

Managing spent fuel at Sizewell B

Submission of Planning Application and Environmental Statement
to the Department of Energy and Climate Change



This consultation deals with the conclusion of the Best Practicable Environmental Option (BPEO) Study and the process moving forward to the submission of British Energy's Planning Application and Environmental Statement to the Department of Energy and Climate Change.

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Introduction: Spent fuel at Sizewell B

Sizewell B



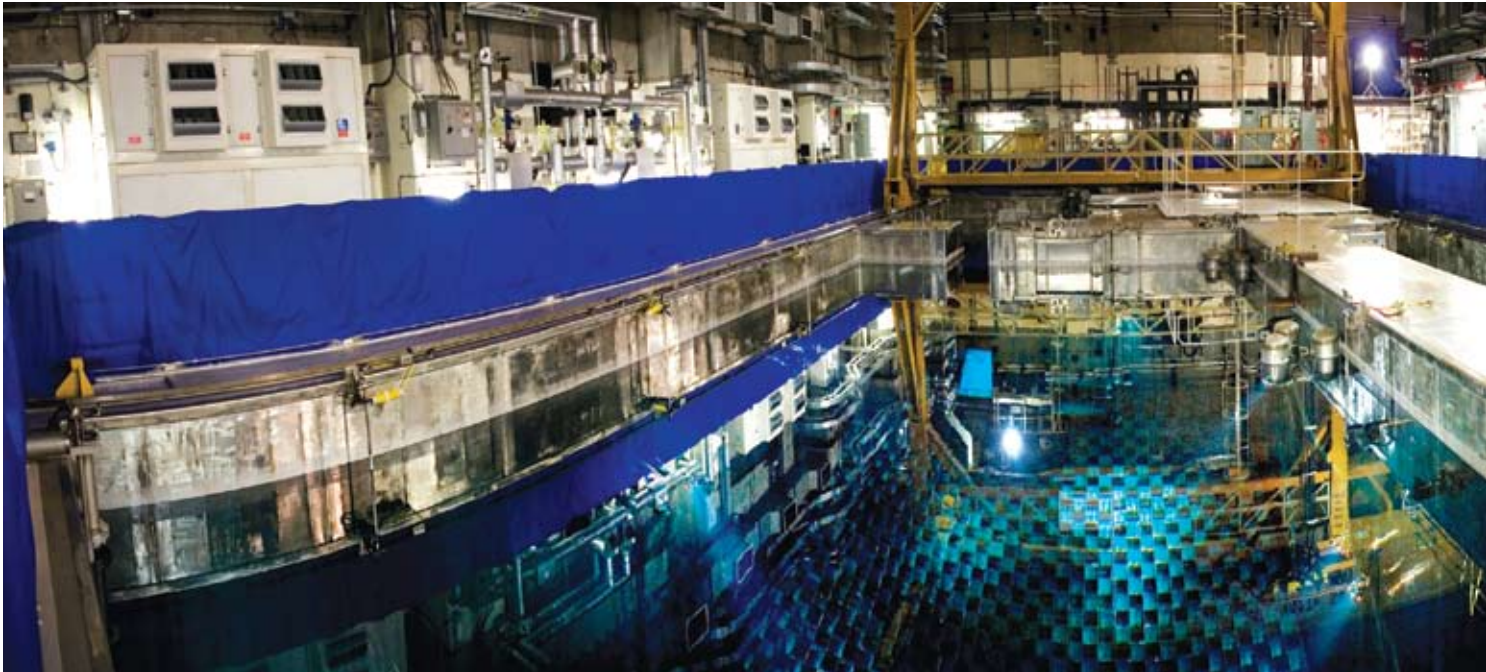
At the heart of a pressurised water reactor such as Sizewell B is the fuel, which is made up of small uranium oxide pellets, no more than a few millimetres thick, stacked together within a tube made of the metal zircaloy. This is called a fuel rod and 264 of these fuel rods are then braced together to form a fuel assembly.

Inside the reactor 193 of these fuel assemblies make up its core, where the process of splitting the atom to produce energy, known as fission, generates heat which is then transferred via circulating pressurised water to the steam generators. Here the water passes over tubes containing a second circuit of water which in turn is heated to produce steam for the turbines.

