



Managing radioactive waste in the UK - your views matter

Discussion Guide 2005



Committee on Radioactive
Waste Management

1. The purpose of this guide

At the moment there is no long-term plan for dealing with the UK's radioactive waste.

The Government has set up the "Committee on Radioactive Waste Management" (CoRWM), to look at the options for managing the UK's radioactive waste and to come up with a long-term solution that will protect people and the environment.

CoRWM believes it is important to involve the public in this process. This guide is designed to get people talking about radioactive waste and how we should deal with it.

2. Why we would like you to get involved

The way we decide to manage radioactive waste could affect people in the UK for many generations. Radioactive waste is hazardous to health, a potential security risk and storing it costs taxpayers' money.

CoRWM wants to know your priorities and concerns about the way the UK should manage its radioactive waste in the long term. Your input, along with detailed technical assessments, will help us to find the best solution.

3. Using the guide

- We would like you to have a group discussion about radioactive waste and what we should do with it, using the instructions, information and reply form included in this guide.
- Group discussions are a good way to help people to consider other points of view and think deeply about the issues involved.
- You do not need to have a special interest in or knowledge about radioactive waste to take part. The guide contains some information about radioactive waste and the options for dealing with it. It also tells you where you can find out more.
- Discussions like this work well with up to 12 people. If you want to hold a discussion with more than 12 people we suggest you split into smaller groups and call us on 020 8683 6602 to request more guides.
- You will need to allow at least an hour to discuss all the questions in this guide.

4. How we will use your replies

When you have completed the reply form you can either send it to the freepost address below, or enter the results online at:

<http://corwm.dialoguebydesign.net>

Please make sure your replies reach us by 31st December 2005.

The results of the discussions will be shown on this website in the New Year. CoRWM will show how they have used what they have heard from the public when reporting to Government.

To return your reply form, or if you have any queries please contact:

CoRWM
FREEPOST SEA 12430
Thornton Heath
CR7 7XT
Tel: 020 8683 6602
e-mail: facilitators@dialoguebydesign.com

This guide was produced by Dialogue by Design on behalf of CoRWM.

Enter your responses and view the results at:

<http://corwm.dialoguebydesign.net>

Instructions - for organisers

Before you meet

If there are more than 12 people in the group you may find it useful to split up into smaller groups. You may also wish to photocopy the information cards, or request more copies.

Discussion Tip

For each question you may want to ask each person to give their views, and then see if the group can agree an answer to write on the reply form. If you cannot agree, the recorder should make a note of the different points made on the reply form.

Step 1 - Decide who does what

Choose a chairperson – someone to make sure everyone can have their say, and that you answer all of the questions that you want to, in the time you have. Give the chairperson this card.

Choose a recorder – someone to write down your answers, fill in the reply form and send us your reply.

Step 2 - Read the information cards

You can either give each person a full set of cards to read OR distribute the cards amongst the group, allow people to read them and then ask each person to summarise one card for the others in the group.

Step 3 - Talk about the criteria for deciding between the options for managing radioactive waste

Discuss: Question 1 - Which 4 criteria do you think are **most** important and why?

Discuss: Question 2 - Which 2 criteria do you think are **least** important and why?

Please record your answer on the reply form.

Step 4 - Talk about the impact of radioactive waste management on future generations

Discuss: Question 3 - Do you think we should dispose of the waste now, so that future generations have less to do, or should we allow them the chance to deal with the waste in a different way?

Please record your answer on the reply form.

Step 5 - Talk about where you think radioactive waste should be managed

Discuss: Question 4 - Do you think we should put all of the waste in just one or two places, or should we put it in a number of different places, for example at or near existing nuclear sites?

Please record your answer on the reply form.

Step 6 - Imagine a radioactive waste management facility was being planned in your area

Discuss: Question 5 - What would make this **more** acceptable to you?

Discuss: Question 6 - What would make this **less** acceptable to you?

Please record your answer on the reply form.

Step 7 - Talk about the options

Discuss: Question 7 - Having had the discussion do you have a preference for any of the options?

Please record your answer on the reply form.

Step 8 - Other Messages

Question 8 - Do you have any other comments or messages for CoRWM?

Please record your answer on the reply form.

Step 9 - Fill in the group details, and your contact details if you would like to keep in touch.

Step 10 - Return your reply form by post or enter the results online.

Radioactive waste management is a complicated subject which raises many questions. It is **not** essential that everyone reads all of the information on this sheet before the discussion, but you may find that it answers some of the questions that come up during the group discussion. It also points you to places where you can find out more.

Who is on the Committee on Radioactive Waste Management?

