Report to Sizewell Site Stakeholder Group

May 2019

This report covers the Environment Agency's regulation of Sizewell A & B nuclear sites and related issues for the period between February 2019 and April 2019.

Our Regulation

We regulate radioactive waste disposals to the environment. We do this through environmental permits that contain limits and conditions aimed at minimising wastes and protecting the environment. We check compliance with the permits by making regular inspections at Sizewell A & B.

Radioactive Substances Compliance Assessment Reports (RASCARs) detailing our inspections and any non-compliances found are placed on the Public Register.

We regulate and control other activities through our environmental permits, including surface water discharges to surrounding water bodies and emissions to air from emergency diesel generators. We are also the joint technical authority, alongside the Health & Safety Executive for the Control of Major Accident Hazard (COMAH) regulations that apply to Sizewell B.

Discharge Reports

The operators at Sizewell A and B are required to report liquid and gaseous discharges to the environment to us on a regular basis. These reports are placed on the public register.

Liquid and gaseous discharges from both Sizewell A and Sizewell B sites were at levels well within permitted limits and no Quarterly Notification Levels (QNLs) were exceeded in the period.

Current Regulatory Activities

Sizewell A

Inspections.

We undertook an inspection on 2nd and 3rd April on the management arrangements for the draining of the fuel pond which has recently started in March. We found the arrangements in place were satisfactory at this present time with no non-compliances noted. The Operator is performing a review to ensure that the way the pond drain is being managed will continue to be the best way of forward. Waste retrieval is being undertaken at the same time as the drain and the Operator is reviewing processes to ensure that the two projects are working well together. We support this review and have asked to be sighted on any conclusions.

Discharges from site.

Gaseous discharges from Sizewell A are mainly constant. There are small variations as the reactors are now "breathing" (i.e. no forced discharge). Discharges follow a seasonal variation. Discharges from the ponds ventilation plant vary depending on the work going on. All Discharges are well below any permitted limits. In the calendar year of 2018 the gaseous discharges were less than 1% of the limits for Tritium, Carbon-14 and beta particulate.

Aqueous discharges are inherently variable. This is due to different decommissioning projects being undertaken at site. Also discharges from the final delay and monitoring tanks fluctuate over time with the number of discharges per quarter varying. The average activity discharge for "other radionuclides" (others includes radionuclides produced when the site was operating) over the last 18 months has been fairly constant. There has been only a small rise in the average Caesium-137 and tritium discharges observed in the same period. Aqueous discharges are well below any permit limit or notification level. In the calendar year of 2018 the discharges were about 10% of the permitted limits for Caesium-137 and "other radionuclides" and less than 1% for tritium.

In March 2019 we saw a rise in tritium discharge in aqueous waste as the pond drain started. This was expected as there is no abatement available for tritium in the pond treatment system. It is estimated by the Operator that tritium levels will rise to 3.5% of the permit limit over the course of the pond drain.

We will continue to monitor discharges.

Update on measurement of Strontium-90 in marine sediment samples around Sizewell.

Following our update to the SSG in our last report in January, we have the results from the Environment Agency monitoring for quarter 3 2018. The results showed that strontium-90 in marine sediment in the samples taken were all below the limits of detection. The results were as follows.

Aldeburgh: Below detectable limits (less than 1.9Bq/kg.

Minsmere: Below detectable limits (less than 1.9Bq/kg).

Southwold: Below detectable limits (less than 2.1 Bq/kg).

Our monitoring has not found any positive results since the measurement from Southwold in quarter 1 of 2017.

The Operator is taking quarterly samples for strontium-90 monitoring in marine sediment at Southwold and Aldeburgh for reassurance monitoring during the pond drain as part of their environmental monitoring programme (EMP). Southwold was chosen by the Operator due to the nature of the substrate (silt rather than sand) and the fact that we have seen positive results for Caesium-137 results. Aldeburgh was chosen as positive results for strontium-90 have been seen previously.

The first result from Southwold from January 2019 showed a small positive value just above the limit of detection (0.84Bq/kg +/- 0.488 Bq/kg). Sizewell B performs the EMP for both sites and the laboratory it uses has a lower level of detection and is more likely to pick up smaller amounts of strontium-90 that may be in the environment.

The levels of strontium-90 seen in marine sediment from any of the positive results from either our own or the Operator's programme are extremely small. We expect sometimes to see small levels of radioactivity that are present in the environment (see updated frequently asked questions below).

The environmental monitoring programmes need to provide assurance that any levels detected in the environment are not a cause for concern. The public and environment are protected by issuing permits to control the amount of radioactivity discharged from sites. The environmental permit issued to Sizewell A allows them to make discharges of strontium-90. These discharges are much lower than the levels that were discharged when the site was an operating station generating electricity.

We carry out routine compliance inspections to scrutinise how the site is complying with the environmental permit. As mentioned elsewhere in this report, the Sizewell A site operates well within its discharge limits.

Measurements of radioactivity in the environment by both the Operators and the Regulators can demonstrate to the public whether there any concerns from radioactive discharges from nuclear sites. If unexpected levels of radioactivity are discovered we can detect them and decide whether to investigate.

