Area 3A
Ergon House
Horseferry Road
London SW1P 2AL

Telephone 0207 238 3000
Website www.defra.gov.uk

defra
Department for Environment
Food and Rural Affairs

Mr Keith Wilson
Port of Tyne Authority
Maritime House
Tyne Docks
South Shields
Tyne and Wear NE34 9PT

Our ref DC 6742
Date 9 September 2003

Dear Keith,

Disposal of Contaminated Dredgings from the Port of Tyne

1. Thank you for your letter of July 28. While I note your disappointment, I am surprised that even now we have not convinced you that, based on the Posford Duvivier report, the material covered by your application IS NOT SUITABLE FOR SEA DISPOSAL. Our meeting next week should start from this point.

2. As to my comment that doing nothing is not an acceptable option, you should not read into this that we shall in due course change our position. We are, of course, prepared to work with you to see if any of the material meets sea disposal criteria and to do what we can in relation to alternative disposal outlets for what remains.

3. Your stance in the application is based on a series of fundamental misunderstandings. One is that TBT will break down quickly in the marine environment. The analysis results (and particularly the variability of the results), point to the fact that some proportion of the contamination is in the form of paint flakes which will break down only very slowly in the marine environment. Another is that TBT is the only contaminant of concern. This is wrong as we made plain when we met. Then you appear to believe that if contaminants are less than level 2, the sediments are automatically acceptable for sea disposal. Again this is incorrect; sediment with contaminant between the two action levels are considered in relation to a number of factors, including the whole range of contaminants it contains and the total volume of material to be disposed of to the site and its characteristics.

4. There also appears to be a serious misconception that the Action Levels we use for judging the acceptability of dredged material *in situ* also apply to sediments at the disposal site. They do not! These action levels will always be higher than the acceptable sediment contaminant levels at disposal sites as we allow for dilution and dispersion of dumped dredged material. Thus, the assumption that sediment levels on the disposal site of <1.0 $\mu g\ g^{-1}$ TBT are acceptable, is incorrect. In practice, we are looking to achieve sediment contaminant levels on disposal sites below Action Level 1 on disposal sites i.e. <0.1 $\mu g\ g^{-1}$ TBT and preferably well below.

5. The Souter Point disposal site has by far the highest levels of TBT in sediment of any disposal site in England and Wales. We do not regard these levels as satisfactory and would not want to see the situation worsened. In addition, as Mike Waldock pointed out when we met in February, the levels of TBT found in the livers of top predators in the north east are among the highest in the country. It is likely that TBT is moving away from disposal sites and entering the food chain. We do not understand the full implications of these findings, but we cannot make decisions on sea disposal that could lead to a worsening of the position.

6. CEFAS are currently working on the analysis of the June 23 samples. Chris Vivian will shortly send you an EXCEL file containing the CEFAS data and comparing it with the Posfords results from 1999 and the recent Mountainheath data. Unfortunately the methods used for analysing for TBT were different and making a comparison is not straightforward. Incidentally our chemists in CEFAS believe that the analyses do not show significant declines in TBT concentrations in surface sediments since 1999 in most cases. We are not surprised by this but it does suggest that a one-off clearance of all the sediments covered by your application, even if possible, would not end the Tyne's problems with this contaminant.

7. The way forward requires a careful characterisation of the sediments according to the depths to which you intend to dredge, as I made clear in my last letter. We are prepared to carry forward the Posford results from 1999 in so far as these give an indication of the depths to which you intend to dredge. But vibrocoring will be essential.

8 You asked for the names of our contacts. As you know Chris Vivian and Sue Reed have been handling the application in CEFAS, but they have been drawing on Lindsay Murray and Mike Waldock's expertise. John Burns is our point of contact with EA in the north east and Mark Quigley in English Nature. You have met Mike Smith and Andy Dixon here and Mike in particular will be involved as far as possible in all the discussions to ensure continuity.