At Sizewell B we refuel the reactor roughly every 18 months during scheduled plant maintenance. Any fuel assemblies that have lost sufficient power to remain useful are removed and replaced by new fuel. The used or spent fuel is then transferred to a fuel storage pond and stored under water. This fuel storage pond houses all of the spent fuel generated so far from the 14-year operating life of Sizewell B. The water in this fuel storage pond acts as a very effective barrier between the fuel, which is still producing heat and is highly radioactive, and the outside environment. The pond is also housed in a reinforced concrete facility with multiple security and safety features.

Introduction: Spent fuel at Sizewell B

Sizewell B fuel ponds



Managing spent fuel after 2015

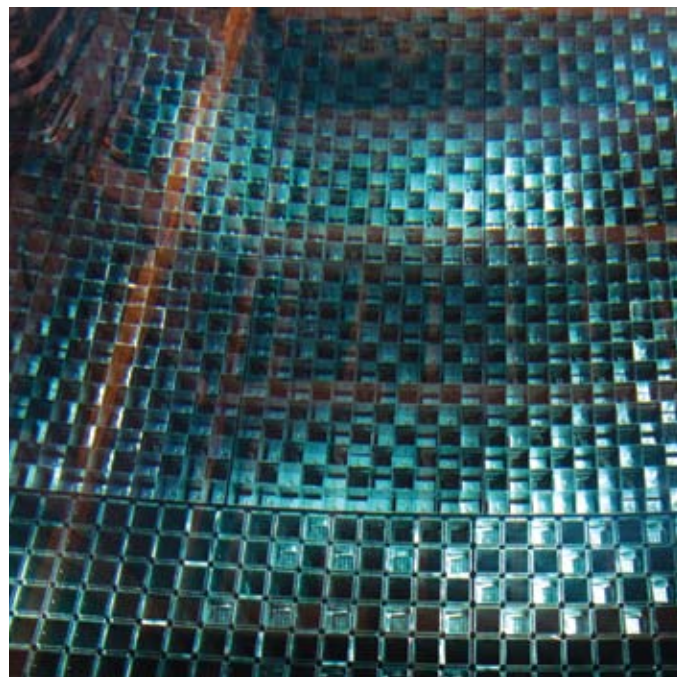
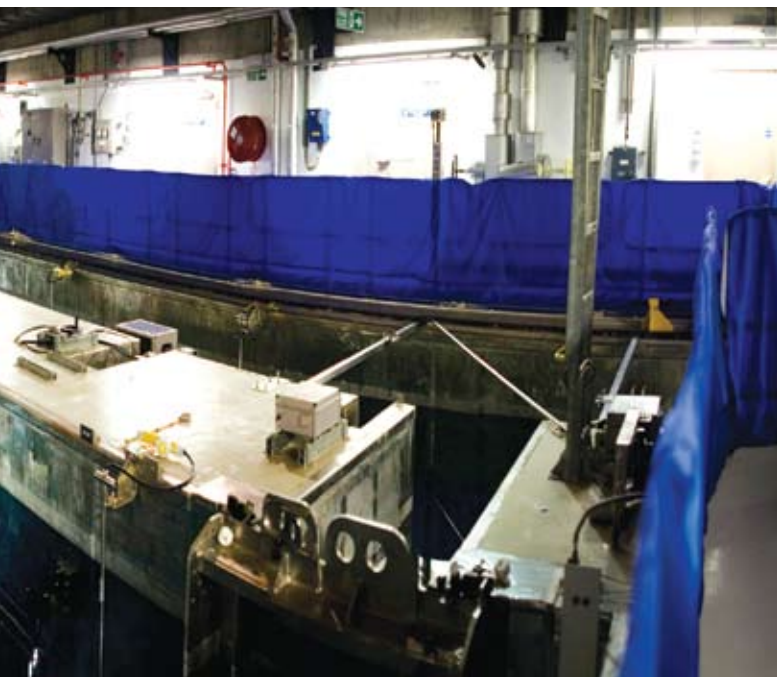
Under the current arrangements, we expect the fuel storage pond to provide capacity up until around 2015. It was never the intention that the station's lifetime fuel storage needs would be accommodated in the existing fuel ponds alone. The current ponds were built to a recognised US design which in theory would allow storage of spent fuel until around 2025. However, the safety arrangements in the UK mean we will only have an allowable capacity up to 2015.

