



SURVIVAL IN LIKELY TARGET **AREAS**

BLUEPRINT FOR
SURVIVAL No. 5

WHERE MIGHT H-BOMB EXPLOSIONS OCCUR IN CANADA?

FOREWORD

Recognizing the need for individual and family survival plans, the Emergency Measures Organization has prepared a number of booklets known as "Blueprint for Survival". "Survival in Likely Target Areas" is the fifth in the series.

This publication is designed to assist those Canadians who live in major cities which might be target areas in the event of nuclear war. Unlike Canadians who live outside the larger urban areas, the city dweller is faced with a difficult choice—evacuation or shelter. To help in preparing a practical survival plan, the booklet examines the advantages and disadvantages of both courses in detail. Because such plans will vary according to different circumstances from city to city and from person to person, a single specific course of action suitable for all individuals cannot be recommended.

WHERE MIGHT H-BOMB EXPLOSIONS OCCUR IN CANADA?

An H-bomb attack on North America would include attacks on defence installations such as bomber and missile bases in the U.S.A. Large industrial centres, capital cities and key ports in the U.S.A. and Canada might also be attacked. In addition, any areas in Canada could be selected as second-choice targets or could be hit by missiles going astray or by bombers being shot down or disabled.


If Canada were to be *deliberately* attacked, Calgary, Edmonton, Halifax, Hamilton, London, Montreal, Niagara Falls, Ottawa, Quebec City, St. John's, Nfld., Saint John, N.B., Toronto, Windsor, Winnipeg, Vancouver and Victoria and the areas immediately surrounding them could be considered as *the more likely* target areas.

A 5 megaton explosion would effectively destroy any of these target areas. Larger weapons (such as 10, 20 or even 50 megatons) could be used with increases in the destructive effects, but in this pamphlet, illustrations and examples of effects all refer to 5 megaton explosions and some comparisons are given in footnotes.

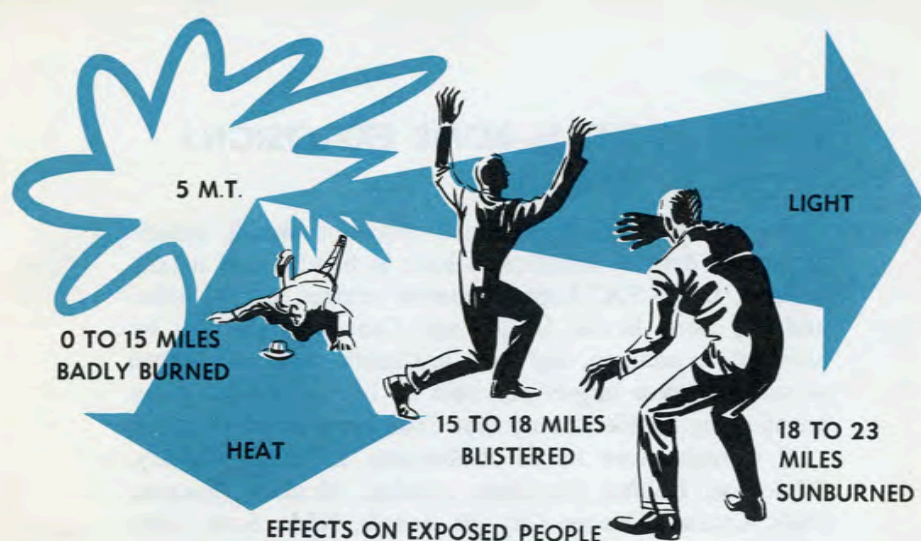
When an H-bomb explodes a white-hot fireball develops and energy is released in the form of light and heat, radioactivity, and blast. As the fireball expands and cools, it shoots upward many thousands of feet, giving the appearance of a huge mushroom.



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WHAT ARE THE DANGERS OF AN H-BOMB EXPLOSION?

