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Case No: HT-2019-000259

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES
TECHNOLOGY AND CONSTRUCTION COURT (KBD)

Rolls Building
Fetter Lane, London EC4A 1NL

Date: 20 December 2022

Before :

THE HONOURABLE MR JUSTICE PEPPERALL

Between :

ENERGY WORKS (HULL) LIMITED

Claimant

- and -

(1) MW HIGH TECH PROJECTS UK LIMITED
(2) M+W GROUP GMBH

Defendants

- and -

OUTOTEC (USA) INC.

Third Party

Judgment
(No. 1)

Stephen Dennison KC, Felicity Dynes, Sanjay Patel and Mathias Cheung
(instructed by **Fenwick Elliott LLP**) for the **Claimant**
Jonathan Acton Davis KC, William Webb, Ebony Alleyne and Thomas Saunders
(instructed by **Clyde & Co. LLP**) for the **Defendant**
Adrian Williamson KC and Paul Bury
(instructed by **Walker Morris LLP**) for the **Third Party**

Hearing dates: 10, 11, 14, 15, 16, 17, 18, 21, 22, 23, 24, 29 & 30 June,
1, 2, 5, 6, 7 & 8 July, 8, 9 & 10 September 2021, and 5 December 2022

Further submissions: 25 & 30 November and 9 & 16 December 2022

Approved Judgment

I direct that no official shorthand note shall be taken of this Judgment
and that copies of this version as handed down may be treated as authentic.

	Paragraph
INTRODUCTION	1
SUMMARY OF MY FINDINGS.....	5
THE PROCESS OF HANDING DOWN THIS JUDGMENT	8
THE EVIDENCE	18
THE PROPER APPROACH.....	18
ROY MEAKIN.....	20
FRESH EVIDENCE.....	23
STATEMENTS OF CASE	26
THE PRINCIPAL CONTRACTS	30
APPROACH TO CONTRACTUAL CONSTRUCTION.....	32
IMPLIED TERMS	33
EWB'S TERMINATION CLAIM.....	37
TERMINATION FOR CONTRACTOR'S DEFAULT	37
TERMINATION PURSUANT TO CLAUSE 44.....	37
THE CONTRACTUAL RIGHT TO AN EXTENSION	41
THE CLAIMS FOR AN EXTENSION.....	43
SUMMARY.....	44
CONTRACTUAL PROVISIONS CONCERNING THE DELIVERY OF RDF.....	46
THE KEY OBLIGATIONS.....	46
THE RDF SPECIFICATION	50
UNACCEPTABLE RDF	53
QUALITY MANAGEMENT SYSTEM.....	55
THE FUEL SPECIFICATION.....	59
PERFORMANCE GUARANTEES	63
SUMMARY.....	68
M+W'S ALLEGED RIGHT TO WITHHOLD PERFORMANCE	735
EXTENSION OF TIME CLAIMS: THE ALLEGATIONS OF BREACH	84
ALLEGATION 1: NO DELIVERIES OF RDF	84
ALLEGATION 2: NON-COMPLIANT RDF	101
ALLEGATION 3: NO APPROPRIATE QUALITY MANAGEMENT SYSTEM	130
ALLEGATION 4: NO APPROPRIATE QUALITY MANAGEMENT SYSTEM THAT WAS CAPABLE OF ENSURING THAT COMPLIANT RDF WAS SUPPLIED TO SITE.....	139
ALLEGATION 5: FAILURE TO CO-OPERATE.....	166
ALLEGATION 6: FAILING TO DEAL WITH M+W FAIRLY AND OPENLY	166
SUMMARY.....	174
EXTENSION OF TIME CLAIMS: CAUSATION.....	175
THE PROPER APPROACH TO THE DELAY CLAIMS	175
THE GASIFIER DELAYS	177
PERIOD 1: 1 JUNE TO 14 AUGUST 2018.....	236
PERIOD 2: 9 NOVEMBER 2018 TO 4 FEBRUARY 2019	254
PERIOD 3: 5 FEBRUARY TO 4 MARCH 2019.....	264
THE ABANDONED CLAIMS	266
EXTENSION OF TIME CLAIMS: NOTIFICATION.....	267
THE NOTIFICATION REQUIREMENTS	268
THE NOTIFICATIONS RELIED UPON	271
CONCLUSIONS ON NOTIFICATION	290
EXTENSION OF TIME CLAIMS: CONCLUSIONS	291
TERMINATION OF THE EPC CONTRACT.....	294
TERMINATION PURSUANT TO CLAUSE 44.....	294
REPUDIATION AT COMMON LAW	295
CONCLUSIONS.....	304

QUANTUM OF EWH'S DELAY & TERMINATION CLAIMS.....	305
EWH'S CLAIM FOR DAMAGES FOR DELAY	306
THE CONTRACTUAL RIGHT TO LIQUIDATED DAMAGES.....	307
THE ALTERNATIVE CLAIM FOR GENERAL DAMAGES	316
THE CLAIM FOR DAMAGES UPON TERMINATION.....	317
THE PROPER APPROACH TO THE DAMAGES CLAIM	317
THE DELAY DAMAGES CAP	319
EXCLUSION & LIMITATION CLAUSES.....	321
WILFUL DEFAULT.....	323
CAUSATION ISSUES.....	350
TERMINATION CLAIM: (1) BLACK & VEATCH COSTS.....	355
THE CLAIM.....	355
THE ENGAGEMENT OF BLACK & VEATCH.....	359
CAUSATION.....	373
THE MITIGATION ARGUMENTS.....	375
TERMINATION CLAIM: (2) ADDITIONAL FINANCING COSTS.....	382
THE CLAIM.....	382
THE VIABILITY OF THE PROJECT.....	387
THE RELEVANCE OF THE DELAY DAMAGES CAP	390
IS THE CLAIM LIMITED TO THE COSTS OF COMPLETION?.....	391
THE LOSS OF REVENUE EXCLUSION.....	394
OTHER ARGUMENTS.....	398
THE ASSUMPTIONS.....	402
CONCLUSIONS.....	409
TERMINATION CLAIM: (3) SUBCONTRACT COSTS.....	410
THE CLAIM.....	410
THE EVIDENCE.....	413
DID EWH ACT UNREASONABLY BY ENTERING INTO NEW CONTRACTS?	424
WERE THE WORKS DONE WITHIN THE SCOPE OF M+W'S CONTRACT?	427
CONCLUSIONS.....	429
TERMINATION CLAIM: (4) COMMISSIONING SUPPORT	431
THE CLAIM.....	431
DID EWH ACT UNREASONABLY BY ENTERING INTO NEW CONTRACTS?	434
WERE THE WORKS DONE WITHIN THE SCOPE OF M+W'S CONTRACT?	436
QUANTUM.....	437
TERMINATION CLAIM: (5) OPERATION & MAINTENANCE COSTS	440
ADDITIONAL O&M COSTS PENDING THE APPOINTMENT OF BLACK & VEATCH.....	441
THE EXTENDED MOBILISATION CLAIM.....	444
THE BISL CLAIM.....	450
CONCLUSIONS.....	462
OTHER TERMINATION CLAIMS.....	463
(6) MAJOR CONSUMABLES.....	464
(7) MINOR CONSUMABLES	465
(8) TECHNICAL SUPPORT	466
(9) SPARES	467
(10) ELECTRICITY.....	468
(11) WATER.....	469
(12) CONSTRUCTION INSURANCE.....	470
(13) SECURITY	471
(14) LEASE COSTS.....	472
SUMS OUTSTANDING AT TERMINATION	473

EWH'S DEFECT CLAIMS	474
DEFECT 28: NOISE ISSUES	477
THE PROBLEM.....	478
THE ALLEGATIONS.....	483
THE CONTRACTUAL OBLIGATIONS.....	484
ON-SITE NOISE LEVELS.....	491
OFF-SITE NOISE LEVELS	494
ANALYSIS.....	501
QUANTUM.....	516
DEFECT 23: SLAGGING	533
BACKGROUND	537
THE MELTING POINT OF ASH	542
THE TEMPERATURE IN THE VAPOUR SPACE	546
THE QUALITY OF THE FUEL IN 2019-20.....	549
THE EXPERTS' CONCLUSIONS.....	560
ANALYSIS.....	567
CAUSATION & QUANTUM.....	576
DEFECT 17: THE FUEL-FEED SYSTEM.....	588
THE ALLEGATIONS.....	590
METERING BIN SWITCHES AND BIN LEVEL TRANSMITTERS.....	600
QUAD SCREWS	603
GEARBOXES.....	607
CAUSATION & QUANTUM.....	609
DEFECT 26: DEMINERALISED WATER PLANT	612
THE CLAIM.....	612
THE EVIDENCE.....	616
ANALYSIS.....	624
CAUSATION & QUANTUM.....	627
DEFECT 9: INADEQUATE CORROSION PROTECTION.....	635
THE CLAIM.....	635
PAINT SYSTEMS.....	639
THE EVIDENCE.....	642
ANALYSIS.....	650
CAUSATION & QUANTUM.....	651
DEFECT 32: BLOCKED BED CONES	660
THE CLAIM.....	660
THE EXPERT EVIDENCE	664
ANALYSIS.....	672
DEFECT 24: MPT PLANT SEPARATION EFFICIENCY	673
THE CLAIM.....	673
THE EVIDENCE.....	679
ANALYSIS.....	689
REMEDIAL COSTS.....	693
MINOR DEFECT CLAIMS	695
LIABILITY OF M+W GROUP GMBH.....	696
M+W'S COUNTERCLAIM	698
THE THIRD-PARTY PROCEEDINGS.....	699
OVERVIEW	699
M+W'S CONTRIBUTION CLAIM: LEGAL PRINCIPLES.....	704
THE ASSIGNMENT OF THE BENEFIT OF THE SUBCONTRACT.....	704
THE CONTRIBUTION CLAIM	709
OUTOTEC'S LIABILITY UNDER THE SUBCONTRACT.....	715
NOTIFICATION	723
OUTOTEC'S LIABILITY UNDER THE WARRANTY.....	725
CONCLUSIONS.....	726

M+W'S CONTRIBUTION CLAIM: DEFECTS.....	728
DEFECT 28: NOISE ISSUES	728
DEFECT 23: SLAGGING	741
DEFECT 17: THE FUEL-FEED SYSTEM	742
DEFECT 9: INADEQUATE CORROSION PROTECTION.....	750
DEFECT 32: BLOCKED BED CONES	756
OUTOTEC'S COUNTERCLAIM: THE MILESTONE PAYMENTS	757
MILESTONE 7.....	765
MILESTONE 8.....	775
MILESTONE 9.....	782
MILESTONE 10	788
MILESTONE 11	789
CONCLUSIONS IN RESPECT OF THE MILESTONE PAYMENTS	806
OUTOTEC'S COUNTERCLAIM: THE DEFENCE OF ABATEMENT.....	807
THE NATURE OF ABATEMENT.....	808
EXCLUDING THE RIGHT OF ABATEMENT.....	811
DOES THE REMEDY OF ABATEMENT SURVIVE ASSIGNMENT?.....	816
CONCLUSIONS.....	822
OUTOTEC'S COUNTERCLAIM: WRONGFUL DEDUCTIONS	823
THE CLAIM.....	823
RECHARGES.....	824
LIQUIDATED DAMAGES UNDER THE SUBCONTRACT	825
PAYMENT PROVISIONS UNDER THE SUBCONTRACT	838
TRUE DEFENCES, SET-OFFS AND COUNTERCLAIM	842
ANALYSIS.....	845
POST-TRIAL EVENTS	853

THE HONOURABLE MR JUSTICE PEPPERALL:

INTRODUCTION

1. By an Engineering, Procurement & Construction contract (commonly referred to as an EPC contract) dated 20 November 2015, MW High Tech Projects UK Limited (“M+W”) agreed to design and build an energy-from-waste plant in Hull for Energy Works (Hull) Limited (“EWH”) for a total price of £153,897,518. The plant was intended to process and then gasify refuse-derived fuel (“RDF”) in order to generate a sustainable source of electricity.
2. The plant comprised two essential components:
 - 2.1 The mechanical pre-treatment plant (the “MPT”) which processed the RDF into Fuel. This plant sorted and shredded the incoming RDF and removed unsuitable and inert material. It was designed and built by Sutco UK Limited pursuant to its sub-contract with M+W. The MPT is not the focus of this litigation.
 - 2.2 The thermal or gasifier train and the steam system which gasified the Fuel and generated electricity. Gasification is the process of converting carbons to syngas consisting mainly of hydrogen and carbon monoxide. It is achieved by heating the carbons, here the processed RDF, to very high temperatures while carefully controlling the levels of oxygen so that the carbons are gasified rather than combusted. The syngas is then combusted to create very hot flue gases which are in turn used to power a steam generator. By a subcontract dated 20 November 2015, Outotec (USA) Inc. (“Outotec”) agreed to design, manufacture, supply and advise on the commissioning and testing of the gasifier at Hull for a total price of US\$39,874,806.40.
3. On 4 March 2019, almost 11 months after the contractual date for completion, the gasifier plant had still not been commissioned and work had been suspended. Accordingly, EWH purported to terminate the EPC contract pursuant to clause 44.1(c), alternatively at common law. The principal issue in the main proceedings is whether EWH was entitled to terminate the EPC contract or M+W was entitled to an extension of time such that EWH’s notice took effect as a termination for convenience. Substantial claims and cross claims turn upon resolution of this central issue:
 - 3.1 EWH seeks damages from M+W and, pursuant to the terms of a guarantee from its parent company dated 20 November 2015, from M+W Group GmbH in the sum of £131,362,885.23.
 - 3.2 M+W counterclaims for a final payment alleged to be due pursuant to clause 42 of the EPC contract in the sum of £24,395,158.94.
4. EWH’s claim includes the sum of £9,943,504.40 in respect of alleged defects in the works. In the event that M+W is found liable for defects in the gasifier, it seeks a contribution from Outotec who in turn denies liability and counterclaims for unpaid sums alleged to have fallen due under the subcontract totalling US\$16,857,314.86.

SUMMARY OF MY FINDINGS

5. This judgment resolves the major heads of claim worth millions and tens of millions of pounds. The more modest defect claims and counterclaims will be dealt with in my second judgment.
6. For the reasons explained below, I make the following findings in the main proceedings:
- 6.1 M+W was not entitled to suspend commissioning of the plant (see paragraphs 73-83).
- 6.2 M+W was not entitled to any extension of time:
- a) EWH was in breach of contract in failing to deliver RDF that met the specifications for heavy metals and fines on various days in October and November 2018 and in failing to deliver RDF that was capable, when processed and blended, of passing the Fuel specification for net calorific value in November 2018 (see paragraphs 101-129).
 - b) M+W's other allegations of breach of contract are dismissed (see paragraphs 84-100 & 130-174.)
 - c) In any event, the claimed periods of delay were not caused by the alleged or established breaches of contract (see paragraphs 175-266).
 - d) M+W notified some but not all of its claims (see paragraphs 267-290).
 - e) The extension of time claims therefore fail (see paragraphs 41-45 & 291-293).
- 6.3 EWH was entitled to and did terminate the EPC contract for Contractor's Default pursuant to clause 44.1(c) (see paragraphs 37-40 & 294).
- 6.4 EWH was in any event entitled to and did terminate the EPC contract by reason of M+W's repudiation (see paragraphs 295-304).
- 6.5 Upon handing down this judgment, I shall hear counsel upon the causation issue that arises in view of my findings in respect of defect 23 (see paragraphs 350-354).
- 6.6 Subject to the causation issue which may affect some of the termination claims, EWH is entitled to liquidated damages for delay and damages upon termination of the EPC contract in excess of £117 million:

Head of claim	Award (£)	Paragraphs
Liquidated damages for delay	23,077,331.70	306-316
Termination claims		
1. Black & Veatch costs	8,321,716.61	355-381
2. Additional financing costs	53,119,794.00	382-409
3. Subcontract costs	19,422,445.71	410-430
4. Cost of commissioning support	1,973,985.34	431-439

5. Operation & maintenance costs	19,170,125.89	440-462
6-14. Other termination claims	11,822,071.43	463-472
Less agreed costs saved on termination	(15,269,533.00)	430
Sub-total	121,637,937.68	

Outstanding liabilities on termination	2,486,390.59	473
Less agreed credit for sums received pursuant to the call on the retention bond	(6,928,967.00)	
	£117,195,361.27	

6.7 EWH is entitled to further damages of at least £2,152,021.55 in respect of its major defect claims, being those individually pleaded at between £500,000 and £3.2 million:

Defect no.	Defect	Award (£)	Paragraphs
28	Noise issues	1,650,714.48	477-532
23	Over Fire Air / Under Fire Air slagging issues	Nil	533-587
17	Feeding system – screw and bin design	1,423.86	588-611
26	Defective demineralised water plant	193,241.46	612-634
9	Inadequate corrosion protection	154,835.00	635-659
32	Blocked bed cones	Nil	660-672
24	MPT plant separation efficiency	151,806.75	673-694
		£ 2,152,021.55	

6.8 EWH's further claims in respect of the twenty-six minor defects with an individual value under £500,000 will be addressed in my second judgment (see paragraph 695).

- 6.9 Further, I declare that M+W Group GmbH is liable under the parent company guarantee for the sums awarded against M+W in these proceedings (see paragraphs 696-697).
- 6.10 I dismiss M+W's counterclaim (see paragraph 698).
7. Further, for the reasons explained below, I make the following findings in the third-party proceedings:
- 7.1 Outotec's liability for defects is limited by clauses 37 and 45.2 to those matters properly notified under the subcontract (see paragraphs 715-727).
- 7.2 M+W's contribution claims in respect of defects 28, 23, 9 and 32 are dismissed (see paragraphs 728-741, 750-756).
- 7.3 M+W's contribution claim in respect of defect 17 succeeds in part and Outotec shall provide a 100% contribution in respect of such losses (see paragraphs 742-749).
- 7.4 Subject to the defence of abatement, Outotec's counterclaim in respect of milestones 7, 8, 9, 10 and 11 succeeds in the total sum of \$6,858,466.71 (see paragraphs 757-806).
- 7.5 M+W is entitled in principle to rely on the defence of abatement to reduce such liability. Upon handing down this judgment, I shall hear counsel further as to the consequences of such findings (see paragraphs 807-822).
- 7.6 I dismiss Outotec's counterclaim to recover liquidated damages deducted from the milestone payments but the claim for recharges succeeds (see paragraphs 823-852).

THE PROCESS OF HANDING DOWN THIS JUDGMENT

8. This dispute is high value, complex and highly technical. The information before me is vast and the electronic bundle runs to 142,037 pages. Putting that in context, a paper copy of the bundle would fill 474 lever arch files. Of that material, the EPC contract and its schedules run to 7,259 pages. The Outotec subcontract is less complex at 564 pages but is just one of forty subcontracts. The contractual documentation also includes a further seventy-nine agreements, financing documents, variations, warranties and leases. The parties served statements from 28 witnesses that run to over 1,900 pages. They also rely on expert evidence from 25 different experts whose combined reports run to over 8,500 pages. I have my own manuscript notes as well as transcripts of twenty-two days of evidence and submissions. Finally, the parties provided me with 1,894 pages of written submissions together with rather more compressed oral submissions over four days.
9. I should like at the outset to express my admiration for the extraordinary grasp of the detail of this complex dispute so clearly displayed by all counsel and for their skill in ensuring that this case was tried pretty much within its original time estimate. I also pay tribute to the enormous assistance that they provided to me throughout the trial and through their detailed written submissions which are of the very highest quality. The parties understandably focused their limited time at trial on the issues on which the most money rides. That laser-like focus has, however, come at some cost in that in writing this judgment it became increasingly evident that there were important areas of the case where the parties mounted no or very little challenge to their opponents' cases either through cross-examination or

submissions. Further, while counsel rightly focused on the tens of millions of pounds, it is unfortunate that the parties were not able to take a commercial view on issues worth as little as £1,000. Even given these factors, this judgment has taken far longer to hand down than I would have wished. It is not for the want of application, and I apologise to the parties for the inconvenience caused to them by my delay.

10. While this judgment is of substantial length, it necessarily does not deal with all of the evidence or argument before the court. Rather its focus is on deciding the pleaded issues and upon explaining my reasons as economically as possible for the decisions that I have reached. I acknowledge that, in a case of this size, it is possible for a judge to overlook a piece of evidence or a submission. Even if I have not, a party that loses on an issue might be left uncertain as to whether a particular piece of evidence or argument that is not expressly referred to in this judgment has been taken into account. Given the enormity of the evidence and submissions in this case, I therefore took the unusual step of expressly inviting the parties to identify any material piece of evidence or argument that was already before the court but which they considered might have been overlooked in my draft judgment. It was of course necessary to give sufficient time for this exercise to be completed properly that also took into account the lawyers' other commitments and their need to read back into the case. Accordingly, the handing down of this judgment has been delayed some weeks while this exercise has been completed.

11. Stephen Dennison KC and Jonathan Acton Davis KC, leading counsel for EWH and M+W respectively, welcome this approach. Adrian Williamson KC, leading counsel for Outotec, is, however, troubled. He submits that the circulation of a draft judgment is not the end of the beginning of the litigation, but rather the beginning of the end. He is right to contend that a very tight rein must be kept on further submissions after circulation of a draft judgment. In Egan v. Motor Services (Bath) Ltd (Note) [2007] EWCA Civ 1002, [2008] 1 W.L.R. 1589, Smith LJ observed, at [49]-[51]:
 - “49. I wish to add a few words to deprecate the practice which was adopted in this case of counsel writing to the judge, after a draft judgment has been provided, to ask him to reconsider his conclusions. It is a growing practice and in my view it should happen only in exceptional circumstances.
 50. The purpose of the judge providing a draft of the judgment before hand-down is to enable the parties to spot typographical, spelling and minor factual errors which have escaped the judge's eye. It is also to give the parties the opportunity to attempt to reach agreement on costs and to consider whether they wish to appeal. Consideration of such matters before hand-down can save costs. Circulation of the draft is not intended to provide counsel with an opportunity to reargue the issues in the case.
 51. Only in the most exceptional circumstances is it appropriate to ask the judge to reconsider a point of substance. Those circumstances might be, for example, where counsel feels that the judge had not given adequate reasons for some aspect of his/her decision. Then it may be appropriate to send a courteous note to the judge asking him/her to explain the reasons more fully. By way of further example, if the judge has decided the case on a point which was not properly argued or has relied on an authority which was not considered, the appropriate course will be to ask him/her either to reconvene for further argument or to receive written

submissions from both sides. Letters such as the one sent in this case, which sought to reopen the argument on a wide variety of points, should not be sent.”

12. Mr Williamson refers me to Gosvenor London Ltd v. Aygun Aluminium UK Ltd [2018] EWHC 227 (TCC), [2018] B.L.R. 353, at [46]-[51]. In Gosvenor, Fraser J circulated his draft judgment after a one-day hearing of an application for summary judgment. Circulation of the draft led to an application that the court should recall and reconsider its draft judgment. Fresh evidence was placed before the court and no doubt, if admitted, fresh submissions would have been heard upon the new evidence. In refusing to admit the new evidence and reconsider his judgment, Fraser J rightly said, at [52]:

“Very careful consideration must be given to such applications, and litigants should not be given the ability to have a second bite at the cherry. The distribution of a draft judgment under CPR Pt 40 should not be seen (as it seems to be, by many legal advisers currently) simply as an open invitation to embark upon an additional round of the litigation, remedying lacunae in their own evidence and raising further arguments. If a matter could have been raised at the first hearing, then it should be. If time is needed to deal with something, then the court must be asked for time – this will not always be given, but the matter must be dealt with then.”

13. I entirely agree with those observations. Fraser J was right that the opportunity to comment on a draft judgment is not generally the occasion to file further evidence or make fresh submissions. There are limited circumstances where the court will reopen the case and admit further evidence or argument. Citing Gosvenor is, however, to misunderstand the invitation that I extended to the parties in this case. My direction did not invite either new evidence or argument, but rather – in a very substantial case in which an enormous volume of material was presented in a compressed hearing – the identification of any evidence or argument that was already before the court but which one or other party believed I might have overlooked. That, in my judgment, is not to invite a second bite of the cherry but to remind me, lest it has been overlooked, of the finer details of the first bite.

14. In Spice Girls Ltd v. Aprilia World Service BV, The Times, 12 September 2000, a concession was made in the course of argument. Arden J, as she then was, circulated her draft judgment and, in the usual way, received lists of suggested typographical errors. The judgment was handed down and the judge then heard argument on consequential matters. Permission to appeal was sought on the basis that the judge had overlooked the concession. In reopening the matter and amending her findings of fact, Arden J said, at [9]:

“... it is clear that the court has jurisdiction to correct an error of material fact before the order is drawn (see for example Stewart v. Engel, The Times, 26 May 2000; Pittalis v. Sherefettin [1986] Q.B. 868; Charlesworth v. Relay Roads Ltd [2000] 1 W.L.R. 230). It inevitably happens with complex cases that from time to time a fact which is material is overlooked. But the jurisdiction to correct an error is to be exercised cautiously and sparingly, and the question of review should be raised as promptly as possible. An application to the court to vary a finding of fact is not to be encouraged as it may lead to groundless applications. In this instance, as I have said, Mr Mill’s approach was not to apply to the court to review its finding of fact but rather to use it as a basis for seeking permission to appeal. In my

judgment, an appeal is not the appropriate course where there are errors in judgments which can be corrected by the court which conducted the trial. To leave such matters to an appeal means further delay, uncertainty and costs, which is not in the interests of the litigants. The trial judge is in a strong position to consider the effect of the error in the context of the entire case.”

15. Again, I respectfully agree. No one is infallible, but in most cases a judge can be relatively confident that he or she is unlikely to have overlooked anything that might be material. As Arden J observed, in more complex cases the risk increases. Good practice where counsel believes that that might have happened is for the point to be drawn to the trial judge’s attention since it may be both difficult and inconvenient for any such error to be corrected on appeal. Difficult because the appeal court often defers to the findings of fact of a TCC judge in a highly technical dispute, and because - in order to do justice to any such ground of appeal - the appeal court might have to get to grips with a substantial volume of highly technical evidence. And inconvenient for the reasons identified by Arden J.
16. Further, in English v. Emery Reimbold & Strick Ltd [2002] EWCA Civ 605, [2002] 1 W.L.R. 2409, Lord Phillips MR said, in the context of the connected matter of a perceived lack of reasoning in a judgment, at [25]:

“If an application for permission to appeal on the ground of lack of reasons is made to the trial judge, the judge should consider whether his judgment is defective for lack of reasons, adjourning for that purpose should he find this necessary. If he concludes that it is, he should set out to remedy the defect by the provision of additional reasons refusing permission to appeal on the basis that he has adopted that course. If he concludes that he has given adequate reasons, he will no doubt refuse permission to appeal.”
17. Properly understood, my direction was therefore no more than an express invitation to consider that which the parties should have been considering in any event coupled with the time to ensure that they could fairly be expected to raise any matters of concern in a case of this size. In the event, while I am grateful for the helpful suggestions made by all counsel, the only substantive amendment made as a result of this process is a modest change to the quantum of the contribution that would have been ordered in respect of defect 28 had such claim been properly notified. While I have not found it necessary to amend the text in order to deal expressly with each and every point raised with me after circulation of the draft judgment, I confirm that all matters raised have been carefully considered.

THE EVIDENCE

THE PROPER APPROACH

18. This is a document-heavy dispute in which the best evidence comes not from the lay witnesses or their carefully crafted witness statements, but from the contemporaneous documents. In a well-known passage in Armagas Ltd v. Mundogas SA (The Ocean Frost) [1985] 1 Lloyd’s Rep 1, Robert Goff LJ (as he then was), said that it was necessary to approach the assessment of factual witnesses “by reference to the objective facts proved independently of their testimony, in particular, by reference to the documents in the case, and also pay[ing] particular regard to their motives and to the overall probabilities.”

19. In Gestmin SGPS SA v. Credit Suisse (UK) Ltd [2013] EWHC 3560 (Comm), Leggatt J (as he then was) made some perceptive observations as to the fallibility of human memory, conventional misconceptions as to its reliability (at [16]-[18]) and the honest distortion of memory through the litigation process (at [19]). I agree with the judge's conclusion, at [22]:

“... the best approach for a judge to adopt in the trial of a commercial case is, in my view, to place little if any reliance at all on witnesses' recollections of what was said in meetings and conversations, and to base factual findings on inferences drawn from the documentary evidence and known or probable facts. This does not mean that oral testimony serves no useful purpose – though its utility is often disproportionate to its length. But its value lies largely, as I see it, in the opportunity which cross-examination affords to subject the documentary record to critical scrutiny and to gauge the personality, motivations and working practices of a witness, rather than in testimony of what the witness recalls of particular conversations and events. Above all, it is important to avoid the fallacy of supposing that, because a witness has confidence in his or her recollection and is honest, evidence based on that recollection provides any reliable guide to the truth.”

ROY MEAKIN

20. Generally, I consider that the lay witnesses gave clear and straightforward evidence and sought to assist the court rather than advance the interests of their employers. I regret to say that the same was not true of M+W's primary witness, Roy Meakin. As will become evident, I reject Mr Meakin's evidence on a number of key issues where, in my judgment, his evidence was either contradicted or not supported by contemporaneous records. I find that he allowed himself to become an advocate in M+W's cause and repeatedly strained to explain events according to its narrative rather than simply and straightforwardly assisting the court with his recollection.
21. I am confirmed in this assessment by noting that Mr Meakin previously behaved in this way as a witness in respect of the Hull project. He was a key witness for M+W in Premier Engineering (Lincoln) Ltd v. MW High Tech Projects UK Ltd [2020] EWHC 2484 (TCC) before Stuart-Smith J, as he then was. The judge observed, at [96], that while his evidence had been reliable and clear in some areas, his evidence about a key meeting had been “conspicuously vague and unsatisfactory.” The judge did not accept that his memory of the meeting was as poor as he made out. Further, the judge rejected, at [51] and [74], Mr Meakin's claims that important matters were discussed in undocumented meetings and conversations. So too in this case, as I explain below, I do not accept Mr Meakin's evidence that critical details as to the anticipated programme for Outotec's further works to the gasifier were provided in undocumented conversations.
22. Further, I note that in Premier, Stuart-Smith J observed that Mr Meakin attempted to “duck and weave” in order to put M+W in a more commercially advantageous position. There are, in my judgment, echoes of the same approach in this case in the conflict between the position that Mr Meakin took as against EWH that the Fuel was not compliant and his insistence to Outotec that it was “fine.” Likewise, in the conflict between his insistence in January 2019 that the refiring of the gasifier had to be suspended because of the poor quality

of the Fuel, and his contemporaneous assertion to Outotec that the problem was its failure to complete the necessary remedial works. With regret, I accept EWH's submission that Mr Meakin lacked commercial integrity in such dealings.

FRESH EVIDENCE

23. Each party formally closed its case after the conclusion of the evidence. The case was then adjourned for some weeks to allow the parties to prepare their closing submissions. In the interim, EWH gave further disclosure and sought to rely on some fresh documents in the course of its closing submissions.
24. It is common ground that the duty of disclosure is continuing and that EWH was required to disclose the fresh documents. That conventional position is retained under the disclosure pilot applicable in the Business & Property Courts by paragraph 3.3 of Practice Direction 51U. Where the further disclosure adversely affects claims that have already been advanced by EWH then I also accept that it has acted properly in drawing such disclosure to the court's attention. Doing so avoids the risk of misleading the court and is consistent with the duty to act honestly in all matters of disclosure as required by paragraph 3.1(5) of the Practice Direction. Indeed, EWH has quite properly reduced some heads of claim where the new documents do not support the case that it presented at trial.
25. There is, however, a distinction between giving further disclosure and admitting new material into evidence. I observed that further evidence could certainly be adduced after the close of the parties' cases either by agreement or upon an application to reopen EWH's case. In response, Mathias Cheung, junior counsel for EWH, referred me to the decision of Norris J in Swift Advances plc v. Ahmed [2015] EWHC 3254 (Ch) in which the judge allowed a party to reopen its case to admit a new document that was found after the closing speeches but before the judge had completed his assessment of the evidence. The defendants were able to put in further witness statements and offered the opportunity to give further oral evidence in respect of the new document. Swift is simply an instance of a case in which a judge acceded to an application to reopen a party's case. In the event, the matter was not agreed, and no application was made to reopen EWH's case. Accordingly, this judgment is given on the basis of the material properly put in evidence at trial and I have not considered the new unproven documents.

STATEMENTS OF CASE

26. Throughout this trial, each party has criticised one or other of its opponents for seeking to advance an unpleaded case. The point was first made on the opening day when Mr Dennison expressed some concern that there might be cross-examination or argument by M+W on the basis of unpleaded issues. He made plain that he would object to such course being taken. In response, I made the following uncontroversial observation:

“My basic approach always to pleaded issues is that if somebody wants to amend, they must make an application. If something is shown to be within the current pleadings such that that's not necessary, then so be it. If it's outwith the current pleading, then it seems to me that the pleadings both define and confine the issues in a case, and therefore, absent being persuaded that something is within the current pleaded case or a successful application to amend, then it's out.”

27. Much later in the trial, Felicity Dynes, junior counsel for EWH, objected to a line of questioning on the basis that Mr Acton Davis appeared to be pursuing an unpleaded case. Mr Acton Davis assured me that his purpose in asking the particular questions was to test the assumptions behind the witness's evidence. I allowed him to do so but cautioned all parties:
- “As I said right at the beginning, if it's right that something falls outwith the pleadings, then the mere fact of having presented the argument or having asked the questions doesn't imply any amendment to your pleadings.”
28. As will be apparent, I do not subscribe to the view that statements of case are only of historical interest at trial. In complex commercial litigation, cases will be amended and often re-amended, or even re-re-amended as in this case. Certain parts of a case will be abandoned, and other pleas might fall away only at trial. Parties and judges are not, however, expected to divine other parties' cases by trawling through voluminous witness statements, expert reports and written submissions, but rather are entitled to take the view that the purpose of the evidence served is to seek to prove the pleaded case rather than to advance a new one. Such observation is particularly apposite here, where, as already noted, the witness evidence runs to over 10,000 pages. In such high value and complex litigation with the highest quality legal representation, it is particularly important that pleadings define and confine the issues.
29. No applications to amend were made by any party at trial. Accordingly, each is restricted to its pleaded case. Such restriction is a complete answer to some of the arguments that were presented at trial.

THE PRINCIPAL CONTRACTS

30. The EPC contract between EWH (as Purchaser) and M+W (as Contractor) incorporated the fifth edition of the Model Form of Conditions of Contract for Process Plants suitable for Lump Sum Contracts in the United Kingdom, the “Red Book”, issued by the Institution of Chemical Engineers in 2013, with bespoke provisions set out in the Special Conditions. EWH appointed Fichtner Consulting Engineers Limited to act as the Project Manager. M+W appointed Roy Meakin to act as the Contract Manager.
31. The Outotec subcontract incorporated the fourth edition of the Model Form of Subcontract Conditions, the “Yellow Book”, issued by the Institution of Chemical Engineers in 2013, with bespoke provisions set out in the Special Conditions. On 18 February 2016, Outotec also provided a collateral warranty to EWH by way of deed.