The intention is that in the longer term there will be a national geological underground repository to house high level waste (such as spent fuel) from all facilities that produce such waste in the UK. The Government's Committee for Radioactive Waste Management (CoRWM)

is looking at how this might be achieved but has indicated this repository will not be ready for many years. As Sizewell B is due to operate until 2035, with the possibility of life extension beyond that, we need to ensure we have a suitable plan for managing spent fuel from 2015 onwards.

British Energy, part of EDF Energy, has reviewed the options for the interim management of spent fuel after that date. Managing spent fuel is nothing new – various technologies already exist and there is vast experience from across the world to draw upon.

Earlier this year we carried out a Best Practicable Environmental Option (BPEO) study to identify and compare the options already in use worldwide. From the initial 18 options looked at, a range of technologies that were either at an early stage of development, of a more speculative nature, or did not fit in with current UK policy were excluded.



This left us with four options to investigate further:

- dry storage in casks;
- dry storage in vaults;
- reprocessing;
- wet storage in a new fuel pond.

These four options were assessed against a number of key factors, or attributes, which helped to determine the suitability of each option. These included: health and safety, technical, environmental, political and regulatory, and economic factors.

The BPEO study included discussion and input from a number of stakeholders, including our regulators and the community around Sizewell and Leiston, who were invited to two public exhibitions in May. The result of all of this work was that dry storage in casks has been agreed as the option best suited to Sizewell B, providing the right balance across the issues assessed.

The purpose of this document and the current series of meetings and exhibitions is:

- to explain how we reached the decision to proceed with the dry storage option;
- to outline the proposals for the construction of a storage building to house the chosen option in advance of our planning application;
- to seek your views on our proposals, particularly on the location of the new storage facility and any local impacts of the building and its construction.

Dry storage - the option best suited to Sizewell B

Examples of dry storage in concrete casks (left) and in metal casks (right). Please note: at Sizewell B, any dry storage system would be housed in a new building.



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Dry storage is a method of storing spent nuclear fuel that has already been cooled in a fuel storage pond. The spent fuel assemblies are sealed within a large leak-tight container and surrounded by an inert gas.

There are two types of cask system that can be used:

- concrete – the spent fuel is placed in a stainless steel canister which is welded shut before being placed into a concrete outer casing;
- metal – the spent fuel is placed into a metal cask which is bolted shut.

Both systems are designed to provide protection against external hazards and provide adequate radiation shielding to both the site workforce and members of the public. There are a number of dry storage container designs in use around the world and different designs can be used for storage, transportation or both.

Any dry storage facility at Sizewell B would require a new building to be constructed within the existing power station site to house the containers and we outline more about the construction of this building on page 8. The dry storage building will have a capacity to store up to 3,500 individual fuel assemblies in up to 200 containers. This will be sufficient to cover a potential 60-year lifetime and will extend Sizewell B's spent fuel storage capacity to 2035 (when Sizewell B is currently anticipated to shut down), with a capability to provide a solution until 2055 (if the operating life of the station is extended).

The spent fuel assemblies would initially be kept in the existing fuel pond for a minimum of five years to allow them to cool down before being loaded into the chosen container system. The container would then be sealed before being taken to the new storage building. During the period of storage each container would be subject to periodic testing and maintenance.

Why dry storage was chosen

British Energy carried out a BPEO study designed to identify the most suitable option for Sizewell B.

Our decision making was based on a number of factors, including:

- British Energy's own safety, compliance and commercial considerations including delivery time, cost and the need to minimise any impact on the operations at Sizewell B;
- the general feedback from the public and local stakeholders from our initial consultation in May 2009 on a series of key attributes. This was summarised in the earlier report that is available on our website www.british-energy.com (click on the following titles: About British Energy; Our nuclear power stations; Sizewell B).

All of the options that we considered met the key criteria of being safe, mature technologies, legally compliant and capable of managing all the spent fuel generated during the lifetime of Sizewell B. All of these options were therefore technically viable. However, overall dry storage in casks came out as the preferred option when all factors were taken into account.

As a mature technology that requires very little bespoke design, this option is also deliverable within our timescales and involves a relatively short construction time on site. The fuel is also retrievable and therefore doesn't close out any of the current options for long-term management and disposal of spent fuel.

