

# Summary of Progress towards the Objective of the Radioactive Substances Strategy



## OSPAR Thematic Assessment

### Key Message

OSPAR Contracting Parties have achieved substantial reductions in discharges from the nuclear sector in many cases and are continuing to make good progress in meeting the objectives of the OSPAR Radioactive Substances Strategy

## Background

The OSPAR Commission's strategic objective regarding radioactive substances is to prevent pollution of the OSPAR Maritime Area through progressive and substantial reductions in discharges, emissions and losses of radioactive substances.

To achieve this objective, the OSPAR Radioactive Substances Committee carries out periodic evaluations of progress made in implementing the strategy. Three previous periodic assessments of progress towards the objective of the OSPAR Radioactive Substances Strategy have been published. The Fourth Periodic Evaluation focuses on progress made with regard to discharges from the nuclear and non-nuclear sectors.

Radioactive materials are an essential part of everyday life and have many applications, such as the generation of electricity and diagnostic and therapeutic uses in medicine. Radioactivity also occurs naturally. Exposure to natural background radiation results from naturally occurring radioactive materials in the ground, the air, food and cosmic rays from outer space. For most individuals, exposure to natural background radiation is the largest component of their total radiation exposure.

Use of radioactive materials and the disposal and discharge of radioactive waste is subject to stringent internationally agreed regulation. During the course of their use, quantities of radioactive substances may be discharged into the environment, subject to regulatory authorisation, from nuclear installations such as nuclear power stations, and from non-nuclear installations such as hospitals and oil and gas installations. These discharges can lead to additional radiation exposure for humans and other organisms.