APPROACH TO CONTRACTUAL CONSTRUCTION

32. Issues of contractual construction fall to be determined in accordance with the well-known principles identified by the House of Lords and the Supreme Court in a series of recent cases. Such principles were authoritatively summarised by Lord Neuberger in Arnold v. Britton [2015] UKSC 36, [2015] A.C. 1619, at [15]:

“When interpreting a written contract, the court is concerned to identify the intention of the parties by reference to ‘what a reasonable person having all the background knowledge which would have been available to the parties would have understood them to be using the language in the contract to mean’, to quote Lord Hoffmann in Chartbrook Ltd v. Persimmon Homes Ltd [2009] A.C. 1101, para. 14. And it does so by focussing on the meaning of the relevant words ... in their documentary, factual and commercial context. That meaning has to be assessed in the light of (i) the natural and ordinary meaning of the clause, (ii) any other relevant provisions of the lease, (iii) the overall purpose of the clause and the lease, (iv) the facts and circumstances known or assumed by the parties at the time that the document was executed, and (v) commercial common sense, but (vi) disregarding subjective evidence of any party’s intentions.”

IMPLIED TERMS

33. As Lord Neuberger observed in Marks & Spencer plc v. BNP Paribas Securities Services Trust Co. (Jersey) Ltd [2015] UKSC 72, [2016] A.C. 742, at [28], it is only after the process of construing the express words of a contract is complete that the court can consider the issue of the implication of terms. Here, the court is concerned with what Sir Thomas Bingham M.R. (as he then was) described in Philips Electronique Grand Public SA v. British Sky Broadcasting Ltd [1995] E.M.L.R. 472 (CA), at page 481, as:

“a different and altogether more ambitious undertaking: the interpolation of terms to deal with matters for which, ex hypothesi, the parties themselves have made no provision.”

34. In BP Refinery (Westenport) Pty Ltd v. Shire of Hastings (1977) 180 CLR 266 (PC), Lord Simon said, at page 283:

“for a term to be implied, the following conditions (which may overlap) must be satisfied: (1) it must be reasonable and equitable; (2) it must be necessary to give business efficacy to the contract, so that no term will be implied if the contract is effective without it; (3) it must be so obvious that ‘it goes without saying’; (4) it must be capable of clear expression; (5) it must not contradict any express term of the contract.”

35. In Philips, Sir Thomas Bingham M.R. said, at page 481, that this passage “distils the essence of much learning on implied terms. But its simplicity could be almost misleading.” He wisely cautions judges, at page 482:

“The question of whether a term should be implied, and if so what, almost inevitably arises after a crisis has been reached in the performance of the contract. So the court comes to the task of implication with the benefit of hindsight, and it is tempting for the court then to fashion a term which will reflect the merits of the situation as they then appear. Tempting, but wrong ...

... it is not enough to show that had the parties foreseen the eventuality which in fact occurred they would have wished to make provision for it, unless it can also be shown either that there was only one contractual solution or that one of several possible solutions would without doubt have been preferred.”

36. In the Marks & Spencer case, Lord Neuberger added six comments to this summary of the law, at [21]:

“First, in Equitable Life Assurance Society v. Hyman [2002] 1 A.C. 408, 459, Lord Steyn rightly observed that the implication of a term was ‘not critically dependent on proof of an actual intention of the parties’ when negotiating the contract. If one approaches the question by reference to what the parties would have agreed, one is not strictly concerned with the hypothetical answer of the actual parties, but with that of notional reasonable people in the position of the parties at the time at which they were contracting.

Secondly, a term should not be implied into a detailed commercial contract merely because it appears fair or merely because one considers that the parties would have agreed it if it had been suggested to them. Those are necessary but not sufficient grounds for including a term.

However, and thirdly, it is questionable whether Lord Simon’s first requirement, reasonableness and equitableness, will usually, if ever, add anything: if a term satisfies the other requirements, it is hard to think that it would not be reasonable and equitable.

Fourthly, ... although Lord Simon’s requirements are otherwise cumulative, I would accept that business necessity and obviousness, his second and third requirements, can be alternatives in the sense that only one of them needs to be satisfied, although I suspect that in practice it would be a rare case where only one of those two requirements would be satisfied.

Fifthly, if one approaches the issue by reference to the officious bystander, it is ‘vital to formulate the question to be posed by [him] with the utmost care’, to quote from Lewison, The Interpretation of Contracts ...

Sixthly, necessity for business efficacy involves a value judgment. It is rightly common ground on this appeal that the test is not one of ‘absolute necessity’, not least because the necessity is judged by reference to business efficacy. It may well be that a more helpful way of putting Lord Simon’s second requirement is, as suggested by Lord Sumption in argument, that a term can only be implied if, without the term, the contract would lack commercial or practical coherence.”

EWH’S TERMINATION CLAIM

TERMINATION FOR CONTRACTOR’S DEFAULT

TERMINATION PURSUANT TO CLAUSE 44

37. By clause 13 and Schedule 11 to the EPC contract, M+W was required to complete the works to allow Take Over to be certified by 9 April 2018, being 871 days from the date of the contract. By clause 15 and Schedule 12, M+W was liable to pay liquidated damages, subject to the Delay Damages Cap, at the rate of £84,800 per day in the event that completion was delayed beyond such date save that the right to damages would be suspended insofar as the Project Manager notified the parties that M+W was entitled to an extension of time pursuant to clause 14. Schedule 12 set the Delay Damages Cap at 15% of the contract price.

38. It is common ground that the works had not been completed and Take Over had still not been certified at termination on 4 March 2019. At the daily rate of £84,800, and subject to M+W's argument that it was entitled to an extension of time, such cap was reached on 7 January 2019 some 56 days before termination.
39. Clause 44.1(c), as amended, provides:
- “If: ...
- (c) (subject to clause 15B.1), the Contractor having paid or allowed or becoming liable for a sum or sums in aggregate equal to or greater than the Delay Damages Cap; ...
- then, without prejudice to any other rights or remedies, the Purchaser may forthwith issue a Notice terminating the employment of the Contractor under the Contract with immediate effect.”
40. Accordingly, unless M+W was entitled to an extension of time of at least 56 days, the Delay Damages Cap was exceeded and EWH was entitled to terminate the contract pursuant to clause 44.1(c).

THE CONTRACTUAL RIGHT TO AN EXTENSION

41. Claims for an extension of time are governed by clause 14 as amended. By clause 14.7, both parties agreed that they would “at all times use reasonable endeavours to minimise any delay in the performance of their obligations under the Contract, whatever may be the cause of such delay.” Notwithstanding such agreement, clause 14.4(d) provides that an entitlement to an extension arises where, among other matters, delay was caused by EWH's breach of contract. Such entitlement is, however, subject to prior notification in accordance with clauses 14.1 and 14.1A.
42. In considering a request for an extension of time by reason of an alleged breach of contract, the Project Manager is required by clause 14.2 to have regard to the following matters:
- “(a) an extension shall only be granted when the [breach of contract causing the delay] affects achieving the completion of the Plant or the Works or any part of the Plant or the Works by any date or by the end of any period stated in the Contract;
- (b) all the information currently available to the Project Manager;
- (c) the amount of any extension in respect of a particular cause of delay shall be fair and reasonable; and
- (d) in the event of extension for a cause which occurs at a time when the Contractor is already in delay for which no extension is allowable, the delay accrued prior to the allowable extension shall not be excused.”

THE CLAIMS FOR AN EXTENSION

43. M+W seeks a total extension of time of 27 weeks comprising three periods: (a) 1 June to 14 August 2018; (b) 9 November 2018 to 4 February 2019; and (c) 5 February to 4 March 2019. It pleads an entitlement to such extension by reason of EWH's alleged failure to deliver any RDF, alternatively RDF that complied with the contractual specification. That broad formulation is further explained at paragraphs 94-95 of the Defence and Counterclaim and at paragraphs 3 and 8 of Annex 6 to the Defence and Counterclaim:
- 43.1 First, M+W alleges that EWH did not supply RDF when it "knew" that it was "required" for commissioning: paras 94(i) and 94(ii); Annex 6, paras 3(i) and 8(i).
- 43.2 Secondly, it alleges that the RDF that was delivered did not comply with the RDF specification: para. 94(iii); Annex 6, para. 8(ii). Specifically, M+W argues that:
- a) the RDF delivered was outside the contractual limits for bulk density, net calorific value, heavy metals and fines passing through a 6mm x 6mm screen; and
 - b) EWH failed to supply RDF that was capable of enabling compliance with gasifier inlet bulk density and net calorific value requirements.
- 43.3 Thirdly, it alleges that such breaches were caused by EWH's failure to have in place an appropriate quality management system: para. 95. M+W argues that EWH's quality management system was not appropriate in that:
- a) it was put in place "very late" such that EWH did not have sufficient time properly to monitor its suppliers for compliance; and
 - b) EWH engaged Socotec to test the RDF despite its not being accredited by UKAS to do so.
- 43.4 Fourthly, it alleges that EWH failed to provide an "appropriate quality management system that was capable of ensuring and/or did ensure that compliant RDF was supplied to site" in that:
- a) EWH did not have an "appropriate sampling protocol in place in that it did not comply with BS EN 15442:2011, BS EN 15401:2010 and/or BS EN 15400:2011";
 - b) EWH did not comply with ISO 9001:2015 in that "it lacked any or any adequate plan for testing followed by corrective/remedial action commenced sufficiently far in advance to ensure that by the time RDF was needed for commissioning, it could be reliably produced by the site or sites due to supply it"; and
 - c) EWH did not complete or provide at the time of delivery of the RDF to site any or adequate evidence to confirm that the RDF to be delivered in each lorry load complied with the RDF specification:
para. 95; Annex 6, paras 3(ii) and 8(iii);
- 43.5 Fifthly, M+W argues that EWH failed to co-operate adequately or at all with M+W by failing:
- a) to deliver compliant RDF and/or provide an appropriate quality-management system; and/or
 - b) to provide adequate evidence of an appropriate quality-management system and/or delivery of compliant RDF:

paras 94, Annex 6, paras 3(iii) and 8(iv).

- 43.6 Sixthly, it alleges that EWH failed to deal with M+W fairly and openly by “not disclosing information which M+W reasonably needed in order to exercise its rights and/or perform its obligations under the contract, namely evidence of an appropriate quality-management system being in place and/or operating effectively and/or compliance of RDF deliveries within the RDF Specification”: Annex 6, paras 3(iv) and 8(v).

References in this judgment to the first, second, third, fourth, fifth and sixth allegations are to the allegations as summarised in this paragraph.

SUMMARY

44. Accordingly, the position is as follows:

44.1 Unless M+W can establish an entitlement to an extension of time of at least 56 days, the Delay Damages Cap will have been surpassed and EWH was entitled to terminate the EPC contract for Contractor’s Default pursuant to clause 44.1(c).

44.2 In order to establish an entitlement to an extension of time, M+W must prove:

- a) some breach of contract by EWH;
- b) that such breach of contract caused delay; and
- c) that M+W complied with the notification requirements.

44.3 In the event that M+W establishes such matters, then M+W is entitled to such extension as may be “fair and reasonable.”

45. I shall turn in the next section (paragraphs 46-72) to consider the provisions of the contract concerning the delivery of RDF and quality management which are central to these allegations. I shall then consider M+W’s alleged entitlement to suspend works (paragraphs 73-83) before turning to consider the allegations of breach (paragraphs 84-174). I shall next consider whether any breach caused delay (paragraphs 175-266). Finally, I shall consider whether M+W notified such delay or expected delay and its alleged cause in accordance with clause 14.1 (paragraphs 267-290). In view of my findings on those issues, the question of what extension of time might be fair and reasonable does not arise and I set out my conclusions at paragraphs 291-293.

CONTRACTUAL PROVISIONS CONCERNING THE DELIVERY OF RDF

THE KEY OBLIGATIONS

46. EWH’s core obligations under the EPC contract were set out at Schedule 3 to the contract. Among other matters, section 3.6 required EWH to:

- “(2) make arrangements for the supply of such quantities of RDF in accordance with Schedule 22A under the terms stated in Schedule 14 and 15, subject to the Contractor’s right to reject Unacceptable RDF;
- (3) ... provide RDF with a bulk density and [net calorific value] in accordance with the specification detailed in section 1.3.2 of Schedule 22A, in such proportions that the gasifier inlet bulk density and [net calorific value]

requirements of section 1.4.3 of Schedule 22A can be met by the following means:

- a) blending in the reception hall (operator – mechanical plant);
 - b) de facto blending and inerts removal in the MPT plant; and
 - c) blending in the fuel bunker (operator – mechanical plant)
- (7) make arrangements, at the Purchaser’s expense, for the removal of RDF evidenced through sampling to be Unacceptable RDF as defined in Schedule 22A ...

provided that the Purchaser’s obligations under (7) ... shall be limited to providing the relevant operational personnel ... and shall not derogate from (or excuse) the Contractor’s obligations under clause 33 (Taking Over) to carry out takeover procedures, including any takeover tests.”

47. Schedule 14 dealt with, among other matters, the supply of RDF during the commissioning of the plant. Paragraphs 14.8.1.1 and 14.8.2 provided:

“14.8.1.1 The Contractor shall notify the Purchaser of RDF requirements as set out in 14.8.2 and manage RDF receipt and off-loading process.

The Purchaser shall set up supply contracts. For a period of a maximum 9 weeks from the first RDF delivery on site, the Purchaser will be responsible for the delivery of up to 25,000 tonnes of RDF, the disposal of up to 22,000 tonnes of any Fuel and out of specification Fuel produced, and the disposal of up to 2,250 tonnes of inerts from the MPT plant. The Contractor will be responsible for the costs associated with the disposal of any Fuel and inerts from the MPT plant exceeding the quantities and/or exceeding the period from the first RDF delivery on site stated above...

14.8.2 At least 6 months prior to the start of commissioning, the Contractor shall provide an outline schedule of the quantities and dates of the RDF required to successfully complete the commissioning and Take-Over procedures. As part of the Commissioning Protocol issued to the Purchaser prior to starting commissioning, these dates and quantities shall be confirmed.

In the month before RDF deliveries are due to commence and subsequently two weeks prior to commencement, any changes to the Commissioning Protocol which affect RDF deliveries shall be immediately identified to the Purchaser so that alternative arrangements can be made.

The Contractor shall notify the Purchaser 48 hours prior to any changes to the commissioning tonnages notified in accordance with the paragraph. Failure to do so will result in the Contractor being responsible for any Purchaser costs associated with storing, handling, transporting and disposal of the RDF.”

48. By paragraph 1.3.1 of Schedule 22A to the EPC contract, M+W was required to design, manufacture and deliver the plant based on the RDF parameters described in the schedule. Paragraph 1.3.1 provided:

“The material supply to the facility will be refuse derived fuel (RDF). RDF may be derived from either municipal solid waste (MSW) or commercial and industrial waste (CIW) ...”

49. Section 1.3.3 provided:

“The Contractor shall design, manufacture and deliver a mechanical pre-treatment (MPT) plant to treat the incoming RDF as defined in clause 1.3.2 and Table 22A.2.0 above and to:

- reduce the size of the RDF to meet the requirements in Table 22A.2.
- reduce the percentage of non-combustible ferrous and non-ferrous metals, non-combustible glass and non-combustible inert materials in the incoming RDF to produce a fuel to the gasifier as defined for these parameters in Table 22A.2.2 and 22A.2.3 below.”

THE RDF SPECIFICATION

50. The contractual specification for incoming RDF was set out at Table 22A.2.0 of Schedule 22A. It provided:

Table 22A.2.0 – Incoming RDF Specification			
Property	Unit of Measure, sampling point	Requirement	Typical consequence of exceeding limit
Acceptable European Waste Code	As received, at waste reception	19 12 10 combustible waste (refuse derived fuel)	Not allowed under permit.
Total non-combustible material	% by weight, as received, at waste reception	Maximum 14.5%	If not reduced by the MPT plant, higher tramp will contaminate bed operation and result in defluidisation. Shutdown, cool down, cleanout and reheat cycle will be needed more regularly, impacting availability.

Non-combustible ferrous and non-ferrous metal material	% by weight, as received, at waste reception	maximum 4.5%	If not reduced by the MPT plant, potential defluidisation of the bed. Excessive wire buildup in the bed will create bird nests which will build up over time and require manual shutdown (as noted above) for cleanout.
Non-combustible glass material	% by weight, as received, at waste reception	maximum 4.0%	If not reduced by the MPT plant, potential defluidisation of the bed. Too much glass may ultimately increase the fouling and slagging properties of the bed which may result in slag buildup and more frequent shutdown for cleanout. To reduce glass content may require more bed “blowdown” which increases usage of bed material.
Fines passing a 6 mm x 6 mm screen	% by weight, as received, at waste reception	maximum 15%	The main impact of high fines will be that more of the fuel will be combusted over bed. The temperature within the bed will be increased (less fuel for temp suppression) which means that the UFA flow may need to be reduced to accommodate. Depending on the extent of this adjustment, the fluidizing velocities would require an increase in the flue gas recirculation into the under-bed air. The consequence of this is that the energy content of the syngas (GCV value) would be decreased.

RDF Size distribution (after bale opening, if applicable):	% < 300 mm in any direction, as received, at waste reception	Minimum 90%	Increased oversize for processing and re-shredding, which could limit MPT plant hourly throughput.
	% < 76mm in any direction, as received, at waste reception	Minimum 45%	Less <76mm material will decrease the shredder throughput as more >76mm material will require shredding.
Bulk density (after bale opening, if applicable):	kg/m ³ as received, at waste reception	150 – 300	Fuel lies outside the parameters for which operations are guaranteed. If the bulk density is lower than the minimum, the throughput is unlikely to be met. If the bulk density is above the maximum, more blockages are likely reducing availability.
Net Calorific Value (NCV)	MJ/kg, as received, at waste reception	8-20 See Schedule 3	
Ash content	% by weight, dry solids, at waste reception	maximum 30%	Ash removal capacity limits plant throughput. Increase in slagging & fouling which will affect the heat transfer and hence the predicted/guaranteed performance. Increased ash levels increase losses and reduce overall efficiency to some small degree.
Moisture content	% by weight, as received, at waste reception	15% - 40%	>40% - gas flows too high, load is restricted.

Nitrogen content	% by weight, dry ash free, at waste reception	maximum 1.8%	Higher nitrogen means higher unabated NO _x , requiring higher reduction with SNCR. Increased urea consumption and ammonia slip. Ultimately, NO _x emission levels cannot be maintained without excessive reagent consumption and slip. SCR addition may be necessary.
Sulphur content	% by weight, dry ash free, at waste reception	maximum 0.84%	Increased lime consumption. If S levels become excessive, normal removal efficiencies of scrubber may not be sufficient to achieve outlet emission levels, even with higher lime use. May require additional reagent such as sodium bicarb or caustic spray to assist.
Chlorine content	% by weight, dry ash free, at waste reception	maximum 1.25%	Increased lime consumption. Too high Cl input may limit scrubber ability to achieve emissions, even at increased lime use.
Fluorine content	% by weight, dry ash free, at waste reception	maximum 0.12%	Increased lime consumption. Too high F input may limit scrubber ability to achieve emissions, even at increased lime use.
Heavy metals class I			
Cadmium, Cd + Thallium, Tl	mg/kg dry solid, at waste reception	maximum 10	Increased activated carbon consumption. At some input level, the ability of the fabric filter and PAC injection to achieve required metal emissions will be exceeded. Emission limits will then be exceeded.

Mercury, Hg	mg/kg dry solid, at waste reception	maximum 2	Increased activated carbon consumption. At some input level, the ability of the fabric filter and PAC injection to achieve required metal emissions will be exceeded. Emission limits will then be exceeded.
Arsenic, As; Vanadium, V; Lead, Pb; Chromium, Cr; Cobalt, Co; Copper, Cu; Manganese, Mn; Nickel, Ni; Antimony, Sb; Tin, Sn; Zinc, Zn	mg/kg dry solid, at waste reception	combined total not to exceed 1000	Increased activated carbon consumption. At some input level, the ability of the fabric filter and PAC injection to achieve required metal emissions will be exceeded. Emission limits will then be exceeded.

51. The text beneath the Table 22A.2.0 set out the consequences of RDF being out of specification:

51.1 If the weight of plastic film exceeded 18% as a daily average and, as a result, the bulk density of material in the secondary shredder fell below 150 kg/m³ then:

- a) the parties agreed an adjustment to the throughput guarantee; and
- b) EWH acknowledged that it might have to assume responsibility for extended operating hours.

51.2 If the weight of sanitary waste exceeded 3% as a daily average then, with an exception, EWH acknowledged that the net calorific value of the Fuel to the gasifier might be reduced and the amount of inerts separated by the MPT might be increased.

51.3 The clause continued:

“No other performance guarantees or obligations provided under this Contract shall be diminished or negated by the plastic film or sanitary waste limits.”

52. The text continued:

“Bulk density of the incoming RDF will be calculated according to BS EN 15401 2011: Solid Recovered Fuels – Determination of Bulk Density, using a 220-litre container. 3 measurements of bulk density will be made as required by BS EN 15401, which will be averaged to give a single daily value.

The [net calorific value] of the Incoming RDF will be laboratory tested and reported as set out in BS EN 15400:2011, Solid Recovered Fuels – Determination of calorific value.

Baled inputs will have a maximum bale size of 1100mm x 1100mm x 1700mm, with non-metallic binding and plastic wrapping.

Unless stated otherwise, and excluding bulk density and net calorific value (NCV), the limits stated in table 22A.2.0 above are based upon daily averages of the RDF delivered to the RDF reception, sampled before the pre-shredders and mixed to provide representative samples.

Unacceptable RDF is defined in appendix C and indicates those materials that if passed through the MPT, may cause damage to plant or equipment, cause excessive wear and tear, and adversely affect Plant performance.”

UNACCEPTABLE RDF

53. Appendix C to Schedule 22A defined “Unacceptable RDF” in the following terms:

- “1. Any item greater than 600 mm in any dimension. This does not apply to the external dimensions of whole bales.
2. Any oversized item or items above 10kg that has damaged the shredder.
3. Radioactive materials or substances.
4. Inflammable liquids.
5. Hazardous materials or substances.
6. Paint or varnish of any type.
7. Kevlar materials of any type.
8. Automotive batteries of any size and type
9. Vehicle tyres of any size and type
10. Explosives and explosive materials or substances.

It is acknowledged that there may be traces of the above materials in RDF derived from municipal waste.”

54. In cross-examination, Mr Wilcock accepted that while it would be easy to spot some obviously Unacceptable RDF, such as large lumps of metal, big stones or sheets of tarpaulin, there would be limited opportunity to identify whether the waste was compliant as it was tipped on to the reception hall floor. That said, appropriately sized sieves could easily extract over-sized objects.

QUALITY MANAGEMENT SYSTEM

55. Paragraph 1.3.1 of Schedule 22A further provided:

“... The Purchaser shall have an appropriate quality management system in place to ensure that the RDF is in accordance with Table 22A.2.0 – Incoming RDF Specification.”

56. Mr Dennison argues that, properly construed, Schedule 22A is not addressed to and does not impose obligations on the purchaser. Such obligations are, he contends, contained in

Schedule 3. Rather, the purpose of Schedule 22A is to set out the basis against which M+W was required to design and manufacture the plant.

57. While Mr Dennison is right to say that EWH's responsibilities were set out at Schedule 3, such provisions included the obligations:

57.1 to "make arrangements for the supply of ... RDF in accordance with Schedule 22A"; and

57.2 to provide RDF with a bulk density and net calorific value that was within the RDF specification in such proportions that the narrower Fuel specification might also be met by blending.

[Sch. 3, paras 3.6(2) & (3). See paragraph 46 above for the full text.]

58. Thus, while Schedule 22A was primarily concerned with the design basis for the plant, it also set out the "arrangements for the supply of RDF" that EWH was required to make. Such arrangements included, in my judgment, the obligation to "have an appropriate quality management system in place" to "ensure" that the RDF was within specification.

THE FUEL SPECIFICATION

59. Paragraph 1.4.1 provided:

"The design point for the gasifier is provided in Table 22A.2.1, and the design fuel parameters given in Table 22A.2.1 shall be assumed for the purpose of performance guarantees."

The table then provided:

Table 22A.2.1 – Design Fuel as delivered to the gasifier				
	Units	Dry Solid	Dry, Free Ash	As received
Carbon	% weight	50.3	60.68	
Hydrogen	% weight	6.8	8.2	
Nitrogen	% weight	1	1.21	
Sulphur	% weight	0.2	0.24	
Oxygen	% weight	23.8	28.71	
Chlorine	% weight	0.8	0.97	
Ash	% weight	17.1		
Moisture	% weight			37.3
GCV	MJ/kg		27.36	

NCV*	MJ/kg			12.5*
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60. Schedule 22A specified the permitted size distribution of the Fuel and the general specification for the Fuel at Tables 22A.2.2 and 22A.2.3:

Table 22A.2.2 – Size Distribution	
Size Range	Proportion of Material in Range
Less than 101mm in any direction	100%
Less than 76mm in any direction	90%

Table 22A.2.3 – Fuel Specification (fuel supplied to the gasifier)		
Property	Unit of Measure	Requirement
Bulk density	kg/m ³	150 – 300
Net Calorific Value (NCV)	MJ/kg, as received	10 -16
Ash content	% by weight, dry solid	maximum 30%
Moisture content	% by weight, as received	15 – 40%
Nitrogen content	% by weight, dry ash free	maximum 1.8%
Sulphur content	% by weight, dry ash free	maximum 0.84%
Chlorine content	% by weight, dry ash free	maximum 1.25%
Fluorine content	% by weight, dry ash free	maximum 0.12%
Total non-combustible material	% by weight, as received	maximum 3.5%
Non-combustible ferrous and non-ferrous metal material	% by weight, as received	maximum 1.2%
Non-combustible glass material	% by weight, as received	maximum 2.0%
Fines Size: passing through a 6mm x 6mm screen	% by weight, as received	maximum 15%

Heavy metals class I		
Cadmium, Cd + Thallium, Tl	mg/kg dry solid	maximum 10
Mercury, HG	mg/kg dry solid	maximum 2
Arsenic, As; Vanadium, V; Lead, Pb; Chromium, Cr; Cobalt, Co; Copper, Cu; Manganese, Mn; Nickel, Ni; Antimony, Sb; Tin, Sn; Zinc, Zn	mg/kg dry solid	combined total not to exceed 1000

61. Sections 1.4.2 and 1.4.3 of Schedule 22A provided that M+W was responsible for compliance with the size distribution and Fuel specification provided that the incoming RDF was supplied in accordance with Table 22A.2.0.

62. The text below the Fuel Specification in paragraph 1.4.3 of Schedule 22A added:

“Bulk density of fuel will be calculated according to BS EN 15401 2011: Solid Recovered Fuels – Determination of Bulk Density, using a 220-litre container. 3 measurements of bulk density will be made as required by BS EN 15401, which will be averaged to give a single daily value.

Unless stated otherwise, the limits stated in Tables 22A.2.2 and 22A.2.3 above refer to the fuel fed to the gasifier, sampled from a conveyor belt between the fuel store and the gasifier and mixed to provide representative samples.”

PERFORMANCE GUARANTEES

63. Paragraph 2.2 of Schedule 22A required a “high level of Availability.” Specifically, it provided:

“The gasification stream ... shall be designed to be capable throughout its Design Life of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.”

64. The Firing Diagram was based on a single design point detailed at Table 22A.3. The design point for the net calorific value was 12.5 MJ/kg but the Firing Diagram itself, at para. 3.3.2, was drawn on the basis of the net calorific value being in the range of 10-16 MJ/kg. Note (3) to the Firing Diagram made plain that, among other matters, this was the range of net calorific value for which the gasifier and boiler were to be capable of operating in continuous and stable operation. It will be noted that this range was narrower than the range allowed for the RDF specification (8-20 MJ/kg), but in line with that allowed for the Fuel specification (Table 22A.2.3).

65. The performance guarantees were set out in Schedule 17. The seven Absolute Performance Guarantees were set out at Table 17.3. Subject to clauses 35.14 and 35.14A of the EPC

contract, failure to meet any of those guarantees entitled EWH to reject the plant. The five Economic Performance Guarantees were set out at Table 17.4:

Table 17.4 – Economic Performance Guarantees				
Performance indicator	Units	PAC	MAC	PRC
1) Continuous thermal input from the combustion of Fuel at an NCV between 10.0 and 16.0 MJ/kg on the Firing Diagram at MCR	MW _{th}	100.0	90.0	70.0
FGT plant Consumables. Reference conditions as defined in Schedule 16.				
2) Maximum consumption of hydrated lime	kg/h	450	NA	NA
3) Maximum consumption of activated carbon	kg/h	18.0	NA	NA
Plant start-up				
4) Auxiliary fuel consumption to start the boiler from cold to the point at which it is operating at 100% MCR	kg	92,000	NA	NA
Net electrical export. Reference conditions as defined in Schedule 16.				
5) Minimum guaranteed net electrical export	MW _e	23.839	21.455	16.687

66. A failure to meet any of the Economic Performance Guarantees entitled EWH to be paid liquidated damages as specified at Table 17.5 and Daily Performance Damages as specified at Table 17.5B. In assessing performance against these guarantees, the contract required use of appropriate correction curves. Paragraph 17.1 of Schedule 17 provided:

“The performance guarantees are quoted against a set of reference conditions (such as ambient air temperatures) which may differ significantly from the actual conditions during operation and when the Performance Tests are conducted. It is therefore an essential requirement that the performance guarantees are supported by defined reference conditions and correction curves or formulae to enable the performance as measured against actual conditions to be corrected back to the reference conditions.

These correction curves and formulae shall be provided by the Contractor and form part of the Contract ... The final correction curves shall be approved by the Project Manager.”

67. Taking each of guarantees 1, 2, 3 and 5 in turn:

67.1 Continuous thermal input: This guarantee is framed on the assumption that the net calorific value is within the Fuel specification and the parameters allowed on the Firing Diagram.

67.2 Consumption of hydrated lime:

a) One of the anticipated consequences of the sulphur, chlorine or fluorine levels in the RDF being too high was that the rate of consumption of lime might have to be increased: Table 22A.2.0.

b) Paragraph 16.4.15.8 of Schedule 16 provided:

“The Guaranteed Performance Levels for the consumption of hydrated lime and activated carbon shall be based on the Design Fuel as specified in Schedule 22A ...”

c) Insofar as excessive sulphur or chlorine levels in the RDF caused the levels of such elements in the processed Fuel to exceed the levels assumed in the Design Fuel, or insofar as excessive levels of fluorine in the RDF otherwise caused the Fuel to depart from the Design Fuel, then the consumption of hydrated lime would need to be adjusted by way of a correction curve back to the reference conditions.

67.3 Consumption of activated carbon:

a) One of the anticipated consequences of excess heavy metals in the RDF was that the rate of consumption of activated carbon might have to be increased: Table 22A.2.0.

b) Insofar as excess heavy metals in the RDF caused the Fuel to depart from the Design Fuel, then the consumption of activated carbon would need to be adjusted by way of a correction curve back to the reference conditions.

67.4 Net electrical export:

a) Measurement of the net electrical export was to be undertaken with RDF within the RDF specification as defined in Schedule 22A “with correction curves for RDF bulk density against the design point of 225 kg/m³”: Sch. 16, para. 16.4.15.2.

b) Insofar as the actual bulk density departed from the design bulk density, then the electricity exported would need to be adjusted by way of a correction curve back to the reference conditions.

SUMMARY

68. The broad scheme of these provisions can be conveniently summarised:

68.1 M+W was obliged to design, manufacture and deliver the plant:

a) to process RDF based on the RDF specification: Sch. 22A, para. 1.3, Table 22A.2.0; and

- b) to treat the incoming RDF so that the processed Fuel met the size requirements and reduced the percentage of metals, glass and inert material provided that the incoming RDF met the RDF specification: Sch. 22A, para. 1.3.3, 1.4.2 and 1.4.3; Tables 22A.2.2 and 22A.2.3.
- 68.2 M+W was required to notify its requirements for RDF during the commissioning phase:
- a) An outline schedule of quantities and dates was required six months before commissioning. Such schedule was to be updated one month and then two weeks before deliveries were required to commence.
- b) Changes were to be notified on 48 hours' notice.
[Sch. 14, para. 14.8.2.]
- 68.3 EWH was obliged to deliver RDF in accordance with M+W's requirements notified in accordance with such provisions: Sch. 3, para. 3.6; Sch. 14, para. 14.8.1.1.
- 68.4 In doing so, EWH was obliged to deliver RDF:
- a) in accordance with the RDF specification; and
- b) in such proportions that the Fuel specification for bulk density and the narrower Fuel specification for net calorific value could be met by blending.
[Sch. 3, para. 3.6; Sch. 22A, para. 1.4.2 and Tables 22A.2.0, 22A.2.2 and 22A.2.3.]
- 68.5 EWH was obliged to have an "appropriate" quality management system in place in order to "ensure" that the RDF was in accordance with the specification: Sch. 3, para. 3.6; Sch. 22A, para. 1.3.1.
- 68.6 By the fourth column in Table 22A.2.0 and the text beneath the table, the parties foresaw and agreed the typical consequences of RDF being provided outwith the RDF specification.
- 68.7 M+W's contractual right to reject non-compliant RDF was limited to Unacceptable RDF as defined in Appendix C to Schedule 22A, being such waste that the parties agreed was so out of specification that it might cause damage to the plant or equipment, cause excessive wear and tear, and adversely affect plant performance: Sch. 3, para. 3.6(2), Sch. 22A, App. C.
- 68.8 In the event that RDF was not compliant with the specification at Table 22A.2.0, the parties agreed that there might need to be adjustments to the performance guarantees: Sch. 22A, para. 1.3.2.
- 68.9 EWH was obliged to make arrangements at its own expense to remove from site RDF that was evidenced through sampling to be Unacceptable RDF: Sch. 3, para. 3.6(7).
- 68.10 Compliance with the RDF specification was to be determined as follows:
- a) The bulk density of the incoming RDF was to be calculated as a daily average value by averaging three measurements, each taken using a 220-litre container.
- b) The net calorific value of the incoming RDF was to be determined by laboratory analysis in accordance with BS EN 15400:2011.
- c) All other parameters were to be tested by taking daily averages from representative mixed samples of the RDF delivered to the RDF reception.

[Sch. 22A, para. 1.3.2.]

