNOCK & LOUDOUN	0.2 (0.1)	1.5 (0.7)	80.1 (81.0)	0.1 (0.1)	0.7 (0.6)	81.0 (81.1)
KYLE & CARRICK	50.0 (49.9)	18.9 (18.9)	43.5 (43.6)	52.8 (52.8)	19.1 (19.1)	40.5 (40.5)
TOTALS	57.8 (57.1)	28.3 (24.9)	288.0 (292.1)	64.7 (63.1)	25.6 (24.4)	283.8 (286.6)

AYR SUB-REGION

(TOTAL POPULATION : 374,122)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 2 Wind : WSV Scenario : 2 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
CUMNOCK & DOON VALLEY	0.5 (0.3)	3.2 (1.8)	40.8 (42.4)	0.1 (0.1)	1.3 (1.3)	43.1 (43.1)
CUNNINGHAME	86.2 (85.8)	26.2 (26.1)	23.0 (23.5)	121.3 (119.6)	6.7 (6.9)	7.4 (8.9)
KILMARNOCK & LOUDOUN	0.9 (0.8)	18.0 (17.3)	62.9 (63.7)	12.1 (5.0)	19.0 (18.4)	50.7 (58.4)
KYLE & CARRICK	53.0 (52.8)	19.6 (19.7)	39.8 (39.9)	57.3 (57.2)	19.7 (19.6)	35.4 (35.6)
TOTALS	140.6 (139.7)	67.0 (64.9)	166.5 (169.5)	190.8 (181.9)	46.7 (46.2)	136.6 (146.0)

DUNBARTON SUB-REGION

(TOTAL POPULATION : 313,596)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 1 Wind : WSV Scenario : 1 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
BEARSDEN & MILNGAVIE	3.7 (3.7)	17.4 (17.4)	21.9 (21.9)	3.7 (3.7)	17.4 (17.4)	21.9 (21.9)
CLYDEBANK	14.8 (14.8)	19.1 (19.1)	14.5 (14.5)	14.6 (14.6)	19.3 (19.3)	14.5 (14.5)
CUMBERNAULD & KILSYTH	0.0 (0.0)	0.0 (0.0)	61.4 (61.4)	0.0 (0.0)	0.0 (0.0)	61.4 (61.4)
DUNBARTON	50.8 (41.4)	8.6 (14.7)	17.3 (20.6)	8.6 (8.6)	18.5 (18.5)	49.6 (49.6)
STRATHKELVIN	0.3 (0.1)	8.1 (7.6)	75.7 (76.4)	0.2 (0.1)	8.5 (7.6)	75.4 (76.4)
TOTALS	69.6 (60.0)	53.2 (58.8)	190.8 (194.8)	27.1 (27.0)	63.7 (62.8)	222.8 (223.8)

DUNBARTON SUB-REGION

(TOTAL POPULATION : 313,596)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 2 Wind : WSV Scenario : 2 Wind : EWE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
BEARSDEN & MILNGAVIE	3.7 (3.7)	17.4 (17.4)	21.9 (21.9)	29.8 (29.8)	7.7 (7.7)	5.5 (5.5)
CLYDEBANK	14.8 (14.8)	19.1 (19.1)	14.5 (14.5)	31.6 (31.6)	11.1 (11.1)	5.7 (5.7)
CUMBERNAULD & KILSYTH	0.0 (0.0)	0.0 (0.0)	61.4 (61.4)	46.6 (18.8)	7.0 (23.0)	7.8 (19.6)
DUNBARTON	50.8 (41.4)	8.6 (14.7)	17.3 (20.6)	8.6 (8.6)	18.5 (18.5)	49.6 (49.6)
STRATHKELVIN	0.7 (0.2)	9.6 (8.7)	73.8 (75.2)	47.8 (7.1)	25.1 (27.5)	11.2 (49.5)
TOTALS	70.0 (60.1)	54.7 (59.9)	188.9 (193.6)	164.4 (95.9)	69.4 (87.8)	79.8 (129.9)

GLASGOW SUB-REGION

(TOTAL POPULATION : 755,029)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 1 Wind : VSW Scenario : 1 Wind : ENE						
DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
GLASGOW	252.3 (235.9)	192.4 (168.3)	310.3 (350.8)	256.0 (224.8)	261.3 (193.3)	237.7 (336.9)
TOTALS	252.3 (235.9)	192.4 (168.3)	310.3 (350.8)	256.0 (224.8)	261.3 (193.3)	237.7 (336.9)

Scenario : 2 Wind : VSW Scenario : 2 Wind : ENE						
DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
GLASGOW	277.0 (257.0)	227.6 (207.4)	250.4 (290.6)	610.6 (451.9)	128.2 (144.6)	16.2 (158.5)
TOTALS	277.0 (257.0)	227.6 (207.4)	250.4 (290.6)	610.6 (451.9)	128.2 (144.6)	16.2 (158.5)