As you may be aware, EDF Energy is playing a major part in the development of new nuclear power stations across the UK. We are proposing to build two new units at Sizewell subject to getting all the necessary approvals and consents. Plans for the management of spent fuel from any new reactors at Sizewell will be developed as part of those proposals. The BPEO looked specifically at assessing the most suitable option for Sizewell B only and so doesn't

Sizewell B



preclude the choice of any other equally safe and mature technology solution for potential new nuclear power stations.

Dry storage in casks is a mature technology which has been in use for over 20 years in Europe and the USA. The operational experience with this form of dry storage worldwide is good and it is judged that the system is licencable in the UK. Throughout the BPEO process we have maintained discussions with the Nuclear Installations Inspectorate (NII), Environment Agency (EA), Nuclear Decommissioning Authority (NDA) and other stakeholders.

Constructing a dry storage building at Sizewell B

The construction

The construction of the proposed building to house dry fuel containers is expected to take in the region of two to three years, with an estimated maximum of 50 people being employed to build the project at the peak of construction.

Based on British Energy's experience the guiding planning and design principles for the building will be:

- environmental impacts will be kept to a minimum and mitigation provided where it is required;
- standard designs will be adopted. The appearance of the new building will complement and be in harmony with the existing Sizewell B livery, form and character;
- construction programming will be designed to minimise the impact of construction activities and will be phased to eliminate any effect on the operational performance of Sizewell B and minimise any disturbance to the local community.

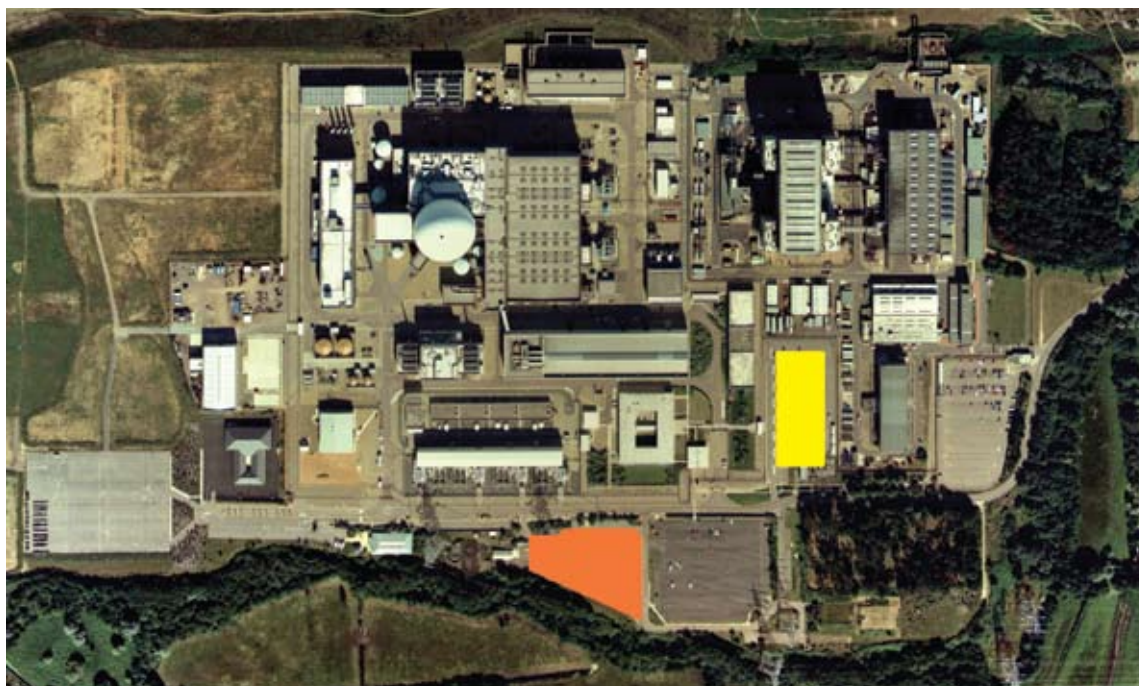
We are currently assessing traffic data for the local road network to determine what impact construction-related lorry movements may have. This may differ depending which type of cask system (concrete or metal) is chosen. This will be reported in the Environmental Statement that accompanies the final Planning Application. It is anticipated that the construction traffic for this project will not significantly