- 68.11 EWH was obliged to make arrangement at its own expense to remove from site up to 22,000 tonnes of Fuel that was out of specification for a period of 9 weeks from the first delivery of RDF: Sch. 14, para. 14.8.1.1.
- 68.12 In assessing whether M+W had met the Economic Performance Guarantees, performance against a number of metrics was to be adjusted by way of correction curves back to the Design Fuel and the mid-point of the design bulk density: Sch. 16, paras 16.4.15.2 & 16.4.15.8; Sch. 17, Table 17.4 and para. 17.1; Sch. 22A, Tables 22A.2.0 & 22A.2.1.
- 68.13 Availability for a minimum of 8,000 hours without shut down for manual cleaning was only guaranteed on the basis that the net calorific value of the Fuel was within the range specified by the Fuel Specification: Sch. 22A, Tables 22A.2.3 & 22A.3 and paras 2.2 & 3.3.2.
69. Accordingly, there was no express contractual obligation to test the waste prior to its delivery to site, or to provide a certificate of conformity. Indeed, the contract required RDF to be tested after its delivery to the RDF reception such that, in normal operating conditions, it would necessarily have been processed through the MP/T plant and gasified before such tests were reported.
70. Further, there was no express right to reject waste that did not comply with the RDF specification unless it was so out of specification that it was Unacceptable RDF. Indeed, the contract expressly envisaged that out-of-specification waste might be supplied, that its supply might have particular consequences (for example in respect of contamination, slagging, availability, throughput, increased consumption of urea, ammonia slip, lime and activated carbon, and compliance with emission levels), and that it was necessary to apply corrective curves by reference to the Design Fuel and the midpoint of the design bulk density in order to assess the plant's performance against a number of guarantees.
71. For these reasons, I accept that the contractual sampling and testing regime cannot have been intended either to determine whether a particular delivery of RDF should be accepted or rejected, or whether processed Fuel should be gasified. Rather, the purposes of sampling and testing were to monitor the quality of the RDF to allow EWH to manage its supply chain and, secondly, to provide an objective basis for evaluating the performance of the plant.
72. The obligation was to have "an appropriate" quality management system in place to ensure compliance with the RDF specification and not to provide a copy of the same to M+W, or to seek or obtain M+W's agreement to its proposed quality management system.

M+W'S ALLEGED RIGHT TO WITHHOLD PERFORMANCE

73. M+W suspended commissioning activities between 1 June and 14 August 2018 before the impasse was broken by the agreement of a Transitional Agreement. Commissioning was suspended again on 14 January 2019 when M+W refused to re-fire the gasifier.

74. In the Executive Summary of its closing written submissions, M+W argues:

“The correct legal position is that where the contract is silent, M+W is unconstrained in how it reacts to [EWH’s alleged breaches of contract]. The only practical limit is that if M+W’s reaction is so unreasonable as to break the chain of causation, it will likely be unable to recover the time and/or cost consequences of responding in that manner.

Otherwise, M+W is entitled to respond to the breach as it sees fit and EWH is obliged to underwrite the time and money consequences of the same under Clauses 14 and 19.”

75. Despite my invitation, Mr Acton Davis cited no authority in support of these sweeping propositions. I have no hesitation in rejecting them as unsound in English law. It is absolutely not the position that, where a contract is silent, a party can respond to the other’s breach of contract “as it sees fit” and subject only to its response not being unreasonable. On the contrary, the primary remedy for a breach of contract is a claim for damages. In some cases, the court may order specific performance of the obligation. Further, the innocent party may, in certain circumstances, be entitled to treat the contract as at an end. Absent some term of the contract to the contrary, the innocent party is not, however, entitled simply to withhold performance of its own obligations, whether such course would be reasonable or not.

76. In Fercometal S.A.R.L. v. Mediterranean Shipping Co. S.A. [1989] 1 A.C. 788, the House of Lords confirmed that even where the breach is repudiatory, the innocent party’s choice is simply between affirmation and treating the contract as discharged. Lord Ackner explained, at page 805E:

“There is no third choice, as a sort of *via media*, to affirm the contract and yet to be absolved from tendering further performance unless and until A gives reasonable notice that he is once again able and willing to perform.”

77. For completeness, that is not to say that the innocent party is not afforded time to decide whether to affirm the contract or treat the contract as discharged: Stocznia Gdanska S.A. v. Latvian Shipping Co. (No. 2) [2002] EWCA Civ 889, [2002] 2 Lloyd’s Rep. 436, at [87], per Rix LJ; Chitty on Contracts (34th Ed.), para. 27-055. That is not, however, a right to suspend performance. Chitty adds, in the same paragraph:

“A contract remains in force until it has been terminated for breach so that a contracting party who has not elected to terminate the contract remains bound to perform his obligations unless the effect of the other party’s breach is to prevent performance of the innocent party’s obligation becoming due.”

78. Further, in Channel Tunnel Group Ltd v. Balfour Beatty Construction Ltd [1992] QB 656, Staughton LJ said, at pp.666-667:

“The contractors maintain that they are entitled to suspend work on the cooling system, although they have not yet done so, by reason of Eurotunnel’s breaches of contract described above. If it were solely a question of English law, this argument

would face some difficulty. It is well established that if one party is in serious breach, the other can treat the contract as altogether at an end; but there is not yet any established doctrine of English law that the other party may suspend performance, keeping the contract alive.”

79. Chitty cites the Channel Tunnel Case at paragraph 39-225 as authority for the proposition that:

“Generally, a breach of contract will only give rise to a claim for damages, and the innocent party will be obliged to continue its outstanding performance of the contract notwithstanding that breach.”

80. Likewise, Keating on Construction Contracts (11th Ed) observes, at paragraph 6-095:

“Every breach of contract entitles the other party to damages to compensate for the loss sustained in consequence of the breach. But, with the exceptions discussed below [in which the innocent party is entitled to treat the contract at an end] and subject to express contractual rights of determination, breach of contract by one party does not discharge the other party from performance of its unperformed obligations.”

Citing the Channel Tunnel Case, Keating adds at paragraph 6-140:

“Although particular contracts may give the contractor express rights if certificates are not paid, there is no general right at common law to suspend work if payment is wrongly withheld. This is consistent with the principle that, except where there is a breach of a condition or fundamental breach of contract, breach of contract by one party does not discharge the other party from performance of its unperformed obligations.”

81. Of course, by s.112 of the Housing Grants, Construction & Regeneration Act 1996, Parliament has legislated to depart from the common law position to allow contractors a statutory right to suspend performance of a construction contract in certain cases of non-payment. Such provision is not in play in this case.

82. Even if Mr Acton Davis’ proposition of law were sound, it is advanced on a false premise. The contract in this case is far from silent:

82.1 M+W had a limited right to suspend performance pursuant to clause 41.9 in the event of non-payment and only then upon seven days’ prior notice. M+W does not suggest that such right is engaged in this case.

82.2 Subject to the parties’ rights at common law and pursuant to clause 44, clause 45.2 limited the parties’ rights to the damages, remedies and reimbursements provided by the contract.

82.3 Clause 46.5 provided:

“Notwithstanding the existence of any dispute ..., the Purchaser and the Contractor shall continue to perform their obligations under the Contract.”

82.4 Further, as already noted, the entitlement to refuse to accept deliveries of RDF only arose in the event that the RDF was so out of specification as to be Unacceptable RDF.

83. Thus, M+W was entitled to refuse to accept deliveries of Unacceptable RDF. Absent some repudiatory breach on the part of EWH, and no such breach is alleged, it was not, however, entitled to refuse to accept other deliveries or to suspend commissioning. If M+W believed that EWH had breached the contract in some way short of repudiation then M+W's obligation was to continue to perform its own contractual obligations. Meanwhile, any consequent claim for an extension should have been made pursuant to clause 14.1 and any claim for additional payment made pursuant to clause 19.1.

EXTENSION OF TIME CLAIMS: THE ALLEGATIONS OF BREACH

ALLEGATION 1: NO DELIVERIES OF RDF

Period 1: 1 June to 14 August 2018

84. On 31 May 2018, Fichtner certified the plant's readiness to receive RDF in accordance with paragraph 14.9 of Schedule 14. The pleaded challenge to the delay in certifying readiness to receive RDF is no longer pursued and accordingly M+W only now seeks an extension of time from 1 June 2018. It is common ground that no deliveries of RDF were made between 1 June and 14 August 2018.

85. As to this period:

85.1 M+W contends that "EWH knew that RDF was required" from at least 14 May 2018: Defence and Counterclaim, para. 94(ia). Thus, it alleges that EWH was in breach of contract in that it failed to deliver compliant RDF between 1 June and 14 August 2018: Annex 6 to the Defence and Counterclaim, para. 3(i).

85.2 EWH accepts that no deliveries were made but denies that M+W notified its delivery requirements in accordance with the contract and accordingly denies that it was under any obligation to deliver RDF: Reply, para. 46.

86. M+W's formulation is curious. EWH's obligation was not to deliver such RDF as it "knew" was required, but only such RDF as M+W had formally notified EWH that it required pursuant to Schedule 14. At paragraph 94(ia)(c), M+W relied upon four RDF supply schedules. Three are now relied upon, and only the first two can be the potential foundation for the claimed extension of time:

86.1 20 April 2018: This schedule showed deliveries commencing on 23 April and running through to 4 June 2018.

86.2 3 May 2018: The deliveries were now scheduled to run from 17 May to 28 June 2018.

86.3 10 August 2018: Following the negotiation of the Transitional Agreement, M+W then sought deliveries of RDF from 14 August to 15 September 2018. It was pursuant to this supply schedule that deliveries commenced on 14 August 2018.

Each of the schedules made plain that M+W required EWH to provide a compositional analysis with the RDF in order that it could be processed.

87. By a letter dated 2 February 2018, Mr Meakin criticised EWH's failure to share details of its quality management system and the results of its off-site testing. He asserted:

“Given the obligation on M+W to design the Plant based on the RDF parameters, the requirement that the RDF is within specification is fundamental to the whole delivery of the Plant. Therefore, it is not unreasonable for M+W to seek assurance that the RDF will be within the required parameters. It is beneficial for both EWH and M+W to be satisfied that the RDF complies with the Contract requirements, because M+W is under no obligation to accept and process it in the MPT plant if it is not.

Given that you have confirmed that EWH has the appropriate quality management system in place in accordance with section 1.3.1 of schedule 22A, and that the RDF will be delivered in accordance with the requirements under section 1.3.2 of schedule 22A, we do not understand your reluctance to provide the requested information or explain how you intend to demonstrate this by sampling and testing in the Plant's reception hall.

M+W is not willing to insert RDF into the MPT plant (which has been specifically designed on the basis of the RDF specification in Table 22A.2.0) unless it is certain that it is in accordance with the required specification such that it will not damage the MPT plant.”

88. Addressing EWH's concerns about delay, Mr Meakin continued:

“With respect, the issues of the delivery of RDF for Take Over and commissioning are intrinsically linked to EWH demonstrating to the reasonable satisfaction of M+W that its deliveries will comply with EWH's obligations under the Contract.

M+W can confirm the date of the first delivery of RDF provided EWH can confirm the RDF is within specification by proving the above have been satisfactorily answered so that M+W can be assured that the RDF can be placed into the MPT Plant and will have no detrimental effect on the MPT equipment or the output fuel specification. It is not possible for EWH to arbitrarily separate the questions of quantity, quality and time of delivery for its convenience.”

89. By a letter dated 13 March 2018, Mr Meakin acknowledged that EWH had indicated its intention to engage a certified UKAS laboratory to sample and test the RDF and to deliver RDF in accordance with Schedule 22A of the EPC contract. He complained, however, that EWH had not provided any method statement, identification of the laboratory concerned or details as to the proposed testing. He contended that it was not sufficient for EWH to make a “bare and unsupported statement” that it would deliver compliant RDF, and that such statement needed to be backed up by reasonable evidence of the quality control systems that the contract required. Mr Meakin argued that EWH's statement overlooked the location and timing of the sampling and testing. Further, he criticised EWH for its unwillingness to share the results of its off-site testing. Mr Meakin rejected the argument that M+W was only entitled to reject Unacceptable RDF, and concluded:

“For the avoidance of any doubt whatsoever, M+W is not obliged to and will not process or put into the MPT plant RDF which does not comply with the parameters of Schedule 22, Table 22A.”

90. By a letter dated 11 May 2018, Mr Meakin insisted that before seeking to deliver any RDF on 14 May, EWH should first provide M+W with its quality management system; its environmental management system; a waste transfer note for each load of RDF to be delivered; details of the compositional analysis for each batch of RDF evidencing its compliance with the RDF specification at Table 22A.2.0; the results of the waste acceptance test criteria for each batch of RDF; and details of the destination of materials taken from site. He explained that M+W would be unable to accept delivery of RDF to site without provision of such documents as it could not otherwise be sure that statutory obligations under the Environmental Permitting (England & Wales) Regulations 2016, the Environmental Protection Act 1990 and the Waste (England & Wales) Regulations 2011 were being met.
91. In cross-examination, Mr Meakin explained his frustration at the lack of information. He asserted that he would have required a contractual variation before agreeing to process out-of-specification RDF. He insisted that M+W needed to know the composition of each truck load of waste before it was delivered to site in order to ensure that the specification could be met by blending.
92. On 25 May 2018, Mr Wilcock responded on behalf of EWH. He refuted that the documentation listed was required prior to delivery of RDF but nevertheless provided copies of the company’s quality management system; its draft environmental management system; the waste transfer notes for intended deliveries that M+W had not been ready to accept on 28 March, 23 April and 14 May 2018; and certificates of conformity for such intended deliveries. He did so, he maintained, not in compliance with any legal obligation but in a spirit of co-operation.
93. Mr Meakin responded on 30 May 2018 with detailed commentary upon the quality management system and other documents provided. He again asserted that each delivery was required to comply with the specification for incoming RDF.
94. Following the certification of the plant’s readiness to receive RDF, EWH and Fichtner repeatedly pressed M+W for an updated delivery schedule. Such request was first made on the day of certification by Fichtner’s email of 31 May 2018. Further requests were made for an updated delivery schedule by EWH’s letters of 8 June and 4, 16 and 20 July 2018; Mr Wilcock’s email of 7 August 2018; and Fichtner’s letter of 29 June 2018. EWH also confirmed that it had sampled a stock of RDF and obtained certificates of conformity, and that it was ready to deliver RDF in accordance with what it regarded as its contractual obligations. Mr Wilcock told me in re-examination that, at 8 June, EWH had at least 3,300 tonnes available for delivery.
95. On 3 June 2018, Mr Meakin replied to Fichtner. He wrote:

“... to allow the Contractor to proceed with commissioning activities we require the Project Managers (sic) assurances and guarantee, that in all respects each delivery of RDF provided by the Purchaser will meet, in perpetuity, the Incoming Fuel Specification and will be provided complete with all necessary supporting documents to satisfy the contractual and statutory obligations and duties, including but not limited to, those requirements set out in the Contractors (sic) letter dated 11 May 2018.

Subject to these assurances the Contractor will be able to consider accepting RDF to part of the Plant and recommence commissioning of the MPT plant.

We look forward to receiving such assurances and necessary supporting documentation to accompany each delivery to permit RDF into the Plant.”

96. The same demand for assurances in perpetuity had been made in another letter of 1 June. This cannot have been a serious demand since it was of course absurd to seek Fichtner’s assurances and guarantees as to EWH’s performance, let alone “in perpetuity.”
97. Meanwhile:
- 97.1 M+W continued to assert by its own letter of 8 June 2018 that EWH was not in a position to meet its contractual commitments in respect of the delivery of RDF.
- 97.2 By a letter dated 15 June 2018, Mr Meakin wrote:
- “Until valid and extensive data, that as a minimum evidences that the incoming RDF has been properly analysed and assessed as compliant with the Specification and satisfies the schedule included in our letter of 11 May 2018, is provided by the Purchaser, the Contractor cannot plan or advise the revised date for RDF deliveries in accordance with clause 14.8.2 of Schedule 14, and the delay to completion continues to escalate as previously notified.”
- 97.3 By a letter of 28 June 2018, Mr Meakin asserted:
- “1. Until such time as the Purchaser provides evidence that specification compliant RDF will be provided, the Contractor cannot provide an update of the Construction Programme ...
4. The quantities of RDF on a weekly basis have been provided, contrary to your statement, the commencement of deliveries is conditional on the Purchaser’s provision of specification compliant RDF. See item (1).”
- 97.4 By a letter dated 16 July 2018, Mr Meakin again asserted that M+W’s inability to provide an updated RDF delivery schedule was a consequence of EWH’s alleged inability to confirm and or ensure that compliant RDF would be delivered.
- 97.5 On 24 July 2018, Mr Meakin wrote:
- “The Purchaser’s continued intransigence in failing to comply with a reasonable request that is entirely in accordance with the Contract can only lead the Contractor to the conclusion that the Purchaser does not have the documentation available, and is thereby in danger of providing material that may damage or affect the Plant’s performance

Unless and until the Purchaser adequately demonstrates that the RDF to be delivered will be compliant with Schedule 22A, Table 22A.2.0, the Contractor is unable to provide an RDF delivery schedule or accept potentially uncompliant material onto site.”

98. Accordingly, there were no unconditional notifications of M+W’s requirements for RDF during the first alleged period of delay from 1 June 14 August 2018. Further, the conditions that M+W sought to impose were extra contractual:
- 98.1 As already explained, EWH was under no obligation to provide a certificate or other evidence of conformity before delivering RDF to site.
 - 98.2 RDF was to be tested after its delivery to the RDF reception.
 - 98.3 While the delivery of non-compliant waste would be a breach of contract, M+W was not entitled to reject non-compliant waste unless it was so out of specification that it was Unacceptable RDF.
 - 98.4 Further, the purported concerns about breach of emissions limits made no sense since the gasifier was not being fired at this stage.
99. Since notification was a condition precedent to the purchaser’s liability to deliver RDF, EWH was not in breach of contract in failing to deliver RDF between 1 June and 14 August 2018.

Periods 2-3: 9 November to 4 February 2019 and 5 February to 4 March 2019

100. Again, the pleaded formulation is curious. M+W alleges, at paragraph 94(ii) of its Defence and Counterclaim, that no RDF was delivered after 25 October 2018 “despite the fact that it continued to be required to commission the gasifier.” There is, however, no attempt to plead the antecedent unconditional notifications of M+W’s requirements that would have triggered EWH’s contractual obligation to deliver RDF to site. Since notification was a condition precedent to the purchaser’s liability to deliver RDF, EWH was not in breach of contract in failing to deliver RDF during these second and third periods.

ALLEGATION 2: NON-COMPLIANT RDF

101. In the course of the trial, the parties and their experts explored the quality of:
- 101.1 the RDF produced by a number of different suppliers off-site between 8 January and 2 August 2018;
 - 101.2 the RDF that was actually delivered to site before termination;
 - 101.3 the RDF delivered post termination; and
 - 101.4 the processed RDF, i.e. the Fuel, both before and after termination.
102. The indifferent quality of the RDF produced by various suppliers which was not delivered to the site in the early part of 2018 is largely academic. As Dr Stephen Wise observed, the whole point of early off-site testing was to identify which suppliers could produce RDF that would meet the specifications. Such testing showed that Mid UK was best able to meet the

contractual specification and indeed EWH then settled on using Mid UK as its sole supplier during the commissioning of the plant. The selection of a sole supplier did mean that EWH lost the ability to blend various streams of RDF, but the critical issue for this delay claim is the quality of the RDF that was delivered.

103. The question of the quality of the RDF delivered and the Fuel processed from such RDF post termination is important to, among other matters, the question of slagging (defect 23) and will be analysed later in this judgment in that context.

104. I turn then to the RDF that was delivered to site before termination. Samples were taken from the RDF supplied by Mid UK to site over 35 days between 14 August and 21 November 2018. Such testing showed that the waste was not compliant with certain parameters within the RDF specification on a number of occasions. Michael Brown's analysis can be summarised as follows, with an additional row showing the analysis for net calorific value on the basis of daily averages:

Parameter	Testing basis	No. of samples	No. of non-compliant samples	No. of days when non-compliant
Bulk density between 150-300 kg/m ³	Daily average	35	2	2
	Spot compliance	322	31	13
Net calorific value between 8-20 MJ/kg	Daily average	35	0	0
	Spot compliance	321	26	16
Heavy metals (As, V, Pb, Cr, Co, Cu, Mn, Ni, Sb, Sn & Zn) not to exceed 1,000 mg/kg of waste	Daily average	35	5	5
Maximum of 15% of fines by weight pass through a 6mm x 6mm screen	Daily average	35	1	1

105. By contrast, Dr Wise observes that the sampling results showed the RDF to be “almost always”, which he put at 98% of the time, to be within the required parameters. That, he adds, is “in the real world ... about as good a set of results as a fuel supplier could expect to achieve.”

106. For the reasons explained below, I consider that Mr Brown overstates the extent of non-compliance, in part because of his reliance on spot compliance. Equally, I accept that, as William Webb (junior counsel for M+W) ably demonstrated in cross-examination, the 98% statistic cited by Dr Wise is not helpful and liable to mislead.

Bulk density

107. The EPC contract specifically provides for the taking of daily averages of mixed waste for all parameters other than bulk density and net calorific value: Sch. 22A, para. 1.3.2. What is less clear is what is to be done differently in the cases of bulk density and net calorific value. It is convenient to repeat the contractual requirements used to calculate the bulk density of both the RDF and Fuel at paragraphs 1.3.2 and 1.4.3 of Schedule 22A:

“1.3.2 Bulk density of the incoming RDF will be calculated according to BS EN 15401 2011: Solid Recovered Fuels – Determination of Bulk Density, using a 220-litre container. 3 measurements of bulk density will be made as required by BS EN 15401, which will be averaged to give a single daily value ...

1.4.3 Bulk density of fuel will be calculated according to BS EN 15401 2011: Solid Recovered Fuels – Determination of Bulk Density, using a 220-litre container. 3 measurements of bulk density will be made as required by BS EN 15401, which will be averaged to give a single daily value.”

108. Mr Brown identifies that this could mean that compliance with the specification for bulk density was to be tested against:

108.1 a daily average calculated from the bulk densities of multiple samples taken in a single day, with each value arrived at after averaging three measurements of bulk density (referred to by Mr Brown as the daily average methodology); or

108.2 the bulk density calculated for each individual sample arrived at after averaging three measurements for the same sample (referred to as the spot compliance methodology).

109. Mr Brown records at paragraph 3.15 of his main report that he was instructed that the correct contractual construction was that the bulk density of each sample (arrived at by averaging three measurements) was to be tested against the RDF specification using the spot compliance method. He added that he agrees with such construction. Dr Wise observes that the method specified by BS EN 15401:2010 (namely filling a container with RDF, allowing it to settle, refilling and then weighing it) is not particularly complicated or prone to error. He therefore suggests that, from a technical perspective, it would make more sense to construe paragraph 1.3.2 of Schedule 22A to require not the averaging of three different measurements of the same sample but the averaging of the measurements of three different samples.

110. BS EN 15401:2010 provides that, after obtaining a single measurement of bulk density, one should unify the used sample with the unused sample material and repeat the test procedure to obtain at least one further replication. As already noted, the contract required three measurements and accordingly two further replications in this case. Such procedure does

not, therefore, involve the repeated measurement of the very same scoop of material but the measurement of three different scoops of material from the same larger sample. Arguably that could be achieved by testing only one of the ten 1,200-litre samples three times. (See below at paragraphs 149-156 for a discussion of the sample size.)

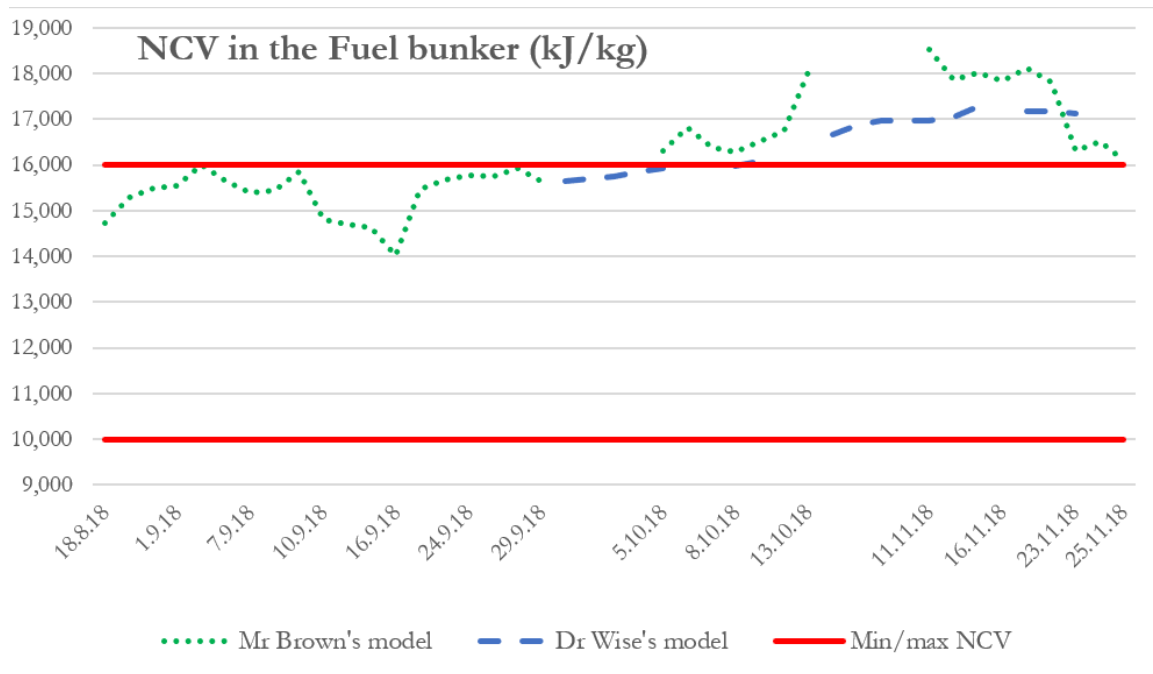
111. When considering the proper construction of the contract, it is important to remember that RDF is inherently heterogeneous; that its particle size can be significantly larger than a more processed material (such as solid recovered fuel) in that up to 90% could have a dimension up to 300 mm and the remaining waste could be up to 600 mm in size; and that the waste is processed and mixed before it is introduced to the gasifier. The purpose of sampling and testing is to be able to draw conclusions about the quality of the RDF supply as a whole, both in order that EWH can manage its supply chain and in order to evaluate the performance of the plant. Mr Brown is right to observe that taking average results masks the peaks and troughs, but since an individual sample or increment may not be representative of the whole, sampling and testing on a spot-compliance basis is not, in my judgment, likely to be particularly useful. Useful conclusions are more likely to be drawn from the sampling and testing of a large number of representative samples of waste. Equally, I accept Dr Wise's observation that counting the number of increments of a heterogeneous material that fell within a particular parameter is not much more helpful. What matters is whether the waste as a whole was within the specification.
112. Further, the contract also required the bulk density of the Fuel to be measured by the same methodology and yet the bulk density requirements of the Fuel specification (also set at 150-300 kg/m³) could be met after blending: Sch. 3, para. 3.6(3). That consideration plainly points away from spot compliance and towards a construction of paragraphs 1.3.2 and 1.4.3 that will lead to more representative results.
113. Furthermore, however one is to arrive at it, the contractual method required a single daily value for both the RDF and the Fuel. Accordingly, I reject the construction of the contract that instead compares the bulk density of multiple daily samples with the contractual specification. While the contract is not entirely clear, I prefer a construction that yields the required single daily value and which is more broadly representative of the bulk density of the RDF delivered. Accordingly, of the two methodologies proffered, I prefer the daily average.
114. Taking the daily average results, the raw data show that the bulk density of the RDF fell below the specification of 150-300 kg/m³ on 9 and 12 November 2018 when it fell to 148.6 and 145.7 kg/m³ respectively. However, paragraph 9.1 of BS EN 15401:2010 required the mean value of the bulk density to be reported to the nearest 10 kg/m³. When this is done, the bulk density for 9 and 12 November would each be rounded to 150 kg/m³ and was therefore within the specification. There was therefore no breach.

Net calorific value

115. As with bulk density, it is unclear what is to be done differently in testing for the net calorific value of the RDF. Again, Mr Brown was instructed that the EPC contract required the net calorific value test results to be analysed on a spot-compliance basis. He therefore reports a

non-compliance in any instance when a single sample test result for net calorific value fell outside of the RDF specification. On such basis, the net calorific value of the RDF fell outside the required range in 26 of the 321 samples taken over the 35 days.

116. While the contract provides a specification for the net calorific value of RDF (being 8-20 MJ/kg), the key requirement was to supply RDF in such proportions that the narrower specification for Fuel (being 10-16 MJ/kg) could be met by blending: Sch. 3, para. 3.6(3). The contract does not expressly identify the method by which this will be assessed, providing only that the net calorific value of the RDF will be “laboratory tested and reported as set out in BS EN 15400:2011, Solid Recovered Fuels – Determination of calorific value.” Testing the RDF on a spot-compliance basis cannot, however, assist in determining the ability to achieve a particular range of values by blending.
117. I therefore agree with Dr Wise that, since the Fuel specification can be met by blending within the MPT plant and in the fuel bunker, it would make more sense to average a number of test results. Indeed, when the throughput remains low - as it would during the commissioning phase - such average might usefully be taken over a number of days. Accordingly, I reject Mr Brown’s approach of considering the net calorific value of the RDF on a spot-compliance basis. Indeed, such approach is inconsistent with his approach of taking a five-day average when modelling the net calorific value of Fuel in the bunker.
118. I therefore consider the daily averages. As noted above, on that basis the net calorific value reported by Socotec was within the RDF specification of 8-20 MJ/kg on each of the 35 days. Indeed, this was important since, as Dr Wise conceded, the effect of the removal of inert material (which, contractually, could be as much as 14.5% of the incoming RDF) by the MPT plant would be to increase the net calorific value of the processed Fuel.
119. The bigger issue, therefore, is compliance with the narrower Fuel specification. While Professor Beckmann reports the results of Fuel testing, each of Mr Brown and Dr Wise preferred to model the likely net calorific value of the Fuel in the bunker between August and December 2018 by considering the RDF data rather than the Fuel data. Such approach had the advantage of excluding the effects of Fuel drying out in the bunker, any further degradation of the material in the bunker and any issues arising from the separation efficiency of the MPT plant. Their models can best be understood in graphical format:



120. Mr Brown's model takes a simple five-day rolling average of the net calorific value because the bunkers were designed to hold 13,000 m³ of Fuel, being the equivalent of 4 to 5 days' operation of the gasifier. Dr Wise agrees that it is appropriate to take an average net calorific value over several days. He does not, however, consider that Mr Brown accurately models the net calorific value of the Fuel:

120.1 First, Mr Brown concedes that one could take the rolling average over a higher number of days to reflect the fact that the plant was not in operation and the throughput was therefore low. Mr Brown adds that amending his model to take the average over a higher number of days would "only chip at the margins." Dr Wise agrees that a higher number of days should have been taken and observes that "chipping at the margins" would have a significant effect on Mr Brown's analysis given that nine of the sixteen exceedances were within 5% (i.e. the net calorific value was between 16 and 16.8 MJ/kg).

120.2 Secondly, Dr Wise observes that the five-day rolling average was taken regardless of the substantial swings in the daily delivery tonnage.

120.3 Thirdly, Dr Wise observes that the effect of processing RDF through the MPT plant can be expected to increase the net calorific value of the Fuel by the removal of inerts.

120.4 Fourthly, Dr Wise makes an allowance for Fuel that was removed from the bunker since it could not thereafter affect the net calorific value of later deliveries.

121. Dr Wise's own model is more sophisticated and seeks to take into account the effects of uneven levels of distribution and the effects of processing, although he accepted in cross-examination that one could further refine his methodology for accounting for the effect of the removal of inert material. He comments on his own model:

- 121.1 While Dr Wise calculates the average net calorific value between 9 October and 6 November to be 16.072 MJ/kg, he observes that such exceedance would be within the margin of error of his model.
- 121.2 From 7 to 21 November 2018, Dr Wise accepts that deliveries of RDF probably had a net calorific value which meant that it was less likely that the stricter requirements of the Fuel specification could be met by blending. His calculations put the average net calorific value for this period between 16.655 and 17.264 MJ/kg. That said, he points to the fact that the deliveries on 8 and 19 November were within the Fuel specification and that on 22 November was less than 1% over the maximum. Further, he attributes part of the increase to the drying out of the Fuel over a period of well over a month. He does not, therefore, conclude that there had been a breach in failing to deliver RDF that was capable after blending of meeting the Fuel specification for net calorific value.
122. Nevertheless, both models put the net calorific value over 16 MJ/kg during October and more than marginally so during November 2018. That was, indeed, the contemporaneous view expressed by Richard Burgess, EWH's Project Director, in internal communications. In his January 2019 draft Fuel Paper, he identified four causes:
- 122.1 First, that in seeking to satisfy M+W's concerns about the quality of the RDF, EWH had pushed the specification towards a solid recovered fuel which typically has a higher calorific value.
- 122.2 Secondly, material delivered at the end of a hot summer will have had a reduced moisture content and therefore a higher calorific value.
- 122.3 Thirdly, M+W had refused to accept a number of baled deliveries which would have had a lower calorific value and reduced the net calorific value of the mixed Fuel in the bunker.
- 122.4 Fourthly, material had been stored in the bunker for some months during which time it will have dried out more.
123. While it may well be that the Fuel dried out further in the bunker thereby increasing its net calorific value, on the balance of probabilities I find that EWH was in breach of contract in that it failed to supply RDF that was capable after processing and blending of meeting the stricter net calorific value parameters in the Fuel specification. That said, I also accept the evidence that, at least at low levels of exceedance, this was not a substantial problem. Provided the parameters for moisture content were observed, the net calorific value of the Fuel could be reduced simply by wetting it. Indeed, doing so would have the added advantage of increasing the bulk density of the Fuel.

Heavy metals

124. The heavy metal content was required not to exceed 1,000 mg/kg. It is common ground that the heavy metal content of the RDF delivered to site was outwith the specification on a number of occasions:
- 124.1 Mr Brown reports exceedances on 12, 13, 19, 20 and 21 November 2018.
- 124.2 The exceedances on at least three dates were significant:

- a) The level of heavy metals was 1,810.7 mg/kg on 20 November, being 81% higher than the contractual maximum.
- b) High levels were also recorded on 13 November (1,307.9 mg/kg) and 18 November (1,495.9 mg/kg).

124.3 Dr Wise adds two further minor exceedances on 3 and 4 October 2018.

125. BS EN 15442:2011 recognises that while solid recovered fuel with a very small particle size and a very homogenous bulk will show “good repeatabilities and reproducibilities”, fuels with a larger nominal top size and a heterogeneous bulk (such, I interpolate, as the RDF in this case) will be less consistent for parameters such as copper, nickel and mercury. The standard attributes the poor robustness of testing for such fuels to the imperfection of sample preparation to deal with extremely heterogeneous materials. Accordingly, Dr Wise observes that it is no surprise that testing reported exceedances for heavy metals.
126. Dr Wise also notes that the Fuel sampling data show the extent to which the MPT plant was effective in reducing the heavy metal content in that the level only exceeded the Fuel specification (which was also set at a maximum of 1,000 mg/kg) on one day, 22 November 2018. This, Dr Wise explains, is because non-ferrous metals, and particularly copper, would be separated out by the eddy current separators.
127. Notwithstanding the difficulties in testing for heavy metals, I find that EWH was in breach of contract in failing to deliver RDF that met the specification.

Fines

128. The single non-compliance was on 1 October 2018 when the level of fines passing through the 6mm screen hit 15.1% as against the contractual maximum of 15%. I accept Dr Wise’s characterisation of this exceedance as very minor. It was, nevertheless, a breach of contract.

Conclusion

129. While Dr Wise preferred to talk of minor exceedances, the RDF and Fuel specifications were not targets but contractual obligations. Accordingly, I find that EWH was in breach of contract in failing to deliver RDF that:
- 129.1 met the RDF specifications for heavy metals on various days in October and November 2018;
 - 129.2 met the RDF specification for fines on 1 October 2018; and
 - 129.3 was capable, when processed and blended, of passing the Fuel specification for net calorific value in November 2018.

