Office for Nuclear Regulation

Environment Agency

Regulating geological disposal

an overview

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Published by:
Environment Agency
Horizon House, Deanery Road,
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Office for Nuclear Regulation
http://www.onr.org.uk/geodisposal.htm

The UK government has decided that the best available approach for managing higher activity radioactive waste in the long-term is geological disposal. Higher activity radioactive waste comprises radioactive wastes that are not suitable for near-surface disposal in current facilities.

Radioactive Waste Management Ltd (RWM), a wholly owned subsidiary of the Nuclear Decommissioning Authority, is the developer for geological disposal. The regulators will require RWM to ensure that any future geological disposal facility (GDF) meets the required high standards for protecting people and the environment when it is being developed, while it is operating and after it has closed.

This overview describes the regulatory processes that will apply in England to the development, operation and closure of a GDF. It summarises the regulatory processes for environmental protection, nuclear safety, security, transport and safeguards. It also provides a brief description of the links with the land-use planning process.

What is geological disposal?

Geological disposal means permanently placing radioactive waste in a specially designed facility between 200 metres and 1,000 metres underground. The design of the facility and its contents, combined with the properties of the surrounding rock, provide multiple barriers that contain the radioactivity and prevent harmful quantities from reaching the human environment. The depth of the facility protects the waste from effects at the surface, such as future climate change, surface erosion, and human activities.

Roles of environmental, nuclear safety and security regulators

The regulators in England with an important role to play in geological disposal are the Environment Agency (environmental protection), the Office for Nuclear Regulation (safety, security and safeguards) and the Health and Safety Executive (health and safety in the early stages of GDF siting). A GDF will not be allowed to be constructed or operated without the explicit prior permission from the regulators.

Environment Agency

The Environment Agency (EA) is responsible for implementing and enforcing environmental protection legislation in England. Its areas of responsibility include environmental pollution, waste management, flood risk management, water resources, fisheries and conservation.

The EA regulates disposals of radioactive waste from nuclear licensed sites as well as from other premises that use radioactive substances. Disposals of radioactive waste include radioactive discharges to air and water and disposal of solid waste to land including disposals at landfills, and at the Low Level Waste Repository as well as geological disposal.

Office for Nuclear Regulation

The Office for Nuclear Regulation (ONR) licenses nuclear sites and is responsible for regulating safety and security, on licensed nuclear sites in Great Britain. It also regulates the safety of transporting radioactive materials and works closely with the International Atomic Energy Agency (IAEA) and the European Commission to ensure that the UK's safeguarding obligations are met. The intention is that a GDF will be licensed by the ONR prior to any underground excavation commencing.

Health and Safety Executive

The Health and Safety Executive (HSE) will have a role in ensuring health and safety of work relating to surface-based investigations, for example, where deep boreholes are being drilled to investigate the geology of possible sites. The HSE's involvement will cease once the ONR has granted a nuclear site licence for a GDF.

Natural England and the Marine Management Organisation

Developing a GDF in England will also involve Natural England and, if a coastal site is selected, the Marine Management Organisation. Natural England has specific responsibilities for making sure that England's natural environment, including its land, flora and fauna, freshwater and marine environments, geology and soils, are protected and improved. The Marine Management Organisation's role is to license, regulate and plan marine activities in the seas around England.

High standards of protection

The regulators are working together to ensure that any GDF in England meets their requirements for safety, security, safeguards and environmental protection.

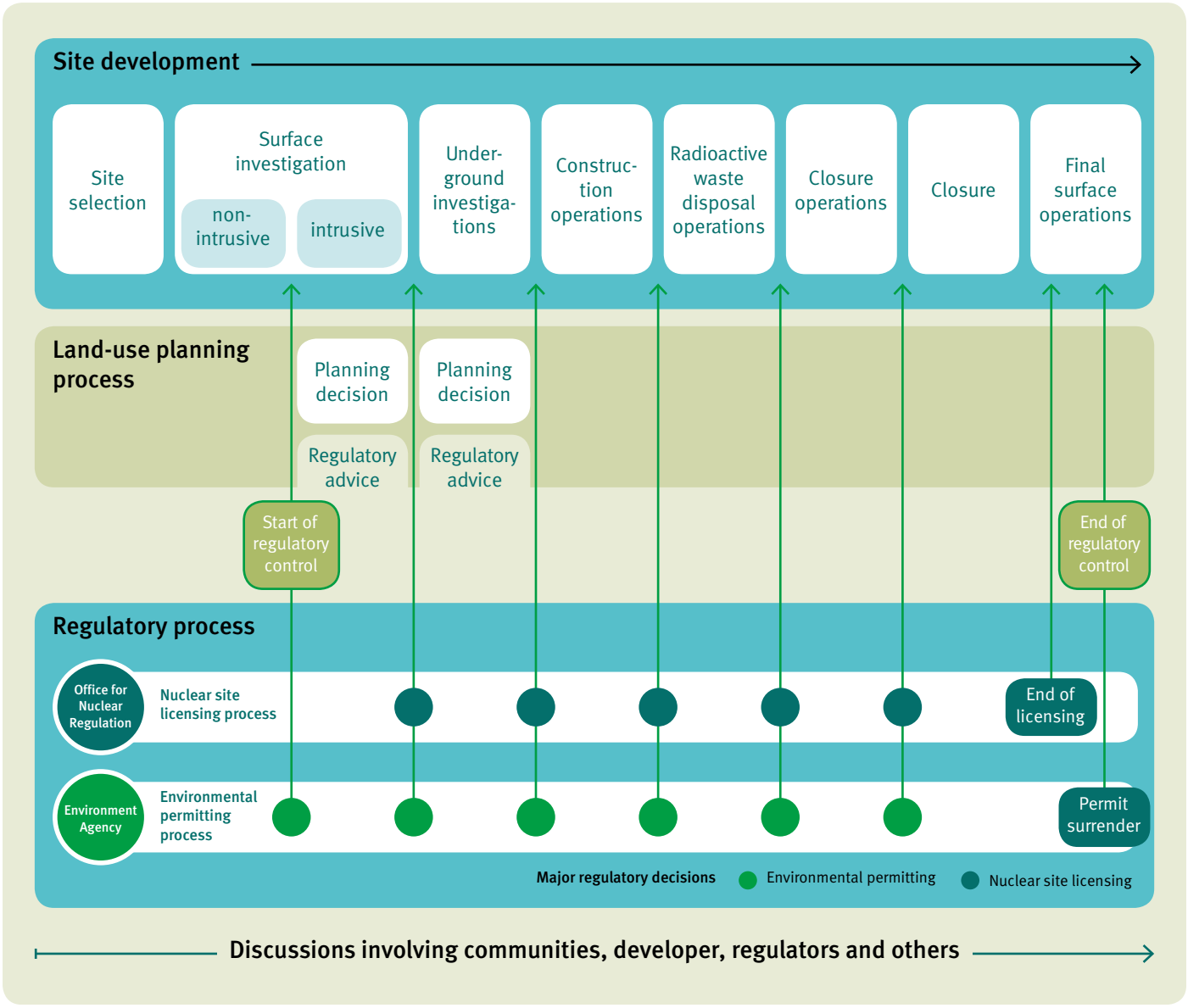
No disposals of radioactive waste will be allowed unless our high standards for protection of people and the environment can be met, both now and in the future.