They are: **LIGHT** and **HEAT**, **IMMEDIATE RADIATION**, **BLAST** (known as immediate effects) and **RADIO-ACTIVE FALLOUT**. Distances at which any effect might be experienced depend on many factors including weather conditions, height of the explosion from the ground and the explosive force.

Light and Heat

For some seconds after the explosion a blaze of light and tremendous heat will be given off from the fireball. If the eyes are not shielded, the glare can cause temporary blindness or eye injury. The heat flash will immediately start fires up to 20 miles away. A person in the open would have exposed skin badly burned up to 15 miles, blistered up to 18 miles and sunburned up to 23 miles away. These burn effects can be lessened by diving behind cover. People behind adequate cover would be protected from the heat flash but still would be in danger from fires. An anti-blast shelter would protect a person against these effects. A person in a basement, if out of line of the windows would be protected against the heat.

NOTE: For a 20 megaton Bomb the distances would be slightly less than twice those shown above.



Immediate Radiation

At the same time as the light and heat, intense radiation is given off for about one minute. Most people within two miles of the explosion who survived the blast and fire would die from this immediate radiation unless they had adequate protection against it.



Blast

Immediately after the light, heat and radiation, a powerful blast wave moves out in all directions from the centre of the explosion. Unlike the blast pressure from conventional explosions which lasts for a fraction of a second, the blast pressure from an H-bomb lasts for several seconds. This sustained pressure crushes buildings or bursts into and causes them to explode.

It destroys everything within 3 miles of the explosion and causes varying degrees of damage out to 15 miles. Unprotected persons within the area of blast damage could be killed or injured by the blast pressure; by pieces of wood, brick, glass and objects hurled through the air at very high speeds; or by being flung bodily against objects.

Therefore within the area of blast damage, the best protection for persons is to be inside anti-blast shelters. They are designed to keep the blast pressures out as well as giving protection against all other effects of the explosion.

Anti-blast shelters can be designed to give protection anywhere in the area of blast damage; directly below the explosion they would have to be buried in the bedrock. Two miles or more away from an explosion effective shelters would be entirely practical, but fairly expensive. Closer in, costs would rise sharply and for most people such construction would not be possible.

Therefore emphasis is being placed upon anti-blast shelters designed for protection two miles or more away from an explosion. Even in one of these there would be an element of risk since no one can say exactly where bombs might explode. The burst might be much closer to the shelter than would have been predicted.

Those without anti-blast shelters could increase their chances of survival by improvising protection against flying pieces of material and collapsing buildings. Examples of this type of improvised protection are ditches, culverts and in basements of buildings or under tables, stairs and workbenches.

NOTE: The distances for blast effects for a 20 megaton bomb would be slightly more than one and one half (1.6) times those shown above.

