



# Reporting Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors

(Reference number: 2013-11)

1. This document sets out how OSPAR Contracting Parties should report on discharges of radioactive substances from non-nuclear sectors.

## Reporting coverage and timing

2. The Contracting Parties listed in Table 1 should report on discharges of radioactive substances which may reach the marine environment of the OSPAR maritime area (or the absence of such discharges) for each sector which is identified in Table 1 as being present in that country.

**Table 1 – Sectors with the Potential to Make Discharges of Radioactive Substances to the OSPAR Maritime Area**

Contracting Party	Oil/gas extraction (inc. on-shore)	Phosphate Industry	Titanium-Dioxide Pigment	Steel	Rare Earth	Medical	Universities and Research Centres	Radio chemical production
Belgium	Not present	Present	Present	Present	Not present	Present	Present	?
Denmark	Present	Present	Not present	Not present	Not present	Present	Present	?
Finland	Not present	Present	Present	Present	Not present	Present	Present	?
France	Present	Present	Present	Present	Present	Present	Present	?
Germany	Present	Not present	Present	Present	Not present	Present	Present	?
Iceland	Not present	Not present	Not present	Not present	Not present	Present	Present	?
Ireland	Present	Not present	Not present	Not present	Not present	Present	Present	Not present <sup>1</sup>
Luxembourg	Not present	Not present	Not present	Present	Not present	Present	Present	?
Netherlands	Present	Present	Present	Present	Not present	Present	Present	Not present
Norway	Present	Not present	Present	Present	Not present	Present	Present	?
Portugal	Not present	Present	Not present	Present	Not present	Present	Present	?

<sup>1</sup> Fluorine (F-18) is produced in Ireland for Positron Emission Tomography (PET). However, F-18 has a half life of 109.8 minutes and so is not reported.

Spain	Present	Present	Present	Present	Not present	Present	Present	Not present
Sweden	Not present	Not Present	Not present	Not Present	Not present	Present	Present	?
Switzerland	Not present	Not present	Not present	Not Present	Not present	Present	Present	Not present
United Kingdom	Present	Not present	Present	Present	Present	Present	Present	Present

3. If a sector ceases to be present in a country, or if it ceases to make discharges of radioactive substances, such closure or cessation should also be reported. If a sector becomes established in a country, reporting for that sector should begin from the following 1 January.

4. As far as possible, Contracting Parties should exclude from their reports any discharges:

- a. direct to areas of sea outside the OSPAR maritime area; and
- b. to watercourses that do not drain to the OSPAR maritime area.

5. Each Contracting Party should report briefly the nature of discharges, including their origin and their essential physical and chemical properties, as well as details of the estimation methods used. This information should be sent in a separate word document. It will be sufficient for this to be provided once and reference to be made to that in subsequent years, unless or until there is a change in the nature of the discharge or in the estimation method, when a full description of the nature of the discharge or the new estimation method should again be given. This does not apply to reporting from the oil and gas industry or the medical sector, where the agreed procedures already implicitly provide this information.

6. The submission of reports should be made on 30 September of each year, to be considered at the RSC meeting of the following year.

## Reporting format

7. For the sectors other than the oil and gas industry, the reporting format in Appendix 1 should be used.

## Specific provisions with regard to the reporting of discharges of radioactive substances from the oil and gas industry

8. Contracting Parties should report separately the estimated total discharges from offshore installations<sup>1</sup> of radioactive substances:

- a. in produced water;
- b. from descaling and decommissioning operations;
- c. from tracer experiments.

In doing so, they should use the reporting format in Appendix 2. The report should state the total discharges of each kind for all installations discharging to each of the OSPAR sub-regions (as defined in the Joint Assessment and Monitoring Programme).

<sup>1</sup> In relation to offshore oil and gas installations, Contracting Parties should report on those installations within their jurisdiction. Where an offshore installation (or part of it) is taken ashore for decommissioning, any discharges from onshore decommissioning facilities of scale containing radioactive substances should be reported as part of the oil and gas industry sector.

## Produced Water

9. Samples of produced water should be taken four times in each year, separated by approximately equal periods of time. The samples should be taken from the discharges from each offshore installation discharging produced water which is subject to the sampling regime required by OSPAR Recommendation 2001/1 (some smaller unmanned gas installations are effectively excluded from the 2001/1 regime). The samples should be analysed using high-resolution gamma spectrometry (or other more accurate and more precise methods) for the major radionuclides found in produced water namely Ra-226, Ra-228 and Pb-210. Estimates of total discharges of these radionuclides, as both suspended solids and dissolved activity, should be calculated by grossing up the activity concentrations in Bq/litre in the samples by the total amount of produced water discharged in the period. The multiplying factor should relate to the total volume of discharge before dilution (see below).

10. The same sampling point should be used as for the produced-water sampling programme under OSPAR Recommendation 2001/1 for the measurement of dispersed oil and other substances – that is, “after the last item of equipment in or downstream of a turbulent region but prior to any subsequent dilution”.