Processes involved in implementing geological disposal

Four main processes support the implementation of geological disposal: site development, land-use planning, environmental permitting and nuclear site licensing. Figure 1 shows the links between these processes and the implementation stages for geological disposal.

The environmental permitting and nuclear site licensing processes implemented in England, by the EA and ONR respectively, are independent from decision-making relating to site development and land-use planning. The regulators support the processes for site selection and land-use planning by providing information, advice and comment on matters within their respective remits. Such discussions, between the developer, regulators, communities and others, will be an important part of implementing geological disposal throughout the lifecycle of a GDF.

Figure 1: Main processes supporting the implementation of geological disposal in England



Site development

The EA and ONR are not involved in making decisions about selecting sites for investigation, however, during site selection, we will work with communities, local authorities and others to explain how our work will help protect people and the environment, both now and in the future. We will also provide information, advice and comment on environmental, safety, security and transport matters that are within our regulatory role.

The UK government's preferred approach to selecting a site for a GDF is to identify willing communities where potential sites could be located.

Initially there may be aerial surveys or seismic studies carried out on areas suggested by a community. Such investigations could help inform where further investigations might take place, such as the drilling of deep boreholes to gather more information on the local geology and hydrogeology. Drilling deep boreholes will require development consent and environmental permitting.

When a preferred site is identified with a willing host community, the developer will seek development consent to construct a GDF, which includes the surface-based waste receipt facilities and the underground disposal facilities and associated infrastructure. Before construction can begin, the developer will need to hold an appropriate environmental permit and a nuclear site licence.

Regulatory independence

The regulators are independent and have no decision-making role in identifying and selecting sites for investigation.

Land-use planning

In England, a GDF, including the necessary deep borehole investigations, will be a 'nationally significant infrastructure project' under the Planning Act 2008. The UK government is developing a non-site specific National Policy Statement for geological disposal facilities supported by an Appraisal of Sustainability and a Habitats Regulations Assessment.

For nationally significant infrastructure projects, the Planning Inspectorate examines the developer's proposals and makes recommendations to the Secretary of State. The Secretary of State makes the final decision on whether to grant a development consent order. The process places specific requirements on the developer to consult local authorities and statutory bodies such as the regulators, and to carry out a widely based public consultation before any application for development consent is made.

Land-use planning, environmental permitting and nuclear site licensing are independent decision-making processes, although there are links between them as Figure 1 shows. The EA and ONR will support the Planning Inspectorate, providing information and comment as it relates to our own areas of responsibility. The EA will be consulted on the Environmental Statements and Habitats Regulations Assessments required to support development consent order applications for deep boreholes, and for each subsequent stage in developing a GDF that requires planning consent. The EA will also be consulted on other matters within its area of responsibility such as environmental permitting, flood risk management and groundwater protection.

Shallow boreholes less than 150 metres deep are not defined as a nationally significant infrastructure project. If the developer decides to investigate a site using shallow boreholes, it might need planning permission from the relevant local authority under the Town and Country Planning Act 1990. The EA, HSE and ONR will provide support to a local planning authority on matters within their areas of responsibility. The EA will be consulted on any related Environmental Statements and Habitats Regulations Assessments.

The developer will also need an environmental permit from the EA (Ref 1) before it can undertake any intrusive investigations relating to a potential GDF, irrespective of the depth of the borehole.

Support to planning process

EA and ONR will take an active role in supporting the land-use planning process by providing advice and information on matters within their own areas of regulatory responsibility.

Environmental and nuclear regulation

The UK operates a "goal-setting" approach to regulation. This approach means that the EA and ONR set out broad safety and environmental goals, and each expect the organisations we regulate to decide, and justify, how best they will achieve these goals. This approach allows organisations to be innovative and to achieve the required high levels of nuclear safety, security and environmental protection by adopting practices that meet its particular circumstances. It also encourages continuous improvement and use of good practices.

The formal regulatory process for geological disposal will start when the developer decides there is a need for surface-based investigations such as drilling boreholes. At this stage, the developer will need to apply to the EA for an environmental permit prior to undertaking any such works. For each geographical area under consideration for geological disposal, the developer will need to hold a separate environmental permit before starting any boreholes.

Regulatory approach

The regulators adopt a goal-setting approach, which allows operators to be innovative but, at the same time, achieve the required high levels of nuclear safety, security and environmental protection.

When considering the hazard associated with the inventory of highly radioactive waste for disposal in a GDF the UK Government has decided, in line with international standards, that a GDF should be licensed by the ONR. Therefore, before construction of a GDF commences the ONR will ensure that the developer has met the requirements of its licensing process (Ref 3). Once satisfied it will grant a nuclear site licence which will last the operational lifetime of the GDF.