CHANCE OF SURVIVAL IN A BASEMENT



0 TO 3 MILES
NEGLECTIBLE



3 TO 5 MILES
SLIGHT



5 TO 10 MILES
FAIR



10 TO 15
MILES
GOOD

EFFECTS OF 5 MEGATON BLAST ON BUILDINGS



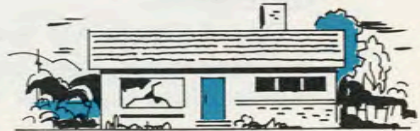
0 TO 3 MILES
COMPLETE DESTRUCTION



3 TO 5 MILES
BEYOND REPAIR

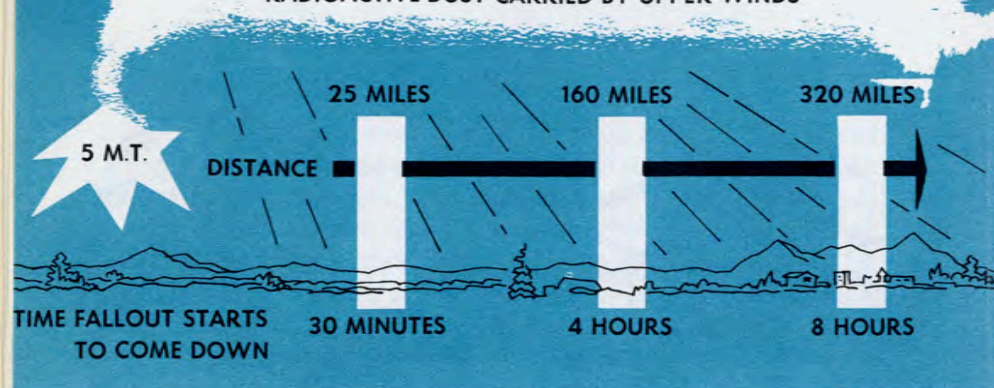


5 TO 10 MILES
MAJOR REPAIRS REQUIRED



10 TO 15 MILES
LIGHT DAMAGE

RADIOACTIVE DUST CARRIED BY UPPER WINDS



Radioactive Fallout

When an H-bomb explodes close to the ground, many thousands of tons of pulverized earth and debris are sucked up as high as 80,000 feet in the sky. Radioactive particles cling to some of this material and about 30 minutes after the explosion, this radioactive dirt, called fallout, starts to come back down on the damaged area. As it is carried down-wind by the high level winds, it falls in a continuous but irregular pattern some 50 miles wide and 200 to 300 miles in length. The fallout gives off rays which are dangerous and could cause death or radiation sickness to unprotected people.

At the time of an explosion it is not possible to say where the fallout will come down in the damaged area, but large sections will be covered by fallout. Survivors in damaged areas, unless advised over the radio, should not run away except when threatened by fires. Otherwise they could be exposed to dangerous radiation. Survivors must try to find fallout protection nearby.

After the explosion, survivors will have about 30 minutes to find protection against fallout. Basements of buildings, even those which are covered by debris and bricks, will give fair protection.

Even if Canada was not attacked directly with H-bombs in a nuclear war, many communities would be in the path of fallout from explosions in the Northern United States.



HOW MUCH WARNING WILL THERE BE BEFORE AN ATTACK?

Long-Range Warning of Attack

A deliberate nuclear attack on North America would probably be prepared with elaborate secrecy to be delivered with maximum surprise. Therefore, it is unlikely that the government will be able to give the public any long-range warning of attack.

Defensive preparations of a dramatic nature such as ordering the evacuation of likely target areas during a period of strained international relations could increase the danger of war starting. It is therefore possible that governments may not propose such action, since they may feel that would bring on the very danger they wish to avoid.

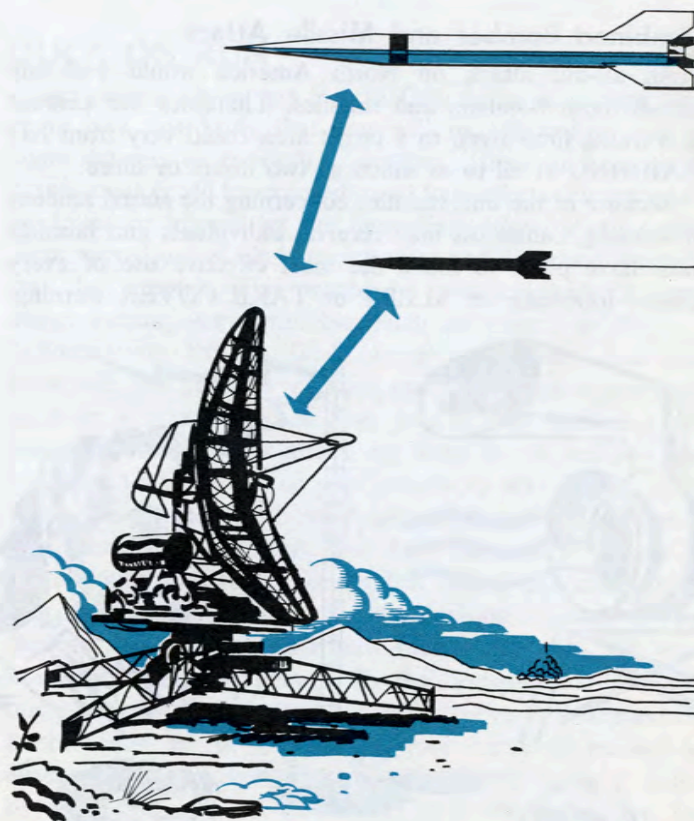
During periods of tension, people must themselves judge what survival preparations they should make. Should a period of tension eventually develop into war, those who had made survival preparations would obviously be in a better position to withstand the effects of nuclear attacks than those who had chosen to ignore the danger signs.