LANARK SUB-REGION

(TOTAL POPULATION : 504,101)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 1 Wind : WSV Scenario : 1 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
CLYDESDALE	0.0 (0.0)	2.1 (0.2)	54.5 (56.4)	0.0 (0.0)	0.0 (0.0)	56.6 (56.6)
EAST KILBRIDE	0.1 (0.0)	1.0 (0.6)	77.1 (77.6)	0.1 (0.0)	10.6 (0.5)	67.5 (77.7)
HAMILTON	0.0 (0.0)	0.0 (0.0)	106.8 (106.8)	0.0 (0.0)	15.6 (1.2)	91.2 (105.6)
MONKLANDS	0.0 (0.0)	0.0 (0.0)	111.7 (111.7)	0.3 (0.0)	37.1 (5.1)	74.3 (106.6)
MOTHERWELL	0.0 (0.0)	0.0 (0.0)	150.8 (150.8)	4.3 (0.4)	31.9 (8.1)	114.6 (142.3)
TOTALS	0.1 (0.0)	3.1 (0.8)	500.9 (503.3)	4.7 (0.4)	95.2 (14.9)	404.2 (488.8)

LANARK SUB-REGION

(TOTAL POPULATION : 504,101)

SUMMARY OF CASUALTIES (THOUSANDS)

	Scenario : 2 Wind : VSW			Scenario : 2 Wind : EWE		
DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
CLYDESDALE	0.0 (0.0)	2.8 (0.8)	53.8 (55.8)	0.0 (0.0)	0.6 (0.6)	56.0 (56.0)
EAST KILBRIDE	2.8 (2.8)	20.4 (20.0)	55.0 (55.4)	68.2 (66.9)	1.1 (1.5)	8.9 (9.8)
HAMILTON	72.9 (72.9)	11.8 (11.7)	22.1 (22.2)	86.9 (86.9)	5.3 (5.3)	14.6 (14.6)
MOKLANDS	31.4 (30.4)	35.0 (33.6)	45.3 (47.7)	80.1 (66.5)	21.9 (17.0)	9.7 (28.2)
MOTHERWELL	93.0 (90.7)	20.3 (20.0)	37.5 (40.1)	113.1 (105.7)	18.2 (11.0)	19.5 (34.1)
TOTALS	200.1 (196.8)	90.3 (86.1)	213.7 (221.2)	348.3 (326.0)	47.1 (35.4)	108.7 (142.7)

RENFREW SUB-REGION

(TOTAL POPULATION : 361,679)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 1 Wind : WSW Scenario : 1 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
EASTWOOD	5.7 (5.7)	16.6 (16.6)	32.7 (32.7)	16.8 (12.1)	19.6 (12.1)	18.6 (30.8)
INVERCLYDE	80.9 (80.9)	8.1 (8.1)	10.5 (10.5)	72.2 (72.2)	11.6 (11.6)	15.7 (15.7)
RENFREW	137.8 (137.8)	36.1 (36.0)	33.3 (33.4)	137.6 (137.5)	35.7 (35.6)	33.9 (34.1)
TOTALS	224.4 (224.4)	60.8 (60.7)	76.5 (76.6)	226.6 (221.8)	66.9 (59.3)	68.2 (80.6)

RENFREW SUB-REGION

(TOTAL POPULATION : 361,679)

SUMMARY OF CASUALTIES (THOUSANDS)

Scenario : 2 Wind : WSW Scenario : 2 Wind : ENE

DISTRICT	KILLED	INJURED	UNINJURED	KILLED	INJURED	UNINJURED
EASTWOOD	5.7 (5.7)	16.6 (16.6)	32.7 (32.7)	30.4 (17.3)	20.8 (13.1)	3.8 (24.6)
INVERCLYDE	80.9 (80.9)	8.1 (8.1)	10.5 (10.5)	72.2 (72.2)	11.6 (11.6)	15.7 (15.7)
RENFREW	138.4 (138.4)	36.0 (36.0)	32.8 (32.8)	192.3 (191.8)	8.5 (8.2)	6.4 (7.2)
TOTALS	225.0 (225.0)	60.7 (60.7)	76.0 (76.0)	294.9 (281.3)	40.9 (32.9)	25.9 (47.5)

GLASGOW DISTRICT

CASUALTY DATA (THOUSANDS)

