

Information in the event of a
**Radiation Emergency in
Portland Port**

What to do if you live nearby

This booklet is important
Please keep in a safe place



This booklet has been produced by Dorset Council,
The Ministry of Defence and Portland Port.
March 2023



This booklet provides essential safety information to be used in the highly unlikely event of an emergency involving the reactor of a nuclear submarine. It is relevant only to those residents living near Portland Port, where nuclear submarines occasionally berth, see map on page 5, but is being distributed more widely to ensure general public awareness in the area.

The procedure in an emergency is simple:

- **Go in**
- **Stay in**
- **Tune in**
- **Go online**

Information will be available on:

 **dorsetcouncil.gov.uk**

 **@DorsetCouncilUK**

 **@DorsetCouncilUK**

TV: **BBC1, BBC2, Meridian TV, West Country TV**

Radio: **BBC Radio Solent 96.1 FM & 103.8 FM**

Greatest Hits Radio 96 & 97.2 FM

Follow the instructions you are given.

Although the chance of ever having to use this booklet in an emergency is very slight, please put it in a safe place where you can find it easily.

For more information on radiation safety, call UK Health Security Agency on **0300 3038162** (and follow the options given), or visit **gov.uk/government/organisations/uk-health-security-agency**

What do you mean by an emergency?

The design of nuclear-powered vessels means that an emergency involving a vessel's reactor is extremely unlikely. However, if the reactor on board a vessel suffers a serious problem, people close to the vessel could be exposed to gamma radiation which is very similar to x-rays. There is no possibility of a "nuclear bomb" type of explosion.

In some circumstances it is possible that radioactive material could escape and affect areas close to the submarine or downwind of it. This may impact people but also the environment through the setting of radioactive dust on exposed surfaces. Fission products deposited on the ground may also be taken up by growing plants and animals.

As soon as the Royal Navy is aware that a nuclear-powered vessel in or near the port has a problem, it will start a well-rehearsed emergency plan that it practices regularly with Dorset Council, Portland Port, the emergency services and the health service.

How do I know if I will be affected?

If an emergency occurred, it would probably only affect people living or working very close to or within the port, see Emergency Planning Area map on page 5. The Radiation (Emergency Preparedness and Public Information) Regulations 2019 require people living in an area around the port to be given the information in this booklet.

The map on page 5 shows the Emergency Planning Area, also known as the Detailed Emergency Planning Zone (DEPZ). This can be described as an area that extends beyond the minimum radial distance of 1.5 km from the centre point of the operational berth with the boundary following in the main the inner edges of roads, property boundaries and distinctive pathways on land, and with a radius of 1.5 km across all marine areas.

How will I know an emergency has happened?

There will be an announcement on local radio, television and social media, and the advice in this booklet will be repeated. The Police may also issue warnings using loudhailers in the affected areas. An alert will sound to warn the workforce on the Portland Port side.



In an emergency

1

Go indoors and stay there

In a reactor emergency the best thing to do is go indoors and stay there. Do not go outside, where levels of radiation could be higher, unless you are told to do so. Keep pets indoors, to stop them from bringing possible contamination into the house.



2

Close all windows and doors

By closing all windows and doors you will reduce the risk of contamination entering the building.



In an emergency

3

Go online or tune in to your local radio or television and follow any instructions you are given

During a reactor emergency, information and advice will be given out on your local radio, TV and the internet. Follow any instructions you are given. The inside back cover lists details of where to find information online, as well

as details of television stations and radio station frequencies. Announcements will be made giving instructions about what to do covering specific issues such as the arrangements being made for the care of children at school, and action to be taken concerning farm animals, foodstuffs, etc



4

Put out or damp down fires and boilers. SHUT DOWN ventilation devices

Switch off fans, close ventilators and put out or damp down open fires or other heating appliances (such as central heating boilers and gas fires) which draw air from outside. This will help stop possible contamination entering the building.

