in the building (our emphasis). *Hence, if the shelter room has no windows there will be no difference.*"

ECSPAS Estimates of Stone Built Tenement PFs:

Stone Built 3/4 Storey Tenements - Ground Floor PF = 20-25
With windows blocked, or in larger properties with an internal room PF = 40 -50.
HO value for "windows blocked" in ground floor tenement flats is **110.**

However, the calculation of PF's for the upper storeys is more complex - two important factors being the contribution through the floors from windows in lower storeys and the contribution **paticularly in central areas** from fallout on the walls and especially the roofs of buildings opposite ("wall shine" and "roof shine"). This is dealt with in more detail in the NFZ "Housing Survey Methodology" paper. We have not attempted to calculate figures for the other floors of tenement flats. Based on our calculations the HO "windows blocked" figures for Ground floors are an overestimate of around × 2.

It seems probable to us that a more sophisticated method than that outlined in the 'Technical Guidance' is used in the HO computer calculated PFs. - these are calculated using a Fortran programme on a "mainframe" computer.
For example, using the 'Technical Guidance' method with the assumptions made in the example calculation gave us a range of much higher figures (PF's ~ 100-200) for our examples of ground floor tenement flats, than the value in the HO data sheets (PF 17), even with placing the reference point **X** at a number of different central positions.

2) Sample of 'modern' house types (post ~ 1914).

This covers a very wide range of building types and constructions.

One major point here is that some HO figures for **External Wall Weights** are overestimates of the weights of building materials commonly used. For example, one very common type of external wall construction (from about 1900's to the 1960's) is the "11 inch cavity wall" - this consists of two brick "skins" of 4-4½ inch brick with a 2 inch gap or cavity between. Figures from Lothian Region Architects Department and Edinburgh University Department of Civil Engineering and Building Science give the following range:

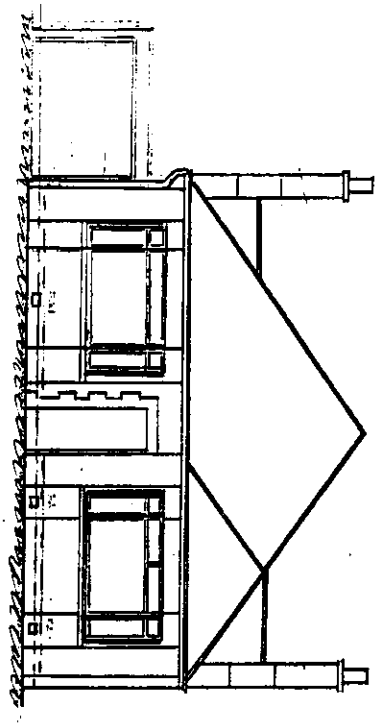
Cavity wall with two layers of 4-4½ inch building brick + external roughcast + internal plaster - **450-480 kg/m²**.

HO Figures from EPG Handbook 1, for **9 inch brick outer walls (equivalent to the 11" cavity wall) give the same value for all house types with this wall construction: 513 kg/m²**

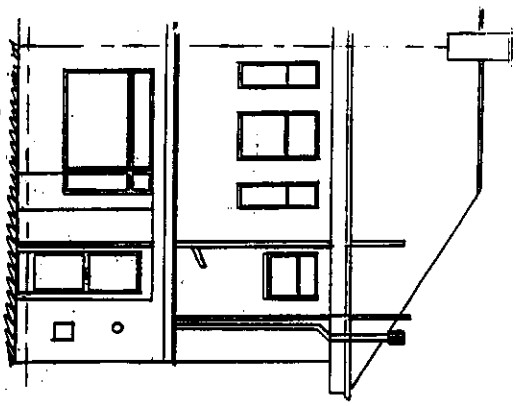
513 kg/m² represents the upper limit of old 4½ inch brick building. Since about the 1940's slightly smaller bricks have been introduced, and modern (from late 1950's) bricks are usually 4" or 100mm. This of course applies equally to internal brick walls.
These differences may seem trivial, but they can produce significant differences in figures for Protective Factors, especially for modern housing. As an example (admittedly rather artificial), the PF of a square brick enclosure of 100m² was calculated (ignoring roof values) using the following wall weights and Home Office tables (from the Technical Guidance): 1) 460kg/m² (typical heavy 11" brick cavity wall), PF = 13
2) 513kg/m² (HO value), PF = 17

The results of the ECSPAS Protective Factor calculations for some modern housing examples are given in DIAGRAM 3. Where a reference position in a house had no internal openings (usually doors) opposite external doors or windows the PF value is equivalent to the HO "windows blocked" value. Calculations were made only for the ground floor, using the ECSPAS method (p.6), both for the standard 1 metre above the floor and for 0.3 metres, representing "lying down" to gain the best protection available without using extra shielding material.
An external wall weight of 400kg/m² was used for two of the examples (2 & 3) as a **generous** value for most modern external non-lightweight wall types (post 1940's) which vary from about 250 - 450kg/m². This covers a wide range of constructions including cavity brick, brick outer and block inner, "systems built" concrete slab outer and block inner, and solid concrete "no fines" walls. The resulting PF values for these examples represent a rough average **upper limit** for these common house types.
A comparison of these results with similar building types in the EPG Handbook shows that the HO overestimates the PF figures for non-lightweight modern and some traditionally constructed buildings - this appears to be mainly due to the wall weight figures rather than other calculation assumptions. The "windows blocked" figures tend to be greater overestimates than the "no action" figures.

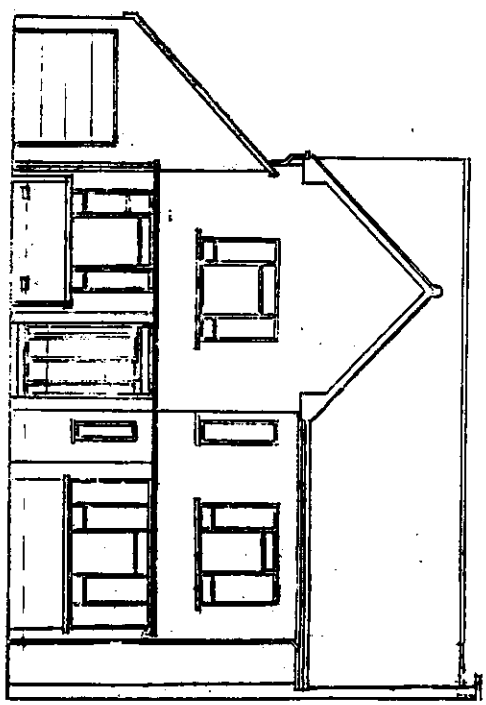
DIAGRAM : ECSPAS PROTECTIVE FACTOR ESTIMATES - MODERN HOUSING TYPES.



1) DETACHED SINGLE STOREY BUNGALOW, BRICK EXT. WALLS: 400kg/m².

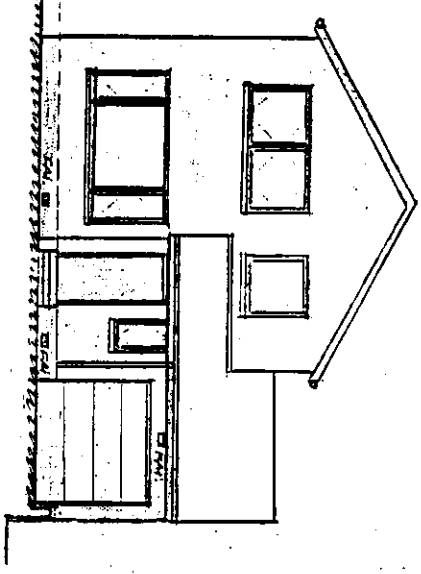


PF 5 - 6 (Equivalent to "windows blocked")
PF 10 ("lying down" position)



2) DETACHED 2 STOREY HOUSE, BRICK & BLOCK EXT. WALLS: 400kg/m².
PF 7 - 8
PF 14 ("lying down" position)

3) SEMI-DETACHED 2 STOREY HOUSE, BRICK AND BLOCK EXT. WALLS: 400kg/m²
PF 7 - 9 (Equivalent to "windows blocked")
PF 14 ("lying down" position)



4) DETACHED 2 STOREY HOUSE, TIMBER AND BRICK OR BLOCK EXT. WALLS: 200kg/m²
PF 3 - 4
PF 6 ("lying down" position)

For example:

The HO "1 storey traditional 1T" is similar in type to our example 1:

HO figures, G floor - "No Action" 8, "Windows Blocked" 11 -
ECSPAS - 5 6

The HO "2 storey modern other 2MO" is similar to our example 3. Although a lighter wall construction is used in the HO example (366kg/m²) the HO figure is still slightly higher:

HO figures, G floor - "NO Action" 8, "Windows Blocked" 11
ECSPAS - 7, 9

However, these differences in HO PF estimates are generally not large enough to move housing types into very significantly higher PF groups unless the "windows blocked" figures are taken. Taking the size of the HO overestimates into account, most housing types found outside Scottish city central areas (which contain most of the Tenements and other stone built + modern steel and concrete buildings) are likely to have PFs less than 10-15. In contrast the city and town centres will have a majority of the properties with PFs of 20 - 50 or more (although most will lie within that range).