SCENARIO : ONE

NUMBER OF BOMBS : 18

WIND DIRECTION : W.S.W

KILLED : 235.9

INJURED : 168.3

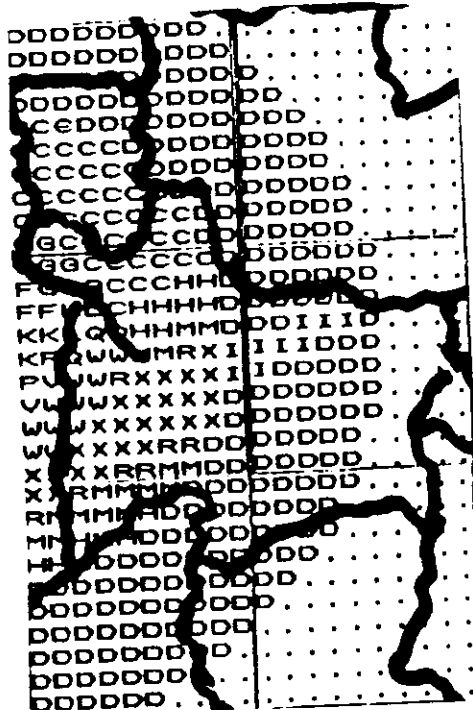
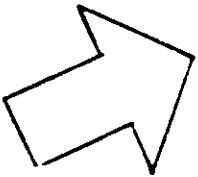
UNINJURED : 350.3

TOTAL POPULATION : 755.0

Printed 1km-square codes use table:

Blast zone

Dose/rad	A	B	C	D	E
< 100	CPKPA	COLSB	CRJIC	YBZTD	N-10J
100 - 300					
300 - 450					
450 - 600					



GLASGOW DISTRICT

CASUALTY DATA (THOUSANDS)

SCENARIO : ONE

NUMBER OF BOMBS : 18

WIND DIRECTION : E.N.E

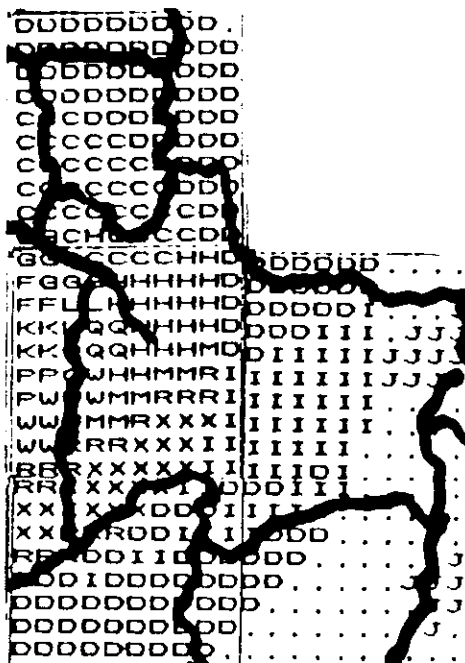
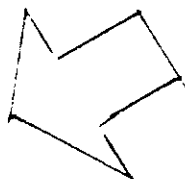
KILLED : 224.8

INJURED : 193.3

UNINJURED : 336.9

TOTAL POPULATION : 755.0

Dose/rad	Blast zone				
	A	B	C	D	E
< 100	1000	1000	1000	1000	1000
100-200	600	600	600	600	600
200-300	400	400	400	400	400
300-400	200	200	200	200	200
400-500	100	100	100	100	100
> 500	0	0	0	0	0



CASUALTY DATA (THOUSANDS)

SCENARIO : TWO

NUMBER OF BOMBS : 24

WIND DIRECTION : W.S.W

KILLED : 257.0

INJURED : 207.4

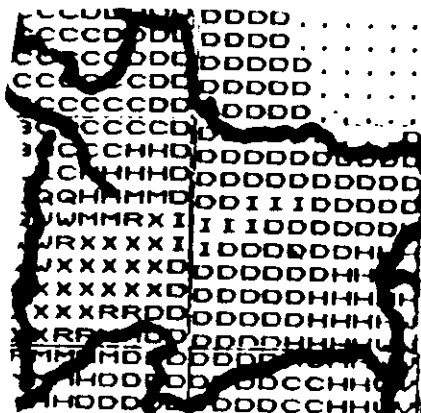
UNINJURED : 290.6

TOTAL POPULATION : 755.0

Printed characters codes use table:

Dial code

Dose/rad	A	B	C	D	E
< 100	CX7A	CG7B	K23C	Y8ZD	N10J
100 - 300					
300 - 450					
450 - 600					
> 600					



GLASGOW

CASUALTY DATA (THOUSANDS) SCENARIO : TWO

NUMBER OF BOMBS : 24

WIND DIRECTION : E.N.E

KILLED : 451.9
INJURED : 144.6
UNINJURED : 158.5
TOTAL POPULATION : 755.0

Dose / rad	Blast zone				
	A	B	C	D	E
< 100	600	600	600	600	600
100 - 150	600	600	600	600	600
150 - 200	600	600	600	600	600
200 - 300	600	600	600	600	600
300 - 450	600	600	600	600	600
450 - 600	600	600	600	600	600
> 600	600	600	600	600	600

