

The Proposed Port Talbot Steelworks (Power Generation Enhancement) Order

Applicant's comments on ABP's response to request for information issued by the Examining Authority on 20 May 2015

1. INTRODUCTION

- 1.1 This document comprises the applicant's comments on ABP's responses to the request for information issued by the Examining Authority on 20 May 2015. It also provides the ExA with an update on the current position of the negotiations between the applicant and ABP regarding the protective provisions.
- 1.2 This document also provides a further update on the position regarding:
- 1.2.1 the outcomes of the results of the site investigation works and Detailed Qualitative Risk Assessment (DQRA); and
 - 1.2.2 the Environmental Permit application.

2. GENERAL UPDATE

- 2.1 Considerable progress has been made on the principles of the protective provisions and the parties are currently seeking to agree the appropriate drafting. A final update will be provided to the ExA confirming the position by the close of the examination on 9 June 2015.

3. RESPONSE TO GENERAL COMMENTS MADE BY ABP

- 3.1 At paragraph 1.2 ABP states that the applicant has "made only passing acknowledgement to ABP's concerns". This statement is contrary to the evidence which shows that the applicant has engaged extensively with ABP both during the development of the proposals and following the submission of the DCO application. This engagement has been undertaken to understand ABP's concerns and the likely impacts of the proposed development on its commercial operations and its statutory functions as harbour authority.
- 3.2 Evidence of this engagement with ABP is included in the applicant's Environmental Statement (see Vol. 3(a) Appendix 1.11). This engagement has continued following the submission of the application and it is hoped that this will result in the parties being able to agree protective provisions.
- 3.1 At paragraph 1.3, ABP suggests that the applicant "seems to be operating on the understanding that they have an overriding right to abstract water from the dock regardless of ABP's operational needs and statutory duties". On the contrary, the applicant fully recognises that its right to abstract water from the dock water system is subject to a

framework of legal agreements with ABP. The applicant is not seeking any powers or statutory rights within the DCO that would override those agreements.

Alleged inconsistencies between applicant's submissions and the ES

- 3.2 In paragraphs 1.5 to 1.8 ABP has used a statement made by the applicant in response to the ExA's second written questions to attempt to discredit the water modelling results presented in the applicant's Environmental Statement (ES). The 'inconsistencies' which ABP claims to have identified are explained below.
- 3.3 The applicant's statement that the net consumption limit of 54.8 megalitres per day "may not be sufficient to meet the operational needs of the steelworks" was not intended to mean that the proposed power plant in combination with the current steelworks operation requires more water than this. The statement was made in the context of explaining the applicant's objection to the principle of a protective provision which imposes abstraction limits on the wider steelworks.
- 3.4 The applicant opposes the net consumption limit not because it would provide insufficient water for the power plant in combination with the current steelworks operation, but on the grounds that it is not appropriate for the DCO to impose a limit which applies to the wider steelworks. Putting aside the fact that there is no practical means of measuring the applicant's net consumption from the dock, and that it would not guarantee water levels within the dock, any such limit could have the effect of introducing a statutory constraint on the future development of the steelworks.
- 3.5 If the applicant ever needed to increase the abstraction from the dock for the purposes of expanding the steelworks, the appropriate mechanism for regulating this would be the existing 1996 Licence with ABP and through whatever additional commercial negotiations with ABP were necessary at that time. As is now apparent to the ExA, the 1996 Licence does not specify a limit on the amount of water that can be abstracted, but imposes obligations on Tata to meet the costs incurred by ABP in pumping water to maintain an unspecified water level in the dock.
- 3.6 It would undermine the applicant's ability to expand the steelworks in the future and negotiate the necessary contractual arrangements with ABP if the DCO authorising the power plant were to impose a statutory cap on the amount of water which the steelworks can consume. This is the point which the applicant was seeking to make in paragraph 4.11 of the applicant's submissions of 11 May 2015.
- 3.7 The point was not as clear as it could have been, but this provides no justification for ABP's suggestion that the modelling results presented in the applicant's ES may need to be re-run. The modelling is robust and is based on sound assumptions about what would represent a 'worst

case' for consumptive losses from the dock. These assumptions are explained below.