ALLEGATION 3: NO APPROPRIATE QUALITY MANAGEMENT SYSTEM

(a) The quality management system was put in place very late

130. EWH provided a copy of its quality management system to M+W on 25 May 2018. The allegation that this was very late such that EWH did not have time properly to monitor its suppliers was rightly not pursued at trial:
- 130.1 While paragraph 1.3.1 of Schedule 22A did not identify any particular time by which EWH was required to have its quality management system in position, it plainly needed to have its system in place before delivering RDF to site.
- 130.2 The first version of the quality management system was prepared on 1 November 2017. After going through further iterations in December 2017 and in April and May 2018, the version supplied to M+W was signed off on 25 May 2018. As it happened, that was still some six days before the plant was certified to be ready to receive RDF.
- 130.3 Irrespective of whether best practice would have been to have developed the quality management system at an earlier point, EWH was not, in my judgment, in breach of contract in developing the final version on a just-in-time basis.
- 130.4 While the quality management system itself required pre-commissioning work to have started at least three months before RDF was first received on site, the system was of course being developed during that period and pre-commissioning testing was indeed carried out alongside such development from January 2018. During that period, Andrew Mayo was able to work with EWH's fuel suppliers in order to ensure that the RDF supplied complied with the specification.

(b) UKAS accreditation to test RDF

131. Paragraph 1.3.2 of Schedule 22A provided that non-combustible material (defined as metals, glass, stones, ceramics, tiles, bricks and concrete that did not pass through a 3 mm x 3 mm screen) should be sampled and analysed in accordance with the test protocol set out at Appendix D. One of the requirements of Appendix D was that sampling and analysis of incoming RDF would be undertaken by an "accredited contractor."
132. It is certainly arguable that, even without such requirement, an appropriate quality management system would require the engagement of an accredited contractor for sampling and testing the RDF. While the application of Appendix D was limited to the on-site sampling and testing of various inert materials, its requirement that the sampling and analysis be undertaken by an accredited contractor strongly supports such argument. In any event, the quality management system itself required that the contractor undertaking both the off-site pre-commissioning sampling and testing and the on-site commissioning sampling and testing should be "UKAS accredited." No doubt for that reason, the parties and the experts have focused not on whether accreditation was required but upon the appropriateness of appointing Socotec as the contractor.
133. It is common ground between the parties and their experts that, in the absence of any directly applicable standard, three standards for the sampling and testing of solid recovered fuel provide a useful approach. Specifically:

- 133.1 BS EN 15442:2011 (Solid recovered fuels – Methods for sampling), which provides a useful approach for sampling.
- 133.2 DD CEN/TS 15401:2010 (Solid recovered fuels – Determination of bulk density), which despite the different notation is actually the standard relied upon by M+W in its Defence. It was also the contractually mandated methodology for calculating bulk density: Sch. 22A, para. 1.3.2. (Note, however, that the contract erroneously referred to the standard having been issued in 2011 rather than 2010.)
- 133.3 BS EN 15400:2011 (Solid recovered fuel – Determination of calorific value), which provides the contractually mandated methodology for calculating the net calorific value: Sch. 22A, para. 1.3.2.
134. While Socotec was accredited in respect of some processes involved in the sampling and testing of solid recovered fuel, it was not, as it conceded in a meeting on 20 September 2018, accredited to sample and test solid recovered fuel pursuant to BS EN 15442:2011. Further, its accreditation did not expressly cover testing against each and every contractual parameter. By its closing arguments, M+W therefore argue that Socotec’s accreditation for sampling solid recovered fuel was “limited.” That, however, is not the pleaded case and accordingly such argument is not open to M+W.
135. Socotec was UKAS accredited under ISO 17025 for conducting sampling and testing in a competent, consistent and transparent way. Its certificate of accreditation bore the serial number 0001 which, Dr Stephen Wise explains, indicated that Socotec was the first laboratory in the UK to be accredited against this standard. ISO 17025 is, he explains, an overarching accreditation. That, in my judgment, is sufficient to dispose of allegation 3(b).
136. The pleaded allegation is that Socotec was not specifically accredited to test RDF. It is factually correct but there was no such contractual obligation. Furthermore:
- 136.1 There was no specific British or other recognised international standard for the sampling and testing of RDF.
- 136.2 M+W has failed to establish on the balance of probabilities that UKAS accreditation was available in respect of testing RDF. While M+W relied on a certificate said to have been issued to Waste Research Limited which appeared to show that that company was accredited in the testing of RDF, the certificate was curiously marked as a draft.
137. Given Socotec’s UKAS accreditation to ISO 17025 and the absence of any recognised standard for testing RDF, I reject M+W’s case that the quality management system was not appropriate by reason of its failure to require the contractor to be specifically accredited in the testing of RDF.

Conclusion

138. M+W has failed to prove allegation 3.

ALLEGATION 4: NO APPROPRIATE QUALITY MANAGEMENT SYSTEM THAT WAS CAPABLE OF ENSURING THAT COMPLIANT RDF WAS SUPPLIED TO SITE

(a) No appropriate sampling protocol

139. The pleaded allegation at paragraph 3(ii)(a) of Annex 6 to the Defence is that EWH was in breach of contract such as to cause critical delay between 1 June and 14 August 2018 in that it did not have an “appropriate sampling protocol in place (in that it did not comply with BS EN 15442:2011, BS EN 15401:2010 and/or BS EN 15400:2011 as explained by Michael Brown at item 8 of the RDF experts’ joint statement)”. This plea therefore incorporates the particulars explained by Mr Brown in such report which concern revisions 4 and 5 of the sampling protocol.
140. It is self-evident that the alleged inadequacy of revisions 4 and 5 cannot have caused any delay during the first period of alleged delay given that:
- 140.1 revision 4 was dated 28 July 2018 and subsequently agreed on 16 August as part of the transitional agreement;
- 140.2 revision 5 only came about following an urgent safety review on 15 August and was formally dated 26 September 2018; and
- 140.3 there were, in any event, no deliveries of RDF during such period.
141. The general plea as to the alleged inadequacy of the quality management system is, however, repeated for periods 2 and 3 at paragraph 8(iii) by which time revision 5 was being operated and deliveries had started. By its closing submissions, M+W focuses the argument by contending that EWH’s sampling protocol was not appropriate because it breached two requirements of BS EN 15442:2011:
- 141.1 First, in breach of Annex F, M+W argues that the increments taken were too small since the standard required the minimum size to be 900 mm x 900 mm x 900 mm (being three times the nominal top size of the material being sampled) whereas Socotec took increments measuring a minimum of 300 mm x 300 mm x 300 mm.
- 141.2 Secondly, in breach of paragraph 6.5, M+W argues that the protocol involved taking only ten rather than twenty-four primary increments. While Socotec then took twenty-four sub-increments from each primary increment, M+W argues that its approach failed to take a broad cross-section of each lot.
142. The wording varied a little between the various iterations of EWH’s sampling protocol, but version 5 provided:
- “In the absence of any British Standard for sampling of RDF, the principles of BS EN 15442:2011 Solid Recovered Fuels – Methods of Sampling is followed as far as practical for the sampling of RDF.”
- By its stated objectives, the sampling protocol sought to define a sampling process that could be carried out safely within operational constraints that followed the principles of BS EN 15442:2011.

143. BS EN 15442:2011 provides that to sample and test a lot of up to 1,500 tonnes, at least twenty-four increments should be taken. An increment is a portion of the fuel extracted in a single operation of the sampling device. Since each particle should have an equal chance of being sampled, the increments should be taken from various places across the lot. The increments taken from a single lot of material are together the sample; the minimum sample size therefore being the product of the number of increments and the minimum increment size.
144. Each increment should generally be three times the size of the nominal top size of the waste being sampled. Paragraph 6.8.2 of the standard provides:
- “Only if the nominal top size is more than 40 mm the effective sample size may be reduced in order to downscale the sample size to realistic proportions. The reduction of the particle size and the sample size shall be done according to EN 15443, but the sampling report and the analyses report shall clearly mention this deviation and state that therefore the testing results are less representative.”
145. EWH’s protocol noted that the plant’s maximum daily throughput was 1,450 tonnes and therefore defined the lot as a day’s deliveries of RDF. The protocol provided that generally ten samples would be taken from each lot. Twenty-four increments would then be taken from each sample. The protocol recognised at section 9 that for a nominal top size of 300 mm, the standard indicated that each increment should be 900 mm cubed. Further, the protocol identified that an increment measuring 900 mm x 900 mm x 900 mm would have a volume of 0.729 m³ (i.e. 729 litres) and, assuming a bulk density of 225 kg/m³ (the average of the range specified in the EPC contract), a mass of 164 kg.
146. Having identified this issue, the sampling protocol identified what it described as a “practical and representative” model for determining the appropriate volume for each increment:
- “For RDF with a nominal top size of 100 mm, the required increment size is 27 litres ... Therefore, an actual increment of 50 litres is compliant with this requirement. Furthermore, 10 samples per day of 24 increments of 50 litres gives a daily sample volume of 12 m³.
- For a nominal top size of material of 250 mm, the required increment size is 421 litres ..., and 24 increments of 421 litres gives a sample size of 10.1 m³. Therefore 10 samples of 24 increments of 50 litres from a Lot gives a greater sample volume than the Standard requires for a nominal top size of 250 mm.
- For material with a nominal top size of 300 mm, the required increments size is 729 litres ..., and 24 increments gives a sample size of 17.49 m³. Therefore, by taking 15 samples of 24 increments of 50 litres from a Lot gives a greater sample volume than the Standard requires for a nominal top size of 300 mm.
- Therefore, the minimum increment size is 50 litres.”
147. Since twenty-four increments were to be taken from each sample, the protocol identified the effective sample size as 1,200 litres or 1.2 m³. Since ten such samples were to be taken from each lot, a total volume of 12,000 litres (12 m³) would be tested each day. Assuming a bulk density of 225 kg/m³, this would equate to a total mass of 2.7 tonnes. This was, as the

sampling protocol noted, greater than the total volume that would be tested by testing twenty-four increments each of 421 litres, being the volume achieved if taking increments measuring 750 mm cubed as indicated for a nominal top size of 250 mm). It was, however, less than the total volume of twenty-four increments each measuring 900 mm cubed as indicated for a nominal top size of 300 mm.

148. Before commenting upon the protocol, it should be noted that there is a difference in terminology. The standard refers to twenty-four increments being taken from the lot that together comprise the sample, whereas the sampling protocol refers to ten samples being taken from the lot each of which is then further divided into twenty-four increments. To avoid confusion, I shall when referring to the methodology set out in the sampling protocol refer to the ten primary increments from each of which twenty-four sub-increments were taken.

The size of the increments

149. Strictly speaking, I consider it is too exacting to take the view that the RDF specification indicated a nominal top size of 300 mm since the specification required 90% of the waste to be less than 300 mm in all dimensions whereas the standard defines the nominal top size as “the aperture size of the sieve used for determining particle size distribution of solid fuels through which at least 95% by mass of the material passes.”
150. As already noted, an increment measuring 900 mm x 900 mm x 900 mm would have a volume of 729 litres and, assuming a bulk density of 225 kg/m³, a mass of 164 kg. Mr Brown observed that the 50-litre sub-increments in this case were less than one tenth of the size required by the standard. Dr Wise rightly accepted that in theory it is always preferable to take larger increments but stressed that you cannot ignore practicality when designing a sampling process. He explained that the standard was not designed for fuel with a large nominal top size and that in order to take account of the practicality and health and safety implications of taking such large increments, it was appropriate to take smaller increments. He also made the point that while a container measuring less than one dimension of a solid object might be less likely to pick it up, it would be able to pick up large flexible objects such as plastics.
151. In cross-examination, Mr Webb rightly pointed out that the proviso in paragraph 6.8.2 of the standard allows a relaxation in the effective sample size and says nothing directly about the size of the increments. There is, however, a link in that the sample comprises the total increments. It is also worth identifying the low threshold level above which the standard accepts some deviation:
- 151.1 A nominal top size of 40 mm would indicate an increment measuring 120 mm x 120 mm x 120 mm. Such increment would have a volume of only 1.7 litres and, even at a bulk density of 225 kg/m³, a mass of just 389 grammes. Twenty-four such increments would have a volume of 41.5 litres and, at the assumed bulk density, a mass of 9.3 kg.
- 151.2 While a nominal top size of 300 mm is only 7½ times larger than 40 mm, the volume of triple such top size is to increase the indicated volume of the increment 422-fold, being 7.5³.

152. Back calculating, the 50-litre sub-increments specified in the sampling protocol would measure 368.4 mm cubed ($\sqrt[3]{0.05 \text{ m}^3} = 368.4 \text{ mm}$). Dr Wise concluded that EWH had arrived at a “reasonable and robust solution that ensured that every particle of the sample had an equal probability of being included in a sample while also ensuring that increment sizes were more manageable, and sampling could be carried out safely.” He added that any statistical concern that the increments were too small to ensure that every particle had an equal probability of being included in the sample was eased by the fact that multiple samples were being taken each day and that the results of those sub-samples were being averaged to produce a representative result.
153. I am satisfied that Dr Wise is right to say that BS EN 15442:2011 (even if it were directly applicable) did not require the taking of 729-litre increments each weighing some 164kg. Accordingly, I am satisfied that even within the confines of the standard, EWH was entitled to devise an alternative sampling strategy that involved taking smaller increments.
154. It is instructive to observe that M+W’s independent sampling contractor, Waste Research Limited, also had to take a pragmatic approach in its own sampling protocol. Such protocol was expressly approved by Mr Meakin:
- 154.1 Waste Research Limited used a nominal top size of 285 mm and a bulk density of 160 kg/m³. Such parameters were said to be based on experience of testing RDF from various sites that had been specified with a top size of 300 mm. It therefore took 100 kg increments.
- 154.2 While significantly larger than the 50-litre sub-increments sampled by Socotec, Mr Brown observed that even this methodology led Waste Research to take samples that were too small.
155. At a bulk density of 225 kg/m³, the 100 kg increments taken by Waste Research Limited would have had a volume of 444 litres. Given, however, the low bulk density of much of the RDF it might be safer to assume an average bulk density of 160 kg/m³ (as used in Waste Research’s own sampling protocol) which would give a volume of 625 litres. I have therefore considered Waste Research’s own findings as helpfully reported by Mr Brown:
- 155.1 One area where taking more voluminous increments might particularly assist would be in identifying the proportion of waste that exceeded 300 mm in any dimension. Yet, the Waste Research sampling found no waste exceeding such dimension on 7 November 2018 and an average of 5.56% doing do so on 7 December 2018. Such findings were well within the specification that required the daily average of waste not exceeding 300 mm in any direction to be at least 90%.
- 155.2 Further, I note that the proportion of waste that was less than 76 mm in any direction was very high at 96.03% on 7 November and 93.15% on 7 December 2018. Such findings were very significantly higher than the minimum of 45% which was required to be less than 76 mm.
156. As the experts explained, one cannot take much from the Waste Research findings given the very limited data available. Such data are, however, consistent with Socotec’s findings that

the vast majority of the waste was smaller than 75 mm. (Socotec tested against this marginally more demanding standard rather than the contractual 76 mm.)

Taking ten primary increments

157. Dr Wise accepted that the methodology differed from the standard in that only ten primary increments were taken. He said that one has to consider the practical implications of any sampling protocol. He observed that there were large articulated lorries in and out of the reception hall and that health and safety considerations justified taking a smaller number of primary increments. Further, he denied that the chosen methodology was less representative.
158. M+W is right to observe that, while ending up with 240 sub-increments, Socotec's methodology only involved dipping into the lot in ten different places. I accept that this is not in accordance with the British Standard and further that such approach meant that, while a lot of information would be obtained about the ten samples, there would not be the same breadth of information that would have been achieved by "dipping into the waste" in twenty-four places. Given the heterogeneous nature of RDF, that meant that such sampling would be liable to be less representative.

Conclusions

159. Drawing these matters together:
- 159.1 The contractual obligation was to have an appropriate quality management system and there was no contractual requirement to have a sampling protocol. Against that, I accept Mr Brown's observation that a good quality management system was important precisely because the RDF would only be sampled after delivery to the plant and, in normal operating conditions, the test results would only be received after the waste had been processed and gasified. Despite therefore the absence of an express obligation, I accept that an appropriate quality management system should include a sampling protocol.
- 159.2 While it is common ground between the parties and their experts that BS EN 15442:2011 provides a useful approach for sampling in the absence of any directly applicable standard, the contract did not mandate compliance with such standard which was not, in any event, directly applicable to RDF.
- 159.3 The sampling protocols provided to M+W did specify that the method of sampling would be "based on the principles" in BS EN 15442:2011. Further, Socotec's proposal for offsite sampling was included at Appendix B to the quality management system. It confirmed that sampling would be carried out in accordance with a "documented in-house method based on the principles of BS EN 15442:2011." Strict compliance was not therefore mandated and M+W can only prove the alleged breach if the departures from the standard meant that EWH had failed to provide an "appropriate" quality management system that was capable of ensuring that compliant RDF was supplied to site.
- 159.4 Even if compliance with the standard were required, the large nominal top size justified some departure from the sample size. Given considerations of health, safety and practicality; the testing of 240 sub-increments per day; and the relatively small size of the bulk of the waste, I do not consider that M+W has discharged the

burden of proving that the use of 50-litre sub-increments was a breach of the obligation to have an appropriate quality management system.

159.5 Having decided to test 240 sub-increments each containing 50 litres of waste, I accept that one could have improved the methodology by:

- a) taking twenty-four 500-litre primary increments and then dividing each of those into ten sub-increments; rather than
- b) starting with ten 1,200-litre increments and dividing each into twenty-four sub-increments,

even though both methods involved testing 240 sub-increments with a total volume of 12 m³. Nevertheless, again I consider that M+W has failed to discharge the burden of proving that EWH's methodology was a breach of the obligation to have an appropriate quality management system.

(b) Lack of a plan for testing and corrective/remedial action

160. This allegation is pleaded on the basis that EWH did not comply with ISO 9001:2015 in that "it lacked any or any adequate plan for testing followed by corrective/remedial action commenced sufficiently far in advance to ensure that by the time RDF was needed for commissioning, it could be reliably produced by the site or sites due to supply it." There was no direct contractual obligation to do so but M+W argues that an appropriate quality management system would have complied with such standard. ISO 9001:2015 is a generic international standard for Quality Management Systems in any industry. It employs the Plan-Do-Check-Act cycle.

161. I accept Mr Brown's evidence that, in the absence of a specific contractual yardstick against which to assess the quality management system or a defined standard for the production of RDF, the appropriateness of the quality management system could only be assessed against general principles of quality management. Dr Wise is also right to observe that concepts in respect of planning, performance monitoring and performance review could usefully be imported in a quality management system for procuring RDF without actually requiring the implementation of ISO 9001:2015.

162. Mr Brown identifies three core principles of ISO 9001, that a quality management system should be:

- 162.1 predetermined;
- 162.2 fully designed; and
- 162.3 work as a system of repeatable processes using the Plan-Do-Check-Act cycle.

163. Here, the quality management system set out a supply-chain strategy for procurement from multiple sites and nominated Socotec as the sampling contractor. Further, EWH analysed the off-site sampling results and visited and audited suppliers. Such arrangements were, in my judgment, sufficient. Accordingly, I reject this allegation of breach.

(c) Failure to provide evidence that each lorryload complied with the RDF specification

164. For the reasons already explained at paragraphs 68-72, there was no contractual requirement either to sample and test each lorryload, or to provide evidence that each lorryload complied with the RDF specification.

Conclusion

165. M+W has failed to prove allegation 4.

ALLEGATION 5: FAILURE TO CO-OPERATE

ALLEGATION 6: FAILING TO DEAL WITH M+W FAIRLY AND OPENLY

166. To make good these allegations of breach, M+W relies on express and implied terms of the EPC contract. The express terms are at clauses 2.1-2.2, which provide:

“2.1 The parties and the Project Manager shall each co-operate with each other in the discharge of their respective obligations under the Contract with the aim of satisfactorily completing the Plant and the Works in accordance with the Contract.

2.2 The parties shall deal fairly, openly and in good faith with each other. Each party shall disclose information which the other might reasonably need in order to exercise his rights and to perform his obligations under the Contract. In particular, each party shall promptly disclose full information to the other concerning any matter which will or may prevent the Plant or the Works being completed in accordance with the Contract. The parties shall work together in a manner consistent with their respective obligations under the Contract to resolve or mitigate the effect of any such matter.”

167. In addition, M+W asserts an implied term at paragraph 22B of its Defence:

“Further or alternatively, insofar as [M+W] required EWH’s co-operation to discharge its own obligations, it was an implied term of the Contract, to give it business efficacy and/or to reflect the obvious intention of the parties, that EWH would provide the necessary co-operation.”

168. It is difficult to see that the alleged implied term takes matters any further forward. In any event, I reject the implied term:

168.1 The parties had set out the content of their mutual obligations of co-operation and of fair and open dealing in good faith at clauses 2.1 and 2.2.

168.2 The implication of some further gloss on such terms is not necessary to give the contract business efficacy and the contract is effective without such implied term. It therefore fails the test for implication set out by Lord Simon in BP Refinery (Westernport) Pty Ltd v. Shire of Hastings (1977) 180 C.L.R. 266 (PC), at p.283, as further explained by Sir Thomas Bingham M.R. in Philips Electronique Grand Public SA v. British Sky Broadcasting Ltd [1995] E.M.L.R. 472 (CA), at p.481, and Lord Neuberger in Marks & Spencer plc v. BNP Paribas Securities Services Trust Co. (Jersey) Ltd [2015] UKSC 72, [2016] A.C. 742, at [21].

(a) Failure to co-operate by failing to deliver compliant RDF and/or an appropriate quality management system

169. As already explained, EWH was not in breach of any obligation to deliver RDF. While EWH was in breach of contract in period 2 in failing to deliver compliant RDF, I do not consider that M+W has thereby established a separate breach of the obligation to co-operate. Even if I am wrong in this view, I do not consider that this further formulation advances M+W's case.
170. I have already rejected the allegation that there was no appropriate quality management system. Reformulating the matter as a failure to co-operate does not advance M+W's case.

(b) Failure to co-operate, or deal fairly and openly by failing to provide adequate evidence of an appropriate quality management system and/or the delivery of compliant RDF

171. As already explained, EWH was not under any obligation to provide evidence of its quality management system or that deliveries of RDF were compliant. In particular, there was no obligation to ensure that each and every load of RDF was compliant with the specification. Loads would be mixed in the reception area and then sampled and tested after delivery to obtain representative test results.
172. In any event, EWH did engage with M+W as to its quality management system and, pursuant to the Transitional Agreement, provided additional compositional analysis.
173. I reject the allegations that there was any failure to co-operate or to deal fairly and openly with M+W. There is, in any event, some irony in such allegations. While I will return to the matter when considering the issue of wilful default, it was M+W that failed to deal fairly and openly with EWH by failing to report its concerns about the design of the gasifier, by concealing important information as to the likely delay to the programme and by seeking to justify the suspension of works by concerns, sometimes contrived, as to the efficacy of the quality management system and the composition of the waste.

SUMMARY

174. I therefore reject the allegations of breach during the period from 1 June to 14 August 2018 and there can be no question of any entitlement to an extension of time for such period of alleged delay. While rejecting the other allegations, I do find EWH to have been in breach of contract in that it failed to supply RDF in accordance with the RDF specifications for heavy metals and fines on a limited number of days in October and November 2018. Further, I find it to have been in breach of contract in November 2018 in that it failed to supply RDF that was capable, after processing and blending, of meeting the narrower parameters for net calorific value in the Fuel specification.

EXTENSION OF TIME CLAIMS: CAUSATION

THE PROPER APPROACH TO THE DELAY CLAIMS

175. The court must consider on the balance of probabilities whether any proven breaches of contract affected the date of completion of the works, or any part of the works. If so, and leaving out of account any earlier delay for which no extension of time is allowable, the court should grant such extension as is fair and reasonable. Commenting on similar contractual machinery in Walter Lilly v. Mackay [2012] EWHC 1773 (TCC), Akenhead J observed, at [365]:

“In the context of this contractual-based approach to extension, one cannot therefore do a purely retrospective exercise. What one cannot do is to identify the last of a number of events which delayed completion and then say it was that last event at the end which caused the overall delay to the Works. One needs to consider what critically delayed the works as they went along.”

176. Further, I accept that M+W would be entitled to a full extension of time without apportionment in the event that there were two concurrent causes of delay only one of which gave rise to a claim for an extension: see Walter Lilly v. Mackay (supra) at [366]-[370], Akenhead J; Henry Boot Construction (UK) Ltd v. Malmaison Hotel (Manchester) Ltd (1999) 70 ConLR 32, at [13], Dyson J, as he then was; and De Beers UK Ltd v. Atos Origin IT Services Ltd [2010] EWHC 3276 (TCC), (2010) 134 ConLR 151, at [177], Edwards-Stuart J.

THE GASIFIER DELAYS

177. I have already considered the issues concerning the supply of RDF. Before addressing causation, it is necessary also to consider more broadly the delays in commissioning the gasifier.

Design concerns

178. The design of the thermal train was based upon Outotec’s gasification technology. At its heart was a fluidised bed. The Fuel, being the processed RDF, was fed into the gasifier by plug screw conveyors. Such technology was also being used on two other projects for M+W, being the Levensat project in Lanarkshire and the Charlton Lane project in Surrey.
179. Ben Purcell, M+W’s Contract Manager for the Outotec subcontract, was first aware that the feed screw was not operating as it should at Levensat in September 2016. M+W became increasingly concerned as to the likely performance of the Outotec design in early 2017. Mr Meakin therefore assembled the so-called Intervention Team comprising a team of experts from across Europe to carry out a technical review of Outotec’s design. The verdict of the Intervention Team was damning as early as March 2017. The agenda for a meeting in Frankfurt on 21 March 2017 recorded the following concerns:
- 179.1 Outotec’s performance on other projects had been internally audited by M+W and was considered to be of a “very poor standard, in many ways.” In cross-examination, Mr Meakin could not recall whether that was a reference to Charlton Lane or Levensat; and accepted that it followed that M+W believed that Outotec’s performance on both projects had been very poor.

- 179.2 Some parts of the Outotec contracts were deemed to be an “outright failure” and there was growing concern that the process would have difficulties in passing the performance tests. There were said to be numerous examples from the other projects to demonstrate “this poor and failing performance.”
- 179.3 Fundamentally, the team was concerned as to Outotec’s ability to deliver a gasification plant that would run on processed RDF. It recorded that, as far as it could determine, Outotec had never commissioned such a plant on RDF fuel. The team said that it had “justifiable and serious concerns about some fundamental design issues.”
- 179.4 The team noted M+W’s concern that Outotec had used over-optimistic design assumptions which were not in accordance with market standards and norms. There was accordingly a risk of under achievement or even outright failure against the performance tests.
- 179.5 Further, the team was concerned that Outotec had either not fully understood or properly engaged with a number of process risks. Specifically, the team was concerned with, among other matters, the risks of achieving a sustained fuel feed through the auger screw and of blockage of the fly ash extraction system and the multi-clone residue extraction system.
- 179.6 The team was concerned as to the absence or inadequacy of quality documentation including the Factory Acceptance Tests on, among other pieces of equipment, the plug screw conveyor. Outotec’s quality system was regarded as not being “credible.” It seemed like a series of random documents were sent through without clear reference to the supply packages. The documentation was not considered suitable for transmission to the clients on each of the projects. The resolution of this issue was regarded as time critical since clients would not allow Take Over to be certified without compliant and complete quality documentation.
- 179.7 The team noted that many scheduled deliveries were late and that inexplicable last-minute delays were commonplace.
- 179.8 The quality of fabrications was said to be “seriously deficient” and indicative of endemic failures and a lack of control throughout Outotec’s supply chain. Poor quality supply had caused a considerable amount of rework. The steelwork supplied through Sweden and Eastern Europe did not fit together properly and modifications had been required during the erection process.
180. M+W was particularly concerned about the design of the fuel-feed system:
- 180.1 At a meeting with Outotec at Coeur d’Alene in Idaho in April 2017, M+W expressed its concerns that the fuel-feed system would not allow a steady flow of Fuel into the gasifier; that it would frequently block and jam and be a cause of low availability; and that both the company and its advisers were not aware of any such screw-feed system that operated successfully. Outotec explained the reasons for its design choice of a screw feeder and reassured M+W that there had been significant engineering evaluation of the selected feed system.
- 180.2 An interim presentation on 14 June 2017 concluded that the plant would not achieve the minimum standards for Take Over without some modification and additional investment. The plug screw was identified as a principal risk that could “prevent any sensible progression on the rest of the testing process.” The use of

developing technology was identified as a risk factor that had, in the past, had “devastating consequences” for commissioning times and availability in the first year of operation. The final slide posed what it described as a “fundamental conundrum”:

“Does M+W let the [Outotec] technology fail during the commissioning and testing phase prior to implementing the process improvement works? And then implement the process improvement works?

Or does M+W implement the process improvement works prior to commissioning and testing in order to avoid severe difficulties and possible rejection? Which would result in [Outotec] walking away from any of their guarantees?”

180.3 In a report dated 7 July 2017, the team recorded that there was no evidence of alternative feed systems having been assessed and considered at the design stage, or that the system had been tested using a representative fuel. Further, it was noted that Outotec’s design had not been tested at any waste treatment plant before despite there being clear evidence from other plants that similar systems had suffered severe functionality problems. M+W also expressed concern that compression of a fuel plug had been shown to be sensitive to variations in fuel composition, and yet there could be variability in composition of the RDF while nevertheless remaining within the specification. Any jamming of the plug screw conveyor which could not be freed by reversing the screw direction would require a complete shutdown in order to strip down the system and clear the blockage. Further, M+W noted that the last section of the feeding screw pipe would be exposed to the very high temperatures of the fluidised bed such that when the system stops feeding waste, material inside the pipe would melt and lead to blockages. It added that the fuel-feeding screw was vulnerable to jamming due to hard objects lodging between the screw and the outer casing. This was said not to be opinion, but a conclusion based on empirical evidence from other plants where similar mechanisms had been used.

180.4 The report concluded:

“There are a significant number of concerns attached to the plug screw conveyor ... which cannot be dismissed on the basis of opinion, since there are no working examples against which to demonstrate compliance with the specification. There should be a design rationale which deals with each of the possible scenarios, in order to ensure smooth working of a critical item of plant.

These concerns are greatly magnified because any lack of functionality will make it extremely difficult to test the rest of the plant, due to the knock-on effects on every part of the downstream process. The plug screw conveyor also has the capacity to cause uneven processing within the gasifier, thus making it more difficult to fault-find and correct other process issues in the gasifier, boiler, economizer and flue gas treatment plant.”

180.5 The notes of a risk assessment meeting recorded that Outotec had openly acknowledged that the fuel-feed system had been a “voyage into the unknown.” Outotec professed its confidence that the system would work but M+W noted that it was unclear on what grounds such confidence was based.

- 180.6 The final report of the Intervention Team issued on 1 August 2017 concluded that there would be blockages and jamming of the screw, and uneven distribution of Fuel to the bed of the gasifier; that the discontinuous supply of Fuel would disturb the gasification process; that the process would be unstable with fluctuations in temperature, pressure and emissions; and that fuel plugs would lead to unplanned shutdowns. Such issues, the team reported, would lead to an inability to conduct Take Over tests; an inability to control the gasification process; the need for complete disassembly when the fuel screws jam; and, therefore, unplanned shutdowns and maintenance leading to a loss of availability. The team estimated that it would take some 6-8 months to replace the plug screw conveyor with a proven alternative solution at an estimated cost of £2 million.
181. The Intervention Team also noted that the design of the gasifier had a “zero fouling factor” leading to excessive temperatures and slagging. The report estimated that the necessary remedial works to resolve issues with gasifier functionality would last 6 months and would cost an additional £3.5 million.
182. By a letter dated 28 June 2017, M+W formally gave Outotec notice that it considered the plug screw conveyors to be defective contending that there was potential for fragments of incompressible objects to become jammed and for compressible waste to form a bung that could not be moved forward thereby allowing oxygen levels to rise and combustion (rather than gasification) to occur. Blockages would require a complete shutdown in order to strip down the plug screw conveyors. M+W formally sought Outotec’s proposals and programme for rectification works within 7 days. It stressed that such works needed to be carried out urgently. It explained:
- “A loss of functionality ... will be extremely serious for the process and the continued operation of the plant, which includes the ability to perform as a gasification plant (and not as a combustion plant). If this issue is not dealt with in advance of any commissioning process, it could cause significant delay to commissioning and Take Over of the plant to the Purchaser, with the consequent impact on both M+W and [Outotec].”
183. By a letter dated 11 July 2017, M+W gave notice pursuant to clause 37.6 of the sub-contract that Outotec had failed within a reasonable period to submit the required remedial proposals. It gave notice of its intention to proceed with its own remedial works at Outotec’s cost. The possibility of such action was suspended by a further letter dated 19 July 2017 after the parties agreed additional operational testing.
184. In the autumn of 2017, site acceptance tests were undertaken on the plug screw conveyors at Levensat. Mr Meakin told me that such tests were insufficiently extensive to demonstrate whether the conveyors functioned as intended.
185. There was, however, a marked difference in emphasis between these hard-hitting conclusions and Mr Meakin’s evidence at trial. He accepted that M+W had “doubts” about Outotec’s technological solution but stressed that the views of the Intervention Team “didn’t always hit the mark.” He explained that M+W used the experts on the team to look

proactively at what, from their experience, might go wrong. M+W was using strong language “to some extent pushing the point very hard home” with Outotec.

186. I do not accept that the depth of concern that was so evident from the contemporaneous documents can simply be explained as M+W’s attempt to bring commercial pressure to bear on Outotec. These were, I find, serious and genuine concerns that were expressed with equal alarm both internally within M+W and when addressing Outotec. Further, I do not find Mr Meakin’s attempt to distance himself from the Intervention Team’s views to have been credible. He was named in the team’s report as the “Report Sponsor” and there is no evidence that he either harboured or voiced reservations about the team’s conclusions. Indeed, on 15 March 2017 he reported to another member of the team that he had had a long conversation with Mr Stumpf, the ultimate owner of the M+W Group, and that Mr Stumpf “got” all of it and was consequently “very concerned.”
187. I accept EWH’s submission that by suspending the threat to undertake any necessary remedial works at Outotec’s cost, M+W was effectively electing to allow the Outotec technology to prove itself or fail, and to take the risk of delaying any necessary remedial works to a much later stage when it was almost inevitable that such works would cause delay to the overall project.