This estimation is borne out by the figures produced by the Central, Lothian and Tayside Regional surveys of housing stock PFs.
An overall summary of their findings gives the following general pattern:

In areas outside major urban concentrations **60-70%** of the population live in buildings with PFs of 10 or less, and ~ **30%** in buildings with a PF of 15 or more. In urban areas the % of the population in buildings with a PF of 15 or more rises to about **50** with the majority of the rest still having PFs of 10 or less. These figures represent the "no action" or "unaltered" values from the EPG Handbook. The "windows blocked" figures are unrealistic overestimates of protection afforded, merely by having internal apertures closed. Considering that much of the internal structure of buildings (except in the case of those with concrete floors) is of relatively light weight (Plasterboard/lath & plaster on timber framing and wooden floors) then closing apertures, even with relatively heavy materials would still leave the majority of the surounding structure affording its lower level of protection.
In resonably heavily built dwellings (stone or brick) the PF can be effectively raised by adopting a prone position, providing of course this is out of "line of site" with external doors and large "French" type windows extending to ground level. In our examples a PF of 10 - 14 could be achieved by this measure in houses with external walls of brick or heavy brick and block construction (see DIAG: 3).

Unfortunately each Region has used somewhat different PF ranges for their estimates. However considering the diversity of housing types and methods of estimation the pattern is reasonably consistent.

North East Fife District

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	38.6	0.2	4.6	6.6	9.9
Scenario 2 (WSW)	38.6	0.2	4.6	6.6	9.9
Scenario 1 (SW)	33.5	0.3	2.0	9.0	15.1
Scenario 2 (SW)	33.5	0.3	2.0	9.0	15.1

Midlothian District

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	76.0	0.0	0.0	5.1	0.0
Scenario 2 (WSW)	61.5	0.7	7.1	9.2	2.6
Scenario 1 (W)	79.8	0.0	0.0	1.3	0.0
Scenario 2 (W)	67.9	0.7	8.1	2.3	2.0

West Lothian District

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	121.2	1.3	12.7	0.2	2.6
Scenario 2 (WSW)	88.0	2.5	30.6	3.7	13.2
Scenario 1 (W)	104.3	1.0	7.2	13.6	11.8
Scenario 2 (W)	76.6	2.1	21.9	7.5	29.8

Stirling District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	50.5	0.0	0.3	15.5	10.2
Scenario 2 (WSW)	28.9	0.7	7.8	20.2	18.8
Scenario 1 (SW)	73.7	0.0	0.3	0.6	1.8
Scenario 2 (SW)	60.4	0.7	12.1	0.7	2.5

FIFE REGION

Dunfermline District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	42.8	0.5	9.8	2.1	66.5
Scenario 2 (WSW)	33.4	0.5	13.5	2.2	72.2
Scenario 1 (SW)	27.2	0.3	7.0	5.5	81.8
Scenario 2 (SW)	14.6	0.3	6.5	6.0	94.5

Kirkcaldy District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	99.5	0.0	0.0	10.5	32.8
Scenario 2 (WSW)	99.5	0.0	0.0	10.5	32.8
Scenario 1 (SW)	68.3	0.0	0.0	28.5	45.9
Scenario 2 (SW)	68.3	0.0	0.0	28.5	45.9

EAST CENTRAL SCOTLAND PLANNING ASSUMPTIONS STUDY (ECSPAS)

Paper 2.7: Tables of Casualty Figures by District. NUKECALC2.1

Tables 5. Scenarios 1 and 2, Wind 40 mph, Protection Factors 1,1,2,5,8

The following tables list the casualties (in thousands) by category for the Districts in East Central Scotland, under the assumptions of a wind speed of 40 mph, visibility of 20 km, and protection factors of 1,1,2,5,8 in blast rings A,B,C,D and E, apart for the urban areas of Dundee and Edinburgh where the protection factor for blast ring E is increased to 15 to reflect the higher protection offerred by (undamaged) stone-built housing. The calculations are performed for two winds, WSW and either SW or W (chosen to maximise fallout effects for individual District in order to assess the sensitivity to changes in wind direction. (See fallout maps and text for further explanation of these terms.)

CENTRAL REGION

Clackmannan District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	46.4	0.0	0.1	1.0	0.2
Scenario 2 (WSW)	24.8	0.8	10.5	5.8	5.7
Scenario 1 (SW)	47.3	0.0	0.1	0.1	0.1
Scenario 2 (SW)	29.4	0.9	12.7	1.3	3.3

Falkirk District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	138.5	0.0	0.3	4.8	0.1
Scenario 2 (WSW)	16.5	0.2	14.1	3.2	109.8
Scenario 1 (SW)	129.4	0.1	0.4	13.9	0.0
Scenario 2 (SW)	8.9	0.2	6.3	6.3	122.2

Tables 2. Scenario 2, WSW wind 40 mph, Protection Factors 1,1,,5,15

The following tables list the casualties (in thousands) by category for Central and Fife Regions, under the assumptions of a WSW wind of 40 mph, visibility of 20 km, and protection factors of 1,1,2,5, in blast rings A,B,C,D and an **increased protection factor of 15 in blast ring E**. (See text for an explanation of these terms.)

This is to explore the sensitivity of the fallout casualty estimates to the assumed protection factor for **undamaged buildings**.

The wind direction chosen is that which maximises fallout over Central and Fife Regions (see fallout maps in Paper 2.5).

CENTRAL REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 2 (WSW)	80.5	1.6	32.4	25.5	127.7
	(30.0%)	(0.6%)	(12.1%)	(9.5%)	(47.7%)

FIFE REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 2 (WSW)	189.5	0.7	18.1	19.7	96.2
	(58.5%)	(0.2%)	(5.6%)	(6.1%)	(29.7%)

Table 3. Scenario 2, W wind 40 mph, Protection Factors 1,1,2,5,8

The following tables list the casualties (in thousands) by category for Lothian Region, under the assumptions of a W wind of 40 mph, visibility of 20 km, and protection factors of 1,1,2,5,8 in blast rings A,B,C,D and E. (See text for an explanation of these terms.)

The wind direction chosen is that which maximises fallout over Lothian Region (see fallout maps in Paper 2.5).

LOTHIAN REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 2 (W)	175.1	3.2	36.4	32.2	476.2
	(24.2%)	(0.4%)	(5.0%)	(4.5%)	(65.9%)

Table 4. Scenario 2, W wind 40 mph, Protection Factors 1,1,2,5,15.

The following tables list the casualties (in thousands) by category for Lothian Region, under the assumptions of a W wind of 40 mph, visibility of 20 km, and protection factors of 1,1,2,5 in blast rings A,B,C and D and an **increased protection factor of 15 in blast ring E.** (See text for an explanation of these terms.)

This is to assess the sensitivity of these calaculations to **increased protection factors of undamaged houses.**

The wind direction chosen is that which maximises fallout over Lothian Region (see fallout maps in Paper 2.5).

LOTHIAN REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 2 (W)	180.3	3.2	36.4	31.9	471.3
	(24.9%)	(0.4%)	(5.0%)	(4.4%)	(65.1%)

EAST CENTRAL SCOTLAND PLANNING ASSUMPTIONS STUDY (ECSPAS)

Paper 2.6 :Tables of Casualty Figures by Region. NUKECALC2.1

Tables 1. Scenarios 1 and 2, WSW wind 40 mph,
Protection Factors 1,1,2,5,8

The following tables list the casualties (in thousands) by category for the four Regions in East Central Scotland, under the assumptions of a WSW wind of 40 mph, visibility of 20 km, and protection factors of 1,1,2,5,8 in blast rings A,B,C,D and E. (See text for an explanation of these terms.)

CENTRAL REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	235.3	0.0	0.7	21.2	10.5
	(87.9%)	(0.0%)	(0.3%)	(7.9%)	(3.9%)
Scenario 2 (WSW)	70.2	1.6	32.4	29.2	134.3
	(26.2%)	(0.6%)	(12.1%)	(10.9%)	(50.2%)

FIFE REGION

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	180.8	0.7	14.4	19.2	109.1
	(55.7%)	(0.2%)	(4.4%)	(5.9%)	(33.6%)
Scenario 2 (WSW)	171.4	0.7	18.1	19.2	114.8
	(52.9%)	(0.2%)	(5.6%)	(5.9%)	(35.4%)