5

Do not make calls using mobile phones or landlines unless you need help or advice urgently

In a reactor emergency, the telephone system may become overloaded, and the emergency services would not be able to contact each other to ensure your safety. If you must make a call, please keep it short.



In an emergency

6

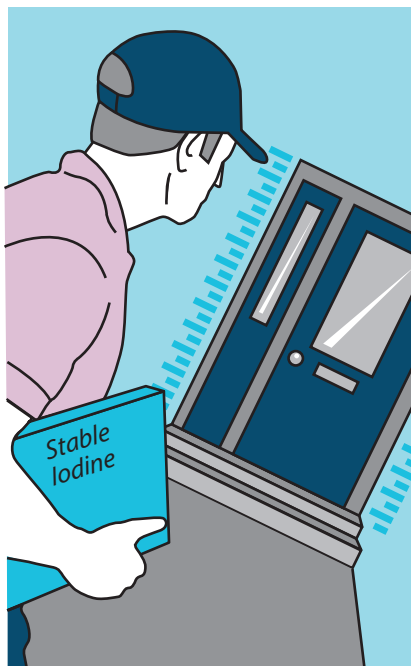
Do not leave the area unless you are advised to do so

It is very unlikely that the hazard from a reactor emergency would require an evacuation outside of the Portland Port site. In any event, staying inside is the most important safety measure, unless you are told by the Police that you need to leave. If an evacuation is necessary, you will be told about all the arrangements being made at the time. If you have to leave, you should take your pets with you.

7

Take stable iodine tablets (SITS) ONLY if they are issued to you and you are told to do so

You might hear an announcement on the television, radio or social media telling you to take stable iodine tablets (SITS). These tablets help to protect you from the effects of radioactive iodine which could escape if there is a reactor emergency. Emergency response personnel will deliver the tablets and a set of instructions to all those premises in the affected downwind area in the event of such an emergency. This system of delivery is practiced regularly to ensure that the tablets can be distributed to everyone who needs them within a very short time of a reactor emergency being declared. If you are told to take the tablets, you should continue to remain indoors. The tablets help protect you, but staying inside is still the best protection.



What happens after the warnings are given?

As soon as it is safe to go outside again, there will be announcements online, on social media, on local radio and TV, and by loudhailer. In the days following the emergency, health experts will carry out checks on the air, water and soil to make sure it continues to be safe. There will be more information online and in the media on what further action you need to take, if any.

An information helpline number will also be made available. Remember, the risk of this sort of emergency happening is extremely remote, but being prepared is nevertheless both sensible, as well as required by law.

Will we be evacuated?

There would not usually be the need for an evacuation, but if there is an emergency, pack the following items and be ready to go just in case:

- Clothing and bedding
- Medicines or special foods you might need
- Private documents and special valuables
- If you have children - baby food, clothing, toys and books
- If you have pets - leads, baskets/carriers, cages and food

Evacuated areas will be controlled, so don't worry if you have to leave your home, it will be safe. In the event of an emergency, do not leave your home unless advised to do so - the best thing to do is to **stay in**.

I have friends and relatives living outside the Emergency Planning Area for Portland Port. Should they have the tablets too?

The authorities will continually monitor the situation. If the decision is taken that others outside the Emergency Planning Area require precautionary measures, they will be advised accordingly.