Commissioning issues

188. During testing in May 2018, Ray Nickerson, an Outotec engineer with a colourful turn of phrase, explained to his colleagues the need for an urgent solution for bridging (being the build-up of layers of fuel that impeded its free flow). He proposed installing vibrators or air cannons, but preferably air cannons, to blast the bridge. An internal email dated 20 May 2018 confirmed Outotec’s decision to implement the air cannon solution. Dave Brands of Outotec commented:
- “Waiting for the problem to become visible to the customer and the rest of the industry, then hiding behind a fuel specification, is not good business. [Outotec] needs to be proactive and stay under the radar on this one.”
189. Wendy Crispin explains in her witness statement that Outotec did not then promote the installation of air cannons at Hull after their use at Levensat caused a fire.
190. Meanwhile, there had been correspondence between M+W and Outotec from February 2018 about the need to replace the powder activated carbon and lime silos. M+W asserted that the silos installed by Outotec did not comply with the required British and European safety standards. On 27 April 2018, M+W formally instructed Outotec to confirm whether the silos complied with the subcontract and for its remedial proposals. M+W explained that if Outotec did not comply with such instruction, M+W would make good the defect and seek reimbursement of its costs.
191. Absent any reply from Outotec, Mr Purcell wrote on 11 May 2018 giving notice of M+W’s intention to procure replacement silos at an approximate cost of £250,000. On 23 May 2018, Geoff Wilson, who was responsible for procurement, advised that while suppliers had

initially quoted 12-14 weeks, he believed that a 9-week schedule was “demanding but achievable.” Mr Meakin observed that the basic logic would indicate a critical delay to commencement of the Take Over tests. A programme was then prepared showing the critical path running through the work on the silos; with manufacture completed by 25 July and the installation work running to 1 August.

192. By email sent on 4 June 2018, Nicklas Morén of Outotec sought M+W’s immediate acceptance of a proposal to implement design changes to the plug screw conveyor. Two improvements were suggested as a result of “lessons learnt” on other plants, namely the installation of air cannons to prevent bridging and provide an even supply of fuel and the installation of a water quench system to control the temperature.

193. By letter dated 5 June 2018, Ben Purcell reminded Mr Morén of M+W’s assertion in its letter of 28 June 2017 that the design of the plug screw conveyors was defective. He complained that Outotec was belatedly seeking to address the issue together with additional design defects that were first identified by M+W the previous year. He added:

“However, as M+W are in the process of commissioning the Subcontract Plant there is now no time available to implement Outotec’s proposed changes before Taking Over and consequently this will delay the Main Contract Works entitling the Purchaser to liquidated damages for the delay caused.”

The letter concluded by demanding detailed proposals and a completed design solution within three business days.

194. Meanwhile, M+W’s May 2018 report had been issued on 6 June 2018. No programme was included in the report. M+W explained that this was because it was awaiting final confirmation of EWH’s agreement to provide RDF.

195. On 8 June 2018, Outotec responded in combative terms. It was proposing, it asserted, “minor design changes ... as an ISO 9001 certified sub-contractor and consistent with a continual awareness for design improvements ... to eliminate a potential hazard and improve operational stability.” It said that it would inform M+W in due course of the schedule and timeline for the water-quench solution but insisted that the installation works would not impact the ongoing commissioning of the plant. The letter was rather unclear as to whether the air cannons were to be installed. Mr Meakin said in evidence that in effect both M+W and Outotec were protecting their contractual positions: M+W was asserting that there were defects that threatened the critical path while Outotec was contending that it was simply proposing some design improvements which should not threaten the commissioning timetable. Ultimately it was not that helpful and M+W still had no precise proposals or timeline from Outotec. Mr Meakin told me that he was not in any event confident that Outotec had then identified all of the necessary remedial works to the plug screw conveyors.

196. On 9 June 2018, Mr Meakin replied that he was aware of the design changes since they were being implemented across all three projects. He requested the design and installation details by return as well as a programme for the design, manufacture and installation so that M+W

could assess the impact of the design improvements. In cross-examination, Mr Meakin observed that while he had demanded a programme from Outotec, he was able to take advice from the commissioning engineers on site. In any event, he insisted that the work was not major and that it would not affect progress.

197. Mr Purcell of M+W responded further on 14 June 2018. He rejected Outotec's characterisation of the modification works as simply design improvements. M+W challenged Outotec's view that the modifications were minor and that they would not delay commissioning. Indeed, Mr Purcell retorted that Outotec's proposal established that its design was untested, unproven and defective. He asserted that there was then no time available to implement the modifications before Take Over and that the required works would "without question" delay the main contract works and entitle EWH to liquidated damages. Mr Purcell repeated M+W's demand for detailed proposals and an implementation schedule within a further three working days. Asked about this letter, Mr Meakin again made the point that M+W were pressing their subcontractor hard. He explained that the plug screw conveyor issues had the capacity to become critical if the parties were able to resolve the issue with the RDF.
198. Meanwhile, further problems had been identified at Levensat when the plug screw conveyors became blocked with plugged material and then tripped. Additional modifications were proposed. While Mr Meakin was not directly copied into the correspondence, the thread was forwarded to Matt Crawley, a quantity surveyor on the M+W team at Hull, on 14 June 2018. Mr Meakin accepted that he was made aware of these further issues.
199. By an email sent on 19 June 2018, Stephen Tayton of M+W again chased Outotec urgently for its proposed design solution and programme. On 22 June 2018, Outotec continued to deny that its original design was defective and blamed M+W for its own delay in allowing the implementation of the proposed modifications. Mr Meakin told me that it was not clear what M+W was supposed to have done and that he was still waiting for Outotec's clear proposals. He was justified in that response.
200. On 27 June 2018, Mr Tayton wrote to Outotec about what he described as the "catastrophic failure" of the plug screw conveyor at Levensat. He sought Outotec's detailed design solution and confirmation that the rectification work would be completed by 31 July. On 3 July, Björn Hoffmann of Outotec rejected the suggestion that there had been a catastrophic failure or indeed that the plug screw conveyor was defective. Mr Tayton responded by sending photographs of the damaged plug screw at Levensat and added caustically:
- "If your statement is to be believed that would mean that Outotec expected the flights of the plug screw to strip off in this way when using RDF (the fuel which it should have been designed for) ...
- For the avoidance of any doubt the work being undertaken by Outotec at Levensat (followed by Hull & Suez) is not a variation, it is Outotec attempting to implement a new unproven design to fix a major defect in the fuel-feed equipment they have supplied."

201. On 27 June 2018, Callum Morris of M+W sent Mr Meakin a draft programme that included the work in replacing the silos and remedial works to the plug screw conveyors. The programme allowed thirty-six days for replacing the silos (26 June to 31 July) and forty-three days for the plug screw conveyors (16 July to 27 August). Within the forty-three days, M+W allowed:
- 201.1 seven days for a trial of the new plug screw conveyors at Levensat (16-22 July), but assumed that manufacture of the new plug screw conveyors could start during such testing and be completed by 29 July; and
- 201.2 twenty-one days for the installation of the new plug screw conveyors.
- Since, however, M+W's programme showed the outstanding works to the MPT plant running to 1 September 2018, the Outotec works were not shown to be on the critical path.
202. Mr Morris's covering email observed that M+W still needed the "Outotec activity date from Rob." Mr Meakin said that would be Rob Lettice, the M+W engineer responsible for the Outotec sub-contract. He added that perhaps Mr Lettice had got some indicative dates from Outotec. That was, however, speculation and there is no evidence before me that Outotec had provided any programme for the proposed remedial works as at 27 June. While Mr Meakin insisted that this wasn't "a complete finger in the air" but based upon discussions between the engineers on site, no evidence was called from Mr Morris, Mr Lettice or otherwise to establish any information that might have been obtained from Outotec.
203. Mr Morris provided two further level 1 programmes on 28 June 2018 allowing forty-two days and, alternatively, forty-eight days for the commissioning of the MPT plant. Neither programme made any allowance for the Outotec works.
204. Meanwhile, by a letter dated 28 June 2018, M+W again pressed as a matter of urgency for Outotec's completed design solution and implementation schedule so that it could undertake its own design review, HAZOP assessment and "determine the impact and delay caused to the commissioning programme and Taking Over of the Main Contract Works." On 2 July 2018, Mr Tayton chased Outotec for the design solution, the implementation programme and other information.
205. On 3 July 2018, M+W produced two more level 1 programmes. One excluded the Outotec works while the other included an allowance for such works. Mr Meakin could not recall why two separate programmes had been prepared and why one programme did not show the full picture. He resisted, however, Mr Dennison's suggestion that he was undertaking this modelling in order to work out what to disclose to EWH in the next monthly report.
206. The programme that included Outotec's proposed further works reduced the period for the installation of the plug screw conveyors to twelve days. The reduction of the installation period by nine days prevented M+W from showing the plug screw conveyor modifications as critical. While Mr Meakin asserted that the installation period had been reduced on the basis of information given to M+W at the time, there is again no evidence before the court to support that claim. Further, his own internal email of 3 July 2018 is revealing as to the true purpose of the revised projection. Mr Meakin wrote:

“I have reduced the PSC installation period to 12 days, which is still inside the RDF delay timescale (by 4 days).”

207. M+W issued its June report to EWH on 13 July 2018. Again, no reference was made to the need for Outotec to undertake remedial works to the plug screw conveyors although there was reference to the installation of new silos. Such work was not shown on the critical path.
208. By an email dated 10 July 2018, Mr Meakin explained that in light of Outotec’s inactivity, M+W had decided to replace the defective powdered activated carbon and hydrated lime silos. Meanwhile, trials of the plug screw conveyors were being conducted at Levensat. On 21 July 2018, Scott Edmondson of M+W reported to Mr Meakin that there were issues with RDF bridging above the plug screw conveyors despite the application of a non-stick coating. Outotec was installing air cannons to prevent bridging, but Mr Edmondson said that he had reservations. Further, he noted that the hopper issues had prevented continuous operation of the plug screw conveyors. Mr Meakin responded by seeking a timeline to complete the testing. Mr Edmondson said that the timeline would depend on the air cannon modifications and successful running of the plug screw conveyors. He added that he “guessed” from past experience that it would also be necessary to modify the plug screw conveyor nozzles and hopper geometry. Mr Edmondson added that it was “clearly an iterative R&D design process.” Mr Meakin ended the exchange by commenting that he wasn’t convinced that it would work either.
209. On 30 July 2018, M+W produced two further level 1 programmes. One showed the first delivery of RDF on 6 August and the other showed it a week later on 13 August. Both made allowance for the Outotec remedial work but showed that the commissioning of the MPT plant remained critical. Mr Meakin insisted in evidence that M+W was able to produce these programmes because it had Outotec’s programme for the works to the plug screw conveyors. On 31 July 2018, however, Mr Purcell wrote to Outotec complaining that the company had not provided any further information and asserting that M+W had “absolutely no visibility of the nature and extent of the proposed rectification/modification works or the impact that these works will have on the completion and commissioning of the Main Contract Plant.” While Mr Meakin suggested that this was a little heavy-handed and insisted again that M+W had a programme for these works, I do not accept this claim.
210. Notwithstanding the fact that M+W was modelling the impact on the programme of the Outotec modifications by late June, no reference was made to the possibility that modifications might be required to the plug screw conveyors in M+W’s monthly reports to EWH and Fichtner for June and July 2018 (issued on 13 July and 8 August respectively). Mr Meakin explained such failure on the basis that M+W was managing its own supply chain.
211. The impasse between the parties as to the delivery of RDF was broken by the Transitional Agreement. In the event, RDF deliveries started on 14 August 2018. The very next day, Mr Morris produced a markedly different level 1 programme that showed the modifications to the plug screw conveyors completing on 13 October 2018. Such works were now on the critical path, as Mr Meakin noted in his internal email of 21 August. The allowance for the installation works, testing and tuning, originally put at twenty-one days but subsequently

shortened to twelve days on 3 and 30 July (thereby changing the critical path), suddenly pushed back out to thirty-five days. There is, however, no evidence that Outotec had provided any new information during the first two weeks of August 2018 to explain these changes. Indeed, Mr Tayton made precisely that complaint in his letter of 29 August 2018 to Outotec. As to Levensat, he criticised Outotec for its attempts to remedy the defect running to over thirteen weeks and involving a “typical prototype proving methodology without any assurance that the revised designs and modifications will meet the functional design requirements.” M+W had, he said, “limited confidence” that the modifications would remedy the defect. As to Hull, he added that two months had passed since M+W’s letter of 28 June and yet no further information had been provided and M+W still had “absolutely no visibility of the nature and extent of the proposed rectification/modification works or the impact that these works will have on the completion and commissioning activities of the Main Contract Plant.”

212. Meanwhile, cold tests were conducted on the screw feeder in late August or early September. Photographs demonstrate that flights were bent and damaged. Mr Morén explained that the flights were rewelded. The straight-talking Wendy Crispin had, however, another take on this episode. She wrote, in some frustration, to colleagues on 12 September 2018:

“We need to respond with a legal letter and back charge M+W for breaking these screws. They ran it at over 100% torque, against our advice and ran it backward and bent screws that we weren’t going to reinforce. Erin had conversations with people on site that may help our case too. I just don’t understand why M+W is so intent NOT getting this plant up and running. When will the customer fire them so we can finish the job???”

213. M+W finally received the design drawings in early September 2018. On 21 September 2018, Mr Purcell wrote to Outotec pointing out that these works were now critical to completion since, without a functioning fuel-feed system, the Fuel could not be fed into the gasifier and the plant could not be commissioned. He complained that a complete and accurate schedule of works was still not available. By a later letter dated 2 October, he added that Outotec’s initial programme of 6 September was incomplete and unrealistic in that it had not included provision for the necessary electrical, instrumentation and control-system work required to implement the remedial scheme. Further, Mr Purcell noted an additional design change. M+W stated in terms that these works were delaying completion and that it held Outotec fully responsible, including for liquidated damages falling due under the EPC contract.
214. The First Fire on RDF was achieved on 9 November 2018. Two weeks later, Mr Meakin wrote to Mr Morén to report that the fuel feed system did not work without significant manual intervention to break up RDF blockages. Mr Meakin asserted that Outotec had already admitted that its rectification works had been unsuccessful and that further alterations would be required. He formally required Outotec to provide detailed proposals within three working days. Outotec responded on 28 November 2018 seeking further particulars. Mr Morén said that the company was “working on a possible solution” but needed more data. There was, accordingly, no settled design solution or clear proposal from Outotec to resolve matters.

215. By an email sent on 27 November, Mr Meakin specifically noted that the gasifier bed could not handle the tramp and non-combustibles despite the Fuel being “in specification.” Likewise, on 29 November, Mr Meakin drafted a further letter to Outotec in which he again asserted that the Fuel was within specification. In evidence, Mr Meakin told me that plainly M+W were wrong about the Fuel but that they thought that at the time. He was, he said, seeking to keep the pressure on Outotec.
216. Consistently with this contemporaneous record, Mr Morén told me in his evidence that he had attended meetings in January/February 2019 in which Mr Meakin had told him that the fuel was “absolutely fine.” This recollection is supported by Mr Morén’s internal email of 15 February 2019 in which he recorded that M+W had always said that the fuel was “absolutely fine.” Furthermore, Achim Ditthardt noted in an email that at a meeting on site on 5 December 2018, Mr Meakin had observed that the fuel could be within a wide range and that the fuel at Hull was of a “much better” quality than at Levensat.
217. On 29 November, Mr Meakin also attempted to assess how the Outotec issues would affect the programme. He noted that it was very difficult with the limited and changing information that he was receiving from Outotec. With that caveat, he projected the further remedial works continuing through to 14 January 2019. In an internal email chain on 6 December 2018, Mr Meakin calculated that the first revision to the feeder systems had delayed the project by fifty-six days pushing the First Fire date out to 9 November; that the second set of remedial works had failed; and that the third proposed set of remedial works would delay the project by a further fifty-three days. He observed that the combined delay of 109 days equated to liquidated damages of £9.24 million.
218. On 7 December 2018, Peter Schoenhofer of M+W wrote to Outotec Oyj, the guarantor of Outotec’s obligations under the subcontract. He asserted that Outotec’s default, specifically in respect of the fuel-feed system, was preventing handover of the project. M+W sought an immediate remedial plan and assurances that any modifications would be proven technology rather than used to support continuing research and development.
219. The ensuing internal debate within Outotec included the suggestion on 8 December by Achim Weiher that Outotec needed to “focus on other places like fuel quality and start-stop operation or whatever is in their ‘garden’.” Kevin Sitton agreed that they should take a point about fuel arguing “it’s hard to run diesel in a car designed for gasoline.” Klaus Sauerbier responded to these ideas by saying that it was “too vague” and by pointing out that Outotec would not be relying on any evidence. He suggested that someone from the technical team would first have to identify a mismatch between the fuel supplied and the contractual specification.
220. When it was put to him that Mr Weiher was suggesting that Outotec should seek to shift the blame, Mr Morén said that he did not read that in the email. I certainly do read the email exchange in that way but acknowledge that there were occasionally issues with Mr Morén’s understanding of the questions asked and I do not hold that against him. In any event, Mr Morén said that he had asked about fuel quality in a site meeting at around that time and was assured by Mr Meakin, as I have noted above, that the fuel was “absolutely fine.” In any

event, Outotec responded to M+W on 12 December 2018. In a carefully crafted and detailed four-page letter, no attempt was made to blame the performance of the plant upon the quality of the fuel.

221. A further internal programme dated 13 December 2018 projected a further delay of forty-six days to a revised Take Over date of 5 March 2019. Such programme noted the failure of the trial of the fuel-feed system on 5 December and was instead dependent on the success of the next trial on 18 December.
222. In a further letter dated 19 December 2018, Mr Schoenhofer noted Outotec's claims as to their performance with "increasing incredulity." He maintained that the fuel feed system was defective and that Outotec had "no real idea" how to meet the subcontract specification as evidenced by its "continuing trial and error" approach. Mr Meakin confirmed that M+W were frustrated. The letter was, he said, in "typical Peter Schoenhofer style" in spelling that out.
223. On 23 December 2018, Mr Meakin wrote internally that the delay on the fuel-feed system alone was then 114 days, that dates remained outstanding for works to install air cannons and upon the instruments, and that Outotec's schedule did not include further works to the screw conveyors and knife gates that were underway at Levensat and Ince and might prove to be required at Hull. Take Over was now projected for 17 March 2019.
224. M+W issued its December report on 7 January 2019. It reported a likely delay to Take Over to 20 March but did not mention the possibility of yet further works being required. By letters dated 8 and 15 January 2019, Outotec asserted that the commissioning of the gasifier could proceed without the air cannons. M+W resisted this approach.
225. Meanwhile, Waste Research Limited carried out testing of the Fuel in the bunker to M+W's order. Such analysis reported three areas of non-compliance:
 - 225.1 Fuel samples taken on 7 November and 5 & 7 December 2018 were found, on a spot-compliance basis, to have a net calorific value between 16.68-20.17 MJ/kg, and therefore in excess of the stricter limits in the Fuel specification of 10-16 MJ/kg.
 - 225.2 Fuel samples taken on the same day were found, on the same basis, to have a bulk density between 110-149 kg/m³, and therefore outside the range specified of 150-300 kg/m³.
 - 225.3 A sample taken on 7 December 2018 was found to contain heavy metals at the rate of 1,231.3 mg/kg, and therefore in excess of the contractual limit of 1,000 mg/kg.
226. By a letter dated 9 January 2019, Mr Meakin asserted that Waste Research Limited's testing showed that the RDF was out of specification in at least three parameters. He then asserted that EWH had not demonstrated that the RDF was within specification and that M+W had no duty to process out-of-specification RDF. Proposals for rectification of the fuel problem were demanded prior to re-firing the gasifier. Together with the letter, Mr Meakin provided

Waste Research's analysis of the incoming RDF, which again showed non-compliances in respect of, among other parameters, net calorific value, bulk density and heavy metal content.

227. Further, by a letter dated 14 January 2019, Mr Meakin gave notice to Fichtner and EWH that M+W was suspending the planned re-fire of the gasifier with solid fuel because of EWH's alleged failure to rectify the out-of-specification Fuel within the bunker.
228. While not mentioned in the contemporaneous correspondence, Mr Meakin insisted in his evidence that his real concern was that the level of heavy metals might lead to the plant exceeding the emissions limits in the Environmental Permit. He accepted that no monitoring had been undertaken or proposed to assess whether that would be an issue. He accepted that the Environment Agency made significant concessions and relaxations during the commissioning phase, and that he had not considered whether any breach of the emissions limits might breach such relaxed limits. Furthermore, Mr Morén said in evidence that he could not recall M+W consulting Outotec on the risk of an emissions breach.
229. M+W adopted, however, a very different position with Outotec. By letters dated 17 and 19 January 2019, Mr Meakin challenged Outotec's position that the plant could be successfully re-fired on RDF without the air cannons being in place.
230. By an internal email sent on 18 January 2019, Mr Meakin reported to Messrs Schoenhofer, Penno and Robinson on the further delay being caused by Outotec. He then wrote that he had included a purchaser delay bar in the latest programme. He explained:
- “This is following our request (to EWH) to provide sampling and analysis information before we re-start. To be clear this is not the strongest claim, but it has been made. We can (and will) keep this claim running.”
- In cross-examination, Mr Meakin insisted that what he had meant was that the claim against EWH needed more data. With the further data now available, he asserted that the claim was indeed stronger. Again, he accepted that there had been no internal report about his concern about emissions levels.
231. On 27 January 2019, Mr Morén wrote to Mr Meakin putting forward two options in respect of replacing the plug screw conveyors to change the geometry and improve the flow of Fuel, as had been done at Levensat. Mr Morén warned that replacing the double actuated valve would require a long lead time. On 28 January, Mr Meakin reported internally to Mr Schoenhofer that Outotec was now stating mid-May for a partial fix and the end of August for a full solution. He added that this was not the programme of a subcontractor who was under pressure and asked whether Mr Schoenhofer might be having a follow-up call with the Outotec board, presumably in order that such pressure might be applied. Based on the experience at Levensat, Mr Meakin then proposed ways in which parts of the programme of works might be accelerated.
232. On 30 January 2019, Mr Schoenhofer wrote to Outotec Oyj complaining that Outotec was now asserting that the further proposed works were conditional upon operational feedback

from the remedial work to the instrumentation and the installation of the air cannons. That, he asserted, was totally unacceptable and suggested that the further works were neither designed nor proven. He warned of the potentially catastrophic consequences and the real risk that EWH might terminate the EPC contract or reject the plant. He insisted on a firm and optimised schedule of works.

233. The installation of the air cannons and the service test were completed on 5 February 2019. On 5 February, Mr Meakin reported the position to Mr Stumpf. He identified all of the outstanding Outotec systems and advised that his attached programme now projected Take Over at 8 May 2019 (with a total Outotec delay of 174 days), but that was dependent on Outotec's tests being successful. That, he candidly recorded, was not likely. An alternative programme put Take Over at 13 November 2019.
234. None of this, as Mr Meakin accepted in his evidence, was reported to EWH.
235. The gasifier was fired on oil on 7 February but was then shut down. A planned refiring on the processed Fuel did not take place the next day. Despite Outotec's encouragement, the gasifier was not refired. Mr Morén said that no one on site could understand M+W's position and that his own perception was that M+W were trying to find excuses for not refiring the gasifier. Mr Morén said that he believed that the gasifier could and should have been refired using the Fuel in the bunker.

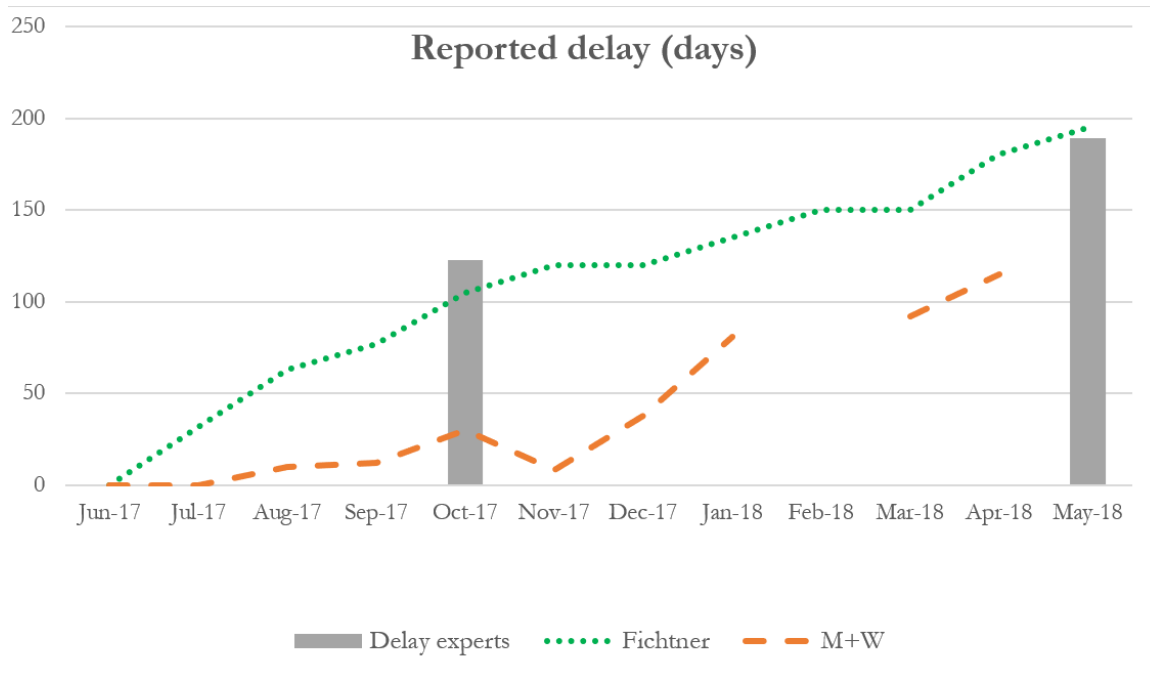
PERIOD 1: 1 JUNE TO 14 AUGUST 2018

236. Given my findings above, this issue does not actually arise. Nevertheless, lest I am wrong in rejecting the allegations of breach during this first period of delay, I consider the question of causation.
237. The starting point is that the project was already in significant delay at 1 June 2018. The parties' programming experts agreed that there had been twenty-seven weeks' critical delay by that date. Absent any claim for an extension for that delay, and none is now pursued, M+W had an accrued liability for liquidated damages of circa £16 million. Further, by clause 14.2(d), such earlier delay cannot be excused.
238. While M+W now seeks an extension from 1 June 2018, I note that by its Response to EWH's Request for Further Information served on 30 October 2020, M+W only asserted a claim from 30 June 2018. It pleaded, at paragraph 14 of its Response, that the critical path ran through the installation of piping between the end of May and 18 June and through steam blows and the commissioning of the gasifier between 19 and 30 June. Neil Robinson told me that this information came from the project team but was supported by Mr Loayza, M+W's delay expert.
239. The Approved Programme at Schedule 11 to the EPC contract showed a float of some 10½ weeks between the completion of commissioning the MPT plant and the first fire on RDF. Accordingly, commissioning the MPT plant would only become critical if it caused delay to

the date of the first fire. The programme allowed eight weeks for this commissioning such that, given that readiness to receive RDF was certified on 31 May 2018, the work should have been completed by about the end of July.

240. In considering causation, the delay experts agreed that it was appropriate to analyse the project on an as-planned and as-built windows basis. Further, they sought to identify the critical path, being the sequence of activities that at any point in time drove the overall completion of the project. Delay to an activity that is on the critical path necessarily causes delay to completion whereas delay to other activities does not have such effect. While there is significant agreement between the delay experts, they disagree as to the critical path during the first delay period:
- 240.1 M+W's expert, Carlos Loayza, considers that the critical path ran through the commissioning of the MPT plant from 2 June to 14 August 2018. In addition, he considers that the replacement of the powder activated carbon silos was critical briefly at the beginning of the window and that the modifications to the gasifier became concurrently critical from 27 June 2018.
- 240.2 EWH's expert, Scott Jardine, considers that the critical path throughout this period ran through the completion of the gasifier installation works including the replacement of the powder activated carbon and hydrated lime silos and modifications to the gasifier feed system.
241. Mr Loayza's analysis is heavily dependent upon M+W's internal programmes. It is certainly right to say that such programmes showed the delay to the commissioning of the MPT plant to be critical during June, July and the first half of August 2018. Such programmes failed, however, to make any allowance for the modification works to the gasifier until the level 1 programme issued on 27 June 2018. Thereafter four separate programmes issued between 27 June and 14 August made some allowance for the modification works but still showed the critical path running through the commissioning of the MPT plant. That position then changed dramatically in the programmes issued after 14 August.
242. M+W has called no evidence whether from the planner, Mr Morris, or anyone else to support his programmes and, specifically, to explain the basis on which he programmed the remedial works proposed by Outotec in the absence of any proper information from the subcontractor. I reject Mr Meakin's evidence that M+W must have been provided with the details of Outotec's plans in undocumented conversations. Such account was speculation rather than a first-hand account, but it is simply inconsistent with M+W's repeated demands for clear proposals and a timeline and with the absence of any internal document within M+W discussing this critical information. I am driven to the conclusion that the programmes prepared between 27 June and 14 August 2018, on which Mr Loayza places so much weight, were engineered to support a potential claim for an extension of time rather than to show the true position.
243. In any event, there is no doubt that the earlier programmes significantly understated the true extent of the outstanding work. I chart in the table below the difference between the delay reported contemporaneously by both Fichtner and M+W. When then considered against the agreed expert position on the actual critical delay at both 1 October 2017 and 1 June

2018, it is clear both that M+W consistently understated the delay and that Fichtner's own contemporaneous assessments of delay were more accurate:



244. I accept the evidence of Matt Poole of Fichtner that, while it is not unusual for project managers and contractors to disagree about the level of delay, the discrepancy in this case was difficult to explain. Mr Poole was, in my judgment, right to conclude that the differences between the estimates of delay indicated that M+W were wrongly compressing activities. Indeed, in his witness statement he graphically demonstrated how the period between first fire on RDF to Take Over was compressed at one point from 130 days to just thirty.

245. Mr Jardine analysed M+W's forward projections together with the system handover data recorded in M+W's monthly programme reports. Such analysis showed repeatedly that M+W was only able to complete a small proportion of the systems that it expected to complete each month. In other words, its programmes were consistently overly optimistic, and the completion dates constantly moved out over time. By way of example:

245.1 The April 2018 programme report projected that sixty systems would be completed that month. In fact, between sixteen and eighteen systems were completed, being 27-30% of the projection.

245.2 In May 2018, M+W projected that forty-nine systems would be completed that month. In fact, only nine or ten systems were completed, being a mere 18-20% of the projection.

245.3 In July 2018, M+W reported that only twenty-six systems would be completed that month. Twelve systems were actually completed being a rather higher completion rate of 46% of the forecast.

- 245.4 In August 2018, M+W projected that it would complete thirty systems that month. In fact, just five were completed being a mere 8% of the projection.
246. Mr Jardine's analysis was not confined to the rate of completion of systems on the thermal train. That said, he explained that the vast majority of the systems analysed were required to fire the gasifier on RDF. Furthermore, I am satisfied that the delays on the MPT plant compared favourably with those on the thermal train.
247. While I find that M+W's concerns about Outotec's performance were both serious and genuine, they were not shared contemporaneously with EWH. Mr Meakin said in evidence that doing so had not crossed his mind. Further, he rejected the suggestion that he should have kept EWH informed, insisting that M+W was dealing with its own supply chain. In my judgment, M+W's failure properly either to report or account in its programmes for its concerns meant that such programmes were inevitably unreliable.
248. I prefer Mr Jardine's analysis and conclude that the critical work throughout period 1 was the completion of the gasifier installation works. As he demonstrated, M+W's contemporaneous programmes were consistently overly optimistic and downplayed until after the parties resolved the impasse in respect of the delivery of RDF, the true extent of the issues with the gasifier. Taking into account the serious concerns that had been identified by the Intervention Team with Outotec's design in 2017, M+W's then conclusions as to the scale of the problem and likelihood that if not resolved these issues would delay Take Over, and the lack of detail both as to the proposed remedial works and timeline throughout the summer of 2018, I am satisfied that any properly prepared programme would have shown the gasifier works, and not the MPT plant works, to have been critical throughout period 1.
249. Rather than leave such matters to the independent experts, Mr Acton Davis asked Luca Carlassara of Fichtner about the criticality of the commissioning of the MPT plant. He too did not accept that the commissioning of the MPT plant was critical throughout period 1. Further, I agree with Mr Wilcock's observation in cross-examination that M+W's position during this period was less about addressing its alleged concerns with the RDF and more about "buying time to mask delay."
250. Thus, even if I am wrong in rejecting M+W's case on breach, the alleged breaches were not causative of the delay during period 1. While that finding is sufficient to dispose of this issue, in my judgment the true causes of the delay during period 1 were M+W's wrongful suspension of the commissioning works while M+W deliberately failed to request deliveries of RDF and the need for further works to the gasifier.
251. In closing argument, Mr Acton Davis relies on the fact that breach of the emissions limits in the Environmental Permit would be an offence contrary to regulation 38 of the Environmental Permitting (England & Wales) Regulations 2016. He relies particularly on the risk of emissions from excess heavy metals. Further, he argues that M+W should not be required to process RDF through its expensive new MPT plant without reassurance as to its composition such that it could be sure that the plant would not be damaged.

252. As Christopher Wilcock observed in an email sent on 28 January 2019, breach of the environmental permit was “non-negotiable.” That said, there is no evidence before me that the level of heavy metals was such as to put the plant at risk of breaching such limits. Indeed, as I have already observed, while there was a breach of the EPC contract in the delivery of RDF that was out of specification, the evidence is that the use of eddy current separators in the MPT plant proved effective in reducing the heavy metal content. Further, and in any event, the risk of high levels of heavy metals was foreseen and the agreed remedy was the use of activated carbon. The issue at the time was as to whether the net calorific value might be slightly high. As Mr Burgess retorted in cross-examination, such issue posed zero risk of breaching the permit.
253. In any event, I reject M+W’s argument that the risk of a breach of the Environmental Permit justified its refusal to accept deliveries of RDF throughout the period from 1 June to 14 August 2018. Following the certification on 31 May that the plant was ready to receive RDF, M+W could mechanically process such fuel through the MPT plant but the gasifier was not ready, and had not been certified as ready, for its first fire on RDF. Accordingly, there was no question of there being any environmental risk through the simple mechanical processing of the heavy metals.

PERIOD 2: 9 NOVEMBER 2018 TO 4 FEBRUARY 2019

254. The delay experts agree that the cause of the delay from 9 November 2018 to 4 February 2019 was the need to make modifications to the gasifier feed system. M+W argues that these works were required to resolve the issue of bridging within the hoppers which was, in turn, caused or contributed to by the supply of RDF with excessively low bulk density.
255. While it is right to record that EWH experienced difficulties in obtaining a supply of RDF that consistently met the specification for bulk density from such suppliers, it eventually settled on sourcing RDF from a single Mid UK operated facility. I have already analysed the bulk density of this RDF. On just two out of 35 days (being 5.71%), the average bulk density fell below 150 kg/m³, although, as explained, such test result was to be reported to the nearest 10 kg/m³ such that there was no breach.
256. In any event, M+W’s argument runs contrary to the parties’ expectations in that Table 22A.2.0 noted:
- “If the bulk density is lower than the minimum, the throughput is unlikely to be met. If the bulk density is above the maximum, more blockages are likely reducing availability.
257. In the Joint Statement of the defect experts on defect 17, David Wakefield reported that 80% of the RDF supplied to the plant had a bulk density between 170-180 kg/m³ and that separation efficiencies in the MPT plant drop off with lower bulk densities if a constant mass throughput is maintained leading to more detritus being carried through to the fuel feed system. That said, he advised that it was unlikely that additional detritus led to more blockages and much more likely that the flow characteristics of the lower bulk density

material contributed to poor flow. In referring to lower bulk density, Mr Wakefield is plainly alluding to the design bulk density of 225 kg/m³. In cross-examination, he confirmed that the Fuel issues in respect of the operation of the plug screw conveyor were to do with bulk density and the shape of the material. He agreed, however, that he had not undertaken any analysis that identified that the modifications undertaken in 2018/9 had been required because of any particular characteristic of the Fuel.