LOTHIAN REGION

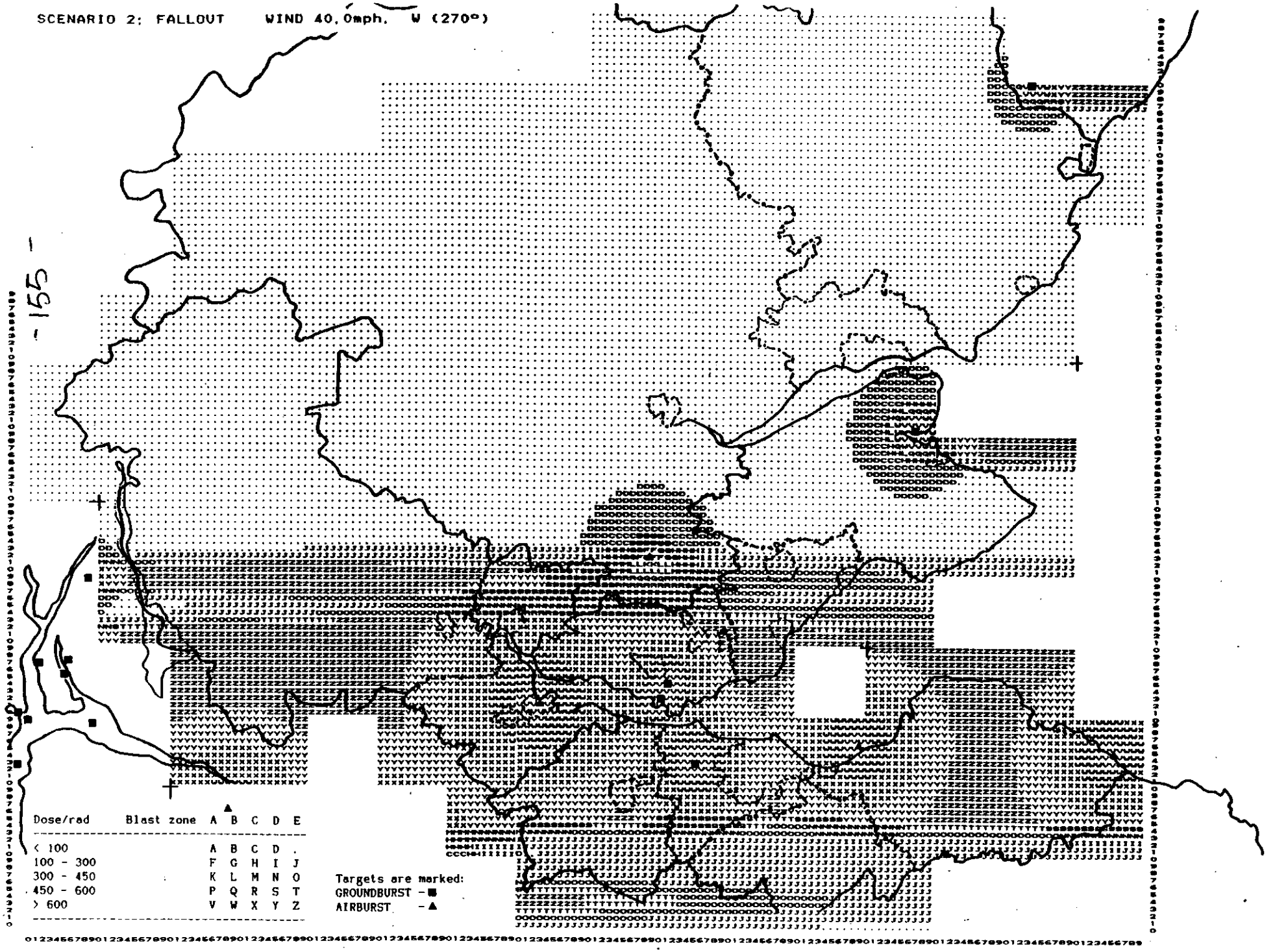
Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	443.9	3.4	42.4	44.9	188.5
	(61.4%)	(0.5%)	(5.9%)	(6.2%)	(26.1%)
Scenario 2 (WSW)	300.6	6.6	93.6	64.4	257.9
	(41.6%)	(0.9%)	(12.9%)	(8.9%)	(35.7%)

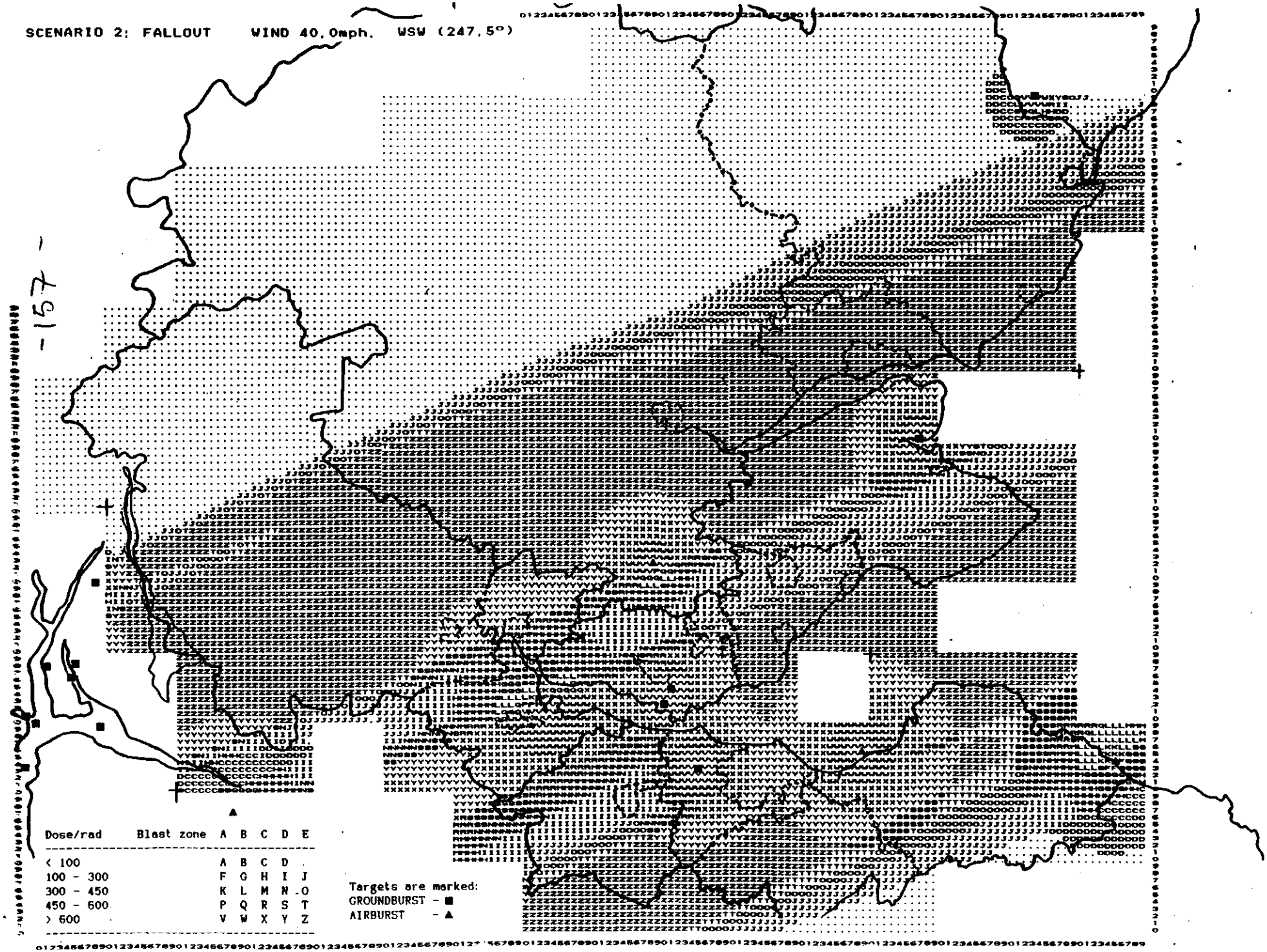
TAYSIDE REGION

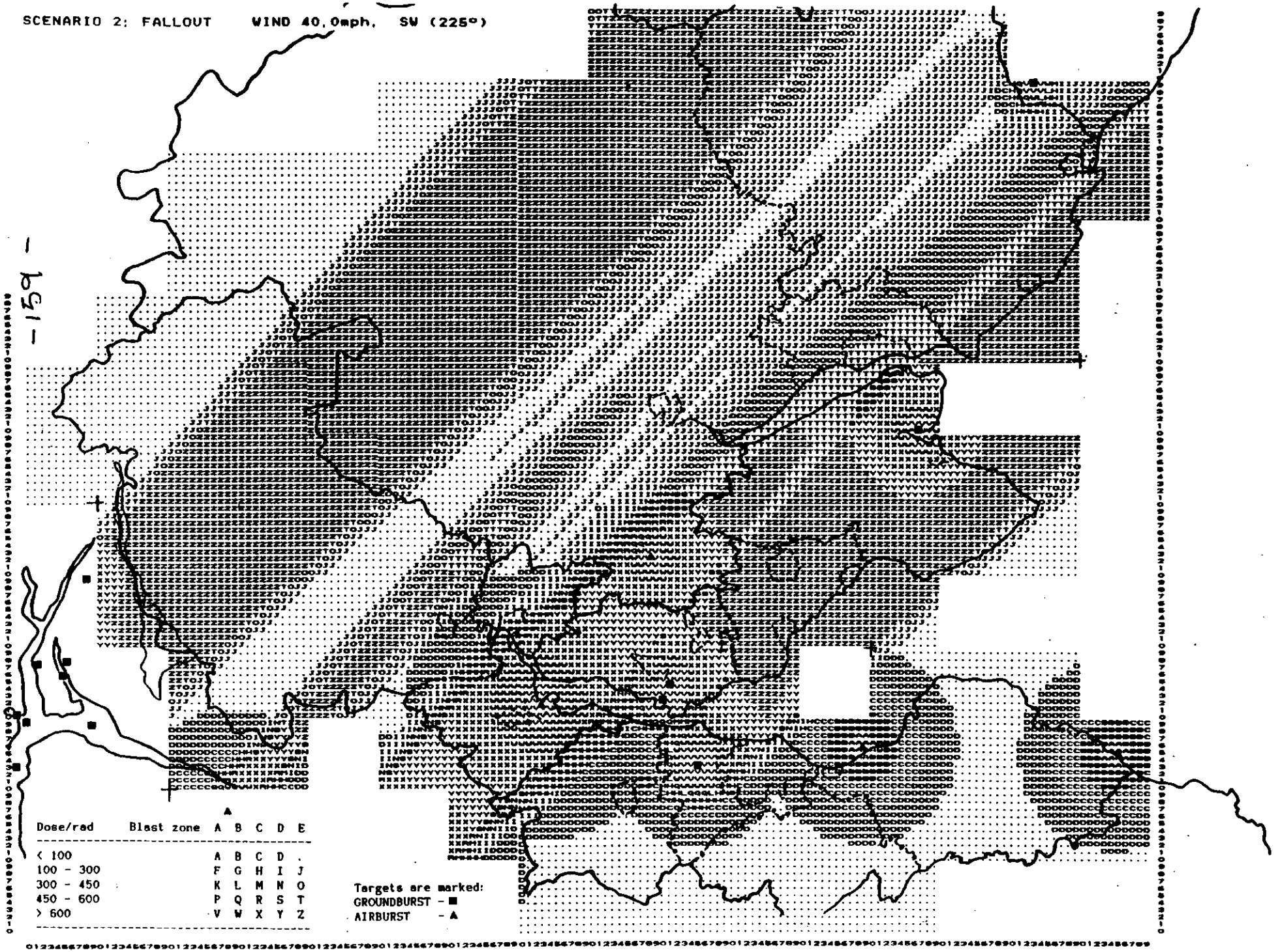
Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	370.2	0.0	1.2	4.4	5.4
	(97.1%)	(0.0%)	(0.3%)	(1.2%)	(1.4%)
Scenario 2 (WSW)	370.2	0.0	1.2	4.4	5.4
	(97.1%)	(0.0%)	(0.3%)	(1.2%)	(1.4%)