Outline Planning Zone

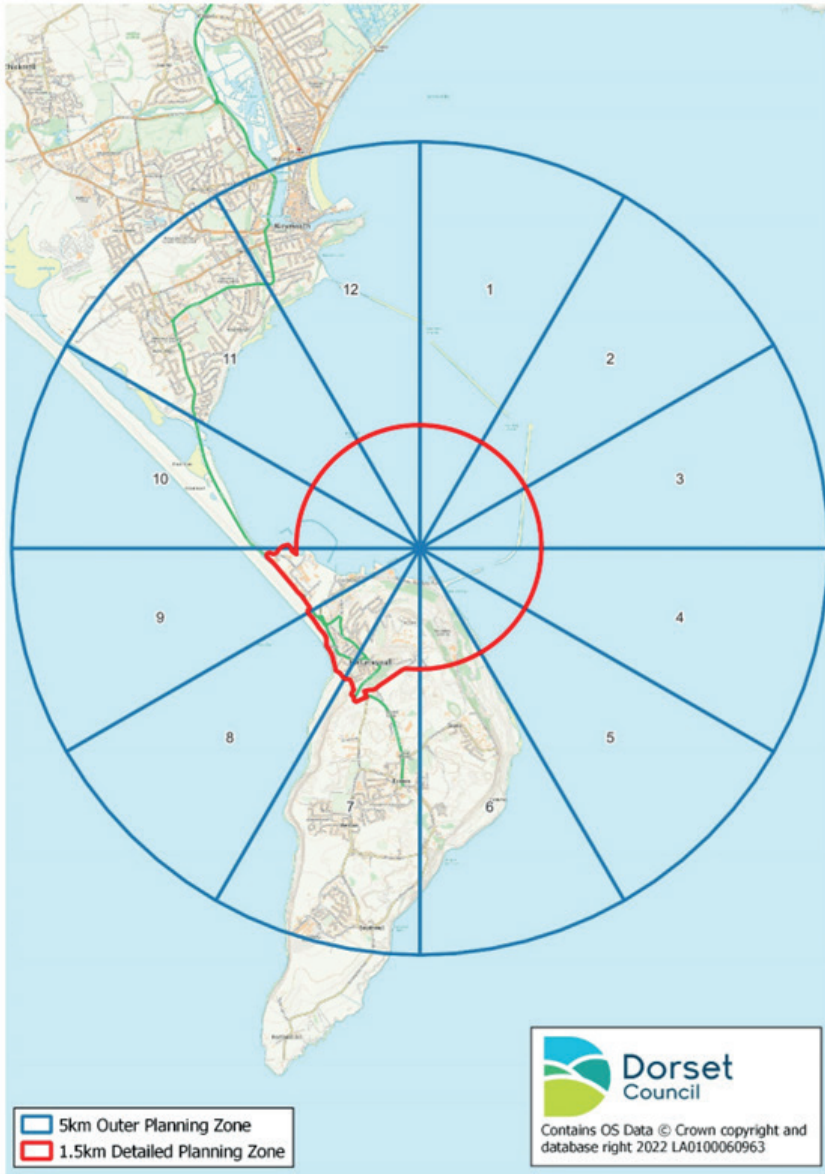
See map on page 11

In accordance with REPPiR 2019, an Outline Planning Zone (OPZ) has also been set, extending in the shape of a 5km circle with the operational berth at its center (see map). This is to assist in proportional planning for extremely low probability events, triggered by an incident with impacts extending beyond the Emergency Planning Area. Protective actions for people in the Outline Planning Zone would only be activated if it was determined that the risk from the emergency extended beyond the area for which detailed emergency plans already exist. The inclusion of an OPZ map in this leaflet is a new requirement under the Regulations, and it does not represent a change in hazard.

Food and drink

Government agencies will provide advice to users of private water supplies and on the consumption of other foodstuffs such as freshly grown vegetables. This advice will be broadcast on local radio and television. Advice will also be given to farmers, fishermen and other food producers.

Outline Planning Zone (OPZ) map



What is radiation?

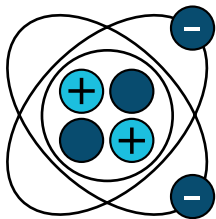
Atoms

Everything is made up of tiny building blocks called atoms.

Each atom is made up of **electrons** which orbit around a **nucleus**. This contains **protons** and **neutrons**.

Atoms of the same substance or element have the same number of protons and electrons.