258. Chris Higman reported that he could find no basis for concluding that the cause of bridging was the quality of the fuel.
259. Of the three experts, the real expert in plug screw conveyor technology was Professor Johannes Fottner. Professor Fottner spent five years as a Research Associate at the Chair of Materials Handling Flow Logistics at the Technical University of Munich with a research interest in the design and economic use of high-performance screw conveyors. After 14 years in industry, he returned to the university in 2016 as a Professor of Logistics Engineering and Full Professor of the Chair of Materials Handling Flow Logistics.
260. Professor Fottner explains that a number of different parameters can cause or contribute to bridging and blocking of a screw conveyor. Specifically, he considered:
- 260.1 the properties of the material being processed;
 - 260.2 the conveying speed of the screw conveyors;
 - 260.3 the effects of non-continuous operation and frequent stops and starts;
 - 260.4 the effects of mechanical pre-treatment; and
 - 260.5 the position and functionality of the fill-level sensors on the infeed hoppers.
261. While each of these matters can explain the increased formation of bridging and blockages in the material feed, he explained that “by far the most likely” explanation was the properties of the fuel. Such problems led to the need to optimise the plant during the commissioning phase. I accept Professor Fottner’s evidence, as Mr Higman did in cross-examination, that:
- 261.1 one of the reasons why material can have a low bulk density is because it is able to support a certain amount of void space in its natural resting state;
 - 261.2 material with lower bulk density is more likely to create voids and bridges within a hopper;
 - 261.3 the lower the bulk density, the less likely it is that a bridge will collapse under its own weight.
262. That said, Professor Fottner did not attribute the need for modification works to any non-compliance with the RDF specification. Rather the tenor of his evidence was that the works required were part of the commissioning process to refine the fuel feed system to meet the operating conditions.

263. I reject any suggestion that the underlying cause of the modification works to the fuel feed system was any problem with the quality of the RDF and, specifically, with its bulk density. While lower than the design bulk density, the material was within the specification albeit towards the bottom end of the range.

PERIOD 3: 5 FEBRUARY TO 4 MARCH 2019

264. The delay experts agree that the cause of delay during the final month of this period was M+W's decision not to proceed further with commissioning of the gasification train. For the reasons already explained (paragraphs 73-83), I reject M+W's argument that it was entitled to suspend commissioning.

265. In his evidence, Mr Meakin asserts that M+W suspended refiring because of concern that the level of heavy metals in the Fuel might cause the plant to exceed the emissions limits. However:

265.1 As set out above, that is not what he said at the time to Outotec.

265.2 Further, M+W did not - as Mr Meakin accepted in cross-examination - inform EWH in writing about the alleged concern about breaching the emissions limits. While he claimed in his oral evidence that, despite the lack of written complaint, such concerns were discussed with EWH, there is no such claim asserted in his witness statement. Further, there is no documentary evidence within the internal documents of either M+W or EWH to support the suggestion of discussions about the emissions limits.

265.3 In any event, the parties foresaw and provided for the typical consequence of excess heavy metals in the fourth column of Table 22A.2.0. Their proposed solution was to increase the consumption of activated carbon, albeit they recognised that the level of heavy metals could be so high so as to prevent such remedy being efficacious such that emissions limits might be exceeded.

265.4 It was, of course, possible to remove out-of-specification Fuel from the bunker in order to prevent such position being reached. Indeed, paragraph 14.8.1.1 of Schedule 14 envisaged that EWH might be required to remove up to 22,000 tonnes of out-of-specification Fuel and inerts at its own cost. Mr Acton Davis counters that paragraph 14.8.1.1 was not intended to cover the removal of Fuel that is out of specification because the RDF delivered by EWH was itself out of specification, and further he points to the limit on M+W's right to have such Fuel removed at EWH's cost and M+W's liability for any additional removal costs. I am not persuaded by such arguments:

a) Paragraph 14.8.1.1 is not so limited and is equally applicable to Fuel that is out of specification by reason of the RDF not being compliant with Table 22A.2.0.

b) The limitation on the quantity of Fuel that EWH is obliged to remove at its own cost is not in point. If additional Fuel beyond the 22,000-tonne limit were out of specification by reason of EWH's breach of contract in failing to deliver compliant RDF then it would be open to M+W to seek to recover its costs of disposal of any excess Fuel. The possibility of such cost being incurred down the line did not, however, entitle M+W to insist on extra-contractual guarantees as to the quality of the RDF.

- c) In any event, the parties considered and agreed the boundaries at which M+W might properly refuse to accept non-compliant RDF. It was only if the RDF was Unacceptable RDF as defined at Appendix C of Schedule 22A (such that the parties envisaged that the processing of such fuel might cause damage or excessive wear and tear) that M+W was entitled to refuse to accept delivery.
- 265.5 Further, by clause 46.5 of the EPC contract, the parties agreed that notwithstanding the existence of a dispute, the parties would continue to perform their own contractual obligations.
- 265.6 I am fortified in this view by disclosure of Mr Meakin's comment to his colleagues within M+W that the argument that EWH should provide sampling and analysis data before the gasifier was restarted was "not the strongest."

THE ABANDONED CLAIMS

266. While the trial before me was only concerned with the delay claims that have stayed the course, it is telling that a number of other claims for extensions of time arising from allegations of a lack of a water supply, exceptionally adverse weather conditions, strike action, late certification of the Readiness to Receive RDF and river wall earth works were each asserted between March and June 2018 but since abandoned. While the delay claims must be considered properly on their own merits, I accept EWH's characterisation of the delay claims as essentially motivated by the commercial need for M+W to protect its position against the risk of very large claims for liquidated damages and the possibility of termination.

EXTENSION OF TIME CLAIMS: NOTIFICATION

267. In view of my findings on causation, it is academic to consider whether M+W gave proper notice of its delay claims. Nevertheless, lest I am wrong about my earlier findings, I consider the issue of notification.

THE NOTIFICATION REQUIREMENTS

268. The contractual entitlement to an extension of time is subject to the requirement of prior notification. Clauses 14.1 and 14.1A provide:

"14.1 If the Contractor suffers any delay in the execution of the Works, or has reason to expect to suffer any such delay, he shall as soon as it is reasonably practicable to do so, notify the Project Manager of the delay or expected delay and the cause of the delay or expected delay.

As soon as reasonably possible after that, the Contractor shall notify the Project Manager of any extension to any date or period specified in the Contract for the completion of such obligations as he considers would be fair and reasonable in the circumstances. The Contractor shall keep records made at the time of the circumstances, extent and effect of such delay ...

14.1A The notification of delay by the Contractor in accordance with the first paragraph of Sub-clause 14.1 is a condition precedent to any entitlement of the Contractor to an extension under this Clause 14."

269. The obligation was to “notify” and not to give “Notice.” Accordingly, I reject EWH’s argument that the requirement of notification of delay or of a consequent claim for an extension of time pursuant to clause 14.1 incorporated the formalities of clause 1.8. There are, however, three aspects to notification:
- 269.1 First, M+W was required to notify Fichtner both of the fact and the cause of the delay or expected delay.
- 269.2 Secondly, M+W was required to notify Fichtner of the extent of the extension that it considered “fair and reasonable.”
- 269.3 Thirdly, there were two discrete timing requirements:
- a) The obligation to notify the fact and cause of any delay arose as soon as it was reasonably practicable to notify Fichtner once M+W either suffered delay or had reason to expect that it would suffer delay.
 - b) The obligation to notify the extension sought arose “as soon as possible after that.”
270. It should be noted that the only matter that was a condition precedent was that set out in the first paragraph of clause 14.1. Thus:
- 270.1 The requirement to notify delay, or expected delay, and its cause as soon as it was reasonably practicable was a condition precedent to any extension.
- 270.2 The further obligation to notify as soon as reasonably practicable thereafter the extension that M+W considered fair and reasonable was not a condition precedent.

THE NOTIFICATIONS RELIED UPON

271. M+W’s case as to notification is pleaded at Annex 7 to its Defence and Counterclaim. It relies on letters dated 15 and 30 May 2018, 8 and 22 June 2018, 19 July 2018, 22 August 2018, 18 and 26 September 2018, 8 November 2018 and 5 February 2019. In closing argument, Mr Acton Davis focused on the first three letters while making clear that M+W continued to rely on all of the pleaded notices.
272. By its written closing submissions, M+W also argued that it was “clear from the ... evidence in this case, including the witness testimony, that EWH contemporaneously had actual knowledge of the issues with RDF and that M+W viewed these as entitling M+W to more time and money.” Of course, the contractual requirement was not that EWH should have “actual knowledge” but that M+W should “notify” the Project Manager in accordance with clause 14.1. In any event, such expanded case is not pleaded and is not therefore now open to M+W.

Letter of 15 May 2018

273. Roy Meakin’s letter of 15 May 2018 referred to events the previous day when M+W had refused to accept deliveries of RDF. It referred to earlier correspondence in which M+W had maintained that supporting data should be provided with each delivery of RDF. It then continued:

- “1. The Purchaser refused to provide the qualitative data in respect of deliveries as set out in the Contractor’s letters noted above.
2. The Purchaser refused to provide the legislatively mandated data in respect of deliveries and rejects as set out in the Contractor’s letters above.
3. The Purchaser had not provided evidence of the Quality and Environmental Management Systems.

The Contractor was therefore unable to accept delivery of the RDF, despite awaiting the requested data for the day before issuing this Notice as it fails to meet the Contract and legislative requirements.

As an aside, the Contractor records that no sampling/analysis personnel were present to undertake evaluation of the incoming RDF. In the circumstances, the Contractor has no choice but to issue this letter as notice of delay in accordance with clause 14.1.”

274. By reference to the pleaded breaches of contract, the letter of 15 May was notification of a delay alleged to have arisen by reason of EWH’s failures to evidence that each delivery of RDF was compliant with the contractual specification and that it had a proper quality management system in place (allegations 4(c) & 5(b)).

Letter of 30 May 2018

275. Mr Meakin’s letter of 30 May 2018 was written to EWH and was not accordingly notification of anything to Fichtner. It set out a critique of the quality management system:
- 275.1 Noting that the first draft dated 1 November 2017 was marked “1st draft for comment”, Mr Meakin queried whether EWH had had an appropriate quality management system in place as required by Schedule 22A.
 - 275.2 He noted the absence of a document referenced in the second version dated 11 December 2017.
 - 275.3 Noting that two waste transfer stations regularly failed to provide RDF that met the specification in January and February 2018, Mr Meakin observed that it was unclear which stations had been excluded.
 - 275.4 He reasserted M+W’s position that each delivery of RDF must be compliant with the contractual specification.
 - 275.5 He raised detailed questions about testing, waste transfer notes and certificates of conformity. Further, he sought certificates for Biffa and Veolia.
 - 275.6 He asserted that M+W would reject any Unacceptable RDF.
276. The letter complained that the documents provided by EWH raised “more questions over the reliability of data and the Contractor’s entitlement to use and rely on the data.” Mr Meakin concluded by asserting:

“As such the delay in RDF remains to the Purchaser’s account.”

277. If the letter of 30 May 2018 had been sent to Fichtner then, by reference to the pleaded breaches of contract, it was notification of a delay alleged to have arisen by reason of EWH's failures to evidence that each delivery of RDF was compliant with the contractual specification RDF and that it had a proper quality management system (allegations 4(c) & 5(b)). It was not, however, so sent.

Letter of 8 June 2018

278. Mr Meakin's letter of 8 June 2018 asserted that EWH had not been in a position to provide the "mandated documentation" in respect of the deliveries of RDF planned for 14 May 2018, and that such matters had been confirmed in the May letters. He continued:

"The upshot is that since 14 May 2018 to the date of this letter, the Purchaser has not been in a position to meet the contractual commitments in respect of the supply of RDF. Our letter dated 15 May 2018 gave Notice of delay in accordance with Clause 14.1.

Our submissions in respect of the extent of the delay and associated extension of time for completion together with assessment of additional payment due under Clause 19 will follow once the delaying events are ended."

279. The letter concluded by challenging EWH's claims for liquidated damages.

280. By incorporating the May correspondence, I accept that the letter of 8 June was notification of a delay alleged to have arisen by reason of EWH's failures to evidence that each delivery of RDF was compliant with the contractual specification RDF and that it had a quality management system (allegations 4(c) & 5(b)).

Notice of 22 June 2018

281. The notice of 22 June 2018 stated:

"6. The Purchaser has been unable or unwilling to provide the Contractor with documentation validating the acceptability of RDF to be supplied by the Purchaser, the consequence of which is that the Contractor cannot accept Purchaser provided RDF on to the site;

6.1 this accordingly requires an extension to the Take Over in respect of the Works under the EPC Contract,

6.2 In light of the above material circumstances we consider a matter(s) entitling M+W to an extension of time to any date or period specified under the EPC Contract has occurred under clause 14.4, being 14.4(d).

6.3 Accordingly, we give you notice, pursuant to clause 14.1 of the EPC Contract, that the progress of the Works will be delayed and an extension of time Take Over in respect of the Works is required ..."

282. The notice continued at Part B to give a written statement of the grounds for an extension. M+W asserted:

“The Purchaser’s breach is the failure to provide the qualitative data in respect of the [RDF] that is required to be provided to the Contractor for use in commissioning and testing the Facility.”

283. Since the notice was concerned with a delivery on 14 May 2018, it asserted that the delay to that date was forty days.
284. Plainly this was notification of a delay alleged to have arisen by reason of EWH’s alleged failures pleaded as allegations 4(c) & 5(b).

Letters of 19 July and 22 August 2018

285. These letters simply updated the claim to sixty-eight and then ninety-three days.

Letter of 5 February 2019

286. Mr Meakin’s letter of 5 February 2019 referred to a series of letters from 28 March 2018 to 28 January 2019. Much of that correspondence related to M+W’s insistence that EWH should evidence that each delivery complied with the contractual specification but the correspondence in January 2019 included complaints that RDF delivered to site was not in fact compliant. The letter continued:

“Absent the provision of valid sampling results that demonstrate compliance of the Incoming RDF with Schedule 22A Table 22A.2.0, the Contractor has no duty to process the material delivered and is prevented from completing the commissioning and Take Over testing of the Works.

From the foregoing, it is clear that the failure of the Purchaser to comply with the Contract has impacted upon the Contractor’s ability to comply with the Contract, and the Contractor repeats the Notices in accordance with Clauses 14.1 and 19.1 in respect of delays and additional costs provided in the above noted correspondence.

The failure to provide compliant RDF continues, and the Contractor has requested the Purchaser’s action to rectify the non-compliant fuel currently stored in the bunker. The delay occasioned by the Purchaser’s failure continues, however, as advised by the Contractor in his submission dated 22 June 2018 ..., the delay to the works at that time was noted as 50 days. The Purchaser is still (at the date of this letter) unable to evidence deliveries in compliance with Schedule 22A, Table 22A.2.0, and indeed the Purchaser’s own results demonstrate that the material is not in compliance. The period since the submission of 22 June 2018 to the date of this letter is a further 228 calendar days, the total impact of the Purchaser’s failure to demonstrate RDF compliance is 278 calendar days and the Contractor is entitled to relief from damages and his associated cost for this period.”

287. I have considered the January 2019 correspondence referred to in this letter and said to indicate a failure to comply with the specification:
- 287.1 The letter dated 23 January 2019 was written to EWH and not Fichtner. It was not concerned with delay but with M+W’s complaints that EWH’s subcontractor had

failed to carry out sampling and analysis in accordance with Schedule 22A; that even such allegedly non-compliant sampling showed that the samples did not comply with the contractual specification; and that the Fuel (being the processed RDF) in the Fuel Bunker was consequently non-compliant and needed to be removed at EWH's cost.

287.2 The letter of 28 January 2019 complained that, in alleged breach of Schedule 22A, the sampling and analysis of the incoming RDF was not undertaken by an accredited contractor. This was not, however, said to cause delay but rather M+W asserted that it would henceforth employ its own accredited contractor to sample and analyse incoming RDF.

288. By reference again to the pleaded case, this letter was notification of a claim for delay arising from alleged breaches of contract in the provision of non-compliant RDF (allegation 2) and in failing to evidence that each delivery of RDF was compliant with the contractual specification RDF (allegations 4(c) & 5(b)).

Other documents pleaded in Annex 7

289. None of the other documents pleaded at Annex 7 takes M+W's case any further:

Date	Analysis
18 September 2018	This letter notified alleged delay to the commissioning of the MPT plant due to: “1. RDF deliveries not in accordance with the Contractor's Schedule of Delivery Requirements both in timing and quantities 2. Additional RDF Fire Management activities imposed by the EA Guidance (imposed subsequent to Contract Execution) 3. Failure by the Operating Contractor to manage loading of the MPT plant to meet the desired throughputs 4. Failure by the Purchaser to provide correct offtake skips” The letter was not therefore notice of the alleged breaches of contract now relied upon to justify an extension of time.
26 September 2018	This letter gave notice of a claim for delay arising out of EWH's alleged failure to provide an Updated Sampling Protocol for RDF following the Transitional Agreement reached in August 2018. Again, this was not notice of a claim now pursued in these proceedings.

8 November 2018	This letter gave notice of a claim for delay arising out of a shortfall in the delivery of RDF on 7 November. Again, this was not notice of a claim that is now pursued.
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CONCLUSIONS ON NOTIFICATION

290. Thus, M+W only gave notice of allegations 2, 4(c) and 5(b). Such notice was timely. Since notification pursuant to the first paragraph of clause 14.1 was a condition precedent to any entitlement to an extension, it follows that M+W's claim for an extension on the grounds of any other breaches must fail.

EXTENSION OF TIME CLAIMS: CONCLUSIONS

291. Thus:
- 291.1 In respect of period 1 (1 June to 14 August 2018), M+W has failed to establish any breach of contract or that the alleged breaches of contract caused any delay to Take Over.
- 291.2 In respect of period 2 (9 November 2018 to 4 February 2019):
- a) M+W has established allegation 2 in part, but I reject its other allegations of breach of contract; and
 - b) M+W has failed to establish that the alleged breaches of contract caused any delay to Take Over.
- 291.3 In respect of period 3 (5 February to 4 March 2019), M+W has failed to establish any breach of contract or that the alleged breaches of contract caused any delay to Take Over.
- 291.4 In the event that I am wrong in these conclusions:
- a) M+W only gave timely notice of allegations 2, 4(c) and 5(b); and
 - b) since notification pursuant to the first paragraph of clause 14.1 was a condition precedent to any entitlement to an extension, it follows that M+W's claims for an extension on the grounds of any other breaches must fail.
292. These conclusions are not affected by the following note in EWH's internal analysis in November 2018 of proposed terms of settlement:

“The advised extension of time of 91 days is credited to the existing LD account. However, it is assumed that LD's are settled in November, and then paid (at the lower 50% rate) on a monthly basis thereafter until Take Over is achieved. This is an optimistic assumption as, so far, the Contractor has shown no appetite to settle its LD account on time.”

As to this document:

- 292.1 First, I am satisfied upon his oral evidence and the lack of any contradictory documentary record to accept Mr Carlassara's assertion that Fichtner did not give any such advice.

292.2 Secondly, while Mr Burgess was pressed in cross-examination to accept that this was a concession that EWH had been advised, perhaps by Fichtner, that M+W was entitled to an extension of ninety-one days, I accept his evidence that this allowance was nothing to do with EWH's view as to M+W's alleged entitlement to an extension of time. Rather it came directly from a deal sheet dated 15 November 2018 in which potential terms of settlement had been set out. This was, Mr Burgess insisted, simply a commercial mechanism to allow the parties to achieve settlement by creating an artificial entitlement to an extension of time.

293. Accordingly, I reject M+W's claims for an extension of time.

TERMINATION OF THE EPC CONTRACT

TERMINATION PURSUANT TO CLAUSE 44

294. Having rejected M+W's claims for an extension of time, it follows that, by 4 March 2019, the Delay Damages Cap had been surpassed and EWH was entitled to and did terminate the EPC contract for Contractor's Default pursuant to clause 44.1(c).

REPUDIATION AT COMMON LAW

295. In the alternative, EWH argues that the contract was terminated by its acceptance of M+W's repudiatory breaches of contract. EWH relies on three matters:

295.1 The scale of the delay at termination.

295.2 M+W's repeated suspensions of the works.

295.3 M+W's alleged failure to comply with its contractual reporting obligations.

296. Since, for the reasons explained above, I conclude that EWH was entitled to terminate the contract pursuant to clause 44.1(c), it is not strictly necessary to consider the alternative case at common law. Lest I am wrong, then M+W argues that a failed termination pursuant to clause 44 takes effect as a termination for convenience pursuant to clause 43 and that the common law right is excluded. It relies on clause 44.12 of the contract which provides:

“If the issue by the Purchaser of any Notice terminating or purporting to terminate the employment of the Contractor under this Clause 44 is subsequently determined to have been invalid, such Notice shall not constitute a repudiation of the Contract by the Purchaser but shall be deemed to have been a Notice of Termination issued in accordance with Sub-clause 43.1 and thereupon the rights and obligations of the parties shall be as stated in Clause 43 (Termination by the Purchaser for convenience) and not as stated in this Clause 44.”

297. EWH points to clause 45.2 which expressly preserves the right of termination at common law. It provides:

“Except in the case of termination of the Contractor's employment under Clause 44 (Termination for Contractor's default), or Clause 44B or a repudiation of the Contract by either party, the liability of either party to the other arising out of or in

connection with the Contract or the Works, whether by reason of any breach of contract or of statutory duty or tortious or negligent act or omission shall be limited to the damages, remedies and reimbursements expressly provided in the Contract.”

298. I reject M+W’s argument that the contract provided a comprehensive code for termination that excluded the possibility of termination at common law:
- 298.1 First, “clear express words” are required to rebut the presumption that the parties are entitled to their rights at common law: per Lord Diplock in Gilbert-Ash (Northern) Ltd v. Modern Engineering (Bristol) Ltd [1974] A.C. 689, at 717H; reaffirmed by Lord Leggatt in Triple Point Technology Inc. v. PTT Public Co. Ltd [2021] UKSC 29, [2021] A.C. 1148, at [109]-[112]).
- 298.2 EWH’s right to terminate for Contractor’s Default under clause 44.1 was expressly provided to be without prejudice to its other rights and remedies.
- 298.3 Far from excluding the common-law right of termination, clause 45.2 expressly and clearly preserved such right in the event of repudiation.
299. In my judgment, the proper construction of the contract is that clause 44.12 prevents an invalid notice of termination served pursuant to clause 44 from being treated as a repudiatory breach. It does not, however, prevent EWH from seeking to terminate the contract in any event upon the grounds of M+W’s alleged repudiatory breach.

Termination for delay

300. Repudiation involves a breach of contract which is grave enough to go “to the root of the contract”: per Lord Wilberforce in Federal Commerce & Navigation Co. v. Molena Alpha Inc. [1979] A.C. 757, at 779. In Stocznia Gdynia S.A. v. Gearbulk Holdings Ltd [2009] EWCA Civ 75, Moore-Bick LJ observed, at [20], that the provisions for liquidated damages in a contract provided “an agreed measure of compensation for breaches of contract by way of delay ... which, although important, do not go to the root of the contract.” He added:
- “However, they have also agreed that there comes a point at which the delay or deficiency is so serious that it should entitle Gearbulk to terminate the contract. In my view they must be taken to have agreed that at that point the breach is to be treated as going to the root of the contract. In those circumstances the right to terminate the contract cannot sensibly be understood as anything other than embodying the parties’ agreement that Gearbulk has the right to treat the contract as repudiated with ... the usual consequences.”
301. Here, the termination notice was served on 4 March 2019, almost two months after the Delay Damages Cap was reached on 7 January 2019. At that point, the total delay was a few days shy of 11 months beyond the contractually agreed Take Over date of 9 April 2018. Ongoing delay beyond the Delay Damages Cap was at EWH’s cost since there was no further entitlement to liquidated damages. I have no hesitation in concluding that by 4 March 2019 the works had been delayed to such an extent that M+W’s breach of contract went to the root of the contract.

Suspension of the works

302. I have already rejected M+W's claimed entitlement to suspend commissioning. Even if the delay to 4 March 2019 was not itself sufficient to amount to a repudiation, such delay coupled with M+W's unjustified refusal to continue with commissioning the gasifier plainly entitled EWH to terminate the contract.

Breach of reporting obligations

303. There is also a good case for alleging that M+W was in breach of contract for failing properly to report on the progress of the works. In light of my findings on the other grounds, it is, however, unnecessary to consider such case further at this stage or to consider whether any such breach went to the root of the contract.

CONCLUSIONS

304. Accordingly, I find that, even if I am wrong in concluding that EWH validly terminated the contract for Contractor's Default under clause 44.1(c), EWH was entitled to and did validly terminate the contract at common law.

QUANTUM OF EWH'S DELAY & TERMINATION CLAIMS

305. By its final schedule of loss served with its closing submissions, EWH claimed some £131,362,885.23 plus interest:

Head of claim	Claim (£)	Paras.
Damages to termination		
Liquidated damages for delay ¹	23,077,331.70	306-316
Damages post termination		
1. Black & Veatch costs	12,119,903.25	355-381
2. Additional financing costs ²	53,119,794.00	382-409
3. Sub-contract costs	19,457,624.02	410-430
4. Cost of commissioning support	2,237,397.97	431-439
5. Operation & maintenance costs	19,176,101.08	440-462
6. Costs of major consumables	4,924,884.62	463-464
7. Minor consumables	20,117.21	463 & 465

8. Cost of technical support	1,970,870.33	463 & 466
9. Cost of spares	1,387,108.43	463 & 467
10. Costs of electricity	1,452,535.05	463 & 468
11. Cost of water	168,090.02	463 & 469
12. Construction insurance costs	1,212,352.29	463 & 470
13. Security costs	662,673.95	463 & 471
14. Lease costs	144,706.32	463 & 472
Cost of making good defects	9,943,504.40	474-695
Less amount left in contract price	(15,269,533.00)	
Total termination claims:	£ 112,728,129.94	
Other claims		
Cost of consumables for which M+W was responsible	2,195,848.27	
Cost of provision of electricity for which M+W was responsible	290,542.32	
Total other claims:	£ 2,486,390.59	
Total claims:	138,291,852.23	
Less agreed credit for sums received pursuant to the call on the retention bond:	(6,928,967.00)	305
Net claim:	£ 131,362,885.23	

¹ This is the primary claim for delay prior to termination. In the alternative, EWH seeks general damages in the sum of £23,622,603.

² Again this is the primary claim. In the alternative, EWH seeks the alleged diminution in value of the plant in the sum of £52,948,753.

EWH'S CLAIM FOR DAMAGES FOR DELAY

306. EWH seeks liquidated damages for delay in the sum of £23,077,331.70. Relying on British Glanzstoff Manufacturing Co. Ltd v. General Accident, Fire & Life Assurance Corp. Ltd [1913] A.C. 143, M+W argues that upon the true construction of the contract, the claim for

liquidated damages was lost upon termination and replaced by a claim for general damages for delay.

THE CONTRACTUAL RIGHT TO LIQUIDATED DAMAGES

307. Clause 15.1 of the EPC contract provides:

“If the Contractor fails to satisfy the requirements under Clause 33 and Schedule 15 in accordance with Schedule 11 (Times of completion) to enable the Project Manager to issue the Take Over Certificate or the Contractor fails to do any other thing in accordance with Schedule 11 (Times of completion), the Contractor shall pay the Purchaser liquidated damages as specified in Schedule 12 (Liquidated damages for delay) (subject to Sub-clause 15A), but shall have no liability to pay damages in excess of the Delay Damages Cap.”

308. Paragraph 12.2 of Schedule 12 provides:

“The Liquidated Damages payable for delay in accordance with Sub-clause 15.1 of the Contract shall be calculated by multiplying the daily rate set out in Table 12.1 by the number of days by which completion of the construction of the Plant and the satisfaction of all the requirements under Clause 33 and Schedule 15 to enable the Project Manager to issue the Take Over Certificate is later than the permitted period for the same as stated in Schedule 11.”

309. M+W argues that, since liquidated damages are calculated by reference to the difference between the actual and contractual dates of Take Over, no such damages are payable upon the termination of the contract before Take Over is achieved. Mr Acton Davis prays in aid the construction of a similar provision in Glanzstoff, and submits that such argument remains open notwithstanding the decision in Triple Point Technology Inc. v. PTT Public Co. Ltd [2021] UKSC 29, [2021] A.C. 1148 since ultimately the question is the proper construction of the liquidated damages clause.

310. In Triple Point, Lady Arden described Glanzstoff, at [42]-[43], as a “little-known case” that was not of significance and which did not establish any new proposition of law. Rather, it was a decision that turned upon the interpretation of the particular contract in that case. Throwing further doubt upon the decision, she added, at [42]:

“When the court is required to interpret a similar clause today, it will have to decide the issue in the same way as any other question of interpretation and not by treating Glanzstoff as having created some special rule applying to liquidated damages clauses.”

311. In my judgment, M+W’s argument falls into the error identified by Lady Arden at [35]-[36]:

“35. The difficulty about this approach is that it is inconsistent with commercial reality and the accepted function of liquidated damages. Parties agree a liquidated damages clause so as to provide a remedy that is predictable and certain for a particular event (here, as often, that event is a delay in completion). The employer does not then have to quantify its loss, which

may be difficult and time-consuming for it to do. Parties must be taken to know the general law, namely that the accrual of liquidated damages comes to an end on termination of the contract (see Photo Production Ltd v Securicor Transport Ltd [1980] A.C. 827, 844 and 849). After that event, the parties' contract is at an end and the parties must seek damages for breach of contract under the general law. That is well understood: see per Mr Recorder Michael Harvey QC in Gibbs v. Tomlinson (1992) 35 Con LR 86, 116. Parties do not have to provide specifically for the effect of the termination of their contract. They can take that consequence as read. I do not, therefore, agree with Sir Rupert Jackson when he holds in the second sentence of paragraph 110 of his judgment that 'If a construction contract is abandoned or terminated, the employer is in new territory for which the liquidated damages clause may not have made provision.' The territory is well trodden, and the liquidated damages clause does not need to provide for it.

36. Of course, the parties may out of prudence provide for liquidated damages to terminate on completion and acceptance of the works so as to remove any question of their being payable thereafter. But if they do, it is in my judgment unrealistic to interpret the clause as meaning that if that event does not occur the contractor is free from all liability for liquidated damages, and that the employer's accrued right to liquidated damages simply disappears. It is much more probable that they will have intended the provision for liquidated damages to cease on completion and acceptance of the works to stand in addition to and not in substitution for the right to liquidated damages down to termination."

312. Lord Leggatt observed, at [79], that, subject to contrary agreement, the parties' accrued rights are preserved on termination. He then added:

"In principle, therefore, where at the time of termination delay for which liquidated damages are payable has already occurred, there is no reason - in law or in justice - why termination of the contract should deprive the employer of its right to recover such damages, unless the contract clearly provides for this."

313. Further, Lord Leggatt made clear, at [86], that the court must approach the question of construction from the starting point that "it is ordinarily to be expected that, unless the clause clearly provides otherwise, a liquidated damages clause will apply to any period of delay in completing the work up to, but not beyond, the date of termination of the contract." He added, at [93]:

"In short, the purpose of agreeing in advance on a sum payable as liquidated damages for each day of delay caused by the contractor would be defeated if the stipulated sum was payable only if and when the contractor chose to complete the contract."

314. As in Triple Point, I construe the reference in the instant case to the date of actual completion of the works as the end point for liquidated damages: see Triple Point, at [48]. Any other construction would, as Lady Arden put it, render the liquidated damages clause of little commercial value. Accordingly, I find that liquidated damages were payable in the event of termination even though 'Take Over' was not in fact achieved. I am fortified in this

orthodox construction of the liquidated damages clause by the following further provisions of the contract that make plain that EWH's entitlement to liquidated damages for delay accrued from time to time and did not crystallise solely upon the delayed certification of Take Over:

314.1 Paragraph 12.2 of Schedule 12 provides:

“Unless otherwise stated in the Contract, Liquidated Damages for Delay shall be paid by the Contractor to the Purchaser against a weekly certificate issued by the Project Manager to the Contractor. The Contractor shall pay the amount of each certificate by a date which shall be fourteen days after the date of issue of the certificate.”

314.2 Clause 15B.1 makes provision for the possible suspension in certain circumstances of the right to terminate the contract “as a consequence of the Contractor having paid or allowed or becoming liable for a sum or sums in aggregate equal to or greater than the Delay Damages Cap.” During any such extension period, clause 15B.2 required M+W to “continue to pay Liquidated Damages.”

314.3 Similarly, EWH's right to terminate arose under clause 44.1(c) upon M+W “having paid or allowed or become liable for a sum or sums in aggregate equal to or greater than the Delay Damages Cap.”

315. Accordingly, EWH is entitled to liquidated damages against M+W in the sum of £23,077,331.70.

THE ALTERNATIVE CLAIM FOR GENERAL DAMAGES

316. It is not, therefore, necessary to consider EWH's alternative case for general damages for delay.

THE CLAIM FOR DAMAGES UPON TERMINATION

THE PROPER APPROACH TO THE DAMAGES CLAIM

317. Subject to the terms of the contract, EWH can recover the losses that arose either naturally from M+W's breaches of contract according to the usual course of things, or which were within the parties' reasonable contemplation as a not unlikely result of such breaches: Hadley v. Baxendale (1854) 9 Ex. 341; Victoria Laundry (Windsor) Ltd v. Newman Industries Ltd [1949] 2 K.B. 528; The Heron II [1969] 1 A.C. 350. The burden is of course on EWH to plead and prove its losses. Given the precision sought by M+W, it is appropriate to observe that EWH must prove its losses on the balance of probabilities.

318. It is equally trite that a claimant cannot recover damages for any part of its loss that it could have avoided by taking reasonable steps, or which it did in fact avoid. The burden is on M+W to plead and prove EWH's alleged failure to mitigate its losses: Roper v. Johnson (1873) L.R. 8 C.P. 167. Claimants cannot, however, be expected to weigh precisely their losses. In Banco de Portugal v. Waterlow & Sons Ltd [1932] A.C. 452, Lord Macmillan observed at page 506:

“Where the sufferer from a breach of contract finds himself in consequence of that breach placed in a position of embarrassment the measures which he may be driven

to adopt in order to extricate himself ought not to be weighed in nice scales at the instance of the party whose breach of contract has occasioned the difficulty. It is often easy after an emergency has passed to criticise the steps which have been taken to meet it, but such criticism does not come well from those who have themselves created the emergency. The law is satisfied if the party placed in a difficult situation by reason of the breach of a duty owed to him has acted reasonably in the adoption of remedial measures, and he will not be held disentitled to recover the cost of such measures merely because the party in breach can suggest that other measures less burdensome to him might have been taken.”

