# SP1914 Decision document: EDF Energy sediment sample plan TR502 v11

## Summary

SP1914 is the sediment sample plan for the characterisation of the sediment to be dredged from the Somerset foreshore in England, part of the construction site of the Hinkley Point C power station. The sample plan describes the sampling campaign and the chemical and radiological assessment of the sediment at the dredge locations to determine if it is suitable for disposal at sea. This will support a marine licence application for the disposal of dredged material at Cardiff Grounds (LU110) licensed disposal site.

The purpose of this document is to support the approval of a revised sample plan for Hinkley Point C dredge disposal application (document "Sample Plan TR502 v11").

On 10 June 2020, NRW provided EDF Energy with its pre-application advice on the content of a draft sample plan and made a number of recommendations that EDF Energy needed to consider before submitting its final sampling plan to us for approval. The pre-application advice was informed by a 6-week consultation with technical advisors and the public.

EDF Energy submitted Sample Plan TR502 v11 on 18 August 2020. Following a review of TR502 v11, NRW is satisfied that the recommendations detailed within pre-application advice of the 10 June 2020 have been fully addressed &/or incorporated within Sample Plan TR502 v11, as detailed below.

NRW is satisfied that the sediment sampling and analysis is appropriate to support a marine licence application for disposal of dredge material.

## Assessment of NRW's Recommendations

The changes incorporated in the sample plan TR502 v11 to address NRW recommendations (SP1914 EDF Sample Plan Pre-application Advice) are as follows:

| Recommendation number | NRW PS Recommendations contained in Pre-application Advice (10.06.20) | –EDF Energy -summary of how these have been addressed within v11 sample plan |
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| 1<br>Sampling and dredging depth | OSPAR guidelines indicate that "the distribution and depth of sampling should reflect the size and depth of the | Further clarifications added to page 16: "*Either vibrocores, rotary cores, or Shelby tubes will be used, depending on* |

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| | area to be dredged". Hence, any area that could be considered capital (or new-work) dredge should be sampled at depth with cores. Areas labelled as maintenance dredge in the sampling plan should only be considered as such if the intended dredged depth would not surpass the dredged depth of previous campaigns. Only within maintenance dredge areas would grab samples be considered sufficient to characterise the dredged material. Where this is not the case (i.e. dredging carried out deeper than previous campaign), then the area is considered a capital dredge and core samples will be required. We would require evidence of previous and intended dredged depths to support the use of core or grab sampling at each station. | *ground conditions encountered. The cores should extend to the maximum dredge depth, or until expert geotechnical examination reveals that undisturbed geological material has been reached, or the sample consists almost exclusively of sand, gravel, or rock. The maximum core length would be 7.5 m, depending on planned dredge depth at the location*" and "*At each sampling station within maintenance dredging zones (inside black hashed areas in Figure 1), surface grab samples should be obtained by grab sampling*".<br><br>Further page 16 states: *"The core stations located within the capital dredge areas encircle each maintenance dredge area, and are in close proximity, therefore the subsurface samples from these stations would adequately characterise subsurface sediments at depth across both capital and maintenance areas."* |
| 2<br>Subsampling | PSA, chemical and radiological analysis depths: Paragraph 5.2 of OSPAR 2014 states: "A survey of the area to be dredged should be carried out. The distribution and depth of sampling should reflect the size and depth of the area to be dredged, the amount to be dredged and the expected variability in the horizontal and vertical distribution of contaminants. Core samples should be taken where the depth of dredging and expected vertical distribution of contaminants suggest that this is warranted." However, OSPAR does not specify the depth of samples. Vertical subsamples for PSA and chemical analysis are commonly taken every meter down to the maximum dredged depth. However, in areas of contamination concern this can be reduced to every 0.5m. Given the location, we request all samples in depth (i.e. cores) to be subsampled for PSA and chemical analysis at sediment surface, 0.5m and each 1m interval below the surface to the maximum dredge depth. Subsamples for radiological analysis should be taken at sediment surface, 0.25m, 0.5m and at each 1m interval below the surface to the maximum dredge depth. | Table 3 within Sample Plan TR502 v11 takes account of the subsampling and analysis recommended. |
| 3<br>Sampling methodologies | The sample plan submitted does not specify sampling methods. The sample plan must specify the specific grab and coring methods in the final sampling | Section 2.1 of TR502 v11 includes core and grab specifications. Confirming that grab samples will be taken using a van |