9. You appear also to have misunderstood Chris Vivian's position. He has worked on marine licensing issues for CEFAS for fifteen years and was involved in all the discussions of phasing out sea disposal of industrial waste and sewage sludge. He thus has extensive experience of finding alternative outlets for materials. More recently he has advised on aggregate extraction. He currently chairs the OSPAR Group on Human Activities and is vice-Chairman of the London Convention Scientific Group. He also chaired the Working Group that revised OSPAR 'Guidelines for the Management of Dredged Material. Recently the focus of his job has changed to strengthen senior levels of the CEFAS Regulatory Assessments Team. When he admitted to not being totally familiar with a detail of your application, it was simply the problem of absorbing the vast amount of information that it contained. It is also just one of well over 100 FEPA applications currently being processed!

10. Could I also refer you to the questions annexed to my letter of June 28, as I do not believe you have yet addressed all the points raised therein.

11. I am attaching to this latter a series of annexes setting out comments on detailed responses to various document submitted . To save further delays I have not spent much time editing these.

12 I am copying this letter to John Burns at EA and Mike Quigley at EN. I have also copied it to Professor Fleming

Yours sincerely

Graham Boyes

Graham Boyes
Direct Line 0207 238 5868 **GTN** 238 5868
Fax 0207 238 5724
Email graham.k.boyes@ defra.gsi.gov.uk

ANNEX 1

Comments on Port of Tyne Letter Dated 28 July 2003

Paragraph 3

1. While our understanding of the issue under discussion may have moved on since December 1998**,** the sediments remain unsuitable for sea disposal due to the very high level of a number of contaminants.

2. While we were satisfied that PoT had carried out a thorough investigation of potentially available disposal options, we did not accept that adequate information had been presented about the cost and practicality of the options, particularly those dealt with in the Legal Framework Matrix.

3. What is the further research is referred to in the 5th paragraph? We do not intend to carry out any further research on disposal options at present. We are aware of the alternatives but their cost and practicality needs to be assessed in detail on a case-by-case basis by PoT.

4. Paragraph 4My letter dated 27 June asked for clarification of how PoT estimated the volumes of ‘contaminated’ and uncontaminated’ sediments at each location from the sediment contaminant data in Part 3 of the Posford Duvivier Report included with the application. It would be helpful if this could be done by reference to the grid squares on the sample maps.

5. As virtually all the results in Part 3 of the application document for the relevant locations exceed Action Level 1 for at least 1 contaminant, nearly all the sediments are contaminated to some extent. Therefore, the so-called 'contaminated’ sediment is in reality ‘highly contaminated’ and the ‘uncontaminated’ sediment is in reality ‘contaminated’ i.e. there is no 'uncontaminated’ sediment.

6. PoT are incorrect to assume that sediments with contaminants less than Action Level 2 are by definition ‘acceptable’. Only sediments with contaminants less than Action Level 1 are automatically acceptable in terms of their contaminant concentrations. Sediments with contaminant levels greater than Action Level 1 but less than Action Level 2 may be acceptable, depending on further investigations taking into account the volume of the material, further chemical/biological testing, the sensitivity of the disposal site etc. Thus, it is quite conceivable that an application for sea disposal of sediment with contaminant concentrations below Action Level 2 can be rejected.

7. Heavy metals were not dealt with in our interim response as we focused on TBT as did the PoT application. The Posford Duvivier report clearly identified that substantial volumes of sediment were contaminated with heavy metals so that they were unlikely to be acceptable for sea disposal. CEFAS has never suggested otherwise to PoT. The issue of heavy metal contamination was raised in my letter of 27 June 2003 when we had been able to fully consider all the paperwork submitted with the application.

8. The ‘contaminated’ and ‘uncontaminated’ categorisation by the PoT is based upon samples from a small number of individual boxes within a large grid at each location. As the 'contaminated' and 'uncontaminated' sample stations are often close together at

the berths, it will be very difficult, if not impossible in most cases, to dredge them separately. However, in a few locations, additional sampling to the full dredging depth may be able to delineate areas that might have acceptable levels of contaminants for sea disposal. This is a common practice that is carried out on a proportion of applications each year.