Consequently, joint regulation by the EA and the ONR will begin after a preferred site for a GDF has been identified and the developer has been issued with a nuclear site licence and the appropriate environmental permit to start excavations to enable underground investigations. Figure 2 shows joint regulatory control for environmental permitting and nuclear site licensing. Annex 1 shows some elements of the environmental permitting and nuclear site licensing processes.

Joint regulation by the ONR and the EA will ensure that their separate regulatory requirements are met in a way that provides the required high standard of protection of people and the environment. It is anticipated that the regulated activities will continue for around 150 years and joint regulation will continue while the facility is being constructed, while it is operating and whilst it is being closed. Figure 3 shows some elements of the environmental permitting and nuclear site licensing processes. At an appropriate time after the facility has closed, when the requirements to protect people and the environment now and in the future have been demonstrated, the site will no longer need to be regulated and regulatory control will end.

Early interaction

The regulators' early interaction with RWM will help the company better understand our regulatory requirements. It will also help RWM develop the organisational structure and capabilities expected of an organisation that we might regulate in the future.

Figure 2: Joint regulatory control of a geological disposal facility

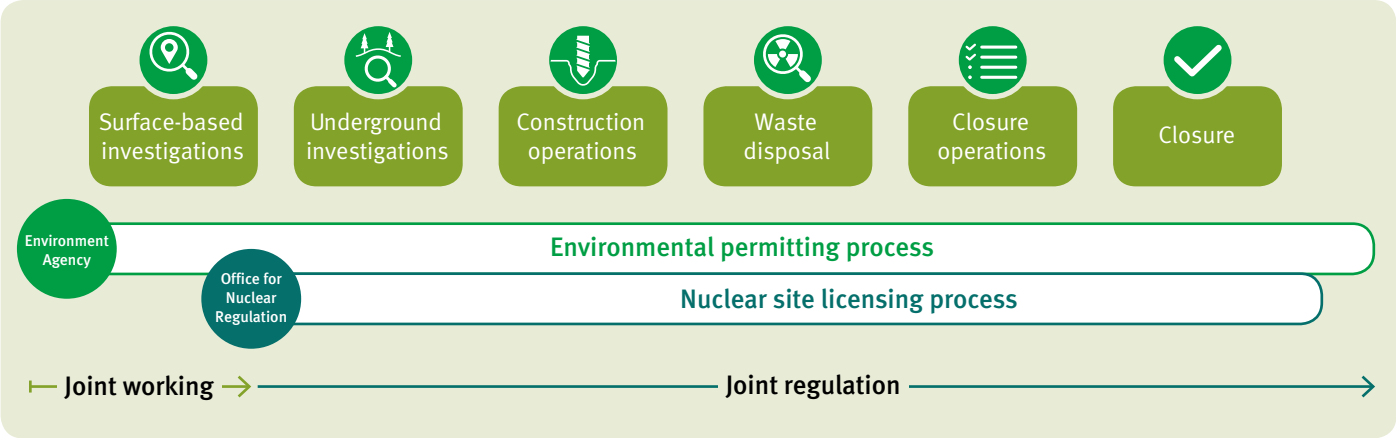
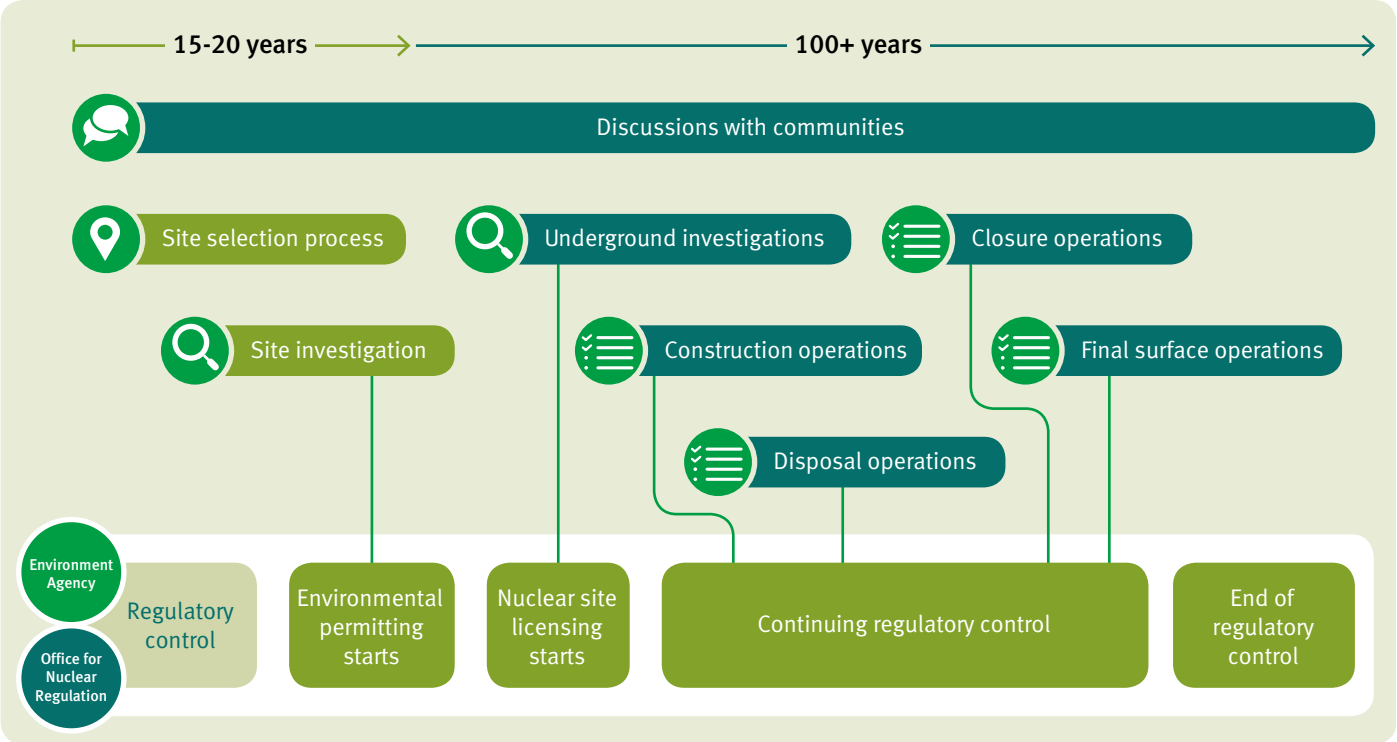


