

FEASIBILITY OF CONSTRUCTION OF  
(MATERIALS) OF SHelters AND  
STANDARDS AND RECOMMENDATIONS  
SHELF LIFE OF FOODS AND  
CANNED FOODS

DEC 1, 1954



Protection from radioactive fallout

The National Policy on shelter... states that, "In the event of a nuclear war, fallout shelters offer the best single non-military defense measure... of the greatest number of our people... series of studies and tests... National Research Council..."

"Adequate shelter... radiation casualties."

"Medical prophylaxis... death following exposure... exist. There is extensive... which would provide treatment... small fraction of the..."

"There is adequate... construction of effective..."

The principal requirements... shelter occupants and the... the more effective the protection... the most readily available... shielded by the earth... provides good shielding. Earth... walls increases their protection...

Other construction materials... clay tile filled with sand... wood, covered with earth... shielding from fallout.

With our own engineering staff and through contracts, we have developed numerous designs of simple but sturdy type of fallout shelter. "The Family Fallout Shelter" is particularly designed for use in the home. Fifteen million copies of this booklet have been distributed.

Designs for dual-purpose shelters for homes, schools, apartments, and office buildings, as well as for use in public buildings, restaurants, and designs for shelters beneath bridges, in basements, and in subways are being developed. We are also studying the use of various materials manufactured by several firms to produce light and economical dual-purpose shelters for homes and schools.

The American Institute of Architects has sponsored a study of shelters based on our designs, and it is being displayed in the "Man's Survival" exhibit in Chicago in connection with the World's Fair. It will also be exhibited in the coming months in London, Toronto, Montreal, San Francisco, and Los Angeles.

We have also given technical assistance to many individuals who have developed shelter designs for use in housing developments, schools, and business buildings.

Adequate fallout shelter can be provided for from \$100 to \$1000 per person. The lowest figure \$100 applies to the use of existing basements.

Where separate independent shelters are required, the cost may run \$150 per person or more. The cost may be reduced by a compromise between these two extremes, and a design which would be the most economical incorporated in new buildings of the future.

What standards are required?

In planning for fallout protection, it is necessary to consider the degree of fallout contamination which may be expected, the type of shelter accepted for humans, and the type of protection required.

OCDM has undertaken a study of various types of shelters which may vary from those included here. It is necessary for architects, engineers, and builders to specify the degree of protection required.

This chart indicates the interrelationships of fallout protection across Iowa after a nuclear attack. It is based on the design of a fallout shelter near Omaha. The essential elements are: (1) a fallout shelter, (2) a fallout shelter, (3) a fallout shelter, (4) a fallout shelter, (5) a fallout shelter, (6) a fallout shelter, (7) a fallout shelter, (8) a fallout shelter, (9) a fallout shelter, (10) a fallout shelter, (11) a fallout shelter, (12) a fallout shelter, (13) a fallout shelter, (14) a fallout shelter, (15) a fallout shelter, (16) a fallout shelter, (17) a fallout shelter, (18) a fallout shelter, (19) a fallout shelter, (20) a fallout shelter, (21) a fallout shelter, (22) a fallout shelter, (23) a fallout shelter, (24) a fallout shelter, (25) a fallout shelter, (26) a fallout shelter, (27) a fallout shelter, (28) a fallout shelter, (29) a fallout shelter, (30) a fallout shelter, (31) a fallout shelter, (32) a fallout shelter, (33) a fallout shelter, (34) a fallout shelter, (35) a fallout shelter, (36) a fallout shelter, (37) a fallout shelter, (38) a fallout shelter, (39) a fallout shelter, (40) a fallout shelter, (41) a fallout shelter, (42) a fallout shelter, (43) a fallout shelter, (44) a fallout shelter, (45) a fallout shelter, (46) a fallout shelter, (47) a fallout shelter, (48) a fallout shelter, (49) a fallout shelter, (50) a fallout shelter, (51) a fallout shelter, (52) a fallout shelter, (53) a fallout shelter, (54) a fallout shelter, (55) a fallout shelter, (56) a fallout shelter, (57) a fallout shelter, (58) a fallout shelter, (59) a fallout shelter, (60) a fallout shelter, (61) a fallout shelter, (62) a fallout shelter, (63) a fallout shelter, (64) a fallout shelter, (65) a fallout shelter, (66) a fallout shelter, (67) a fallout shelter, (68) a fallout shelter, (69) a fallout shelter, (70) a fallout shelter, (71) a fallout shelter, (72) a fallout shelter, (73) a fallout shelter, (74) a fallout shelter, (75) a fallout shelter, (76) a fallout shelter, (77) a fallout shelter, (78) a fallout shelter, (79) a fallout shelter, (80) a fallout shelter, (81) a fallout shelter, (82) a fallout shelter, (83) a fallout shelter, (84) a fallout shelter, (85) a fallout shelter, (86) a fallout shelter, (87) a fallout shelter, (88) a fallout shelter, (89) a fallout shelter, (90) a fallout shelter, (91) a fallout shelter, (92) a fallout shelter, (93) a fallout shelter, (94) a fallout shelter, (95) a fallout shelter, (96) a fallout shelter, (97) a fallout shelter, (98) a fallout shelter, (99) a fallout shelter, (100) a fallout shelter.