9. The average values for at least 1 contaminant for all of the material from each of 8 locations exceed Action Level 2. Therefore, in the absence of additional sampling as suggested in 7 above, we need to consider the whole 251,563 m^3 proposed for disposal under this application to be 'highly contaminated' and assess it as such.

10. The contaminants that exceed Action Level 2 for the average value ('contaminated' +'uncontaminated' sediments) at each of the locations are:

Location	Contaminants
A&P Tyne (N Shields) Ltd	TBT, Zn
Branmore Investments Ltd	TBT, Hg
Aker McNulty Ltd	TBT
Swan Hunter	TBT, (Pb)*, Zn
A&P Wallsend Ltd	TBT, Zn
NCC Neptune Yard	TBT, Cd, Pb, Zn
A&P Tyne Ltd Hebburn	TBT, (Zn)*
Bill Point	Cd, Pb, Zn

* average level just under Action Level 2

11. The values for UK Action Level 2 for most contaminants tend to be relatively generous when compared with countries in Europe and North America that have set Action Levels for dredged material. The Action Levels are currently under review in the light of recent scientific evidence and it is likely that TBT will be a particular focus of attention as it is a Priority Hazardous Substance for both OSPAR and the EU. For example, Germany has recently reviewed its Action Levels for TBT and proposes to reduce its current Action Level 2 of 0.6 $\mu g\ g^{-1}$ to 0.3 $\mu g\ g^{-1}$ at the beginning of 2005 and to further reduce it to 0.06 $\mu g\ g^{-1}$ by 2010. Action Level 1 in Germany is currently 0.02 $\mu g\ g^{-1}$ and will remain at that level. There is good scientific evidence to suggest that the current UK Action Levels for TBT are generous and should probably be reduced significantly over time.

Paragraph 5

12. We remain of the view that the whole volume of sediments has not been adequately characterized. We remain very concerned that we would be open to very serious criticism if we permit the disposal at sea of the material in question without characterising the material at greater than 1 metre depth as suggested by PoT. As we understand it, PoT will wish to dredge down to 2.5 metres at some locations. Given the history of metal contamination in the Tyne, we believe that it is quite conceivable that deeper sediments may contain at least as high levels of trace metals than the upper

layers. We therefore believe that characterising the material below 1 metre is essential before we can consider the disposal of that material.

13. We also note that samples from several of the areas that PoT wish to dredge have only been obtained from the surface:

Location	*Dredging Depth, m*
A&P Tyne (North Shields) Ltd	1
Aker McNulty Ltd	1.5
A&P Tyne Ltd Hebburn - Bede & West Quays	1.5
Bill Point	2.5

14. In relation to TBT, without knowing the contaminant levels down to the full extent of dredging, we cannot know whether the proposed operation to clean out the estuary of TBT in sediments once and for all, will in fact do anything of the sort. If high levels of TBT extend to greater depths than the proposed dredging depth, then the dredging operation will simply expose fresh TBT contaminated sediment to the River Tyne. In the short-term this may well introduce a pulse of TBT into the water column since the TBT in those sediments at depth will not be in equilibrium with the water column.

15. Given the relatively small number of samples at each location, the variability of the contaminant data and the lack of sampling to the full dredging depth, we are not confident that the number of samples taken is sufficient to satisfactorily characterise the whole volume of sediments at those locations if they were to be disposed of at sea. In addition, the sampling density is inadequate if it is necessary to delineate areas that might have acceptable levels of contaminants for sea disposal – see 7 above. This is despite PoT quoting the comment from the AE0232 final report "…the most intensive ever conducted in the UK to assess the extent of TBT contamination in dredged material". While the statement may well have been correct at the time, it does not mean that the sampling regime at the proposed dredging locations is necessarily sufficient for the purposes of this application.