To date we have found no issues or concerns involving measurement of strontium-90 in marine sediment.

We will continue to inform the SSG of any issues highlighted by the environmental monitoring programmes. Please read our frequently asked questions for further information.

South East sites waste teleconference.

On 4th March 2019 we dialled into a joint Magnox, EA and Office for Nuclear Regulation meeting on waste strategy at South East sites. This meeting discusses how waste disposal is optimised and managed at the sites (Dungeness A, Sizewell A and Bradwell) and provides a forum for Operator and Regulator feedback.

Bradwell Care and Maintenance.

We continue to liaise with the Operator on Bradwell care and maintenance and the Sizewell A takeover of responsibilities for environmental compliance.

Sizewell B

Annual Review of Safety, Security and Environment

We attended the Sizewell B Annual Review of Safety, Security and Environment (previously called the mid-cycle review meeting) on the 12th February, in conjunction with the Office for Nuclear Regulation (ONR).

The meeting included a comprehensive site tour with senior managers from the station. This was a good opportunity to engage with senior management on the environmental performance of the plant.

During the meeting the operator updated regulators on their performance over 2018, since the last outage, including environmental performance. We were able to question managers and specialists on any areas of concern.

We felt this was a positive opportunity to raise the profile of environmental protection during nuclear power production.

Compliance Visit

We visited Sizewell B on the 13th February to question them on a compliance issue regarding the discharge of the incorrect tank on the secondary side* to the North Sea, which was reported to us on the 7th February 2019.

We used this visit to investigate what had led to the wrong tank being discharged to the sea and took away several pieces of evidence to inform our enquiries. Our compliance action and findings can be found below in the enforcement section of this report.

Sizewell A and B radioactive substances environmental permit variation.

We are at present determining an Environment Agency initiated variation to both permits (as of April 2019).This is to include new conditions that will require both sites to develop and maintain a Waste Management Plan (WMP) and a Site Wide Environmental Safety Case (SWESC) in line with the joint Environment Agencies' guidance document 'Management of radioactive waste from the decommissioning of nuclear sites: guidance on the requirements for release from radioactive substances regulation' (known as the GRR).

We are taking the opportunity to change the list of gaseous discharge routes on the Sizewell A permit. We wish to remove the present "Fixed High Efficiency Particulate Air (HEPA) Filter Units" category specified in table S3.1 of the permit with a full list of gaseous discharge routes that this presently covers. This will provide transparency of the major gaseous discharge routes going forward into decommissioning.

There will be no changes to permit limits in this variation.

Enforcement

We have taken no enforcement action and noted no non-compliances during the period February 2019 – April 2019 for Sizewell A.

For Sizewell B we issued a warning letter on 29th March under the Environmental Permitting (England and Wales) Regulations 2016 for non-compliances associated with their Radioactive Substances Regulation (RSR) permit number XB3539DH.

These non-compliances were associated with the discharge of the incorrect tank on the secondary side* of the station on the evening of the 6th February. No permit limits were breached and the risk to the environment as a result of the event was minimal. However, there were significant management system failures including the tanks not having a specific interlocks and an independent peer review step before discharge. There were also omissions in the plant operating instruction.

The operator has engaged positively, providing all the information we required. On informing us of the event they took several immediate actions to prevent a re-occurrence. We have placed a longer term action on the site which we believe will prevent any future re-occurrence of this event.

NB -*Secondary side refers to the plant system that contains much lower levels of radioactivity because it is not in direct contact with the reactor coolant. Generally the radioactivity in this system is small amounts of tritium gas that have permeated through from the primary side of the plant. Radioactivity is likely to increase in the event of a primary to secondary side leak.*

Contacts

The Environment Agency's Regulators for the Sizewell A and Sizewell B sites are Phil Fahey and Richard Lee respectively. Phil and Richard are both Nuclear Regulators and part of the Nuclear Regulation Group (South) which is based at the Environment Agency's Wallingford office in Oxfordshire.

Phil and Richard undertake environmental regulation of radioactive substances on nuclear licensed sites in southern England and Wales. They work closely with the local Environment Agency teams in those areas as well as external bodies such as the Office for Nuclear Regulation.

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Pollution incidents should be reported to our Incident Hotline on 0800 80 70 60 (24-hour service).
https://www.gov.uk/report-an-environmental-incident

Frequently asked questions. Strontium-90 results in marine sediment.

What is strontium-90?
Strontium-90 is a fission product, which emits beta radiation. Beta radiation is a form of radiation that can be blocked by a thin sheet of metal or similar thin barrier.
Other beta emitters include potassium-40, which is a naturally occurring radionuclide.

Where does strontium-90 come from?
Strontium-90 is present in the environment from a number of sources. Environmental samples will include a 'background' contribution from nuclear accidents and historic atmospheric weapons testing as well as from nearby discharges such as nuclear sites or hospitals. In hospitals it can be used for the treatment of cancers.