No one can count on safety in a nuclear war but advance preparations and sensible action can improve the chances of survival.

Bomber Attack

Bombers will continue to be a major part of an enemy attacking force. They would be detected by the continental air defence warning system which includes the DEW line, Mid-Canada line and Pinetree line radars. When the attack had been detected, the public would be advised by the Army sounding the ALERT on sirens and by radio announcements. The public could not expect more than about 2 hours warning of a bomber attack on North America.

As bombers were detected nearing a likely Canadian target area, the TAKE COVER warning would be given on sirens and radio. The TAKE COVER warning would not necessarily mean that this area would be attacked. The bombers might be flying to other targets.



Missile Attack

Missiles travelling at thousands of miles per hour could be directed toward Canadian or United States targets from enemy territory, submarines or aircraft.

The most warning that could be expected of missiles would be about 15 to 30 minutes after detection by the ballistic missile early warning system (BMEWS). In this case the Army would sound the TAKE COVER warning. Missiles launched from submarines could reach targets in as little as 4 minutes which would mean that there may not even be time to sound the TAKE COVER.

Combined Bomber and Missile Attack

An all-out attack on North America would probably include both bombers and missiles. Therefore the amount of warning time given to a target area could vary from NO WARNING at all to as much as two hours or more.

Because of the uncertainties concerning the actual amount of warning Canadians may receive, individuals and families must have plans to make the most effective use of every minute following an ALERT or TAKE COVER warning.



DUCK OR RUN?

No matter where you live in Canada, in a nuclear war, there is a possibility that you will be exposed to one or more dangers of H-bomb explosions. Those in more likely target areas could be exposed to all four effects. Fewer would be killed or injured by the immediate effects if all people were moved out of likely target areas and dispersed throughout the country. This would be practical only if long-range warning were available. Such warning is unlikely.

Some who live in likely target areas may feel that there will not be time to leave and are therefore prepared to take a chance by staying; others may feel that the possibility of an early attack on their city is unlikely and will plan to leave. Those who choose to stay should make preparations against all the principal effects of an H-bomb explosion, including blast and fire; those who choose to leave would need protection against fallout at their destination. You yourself must make the decision to duck or run. No one can tell you now how much time you will have when an emergency occurs. So the decision that you will make now to plan to stay put or to move will depend on factors such as the location of your home in respect to evacuation routes, the preparations you will make at home if you decide you will stay there, or in the alternative, the preparations made elsewhere that will assure you of protection against fallout should you leave the area where you live.

FOR THOSE WHO CHOOSE TO LEAVE

Recognize the following dangers:

- a. You may be delayed in leaving because of the time it will take to assemble your family;
- b. The roads may be badly congested;
- c. Without advance preparations, you might arrive in an area where food, accommodation and fallout protection are scarce;

- d. Traffic may be stalled by accidents or cars out of gas;
- e. A bomb may explode nearby while you are still on the road and unprotected;