increase overall traffic levels as it will be spread out over the two to three year period, with the peak of the activity coming towards the end of the first year of the build. Our initial transport assessment findings indicate that there will not be any significant cumulative transport impacts associated with other nearby developments, e.g. the Greater Gabbard substation at Sizewell Wents. However, to ensure we minimise any impact, we will agree a preferred access route with Suffolk County Council's highways representatives. Our preferred designated route for traffic during this period will be the same as that used for the construction of both Sizewell A and B Power Stations: exiting the A12 at Yoxford along the B1122 and then turning east along Lovers Lane towards Sizewell and Sizewell Gap Road to the site.



The site itself will be located between the Sizewell A and B station security fences to the south west of Sizewell B in the area of the existing car park and sub-station. The development of the dry storage building in this location will result in the loss of 295 car parking spaces and so a replacement car park is also included as part of this proposal. This is to be located immediately to the north of the existing west car park. The replacement car park will provide an equivalent number of parking spaces and will be constructed prior to the dry storage building being completed.

The replacement car park is proposed for an area of poor semi-improved grassland within the existing site. There will

Sizewell B power station proposed location of dry storage building and extension to west car park



Key:

-  Proposed dry storage building
-  West car park extension

be no loss or fragmentation of any of the nearby protected habitats. Temporary overflow car parking in the intervening period will be provided to the north of the Sizewell B site in an existing overflow car park.

Visual impact

From the feedback following the consultation in May, we know that land use and visual impact are key issues for local residents.

The dry store building will be located on the existing licenced site without the need to use any additional land beyond the existing site boundary or that might be required for a new reactor in the future.

Given that the development sits within a landscape of national importance (Area of Outstanding Natural Beauty, Site of Special Scientific Interest and Heritage Coast), it will be essential that the new development does not alter the character or qualities of the landscape. The height, shape and finish of the dry storage building will, where practicable, be in keeping with the existing buildings within the Sizewell B complex. The location between the two stations has in part been chosen to provide a reasonable amount of visual cover from the existing buildings. From most external perspectives it will be screened by these buildings, although its visibility from southern locations is expected to increase over time as

a result of the decommissioning of Sizewell A.

The actual size of the building will be in the range of 110m length, 50m wide and 13m high. As a comparison the Sizewell A reactor building, which it will be located close to, is approximately 60m high. The dry storage building will also be below the level of the mature trees that fringe the western edge of the Sizewell complex (Coronation Wood).

Licensing and regulatory consent

The proposed dry storage building will be within the existing Sizewell B site licence boundary and as we already manage and store spent fuel at Sizewell B, it does not constitute a new process or new use of ionising radiation so no relicensing or new licence for the site under the Nuclear Installations Act 1965 (as amended) is required. However, we are seeking approval, within our normal procedures, by the NII for the modifications to the plant, systems and processes that will be needed.

The dry storage building will also require minor amendments to the existing environmental authorisations and applications are being made to the Environment Agency as part of the project. This process will begin formally once we have submitted our proposals in January 2010 and we would look to have this completed prior to construction which we plan to begin in 2012.

The proposed on-site location for the dry storage building, viewed from the west



Viewed from the Sizewell Belts the proposed new building will be below the tree line in front of the Sizewell A station



The proposed location for the replacement car park viewed from the north-east



Viewed from Sizewell Caravan Site the proposed new building will be behind the existing Sizewell A switch station



The planning process

Your views from this consultation period will feed into our Environmental Statement. This will accompany our planning application which we will submit to the Department for Energy and Climate Change (DECC) in January 2010, as an application for a Section 36 consent under the Electricity Works (England and Wales) Regulations 2000.

You can submit your views either at one of the meetings or exhibitions (please see below for dates) or by returning the form on page 11. You can also email your questions or comments to mail@sizewellspentfuelproject.co.uk. There is also an answerphone service: **0800 975 5852**.