Nucleus

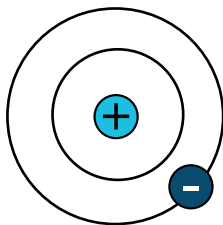


Protons

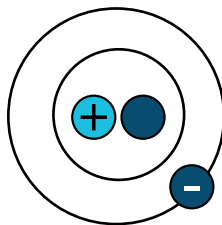
Neutrons

Electrons

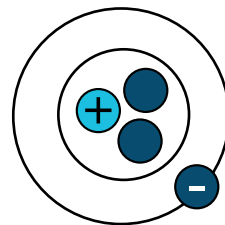
There can be different numbers of neutrons in the same element. An element which has a different number of neutrons is called an **isotope**.



Hydrogen



Deuterium



Tritium

For example, the element hydrogen has the isotopes hydrogen, deuterium and tritium.

When you know the number of protons and neutrons in the nucleus of a specific atom, it is often called a nuclide. An example is the **nuclide** carbon-16, which has 6 protons and 10 neutrons.

Atoms can link together to form **molecules**. Molecules can be made up of atoms of the same element or different elements. The molecule water (H_2O) is formed when two Hydrogen atoms join with one Oxygen atom.

Radioactivity and radiation

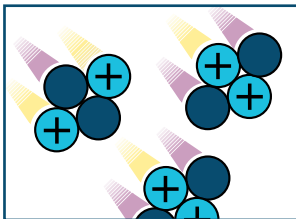
Some atoms are naturally unstable. They can change into atoms of another element by getting rid of some of their protons, neutrons and electrons. When this happens, the atom gives off **radiation**.

An atom is **radioactive** when it changes and gives off radiation.

This change is called decay. An atom which is decaying is known as a **radionuclide**.

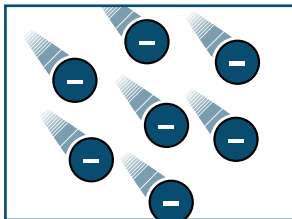
Radionuclides can emit 3 types of radiation:

Alpha radiation



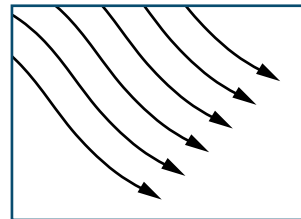
Heavy, positively charged particles, each made up of 2 protons and 2 neutrons

Beta radiation



High speed electrons (negatively charged)

Gamma radiation



Similar to X-rays

- As you approach a source of radiation you are increasingly affected the closer you get
- You can reduce or eliminate the effect by moving away
- If you make contact with the source of radiation you can become contaminated
- You cannot be contaminated with radiation, but you can be contaminated by a substance emitting radiation
- The effect remains with you until you are “decontaminated”, ie the contamination is removed

How radiation could affect your body

Everybody receives a small amount of natural **radiation**.

Radiation can cause changes to molecules and tissue. One type of change that can be produced is **ionisation**.

For example, ionised water molecules in tissue are chemically very reactive and are called **free radicals**. Free radicals can damage other molecules. Ionisation can also change or affect DNA, the molecule which contains the information used to control our growth and development.

All this can lead to biological effects such as cell changes, including an increased risk of developing cancer. It is possible that these changes may not show up until some time after exposure to radiation.

Different types of radiation can cause different effects. Some parts of the body are more sensitive to radiation than others.

Studies have shown that the risk of an effect from exposure to radiation increases with the radiation dose.

Radiation measurement

Quantities and units

The unit by which the amount of radioactivity is measured is the Becquerel (Bq). The Bq is a very small measurement unit and so readings are usually given as Terra/Mega Bqs.

1 becquerel (1 Bq) - 1 atomic disintegration per second

The effect of ionising radiation on the body is measured in sieverts.

The sievert (Sv) is the unit of radiation dose.