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<tr><td></td><td>methodology. Bridgwater Bay is comprised of intertidal mudflats saltmarsh and flats and shingle ridges. If the seabed is soft muds/sands Day or Van Veen grabs should achieve a surface integral sample adequate for chemistry and particle size analysis. These grabs allow for the sampling of undisturbed surface sediments. A Hammond grab is not recommended as it mixes the sediment in its application to the seabed and does not provide a surface only sample. However, if the seabed is gravelly then the Shipek grab is good for getting surface integral samples for chemistry and particle size analysis.</td><td>Veen or Day Grab (or similar) as recommended.<br><br>The sample plan confirms that either vibrocores, rotary cores or Shelby tubes will be used depending on ground conditions. This is further detailed in section 4 of the sample plan.</td></tr>
<tr><td>4<br>Chemical analysis</td><td>Where EDF ENERGY intends to deviate from the chemical determinants as listed in Annex 1 of the OSPAR guidelines, a clear justification must be provided (e.g. Dieldrin and DDT are missing but these can be omitted if there is no obvious source (e.g. agriculture).</td><td>Clarification added within section 4.2 (final paragraph) providing justification why analysis of Dieldrin and DDT is not proposed.</td></tr>
<tr><td>5<br>Sediment assessments</td><td>OSPAR guidelines as part of the Tier 1 ‘strongly recommends’ the following assessments:<table><tr><td>Determinant Indicating</td><td>Indicating</td></tr><tr><td>• grain size analysis (by laser or sieving methods)<br>• percent solids (dry matter)</td><td>• Cohesiveness, settling velocity/resuspension potential, contaminant accumulation potential</td></tr><tr><td>• density/ specific gravity</td><td>• Consolidation of placed material, volume in situ vs. after deposit</td></tr><tr><td>• organic matter (as total organic carbon)</td><td>• Potential accumulation of organic associated contaminants</td></tr></table>All assessments suggested by the guidelines must be conducted or clearly explained why these are not needed.</td><td>NRW agrees with the justification provided in section 4.3 of sample plan TR502 v11 not to conduct part of the assessments, namely percent solids, density (or specific gravity) and organic matter. Percent solids will not be required as contaminants will be directly measured by chemical analysis. Measurement of total organic carbon used as indicator of hydrocarbon content will not be needed as a full PAH analysis will be conducted. TOC can be used also for normalising the results, but Cefas Action Levels do not require normalising. Finally, density can be estimated using the PSA results.</td></tr>
<tr><td>6<br>Dredge area</td><td>Figure 1, page 11 "Note that the area of the jetty berthing pocket dredge has yet to be finalised and the area shown is indicative". It is noted that the location of the jetty berthing is not part of the scope of this sample plan; however, the sample plan in relation to the disposal licence must characterise the sediment to be deposited at LU110 and be representative of the dredge area. All</td><td>Clarifications provided in Section 2.1 paragraph 3.<br>Figure 1 has been updated to better represent the dredged areas. The text in section 2.1 indicates the relation between dredged areas/volumes and sample stations: “The pocket dredge area associated with the HPC jetty has not been finalised, enough samples will be collected to characterise it in case</td></tr>
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| | sampling should be completed within the footprint of the planned dredge areas, ensuring that the survey is fully representative of the material to be dredged. The sample plan must explain why the sampling survey proposed is fully representative of the dredged area and thus meets these requirements. | *dredging of this area is undertaken in the next three years. Sample stations will be evenly spaced within each dredge area to provide representative coverage of both capital and maintenance dredging zones*". |
| 7<br>Dredge area | We support the approach that each general location has been treated as an individual dredge area for the purpose of the sampling plan rather than referring to total dredge volume. We would like to see this separation to be maintained as it allows for a better characterisation of the dredge material and for area specific decisions to be taken. | No action required, this approach remains within sample plan TR502 v11. |
| 8<br>Testing for plutonium | The chosen sample location for plutonium should be explained. Clear justification on the number of stations in relation to risk will need to be provided. In addition, each core chosen for such analysis will require subsamples to be taken from all depths. Alpha spectroscopy will be used to determine the plutonium (Pu-239+240) and americium (Am-241) isotopes. Alpha spectroscopy will be undertaken on cores which are also used for the gamma spectroscopy in line with ISO 185891, to enable direct comparison of results from each analysis. It is important to note that if evidence of enhanced activity was found in the initial screening of the sediment cores or enhanced activity of americium-241 in any core a more refined radiological assessment on the existing cores taken might be required as per IAEA de minimis levels stepwise evaluation procedure. | TR502 has been updated to address this recommendation. Section 4.1.1 provides details on the *de minimis* approach where enhanced activity in the initial screening of the sediment cores or of americium-241 can trigger a more refined radiological assessment on the existing cores. Section 4.1.2 describes the alpha spectroscopy and tritium/OBT analysis which will provide confirmation of the suitability of the gamma spectroscopy method to infer the presence of pure alpha or beta emitters in the sediment.<br><br>The sample plan confirms that Alpha spectroscopy will be used to determine the presence of plutonium (Pu-239+240) and americium (Am-241) isotopes within subsamples from two cores from the two locations where the majority of the dredging will take place. The samples will also be analysed using gamma spectroscopy at all subsamples and in line with ISO 185891.<br><br>Furthermore, text has been included in section 3.1 paragraph 1 and section 4 paragraph 3 - 4, clarifying the scenarios where more than one core may be needed to sample for each sample station, and where sub-samples in more than one sample container may be needed for any given station/sub-sample depth layer. |
| 9<br>Testing for Tritium/OBT | Specific to this location, we require the analysis of a limited number of samples for OBT/Tritium analysis in a targeted way. Clear justification on the number of samples in relation to risk will need to be provided. In addition, each core chosen for such analysis will require subsamples | TR502 updated to address this recommendation. Section 4.1 updated accordingly: detailed in section 4.1.2.<br><br>Section 4.1.2 provides sufficient justification for the number of samples and sample plan details for OBT/Tritium. |