11. Estimates of uncertainty in the data for discharges of Ra-226, Ra-228, Pb-210 should be given as +/- numerical values in a bracket after the value of discharged water for each of the radionuclides in the reporting format.

## Discharges of waste from descaling operations

12. Three different approaches to descaling need to be considered in order to choose the appropriate way to estimate any discharge of radioactive substances to the sea:

- a. the use of high-pressure water jets, with the discharge of the water and the scale dislodged by it to the sea (without settlement and separation of the scale);
- b. the use of high-pressure water jets, followed by settlement of the water used, in order to allow the scale to settle as sediment, and the subsequent removal of that sediment to land and discharge of the water fraction to the sea;
- c. the use of acids and scale solvers to remove the scale and the discharge of the whole to the sea.

13. Where the approach in § 12(a) or (c) is used, samples should be taken of the liquids as they are discharged to the sea during each separate descaling operation. Where a descaling operation lasts several days, the whole may be regarded as a single operation. The sample should be taken while the descaling discharge is fully under way – not at the beginning or the end of the process or close to any pause in it.

14. Where the approach in § 12(b) is used, samples should be taken from relevant settlement tanks before discharge of the water fraction. It is assumed that the water fraction contains negligible amounts of radionuclides. To confirm this, samples should be taken from major descaling operations in a three-year period. The data obtained will be reviewed at the end of the period with a view to discontinuing measurements unless they can be justified.

15. In cases under 12(a), the amount of Pb-210, Ra-226, Ra-228 and Th-228 discharged should be estimated on the basis of measurements of the amounts of solids in samples of the discharged water, and the analysis of those solids using high-resolution gamma-spectrometry (or other more precise and more accurate methods). The activity concentration (in Bq/litre) found in the samples should be grossed up by the total amount of water discharged. There is no need to measure radioactive substances in solution in the water, since more than 95% of the radioactivity in a sample is likely to be concentrated in the solids. In cases under 12(b), the amount of Pb-210, Ra-226, Ra-228 and Th-228 in the water fraction should be measured using high-resolution gamma-spectrometry (or other more precise and more accurate methods). The activity concentration (in Bq/litre) found in the samples should be grossed up by the total amounts of water discharged.

16. In cases under 12(c), account must be taken of the amounts of radioactive substances in solution, in addition to any solids. Samples of the solution should therefore also be analysed, using high-resolution gamma-spectrometry (or other more precise and more accurate methods). The activity concentrations in the samples (in terms of Bq/litre) should be grossed up by the total amount of liquid discharged.

17. It is important to ensure that, when sampling is conducted prior to dilution, the multiplying factor relates to the total volume of discharge before dilution.

### Radionuclides from tracer experiments

18. Contracting Parties should report the amount of activity that is applied in tracer experiments. Radioactive tracers should be reported against "Tritium" and "Total of other  $\beta/\gamma$  emitters".

### Specific provisions for reporting discharges of radioactive substances from the medical sector

19. The aim of the reporting is to estimate the scale of medical discharges of radioactive substances consistently across the OSPAR maritime area, without imposing unjustified administrative burdens on health services. Reporting should therefore be based on data collected for other purposes. Most hospitals and medical centres should be collecting data on the amount of medicinal radionuclides administered.

20. Contracting Parties should therefore report discharges of the radionuclides I-131 on the following basis:

a. *For Contracting Parties that **do not** use holding tanks to reduce the concentration of I-131 in the liquid discharges from medical establishments to below 10 Bq/l:*

Contracting Parties should calculate the amount of I-131 discharged on the basis of biokinetic data from ICRP 53 (ICRP, 1988): the proportion of the administered doses that is discharged as liquid waste is:

I-131 Ablation Therapy	–	100% of the administered dose;
I-131 Thyrotoxicosis treatment	–	for in-patients, 50% of the administered dose;
	–	for out-patients, 30% of the administered dose;
	–	for patients who cannot be classified as in-patients or out-patients, 50% of the administered dose.

b. *For Contracting Parties that **do** use holding tanks and require hospitals to reduce the concentration of I-131 in the liquid discharges to below 10 Bq/l:*

Reporting should be limited to confirming that this is done.

### Specific provisions for reporting discharges of radioactive substances from the Universities and Research sector

21. For Contracting Parties that require universities and research centres to use holding tanks to reduce concentration of P-32, S-35 and Cr-51 in liquid discharges, reporting should be limited to confirming that this is done.

### Review

22. At its meeting in the 2013/14 meeting cycle, RSC will review:

- a. the frequency and timing of further reports;
- b. the selection of radionuclides identified for specific reporting and for use in reporting on discharges from the oil and gas industry and the medical sector;
- c. the specific provisions regarding reporting of discharges of radioactive substances from the oil and gas industry and the medical sector.