- 3.7.1 **The current situation** – The water balance model, approved by NRW and developed in consultation with ABP, had to estimate the net consumptive losses figure for the dock, as there is no means of accurately measuring this figure. Based on the current abstraction of 166,000,000m³/yr from the dock, the 88% return rate to the dock assumed in the NRW water balance, gives 20,000,000m³/yr (12%) lost due to evaporation and blow downs.
- 3.7.2 This is outlined in the water balance report contained within Document 6.03.1 Vol. 3b, Appendix 14.2 and was the basis for the modelled scenario Runs 3-5 for Option 1 and 9-11 for Option 2 construction scenarios.
- 3.7.3 **The future scenario (with the proposed development)** – The implementation of the proposed development will include decommissioning of turbo alternators (TA2, TA3, and TAB1) which currently utilise dock water for cooling systems. The new proposed cooling towers units will have an open circuit (i.e. water used in the turbine condensers is cooled in. cooling towers and recycled back into the system) and will therefore no longer require the current volume of abstraction from the Port Talbot Dock.
- 3.7.4 Abstraction from the Port Talbot Dock will still be required after the decommissioning of the existing turbo alternators and during the whole operational life of the proposed development, at approximately 47,000,000 m³/yr (based on current average abstraction (165,736,617 m³/yr) – reduction in abstraction volumes for the proposed development (119,136,000 m³/yr).
- 3.7.5 The discharge will be at a return rate of 57.5% of the abstraction amount. This is a decrease from the return rate of 88% modelled for the current situation and therefore represents an improvement on the current situation. This abstraction and discharge will be for the existing TA9 cooling system and process cooling water requirements throughout the site.
- 3.8 For the purposes of the modelling, the applicant assumed that any reduction in the evaporative losses associated with decommissioning of these turbo alternators would not be realised and that the estimated 20,000,000 m³/yr consumptive losses would continue. This is therefore a worst case approach from a net consumptive losses perspective when comparing the 'current' situation to the 'future' situation.
- 3.9 When the reduced return rate is accounted for, the net reduction in abstraction from the Port Talbot Dock will be approximately, 146,000,000 m³/yr, providing an overall abstraction of approximately

20,000,000 m³/yr from the dock. There will also be an increase in consumptive abstraction from the River Afan (Dock Feeder Channel) of 5,000,000 m³/yr. This would decrease the amount of water reaching the dock from the feeder channel.

- 3.10 Modelling results for dock level change (Appendix 14.2: Table 14.2.4, Run 12) demonstrate that, for a worst case scenario (no planned improvement works), the percentage of time the level of the Port Talbot Dock is below the minimum level required for impoundment by Tata will slightly increase from 11% to 14%. However, it is accepted that the Applicant would have to impound to maintain the dock level as this is an existing standard operation.
- 3.11 In addition, the planned improvement works, including the control on the dock feeder off take and refurbishments of the lock gates, mean that flows in the River Afan are improved even when the abstraction requirement is increased for the proposed development. This occurs because the control on the dock feeder limits the quantity of water being re-directed from the River Afan to the Dock Feeder Channel during periods of high water level in the Port Talbot Dock, thereby increasing flows in the River Afan and countering the increase in abstraction as modelled as a worst case.
- 3.12 The reduction in abstraction and discharge volumes from / to the Port Talbot Dock, as a result of the proposed development, will occur during the operational phase. This reduction will be on average approximately 13,600 m³/hr (119,000,000m³/yr). This reduction is a direct result of decommissioning the three existing TA's, which currently operate as a once-through feed and return system (i.e. the cooling water is abstracted from the Port Talbot Dock, goes through the heat exchanger and is then returned directly to the Port Talbot Dock).
- 3.13 Therefore, the water balance model Runs 3-5 were superseded by Runs 6-8 and then again superseded by Runs 12-14 as NRW requested a cap on the Greenpark Weir value. Therefore Runs 9-11 are therefore replaced by Runs 15-17. This point has previously been understood and accepted by ABP.
- 3.14 In addition, the model assumes levels of consumptive abstraction, for the proposed development as recognised in the ABP snapshot model dated 17 February 2015, from the dock feeder channel that are higher than those now estimated following further engineering development of the scheme as confirmed to the ExA in response to first written questions submitted on 15 January 2015 (Question 3.09).
- 3.15 In summary, the applicant has assessed a robust 'worst case scenario' in the model and has been consistent in its approach in assessing of the effects of the proposed development on the dock water level.