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| | to be taken from all depths for OBT/Tritium analysis in line with ISO 18589 ( https://www.iso.org/standards.html ) | analysis. This will take place in the same two locations/cores as those for alpha spectroscopy samples.<br><br>References to standard de minimis procedure added to section 4.1. Appendix A specifies which stations will be considered for supplementary radiological analysis. |
| 10<br>Recent sediment disturbance evidence | We require the provision of evidence of any previous activity undertaken by EDF in the proposed dredge areas that could have disturbed the sediment to be dredged. | No update to TR502 is required. EDF has provided shapefiles of campaigns that might have disturbed sediment in the dredged locations. All activities are relatively minor (grab sampling/sonar cameras) and have been plotted on a map to support this point. |
| 11<br>Grid reference Error | The grid ref error for station 15/16 must be corrected. | TR502 has been updated. An updated Appendix 1 containing all sample locations has been included. A paragraph has been added to section 2.1, referencing Method Statement. |
| 12<br>Sampling protocol | The following information must be included with any samples (irrespective of the laboratory to be used for analysis):<br>▪ Clearly labelled samples;<br>▪ Completed sample position sheets, including the latitude and longitude (decimal degrees and the projection i.e. WGS84) of each location and if core samples are required the depth at which each sample is taken;<br>▪ Details of the method of sampling; | This recommendation has been incorporated into sections 2.1 and 3 of Sample Plan TR502 v11. |
| 13<br>Sampling protocol | Surface samples should be taken from the upper layer of in situ sediment using a non-metallic / stainless steel scoop. To maintain the integrity of the samples they must be frozen and remain in the freezer until they can be dispatched. Ensure the samples are dispatched in a cool box - the cool box should not be placed in any other packaging. | This recommendation has been appropriately incorporated in the sample plan. |
| 14<br>Retention of samples | Samples should be kept until the application has been determined in case any further testing is required. The storage arrangements must ensure that there is no deterioration of the sample should further testing be required. | This has been appropriately incorporated into the sample plan, see section 4.<br><br>We recommend that enough sample material is collected and retained to allow further analysis if required |
| 15<br>Use of accredited laboratories | The analysis must be carried out following established specific dredge material testing methods by approved and UKAS3 accredited laboratories. | Analysis is proposed to be carried out by Cefas. Evidence of Cefas' accreditation has been provided to NRW. |
| 16<br>Handling of samples | To ensure consistency between laboratories it is expected that all analyses required will be undertaken from the same sample container. You should ensure that a sufficient sample is | This recommendation has been appropriately incorporated into the sample plan, see section 4. |