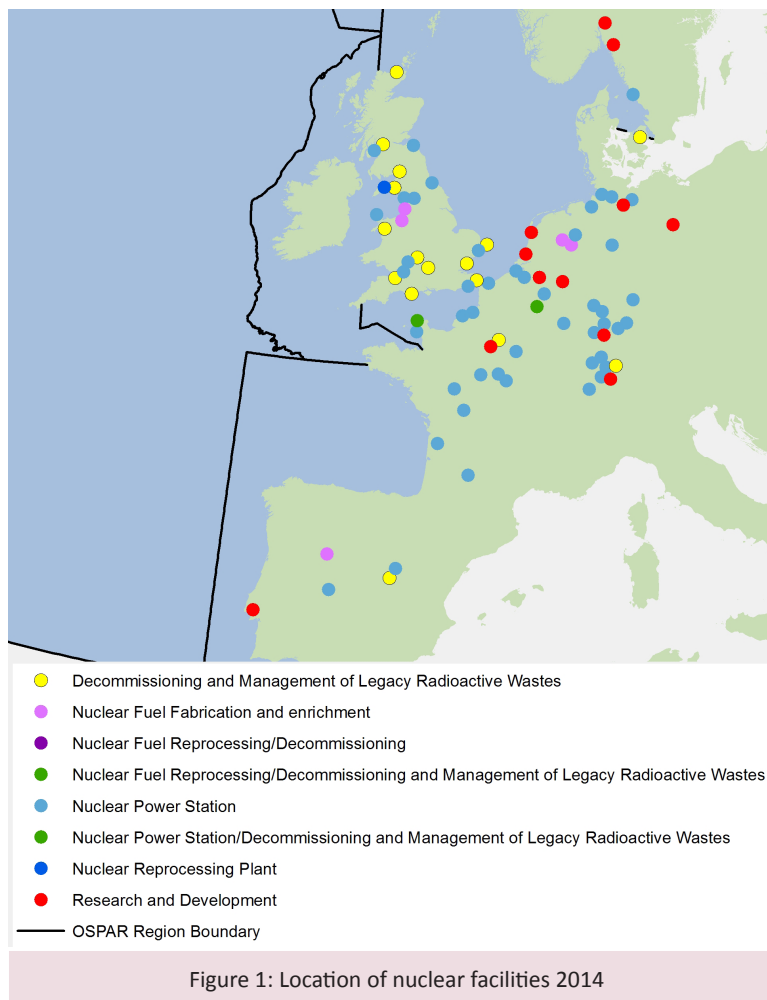


Figure 1: Location of nuclear facilities 2014

## Results

OSPAR's Fourth Periodic Evaluation builds on the previous periodic evaluations to assess progress made by OSPAR Contracting Parties in reducing discharges of radioactive substances to the North-East Atlantic, in order to meet the objective of the OSPAR Radioactive Substances Strategy. For the nuclear sector, discharges from the latest assessment period (2007 – 2013) have been compared with data for the baseline period (1995 – 2001). OSPAR collects discharge data for several radionuclides that, for evaluation purposes, are grouped into those that emit alpha radiation (total alpha) and those that emit beta radiation (total beta). Discharges of the beta-emitter tritium are not included in the assessment of total beta, but are collated separately. Discharges of the radionuclides Technetium-99 (Tc-99), Caesium-137 (Cs-137) and Plutonium-239,240 (Pu-239,240) are also assessed individually.

For the nuclear sector, in 35 out of 53 assessments across the four sub-sectors (nuclear fuel production and enrichment, nuclear power, nuclear fuel reprocessing, nuclear research and development), there is evidence that substantial reductions in discharges have been achieved compared to the baseline period. In another five assessments there is some evidence of a substantial reduction. None of the assessments show any evidence of an increase in discharges. Furthermore, results for the nuclear sector as a whole show clear evidence of reductions in the discharge of total alpha (**Figure 2** overleaf) and total beta (excluding tritium) (**Figure 3** overleaf), as well as for the individual radionuclides Tc-99 and Cs-137.

For the nuclear sector, the main contributors to the total activity discharged during the baseline period were the nuclear fuel reprocessing and nuclear fuel production and enrichment sub-sectors, however discharges from all the nuclear sub-sectors reduced. While discharges from the reprocessing sub-sector are much reduced, it remains the dominant

source of discharges from the nuclear sector – contributing approximately 90% of the total alpha discharges and approximately 80% of the total beta (excluding tritium) discharges over the assessment period.

For the non-nuclear sector, the submission of discharge data began in 2005. In the case of the oil / gas sub-sector, enough data have been submitted to derive a baseline period (2005 to 2011). However, it will not be possible to identify trends in discharge without additional years of data.

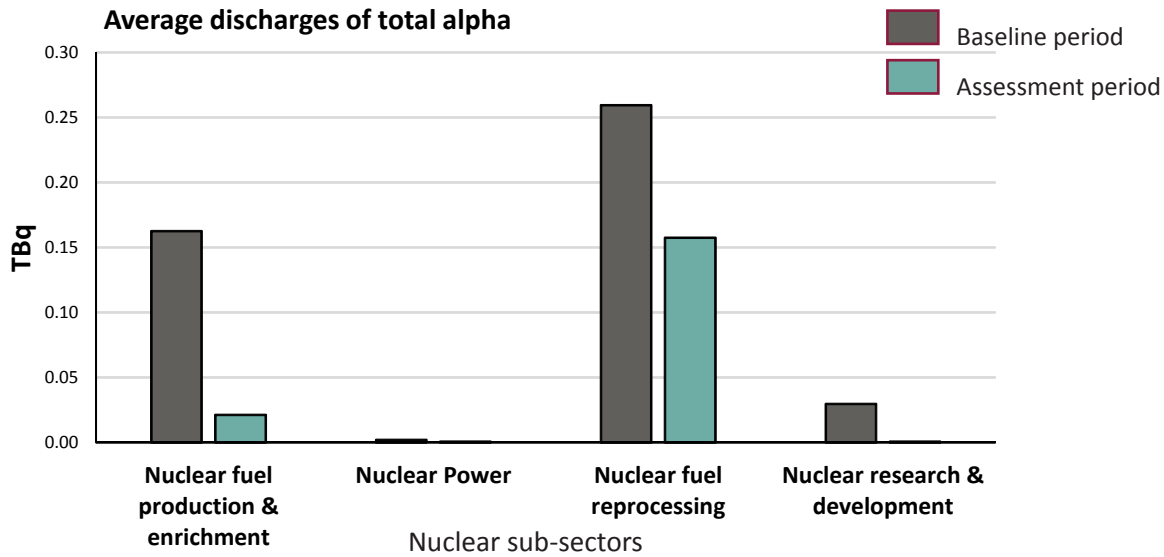


Figure 2: Average discharges of total alpha activity from the different nuclear sub-sectors in the period 2007 to 2013 (blue) relative to the baseline period 1995 to 2001 (grey)