Paragraph 8

16. The Sintra Agreement goes further than seeking just the cessation of discharges by also seeking '…the ultimate aim of achieving concentrations in the environment near background values for naturally occurring substances and close to zero for man-made synthetic substances'. As the target date for achieving this aim is 2020, we need to be reducing these inputs now in order to have a chance of meeting the aim. In addition, I don't believe we can trade off the Sintra Agreement against economics.

Paragraph 9

17. We have carefully considered the option of capping the material at the disposal site with the maintenance dredged material from the PoT. Capping operations are designed to seal off contaminated material from the marine environment to prevent adverse impacts on biota and other uses of the sea. Capping materials are usually placed 1 – 2 metres deep, over the contaminated material and the material used should remain in place permanently under normal hydrodynamic conditions so as to maintain the cap. In view of the relatively small volumes of maintenance dredged material (~250,000 tonnes) available to cap the contaminated material, it is likely to be

difficult to achieve an appropriate cap thickness. In addition, since this maintenance dredged material consists of muddy sands and sandy muds, we consider that it will be subject to transport off the disposal site. Thus, such a capping operation will only delay exposure of the contaminated sediments rather than provide permanent isolation that is the normal intent of capping. Therefore, capping as proposed will not provide any long-term environmental benefit in this case, just short-term isolation of the contaminated material.

18. Paragraph 10

19. It is clearly not the Government's responsibility to monitor the environmental impact of the proposed disposal of contaminated dredged material. Under the provisions of FEPA (see the licence fees document), the monitoring of disposal sites, including Souter Point, is paid for out of licence fees. It would not be reasonable for additional monitoring for the PoT to be paid from this source since in effect all the other ports in England and Wales would be subsidising PoT. Any additional monitoring is the responsibility of the licensee. In any case Defra and CEFAS have no additional funds available to carry out such monitoring even if they wished to do so.

20. If we were to consider permitting the disposal of any of the material proposed by PoT, then we would develop monitoring proposals as indicated in paragraph 16 of my' letter dated 8 May 2003.

Paragraph 11

21. As regards Northumberland Dock we wished to establish what were the requirements proposed by the Environment Agency/English Nature and why PoT considered them unduly onerous.

ANNEX 2

Specific Comments Upon the 'Supporting Information for Sea Disposal Permit Application for TBT Contaminated Tyne Estuary Sediments'

1. The title is not accurate as the Tyne Estuary sediments concerned are also highly contaminated with a number of trace metals.
2. Section 3 of the document misses the important reference to Article 4 and Annex II of the Convention given in paragraph 3.2 of the OSPAR Guidelines for the Management of Dredge Material (hereafter 'the Guidelines'). Annex II deals with dumping issues.
3. While Figure 1a calls the diagram a 'decision pathway', it has always been recognised in the OSPAR and London Conventions that it is not a strict flow diagram or decision pathway and should be used iteratively. The London Convention states “The schematic shown in Figure 1 provides a clear indication of the stages in the application of this guidance where important decisions should be made. In general, national authorities should use this schematic in an iterative manner ensuring that all steps receive consideration before a decision is made to issue a permit”.
4. The OSPAR Guidelines for the Management of Dredged Material are primarily a scientific and technical framework for assessing dredged material proposed for disposal at sea. Economic considerations are acknowledged but are expected to be dealt with outside the scientific and technical assessment framework.
5. Therefore, the suggestion in Figure 1b that the Legal/Environmental Risk Framework Matrix should replace the 4 boxes between 'Dredged material characterisation' and 'Selection of sea disposal site' in Figure 1a of the OSPAR Guidelines in the supporting information is quite unacceptable. It also would distort the whole assessment process if used as a decision pathway as it pre-empts effective consideration of some of the boxes below.
6. While TBT does have a relatively short half-life of around 1 year in aerobic sediment (1st bullet of section 8.2 on page 6), it still means that concentrations significantly above 1 $\mu g\ g^{-1}$ would be likely to persist at the disposal site for many years. Conventionally, it takes about 5 half-lives for a substance to degrade to about 5 percent of its original level and 10 half-lives to degrade to negligible levels i.e. approximately 5 and 10 years respectively for TBT.
7. Furthermore, there appears to be a misconception that the Action Levels we use for judging the acceptability of dredged material *in situ* also apply to sediments at the disposal site. They do not! These action levels will always be higher than the acceptable sediment contaminant levels at disposal sites as they allow for dilution and dispersion of dumped dredged material after dumping. While we do not as yet have accepted Sediment Action Levels (SAL) for dredged material disposal sites, proposals have been made for a TBT SAL of 0.001 – 0.005 $\mu g\ g^{-1}$ on organic carbon (CEFAS, 1997). Given an organic carbon content of 10% (probably a bit high) this equates to a total sediment value of 0.0001 – 0.0005 $\mu g\ g^{-1}$. Lower organic carbon levels would drive the total sediment values lower still. OSPAR has produced Ecotoxicological Assessment Criteria for TBT in sediment of 0.000005 – 0.00005 $\mu g\ g^{-1}$. These criteria have no legal significance but are to be used to assess monitoring data with the aim of