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| | collected, in a single container, for all the analyses required. | |
| 17<br>Non-technical summary | A non-technical summary clearly reasoning the approach taken as well as the evaluation of the risks driving the sample plan is needed. | Sample Plan TR502 v11 contains a non-technical summary at the beginning of the report. |

Further points addressed in the new version are as follows:

1. Table of indicative sample locations added to Appendix A as requested. Sample locations have been checked by NRW.
2. Table outlining coordinates for dredge areas, as displayed in Figure 1 added to Appendix B (appended excel file to email submission of the 18/08/2020). Coordinates have been checked by NRW.
3. Originally TR502 Figure 1 showed the proposed dredged area as a buffer of close to 100m around intakes, outfalls, etc. Stations in interim draft versions were not evenly distributed across the proposed dredging areas. NRW highlighted this issue and sought clarity. EDF indicated that the buffers depicted in the figure were not representing the proposed dredged areas but the navigation safety areas around infrastructure. NRW requested EDF amend the figure 1 to show a buffer that will enclose the proposed dredged areas. Following discussion with NRW PS Figure 1 has been updated with 20m buffer area, as well as dredge areas and sample locations, to accommodate potential minor design changes. The reduction in buffer area has resulted in a polygon shape change meaning that there are now 4 discrete intake sample areas – one for each intake - rather than two areas each containing a pair of intakes as before. Therefore, table 2 has been updated accordingly to give dredge volumes per intake area (noting that total volumes have not changed). Each intake area now has 4 sample stations for the c. 60,000 m3 of material. One of these stations is a maintenance/grab sample station. NRW is of the view that the number of stations in relation to the total area and volume to be dredged in the intakes is compliant with OSPAR regulations (4 – 6 stations for 25,000-100,000 m3), and the number of stations does not need to change.
4. A caveat has been added to the Introduction to explain that the purpose of this version (v11) is for approval in context of sub sampling and analysis.

## Conclusion

NRW is satisfied that the recommendations detailed within our pre-application advice of the 10 June 2020 have been appropriately and fully incorporated within Sample Plan TR502 v11.

NRW is therefore satisfied that the sediment sampling and analysis plan is sufficient for the characterisation of the sediment to be dredged and to support a marine licence application for disposal of the dredge material at sea. NRW reserves the right to request further sampling/analysis should any submitted marine licence application differ from that information submitted with the sample plan approval request, if works have not commenced within a suitable timeframe, or if new information is made available to us.

If a marine licence application is submitted, it will be subject to a full public consultation. NRW only issues marine licences if satisfied that the activity can take place without harming the health of people, wildlife and the marine environment.