THE DELAY DAMAGES CAP

319. M+W argues that the Delay Damages Cap applies equally after termination such that there can be no further entitlement to any delay-related losses after the cap has been exhausted: Annex 4 to the Defence, para. 36(i).
320. The Delay Damages Cap was defined by clause 1.1 as the “maximum aggregate Liquidated Damages payable for delay as stated in Schedule 12.” The simple answer to M+W’s argument is that the claims for losses suffered and costs incurred after termination of the EPC contract are not claims for liquidated damages within the meaning of Schedule 12. Indeed, as I have already explained, the proper construction of the entitlement to liquidated damages in this contract is the conventional one identified by Lord Leggatt in Triple Point, namely an entitlement to damages for delay up to but not beyond the date of termination. Accordingly, I reject M+W’s argument that there can be no claim for losses suffered and additional costs incurred by reason of delay post termination once the Delay Damages Cap has been reached.

EXCLUSION & LIMITATION CLAUSES

321. Clause 45.1 provides:
- “Notwithstanding any other provision of the Contract and subject to Sub-Clause 45.1A neither the Contractor nor the Purchaser shall be liable to the other for: ...
- (b) loss or deferment of anticipated or actual profit, loss of revenue, loss of use, loss of production, business interruption or any similar damage or for any consequential or indirect losses of any kind resulting from or arising out of or in connection with the Works or the performance of them or any act or omission relating to them howsoever caused;
- except in respect of ...:
- (ii) any sum included within the liquidated damages for delay under Sub-clause 15.1, Clause 15B or in lieu of liquidated damages under Clause 15A ...”
322. Clause 45.3 provides:
- “Subject to Sub-clause 45.3A, the total aggregate liability of the Contractor to the Purchaser arising out of or in connection with the Contract and the Works shall not exceed [£153,897,518].”

WILFUL DEFAULT

323. Clause 45.3A of the contract provides:

“The limitation of liability referred to within Sub-clause 45.3 shall not apply and the Contractor does not exclude or restrict liability for any of the following (and which shall not be taken into account in determining whether the limit of liability under Sub-clause 45.3 has been reached):

- (a) liability arising under Sub-clauses 30.10 or 30.15 and Clause 31 (Insurance);
- (b) liabilities arising or payments made by the Contractor to the extent corresponding payments are received or receivable by the Contractor pursuant to insurance policies required to be effected and maintained in accordance with this Contract (with the exception of professional indemnity insurance under Clause A6) or to the extent that corresponding payments would have been received or receivable by the Contractor pursuant to such insurance policies but for the Contractor’s failure to effect and maintain such policies or comply with the terms of such insurance policies (including a failure to diligently pursue insurance claims or causing such insurance policies to become void, unenforceable or impaired);
- (c) the wilful default of the Contractor and/or any person for whom the Contractor is responsible;
- (d) fraud or fraudulent misrepresentation or a breach of the Bribery Act 2010 in each case by the Contractor and/or any person for whom the Contractor is responsible.”

324. By its Reply, EWH pleads its reliance on clause 45.3A. At paragraph 60A, it contends that M+W was in wilful default by reason of:

- “(i) M+W’s failure properly to report on the nature and extent of the defects in the fuel feed system, the extent of the remedial works that would be required to remediate those defects, and the impact that those works would have on the completion of the Contract works, and
- (ii) M+W’s failure and/or refusal to continue commissioning works from mid-January 2019 onwards.”

325. EWH asserts that, in a case of wilful default, clause 45.3A does not, upon its true construction, simply disapply the limitation of liability in clause 45.3 but it also prevents M+W from relying upon any exclusion or limitation of liability: Reply, para. 60B.

The proper construction of clause 45.3A

326. “Wilful default” is not defined by the EPC contract. In Re City Equitable Fire Insurance Co. Ltd [1925] Ch 407, the Court of Appeal considered the expression “wilful neglect or default.” Approving Romer J’s construction, Warrington LJ said, at pp.524-525, that:

“a person is not guilty of wilful neglect or default unless he is conscious that in doing the act which is complained of, or in omitting to do the act which it is said

he ought to have done, he is committing a breach of his duty, and also, as he said recklessly careless whether it is a breach of duty or not.”

327. The expression “wilful misconduct” was considered by Longmore J, as he then was, in National Semiconductors (UK) Ltd v. UPS Ltd [1996] 2 Lloyd’s Rep. 212. The judge said, at p.214:

“... for wilful misconduct to be proved there must be either (1) an intention to do something which the actor knows to be wrong or (2) a reckless act in the sense that the actor is aware that any loss may result from his act and yet does not care whether loss will result or not or, to use Barry J’s words in Horobin’s Case, ‘he took a risk which he knew he ought not to take’: [1952] 2 Lloyd’s Rep. at 460.”

328. National Semiconductors was considered with apparent approval by the Court of Appeal in Denfleet International Ltd v. TNT Global SPA [2007] EWCA Civ 405, [2007] R.T.R. 41 in the context of the expression “wilful misconduct” in the Convention on the Contract for the International Carriage of Goods by Road. Toulson LJ said, at [25]:

“To establish wilful misconduct within the meaning of the [Convention], it is not enough to show that the carrier was at fault in failing to take proper care of the goods and that the carrier’s conduct was the product of a conscious decision. It has to be shown that the actor knew that his conduct was wrong or was recklessly indifferent whether it was right or wrong; and, as part of that requirement, he must have appreciated that his conduct created or might create additional risk to the goods.”

329. In De Beers UK Ltd v. Atos Origin Services UK Ltd [2010] EWHC 3276 (TCC), Edwards-Stuart J considered a clause that disapplied any exclusion or limitation of liability for fraudulent misrepresentation, wilful misconduct or deliberate default. The judge concluded, at [206], that the clause listed the three concepts in descending order of culpability. He then explained:

“Fraudulent misrepresentation obviously involves dishonesty. Wilful misconduct refers to conduct by a person who knows that he is committing and intends to commit a breach of duty, or is reckless in the sense of not caring whether or not he commits a breach of duty (see Romer J in Re City Equitable Fire Insurance Co Ltd ...) Deliberate default means, in my view, a default that is deliberate, in the sense that the person committing the relevant act knew that it was a default (i.e. in this case a breach of contract). I consider that it does not extend to recklessness and is therefore narrower than wilful misconduct (although the latter will embrace deliberate default).”

330. A wilful default is thus wider than a deliberate default and may be established upon proof of recklessness. In my judgment, to prove a “wilful default” within the meaning of clause 45.3A, EWH must prove that M+W was in breach of contract and that either M+W intended to commit such breach or was recklessly indifferent as to whether its conduct was in breach of contract or not.

Clause 45.4

331. For completeness, I should record that, in the course of argument as to the proper construction of clause 45.3A, I was not addressed as to clause 45.4, which provides:

“Sub-clauses 45.1 and 45.3 shall apply whether or not either party shall be held to have repudiated the Contract.”

332. It is at least arguable that there is some tension between the two clauses. That said, the clauses do not entirely overlap since there is no mental element in determining whether a party has repudiated a contract and it is possible to conceive of circumstances in which a party commits a repudiatory breach of contract without either intending to commit such breach or being recklessly indifferent as to its contractual obligations. Accordingly, I am satisfied that the two clauses can be reconciled. In any event, had there been a conflict then the special condition negotiated between the parties at clause 45.3A would prevail over clause 45.4 in the general conditions: see clause 1.2 and Homburg Houtimport BV v. Agrosin Private Ltd [2003] UKHL 12, [2004] 1 A.C. 715, at [11].

(1) Failure to report

333. M+W’s reporting obligations can be found at clauses 2.2, 3.5 and 3.7 of the EPC contract:

“2.2 The parties shall deal fairly, openly and in good faith with each other. Each party shall disclose information which the other might reasonably need in order to exercise his rights and to perform his obligations under the Contract. In particular, each party shall promptly disclose full information to the other concerning any matter which will or may prevent the Plant or the Works being completed in accordance with the Contract...”

3.5 If at any time during the performance of the Contract the Contractor is of the opinion that a change to the Works or the design or method of operation of the Plant:

- (a) is necessary to eliminate a potential defect in the Plant...; or
- (c) would otherwise be beneficial to the Purchaser;

the Contractor shall promptly notify the Project Manager accordingly.

3.7 Unless otherwise agreed, the Contractor shall at intervals of not more than one calendar month report to the Project Manager in accordance with Schedule 21... on the progress of the Works, supporting his reports with appropriate documents including any proposed revisions to the Approved Programme ...”

334. EWH particularises its case in respect of the alleged failure to report at paragraph 60A(a) of its Reply. The allegation focuses on the disconnect between M+W’s monthly reports for December 2018 and January 2019 and M+W’s internal recognition in January and February 2019 as to the true extent of the likely delay in completion of the Works.

335. By letter dated 19 December 2018, M+W complained to Outotec about continuing design defects in the fuel feed systems affecting all three projects. It observed that rectification

would further delay the project at Hull and that the scope and duration of such works remained unclear. Mr Meakin then provided an internal update on 23 December 2018. He noted a Take Over date of 17 March 2019 but added that Outotec's dates for installing the air cannons were still to be confirmed and that there was no allowance for the screw and knife gate changes that were currently underway on the other projects. Such additional works, he noted, might also be needed at Hull.

336. M+W issued its December 2018 report on 7 January 2019. It reported a new projected Take Over date of 20 March 2019 "as a result of the ongoing Outotec issues." Such date was said to be subject to satisfactory completion of Outotec's remedial works.
337. On 18 January 2019, Mr Meakin reported internally on the likely delay to Take Over. The projection included an allowance for a stabilisation period as advised by Dave Brands of Outotec and gave alternative Take Over dates of 5 and 28 April 2019. On 21 January 2019, M+W prepared a further level 1 programme that estimated a 12-week gasifier rectification period for the installation of diffusers and resolution of the ash/bed systems. This programme projected Take Over as slipping out to 16 July 2019.
338. On 27 January 2019, Outotec sent M+W its proposed programme for modification works to the plug screw conveyor. The programme showed the completion of Outotec's works by 29 August 2019 but did not confirm that these additional works were either necessary or would be carried out. After failing to get a clear answer to precisely what works would be done, M+W wrote to Outotec on 30 January 2019. The letter confirmed "in the strongest possible terms that the 'conditional' schedules provided on 27th January 2019 ...[were] totally unsatisfactory and unacceptable." M+W observed that the condition that the knife gate modification works remained provisional implied that the further works were neither designed nor proven.
339. By an internal email sent on 5 February 2019, Mr Meakin provided Mr Stumpf with a project update. He summarised that twelve of the Outotec systems had issues and that the subcontractor was "currently no-committal (sic) on rectification dates"; four systems were "OK"; and a further three systems could not be hot-commissioned until the feed system issues had been resolved. He then reported:
- "Programme attached shows Take Over at 8th May – based upon Outotec tests being successful, which is not likely;
- 2nd programme shows impact of the Outotec PSC Programme (issued by Outotec, 27th January)"
- The attached programme showed both the 8 May date and M+W's projection of a further revised Take Over date of 13 November 2019 on the basis of the Outotec programme.
340. Yet two days later, on 7 February 2019, M+W issued its January 2019 report. It then reported a revised Take Over date of 7 May 2019.

341. I am satisfied that during January and February 2019, M+W failed promptly to disclose full information to EWH concerning the nature and extent of the defects in the fuel feed system, the extent of the remedial works that would be required to resolve those defects, and the likely timeline for such works. I am satisfied that these were matters which plainly might prevent the timely completion of the Works. Further, the January 2019 report did not amount to a proper report on progress. Accordingly, M+W was, in my judgment, in breach of its obligations under clauses 2.2 and 3.7 to report the nature and extent of defects in the fuel feed system throughout January and February 2019.
342. I am satisfied that such defaults were deliberate. Indeed, this conduct was a continuation of M+W's previous strategy in 2017 and 2018. While Mr Meakin characterised it as simply M+W dealing with its own supply chain, I am satisfied that the failure to report the nature and extent of the continuing issues with the fuel feed system in early 2019 and thereby withholding M+W's own very serious concerns as to the extent of the likely delay to Take Over was deliberate. Even if I am wrong to regard such conduct as deliberate, it is clear that at the very least M+W was recklessly indifferent as to whether its conduct was in breach of contract or not.

(2) Suspension of the works

343. EWH's case as to the suspension is particularised at paragraph 60A(b) of the Reply. It contends that the January 2019 suspension of works was "a pretext for refusing to perform its obligation to proceed with the works" and that M+W's true purpose was "to mask the extent of the delay that was being caused by the remedial works to the gasifier and fuel feed system."
344. I have already addressed the suspension of the works between 14 January and 4 March 2019. For the reasons explained above, I have found that M+W was in breach of contract in suspending the commissioning.
345. In his email of 18 January 2019, Mr Meakin explained that he had included a purchaser delay bar in his draft programme. This, he said, was following M+W's request that EWH provide sampling and analysis information before M+W resumed work. He added:
- "To be clear this is not the strongest claim, but it has been made. We can (and will) keep this claim running."
346. On 24 January 2019, Mr Meakin explained to Mr Schoenhofer:
- "You should also know that we have written to the Purchaser, to claim delay due to the fuel in the bunker being out of specification. This claim (we allege) prevents us from re-firing. This should give us concurrency of delay."
347. In cross-examination, Mr Meakin sought to explain that the claim was not the strongest in that M+W did not have the data to make its case. In my judgment, it is clear that M+W's true purpose was to be able to show concurrency of delay and thereby achieve some commercial leverage. I am therefore satisfied that at the very least M+W was recklessly

indifferent as to whether its conduct in suspending performance was in breach of contract or not.

Wilful default: causation

348. The finding of wilful default is not, however, the end of the matter. Upon its true construction, clause 45.3A disapplies the contractual limitations and exclusions to any liability for such wilful default. Accordingly, a finding of wilful default can have no effect in respect of claims other than for such default. While M+W was in wilful default in failing to report the nature and extent of the problems with the fuel feed system and in suspending work, the claims for post-termination losses are not claims for losses consequent upon such defaults.

Conclusion

349. Accordingly, while I find that M+W was in wilful default as alleged at paragraph 60A of the Reply, such finding has no effect upon the claims for post-termination losses and EWH's claim remains subject to the contractual exclusions and limitations in clauses 45.1 and 45.3.

CAUSATION ISSUES

350. Mr Acton Davis submits that the quantum claim is inadequately explained and evidenced and that EWH has failed to prove its case on causation. He asserts that the factual and legal basis for asserting that the losses that were incurred post termination are the sole responsibility of M+W remains "largely unknown." Further, he argues that the claim ignores the true contractual scope of M+W's works by making the impermissible assumption that whatever work EWH decided was required was in fact attributable to M+W's breach of contract.
351. Mr Dennison responds that the required evidence was served and called but that M+W simply elected not to challenge it. Certainly, despite the value of EWH's damages claim, the parties spent very little time at trial investigating the losses. Indeed, a number of the lay witnesses who dealt with the quantum of these claims were not required to attend court for cross-examination at all. Those who were required to attend were not subjected to rigorous cross-examination and much of their evidence was unchallenged. Further, the experienced quantum experts largely agreed the calculations of loss upon various assumptions.
352. EWH's claim proceeds on the assumption that the additional work that has had to be carried out since termination was caused by M+W's breaches of contract. There was undoubtedly further work to be done. As will become apparent, EWH has failed, however, to prove its case in respect of all of the pleaded defects. In particular, for the reasons explained below, it has failed to establish its case in respect of defect 23 (slagging). While the immediate consequence is that damages cannot be recovered for defects that have not been proved, there may be a broader impact upon EWH's claim for termination damages. Mr Acton Davis submits that in the event of such finding "all losses flowing from slagging, including any time-related costs which would have been incurred in any event whilst the slagging issues were resolved, are not recoverable from M+W." He adds that neither EWH nor its experts have identified a way of identifying the impact of an adverse finding on defect 23. Further,

he argues, the court should not “wade through the quantum documentation to give effect to its factual findings on causation.” He concludes this argument with the submission:

“In short, if the costs that are not recoverable cannot be disentangled from costs which may be recoverable, that ought to be fatal to the entire head of cost subject to the problem.”

353. Upon handing down this judgment, I will invite the parties to address me further upon its consequences. While I will reserve my judgment until I have heard the argument, three general observations as to my initial views on that issue may be helpful:
- 353.1 First, it is for EWH to prove its true loss. If it fails to do so then it cannot recover damages.
- 353.2 Secondly, Mr Acton Davis is right that the court should not itself wade through the complex quantum evidence in order to determine what, if any, loss has been proven in view of the findings in this judgment.
- 353.3 Thirdly, however, in any complex litigation with a substantial number of issues in dispute, there are many possible outcomes. There is a limit to which it is sensible or helpful for the parties to anticipate each and every permutation. Accordingly, once the court has determined the issues of liability it is not appropriate simply to dismiss potentially valuable claims on the basis that the court needs further assistance in separating out those losses that were caused by established breaches of contract from those which were not.
354. Rather than simply adjourn all further issues of quantum on EWH’s termination claim, I set out my findings below in order to indicate the awards that would have been made, at least upon the major heads of claim, if the court had accepted that all of the losses flowed from termination. Doing so will dispose of a number of points of contractual construction and principle that were argued at trial.

TERMINATION CLAIM: (1) BLACK & VEATCH COSTS

THE CLAIM

355. On 22 March 2019, EWH appointed Black & Veatch Limited as its replacement EPC contractor in order to complete the works. Subsequently, EWH was able to reduce the Black & Veatch manpower upon the appointment of BISL as its replacement O&M contractor. Black & Veatch totally demobilised in March 2020 at the start of the COVID-19 national lockdown.
356. EWH seeks its additional costs of engaging Black & Veatch in the sum of £12,119,903.25. Such revised sum arises from the work done by the parties’ quantum experts, Ann Nash and Mark Gordon, on the basis of the rates agreed in the Black & Veatch contract for its salaried staff and for agency staff based on industry rates plus 10%. If, however, the court were to reduce the award for salaried staff time to industry market rates then the experts agree the reduced sum of £8,321,716.61.

357. The experts' assumptions – and which are therefore matters to be determined by other evidence – include that the scope of the work undertaken was reasonable; that the works undertaken were within the scope of M+W's works; that EWH used reasonable resources; that the time taken for the works was reasonable; that all such costs arose from the termination of the EPC contract; and that sums owed by EWH and M+W would be paid.
358. While the experts cannot assist about these issues, there is significant evidence from Mr Wilcock, Mr Burgess and Mark Roberts, also of EWH. Such evidence was largely unchallenged.

THE ENGAGEMENT OF BLACK & VEATCH

359. Mr Burgess explains that from early 2018, EWH was concerned at the significant delay in this project and at M+W's increasingly commercial stance. The board considered that there were going to be significant commercial and contractual challenges ahead in completing the project with M+W. While focusing its primary efforts upon resolving issues with M+W, the board started to consider the need for contingency planning.
360. Mr Burgess prepared a paper for the May 2018 board meeting at which he recommended that a high-level review be conducted to develop EWH's contingency plan for completing the project. He noted four options for completing the project: (1) appointing a new EPC contractor on a fixed-price basis against time and performance guarantees; (2) appointing a new EPC contractor on a time and materials plus basis; (3) appointing a managing agent but with all payments being made directly to the sub-contractors; and (4) delivering the remaining works in-house. The planning was codenamed Project 101.
361. Mr Burgess advised that the first option would appear unlikely due to the diligence period required for any new contractor and the "hefty risk premium" that would inevitably be sought. He also ruled out the fourth option on the basis of EWH's insufficient "depth of capability and experience" of delivering such a project. That left two viable options. Of the second, Mr Burgess added:

"In the potential pursuit of option (2), the potential replacement contractor will:-

- Have experience in the construction of similar plants
- Have the technical and financial resources available to complete the works in the required timescales
- Be known to the project teams (due to the *bit the ground running* nature of the completion works)
- Be attracted to the project for reasons other than fee if possible.

Two organisations present themselves as candidates here, MBV Energy (the JV between MWH and B&V), who undertook the Ince Park project and Outotec, the technology provider at EWH and an experienced EPC contractor worldwide with ambitions in the UK market.

Of the two, Outotec have significant vested interest in stepping into the contract. They are believed to be in significant dispute with M+W and are exceptionally keen

to establish their UK credentials. Any arrangement would need to protect both sides from the dispute under their existing contract.

It is recommended that very discrete (sic) enquiries are made to both organisations. Should the need to formalise discussions arise, it will be important to ideally introduce a little competitive tension into the discussions, but also have a fall-back option if the preferred option does not crystallise.”

362. The board endorsed the strategy which it summed up in a pithy minute:

“Plan for the worst – M+W default

Hope for the best – M+W fall into line and deliver the project.”

The board recommended some caution. There was to be no direct communication with the supply chain (presumably Outotec) at that stage. Work was to start but there was to be a hold on seeking any external validation.

363. Mr Burgess prepared an internal memorandum dated 17 November 2018 in which he compared the financial consequences of various alternative scenarios. In particular, his analysis compared the internal rate of return that EWH might achieve by appointing a replacement contractor in a termination scenario with the rate of return if it entered into a settlement agreement with M+W. Such analysis marginally favoured termination with a projected internal rate of return of 12.3% against 11.71% in a settlement scenario. He also looked at the cash position. While over the long term the cash position would be better under the termination scenario, his analysis showed that cashflow would be significantly better under the settlement scenario until late 2020. In cross-examination, Mr Burgess stressed that EWH was not chasing the possible economic benefits of termination but that his analysis demonstrated that termination was at least a viable option in which the rate of return might be slightly improved albeit the short-term cash position would be worse.

364. The settlement scenario included the additional cost of supplying RDF that would be acceptable to M+W. I accept Mr Burgess’s answer in cross-examination that this was not a concession that EWH had hitherto been supplying RDF in breach of Schedule 22A (about which I have in any event made findings) but rather a recognition that EWH had been incurring significant additional costs in appeasing M+W’s demands irrespective of whether they were valid, and that settlement would only be possible by continuing to do so. Indeed, the summary of the settlement scenario explained:

“The Contractor continues to apply pressure to the Purchaser relating to the consequences of supplying out of specification fuel, not accepting of the fact that the fuel is waste derived, and therefore some variance is to be expected. Energy Works has countered this risk by supplying an enhanced RDF at a cost of £35/tonne. This discount has been applied to all fuel where revenue has been recognised.”

365. Mr Burgess explains the significant financial stress caused on this project by delay. He points to the parties’ agreement of liquidated damages at £84,800 per day which he maintains was a genuine pre-estimate of EWH’s losses. Indeed, such assertion gains significant support from the evidence at trial supporting the alternative claim for general damages. It was

therefore critical that EWH's completion strategy minimised further delay in order to protect the viability of the project.

366. Mr Burgess observes that there were two main options available to EWH. It could await termination and then run a procurement exercise inviting tenders from interested contractors. Alternatively, it could identify a preferred partner in advance of termination and develop a contingency plan that could be put in place quickly if it became necessary. He explains that the board rejected the first option since it would involve significant post-termination delay during which the plant would have to be shut down. Further, it would not be possible to assess the condition of the plant to the level of detail required to produce a tender pack until after termination. Such a procurement strategy might take twelve months to run its course. Furthermore, Mr Burgess observed:

“EWH was also aware that it would not get a replacement EPC contractor at a reasonable price or on acceptable terms. We did not believe that any contractor would be keen to take on a part-finished plant on a standard EPC basis because they would never have a perfect knowledge of the completion status of the plant. The idea that anyone would accept responsibility for M+W's work, liquidated damages and performance guarantees was untenable. Even if we could find a contractor who would, there would be a massive uncertainty premium.

A full procurement process with a fixed scope of work would not lead us to an agreement with the level of protection or guarantee that the original EPC contract did. M+W had the benefit of a clean site and could control all of the design, procurement, construction and commissioning activities. A replacement contractor would be in a completely different position and would not be willing to give us a full wrap at a sensible cost. Whoever we contracted with would be expensive and the likelihood of a fixed-price arrangement was very slim. Consequently, there was little benefit in spending months on a procurement process that would not take us to a particularly good position. At this point, we believed that simply comparing rates would not help us and that we would do better to focus on quality.”

367. Mr Burgess explains that the remaining option of working with a preferred partner had the advantages of allowing EWH to plan on a confidential basis before termination and reassuring investors that termination was a credible alternative strategy. He says that ultimately the board elected to take this route. It concluded that if it were not going to be possible to reach a fixed-price arrangement, the commercial advantages of a competitive process would be nullified. EWH therefore decided to select a contractor on the basis of ability to deliver its objectives of minimal further delay and meet the specification. It sought a contractor with relevant experience of the technology and a track record of performing in difficult circumstances.
368. The investor, Bioenergy, already had experience of working with Black & Veatch at Ince where the contractor had successfully delivered the works utilising Outotec gasification technology and achieving Take Over on 11 March 2019. Mr Burgess said that this put Black & Veatch in a unique position since no other contractor had completed a gasification plant using Outotec technology in the UK at that time. Black & Veatch had impressed at Ince as a proactive and solutions-focused contractor with expertise in engineering, construction and

installation. It also provided a very high standard of housekeeping and health and safety on site.

369. Confidential discussions started with Black & Veatch in July 2018. A limited contract was placed to allow Black & Veatch to carry out an initial project assessment. Outline heads of terms were explored between September 2018 and February 2019, but the actual negotiations over the contract were conducted in the short window between termination on 4 March and the execution of the Black & Veatch contract on 22 March 2019.
370. The Black & Veatch contract was on a time and materials basis. Mr Burgess accepts that, while his team had some successes, EWH was not able to conclude the deal that it had been targeting. In particular, EWH was unable to achieve a favourable allocation of risk. Black & Veatch were nervous about taking on invisible risks in an incomplete plant designed and constructed by a third party. Mr Burgess wrote a note on 18 March 2019 identifying the areas where he considered that the terms offered by Black & Veatch were “some distance from the market position.” The first two matters concerned Black & Veatch’s refusal to accept commercial risk. In addition, it sought a mobilisation fee of 10% of expected costs which had an obvious cashflow impact. Further, the terms included incentives which Mr Burgess advised were beneficial since they encouraged early generation and early completion.
371. While EWH would have liked Black & Veatch to have accepted greater accountability and commercial risk, it recognised that it would always be difficult to determine whether issues with design or construction arose solely from the negligence of M+W or the new contractor. Mr Burgess concludes:
- “In the end, the B&V Contract was far from perfect, but EWH could not obtain better terms from B&V. Bringing in an alternative was not an option at that stage as it would have led to significant further delay and, even if that had been a possibility, we would have faced similar challenges as we did with B&V. In the end, the Board decided that it was better to get on with it and complete the Plant.”
372. Mr Burgess insisted in cross-examination that EWH had been very happy with Black & Veatch’s performance, but they ran into further issues such as slagging, noise and fuel-feed issues that EWH had to avoid. Consequently, the period to completion became significantly longer than originally anticipated and EWH became increasingly concerned as to the level of cost that it was incurring. Further, there were concerns about the quality of the records and that Black & Veatch staff were overbooking hours to the project. A demobilisation plan was formed in January 2020 but COVID-19 intervened and Black & Veatch left site around the end of March 2020.

CAUSATION

373. M+W pleads that EWH is required to prove that Black & Veatch’s works were limited to those matters which fell within the scope of M+W’s own works and which were incomplete at termination: Annex 4 to the Defence, para. 14(i). Mr Burgess gave evidence that the Black & Veatch works were so limited. That evidence was not challenged and no evidence was called to contradict him. Instead, the issue was addressed with Ms Nash, EWH’s quantity surveying expert.

374. It will, however, be necessary to address causation more broadly in a further judgment for the reasons identified at paragraphs 350-354 above. In that respect, I note the following matters:
- 374.1 Mr Burgess says that, on termination, EWH believed that it would achieve Take Over by 31 October 2019. It needed to reach Take Over and pass the Installed Capacity test as required by the Low Carbon Contracts Company by 31 December 2019 in order not to put the Contract for Difference funding at risk. In fact, he says that it became clear by the summer of 2019 that the October date would not be met. The December longstop date was in turn extended on four occasions and Fichtner certified that the test was ultimately met on 2 July 2020.
- 374.2 Black & Veatch's scope of work was to complete M+W's works. On taking over on site, Black & Veatch ran checks on all systems that had been cold commissioned. An Outstanding Work List ("OWL") was drawn up. Black & Veatch's first fire on oil took place in late June 2019 and the plant was first fired on RDF in early July 2019. It was through this hot commissioning phase that EWH identified that there were significant issues with noise attenuation, the fuel feed system and ash agglomeration (i.e. slagging).
- 374.3 Mr Wilcock says that the noise and fuel feed issues were apparent in August 2019 and that the slagging issue became apparent a little later in September 2019. Mr Burgess says that Black & Veatch had made good progress to that point but it then became increasingly clear over time that these defects would require major physical modifications to the plant. He observes that the noise and slagging issues required particularly intrusive intervention and remedial work. That was not expected since EWH had never expected Black & Veatch to be on site for more than a few months.
- 374.4 Mr Wilcock explains that throughout 2019 the number of Black & Veatch personnel on site increased significantly beyond EWH's original expectations. Such increase was brought about due to the extent of the problems encountered in trying to achieve stable operating conditions on solid fuel.

THE MITIGATION ARGUMENTS

375. M+W pleads that the costs were "unreasonably high" and asserts that EWH failed to mitigate its losses. It argues that it was unreasonable to engage Black & Veatch on a time-spent, as opposed to a lump-sum, basis and that the rates agreed were well above market rates by an average of 50%: Annex 4, para. 14(ii).
376. Neil Robinson, M+W's Operations & Commercial Director, accepted in his second witness statement that, had he been in Mr Burgess's shoes, he too would have advised that option two, namely the engagement of a new EPC contractor on a time and materials plus basis, was the most appropriate strategy. Such concession must be fatal to the argument that EWH failed to mitigate its losses by contracting on a time-spent basis.
377. Briefly, however, I accept Ms Nash's expert evidence that in her experience it is very difficult to find a main contractor to take on all of the risks that come with completing works

designed and commenced by others on a lump-sum basis. Indeed, Mr Gordon himself accepted that it was, at least initially, reasonable to appoint a new contractor on such basis. While he added that once the condition of the plant was known, a second stage “could have been negotiated under which some form of cost incentivisation could have been agreed”, I accept Ms Nash’s response that she has never come across such a two-stage approach upon a contractor taking over a distressed project of such complexity. I accept EWH’s submission that Mr Gordon’s suggestion falls short of the evidence required to prove that, in contracting with Black & Veatch on a time-spent basis, EWH failed to take reasonable steps to mitigate its loss.

378. It is common ground that the Black & Veatch rates were higher than market rates. Mr Robinson observes that companies such as Black & Veatch and his own former employer, Jacobs Engineering, are “very tuned in to commercial opportunism and optimisation.” He criticises EWH for failing to maintain a dialogue with at least two alternative contractors prior to termination and for failing to conduct any tender process. He observes:

“It would have been entirely possible for EWH to go to a B&V competitor and request equivalent rates for comparison. Option 2 did not preclude EWH from market testing what B&V were offering.”

379. Mr Robinson also rejects the suggestion that there were no other suitable contractors with the same combination of engineering expertise and construction capability. As to Black & Veatch’s successful experience with Outotec’s gasification technology at Ince Park, he observes that that project used woodchip rather than processed RDF and completion was in any event delayed. Mr Robinson adds:

“Based on the apparent fact that EWH did not approach any other contractors, but spent over nine months planning its ‘Plan B’, B&V would clearly adopt high rates because presumably they knew there were no other bidders and they (B&V) had become preferred bidders without having to agree commercial terms. I could understand this as an outcome if any engagement was after termination and had EWH not started planning in June the year previously. Planning for so long, with only one contractor will inevitably give that contractor leeway to use excessively high rates and EWH backed itself in a corner in this respect.”

380. As indicated above, the additional cost incurred by EWH’s procurement strategy was agreed by the experts, subject to their other assumptions, in the sum of £3,798,186.84. Ms Nash observes that this equated to a delay of forty-five days at the agreed rate of £84,800 per day. This helps to put matters in perspective. Certainly, it was reasonable to contract quickly, both to secure the integrity of the part-completed works but also to minimise EWH’s losses. Mr Gordon is, however, right to respond that the calculation is of limited value given that the criticism is not that EWH should have delayed further in appointing a new contract manager but rather that it should have been negotiating with other contractors alongside Black & Veatch in order to introduce some competition into the procurement process.

381. I accept that the pool of potential alternative contractors was limited and that Black & Veatch’s experience at Ince Park will, quite reasonably, have weighed heavily in EWH’s thinking. Further, I accept that exploratory talks with alternative contractors prior to

termination necessarily had to be conducted in confidence and that EWH was right to appoint its chosen contractor quickly after termination without launching a protracted procurement process. Nevertheless, termination had been foreseen as a possible outcome as early as May 2018. Further, as Mr Burgess then recognised, it was important to “introduce a competitive tension” into EWH’s negotiations. In my judgment, the course taken by EWH of negotiating with only one contractor exposed EWH to a foreseeable and avoidable risk of leaving itself with little or no bargaining power such that it would have little choice other than to accept the terms proposed by Black & Veatch. Accordingly, I accept M+W’s argument that EWH failed to mitigate its losses by dealing exclusively with Black & Veatch. I would therefore award, subject to the causation issue, the sum of £8,321,716.61.

TERMINATION CLAIM: (2) ADDITIONAL FINANCING COSTS

THE CLAIM

382. The funding of the project is explained by both Hamish McPherson, EWH’s Chairman, and Mr Burgess. EWH is funded by its investors, Bioenergy Infrastructure Holdings Limited; John Hancock Life Insurance Co. (USA); Noy Waste to Energy 2 Limited Partnership; and Charlie and Noreen Spencer. By a Subscription Agreement dated 20 November 2015, the investors loaned £156 million to fund the plant at Hull. Interest was payable from drawdown at the initial rate of 12.676% until 30 April 2018 and thereafter at the rate of 13% per annum. Interest accrued daily and was payable quarterly in arrears.
383. EWH’s ability to repay the shareholder loan and thereby reduce its financing costs was dependent upon receiving revenue from the plant. The delayed Take Over of the project caused EWH to incur additional financing costs as it continued to service the loan. Mr Burgess observes, at paragraph 339 of his first witness statement:
- “As a capital-intensive project, EWH was (and remains) particularly sensitive to timing issues. It is imperative that the Plant starts generating revenue as soon as possible to cover the cost of financing. Any prolonged delay critically impairs the ability of any project to service its borrowing or cost of capital. M+W’s [delay] has caused EWH to incur additional financing charges because the Plant is not generating energy or revenue.”
384. Mr Burgess explains that the claim is the difference between the interest accruing under his base case, which assumed that the plant was operational on 4 March 2019, and his actual case, which assumed that it was operational from 1 April 2021. There is no claim for additional financing costs incurred pre-termination since the parties agreed, and I have awarded, liquidated damages. The claim is therefore pursued from termination (4 March 2019) to 31 March 2021. Given that the plant had not been completed, Mr Burgess’s calculations were necessarily based on a number of assumptions as to the revenue that would have been generated and the costs that would have been incurred had the plant been operational from 4 March 2019.
385. The calculation forecasts future revenue by making assumptions as to the tonnage of RDF delivered (which in turn depends on its net calorific value); the gate fee payable; and the future levels of the various payments that would be received for generating electricity (the Baseload Market Reference Price, the Balancing Services Use of System and the

Transmission Network Use of System payments). It also models saved costs such as the cost of disposing of ash and processed waste that is not suitable for gasification; operating and maintenance fees; and consumables. Since the model considers the cashflow available to discharge interest payments, it also takes account of overheads and taxation. Further, the model takes account of additional costs incurred by reason of the delayed Take Over of the plant, namely additional project management and leasehold costs.