CoRWM is an independent committee of 11 people. They come from all over the UK and have experience in science, business, planning, environment, health & safety, energy, and law. You can find a list of members on the CoRWM website.

What is radiation?

Everything is made up of atoms. At the centre of every atom is a nucleus. Some materials have unstable nuclei which give off particles or rays. This is called ionising radiation.

What is radioactive waste?

Radioactive waste is material that we do not intend to use, that gives off ionising radiation. It includes a wide variety of material, such as used equipment, contaminated clothing and reactor fuel components. Different types of waste give off different amounts of radiation.

What are the main categories of radioactive waste?

Wastes are classified as high level (HLW), intermediate level (ILW), low level (LLW) and very low level (VLLW) depending on the amount of radioactivity and whether they generate heat. High Level Waste accounts for 95% of the radioactivity in wastes in the UK, and it needs to be stored in ways which disperse the heat it generates. At the other end of the scale, some Very Low Level Waste could be disposed of in landfill sites. The largest volume of the wastes within CoRWM's remit is Intermediate Level Waste. Most Low Level and all Very Low Level Waste is outside CoRWM's remit, and is subject to a separate Government review.

Where does it come from?

Radioactive waste is created by generating electricity using nuclear power, making and maintaining nuclear weapons, and using nuclear technology in hospitals, laboratories and industry.

Why is it dangerous?

The radiation from radioactive waste can harm human, animal and plant health. It can damage the cells in our bodies which may cause cancer or defects which parents can pass on to their children. Radioactive material can be harmful if it gets inside the body. The right kind of shielding provides protection from direct exposure to radiation.

How long is it dangerous for?

Radioactive materials become less radioactive over time as unstable nuclei decay to stable ones. Some materials lose most of their radioactivity in minutes or hours. Others take hundreds of thousands of years.

Who is in charge of dealing with it?

Responsibility for managing radioactive wastes in the short-term usually lies with the organisations producing the wastes. Their approach has to follow Government policy and is monitored by safety, environmental and security regulators. A company called Nirex has responsibilities which include keeping track of how much radioactive waste there is, and for advising on how wastes should be packaged. Decisions about who will have responsibility for managing wastes in the long term will be taken after CoRWM has reported to Government.

Who will pay for the long-term management of wastes?

The bulk of the funding is likely to come from the taxpayer, although some funding may come from the nuclear industry using income from the sale of electricity or from the reprocessing of spent fuel.

CoRWM are considering a small number of options. Are there any other options that may be possible in the future?

In 2004, CoRWM created a long-list of options. Many of these options have now been ruled out. However CoRWM is likely to recommend to Government that some of the options that were not short-listed should be kept on a 'watch' list. This means that not enough is known about them at this stage to take them forward as viable options, but that there is a possibility that further research and development might make them viable in the future. Further information can be found on the CoRWM website.

What are other countries doing?

All nations that have made a decision on what to do with their radioactive waste have selected deep geological disposal as their preferred option, but many are having trouble finding an acceptable place in which to implement it. Some countries have agreed to a long period of storage while they investigate disposal more thoroughly, and others are continuing to research other methods.

Will we import waste from other countries?

The UK currently reprocesses foreign spent fuel at the Sellafield site in Cumbria. High Level Waste from this process will be returned to the country of origin. The bulkier Intermediate and Low Level Waste also produced during reprocessing will be kept in the UK in return for customer countries taking more High Level Waste. Some people are concerned that no radioactive wastes should be imported from other countries specifically for long-term management in the UK. CoRWM will address this issue in future work.

Who are CoRWM involving in its work?

CoRWM is seeking to involve a wide range of people in its work, including those with specialist knowledge of radioactive waste management, stakeholders from organisations with an interest in its management, and members of the public. This discussion guide provides one way in which CoRWM seeks to involve the public.

Does CoRWM's remit extend to whether new nuclear power stations should be built?

CoRWM's task is to make recommendations about what to do with radioactive wastes in the long term, not to form a view on whether there should be new nuclear power stations. However, CoRWM is aware that these issues are linked in various ways and will inform Government of the views it hears through its consultation with the public and other stakeholders.

Links to further information

- **CoRWM** - www.corwm.org.uk
- **UK Atomic Energy Authority** - www.ukaea.org.uk
- **British Nuclear Fuels Limited** - www.bnfl.com
- **Nirex** - www.nirex.co.uk
- **Nuclear Decommissioning Agency** - www.nda.gov.uk
- **Greenpeace** - www.greenpeace.org
- **Friends of the Earth** - www.foe.co.uk
- **Health Protection Agency** - www.hpa.org.uk/radiation

Radioactive waste has been produced in the UK since the 1940s, mainly from developing and using nuclear power. The waste is hazardous to human health and some will continue to be hazardous for thousands of years.