Why are you measuring strontium-90 in marine sediment?
Measuring strontium-90 in marine sediment is already part of the environmental monitoring programme at Sizewell A. In 2017 we decided to add to our own environmental monitoring programme around Sizewell. We decided that we would measure strontium-90 along with the other radionuclides already being measured in the marine sediment samples that we take.
The ponds at Sizewell A are being drained in 2019. We want to monitor strontium-90 during this drain. Marine sediment can act as a "sink" for radioactivity in the environment and we wish to perform our own monitoring to ensure the protection of the public and environment. We started the programme in 2017 so we could get some baseline measurements before the pond drain commenced.

Where and how often are you measuring strontium-90 in marine sediment?
We added strontium-90 measurements to samples already being collected by us at Aldeburgh, Minsmere and Southwold. We normally take samples twice a year, in quarter 1 and quarter 3.

What did you measure in 2017 and 2018?
The measurements in 2017 were as follows;
Aldeburgh: Below detectable limits in quarters 1 and 3 in both 2017 and 2018.
Minsmere: Below detectable limits in quarters 1 and 3 in both 2017 and 2018.
Southwold: 10.5 Bq/kg plus or minus 4 Bq/kg in quarter 1 2017 and below detectable limits in quarter 3 2017 and in quarters 1 and 3 2018.
Radioactivity is measured in Becquerels. The samples are measured in Becquerels per kilogramme (Becquerels (Bq) per kilogramme (kg) i.e**.** Bq/kg).

Is anybody else measuring strontium-90 in marine sediment?
Yes as stated above the Operator measures strontium-90 in 5 locations annually (Aldeburgh, Minsmere, Sizewell Beach, Sizewell Hall and Southwold) and at Aldeburgh quarterly. The Aldeburgh site is taken for reassurance sampling following some low level positive results in 2015 and 2016. An investigation was undertaken at the time by the Operator and found there were no issues affecting the public or the environment because of the positive results and they were likely to be caused by differing analytical techniques (see below). There have been no positive results in the Operator's programme since 2016 apart from a recent value just above the limit of detection found at Southwold in January 2019 (0.84Bq/kg +/- 0.488 Bq/kg, limit of detection 1Bq/kg). The Operator is taking quarterly samples at Southwold and Aldeburgh for reassurance purposes as part of the environmental monitoring programme during the pond drain.

Why have there been some positive results?
There could be a number of reasons. The levels of strontium-90 that we are looking to detect are very small being around the levels of instrument detection. At such low levels the results can be influenced by laboratory procedures, the nature of the sample (is it more silty or sandy) or how mixed the sample is (does the sample taken have the same consistency throughout).

Can people still use the areas where these samples were taken?
Yes. The amount of strontium-90 detected is extremely low and represents a very small amount of the radioactivity routinely found in the environment.

What do the measurements in Becquerels per kilogramme mean?
1 Becquerel per kilogramme is a very small amount of radioactivity. 1 kilogramme of Brazil nuts can contain more radioactivity from natural sources. The human body contains around 4-5,000 Becquerels of the radioactive isotope potassium-40, which also emits beta radiation.

The National Radiological Protection Board (now part of Public Health England) has previously published generalised derived limits for certain radionuclides in the environment.
The document can be found here.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/501934/vol_9_no_1_1998_for_publication.pdf

To reach the annual dose limit for a member of the public from a radioactive source (1 millisievert), a person would have to be exposed to 3,000,000 Bq/kg of strontium-90 in the marine sediment environment. The levels outlined here are significantly below this figure. (Note: on average a person in the UK will receive approximately 2.5 millisieverts from natural background radioactivity).

Has strontium-90 been found in the environment around Sizewell before?
Yes. The Sizewell A environmental monitoring programme has occasionally seen similar levels of strontium-90 in their results for marine sediment i.e. around the detectable limits as mentioned above. We could see positive results in the future but as long as they are of a similar low level then there is in our judgement no cause for concern. We base our opinion on present scientific data and knowledge based on advice from Public Health England which we apply in our work. We have the ability and responsibility to give an opinion on environmental impact as part of our role.

Could the strontium-90 have come from Sizewell A?
Yes it is possible that the Strontium-90 came from Sizewell A. The Environment Agency ensures that the public and environment are protected by issuing permits to control the amount of radioactivity discharged from sites. The environmental permit issued to Sizewell A allows them to make discharges of strontium-90. These discharges are well below the levels discharged when the site was an operating station generating electricity. We carry out routine compliance inspections to scrutinise how the Sizewell A site is complying with their environmental permit. The Sizewell A site operates well within its discharge limits and we find that the overall level of regulatory compliance and environmental performance of the site is good.

Are you going to be measuring strontium-90 in the future?
Yes. We will continue with our programme. We also review the environmental monitoring programme for the Operators of both Sizewell A and B to determine if there are any issues that would affect the public and the environment.

If the levels are so low and are not an issue to the public and the environment why are you telling us about them?
We are an open and transparent organisation and we want to ensure that our customers and any interested stakeholders have the best and the most correct and up to date information as possible.