Figure 3: An indicative timeline for the joint regulatory process for a GDF



Pre-application advice and scrutiny

Radioactive Waste Management Ltd (RWM) is the developer for geological disposal and, in the future, could be both an environmental permit holder and a nuclear site licensee during GDF construction and operation. Before the start of the formal regulatory process, the EA and the ONR are carrying out a joint programme of pre-application advice and regulatory scrutiny of RWM's work on geological disposal. An important objective of the programme is to ensure that any future GDF meets the required high standards for environmental protection, safety, security, waste management and radioactive waste transportation. These expectations have been published in the environment agencies' document 'Guidance on Requirements for Authorisation' (Ref 2) and the ONR's guide to 'Licensing Nuclear Installations' (Ref 3).

The regulators review and assess RWM's technical work on geological disposal, including its research studies. We also provide advice to RWM on its organisational management arrangements so that it can develop the organisational capabilities expected of an environmental permit holder and a nuclear site licensee.

The regulators also examine RWM's disposability assessment process, which aims to minimise the risk that current treatment and packaging of higher activity waste will result in packages that are unsuitable for disposal in a future GDF (Ref 4). The disposability assessment process aims to help the UK nuclear industry carry out work to clean-up and reduce hazards on their sites and reduce the risk of needing to repackage the wastes at a later date. In our joint guidance on radioactive waste management (Ref 5), we recognise RWM as the appropriate body to provide advice on packaging and conditioning of higher activity radioactive waste for geological disposal. Once a GDF is available, the operator of the facility will use the safety case it has developed to establish waste acceptance criteria which are then used to ensure waste will be compatible with the facility and can safely be disposed.

Joint regulation

Joint regulation by the ONR and the EA will ensure that our separate regulatory requirements are met in a way that provides the required high standard of protection of people and the environment.

Regulating a geological disposal facility

Regulation of the development, operation and eventual closure of a GDF takes place in a staged manner. Initial permission is required for surface-based investigations, and in due course for underground investigations, construction and operation. The developer is not able to progress from one stage to the next without first securing the relevant permissions it needs. The purpose of this staged approach to regulation is to ensure that at all times the development is undertaken safely and securely, and in ways that ensure proper protection of people and the environment – without inadvertently undermining the long-term performance of the facility. The following sections describe the various different considerations required in securing the appropriate permissions at each of the stages. Throughout each stage the relevant regulators will inspect and check compliance with the permissions that have been granted, reviewing them regularly to ensure they remain appropriate, and taking any enforcement action that may be required.

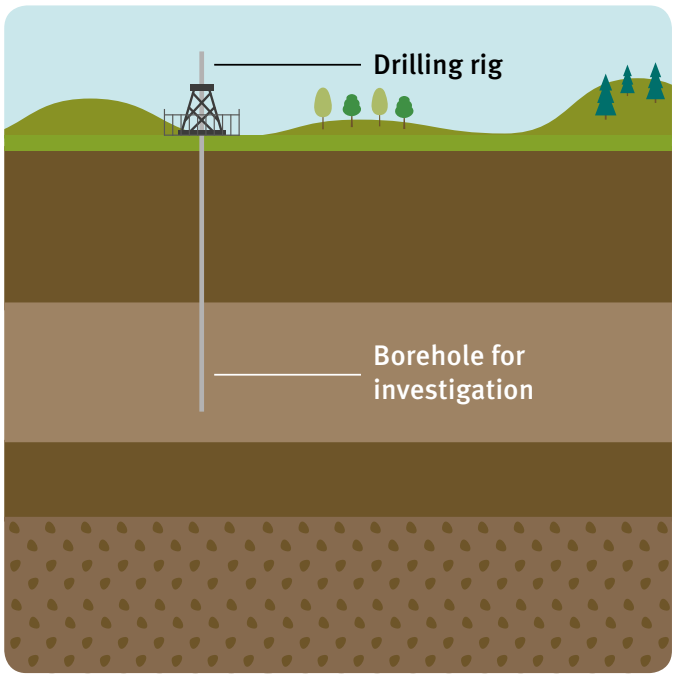
Surface-based investigations

Formal regulation will start when the developer applies to the EA for an environmental permit to start drilling boreholes to obtain information about the sub-surface conditions at a location. An environmental permit will be required for any boreholes. Figure 4 shows an illustration of a borehole investigation.

Before granting an environmental permit, the EA will need to be satisfied that the proposed boreholes will not have a detrimental effect on the long-term environmental safety of a GDF developed at a potential site. An environmental permit can cover more than one borehole at a given location, but if the developer decides to carry out investigations at locations in different geographical areas, then a separate environmental permit will be needed for each location. The developer would also need to apply to the EA for a revised environmental permit if more than one phase of borehole drilling was required at a given location.

The EA will require the developer to control any discharges to air and water, avoid contaminating land, surface and ground waters, manage solid waste appropriately and carry out an environmental monitoring programme. The developer might need to apply for more than one environmental permit to cover, for example, waste, water discharges, emissions to air and water, and groundwater protection. The EA will only grant environmental permits if the developer meets the appropriate regulatory requirements.
At this stage in the lifecycle of a GDF, there are no requirements for the developer to hold a nuclear site licence. Conventional industrial health and safety, such as the safety of site workers during drilling operations, will be regulated by the HSE.