East Central Scotland Totals

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	1230.2	4.1	58.7	89.7	313.5
	(72.5%)	(0.2%)	(3.5%)	(5.3%)	(18.5%)
Scenario 2 (WSW)	912.4	8.9	145.3	117.2	512.4
	(53.8%)	(0.5%)	(8.6%)	(6.9%)	(30.2%)


SCENARIO 2: FALLOUT WIND 40.0mph. W (270°)
Dose/rad Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 2: FALLOUT WIND 40.0mph. WSW (247.5°)
Dose/rad Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 2: FALLOUT WIND 40.0mph, SW (225°)
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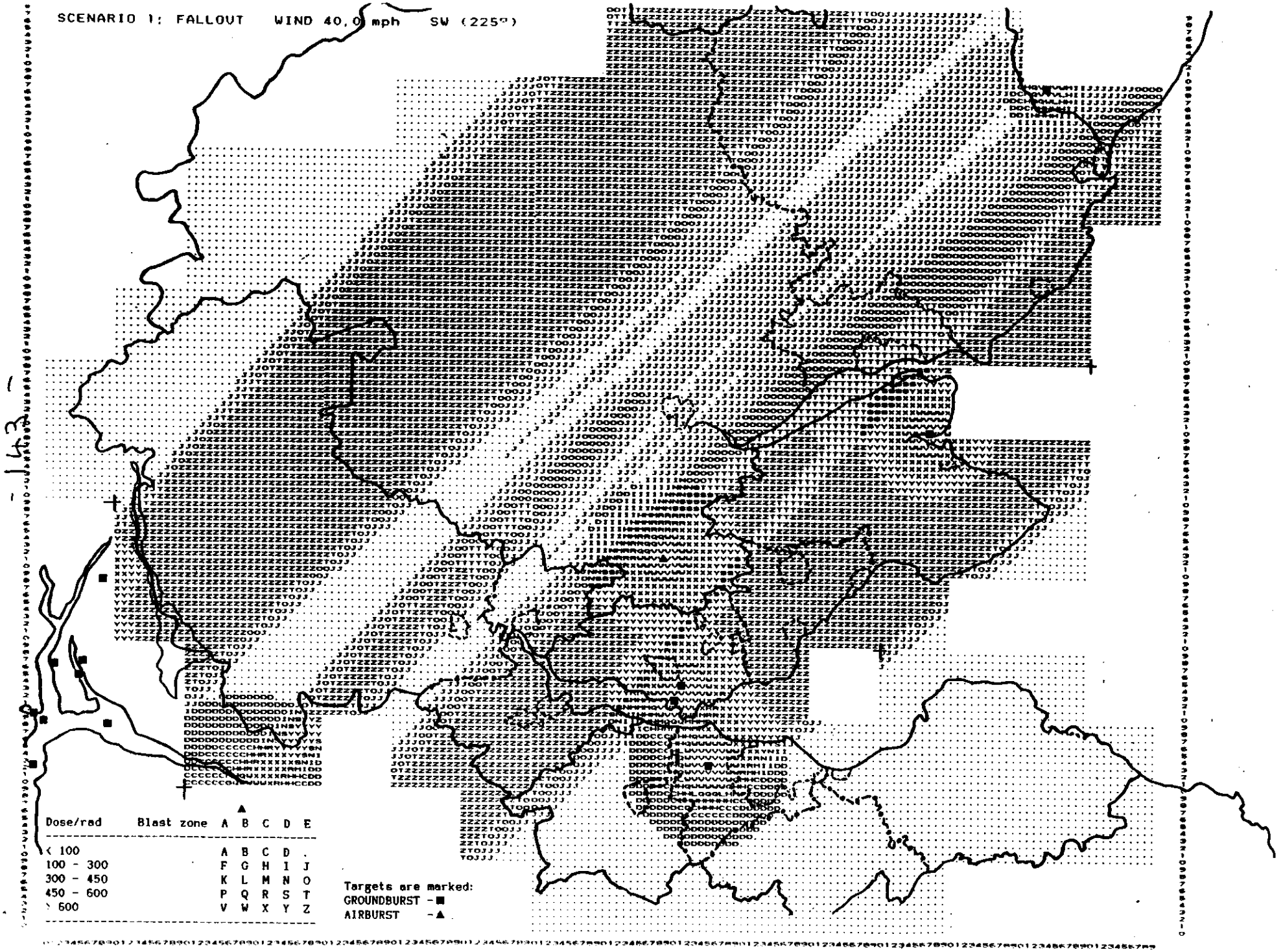
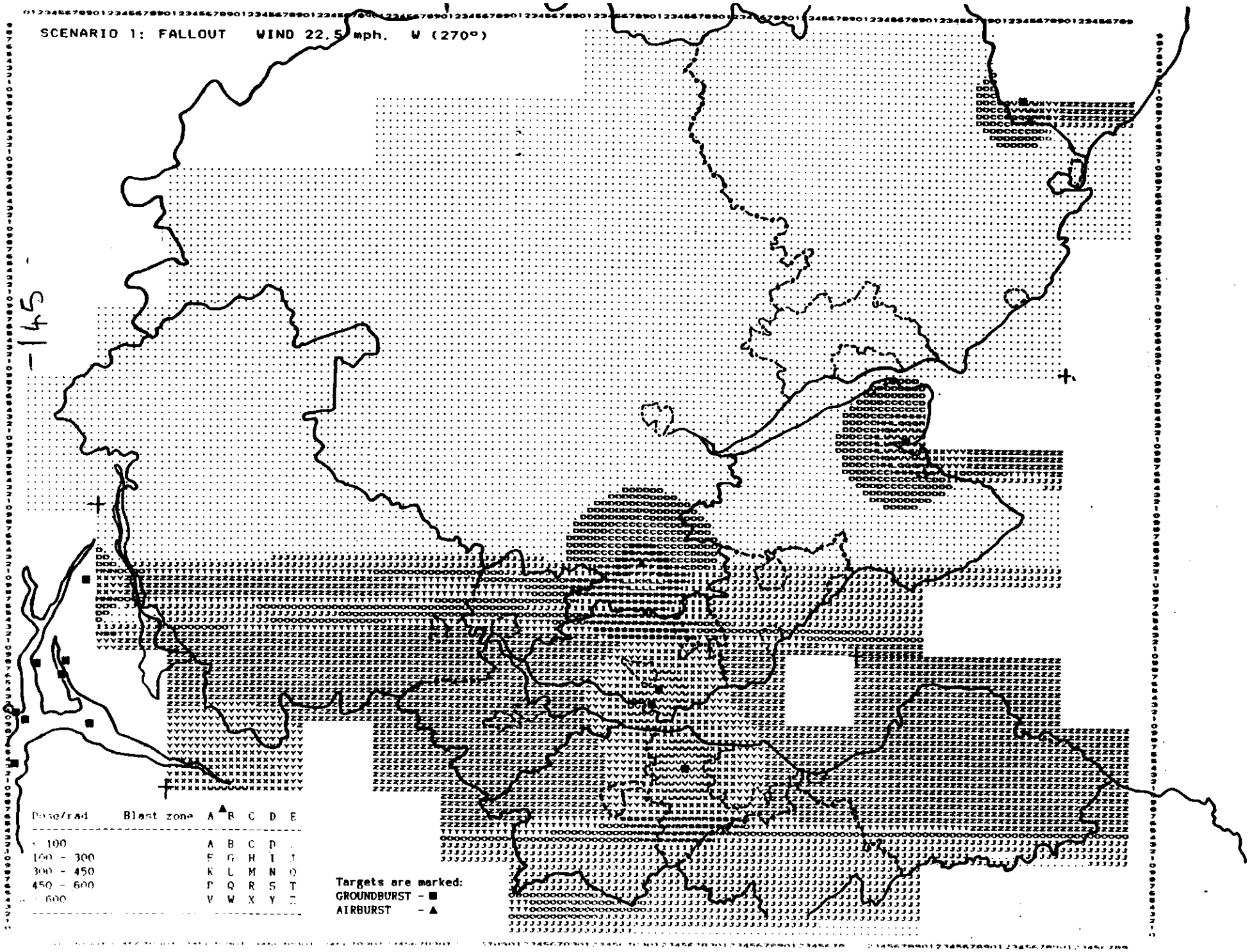
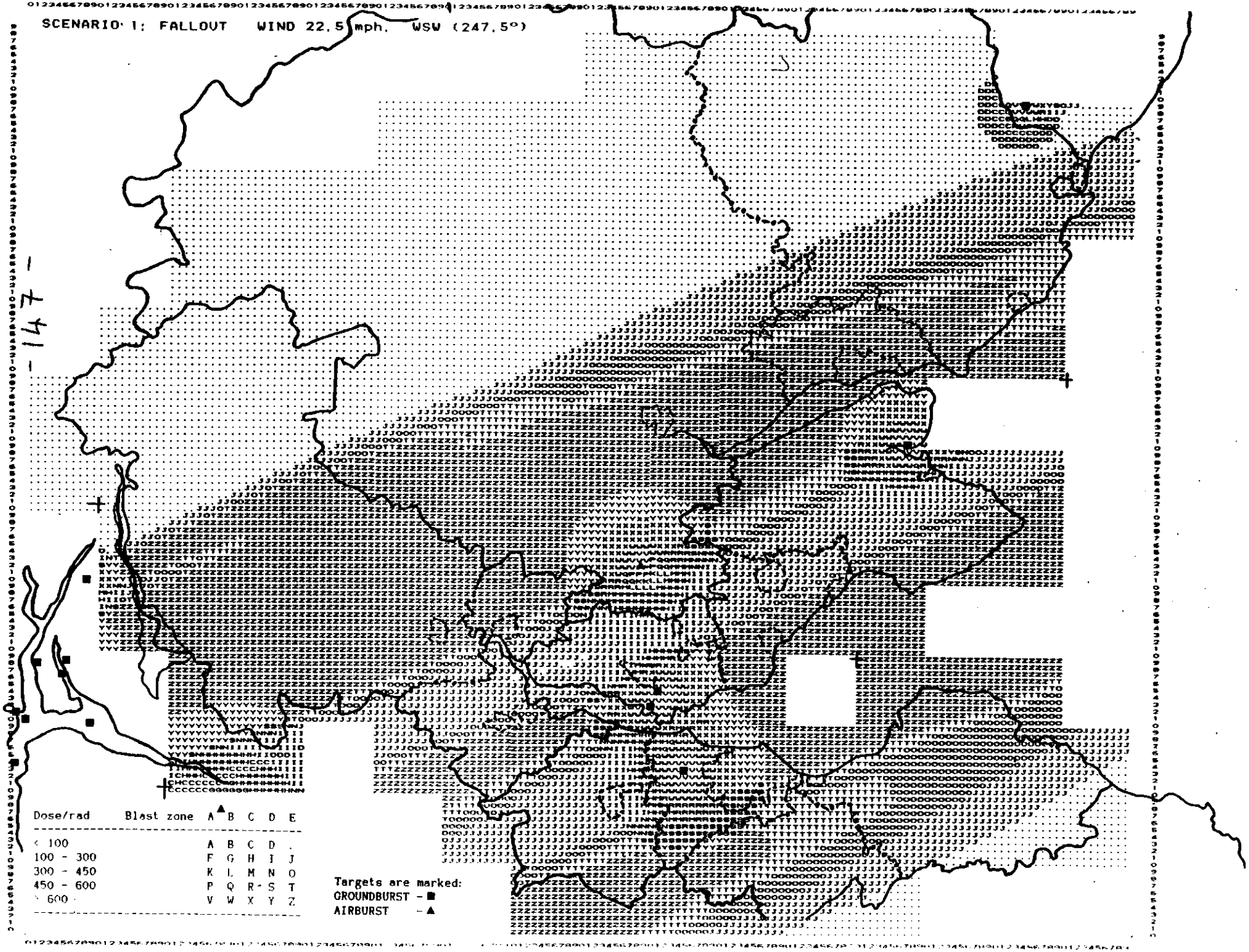
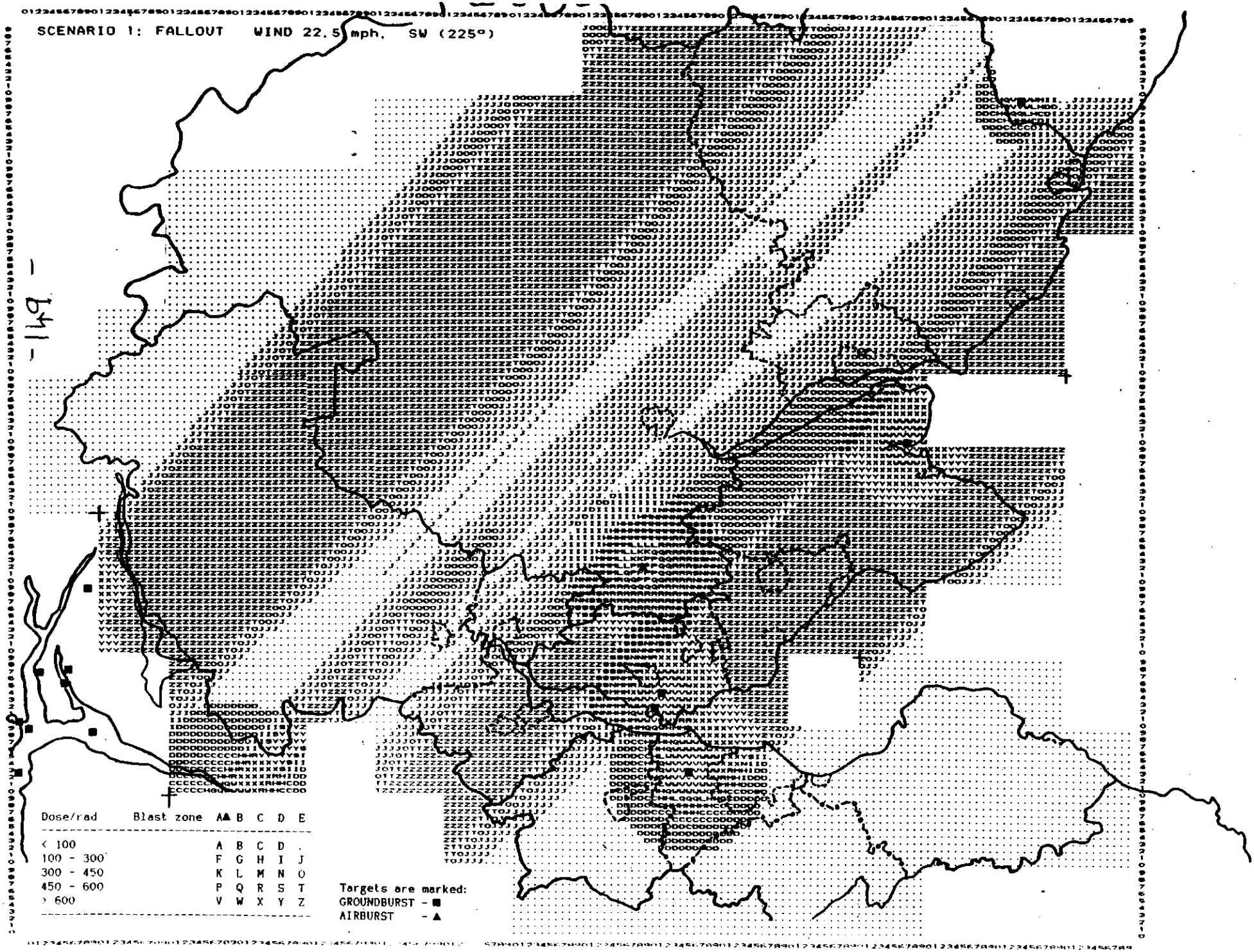
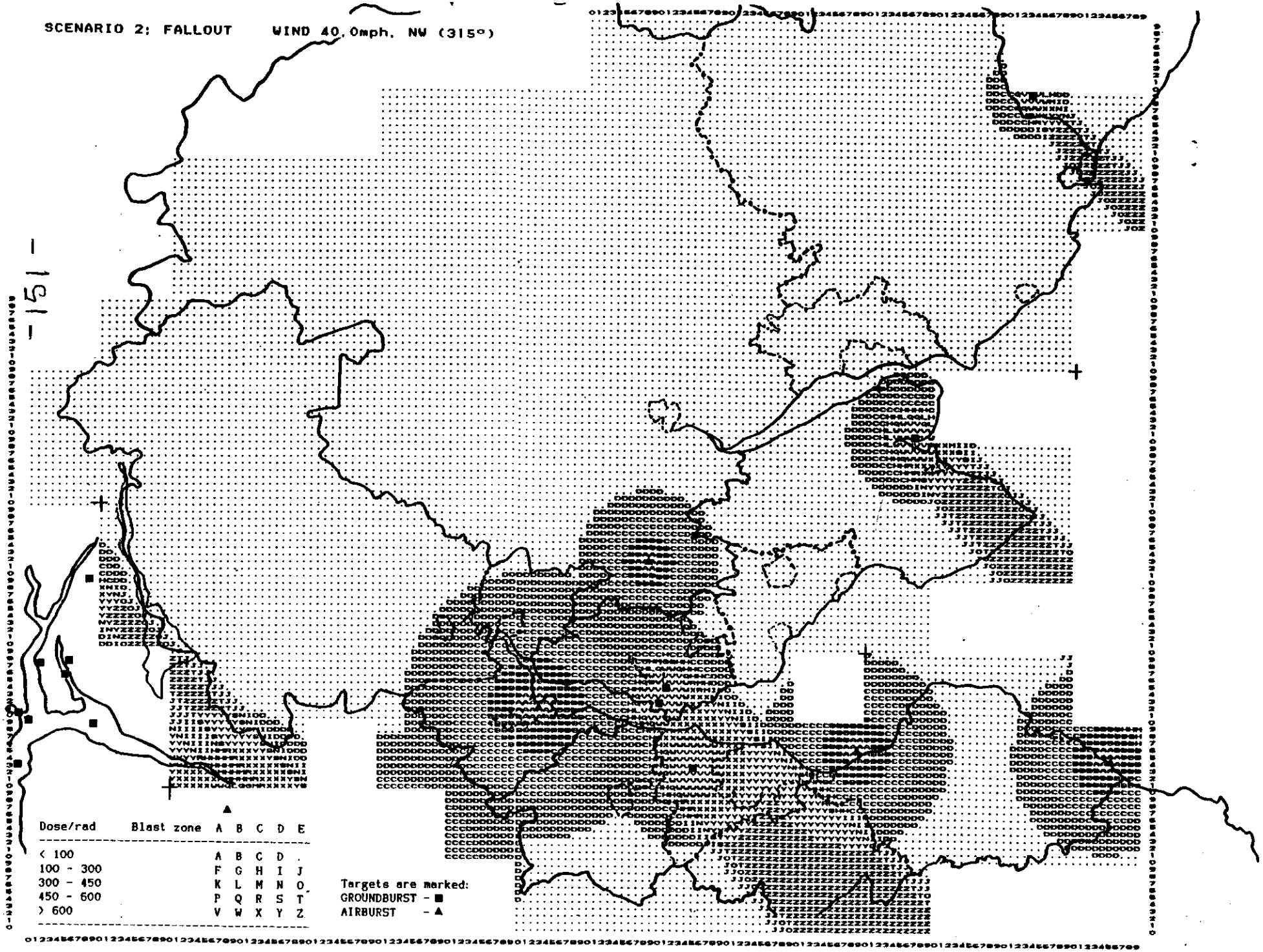
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲

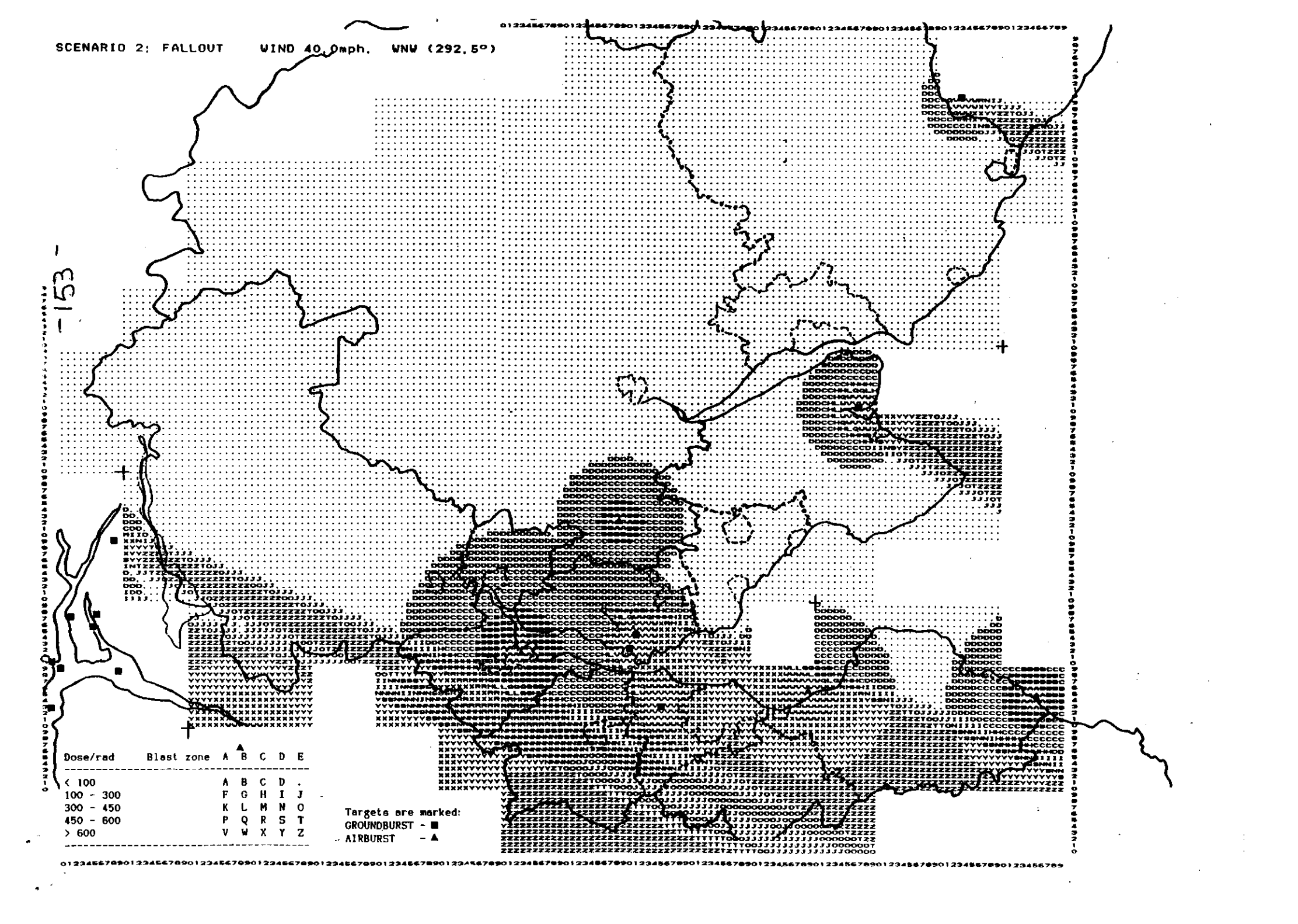

SCENARIO 1: FALLOUT WIND 40.0 mph SW (225°)
Dose/rad Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST -■
AIRBURST -▲


SCENARIO 1: FALLOUT WIND 22.5 mph. W (270°)
Dose/rad
Blast zone
A B C D E
< 100
A B C D
100 - 300
F G H I J
300 - 450
K L M N O
450 - 600
P Q R S T
> 600
V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 1: FALLOUT WIND 22.5 mph. WSW (247.5°)
Dose/rad
Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 1: FALLOUT WIND 22.5 mph, SW (225°)
Dose/rad
Blast zone AA▲ B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 2: FALLOUT WIND 40.0mph, NW (315°)
Dose/rad
Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 2: FALLOUT WIND 40.0mph. WNW (292.5°)
- 153 -
Dose/rad Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲

PF Values for use with Nukecalc casualty/damage estimates for nuclear attack:

If the overestimating of HO PF values in the buildings with PFs of 10-15 or less is taken into account, then an assumption of an average PF of 8 for non-major urban areas is reasonable. It is of course difficult to fix a figure for the urban areas, but a rough mean value of 15 has been chosen. The sensitivity of casualty estimates to changes in these figures is shown in the accompanying paper on Regional and District casualty figures for the two attack scenarios. One major point is that PF values will be reduced even by light damage - e.g. windows will break in the 0.5 - 1.5 psi blast range and allow ingress of radioactve particles. For more detailed discussion of this topic and the effectiveness of measures to improve the PF of dwellings refer to NFZ Guidance Paper J and the "Nukecalc" and "ERR" manuals.

Conclusions:

In agreement with NFZ Guidance Paper J, the ECSPAS has come to the following conclusions on the HO data and methodology on Protective Factors:

1) The calculation assumptions given for estimating Protective Factors (PFs) of houses using the Home Office method (in the HO manual "Domestic Nuclear Shelters, Technical Guidance") are unreasonable and produce unrealistically high values.
   (This paper provides two, more realistic and resonable methods for PF calculation, based on the Home Office tables in Technical Guidance)

2) Some wall weight values for external, and some internal, walls given in the "Technical Guidance" and the "EPG Handbook 1: Protective Qualities of Buildings" are too high, especially for modern housing construction. This is a further cause of the HO overestimation of PF values. However, the figures in the EPG Handbook appear to be derived using more realistic calculations than those suggested in the Technical Guidance. The HO "windows blocked" figures are unreasonably high and do not offer a useful guide to the protection afforded by taking simple protective action

3) These findings have important consequences for the Local Authority identification of buildings suitable for "communal shelters". This is also true for estimating the proportion of the population at risk from fallout due to low PF values of their houses (in areas where they are unlikely to suffer from significant blast damage). A significant proportion of the population of East Central Scotland live in areas of high risk from blast damage in nuclear attack and therefore be unable to protect themselves in their homes by any reasonably achievable methods.

EAST CENTRAL SCOTLAND PLANNING ASSUMPTIONS STUDY (ECSPAS)

To the Management Committee, Dundee, June 10th 1988.

Paper 2.5: Fallout Distribution Maps.

These maps were generated by the NUKECALC program and show the level of accumulated dose likely to be received as a result of the nuclear attacks envisaged in the ECSPAS-modified Scenarios 1 and 2.
The Study research into upper air wind speeds, contained in Paper 2.3 shows that the most likely wind direction is westerly, and we have plotted the accumulated dose from fallout for both Scenario 1 and Scenario 2 for winds speeds of 40 mph. For comparison fallout contours are also plotted for wind speeds of 22.5 mph for three wind directions for Scenario 1. All the additional targets of Scenario 2 are attacked with airbursts and hence do not contribute any radioactive fallout. Blast damage from these airbursts will lower the protection offerred by housing against radiation, and as a result will contribute to increased radiation casualties. These contours are idealized and the actual distribution of fallout would be much more complex. It is clear that the four regions are more at risk with certain wind directions than others. For example, Lothian Region would seem most at risk from a W wind, whilst Tayside Region is clearly most badly affected by a SW wind. Each map has a key indicating the level of accumulated dose. The blast zones A, B, C, D correspond to static overpressure from the bomb of more than 12psi, 12-5psi, 5-2 psi, and 2-1 psi respectively.

KEY TO FALLOUT DISTRIBUTION MAPS

A3 Map Scale 2.12cm. = 10Km A4 Map Scale 1.5cm. = 10Km

O.S. 10Km. Squares covering the East Central Scotland 'Nukecalc' map area.