Terms of the 1996 abstraction licence

- 3.16 At paragraph 1.9, ABP acknowledges that the 1996 Licence permitting the abstraction of water from the Dock does not have any limit on the quantity of water that can be abstracted and states that this point has already been explained to the ExA in ABP's representations of 11 May 2015.
- 3.17 ABP provided this explanation to the ExA on 11 May because it realised that the applicant (in its submissions of the same date) would be bringing to the ExA's attention the misleading description of the 1996 Licence that had been included in ABP's submissions of 15 January and 5 March 2015.
- 3.18 The applicant had not intended for the existing contractual arrangements between the parties to be a matter for consideration during the examination. However, it was left with no option but to raise this point with the ExA to correct the misleading impression being given by ABP that its preferred protective provisions seek to do no more than replicate the existing contractual arrangements.

Scope of proposed abstraction limit

- 3.19 Paragraph 1.10 of ABP's response is confusing. Referring to the applicant's submissions of 11 May, ABP states that "*the applicant seems to be implying that it should have the right to take water from the dock 'for any other purpose for which the applicant may require water to be abstracted'*".
- 3.20 This is not at all what paragraph 4.11 of the applicant's 11 May submission is doing. The paragraph is not asserting the extent of the applicant's rights; it is explaining the scope of the abstraction limits proposed by ABP. The paragraph points out that the net consumption limit proposed by ABP for the dock would apply not only to the power plant, but to "any other purpose" for which the applicant may require water to be abstracted from the Dock. The words "*any other purpose*" are taken directly from paragraph 2(2) of ABP's protective provision.
- 3.21 The applicant maintains that it is not appropriate for a DCO authorising the power plant to impose abstraction limits on the entire steelworks, regardless of the fact that the proposals would give ABP discretion to increase those limits. The steelworks is not the development which would be authorised by the order.
- 3.22 By resisting these limits ABP claims that the applicant is failing to recognise that this "is precisely the operating framework within which the applicant has been operating" for many years.
- 3.23 It is simply not correct to suggest that the measures ABP is seeking to impose would be *precisely* the same as the current operating framework. As the ExA is aware, the relationship between the

steelworks and the Port of Port Talbot is regulated by an existing contractual framework. This contractual framework provides ABP with a robust legal mechanism to protect its interests.

- 3.24 Even where equivalent terms may be used in the protective provisions, there is a significant difference between two businesses freely entering into contractual arrangements to regulate the interface between their operations, and measures being imposed by provisions in a statutory instrument. Contractual arrangements can reflect all of the circumstances that are relevant to the parties and can include all the provisions necessary to regulate the parties' commercial relationship.
- 3.25 This is quite different to protective provisions in a DCO which are solely intended to regulate the exercise of the statutory powers granted by the order to ensure that the property and interests of affected third parties are adequately protected from the development for which consent is granted.
- 3.26 The applicant's steelworks are outside the scope of the DCO and it would not be appropriate for the order to impose restrictions on the operation of the steelworks which, inevitably, could not reflect the wider circumstances that are relevant to the relationship between the parties' respective operations.

4. ABP'S RESPONSE TO Q. 4.4.1(A)

- 4.1 The applicant can confirm that ABP's summary of the cumulative effect of the 1955 and 1959 Agreements is correct. Accordingly, there is already in existence a limit of 27.4 megalitres per day on the applicant's abstraction of water from the Dock feeder channel. This legal framework (including the terms of any renewal negotiated by the parties) provides a robust legal mechanism by which ABP can protect its interests and the appropriate mechanism for imposing abstraction limits which would apply to both the proposed power plant and the wider steelworks. It is not appropriate for these limits to be imposed by the DCO and the applicant's preferred drafting for the protective provisions therefore does not include abstraction limits.

5. ABP'S RESPONSE TO Q. 4.4.1(B)

- 5.1 ABP's response to this question does not directly address the issue of why the existing water level based methodology for managing the impounding of the dock water level cannot be applied as a trigger mechanism for impounding in the future. The applicant maintains that the mechanism provided for in the applicant's preferred protective provision (as amended - see below) provides the appropriate mechanism for impounding sea water in the future. This mechanism remains the subject of ongoing discussions between the parties, principally regarding the level that must be maintained and the apportionment of the costs of impounding.