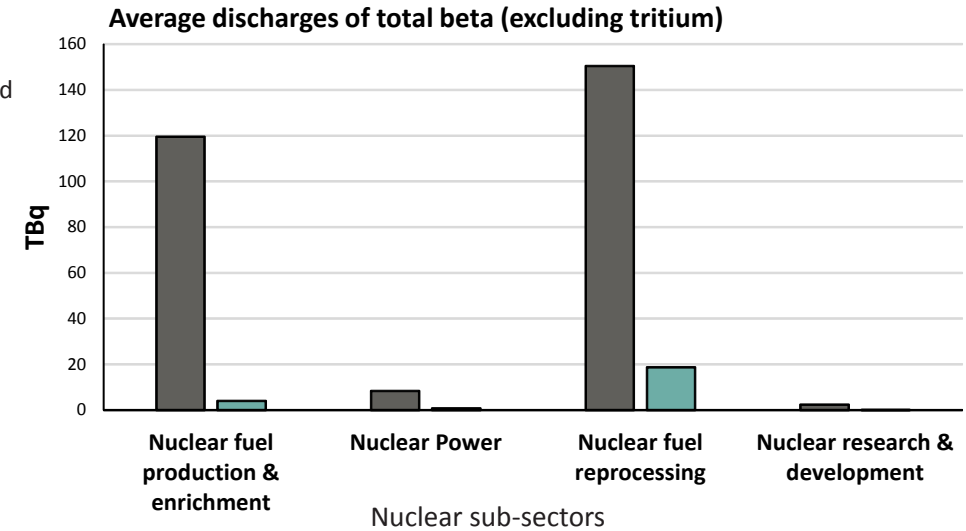


Figure 3: Average discharges of total beta activity (excl. tritium) from the different nuclear sub-sectors in the period 2007 to 2013 (blue) relative to the baseline period 1995 to 2001 (grey)

## Conclusion

Overall, the Fourth Periodic Evaluation has confirmed that in relation to discharges from the nuclear sector:

- OSPAR Contracting Parties are continuing to make good progress in meeting the objectives of the OSPAR Radioactive Substances Strategy;
- OSPAR Contracting Parties have achieved substantial reductions in discharges in many cases, as required by the OSPAR Radioactive Substances Strategy.

In general terms, the situation for the nuclear sector has improved since the Third Periodic Evaluation. In particular:

- There has been a 2.5 fold reduction in discharges of total alpha since the baseline period (1995 – 2001);
- There has now been a 12-fold reduction in discharges of total beta (excluding tritium) since the baseline period (1995 – 2001);
- Discharges of Tc-99 have continued to decline with a reduction of 38 fold in the discharges since the baseline period.

Although the focus of the Fourth Periodic Assessment has been on discharges of radioactive substances from the nuclear and non-nuclear sectors, the radiological impacts on man and biota from these discharges are expected to be low, as previously concluded in the Third Periodic Evaluation..

## Knowledge Gaps

As a long-established OSPAR Committee, the Radioactive Substances Committee has worked to turn knowledge gaps into work streams to support future evaluations. The Radioactive Substances Committee is currently working on, or is developing plans to:

- Periodically review the development of industrial abatement techniques for tritium in the liquid effluent of power and reprocessing plants;
- Determine additional activity concentrations in the marine environment resulting from discharges of naturally occurring radionuclides in produced water to the marine environment;
- Review the need to assess the discharges and indicators for the various sub-sectors of the nuclear and non-nuclear sectors;
- Determine a methodology for assessing whether additional concentrations in the marine environment above historic levels are close to zero.