You Should do the Following Things NOW

- a. Arrange to go to the homes of friends or relatives or to a summer cottage which will afford some protection against fallout;
- b. Stock emergency supplies at your destination;
- c. Store essential papers such as title deeds, marriage licenses, birth certificates or other important legal papers at your destination;
- d. Have all members of your family, particularly children, carry personal identification tags, cards, etc.;
- e. Know the main evacuation routes and the best route to get to them from your home;
- f. Make sure your school authorities have a plan for your children should the warning be given during school hours. Know this plan;
- g. Keep your car filled with sufficient gasoline to reach your destination;
- h. Know how to improvise protection quickly should you be prevented from leaving;
- i. Know what emergency supplies you are going to take with you. Have them in boxes or suitcases for quick loading into the car;
- j. If you do not have a specific place to go, know the reception plans of communities on your evacuation route.

When the National ALERT Sounds

- 1. Assemble your family;
- 2. Gather your emergency supplies, including the battery-operated radio;
- 3. Turn off or dampen stoves or fires;
- 4. Drive carefully to your evacuation route;
- 5. Follow the instructions and directions of traffic police;



6. If traffic is stalled, don't become impatient, and remember to keep your car engine running faster than normal idling as this will keep the engine from overheating;
7. If your car stalls, put it into gear, push the starter button until the car is off the road. If your car has automatic drive, get out and get some one to push you off the road.
8. Others may be in difficulty—help them—pick up other passengers.
9. Keep listening to the radio.

When the TAKE COVER Sounds

1. If you are outside of the target area, keep moving until you arrive at your destination;
2. Keep listening to the radio;
3. If you are on the main evacuation route inside the city, you must not stop. This would hold up those who want to go on;
4. Open your car windows and have all other passengers lie on the floors or seats covered with blankets or coats. At the first flash of brilliant light—duck.



If an H-Bomb Explodes

1. If possible keep going;
2. If you are unable to continue, try to get your car off the road. Find fallout protection. Take what supplies you can including the radio.

FOR THOSE WHO PLAN TO STAY

Recognize the following dangers:

- a. To improvise anti-blast protection quickly at the last moment is difficult;
- b. After the attack, you may have to face fires and fallout;
- c. In damaged areas protection against fallout may be hard to find;
- d. If you are trapped or injured, rescue may be delayed.

You Should Do the Following Things NOW

- a. Have an anti-blast shelter if you can;
- b. If you don't have an anti-blast shelter, prepare the best protection you can;
- c. Stock emergency supplies in your shelter or protected area;
- d. Check with your municipal authorities if gas and water should be turned off at house mains and if so, know how to do it;
- e. Know Home Nursing or First Aid;
- f. Observe fire prevention measures and know how to put out small fires;
- g. Know how to assemble your family;
- h. Make sure your school authorities have a plan for your children should the warning be given during school hours. Know this plan;
- i. Have all members of your family, particularly the children, carry personal identification tags, cards, etc.;
- j. Know how to improvise fallout protection;
- k. Know what shelter is available at your place of work and on your route home.



When the National ALERT Sounds

1. Assemble your family;
2. Have one listen to the radio while others place last-minute emergency supplies in the shelter or protected area;
3. Turn off or dampen stoves or fires;
4. Fill bath tubs, sinks, pails with water;
5. Follow the instructions of municipal authorities about shutting off the gas and water;
6. Close all shutters, draw blinds and rip down inflammable curtains and drapes;
7. If you do not have an anti-blast shelter, you should improve your protected area by piling mattresses or heavy trunks around it;
8. If you do not have an anti-blast shelter or protected area, you should dig a shallow trench or go to another building; which could give protection.
9. If you go to another building, take all the emergency supplies you can carry.