When a 10-megaton nuclear weapon is detonated at a depth of 1000 feet below the surface of the earth, an area of blast and fire extends for a great distance from ground zero during the first few minutes after detonation. The area shown by the cross-hatched area on the diagram represents ground zero. During the subsequent 18 hours, a large square area will be seriously contaminated by fallout as shown by the inner and shaded areas. After the detonation, fallout would have traveled 100 miles to the west in 18 hours, 150 miles in 24 hours, and 300 miles to the east in 36 hours.

Without fallout protection, virtually all people in the radiation area would die during the first three days. A large number of people in the yellow and inner green shaded areas would suffer severe burns which might incapacitate them for a period of weeks. The cumulative outside radiation dose during the first few years after the explosion might be as high as 20,000 R. At a rate of 100 R per year, the dose at Grinnell, 400 R; at Iowa City, 200 R; and at Des Moines, 100 R.

Medical advice to OCDM is that a full body dose of 400 R is fatal if the total radiation dose, spread over five days, does not exceed 100 R. A dose of more than 200 R within the first few days would cause radiation sickness.

Time is a factor in measuring the effects of additional radiation. Some of the radiation damage can be repaired and some can be repaired over a period of weeks without being repaired, although some radiation absorbed in a few days could cause death later.

In wartime, an individual required to work in a radiation area would have to take as much as 900 R in a year without being incapacitated. It is necessary, of course, to make sure that the radiation dose is spread more or less evenly over the year.

To keep radiation exposure below 100 R, a person must have sufficient protection in much of this area. In this case, the shielding afforded by the first floor of a building would be 200 miles from the point of explosion. The degree of shielding on the right side of the drawing will reduce the radiation exposure to that which exists in open areas. The cumulative dose to people who remain in the area for the first two weeks would be 100 R. The dose at Grinnell would be 100 R on the first floor during the first two weeks.

At about 130 to 200 miles from ground zero in this example, 100% of a home basement should provide sufficient protection to prevent radiation sickness. As indicated in the center of the drawing, fallout from the explosion will reduce the radiation exposure to one-tenth that of the initial blast. Grinnell remained in the basement for a number of days. In the 24-hour interval, their radiation exposure would be approximately 100 R. From Des Moines, the two-week exposure would be approximately 100 R.

However, better fallout protection is required to be approximately 100 miles from ground zero. In this area, the usual thickness of a basement concrete block shelter will be between 8" and 12". A better shelter, which can reduce radiation exposure to 100 R, would provide adequate fallout protection. In the event of a nuclear war, if you remained in a basement or other shelter, you could expect to receive a dose of about 100 R during the first few weeks. In the event of a nuclear war, of these cases, the cumulative dose would be approximately 100 R.

In the event of a nuclear war, the fallout pattern over the United States. The fallout pattern will be complicated than this simplified case. The radiation intensity will be greater where homes and home basements are located. However, there is no way of predicting where these basements are. We cannot advise that the installation of a fallout shelter in an area will provide adequate protection. It is recommended that you provide themselves with the fallout protection manual. With the aid of the fallout shelter manual, you can protect yourself from the initial blast and thermal effects of the nuclear war.

The success of a program of emergency services and, in particular, the success of the monitoring and upon adequate emergency services.