Figure 4: Borehole investigations



Underground investigation

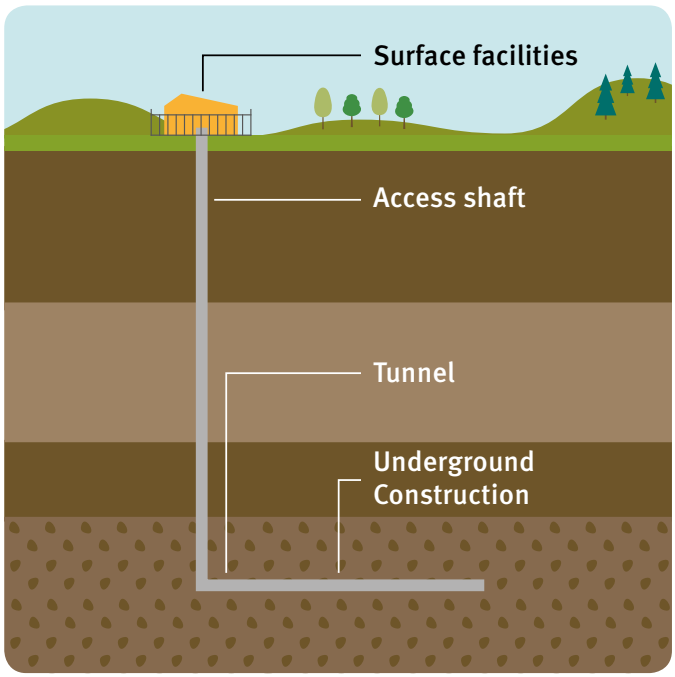
The next major regulatory decisions will be made when the developer wants to begin excavation work associated with underground investigations at a potential site for a GDF. Underground investigations will be needed to provide site-specific information about the geology and hydrogeology at the intended depth for construction of a GDF. Figure 5 gives an artist's impression of underground investigations. To support underground investigations, the developer will have to construct access shafts and tunnels, and is likely to construct surface-based facilities to provide, for example, access and ventilation. Starting underground investigations is a major step towards developing a GDF at a potential site. At this point, both the EA and the ONR will need to decide whether or not to allow activities to proceed.

Before starting excavation work associated with underground investigations, the developer would need to submit an application to the EA for a revised environmental permit. The EA would expect the developer to demonstrate that underground operations will not have a detrimental effect on the long-term environmental safety of a GDF developed at the site. This demonstration could include aspects such as the geology, hydrogeology and other characteristics of the site. There are also clear safety implications for the operational phase of a GDF if the underground investigations and excavations are inadequately conceived or executed. Therefore, at this stage, the developer will also need to obtain a site licence from the ONR before starting any excavation work associated with underground investigations, such as constructing an access shaft or drift.

Initially the developer will need to submit to the ONR a pre-construction safety case for the GDF addressing safety and where appropriate security considerations. If the regulators are satisfied with the developer's applications then a revised environmental permit and a nuclear site licence will be issued to allow the developer to start excavation work and related underground investigations.

The developer might also need to submit applications for revised environmental permits to cover, for example, waste, water discharges, emissions to air and water and groundwater protection. The revised environmental permits would continue to require the developer to protect groundwater and surface waters, minimise contamination of land, manage any waste appropriately and carry out an environmental monitoring programme.

Figure 5: Underground investigations



Underground construction

The next phase in developing a GDF is expected to be the start of underground construction. Before proceeding, the developer will require further regulatory permissions from both the EA and the ONR. Construction operations may include excavating vaults for disposing of radioactive waste and tunnels for accessing the vaults. Also, at this stage, construction is likely to begin of the surface-based facilities for receiving and securely storing radioactive waste before it is transferred underground for disposal.

At this stage, the EA will require detailed evidence to be submitted demonstrating that a GDF at the site could meet its regulatory requirements for disposing of radioactive waste. If the developer's proposals meet regulatory requirements, the EA will grant a revised environmental permit. The evidence submitted should also help the EA to decide, in principle, if it could eventually grant an environmental permit for disposing of radioactive waste.

High levels of environmental protection will be expected to be maintained throughout underground construction operations. Other environmental permits, for example, for waste, water discharges, emissions to air and water, and groundwater protection might also need to be revised.

The ONR will regulate construction to ensure that the design intent is delivered.

The operational phase – radioactive waste disposal

Once a GDF is ready to take its first waste packages, an appropriate environmental permit and permission under the nuclear site licence will be needed before disposals commence. The operator of the GDF will need to develop its safety justification and provide evidence that the facility operations are safe and secure and that, after it has closed, people and the environment will be protected in the long term. This evidence may include information and data obtained in previous development phases, from research, development and demonstration studies, and from experience in other countries.

Figure 6 shows an illustration of a GDF during the operational phase. It is during the operational phase that there will be hazards from the high radiological inventory of the waste. Potential risks arise from handling high hazard radioactive waste, for example, dropped loads and fire during waste unloading and emplacement, and construction of new disposal areas disrupting waste already emplaced, for example, by causing roof or tunnel collapses. Whilst the appropriate packaging of the wastes reduces these risks to a low level, these risks still need to be safely managed. The operator remains responsible for safely operating and maintaining the plant, and for meeting all permit and licence conditions throughout the operating life of the facility.

Although a GDF is significantly different to other licensed nuclear facilities the operations that will be carried out on the site are similar to routine activities on many licensed sites. The ONR anticipates that the existing standard set of nuclear site licence conditions will provide adequate regulatory control for the operation of a GDF, including for the operations handling nuclear waste deep underground.

Radioactive waste disposal

Radioactive waste disposal will not be allowed without the necessary regulatory permissions. The regulators will not grant permission to start disposal operations if the GDF does not meet our required regulatory standards.