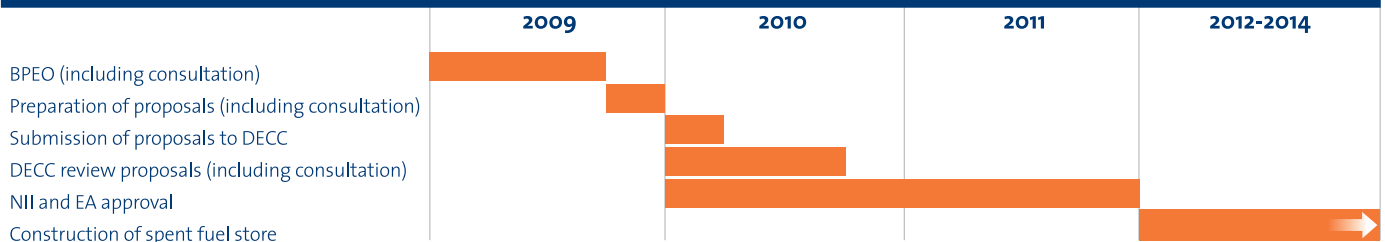
In September this year we submitted a scoping report to DECC outlining the areas we felt we should be studying as part of an Environmental Impact Assessment (EIA).

These areas were:

- Geology and Soils
- Traffic and Transport
- Landscape and Visual Amenity
- Human Activity
- Flora and Fauna
- Noise and Air Quality
- Cultural, Architectural and Archaeological Heritage

We are now in the process of finalising the EIA before submitting our final proposals in January 2010. It is expected that DECC will have their own consultation period of approximately four months in spring/summer 2010 prior to making a decision in the autumn of next year.

Estimated timescales



Consultation dates and wider context

This document deals specifically with British Energy's proposals for managing spent fuel at Sizewell B after 2015. We will be holding a series of meetings and exhibitions to explain our plans and answer any questions.

A public exhibition will be held at the United Church Hall, High Street, Leiston, on:

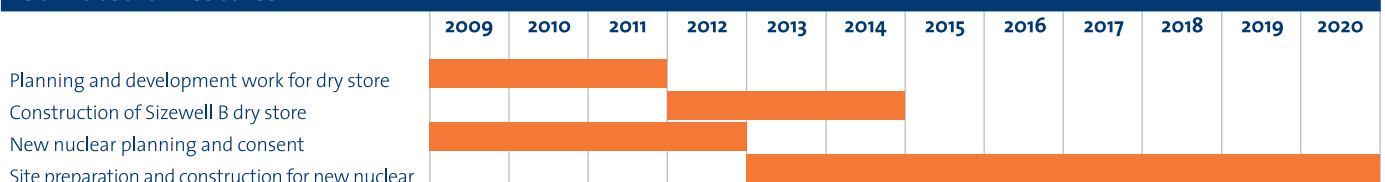
Tuesday 24 November 2009, 1pm – 7.30pm

Saturday 28 November 2009, 9.30am – 2pm

We are conscious as well that during this period DECC will be consulting local people on the nuclear national policy

statement and potential new nuclear build sites. EDF Energy has nominated land at Sizewell as a location for one of these sites and you can find more information about this on our website at www.edfconsultation.info. In addition, we understand that there is likely to be a consultation on the Greater Gabbard wind farm. We are working with both of these organisations to ensure that the public is clear about the separate nature of these consultations, while recognising the potential combination of issues for the local community.

Estimated timescales



Getting your feedback

We want to know what is important to you.

This will help us ensure that our final planning application addresses these issues.

In the table below, you have the opportunity to comment on five specific issues.

If there are any other issues or concerns that you wish to raise, please use the box at the bottom of the page.

Send your reply by 18 December 2009 to:

**Freepost RSBK-KCTX-ULBU
Sizewell B Power Station
25 Priestgate
PETERBOROUGH
PE1 1JL**

Please complete and return by post by 18 December 2009

Name

Address

Postcode

Telephone

Email

Sizewell B Spent Fuel Project response line (answerphone)

T 0800 975 5852

E mail@sizewellspentfuelproject.co.uk

Tell us what you think...

What do you think about the proposed location of the dry storage building?

Do you have any comments about the visual impact of the proposed building?

What wider impacts should British Energy take into account in its final planning proposals?

Do you have any comments on the construction programme and timetable?

Do you have any views on how best to address the issue of construction traffic?

Please include any other issues or questions you might have here.



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