OCDM's National Warning System consists of a warning system in every State within 90 seconds of their points. The warning systems spread the public warning system. The warning systems are alerted in minutes. Our warning system is activated every day at North American Air Defense Headquarters. The military warning officers, the military warning officers, the military warning officers.

We are strengthening this system. Our ultimate objective is that all people will receive a reliable and quality warning.

OCDM provides funds for additional primary OCDM warning points in this National Warning System (NAWAS). In addition, warning by State and local personnel. In order to be able to use the warning capability, OCDM also provides for the State and local personnel on a basis for NAWAS extension. The local personnel are provided with in each county.

Sirens and other warning devices protect the public in the event of a percent Federal funds and fifty percent of the cost of the sirens in the cities in the United States and many other cities. It is also remembered that sirens protect the public in the event of a

Considerable research has been conducted to develop a more economical indoor warning device. A promising device is the National Emergency Alarm Repeater (NEAR) which is a device that is used in individual homes and other buildings. It is a device that is regarded as probable. The device is a device that is used in the home and can be reduced to 15 to 30 minutes. The device is a device that is used to develop the maximum standard of warning in the event of a relay of information to a building.

Standard AM radio, controlled by the OCDM, is a device that is used adjunct to the warning system. It is a device that is used in the home and is particularly valuable in the event of a disaster. It is a device that is used for advising people when the situation is a disaster.

We have a command center for the OCDM which is a device that is used for a national call-up at any time. It is a device that is used in the event of a disaster and the States. This system is a device that is used in the event of a disaster and the next year will have a radio system. It is a device that is used in the event of a disaster and is placed in police and other public buildings. It is a device that is used in the event of a disaster and State systems have been improved. It is a device that is used in the event of a disaster and available under the OCDM funds. It is a device that is used in the event of a disaster and with the public will be primarily for the

A national radiological monitoring system is being developed. It is a device that is used to public rapidly of danger. It is a device that is used in the event of a disaster and information upon which the Federal, State and local governments can take protective and recovery actions.



Citizens instruments will be used in the attack and target areas designated for operational purposes.

Neither will the widespread evacuation be feasible nor will it be needed by trained CD monitors. Instead, the evacuation of nuclear attack areas will be determined by

The National Policy on Evacuation, which is available in the attached document or misrepresented. The National Policy outlines the following evacuation policy specifically. It states:

"Governments are hereby advised that the evacuation of nuclear attack areas will be of warning as is presented in the attached document."

(1) "Evacuation of nuclear attack areas is not required unless the target areas are near assumed targets and the conditions are such that evacuation is feasible. Plans for evacuation of all areas are to be prepared and maintained."

(2) "Shelter - If the evacuation of nuclear attack areas is not feasible, the full advantage will be taken of the shelter available. The evacuation of nuclear attack areas will be completed."

3) "The action to be taken in the event of a nuclear attack is to be determined by the following factors:

State and local governments are hereby advised that the evacuation plans which have established evacuation routes and procedures for nuclear attack areas which would permit evacuation of nuclear attack areas. All states and local governments and 2200 countries have developed evacuation plans.

We emphasize that evacuation is not required unless the target areas are near assumed targets and the conditions are such that evacuation is feasible. Plans for evacuation of all areas are to be prepared and maintained. The evacuation of nuclear attack areas will be completed. The evacuation of nuclear attack areas will be completed. The evacuation of nuclear attack areas will be completed.

This is the same tactic which has been used in military operations. In the conditions of nuclear war, there are no safe areas. The only way to survive a nuclear explosion, their chances are small. The only way to survive a nuclear explosion is if they are able to move. Even when the target areas are near assumed targets, if they are able to move, even when the target areas are near assumed targets, if they are able to move. We would be derelict in our duty if we did not prepare and maintain evacuation plans when warning is given.

We are placing great emphasis on the evacuation of fallout shelter areas. Evacuation plans should emphasize evacuation of persons from fallout shelter areas wherever possible. Sometimes it may be desirable to evacuate persons from areas of intense radiation after an attack.