6. REVISED PROTECTIVE PROVISIONS

- 6.1 In response to the submissions made to the ExA, the applicant has revised its preferred protective provisions. A copy of the revised protective provisions is appended to this document (**Appendix A**). The revisions respond to ABP submissions by:
- 6.1.1 giving ABP responsibility for pumping water into the dock to maintain water levels (at the applicant's cost);
 - 6.1.2 raising the level at which pumping is triggered from +4.45m AOD to +4.95m AOD; and
 - 6.1.3 making the applicant responsible for the reasonable costs incurred by ABP in, maintaining, repairing and renewing any plant or equipment used for the purposes of maintaining a level of +4.95m AOD.
- 6.2 The rationale for these changes is set out below together with some general remarks on why the applicant considers these provisions are appropriate to ensure ABP's undertaking is not affected by the proposed development.
- 6.3 The key point of disagreement between the parties concerns ABP's proposal to make the applicant responsible for the costs of maintaining a level of +5.55m AOD within the dock. ABP has suggested that this obligation is necessary to ensure that it remains capable of fulfilling its statutory obligations as harbour authority and, in particular, its duty to maintain an open port. The applicant considers that ABP's proposals are not driven by its statutory obligations but are an attempt to use the DCO examination process to its commercial advantage.
- 6.4 The open port duty that ABP has referred to does not require a level of +5.55m AOD to be maintained at all times and it is disingenuous of ABP to suggest that a temporary fall below this level would put ABP in breach of its statutory obligations. The details of water levels appended to ABP's submissions of 23 April 2015 acknowledge this by stating "while it is expected that the above levels will be maintained, this cannot be guaranteed".
- 6.5 Paragraph 5 of ABP's preferred protective provisions (submitted on 28 May) would effectively provide a guarantee that such levels would be maintained at all times and the costs of this guarantee would be underwritten by the applicant.
- 6.6 The applicant has revised its preferred protective provisions to provide that it is responsible for the costs of impounding (carried out by ABP) to maintain a minimum level of +4.95m AOD. This is equivalent to the 8m 'minimum level' referred to in paragraph 5 of ABP's draft provisions. The applicant considers that this reflects the existing mechanism that applies under the 1996 Agreement.

- 6.7 As the ExA is aware, the 1996 Agreement between the parties places an obligation on the applicant to meet the costs incurred by ABP "in pumping water for the purpose of maintaining the level of water within the Dock" (see clause 4(a)). It is common ground between the parties that the 1996 Agreement does not specify a water level that needs to be maintained.
- 6.8 It should be noted that the obligations imposed on ABP by clause 2 of that Agreement are to "preserve the Old Docks in being and ... maintain and repair and cleanse the same to the extent necessary to enable the said licences to be exercised". Accordingly, under that Agreement, the applicant is liable to pay ABP's costs to the extent that these are incurred by ABP in maintaining the Dock to the extent necessary to enable the applicant to extract water for cooling purposes at the steel works.
- 6.9 The applicant's previous submissions have explained that the minimum water level that is required for the effective operation of the applicant's abstraction equipment is +4.45m AOD. The applicant's revised drafting would make the applicant responsible for the costs of impounding water to maintain a level of +4.95m AOD.
- 6.10 However, the applicant is not prepared to accept ABP's draft provisions of 28 May 2015 and regards these as an attempt by ABP to extend the terms of the 1996 Agreement to make the applicant entirely responsible for the costs of maintaining a level of +5.55m AOD within the Dock. The level of +5.55m AOD which ABP is seeking to impose is higher than the level which is required for the majority of vessels currently using the dock, and the applicant considers this is largely driven by ABP aspirations for the future development of the Dock which would see it servicing more of the larger vessels.
- 6.11 The applicant is currently considering a proposal which ABP has recently made under which Tata would be responsible for a proportion of the costs of impounding above +4.95m AOD. Negotiations are continuing and the applicant will update the ExA before the close of the examination.
- 6.12 The applicant does not have any comments on ABP's responses to Questions 4.4.1(c) and (f).