identifying potential areas of concern. Thus, we are in practice looking to achieve sediment contaminant levels on disposal sites below Action Level 1 i.e. <0.1 $\mu g\ g^{-1}$ TBT and preferably well below.

8. While the evidence is that the higher TBT concentrations in sediments have been limited to the disposal ground (2nd bullet of section 8.2 on page 6), that is only valid for current rates of input. Given the scientific evidence of impacts at very low TBT concentrations, it is likely that the current peak TBT levels on the disposal site are having impacts and we cannot exclude lesser impacts occurring outside the disposal site from lower levels of TBT. This point is also relevant to the same issue in section 9.2.1. Indeed, the high levels of TBT found in the livers of top predators in the north east clearly indicate that TBT does move off site and enter the food chain. The Souter Point disposal site has by far the highest levels of TBT in sediment of any disposal site in England and Wales and we do not regard the current levels as acceptable for the long-term. In addition, we have an overall policy to not allow conditions at disposal sites to deteriorate any further.
9. We believe from our monitoring and other data off the Tyne that contaminated sediments do move away from the disposal site with the TBT degrading under the probable aerobic conditions and becoming diluted by mixing with less contaminated sediments (3rd bullet of section 8.2 on page 6).
10. The text of the 4th bullet of section 8.2 on page 6 is not a valid argument for substantially increasing the TBT inputs to the disposal site, as it seems to assume relatively little or no additional impacts in those circumstances.
11. Based on CEFAS monitoring data, we do not believe that there is evidence for the Souter Point site being a retentive site (section 9.2.1 and section 10.1).
12. In section 9.4, there has been a misinterpretation of the Guidelines. Reference to paragraph 8.3 of the Guidelines makes it clear that the use of disposal management techniques is to reduce or control impacts <u>not</u> to increase the exposure to TBT as in this proposal.
13. We therefore consider that the approach mentioned in the 3rd paragraph of section 9.4 is <u>not</u> a disposal management technique.
14. We do not accept that this approach '…has the significant advantage that it can be readily controlled..' (5th paragraph of section 9.4) since once the material was dumped you would have no control over it.
15. In relation to the final paragraph of section 9.4, the OSPAR Contracting Parties would not accept restoring one part of the marine environment at the expense of another.
16. Paint flakes will only accumulate at the sediment surface from sediment depths disturbed by hydrodynamic forces (5th bullet of section 10.2). Based on your arguments that the Souter Point site is a retentive one, this would suggest that this process would not be of great significance unless the dumped material is spread out in a thin layer. We would expect it to be of some significance as we believe that sediments do move away from the site However, if the contaminated sediments were to be dumped such that their thickness on the bottom was to be of the order of 10 cm or more, then it is likely that this process would not be significant for the bulk of the material for a

considerable time until the surface layers had been eroded so that all the sediment had been disturbed.