The sievert is a large quantity so often the term millisievert or microsievert is used.

1 millisievert (1mSv) = 1/1000 Sv

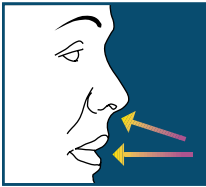
1 microsievert (1µSv) = 1/1,000,000 Sv

For comparison 1 millisievert is less than half the average annual dose from natural radiation in the UK. 1 microsievert is approximately equal to 1/10 of the dose incurred during a flight from the UK to Spain.

Hazards from a radiation emergency

You could be exposed to radiation by:

1. Inhaling contaminated air and gases.
2. Having contact with contaminated surfaces.
3. Eating or drinking contaminated food or water (ingestion).
4. Direct exposure to radiation.



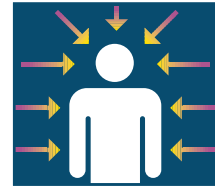
1. Inhalation



2. Contaminated surfaces



3. Ingestion



4. Direct exposure

Urgent Protective Actions (UPA's)

These are the actions you can take to minimise the effects of exposure to radiation and contamination as the result of a nuclear submarine reactor emergency. The public will be told which protective actions it is necessary to take throughout the emergency.

Sheltering staying indoors is the best way to protect yourself in the short term. Doors and windows should be closed to help stop direct exposure, inhalation and contamination of surfaces inside buildings.

Stable iodine tablets can help prevent radioactive iodine from concentrating in the thyroid gland. Issue of these tablets is combined with sheltering and/or evacuation.

Evacuation can help avoid exposure to relatively high doses. It can help protect you from direct exposure and inhalation.

Food bans of milk and other foods may be necessary. This will protect you from ingestion of contaminated foods.



Further information

The Radiation (Emergency Preparedness and Public Information) Regulations 2019 say that this kind of guide has to be updated and distributed every three years to ensure that the public is kept properly informed.

If you would like to find out more about the emergency arrangements for the area around the port you can do so at:

You can get more information on radiation from the following websites:

www.dorsetcouncil.gov.uk/w/portland-port-off-site-reactor-emergency-plan

www.gov.uk/government/organisations/public-health-england

www.hse.gov.uk/radiation

Further copies of this booklet can be obtained from:

The Emergency Planning Service

Dorset Council,

County Hall, Colliton Park

Dorchester, DT1 1XJ

Tel: **01305 221000** (ask for emergency planning)

This leaflet is available on request in larger print or Braille, and can be translated in other languages upon request. Please contact Dorset Council on **01305 221000**.



Summary advice

For use in the event of a nuclear emergency at Portland Port

If there is a reactor emergency at Portland Port, an alert will sound to warn the workforce on site. Broadcasts will be made on radio and television to tell people in the immediate surrounding areas what is happening and what they should do. The police may also issue warnings using loudhailers in the affected areas.

What to do first

You should read all of this leaflet carefully then tear off this summary and hang it somewhere you can find it easily.

- 1. Go indoors and stay there.**
- 2. Close windows and doors.**
- 3. Go online, or listen to local radio or TV. Follow any instructions you are given.**
- 4. Put out or damp down fires and boilers. Shut down ventilation devices.**
- 5. Do not leave the area unless advised to do so, or urgently need help.**
- 6. Take stable iodine tablets (SITS) ONLY if they are issued to you and IF you are told to do so.**

 dorsetcouncil.gov.uk

 @DorsetCouncilUK

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Radio: **BBC Radio Solent**
96.1 FM & 103.8 FM
Greatest Hits Radio 96 & 97.2 FM

Television: **BBC1 BBC2**
Meridian TV
West Country TV

Telephone help and advice lines will be set up in an emergency and made public using the above media

Only use the telephone if you need help or advice urgently

GO IN • STAY IN • GO ONLINE • TUNE IN



GO IN • STAY IN • GO ONLINE • TUNE IN