Radioactive waste is sometimes packaged in concrete and steel.

Image: BNFL

There are currently around 80,000 cubic metres of solid radioactive waste in storage. Compared with the 40 *million* cubic metres of household waste we produce every year it is a tiny amount.

Although the amount of radioactive waste we produce is relatively small, radioactive waste must be dealt with carefully, particularly because of its potential hazards to human health.

The radiation that comes from radioactive waste could cause cancer or birth defects if the dose is high enough. We need to find the best way of dealing with the waste to protect humans and the environment.

The radioactive waste we have produced so far is being processed and stored until we decide how to manage it in the long term. Many nuclear power stations will be carefully dismantled over the coming decades, and this means that the amount of radioactive waste that needs to be managed will increase.

CoRWM has been asked by Government to make its recommendations on the long-term management of radioactive waste by July 2006.



Sellafield - where much of the UK's radioactive waste is produced and stored. Image: BNFL

Choosing between the options for managing radioactive waste

CoRWM needs to compare the options and decide what the best management solution is for the long term. To do this they need detailed scientific and technical information about each option.

To help them gather the necessary information, CoRWM has worked with specialists and the public to create a list of criteria that they will use to assess the options. These criteria are listed on Info Card 3.

CoRWM will take each option and evaluate it against each of the 11 criteria. CoRWM will use the results of this assessment to compare the management options.

Deciding how to manage the waste will not be an easy decision. It is likely that no single option will be the best for all 11 criteria.

For example, one option may have a slightly higher risk to public safety than another, but may make it easier for future generations to retrieve the wastes. Another option may be very expensive but have more positive benefits to the local community.

Once all the technical data have been gathered these are the kind of comparisons the decision makers will have to consider.

It is important to understand which of the 11 criteria the public feel are more important so that these views can be used to inform this decision making process.

CoRWM would like to know which criteria you feel are most important in deciding how to manage radioactive waste. Question 1 and Question 2 ask you about the criteria.

At the moment most types of radioactive waste are stored where they were produced (the map shows where). Low level waste is transported to a disposal facility near Drigg in Cumbria.

Decisions about how to manage radioactive waste in the short term need to be made with the knowledge of what we will do with the wastes in the long term. This is why we need to decide on long-term policy soon.



Low level waste is disposed of at a facility near Drigg in Cumbria. Image: BNFL



Map showing locations of UK radioactive waste

So far CoRWM has considered a list of 15 options for dealing with radioactive waste, and through consulting with specialists and the public, has narrowed this down to three options that each deal with all the types of radioactive material that CoRWM has to consider. These three options are described on info cards 4, 5 and 6.

CoRWM is also deciding whether to further assess a near surface disposal option that might be used for some short-lived or less hazardous radioactive wastes. Because CoRWM has not yet reached a decision, this option has not been included in this discussion guide. However Questions 1 to 6 in this guide are all relevant to the near surface disposal option, and your responses to them would be used in any detailed assessment of it.

You can find out about all the options and why some were not short-listed on the CoRWM website, www.corwm.org

The options would each affect future generations and existing communities in different ways.

Future generations

The option we choose depends to some extent on what we feel are our responsibilities to future generations. Should we dispose of the waste in the best way we know now, or should we allow for the possibility that future generations could come up with a better solution?

Is it fair to leave the burden of dealing with waste (financial cost, environmental damage, and risk to health) to future generations when we are the ones who produced it by, for example, generating electricity? Question 3 asks you about these issues.

One site or many?

Whichever option(s) we decide on, the waste is going to have to be managed somewhere in the UK. Some options allow the waste to be managed at or near to current nuclear sites, others are limited to places with the right geology.

The waste could be concentrated at one or two sites serving the whole UK or it could be dispersed to a number of smaller sites. Question 4 asks you about these issues.



The options would each affect future generations and existing communities in different ways.

Existing communities

Whatever we decide is likely to affect some communities more than others, either positively (e.g. generating jobs) or negatively (e.g. reducing house prices).

Is it fair for one community to be asked to accept the whole burden of managing the UK's radioactive waste? What could be done to improve the situation for affected communities? Questions 5 and 6 ask you about these issues.

Your views

Question 7 asks whether you prefer any of the three options.

The 11 criteria and questions on this card will be used by CoRWM to assess the different options for managing radioactive waste.

1. Public safety in the short term

How well does the option protect the public over the next 100 years or so, both at the site and during transport?

2. Public safety in the long term

How well does the option protect members of the public thousands of years into the future?