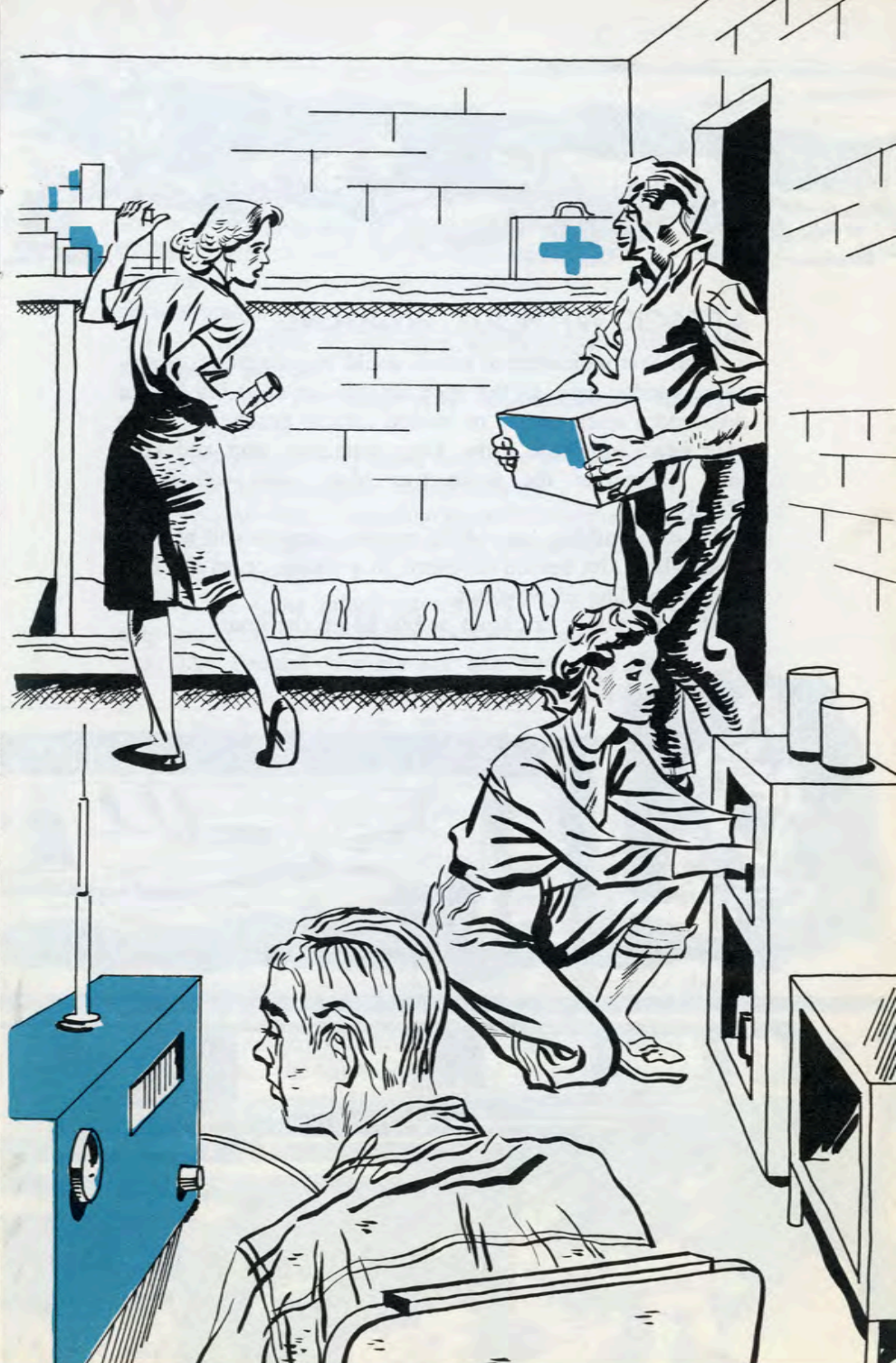
When the TAKE COVER Sounds

1. Go to your anti-blast shelter or protected area, taking your battery radio with you;
2. If you have a concrete block fallout shelter, do not go into it but go to the strongest part of your basement.