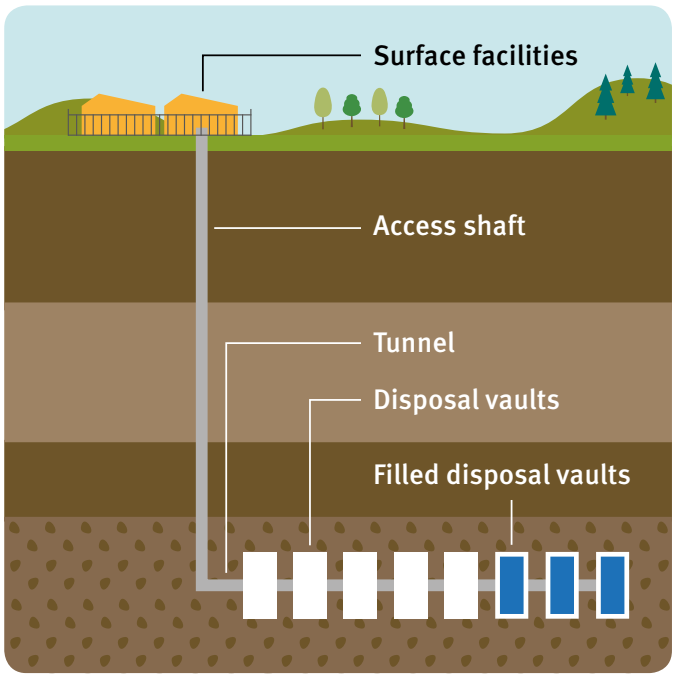
To decide whether there is an acceptable level of safety, security and environmental protection, ONR and EA will consider:

- safety cases
- results of on-site compliance inspections
- findings from investigations of incidents and events
- insights and intelligence gained from the operator's senior management and internal regulator
- the annual demonstration of emergency exercises at each site

The environmental permit issued by the EA for the operational phase will include limits on radioactive discharges to air and water arising from storage facilities at the surface and from underground operations, requirements for disposing of radioactive waste appropriately and possibly restrictions on the type and nature of waste to be disposed. The operator will also be required to revise its environmental monitoring programme to include radioactive discharges. The permit will also require the protection of groundwater and surface waters, minimisation of contamination of land and management of excavation waste and other wastes appropriately.

The operational phase of the GDF is likely to last 100 years or more. A feature of the regulatory regime is a requirement for the operator to periodically review its safety, security and environmental safety performance and submit reports of these reviews to the regulators to demonstrate that the GDF continues to meet regulatory requirements. The EA and the ONR will review the updated evidence and decide whether any regulatory action is needed to ensure a continuing high standard of protection of people and the environment. If regulatory requirements are not being met, enforcement action can be taken to make sure the operator complies; this can include stopping all disposal operations until appropriate action has been identified and carried out.

Figure 6: Operations – radioactive waste disposal



Closure operations

This stage is likely to be several decades after any GDF starts operating. Nevertheless, the regulators will require the operator to have suitable plans in place for closing and sealing the disposal facility before starting to dispose of any radioactive waste. Figure 7 illustrates a GDF that has been closed, with disposal vaults backfilled, access shaft and drift sealed and surface facilities removed.

We will expect the operator to periodically review and update plans for closing and sealing the facility to reflect any new information or knowledge that may have arisen. The operator might decide to adopt a phased approach to closure of the facility, with some disposal vaults being backfilled and closed while the rest of the facility is still in operation. To allow a phased closure, the regulators would need to be provided with evidence that proposals meet regulatory requirements for operational safety, security and long-term environmental safety after the whole facility is finally closed. Only once we are satisfied with the evidence would we grant permission for phased closure.

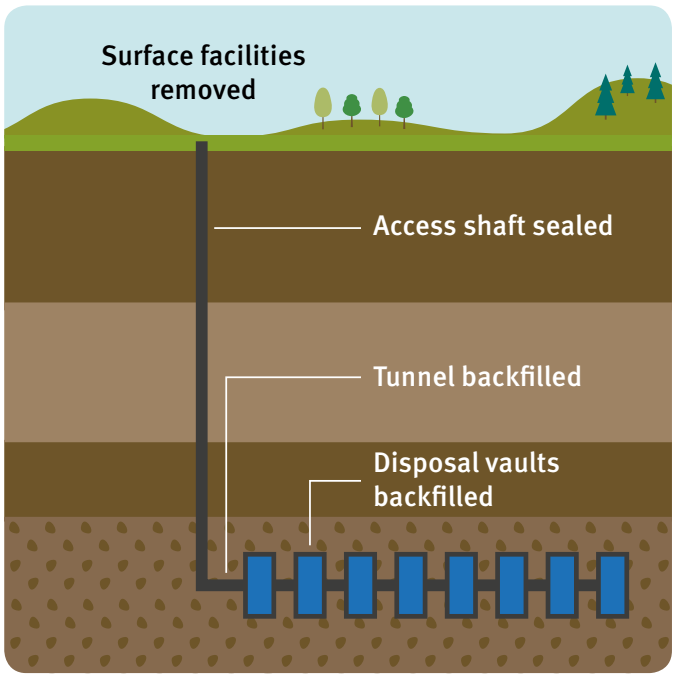
We anticipate requiring the operator to apply for regulatory permission to finally close the facility and to undertake the eventual decommissioning and removal of surface facilities. We would expect the operator to include fully developed plans for closing and sealing the disposal facility as part of its evidence to support its application for closure. The closed facility would be expected to meet the regulatory requirements current at the time of closure for protecting people and the environment in the long term.

Closure

The regulators will scrutinise plans for closing and sealing the disposal facility before any radioactive waste disposal operations are allowed to begin.

The closed facility will need to meet regulatory requirements for long-term protection of people and the environment.

Figure 7: Closed geological disposal facility



End of regulatory control

The regulatory process is likely to continue after the facility has closed, ending only when the EA accepts that the operator no longer needs to hold an environmental permit. Land-use planning controls would, however, still continue after the end of environmental permitting.

After the facility has closed, the operator will need to demonstrate that it has been closed and sealed in accordance with the conditions of the environmental permit and nuclear site licence. The ONR expects that once a GDF has closed there will no longer be an operational risk to safety that would need regulating under a nuclear site licence. Although a GDF will hold a significant inventory of radioactive waste, the purpose of a GDF is to safely dispose of that waste by isolating it from the surface environment and future populations. Adequately demonstrating that the facility has been designed, constructed and operated to meet the requirements for safety and security after the site has closed should prove that there will no longer be any danger to people from the waste disposed of at the facility, and responsibility under the site licence could be ended at this point, and the site licence would be revoked.

The operator will continue to have responsibilities for some time after the nuclear site licence has been withdrawn. To allow surrender (give up) of the environmental permit, the EA would need to be satisfied that the site will meet the required standards to protect people and the environment and that no further regulatory control is required.