NO48NO58
NO07NO17NO27NO37NO47NO57
NN76NN86NN96NO06NO16NO26NO36NO46NO56NO66NO76
NN45NN55NN65NN75NN85NN95NO05NO15NO25NO35NO45NO55NO65NO75
NN44NN54NN64NN74NN84NN94NO04NO14NO24NO34NO44NO54NO64
NN33NN43NN53NN63NN73NN83NN93NO03NO13NO23NO33NO43NO53NO63
NN22NN32NN42NN52NN62NN72NN82NN92NO02NO12NO22NO32NO42
NN21NN31NN41NN51NN61NN71NN81NN91NO01NO11NO21NO31NO41NO51NO61
NN30NN40NN50NN60NN70NN80NN90NO00NO10NO20NO30NO40NO50NO60
NS39NS49NS59NS69NS79NS89NS99NT09NT19NT29NT39NT49
NS48NS58NS68NS78NS88NS98NT08NT18NT28 NT48NT58NT68
NS47NS57 NS77NS87NS97NT07NT17NT27NT37NT47NT57NT67NT77
NS86NS96NT06NT16NT26NT36NT46NT56NT66NT76
NS95NT05NT15NT25NT35NT45

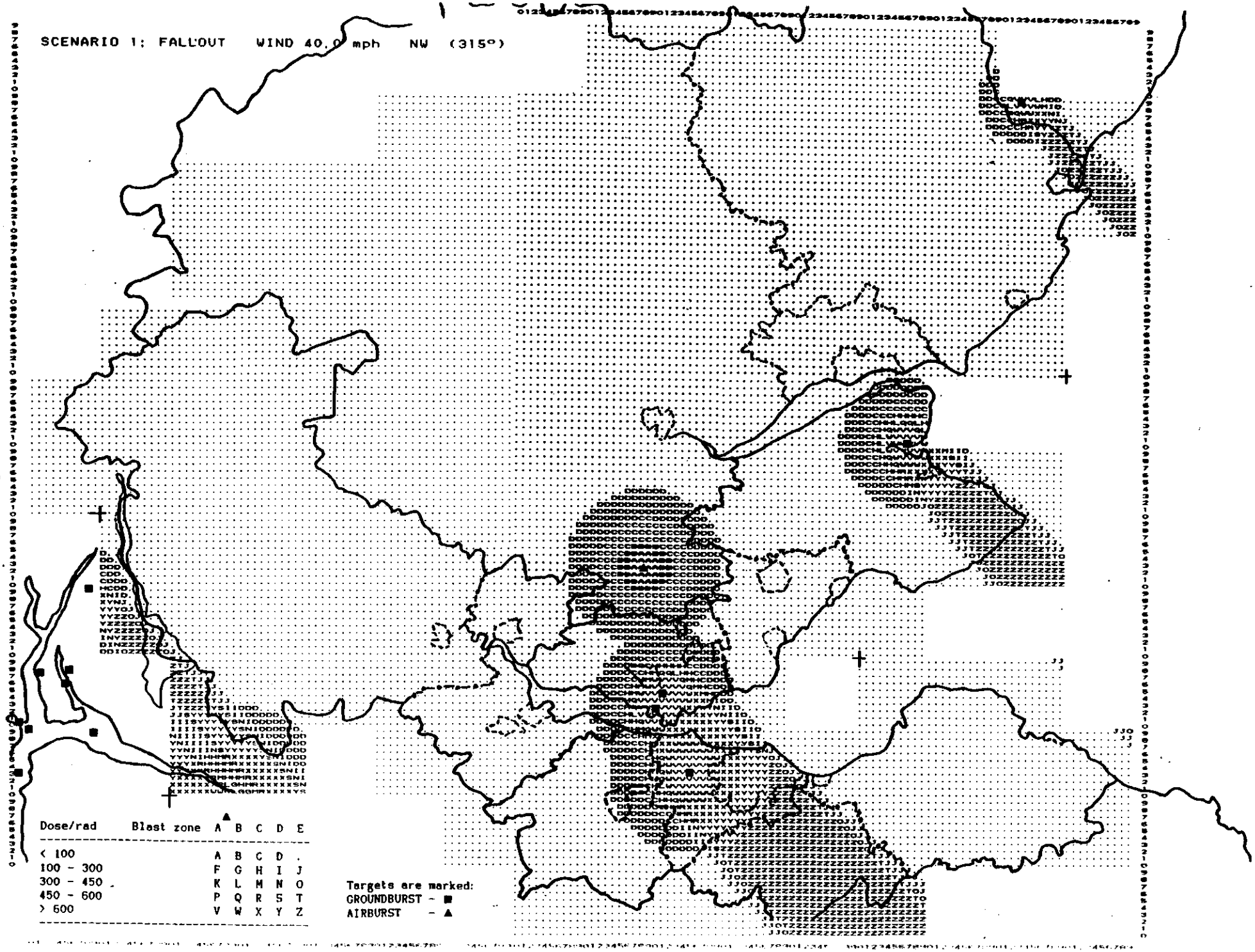
Some squares with 0 population are omitted and NO48 and 58 (Tayside, pop. 13, 15) are omitted to allow the map to fit on A3 paper.

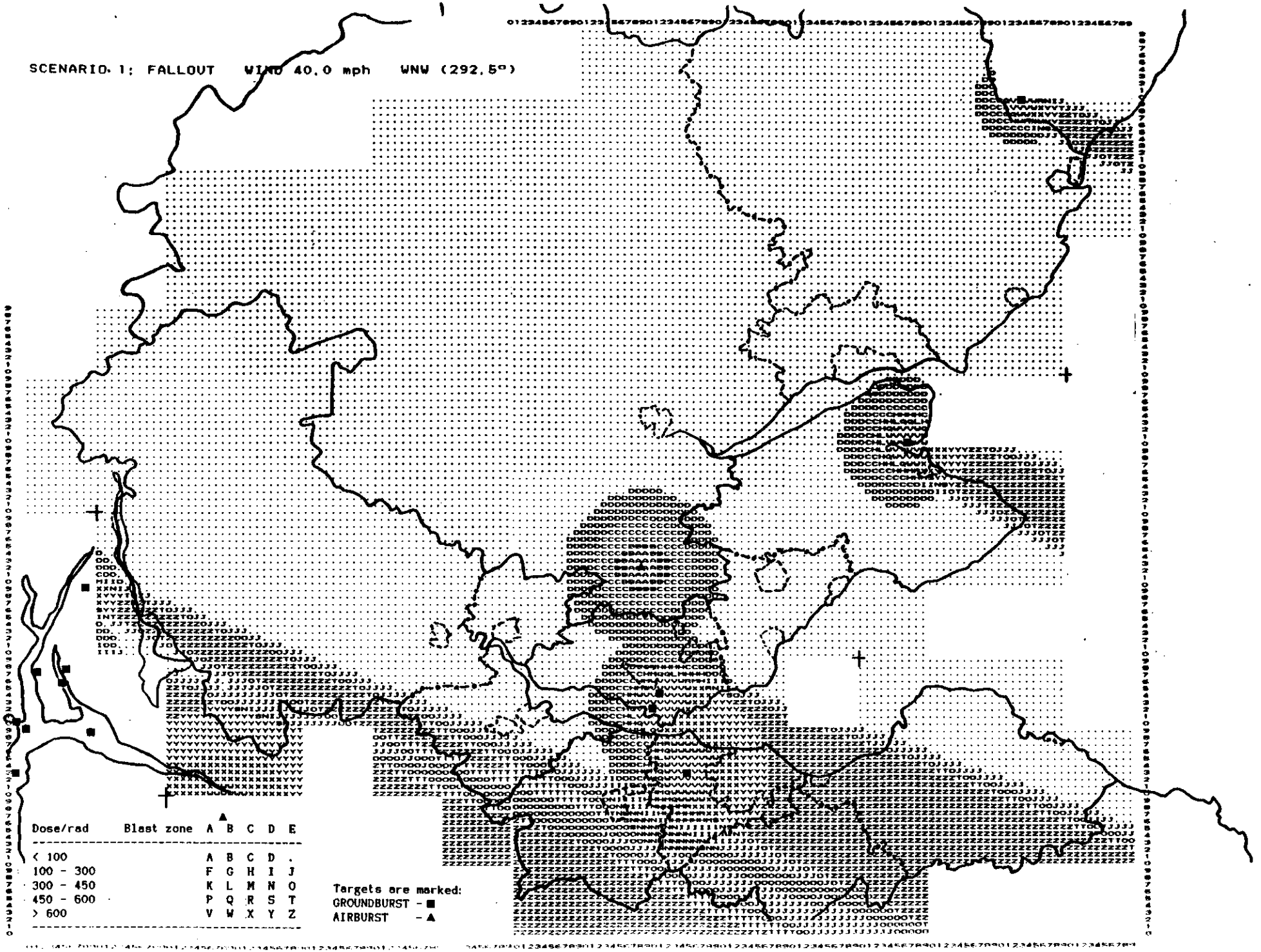
These are composite maps made up from a number of 'Nukecalc' computer printouts. Slight distortion affecting target positions can occur as a result of small differences in individual computer printouts.