If an H-Bomb Explodes

1. Leave your shelter or protected area and:
 - (a) Put out fires;
 - (b) Give first aid;
 - (c) If necessary, improve your fallout protection.You have about 30 minutes to do these things;
2. Go back into shelter and stay there until you are told it is safe to leave, or until rescued;
3. Do not leave unless fires threaten you and then go only as far as necessary to get protection against fallout.





ATTACK WITHOUT WARNING

Your first indication of attack could be a dazzling, almost overpowering light. In the open all you can do is fall flat, or dive into a ditch, gutter or behind natural protection; cover your head with your arms, keep your eyes shut and keep low. Remember the destructive blast wave will follow shortly.

Inside a building, one of the greatest dangers will be from flying glass. Get behind furniture, in a corner or on the floor out of the line of windows.

If you are in a car, train or bus lie on the floor.



CONCLUSION

For those living in likely target areas, there is no certain way of being safe, and no simple answer to whether people should "duck or run". In the final analysis the choice is one that must be made by individuals. In summary, the main alternatives are:

- To stay with an anti-blast shelter stocked with emergency supplies;
- To leave and have safer accommodation arranged elsewhere;
- To leave and rely upon obtaining protection and supplies from reception communities;
- To stay with a properly stocked fallout shelter and a plan to improvise against the immediate dangers from the explosion.

Here are some things governments can do which may help you to make your personal survival plan:

- The Federal Government can and will continue to provide information for individuals on survival matters such as shelter plans and the pamphlet "11 Steps to Survival";
- Municipal authorities should develop and test traffic plans to help those who choose to leave and inform all concerned of the plan;
- Provincial authorities should ensure that reception plans are made by all communities which are not in target areas to provide shelter and care for those who leave target areas;
- Municipal authorities should erect, in prominent places, route signs and known shelter area signs;
- Local government and school authorities should make plans for the survival of school children during school hours, and parents must be made aware of these plans.