Other regulatory considerations

Regulation of radioactive materials transport, nuclear security and safeguards applies to all nuclear facilities and forms an integral part of the overall regulatory process for the operation of a GDF.

Radioactive materials transport safety

The ONR regulates the movement of all radioactive material in Great Britain (apart from some material related to defence). This will include all the radioactive waste that will have to be moved from where it was generated or stored to a GDF.

The UK regulations for transporting radioactive materials are based on those of the International Atomic Energy Agency (IAEA), which are applied internationally.

Regulation relating to transporting radioactive material applies to material being packaged now for future disposal in a GDF and will continue throughout the lifetime of the facility up to the point that the final consignment is received for disposal. This is to ensure that the waste packages being produced can be safely transported for disposal without requiring major repackaging.

Civil nuclear security

Effective security arrangements in the nuclear industry are essential to prevent the theft of nuclear or other radioactive materials, the sabotage of nuclear facilities and to protect sensitive nuclear information. The ONR regulates security and usually approves site security plans that the licensee puts in place. There are significant regulatory obligations on the operators of civil licensed nuclear sites regarding physical security measures covering not only facilities and nuclear material, but also the security of sensitive nuclear information. Vetting permanent staff and contractors, and the movement of nuclear material by road and rail within the UK is also covered. This legislation requires all civil nuclear operators, including an operator of a GDF, to have a reliable and effective Nuclear Site Security Plan in place.

Nuclear safeguards

Nuclear safeguards are measures put in place to verify that countries comply with their international obligations not to divert civil derived nuclear materials (plutonium, uranium and thorium) to create nuclear weapons. This requires international, third-party, verification as part of the international non-proliferation regime. Due to the quantities, type and nature of nuclear material contained within the inventory that will be disposed of to a GDF, safeguards obligations will apply.

The international safeguards inspectorates of the IAEA and the European Commission currently inspects national compliance with safeguards obligations. After the UK exits from the Euratom treaty, the IAEA will continue to provide international oversight of the UK's safeguards obligations. The ONR is looking to develop an appropriate UK safeguard regime to facilitate the IAEA regulatory activities. The ONR is also responsible, on behalf of the UK government, for reporting on safeguards obligations, and provides advice to the Department of Business, Energy and Industrial Strategy (BEIS), who are responsible to Parliament for the UK's international safeguards obligations. The ONR's safeguards team has been involved in international discussions to agree a suitable safeguards approach and how this can be applied during the design, build, operation and ultimate closure of a GDF.

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Web-page: http://www.onr.org.uk/wastemanage.htm

Pdf: http://www.onr.org.uk/wastemanage/waste-management-joint-guidance.pdf

Further information

Office for Nuclear Regulation – Geological disposal

http://www.onr.org.uk/geodisposal.htm

Office for Nuclear Regulation – A Guide to Nuclear Regulation in the UK

http://www.onr.org.uk/documents/a-guide-to-nuclear-regulation-in-the-uk.pdf

Environment Agency – Regulating the geological disposal of radioactive waste

https://www.gov.uk/guidance/regulating-the-geological-disposal-of-radioactive-waste-environmental-protection

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Health and Safety Executive

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Implementing geological disposal

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Managing nuclear and radioactive substances and disposal of radioactive waste

https://www.gov.uk/environment/radioactive-and-nuclear-substances-and-waste

Radioactive Waste Management Ltd

https://www.gov.uk/government/organisations/radioactive-waste-management

Regulatory scrutiny of the Radioactive Waste Management Ltd's work on geological disposal

https://www.gov.uk/government/collections/scrutiny-of-radioactive-waste-management-directorates-rwmd-work

https://geologicaldisposal.campaign.gov.uk/

Annual reports
https://www.gov.uk/government/publications/geological-disposal-scrutiny-of-rwms-work-annual-reports

A-Z Glossary

BEIS – Department for Business, Energy and Industrial Strategy. BEIS is responsible for setting the policies and providing laws and regulations covering the safe, secure management of waste produced from processes involving radioactivity.

Borehole – a generalised term for a cylindrical excavation drilled into the ground for the purposes of site investigation, testing and monitoring.

Closure – the process of putting a disposal facility into its final state after all waste has been emplaced.

Developer – The organisation responsible for implementing geological disposal for higher activity radioactive waste (HAW). The developer will hold the environmental permits (or authorisations) and nuclear site licence required for developing a geological disposal facility.

Disposal – In the context of a geological disposal facility, disposal means the placement of solid radioactive waste without the intent to retrieve it at a later date. Retrieval may be possible but, if intended, the appropriate term is storage.

Environmental permit – Permission granted by the Environment Agency in England to allow an operator to carry out certain activities, subject to conditions and limits on discharges to the environment.

Evidence – The operational and environmental safety cases, together with supporting information, that demonstrate that the required high standards of nuclear safety, security safeguards, and environmental protection can be achieved.

Geological disposal facility – A radioactive waste geological disposal facility means a facility which meets the following conditions:

(a) the main purpose of the facility is to provide the final disposal of higher activity radioactive waste
(b) the part of the facility where radioactive waste is to be disposed of is expected to be constructed at a depth of at least 200 metres beneath the surface of the ground or seabed, and
(c) the natural environment which surrounds the facility is expected to act, in combination with any engineered measures, to inhibit the transit of radionuclides from the part of the facility where radioactive waste is to be disposed of to the surface.

Definition in the Infrastructure Planning (Radioactive Waste Geological Disposal Facilities) Order 2015 – available at: http://www.legislation.gov.uk/uksi/2015/949/contents/made

High level waste – Radioactive waste that generates heat as a result of its radioactivity, so this factor has to be taken into account in the design of storage or disposal facilities.

Higher activity radioactive waste – Includes the following categories of radioactive waste: high level waste, intermediate level waste, a small fraction of low level waste with a concentration of specific radionuclides sufficient to prevent its disposal as low level waste.

Intermediate level waste – Radioactive waste exceeding the upper activity boundaries for low level waste but which does not need heat to be taken into account in the design of storage or disposal facilities.