7. ENVIRONMENTAL PERMIT APPLICATION

- 7.1 As confirmed in the applicant's previous submissions, the Environmental Permit application was submitted to Natural Resources Wales (NRW) on 28 May 2015.
- 7.2 NRW confirmed on 5 June 2015 that the application has been 'duly made' for the purposes of paragraph 12(1) of Schedule 5 to the Environmental Permitting (England and Wales) Regulations 2010 (see **Appendix B**).

8. DETAILED QUALITATIVE RISK ASSESSMENT (DQRA)

- 8.1 NRW provided further comments on 28 May, and the finalised DQRA, which addressed these comments, was submitted to NRW and NPTCBC on 3 June 2015. Evidence of the submission of the finalised DQRA, which includes an explanation of the issues that have been addressed, is appended (**Appendix C**).

APPENDIX A

APPLICANT'S PREFERRED PROTECTIVE PROVISIONS FOR ABP

For the protection of Associated British Ports

1.—(1) In this Part of this Schedule—

“AB Ports” means Associated British Ports in its capacity as the owner, operator and harbour authority for the Port of Port Talbot;

“the dock” means the main inner dock at the Port of Port Talbot; and

“the minimum level” means +4.95 metres above ordnance datum Newlyn or any lower level that AB Ports and the undertaker agree at any time is acceptable within the dock for any given period.

(2) The provisions of this Part of this Schedule have effect for the protection of AB Ports unless otherwise agreed in writing between the undertaker and AB Ports.

2. – (1) Subject to the undertaker complying with paragraphs (3) and (4), AB Ports will use reasonable endeavours to ensure that the water level within the dock is maintained at the level which AB Ports considers necessary to ensure the satisfactory operation of the dock being not less than the minimum level.

(2) If the water level within the dock falls below the minimum level and remains below that level for more than 24 hours without AB Ports pumping water into the dock, the undertaker may, at its own cost, temporarily access the dock to pump water into the dock for the purpose of restoring the water level to the minimum level.

(3) The undertaker must notify AB Ports in writing before entering onto the dock for the purpose of exercising the right in sub-paragraph (2) and whilst exercising that right the undertaker must comply with any reasonable requirements imposed by AB Ports in the interests of health and safety and the security of the Port.

3. The undertaker must, on a monthly basis from commencement of the operation of the authorised development, provide to AB Ports records of the volumes of water abstracted from the River Afan (dock feeder channel) and the dock for the purpose of the authorised development and the Port Talbot steel works identifying the date and point of abstraction and the levels of water abstracted.

4.- (1) The undertaker must pay to AB Ports the costs reasonably incurred by AB Ports in:

(a) pumping water into the dock to maintain the minimum level and supplying, maintaining, repairing and renewing any plant or equipment used by AB Ports insofar as it is necessary for this purpose; and

(b) maintaining, repairing and cleansing the dock and taking such other actions as in the opinion of AB Ports may be necessary to prevent the creation of a nuisance or danger.

(2) AB Ports must, on receipt of a request from the undertaker, from time to time provide the undertaker free of charge with written evidence of the costs mentioned in sub-paragraph (1).

5. Differences arising between the undertaker and AB Ports under this Part of this Schedule must, unless otherwise agreed in writing between the undertaker and AB Ports, be determined by arbitration in accordance with article 27 (arbitration) of the Order.

APPENDIX B

LETTER FROM NRW CONFIRMING APPLICATION DULY MADE



Mr Jason Heatman
Environmental Compliance Manager
Tata Steel Strip Products UK
Port Talbot Steel Works
Port Talbot
SA13 2NG

Our ref: EPR/BL7108IM/V015

Your ref:

Date: 5th June 2015

Dear Mr Heatman

Your environmental permitting application is duly made

Application reference: EPR/BL7108IM/V015

Operator: Tata Steel Strip Products UK

Facility: Tata Steel Strip Products UK, Port Talbot Steel Works, Port Talbot, SA13 2NG

I'm writing to let you know that your application, received on 5th June 2015, is duly made as of 5th June 2015. Duly made means that we have all the information we need to begin determination. Determination is where we assess your application and decide whether or not we can allow what you've asked for. If we have to refuse your application, we'll explain why.

We may need to ask you for more information during determination. If we do we'll write to you to explain what we need and how long you have to reply.