## References

ICRP, 1988 Annals of the ICRP Volume 18/1-4, ICRP Publication 53, *Radiation Dose to Patients from Radiopharmaceuticals*, Pergamon Press, Oxford, United Kingdom.

Appendix 1: Reporting Procedures for  
Discharges of Radioactive Substances from Non-nuclear Sectors- other than oil and gas sectors

Old Description	New worksheet
Medical Sector	Med
Universities & Research centres	Uni_RC
Phosphate industry	PO_Ind
Titanium dioxide pigment manufacturers	TiO2_Man
Primary steel manufacture	Steel
Rare Earth production	Rare_Prod
Radiochemical production	Rad_Chem

1) Specify the OSPAR sub-region to which the discharges are made. If a Contracting Party has discharges to more than one OSPAR sub-region, then the discharges to each sub region should be specified separately on separate lines. The five OSPAR sub-regions are:

- (I) The Arctic,
- (II) The Greater North Sea (including the English Channel),
- (III) the Celtic seas,
- (IV) the Bay of Biscay/Golfe de Gascogne and Iberian coastal waters, and
- (V) the wider Atlantic.

The definitions of these and a map are given in the Strategy for the Joint Assessment and Monitoring Programme.

2) Describe briefly the nature of discharges, including their origin and their essential physical and chemical properties. Describe briefly how the amounts of radioactivity discharged were estimated, explaining how the non-reporting of the discharges not reaching the reporting threshold have been handled.

3) Radionuclides other than the 7 specified in Appendix 1 can be reported, particularly if the activity exceeds that for one of the listed radionuclides. Estimates can be based on the quantities purchased or administered.

4) For Contracting Parties that require universities and research centres to use holding tanks to reduce concentration of P-32, S-35 and Cr-51 in liquid discharges, reporting should be limited to confirming that this is done.

5) Contracting Parties should complete the form in TBq. If no data is available, the cell should be left blank.

6) Please do not enter any explanatory text in the worksheets; your data will be rejected by the database. All explanatory notes should be included in a separate word document in numerical order; the corresponding number should be entered under the note column in the worksheets.

Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	I-131	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	H-3	C-14	P-32	S-35	Cr-51	I-125	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	Pb-210	Po-210	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	Pb-210	Po-210	Ra-226	Ra-228	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	Pb-210	Po-210	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	Ra-228	Th-228	Note
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Appendix 1: Discharges of Radioactive Substances from Non-nuclear Sectors - other than oil and gas sectors

CP	Year 201?	OSPAR_Region	H-3	C-14	S-35	Cr-51	I-125	Pb-210	Po-210	Tot_a	Total_b_g	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

Old Description		New Worksheet
Produced water (TBq)		Produced_Water
Descaling operations, both offshore and onshore, from normal production that leads to discharges	Radioactivity in suspended solids arising from water-jet descaling (TBq)	Rad_Sus_Sol
	Radioactivity in solution as a result of descaling using acids or scale dissolvers (TBq)	Rad_Sol
Descaling operations, both offshore and onshore, from decommissioning of oil and gas installations that leads to discharges	Radioactivity in suspended solids arising from water-jet descaling (TBq)	Dec_Rad_Sus_Sol
	Radioactivity in solution as a result of descaling using acids or scale dissolvers (TBq)	Dec_Rad_Sol
Radioactivity discharged as a result of tracer experiments (TBq)		Rad_Tracer
Total discharged radioactivity (TBq)		

Notes:

## Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

1. Specify the OSPAR sub-region to which the discharges are made. If a Contracting Party has discharges to more than one OSPAR sub-region, then the discharges to each sub-region should be specified separately on separate lines. The five OSPAR sub-regions are: (I) the Arctic, (II) the Greater North Sea (including the English Channel), (III) the Celtic Seas, (IV) the Bay of Biscay/Golfe de Gascogne and Iberian coastal waters, and (V) the Wider Atlantic. The definitions of these and a map are given in the Strategy for the Joint Assessment and Monitoring Programme.
2. The amount of radioactivity applied should be stated for radioactivity discharged as a result of tracer experiments.
3. Contracting Parties should complete the form in TBq. If no data is available, please leave the cell blank.
4. Please do not enter any explanatory text in the worksheets; your data will be rejected by the database. All explanatory notes should be included in a separate word document in numerical order; the corresponding number should be entered under the note column in the worksheets.

Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR_Region	Pb-210	Ra-226	Ra-228	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR-Region	Pb-210	Ra-226	Ra-228	Th-228	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR_Region	Pb-210	Ra-226	Ra-228	Th-228	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR_Region	Pb-210	Ra-226	Ra-228	Th-228	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR_Region	Pb-210	Ra-226	Ra-228	Th-228	Note
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Appendix 2: Procedures for Discharges of Radioactive Substances from Non-nuclear Sectors - Oil and Gas

CP	Year 201?	OSPAR_Region	H-3	Other_b_g_emitters	Note
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