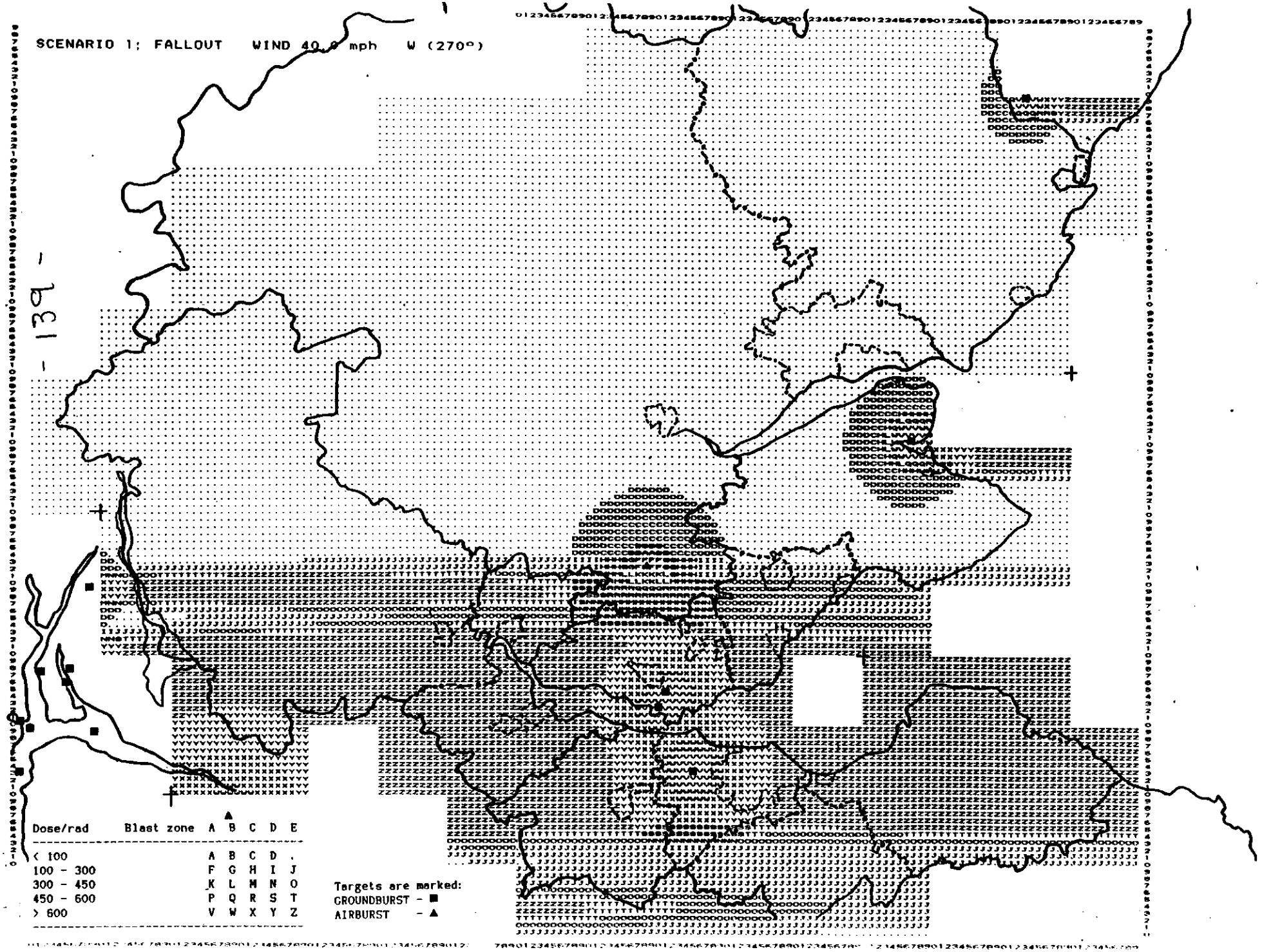
REGIONAL boundaries ————————
DISTRICT boundaries —•—•—•—
Major urban areas - - - - - - - -

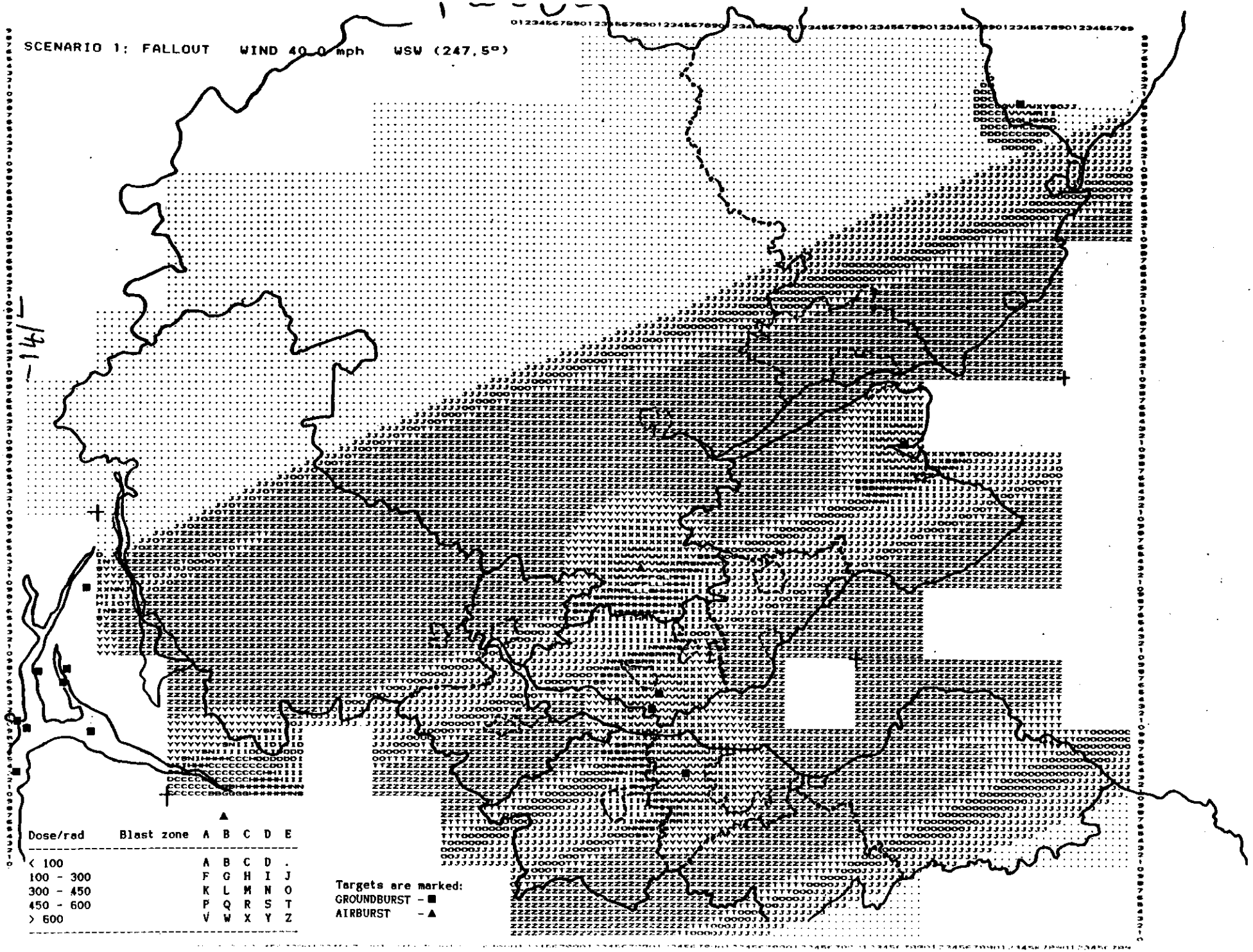
Letters or Dots are codes for fallout/blast in each 1 Km. square according to the following table:

Dose/rad	Blast zone	A	B	C	D	E
< 100		A	B	C	D	.
100 - 300		F	G	H	I	J
300 - 450		K	L	M	N	O
450 - 600		P	Q	R	S	T
> 600		V	W	X	Y	Z


SCENARIO 1: FALLOUT WIND 40.0 mph NW (315°)
Dose/rad
Blast zone A B C D E
< 100
100 - 300
300 - 450
450 - 600
> 600
A B C D .
F G H I J
K L M N O
P Q R S T
V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 1: FALLOUT WIND 40.0 mph WNW (292.5°)
Dose/rad
Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 1: FALLOUT WIND 40.0 mph W (270°)
Dose/rad
Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲


SCENARIO 1: FALLOUT WIND 40.0 mph WSW (247.5°)
Dose/rad Blast zone A B C D E
< 100 A B C D .
100 - 300 F G H I J
300 - 450 K L M N O
450 - 600 P Q R S T
> 600 V W X Y Z
Targets are marked:
GROUNDBURST - ■
AIRBURST - ▲

LOTHIAN REGION

East Lothian District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	77.3	0.0	0.0	1.6	0.0
Scenario 2 (WSW)	22.7	0.2	6.5	9.1	40.5
Scenario 1 (W)	11.2	0.0	0.0	9.5	58.1
Scenario 2 (W)	2.9	0.0	0.2	4.5	71.2

Edinburgh District :Protection Factors 1,1,2,5,15

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	174.7	2.3	29.7	35.1	184.3
Scenario 2 (WSW)	129.1	3.2	49.8	42.4	201.7
Scenario 1 (W)	50.9	0.5	4.3	29.2	341.3
Scenario 2 (W)	29.0	0.4	6.5	17.1	373.2

TAYSIDE REGION

Angus District

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	89.2	0.0	0.5	0.0	0.1
Scenario 2 (WSW)	89.2	0.0	0.5	0.0	0.1
Scenario 1 (SW)	70.8	0.0	0.5	14.4	4.1
Scenario 2 (SW)	70.8	0.0	0.5	14.4	4.1

Dundee District :Protection Factors 1,1,2,5,15

Attack	Uninjured	Injured by Flashburns	Blast	Fallout	Killed
Scenario 1 (WSW)	177.6	0.0	0.0	21.2	10.5
Scenario 2 (WSW)	177.6	0.0	0.0	21.2	10.5
Scenario 1 (SW)	177.6	0.0	0.0	21.2	10.5
Scenario 2 (SW)	177.6	0.0	0.0	21.2	10.5

Perth and Kinross District

Attack	Uninjured	Injured by			Killed
		Flashburns	Blast	Fallout	
Scenario 1 (WSW)	103.4	0.0	0.7	4.4	5.3
Scenario 2 (WSW)	103.4	0.0	0.7	4.4	5.3
Scenario 1 (SW)	105.1	0.0	0.7	2.6	5.5
Scenario 2 (SW)	105.1	0.0	0.7	2.6	5.5