Our Customer Charter explains that as long as you have provided us with all the information we need, included the appropriate fee and there are no complicating factors such as confidentiality decisions, you can expect us to determine your application within the following timescales:

- for transfer or partial transfer of an environmental permit within two months;
- for a standard permit (except for installations); minor or normal variation or surrender or partial surrender of an environmental permit within three months;
- for a standard permit for an installation, a bespoke permit or substantial variation to a permit (with public participation) within four months.

We want to give you a decision as quickly as possible, but the time it takes depends on what's in the application. We may need to agree a longer timescale with you:

- if the application is complex;
- if we need to ask you for more information about the technical aspects of your application;
- if there's a considerable level of interest from the public or other organisations.

If we haven't already spoken to you about when to expect our decision, one of our officers will contact you soon to explain this and deal with any questions you have. If your application

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Gwasanseth Trwyddedu, Cyfoeth Naturiol Cymru, Tŷ Cambria, 29 Heol Casnewydd, Caerdydd, CF24 0TP
Permitting Service, Natural Resources Wales, Cambria House, 29 Newport Road, Cardiff, CF24 0TP

Gwefan/Website www.cyfoethnaturiolcymru.gov.uk
www.naturalresourceswales.gov.uk

Croesewir gohebiaeth yn y Gymraeg a'r Saesneg
Correspondence welcomed in Welsh and English

contained a request for confidentiality we will write to you separately about our decision on that.

We must advertise new bespoke applications, standard rules applications for installations and substantial variations on our website. We explain more about this in our Public Participation Statement.

If you have any questions please phone our Customer Services Centre on 0300 065 3000 and they will put you in touch with one of our Permit Receipt Centre advisors or email permitreceiptcentre@naturalresourceswales.gov.uk.

Yours sincerely



Victoria Seller
Senior Permitting Officer (Regulated Industry)

APPENDIX C

LETTER ACCOMPANYING SUBMISSION OF FINALISED DQRA



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Your Ref :
Our Ref : LOVH4069/001/MT

03 June 2015

Natural Resources Wales
Maes Newydd
Britannic Way
Neath
Port Talbot
SA10 6JQ

For the attention of Joanne Fitton

Dear Sirs

PORT TALBOT STEELWORKS (POWER GENERATION ENHANCEMENT) ORDER
DETAILED QUANTITATIVE RISK ASSESSMENT
RESPONSE TO NRW COMMENTS ON THE CONTROLLED WATERS DQRA

We are pleased to enclose the full DQRA report on the above site and have also provided responses below to the comments on the previously issued DQRA, as supplied to ESG by email on the 20th May 2015 (note that full discussion and justification of the model parameters is included in the report which should be read in full alongside a review of the revised remedial targets spreadsheets).

Level 1 Soils

- FOC values are site specific and, for the Made Ground across the site, have been derived from 21 no. site specific measurements. FOC results from samples that contained significantly elevated concentrations of total PAHs and total TPH have not been included in the calculation of the average FOC in soil, as elevated concentrations of hydrocarbons can affect the laboratory measured total organic carbon (TOC). The samples used for the FOC calculations, together with the respective PAH and TPH concentrations are summarised in Table C3, presented in Appendix C of the ESG H4069/ DQRA Report, dated June 2015.

Level 2 Soils

- Following the NRW comments the value used for the thickness of the pollutant plume in the aquifer at its source was reviewed by ESG and is now set as 11 m, which is slightly less than the aquifer thickness and is also the thickness of the mixing zone specified in Level 2 Soil. The adopted mixing zone and pollutant plume thicknesses are considered appropriate based on the groundwater observations and sample analysis data which indicate that elevated concentrations of the contaminants of concern, and in particular naphthalene, have been detected to significant depths within the aquifer. The presence of elevated concentrations at depths within the aquifer may also indicate that, already dispersed, contamination is migrating from up gradient to the site.
- The source area for the models is deemed to be the whole of the site. Although three 'hotspot' areas of visible / olfactory hydrocarbon contamination were identified during the site investigation, there were areas and depths of soil that were not accessible for sampling; there



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is, therefore, the potential for higher concentrations of contaminants or additional 'hotspots' to be encountered during the earthworks phase of the project in other parts of the site. Furthermore, a review of the distribution of the groundwater concentrations across the indicated that the benzene and naphthalene marker compounds exceeded the adopted EQS in boreholes across the site without any clear indication that there is a specific source area with the remainder of the site being unaffected. Therefore selecting source area to be modelled as the whole of the site is believed to be both conservative and representative of the current conditions on site.