3. Worker safety

How well does the option protect workers from injury or exposure to radiation, both at the site and during transport?



Transporting the waste could impact on safety, security and the environment.

Image: BNFL

4. Security

How well does the option protect the waste from theft, sabotage, terrorist attack or war, both at the site and during transport?

5. Environment

How well does the option minimise chemical or radiation pollution of the environment, physical disturbance of the environment, and the use of natural resources, both at the site and during transport?

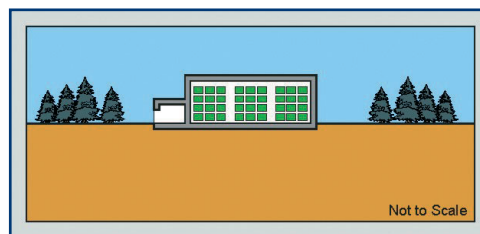
OPTION 1: Long-term interim storage

(keeping it at or near the surface until we dispose of it forever)

The waste would be packaged and stored in new purpose-built stores.

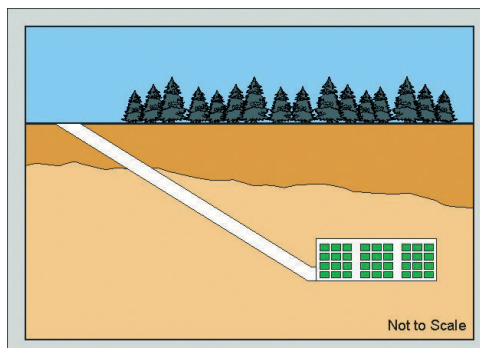
The stores could be above the ground or tens of metres underground and they could be either at a single location or spread around the UK.

The stores could last for hundreds of years, but they would not be permanent, and they would need refurbishment.



Above ground interim storage.

Image: Nirex



Below ground interim storage.

Image: Nirex

The aim of this option is to store the waste until a better option can be implemented.

This may involve waiting until we have more information about other options, or deciding on another option now, but waiting until we are confident it will work before implementing it.

6. Local economy, local society

How will the option affect the local economy, employment, culture and heritage?

Will there be any positive benefits?

7. Local amenity

How will the option affect noise, visual impact, traffic, and land needed in the local area?

8. Burden on future generations

How much of the costs, effort and impacts of managing the wastes will future generations have to bear?



A waste management facility could affect the economy by providing jobs for local people. Image: BNFL

9. Implementability

How easy will it be to carry out the option?

What are the technical, legal and planning challenges involved?

10. Flexibility

How easy will it be for future generations to change the way the waste is managed if circumstances change?

How easy would it be to monitor and retrieve the waste?

11. Cost

How much would the option cost in total?

OPTION 1: Long-term interim storage

Here are some advantages and disadvantages of this option. You will probably be able to think of more.

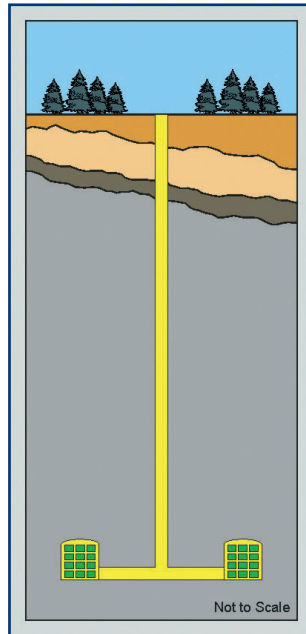
Advantages	Disadvantages
<ul style="list-style-type: none"> • The waste would be retrievable, accessible and easy to monitor, so we could decide to manage it differently in future. • The storage facilities could be built at or near to the nuclear sites where the waste was produced. This would minimise the need to transport the waste, and spread the burden amongst a number of communities. • This option is the least expensive in the short term. 	<ul style="list-style-type: none"> • Future generations would have to manage the waste. They would have to maintain the facility, construct a new facility if the old one has to be replaced or implement a new management strategy. • The option is likely to involve large-scale financial costs in the longer term. • This option may be less safe and secure, for example from terrorist attack or natural disasters, than burying wastes deep underground.

OPTION 2: Deep geological disposal (burying waste underground and sealing it off)

The waste would be buried between 300 metres and 2 kilometres underground in chambers protected by the surrounding rocks and soil.

The chambers would be sealed off and the tunnel leading to them would be filled in.

The packaging of the wastes, the materials used to fill in the chambers and the rocks themselves would all help prevent radioactivity leaking out.