IAEA – The International Atomic Energy Agency publishes international standards and guidance on nuclear safety and environmental protection for geological disposal facilities.

Licence – Under the Nuclear Installations Act 1965, an operator is required to obtain a nuclear site licence in order to construct or operate a nuclear facility. The Office for Nuclear Regulation is required to attach licence conditions to the nuclear site licence which identify matters of safety which the licensee must address through implementing adequate arrangements.

Low level waste – Radioactive waste not exceeding 4 gigabequerel (GBq) per tonne of alpha activity, or 12 GBq per tonne of beta/gamma activity. Overall, the major components of LLW are building rubble, soil and steel items from the dismantling and demolition of nuclear reactors and other nuclear facilities and the clean-up of nuclear sites.

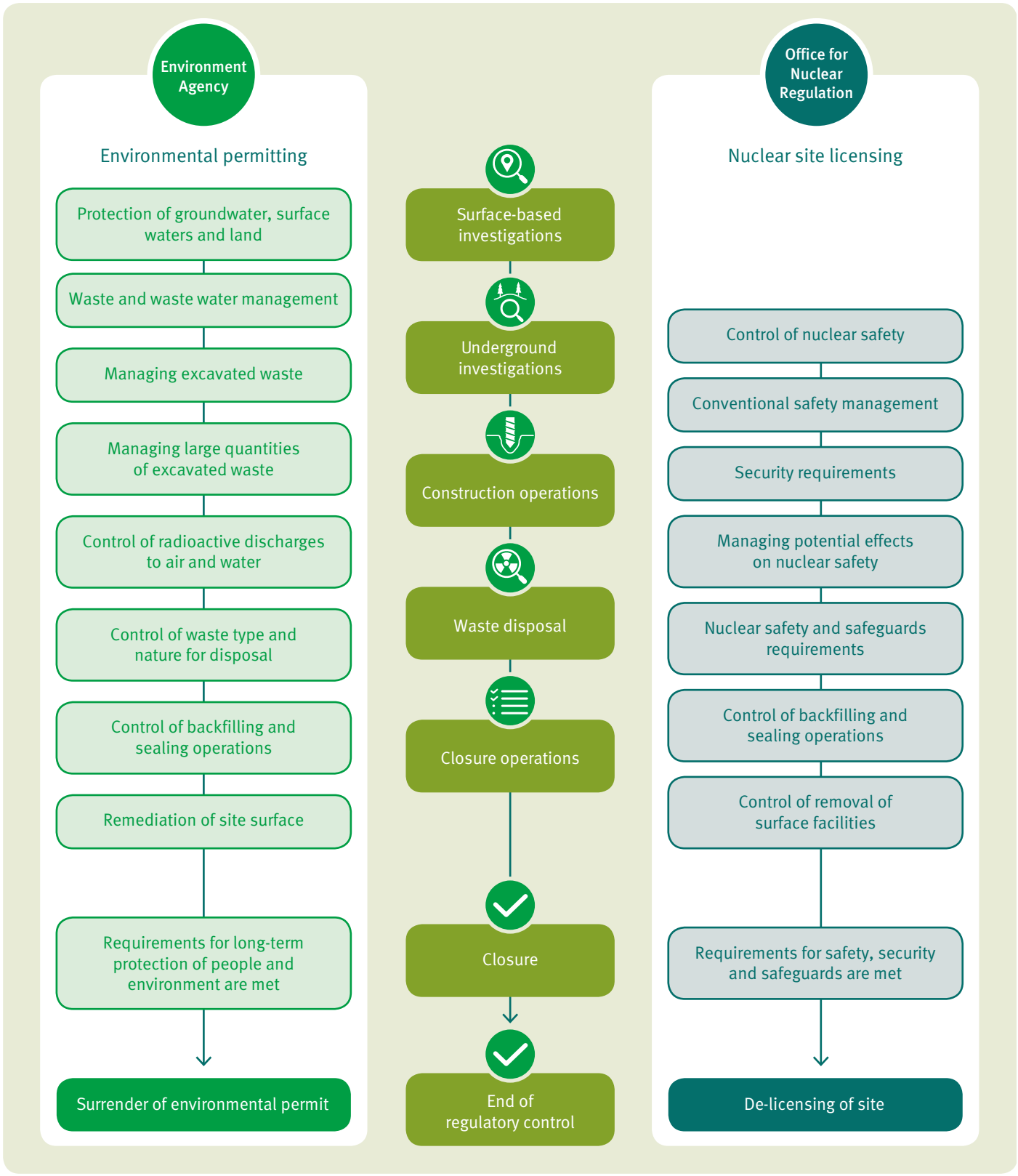
Operator – The operator is the organisation (or legal person) that has control over the operation of a geological disposal facility. The operator is responsible for implementing nuclear safety, environmental protection, security and safeguards requirements to ensure high standards of protection of the workforce, the public and the environment.

Regulatory requirements – Requirements set out in published guidance on the standards that a developer or operator would need to meet to be granted an environmental permit or a nuclear site licence. Regulatory requirements are also included as conditions in an environmental permit and a nuclear site licence; a developer or operator must comply with these conditions.

Safeguards – Nuclear safeguards are measures to verify that countries comply with their international obligations not to use nuclear materials from their civil nuclear programmes to manufacture nuclear weapons. The Office for Nuclear Regulation monitors safeguards performance in the UK, supporting and intervening as necessary with UK dutyholders and/or Euratom and the International Atomic Energy Agency (IAEA) to ensure that safeguards obligations in the UK are met in a proportionate manner.

Storage – Placing waste in a suitable facility with the intent to remove it at a later date.

Annex 1: Illustration of some elements of the environmental permitting and nuclear site licensing processes



Would you like to find out more about us?

Getting involved

During the site selection process, we will participate in public events and, if these are near you, you can come and speak to us.

Email

nuclear@environment-agency.gov.uk
contact@onr.gov.uk

Visit our websites

Environment Agency
https://www.gov.uk/guidance/regulating-the-geological-disposal-of-radioactive-waste-environmental-protection

Office for Nuclear Regulation
http://www.onr.org.uk/geodisposal.htm

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