- The hydraulic conductivity (set to 0.146 m/d) is site specific and based on eight permeability (rising head) tests undertaken on site. The permeability tests were carried out in installations with response zones in a variety of materials and are therefore considered representative of the ground conditions across the site. The hydraulic conductivities measured were in the order of 10^{-6} or 10^{-7} m/s (with the exception of two outliers). The site specific hydraulic conductivities are well within the range of hydraulic conductivities specified for fine sand (min 2×10^{-7} max 2×10^{-6}), as presented in the Consim help file and are therefore considered appropriate for the modelling of the aquifer pathway beneath the site. The permeability test sheets are included in Appendix B of the ESG H4069/ DQRA Report, dated June 2015.
- Following the NRW comments regarding the hydraulic gradient on site being calculated using monitoring data from boreholes, between which an obstruction was encountered during the site investigation, ESG reviewed the available data and selected alternative monitoring data from two sets of selected boreholes, between which no known buried structures are present. Monitoring data from BH2 - BH4 and BH5 - BH7 have been used to calculate the prevalent hydraulic gradient on site. The calculated hydraulic gradient for both sets of boreholes was consistent at 0.0021. This value has therefore been deemed representative and used in the RTM models.

Level 3 Soils

- The NRW comments regarding the use of average groundwater results used as the input parameters, although it appears to be referring to the Level 3 Soil of the model, it is assumed that this query should have been referring to Level 3 Groundwater in the model, and in particular to the 'initial contaminant concentration in groundwater at plume core' input parameter. For this parameter the average groundwater results were used for the whole of the site which is considered to be the most representative 'source area', as discussed above. In the Level 3 Soils of RTM spreadsheet the user has to select between three options for the input parameter 'source concentration': soil leachate concentration as mg/l, soil concentration as mg/kg or assumed concentration. For the present RTM model, the average leachate concentrations for all the inorganic contaminants have been used, for samples from across the site, as discussed above. Leachate results for organic contaminants are considered to be representative, due to the nature of the laboratory analysis and are usually not accepted as valid results by regulators. Therefore, when modelling organic contaminants of concern, the 'source concentration' cell in Level 3 Soil has been left blank. Note that the models are being used to derive remedial targets and the input of source concentrations has no effect on the calculated values.

Level 3 Groundwater

- Following the NRW comments, ESG reviewed several literature sources and adjusted all half lives using anaerobic and more conservative (higher) values. For full details reference should be made to Table C1, presented in Appendix C of the ESG H4069/ DQRA Report, dated June 2015. With regard to the NRW comment regarding the potential for aerobic degradation to completely degrade all the contamination on site leaving none detectable in the water, we would comment that although we have now adopted anaerobic half lives as suggested by NRW, the ongoing presence of significant free phase on the groundwater and potentially as

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yet undetected areas of gross contamination beneath buried structures means that contamination of the water in the vicinity of these sources is to be expected. It is anticipated that source removal during remediation will allow reductions in the dissolved phase contamination within those source areas to be observed in due course.

- Justifications for considering the whole of the site as the 'source' are detailed above.
- A literature value, equal to the specific yield from Brassington (1998) Field Hydrology (pp72-73) for till (mainly sand), has now been used for effective porosity (16%) which is believed to be the most conservative representative literature value for the aquifer beneath the site. As discussed above the hydraulic conductivity (K) is site specific as opposed to from literature values for any particular soil type and is based on eight permeability (rising head) tests undertaken on site in installations with response zones in a variety of materials. It is therefore considered representative of the ground conditions across the site. Please refer to comment regarding hydraulic conductivity above and details within the report.

We trust that the enclosed report and discussion above is satisfactory to NRW and look forward to receiving your response. In the meantime, we will progress the options appraisal and remediation strategy based on the recommendations of the DQRA report.

Yours faithfully
for ESG



Maria Tsamakli
Senior Scientist
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