17. If the 6th bullet of section 10.2 is not representative of the bulk of the material, why was it presented? A more relevant statement should replace it. The same applies to the next bullet.

18. We agree that long-term biological impacts would be expected while concentrations remain above 1 $\mu g\ g^{-1}$ (7th bullet of section 10.2). However, scientific evidence suggests that biological impacts are likely to be significant at much lower concentrations – also see paragraph 7 above.

19. The assessment that '…impacts on human health will be minimal…' (10th bullet of section 10.2) is reliant upon the dumped material being retained at the disposal site. In the circumstances of the dumping operation proposed by the PoT and our understanding of the disposal site, we are not so confident. We would therefore recommend that this aspect to be fully evaluated before sea disposal could be permitted.

Reference

CEFAS (1997) Final reports of the Metals Task Team and the Organics Task Team. Marine Pollution Monitoring Management Group, Group Coordinating Sea Disposal Monitoring. Science Series, Aquatic Environmental Monitoring Report, CEFAS Lowestoft, No. 49, 51pp.

ANNEX 3

Legal/Environmental Risk Framework Matrix for TBT Contaminated Tyne Estuary Sediments and Best Practicable Environmental Option (BPEO)

1. The assessments and scorings made in Tables 4 and 5 are not supported by sufficiently credible detailed information to justify all of assessments, particularly the sea disposal option.
2. We do not accept that sea disposal is the BPEO since we do not accept that the scoring employed in the legal/environmental framework matrix is defendable.
3. The cost of the necessary monitoring has not been included in the sea disposal option in Table 5. It does not matter who pays, it still needs to be included as indicated by the Royal Commission on Environmental Pollution in its 12th Report on BPEO in paragraph 2.6.
4. We do not believe that the BPEO concept should be used to attempt to make unacceptable options acceptable as we believe is being done in this case. We believe this is a distortion of the BPEO concept. The Royal Commission made it clear that any BPEO had to observe existing standards and limits – see para. 5.10(c) – and that financial considerations should not be overriding – see para. 5.5(viii).

ANNEX 4

Comments on the 'Enviro Centre Response Document ' Attached to the Letter from PoT Dated 5 June 2003 (Using reference numbers in that document)

Response Summary

3rd bullet - While the assessment work (it is not monitoring or research) would delay a decision, we consider that it is necessary to fully assess the potential impacts of disposing of the material concerned - also see below under 12, 13 & 14.

4th bullet - We do not accept this point - also see below under 4 & 5.

5th bullet - We do not believe that the latter point has been established.

6th bullet - We have comments on the legal framework matrix below.

7th bullet - The statement that no TBT decay was allowed for in the model is incorrect. There was a typographic error in the caption to Table 1 of Annex 2 to my letter dated 8 May 2003 indicating that TBT decay had not been allowed for despite the inclusion of a column with data on TBT half life. This was a hangover from of previous version that should have been updated. While the model is an initial attempt, we do believe that it has some utility in indicating potential impacts.

8th bullet - See comments below under 18.

Detailed Response

4. & 5. The scope of the assessment is not being extended at a late stage in the decision making process. If PoT had consulted Defra/CEFAS appropriately prior to making their application, these issues would have been raised at that time. We would agree with the first 2 sentences of the 3rd paragraph in relation to monitoring the disposal site. However, the quoted paragraphs from my letter dated 8 May 2003 did not deal with monitoring but characterisation of the material proposed for disposal at sea.

8. We maintain the validity of most of our comments on the risk assessment. We will comment further on them below under Appendix I to the Detailed Response Document. If we have not fully understood the method employed to produce the legal/environmental framework matrix and the environmental risk assessment, would PoT please provide an explanation.