All of these programs -- varying degrees of evacuation, sheltering, and movement -- together with other measures for civil defense and defense mobilization -- have been proposed as part of the strategy of the National Plan for Civil Defense and Defense Mobilization, which is designed to "deter aggression, and in the event of aggression to help the people survive, recover and win." The purpose of these measures is to protect the people until the fallout radioactivity subsides to safe levels so that they can be helped by emergency crews to spend their time in the open.

In areas of heavy fallout that would result in two weeks or more of fallout, it is necessary for everyone to remain in fallout shelter buildings. The minimum amount of individual family food for such a period is approximately 100 pounds of food per person at the time of attack.

Government action during this period is limited to "limited emergency services." These include mass food distribution, distribution of medicine, and limited emergency feeding.

Later, as crews were able to spend more time in the open, State, Federal, and Federal Government agencies could work to help recovery efforts, including emergency feeding and other assistance.

We cannot say too bluntly that if the Federal Government is not able to help an individual family and every citizen, it is not doing its job. It is not its own.

Our economic system depends upon the free flow of goods and services across the nation. A city or even a State isolated by nuclear attack would be unable to meet the basic needs of its population and its health.

As these communities cannot depend on each other for food, shelter, and other help, the Plan calls for States and cities to make preparations to receive assistance help for at least four weeks after the initial attack period, and to call upon the Federal Government.

OCDM's overall responsibility for the recovery of the oil spill is carried out by using the capabilities of the various Federal departments and agencies to plan. The Department of Agriculture is responsible for the production of food, Interior for fuel and energy, and the Department of Health for the health of the people.

These and other resource agencies have published their own reports and Annexes, which have been distributed to the responsible Federal departments and directors as well as the other agencies mentioned.

Such problems of recovery are being handled by a group of experts who are working on more immediate survival. The group is made up of experts from the various agencies.

Announced on May 7, 1968, the Federal Government has been successful in obtaining reasonable public acceptance of the Federal plan. This has been done by letters and inquiries regarding public opinion, and by the publication of the plan. Obtaining appropriations to carry out the plan is another matter.

The Federal role has been defined in the following manner:

1. Education, which includes the following: (a) to inform the public of the problem which can be taken to the Federal Government.
2. Survey of existing studies, including the following: (a) to determine the value of existing studies; (b) to provide information on the value of existing studies.
3. Research to new ideas, including the following: (a) to determine the value of existing studies; (b) to provide information on the value of existing studies.
4. Prototype design and development, including the following: (a) to determine the value of existing studies; (b) to provide information on the value of existing studies.
5. Leadership and example, including the following: (a) to determine the value of existing studies; (b) to provide information on the value of existing studies.
6. Incorporation of studies, including the following: (a) to determine the value of existing studies; (b) to provide information on the value of existing studies.

I have touched on these points in a number of places. The Federal Government has taken in the field of Federal Government, but it is not a barrier and does everything possible to help the Government realize the solution of the problem. The Federal Government is involved in Federal Government of the Government.

1. The 1961 budget will provide for the development of fallout shelters in all new school and public structures where it is deemed suitable. \$11 1/2 million has been appropriated.

2. The Federal Housing Administration and the National Housing Administration have announced that they will accept as eligible items in determining aid for the construction of new housing. In addition, FHA, home loans are extended to assist in the construction of building of fallout shelters in new housing projects.

3. The Housing and Home Finance Agency through the Housing Facilities Administration has announced that fallout shelters may be included in projects under the National Housing Act and may be included under its College Housing Program, its Public Housing Program, and its Project Housing Program.

4. The Department of Health, Education and Welfare through the Public Health Service has announced that grants for the construction of fallout shelters will be made available for the construction of fallout shelters.

5. The HHEA and the Urban Renewal Administration will provide "Master Planning" grants to local authorities to assist in planning the incorporation of fallout shelters in urban renewal projects. In addition, local authorities may be eligible for grants for development improvement projects in areas of urban renewal projects share of the project.

6. The Public Housing Administration is studying the possibility of ruling that fallout shelters may be included in new public housing projects and in projects of local authorities.

Survival is only a matter of time. When the time comes, it comes.

I have made here three major points. They are:

First, fallout protection is being provided by the Federal Government, but it is the cost.

Second, the standards of fallout protection are very low.

And Third, fallout shelters are being built in areas where they are not needed for radiological defense, except in a few cases.

January 25, 1961