**ASK YOUR LOCAL GOVERNMENT FOR ADVICE:
VOLUNTEER TO HELP WITH THEIR PLANS**

FOR FURTHER READING

Your Basement Fallout Shelter—Blueprint for Survival No. 1

Basement Fallout Shelter—Blueprint for Survival No. 2

Fallout on the Farm—Blueprint for Survival No. 3

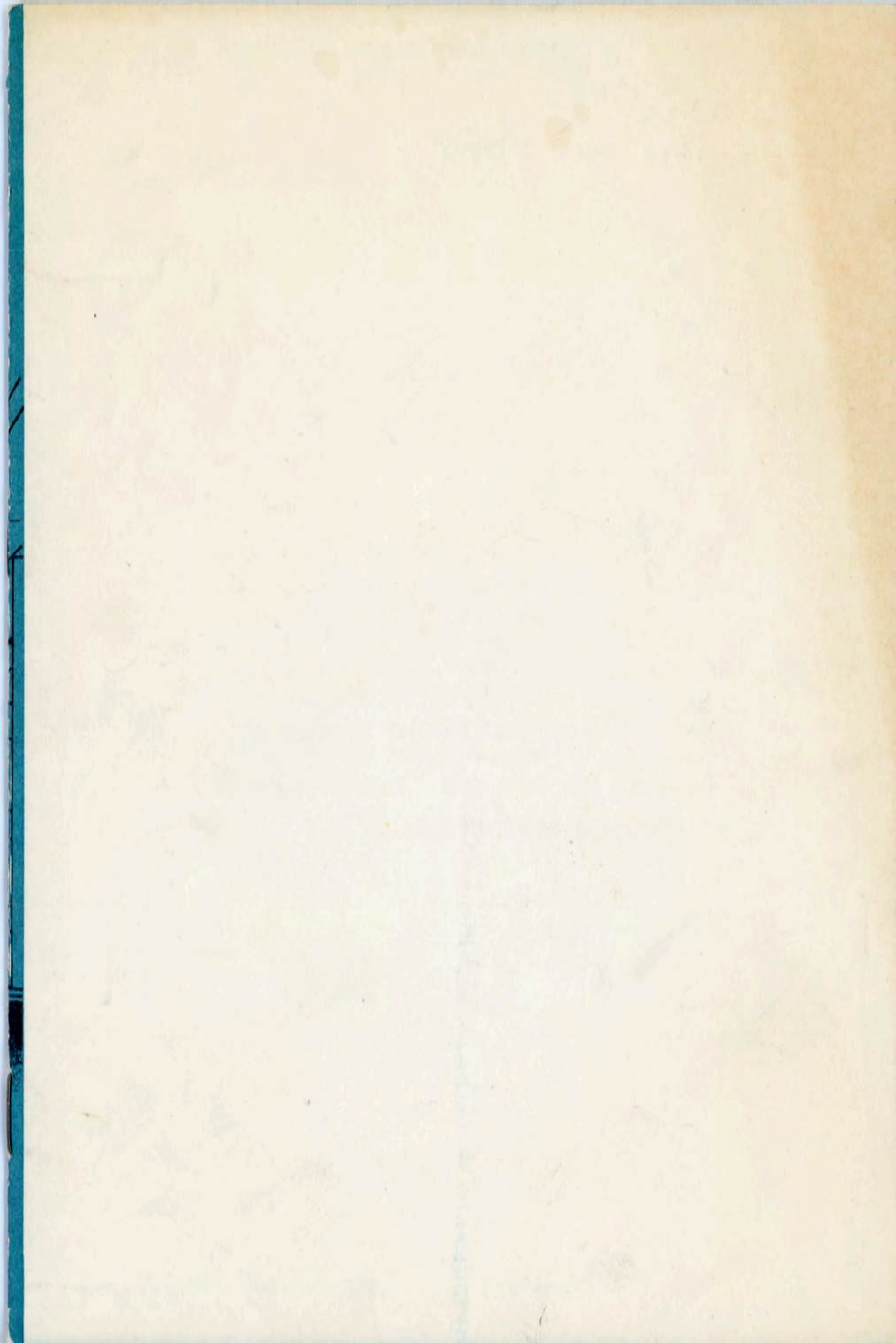
11 Steps to Survival—Blueprint for Survival No. 4

Simpler Shelters

Welfare Tips for Survival

Your Emergency Pack

For your free copy write to EMO P.O. Box 10,000 in your
Provincial Capital (NOT OTTAWA) or to your Municipal
EMO/Civil Defence Co-ordinator.



CALGARY SCHOOL BOARD

CALGARY TARGET AREA SURVIVAL PLAN

Letter to Parents Whose Residence can be Reached from the School Within 20 Minutes:

Dear Sir/Madam:

It has been decided by the Department of Education of the Alberta Government that, in the event of this country becoming involved in a nuclear war, all schools will close on the sounding of the National Survival Warning and all pupils will be immediately dispersed to their homes. This decision was reached on the acceptance of the fact that, in times of great danger, parents would wish to have their children with them.

Accordingly, in the circumstances set out above, this school will close as soon as a National Survival Warning is sounded and your child/children will be sent home.

From a practice run already carried out by your child/children over the most direct route between school and your residence you may expect your child/children to arrive home within 7 minutes of the warning having been sounded.

If, as will happen in many instances, yours is a home from which both parents are absent during school hours, it is possible that child/children could arrive at your home before either of the parents. In order to avoid any problem in this respect it is suggested that you should arrange with some family in the immediate neighbourhood of your home to receive your child/children until you are able to pick them up on your own return to your residence. You will, of course, ensure that your child/children understands the arrangement.

This letter is issued in accordance with the provisions of a plan prepared by Calgary Target Area Civil Defence, and approved by the several School Boards within the Calgary Target Area for implementation in all schools within their respective jurisdictions.

Yours very truly,

B. O. Miller

Principal

ROSEDALE SCHOOL, CALGARY, ALBERTA

School

Mar. 27/62

Date