10. Blyth Harbour - The Blyth case does modify the option considered in the framework matrix in that the materials were encapsulated in a clay-lined dock.

11. The 2nd paragraph is incorrect to state that no TBT decay was allowed for in the model. While modelling is not explicitly required by the Guidelines (Para. 3), that does not prevent us from requiring it – see section 8(5) of the Food and Environmental Protection Act 1985. We do not accept the statement 'This suggestion further widens the scope of assessment

which is not considered acceptable at this advanced stage of the decision process'. We do not consider that we were at an advanced stage in the decision making process at that time. Had PoT approached the licensing authority appropriately at an early stage in their consideration of their application, the assessment could have been appropriately scoped.

12, 13 & 14. The work in these paragraphs is not the basis for a programme of long-term research but the essential features of an assessment to determine the potential effects of disposing of the material concerned. Without this information, we cannot consider satisfactorily predict the environmental impacts of disposal and, we could not therefore recommend issue of a disposal licence.

15. While this may be a one-off operation, it does not preclude the potential for cumulative impacts arising from interactions between this operation and other disposal activities off the Tyne. For example, the contaminant burdens from this operation would be in addition to those from on-going maintenance operations.

16. The CEFAS studies that you refer to were research studies that provided useful information but were clearly not designed as baseline studies with this proposed operation in mind. In addition, the CEFAS studies were carried out several years ago and are thus not suitable as baseline studies for this proposed operation. The recent monitoring cruise in May/June 2003 will provide useful information but is unlikely to be adequate as a baseline survey for the disposal operation proposed under this application since it was designed for a different purpose.

17. There has been a misinterpretation of the Guidelines. Reference to paragraph 8.3 of the Guidelines makes it clear that the use of disposal management techniques is to reduce or control impacts not to increase the exposure to contaminants as in this proposal. We therefore consider that the approach mentioned in the 3rd paragraph of section 9.4 of the supporting information to the application is not a disposal management technique. As regards the interpretation of the Guidelines, that is the responsibility of the national licensing authorities of the OSPAR Contracting Parties.

18. It is not clear whether the strategy referred to is an industry wide one that was discussed at the meeting on 4 June 2003 or a Tyne specific strategy. In the letter to PoT from the MCEU, we were referring to the latter. It may be that both will be required once we have dealt with this application.

Appendix 1

Response to MCEU Comments on Legal Framework Matrix for the Disposal of TBT Contaminated Sediments

Seabed disposal

Pathways - Please explain how bio-magnification has been taken into account.

Probability - The half-life of TBT in paint flakes of >20 years is in anaerobic sediment. The point is that much of the TBT in paint flakes in contaminated sediment when dumped is unlikely to be in an aerobic situation and, therefore, it will persist for some considerable time. Paint flakes will only accumulate at the sediment surface if they are within the disturbed layer (of the order of a few centimetres). Therefore, the probability of occurrence would be **High**.

Consequence - The response indicates a misunderstanding of our previous comment. The scoring and text of the Magnitude of the Consequence is predicated on the effect of the proposed dumping operation being no greater than the current disposal operations. This is not credible given the additional contaminant loads involved and the movement of the material off the site. Thus, this item should be scored **Severe.**

Overall risk - This should now be **High**.

Confined disposal

This option should have included appropriate lining and covering of the confined disposal facility.

Probability - This should be **Low** if appropriate lining is provided to contain the material and appropriate covering material is provided to prevent infiltration of surface water. The fact that the half-life of TBT in anaerobic sediments in a confined disposal facility would be >20 years is of minor significance.

Consequence - Given the above, this should be scored **mild or negligible**

Overall risk - This should be **Low**

Land reclamation

This should be scored as confined disposal for the same reasons.

Landfill

Probability - This should be **Low** as the transport impacts should be manageable.

Consequence - This should be **Low** as the impacts would be contained within the landfill.

Overall risk - **Low**