Deep geological disposal - the yellow shaded areas show where the chamber has been sealed off. Image: Nirex

Even so, very small amounts of radioactivity are likely to reach the surface over a very long time. This would be allowed under the safety and environmental rules set by UK regulators but some people question whether this would be acceptable.

The aim of this option is to dispose of the waste. There is no intention to retrieve the waste in future.

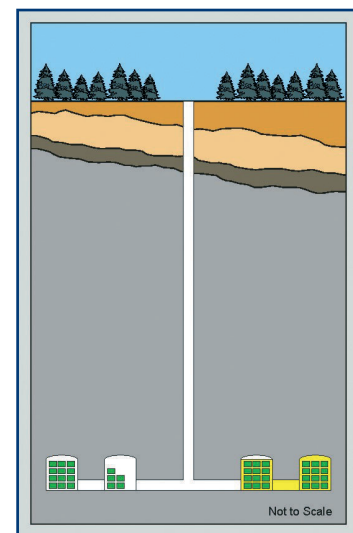
OPTION 3: Phased deep geological disposal (burying waste underground but keeping the chambers open)

Like option 2, *Deep geological disposal*, this option involves placing radioactive waste into engineered chambers.

The chambers would be deep underground in places where the geology can provide a secure barrier.

This option differs from *Deep geological disposal* in that the chambers are designed to be accessible and monitored for an interim period until they are finally closed and filled in at some future date.

The aim of this option is to wait until we are more certain that the facility will perform as we expect it to, before sealing off the waste



Phased deep geological disposal. The yellow shaded areas show where the chamber has been sealed off. The white areas are still open and accessible. Image: Nirex

OPTION 2: Deep geological disposal

Here are some advantages and disadvantages of this option. You will probably be able to think of more.

Advantages	Disadvantages
<ul style="list-style-type: none"> • This option is likely to require much less involvement on the part of future generations than the other two. • This option may be more safe and secure than other options as the waste is kept deep underground and sealed off. 	<ul style="list-style-type: none"> • This option needs particular types of geology which only exist in certain places in the UK. Around one third of land in the UK might provide suitable geology. • Excavating an underground chamber would be very expensive. • The wastes would be difficult to retrieve, making it hard for future generations to manage them differently should they wish or need to.

OPTION 3: Phased deep geological disposal

Here are some advantages and disadvantages of this option. You will probably be able to think of more.

Advantages	Disadvantages
<ul style="list-style-type: none"> • If future generations decide to manage the waste differently, or if there are problems, they could retrieve the waste before the chambers are sealed off. • Burying the wastes underground may make this option more safe and secure, e.g. from terrorist attack, than Option 1, <i>Long-term interim storage</i>. 	<ul style="list-style-type: none"> • Like Option 2, this option needs particular types of geology which only exist in certain places in the UK. • Excavating an underground chamber, keeping the facility open, and monitoring the waste would be very expensive. • This method relies on future generations being able to monitor and maintain the facility until they decide what to do. • In the short term, this option may not be as secure as sealing the waste off straight away.

Q4. Do you think we should put all of the waste in just one or two places, or should we put it in a number of different places, for example at or near existing nuclear sites?

Handwriting practice area for Q4, consisting of 12 horizontal dashed lines.

Q5. Imagine a radioactive waste facility was being planned in your area. What would make this more acceptable to you?

Handwriting practice area for Q5, consisting of 10 horizontal dashed lines.

Q6. What would make it less acceptable to you?

Handwriting practice area for Q6, consisting of 10 horizontal dashed lines.

Q7. Having had the discussion, do you have a preference for any of the options? If so, please say which option you prefer and why.

Lined area for response to Q7.

Q8. Please add any other comments or messages for CoRWM below, or on a separate sheet if necessary.

Lined area for response to Q8.

Q9. Please tell us about your group.

The name of your group or organisation:

The number of people who took part:

The type of group or organisation (please tick)

School / College

Private individual(s)

Other - please specify:

We will be mapping where in the UK discussions have taken place. To help us do this please complete the first line of the address and postcode of the place where you had the discussion. We will NOT use this information to contact you.

First line of address where discussion took place

Postcode of address where discussion took place

How to keep in touch

If you would like to be kept updated about CoRWM's work please provide the contact details of one member of the group.

To receive the CoRWM e-mail newsletter, please ensure you have included your e-mail address below.

Title

First name

Surname

Address Line 1

Address Line 2

Address Line 3

Address Line 4

Postcode

Telephone

E-mail

You can either send this form to:

CoRWM
FREEPOST SEA 12430
Thornton Heath
CR7 7XT

or enter the results online at:
<http://corwm.dialoguebydesign.net>

Please make sure your replies reach us by 31st December 2005.

Thank you for taking part.