386. The claim was reviewed by the parties' forensic accounting experts, Gordon Hodgen instructed by EWH and Paul Isaac instructed by M+W. They had no significant issues with Mr Burgess's calculations, although they proposed some modest corrections which had the effect of increasing slightly the value of this claim.

THE VIABILITY OF THE PROJECT

387. Mr Isaac's principal concern is that Mr Burgess's financial models demonstrate that the plant would never generate sufficient cash to pay the interest on the loan facility. Since the unpaid interest would itself attract interest, he graphically demonstrates in his report how the debt will spiral out of control over its 25-year-term. The point is well illustrated by the fact that even if the plant had been operational in March 2019, EWH's own calculations show that the accrued interest on the loan facility over its 25-year-term would be £829,740,657 such that the total debt would be just short of £1 billion by 31 March 2044. Mr Isaac postulates three possibilities:
- 387.1 First, that the business would not be able to continue trading, although he observes that this is an unlikely outcome given that EWH was owned by the noteholders and it would not appear to be in their interests to cease trading.
 - 387.2 Secondly, that the project was always intended to be refinanced.
 - 387.3 Thirdly, that the investors would never have recovered the unpayable interest in any event.
388. I am satisfied that the answer to the issue raised by Mr Isaac is that EWH always intended to refinance the project once it was operational:
- 388.1 As Mr Hodgen observes, there is obviously a significant difference in the risk profile of a large-scale infrastructure project between a time before it has been built and commissioned and a time when it is a proven and operational facility. For the reasons explained by Mr Isaac, it would obviously be critical to the sustainability of EWH's entire business model for it to seek alternative facilities following completion.
 - 388.2 Indeed, I accept Mr McPherson's unchallenged evidence that the investors always intended to refinance the project at the appropriate time.
389. Refinancing the project after the plant has become operational is, however, irrelevant to this claim which is for the additional financing costs incurred during the delayed period to Take Over.

THE RELEVANCE OF THE DELAY DAMAGES CAP

390. M+W argues that the Delay Damages Cap applies equally after termination such that there can be no further entitlement to any delay-related losses after the cap has been exhausted: Annex 4 to the Defence, para. 36(i). For the reasons explained at paragraphs 319-320 above, the Delay Damages Cap did not apply post-termination of the EPC contract and I reject M+W's argument that these claims are excluded by such cap.

IS THE CLAIM LIMITED TO THE COSTS OF COMPLETION?

391. M+W pleads that EWH's claim for financing costs is not a claim for the costs of completion and that there is no general right to recover all losses flowing from termination: Annex 4 to the Defence, para. 36(ii). It explains its argument further in its submissions at trial that EWH's claim is, it asserts, limited to the losses falling within clause 44.6, which it characterises as being limited to the costs of completion.

392. Clause 44.6 required the Project Manager in the case of a termination under clause 44 to issue a Default Certificate once EWH had completed the works giving a full statement of:

- “(a) all sums due to the Purchaser from the Contractor including any cost incurred by the Purchaser in completing the Works in accordance with sub-clause 44.3(b) which is in addition to that which the Purchaser would have incurred if the Contractor had completed the Works in accordance with the Contract; and
- (b) all sums due to the Contractor in respect of work completed by the Contractor prior to termination of his employment other than any such work of a temporary nature necessitated by such termination ...

Having allowed for all previous payments made to the Contractor and any sum due to the Purchaser from the Contractor, the Default Certificate shall state the balance due to or from the Contractor.”

393. Clause 44.6 certainly provides a device for the Project Manager to offset any sums due to M+W against the additional costs incurred to complete the works post-termination. I do not, however, accept that it limited EWH's entitlement to damages to the costs of completion:

393.1 First, clause 44.6 does not impose such a limitation. On EWH's side of the ledger, the Project Manager is instructed to include provision for “all sums due.” Such sums are expressly said to include the costs of completion but there is no limitation to such costs.

393.2 In any event, the position is made clear by clause 45.2 which provides:

“Except in the case of termination of the Contractor's employment under clause 44 (Termination for Contractor's default) ... or a repudiation of the Contract by either party, the liability of either party to the other arising out of or in connection with the Contract or the Works ... by reason of any breach of contract ... shall be limited to the damages, remedies and reimbursements expressly provided in the Contract ...”

Accordingly, upon my findings that this was both a termination under clause 44 for the Contractor's default and upon M+W's repudiation of the contract, the claim for damages is not in any event limited to the damages expressly provided by clause 44.6.

THE LOSS OF REVENUE EXCLUSION

394. M+W pleads that the claim for financing costs is in truth a claim for loss of revenue that is excluded by clause 45.1(b): Annex 4, para. 36(iii). As already noted, that clause excludes any liability for "loss or deferment of anticipated profit or actual profit, loss of revenue, loss of production, business interruption or any similar damage or for any consequential or indirect losses of any kind resulting from or arising out of or in connection with the Works or the performance of them or any act or omission relating to them however caused."
395. I acknowledge, as the accountants did in their evidence, that there is a clear correlation between the lost revenue suffered by reason of the delayed completion of the works and the additional financing costs which EWH had to pay during the extended period of the works. Such additional financing costs would have been avoided had the project completed on time and revenue started to flow. That said, it is self-evident that revenue and costs fall on different sides of any profit and loss account. It seems to me that as a matter of ordinary language a claim for additional financing costs is not a claim for lost revenue. That simple truism is not affected by the fact that one has to calculate the revenue that would have been generated but for the breach in order to calculate the additional financing costs. Despite that link, this is, in my judgment, a claim for additional costs incurred and not an impermissible dressed-up claim for lost revenue.
396. I am fortified in that conclusion by the decision of Field J in GB Gas Holdings Ltd v. Accenture (UK) Ltd [2009] EWHC 2734 (Comm). In that case, a clause similarly excluded claims for any loss of revenue but the judge held, at [86]-[87], that such provision did not exclude a claim for additional borrowing costs incurred by reason of a loss of revenue. While Mr Acton Davis seeks to rely on the decision of Henshaw J in Toucan Energy Holdings Ltd v. Wirsol Energy Ltd [2021] EWHC 895 (Comm), that case did not concern the question in this case (namely whether a claim for additional financing costs incurred under an existing arrangement was in truth an excluded claim for loss of revenue) but rather whether a claim for the costs of having to go out into the market to refinance a project was an excluded claim for indirect or consequential loss. Indeed, I note with interest that Henshaw J rejected the claim in that case on the basis that it was for indirect or consequential losses and not on the alternative or additional ground that it was a claim for loss of revenue despite the relevant clause also excluding such losses: see [285], [287]-[288] & [766].
397. In any event, clear words would be required to exclude a claim for the additional financing costs incurred by reason of the delayed completion. As Moore-Bick LJ observed in Stocznia Gdynia SA v. Gearbulk Holdings Ltd [2009] EWCA Civ 75, [2009] 1 Lloyd's Rep 461, "the court is unlikely to be satisfied that a party to a contract has abandoned valuable rights arising by operation of law unless the terms of the contract make it sufficiently clear that it was intended." See also Lord Hamblen in Triple Point Technology Inc. v. PTT Public Co. Ltd [2021] UKSC 29, [2021] A.C. 1148, at [106]-[113].

OTHER ARGUMENTS

Do the financing costs arise upon termination?

398. M+W pleads that the financing costs are in any event not recoverable because they are not costs arising from or consequent upon termination: Annex 4 to the Defence, para. 36A(i). I disagree; the additional financial costs arose directly by reason of the delay in achieving Take Over.

Would the financing costs have been incurred in any event?

399. M+W pleads that some or all of the additional costs would have been incurred in any event by reason of the fact that the assumed operational net income between March 2019 and March 2021 would not have been sufficient to service the debt: Annex 4 to the Defence, para. 36A(ii). This is common ground, but EWH's claim is pursued on the basis of the difference between the position it would have been in if the plant had been completed at the date of termination and the actual position.

Is the claim for financing costs limited to the cost of funding the additional work?

400. M+W pleads that EWH is not entitled to claim any sum in relation to alleged additional finance costs in excess of the costs that have been incurred in funding the other termination costs: Annex 4 to the Defence, para. 36A(iii). No coherent basis for such limitation is offered in either the general law or pursuant to the terms of the contract, and I reject M+W's argument.

Is the claim limited to the period to March 2021?

401. M+W's further argument (pleaded at paragraph 36A(iv) of Annex 4 to the Defence) that the claim should be limited to March 2021 is common ground. There is no claim beyond 31 March 2021.

THE ASSUMPTIONS

402. The experts also reviewed Mr Burgess's assumptions. Mr Hodgen considered that they were reasonable. Indeed, Mr Burgess's assumptions were based on actual costs paid by EWH, contracts with third parties and matters put forward by M+W. Mr Hodgen agreed in cross-examination that his review of Mr Burgess's calculations was dependent upon the reasonableness of the assumptions and that many of the assumptions concerned technical matters that were not within his area of expertise. He also conceded the obvious point that the calculation of loss is only as good as the assumptions while Mr Isaac conceded that he had not been given any instructions as to the reasonableness of the underlying assumptions.
403. Although he gave oral evidence, Mr Burgess was not cross-examined about this head of claim or about any of his calculations or assumptions. If M+W wished to challenge the assumptions then it was incumbent upon them to put such case properly to Mr Burgess. The forensic accountants could then have assisted the court not with commentary upon assumptions that were outwith their expertise but with the adjustments that might need to be made to the financial models in the event that the court accepted one or more of the challenges.

404. One particular matter that was explored and upon which the court has substantial evidence is the reasonableness of the assumption that the net calorific value of the Fuel would have been at the design point of 12.5 MJ/kg. The calorific value is directly relevant to the required tonnage of RDF since in order to generate the contracted annual output of 750,000 MWh one would need to gasify Fuel with a total energy of 2,700,000,000 MJ (1MWh = 3,600 MJ). At the design point of 12.5 MJ/kg, that would require 216,000 tonnes of Fuel. Thus, as one increases the net calorific value of the Fuel, the lower the required throughput of Fuel but equally the lower the gate revenue.
405. There is certainly evidence that I consider more fully in the context of defect 23 (see paragraphs 549-561.3 below) that achieving a consistent supply of Fuel with a net calorific value anything like 12.5 MJ/kg proved difficult during the commissioning phase. That said, as Andrew Mayo explained in his evidence, there is a limit to the extent to which fuel suppliers can and will be willing to bend to meet the irregular, unpredictable and modest demands of a plant during commissioning. By contrast, once a plant is operational, it is easier to achieve a more consistent and stable supply. EWH entered into Fuel Supply Agreements with Geminor, Veolia and Biffa that specified RDF between 9-18 MJ/kg. Supply of RDF meeting that requirement would satisfy the RDF specification in the EPC contract of 8-20 MJ/kg, but would not without more guarantee that the tighter Fuel specification of 10-16 MJ/kg would be met, let alone ensure that the average net calorific value of the Fuel would have been at the design point of 12.5 MJ/kg.
406. There is, however, other evidence that would support the ability to source RDF that would allow the design point to be achieved. In particular, M+W's fuel expert, Michael Brown, briefed Mr Isaac that residual waste produced in the UK typically has a net calorific value in a wide range between 6-8 and 21-23 MJ/kg. More importantly, he advised that the mode value (i.e. the most frequent value within samples of residual waste in the UK) is around 9-13 MJ/kg. The midpoint of Mr Brown's suggested range is of course 11 MJ/kg and would not indicate that there should be any long-term issue in obtaining a supply of RDF that, after processing, could be blended to meet the design specification.
407. Mr Isaac also points to the limitations of the contracted minimum commitments in the Fuel Supply Agreements but fairly accepts that he is not an expert in the availability of RDF. I am satisfied that it was reasonable to assume that sufficient RDF was readily available in the market.
408. In the absence of any other proper challenge, I accept Mr Burgess's evidence and his calculation of the additional financing costs, subject to the issue of causation and the modest amendments made to his calculations by the accountants.

CONCLUSIONS

409. Accordingly, EWH is entitled to recover the additional financing costs to cover the delayed completion of the plant. Had M+W been liable for the full period of delay until 1 April 2021, I would assess such damages in the sum of £53,119,794. There is accordingly no need to

consider the alternative claim pleaded at paragraph 56 of Appendix 6 to the Particulars of Claim.

TERMINATION CLAIM: (3) SUBCONTRACT COSTS

THE CLAIM

410. Following termination, EWH re-engaged a number of subcontractors in order to complete the construction work. In addition, it engaged further contractors who had not been previously involved in the project at Hull. It claims its costs incurred with these contractors in the total sum of £19,457,624.02.

411. By Annex 4 to the Defence, M+W puts EWH to proof but does not assert a positive case. It pleads, at paragraph 20:

“EWH is required to prove:

- (i) The subcontractors it engaged to complete the works;
- (ii) The works which they carried out;
- (iii) That this work was within the scope of M+W contract prior to termination and did not include variations or betterment; and
- (iv) That the amounts which it has paid, or says it will be liable to pay in the future, are properly payable to the subcontractors for carrying out said work.”

412. M+W alleges that EWH did not need to re-engage seven subcontractors, being Outotec, Field System Design, Siemens, Sutco, Konecranes, Protec and Ultrasure Fire, because it had the benefit of assigned subcontracts. Further, EWH had the benefit of collateral warranties from Outotec, Field System Design, Siemens and Sutco. It then pleads, at paragraph 22:

“In the circumstances, EWH is required to prove that it reasonably mitigated its loss by taking the following steps:

- (i) Insofar as any of the subcontractor’s work was defective, it should have required the subcontractor to remedy that work at no extra cost; and
- (ii) Insofar as the subcontractor sought additional payment directly from EWH, it should have insisted that any such payment would be solely in accordance with the payment terms found in the original subcontract between M+W and the subcontractor.
- (iii) Generally, insofar as any of the subcontractor (sic) have been paid in excess of the negotiated subcontract sum between M+W and the subcontractor, EWH is required to prove why such additional payments have been made and that they flow from reasonable behaviour on the part of EWH.”

THE EVIDENCE

413. By a solicitor’s letter dated 13 March 2019, EWH formally required M+W to assign all of its subcontracts. By a series of letters dated 26 April 2019, M+W purported to assign some 282 subcontracts and purchase orders to EWH. Originally M+W argued that it had only assigned

the future benefits of the subcontracts; alternatively, that the subcontracts had been novated. Either way, M+W denied any liability for unpaid sums payable under the assigned or novated subcontracts. It was only by O'Farrell J's judgment on the preliminary issues in this case, reported at [2020] EWHC 2537 (TCC), 192 ConLR 79 and handed down on 24 September 2020, that it was established that the true effect of the assignment of the Outotec subcontract was that:

- 413.1 M+W had assigned the accrued and future rights under the Outotec subcontract; but
- 413.2 M+W remained liable for monies that fell due under such subcontract prior to the assignment.

414. Mr Burgess explains the approach followed by EWH at paragraphs 182-275 of his first witness statement. For smaller works, local contractors were used who could be engaged relatively quickly and cheaply. Where there were more substantial works, EWH re-engaged M+W's subcontractors or brought in other trusted suppliers. EWH elected to contract directly with the subcontractors (who are still referred to as such despite the direct instruction) but appointed Black & Veatch as its agent so that it could manage the subcontractors.

415. Re-engaging M+W's subcontractors had the benefits of speed and potentially of saving costs in that they already knew the project. Mr Burgess explains, at paragraph 185.2:

“Time was crucially important. Post-termination, the walk-downs, investigations and [Outstanding Work Lists] made it clear that the works were not as close to completion as M+W had reported and the prospect of losing the benefits of the funding arrangements was thrown into sharp focus. The need to meet conditions precedent, and preserve the funding provided by the [Contract for Difference] and the EU grant, was a significant influence on EWH's drive to complete the works without delay.”

416. Mr Wilcock adds that it made sense to re-engage M+W's subcontractors since EWH believed that the remaining work was mainly commissioning and they would know the plant better than new contractors. Further, Mr Burgess reasoned that re-engagement avoided the difficulty of seeking to get new contractors to take responsibility for work carried out by others. He also explains the difficulty caused by M+W's failure to accept the true position on assignment. M+W wrote to the subcontractors claiming that EWH would thereafter deal with all matters under the subcontracts. Since M+W refused to make further payments to the subcontractors, they naturally looked to EWH for payment.

417. On 28 March 2019, EWH issued notices under the collateral warranties provided by Outotec, Sutco and SPIG requiring each subcontractor to enter into new contracts with EWH. Clause 4.2 of the warranties provided, however, that EWH was required to pay “a sum equal to the amount due” on execution of the new contracts. Agreement of the amounts due became complicated both because the subcontractors were in dispute with M+W as to the true balance and because EWH sought to maintain that the amount due was limited to the sums payable under the latest payment certificates.

418. Ultimately, EWH concluded that it needed to enter into fresh agreements. That was not, however, altogether straightforward:

418.1 Outotec:

- a) After some weeks of negotiation, EWH entered into a Technical Services Agreement with Outotec on 14 May 2019. Such agreement was specifically limited in scope to the works that Outotec had been obliged to carry out under the original Outotec subcontract.
- b) Negotiations for a replacement contract almost reached fruition but were complicated by disputes as to the true state of the account between M+W and Outotec, emerging evidence of further difficulties at the Levensat plant and then by M+W's decision to join Outotec in this litigation as a third party. Ultimately Outotec suspended the Technical Services Agreement on 16 January 2020.
- c) Outotec was engaged to assess the current state of the plant, advise on the commissioning plan, and provide on-site advice and assistance with performance testing and optimisation.

418.2 Field Systems Design:

- a) Field Systems Design was responsible for the electrical control and instrumentation works. EWH elected to contract with Field Systems Design because it held the most up-to-date cataloguing of what works had been completed and its staff already knew the site. Furthermore, Cepha, part of a consortium put together by Field Systems Design, had access to the passwords granting access to the control system and the knowledge and experience of having part-written the control software. EWH considered alternative contractors but concluded that not using Field Systems Design would cause considerable additional cost and delay.
- b) After termination, Field Systems Design asserted a claim of over £5 million for unpaid work. EWH concluded that it could not contract on the basis of the collateral warranty and negotiated a fresh contract. While it took until 5 September 2019 to achieve agreement, EWH managed to get Field Systems Design back on site more quickly against a purchase order.
- c) The works carried out by Field Systems Design and Cepha comprised rectification of defects as well as completion and commissioning works.

418.3 Siemens:

- a) Siemens was the manufacturer of the steam turbine and generator. Mr Burgess describes it as the most complex equipment at the Hull site. Siemens' Project Manager, Jas Bharna, expressed concerns as to the possibility of relying on an assignment of contractual rights. Siemens' own collateral warranty had not included a clause allowing EWH to call for a substitute contract. Instead, Siemens had warranted that it would fulfil its existing scope of works at market rates if M+W did not release the company from its obligations under the subcontract.
- b) Siemens' continued involvement was important both to answer outstanding queries raised by Black & Veatch but also to enable the steam turbine and

generator to be brought safely online. EWH therefore raised a purchase order on 23 May 2019. Siemens had personnel on site from 8 July 2019 and the turbine was first run on 14 August 2019.

c) Siemens personnel remained on site until the end of 2019.

418.4 Konecranes: On termination, the necessary cranes had been installed but commissioning was not complete. The fuel hall cranes operate unmanned 24 hours a day and depend upon complex vision systems and fuel-management strategies. Konecranes had developed the control system and another supplier would not have easily been able to take it over. There was no collateral warranty but fortunately the account was in reasonably good shape such that EWH could simply pick up the liability for the outstanding milestones once they were achieved and for a modest variation claim that, upon investigation, was deemed to be justified. EWH therefore entered into a fresh contract with Konecranes on 5 September 2019.

418.5 Bilfinger: A substantial quantity of Bilfinger's scaffolding was already erected on site on termination. It made sense to re-engage Bilfinger rather than cause all of the scaffolding to be dismantled and face further delay while alternative contractors erected their own replacement scaffolding. A fresh contract was negotiated with Bilfinger and executed on 24 April 2019. EWH's quantity surveyors, Faithful & Gould, advised that Bilfinger's rates compared well with market rates.

418.6 Industrial Engineering & Industrial Services [“IEIS”]:

a) The mechanical and balance of plant works had proved challenging. Indeed, M+W ended up in litigation with both its initial and replacement subcontractors, Fabricom and Premier Engineering. There was no subcontractor in place at termination and accordingly EWH placed the contract with IEIS on the basis of the contractor's performance on the Ince and Levenseat projects. On 3 May 2019, EWH appointed IEIS as its sole mechanical contractor.

b) The scope of IEIS's work was not limited to completing the balance of plant works but also encompassed general mechanical works. Mr Burgess says that the contractor was essentially engaged to address the mechanical and balance of plant work identified on the first set of OWLs, but that the scope of work evolved as EWH became increasingly aware of the work that needed to be done to complete and commission the plant.

418.7 Protec and Ultrasure Fire:

a) The fire protection and suppression system combined conventional bulb sprinkler systems with a more intelligent network system. It was a closed-protocol control system such that it could only be worked on by Protec or a small number of authorised servicing companies.

b) At termination, Protec was in dispute with M+W and refused to return to site until the dispute was settled. It sought a significant sum from EWH who instead brought in Ultrasure Fire in May 2019. Ultrasure's work highlighted that there was still a reasonable quantity of work to be done. EWH then considered either replacing the Protec system or re-engaging Protec. In July 2019, EWH invited tenders from Protec, Ultrasure and a third contractor. No doubt because of its familiarity with the site and the fact that it would not need to replace equipment, Protec emerged as the cheapest supplier. Accordingly, EWH contracted with Protec on 10 September 2019.

- 418.8 C Spencer: M+W was in dispute with Spencer, its civil engineering subcontractor, such that it had left site before termination. M+W had then engaged a number of local companies to complete the work leading to some complication in knowing the precise works that Spencer was responsible for. Further, since Black & Veatch had not yet investigated the extent of the remaining civil engineering works, Mr Burgess adds that EWH did not understand what the scope of the further works should be. Accordingly, EWH concluded that it did not make sense to seek to rely on the collateral warranty.
- 418.9 Gradon Construction: Gradon is a civil engineering subcontractor. It was engaged by EWH on a time-and-materials basis to complete the civil engineering and building works and to rectify defects on the OWL.
419. Mr Roberts explains that the subcontractors were engaged to remedy defective work and complete the outstanding work.
420. Fichtner's October 2018 report recorded that the design phase was "substantially complete", procurement was "close to completion with all major subcontracts placed" and that M+W advised that manufacturing was "substantially complete." Fichtner then reported:
- "Fichtner has inspected the works being completed on Site during this period including external fuel feed conveyors, gasifier train, and BOP.
- Fichtner considers that the quality of the construction works carried out on Site is in general to a reasonable standard."
421. Mr Gordon notes that the total milestone payments made to M+W totalled £138,579,345. Given that the contract price was £153,848,878, the unpaid contract price at termination was £15,269,533. He then estimates that the actual work outstanding at termination was valued at circa £5.9 million:
- 421.1 First, he notes that the last application for payment under the EPC contract was made on 16 August 2018, some 28.57 weeks before termination.
- 421.2 He then takes the likely date of Take Over but for termination to have been 6 July 2019.
- 421.3 He assumes that the remaining work would be completed at a steady rate throughout the 46.29 weeks from 18 August 2018 to 6 July 2019.
- 421.4 Thus, he estimates that the outstanding works at termination could be calculated as follows:
- $$\frac{(46.29-28.57)}{46.29} \times \pounds 15,269,533 = \pounds 5,845,239$$
422. Against that, Mr Gordon notes that EWH seeks around £42 million for the costs to completion. He then reports, at paragraphs 467-468 of his report:
- "467. I would typically expect costs to be higher following a termination due to various factors such as the supply chain's appetite for risk, the piecemeal nature of the work remaining and the lack of commercial tension in the supply chain when a project is knowingly in distress. Whilst my calculation

is rudimentary it does provide an indication as to the order of magnitude of costs EWHL has incurred in completing the post termination works as compared to what it may have incurred.

468. I am unable to explain the reasons for such a significant difference. It is a matter for the Court to decide whether such reasons are related to a difference in scope or other issues for which M+W is not liable.”

423. Ms Nash challenges this analysis:

423.1 First, Mr Gordon makes no allowance for the fact that the contract was loss making. Ms Nash points to M+W’s Cost Control report at 30 September 2018 that recorded costs to date in the sum of £161,252,285. There were further forecast costs of £21.7 million, taking the total project costs to £182.9 million.

423.2 Secondly, Mr Gordon assumes that Take Over would have been achieved by 6 July 2019. Even M+W’s own projections prior to termination were less optimistic, and in any event I am satisfied upon the evidence that the project was further from Take Over than had been appreciated even at termination.

Adopting Mr Gordon’s methodology, Ms Nash suggests that the value of outstanding works at termination was between £7.2 million and £21.7 million.

DID EWH ACT UNREASONABLY BY ENTERING INTO NEW CONTRACTS?

424. M+W’s pleading appears to reverse the burden of proof. It is for M+W to plead and prove EWH’s alleged failure to mitigate its losses. In any event, I reject M+W’s argument that EWH failed to mitigate its losses by re-engaging subcontractors rather than insisting that they complete the outstanding works pursuant to the assigned subcontracts and or through the collateral warranties. Indeed, such argument is rather difficult given M+W’s own contemporaneous actions in seeking to deny its liabilities for monies owed under the subcontracts and arguing that there was no assignment of accrued rights.

425. There is clear evidence that subcontractors would not return to site under the subcontracts without resolving their disputes with M+W unless EWH was prepared to pay all sums owed by M+W. Furthermore, time was an important factor given EWH’s mounting losses, estimated by the parties at £84,800 per day, from further delay. In addition, I am satisfied that it was not unreasonable to re-engage the subcontractors on a time-and-materials basis. Indeed, it would have been very difficult for EWH to have sought fixed-price contracts without a very clear understanding of what precisely remained to be done.

426. Accordingly, I am satisfied that M+W has not discharged the burden of proving that EWH failed to mitigate its losses by its procurement strategy. In any event:

426.1 In respect of Siemens, Mr Robinson confirms at paragraph 86 of his second statement that Siemens refused to honour the assigned subcontract terms even if M+W paid the remaining milestone.

426.2 In respect of Konecranes, the forensic accountants agreed that the sums paid were the same amounts as the milestones and agreed variations that were payable under the M+W subcontract.

WERE THE WORKS DONE WITHIN THE SCOPE OF M+W'S CONTRACT?

427. While there was cross-examination as to the reasonableness of the re-engagement strategy, there has been no challenge to the lay evidence called by EWH that the work undertaken by the re-engaged subcontractors was to remedy defective works and take the project to completion. If M+W wished to argue that additional works were undertaken then it was incumbent upon it to challenge the evidence called by EWH on this issue and to put a positive case that EWH is wrongly seeking to pass on a liability for such additional works.
428. I am satisfied upon the evidence before me that the works undertaken were accordingly within the scope of M+W's contractual obligations.

CONCLUSIONS

429. Limiting EWH to its pleaded claims, the subcontract costs are agreed by the forensic accountants on a figures-as-figures basis in the sum of at least £19,422,445.71:

Subcontractor	Work	Claim (£)
Outotec	Gasifier train	647,238.64
Field System Design	Electrical works	2,741,100.81
Siemens	Turbine works	615,119.09
Konecranes	Overhead travelling cranes	553,920.55
Bilfinger	Labour and scaffolding	950,513.55
IEIS	Mechanical works	4,104,411.32
Protec & Ultrasure Fire	Fire systems	202,654.25
Gradon	Civil works	401,181.31
Miscellaneous contractors		9,711,167.51
Less credits for ash disposal and consumables		(504,861.32)
		£19,422,445.71

430. I award EWH damages in this sum. Of course, it is agreed between the parties that the sum of £15,269,533, being the costs saved by termination of the EPC contract, must be deducted from the termination claim. After setting off this sum, the net liability for the subcontract costs is a little over £4 million.

TERMINATION CLAIM: (4) COMMISSIONING SUPPORT

THE CLAIM

431. Following termination, EWH engaged additional contractors to provide commissioning support. Mr Burgess explains the approach followed by EWH at paragraphs 301-305 of his first witness statement. Commissioning support was obtained on an ad hoc basis as required by Black & Veatch. The service was typically required quickly so as not to delay more significant works.

432. By Annex 4 to the Defence, M+W puts EWH to proof but does not assert a positive case. It pleads, at paragraph 17:

“EWH is required to prove:

- (i) The parties it engaged for commissioning support;
- (ii) The works which they carried out;
- (iii) That this work was within the scope of M+W contract prior to termination and did not include variations or betterment; and
- (iv) That the amounts paid were properly payable to the subcontractors for carrying out said work.”

433. M+W alleges that EWH did not need to re-engage seven subcontractors, being Lowe Engineering, Airlines & Compressors; BSB Engineering Services, BKW Instruments, Halcyon Drives, Weightron Bilanciai and Suez Water Technologies & Solutions, because it had the benefit of assigned subcontracts. It then pleads, at paragraph 19:

“In the circumstances, EWH is required to prove that it reasonably mitigated its loss by taking the following steps:

- (i) Insofar as the subcontractor sought additional payment directly from EWH, it should have insisted that any such payment would be solely in accordance with the payment terms found in the original subcontract between M+W and the subcontractor.
- (iii) Generally, insofar as any of the subcontractor (sic) have been paid in excess of the negotiated subcontract sum between M+W and the subcontractor, EWH is required to prove why such additional payments have been made and that they flow from reasonable behaviour on the part of EWH.”

DID EWH ACT UNREASONABLY BY ENTERING INTO NEW CONTRACTS?

434. Again, M+W’s pleading appears to reverse the burden of proof. It is for M+W to plead and prove EWH’s failure to mitigate its losses. In any event, I reject the mitigation argument. As explained above:

434.1 The argument is rather difficult given M+W’s own actions in seeking to deny its liabilities for monies owed under the subcontracts and arguing that there was no assignment of accrued rights.

- 434.2 There is clear evidence that subcontractors would not return to site under the subcontracts without resolving their disputes with M+W unless EWH was prepared to pay all sums owed by M+W.
- 434.3 Furthermore, time was an important factor given EWH's mounting losses, estimated by the parties at £84,800 per day, from further delay.
435. Accordingly, I am satisfied that M+W has not discharged the burden of proving that EWH failed to mitigate its losses by its procurement strategy in respect of commissioning support.

WERE THE WORKS DONE WITHIN THE SCOPE OF M+W'S CONTRACT?

436. If M+W wished to argue that the commissioning support was not within the scope of M+W's contract then it was incumbent upon it to challenge the evidence given by Mr Burgess and his explanation of the support provided on a contractor-by-contractor basis at pages 22-24 of Exhibit RB1.

QUANTUM

437. The forensic accountants have agreed the cost of commissioning support in two different sums:
- 437.1 The total costs incurred total £2,237,397.97.
- 437.2 Mr Gordon promotes an alternative valuation in the sum of £1,973,985.34 which removes the cost of disposing of MPT rejects which he defines as Unacceptable and/or out-of-specification RDF.
438. As explained above:
- 438.1 M+W was entitled to reject Unacceptable RDF as defined by Appendix C of Schedule 22A to the EPC contract (see paragraphs 46 and 53);
- 438.2 EWH was obliged to make arrangements at its own expense to remove Unacceptable RDF: Schedule 3, section 3.6(7) (see paragraph 46);
- 438.3 there was no right to reject out-of-specification RDF that was not Unacceptable RDF as so defined (see paragraph 68.7);
- 438.4 that said, the delivery of out-of-specification RDF was in breach of contract (see paragraphs 68.4 and 129);
- 438.5 EWH was obliged to remove up to 22,000 tonnes of out-of-specification Fuel at its own cost: Schedule 14, para. 14.8.1.1 (see paragraph 47); and
- 438.6 even after such limit was exceeded, it would be open to M+W to seek to recover the cost of removing Fuel that was out of specification because the RDF itself was out of specification (see paragraph 265.4).
439. I am satisfied that Mr Gordon is right to deduct at least the cost of removing the Unacceptable RDF. Whether he was right also to deduct the cost of removing the out-of-specification material is a moot point since the burden is on EWH to prove its losses and I

am not provided with an alternative figure comprising the deduction of just the cost of removal of the Unacceptable RDF. I therefore award the alternative sum of £1,973,985.34 under this head.

TERMINATION CLAIM: (5) OPERATION & MAINTENANCE COSTS

440. EWH never intended to operate and maintain the plant. Rather, it entered into a contract with its chosen Operation & Maintenance (“O&M”) contractor, Cofely Workplace Limited, later known as Engie Services Limited. By such contract, Engie agreed to provide O&M services for the period of ten years after Take Over. The contract also required Engie to provide services during a 12-month mobilisation period before the planned Take Over.

ADDITIONAL O&M COSTS PENDING THE APPOINTMENT OF BLACK & VEATCH

441. It is common ground that upon termination of the EPC contract, the plant could not simply be mothballed pending the appointment of a replacement contractor and that certain urgent maintenance was essential in order to safeguard the plant. Indeed, M+W stressed the importance of eight different processes, some of which required daily attention, by its solicitor’s letter of 5 March 2019. Mr Burgess explains that an immediate appointment was required, and that the only sensible choice was to instruct Engie to undertake this additional work. A fee of £40,000 per fortnight was agreed. EWH attempted to negotiate a reduced charging structure but Engie did not yield, and Mr Burgess explains that EWH therefore put significant effort into finalising terms with Black & Veatch in order to keep the period of these additional costs as short as possible.
442. EWH claims £71,428.57 being the costs between 7 March (when Engie agreed to take over care and control of the site) to 1 April 2019 (when Black & Veatch took over as principal contractor). M+W pleads that the claim should be further limited because Black & Veatch was appointed on 22 March 2019. Mr Burgess answers that point. He explains that while the Black & Veatch contract was signed on 22 March, the company did not take over the site until 1 April. Otherwise, EWH is simply put to proof.

443. I am satisfied that this claim is made out and award the sum of £71,428.57.

THE EXTENDED MOBILISATION CLAIM

444. As already explained, the mobilisation period was 12 months prior to the contractual Take Over date. Upon the project being delayed, Engie was entitled to charge an extended mobilisation fee of £3,125 per day, subject to indexation.
445. Engie was entitled to terminate the O&M contract upon the failure to start commercial operations by a longstop date of 9 July 2019. By a notice given on 12 August 2019, Engie exercised its contractual right to terminate the O&M contract on ninety days’ notice. Despite attempts to renegotiate the contract, by a further letter dated 12 November 2019 Engie confirmed that the contract would terminate the following day. EWH therefore claims the

extended mobilisation fee from the termination of the EPC contract to the termination of the O&M agreement. The quantum of such claim is agreed in the sum of £877,963.34.

446. Other than simply putting EWH to proof, M+W takes two points:

446.1 First, it argues that EWH failed to mitigate its loss by failing to exercise its contractual right under clause 4.2 of the O&M contract to reschedule the Commercial Operations Date and thereby defer the start of the mobilisation period.

446.2 Secondly, it argues that this head is a delay-related claim and that it was therefore covered by the Delay Damages Cap such that no further sum can now be recovered.

447. The problem with the mitigation argument is that the option under clause 4.2 had to be exercised before the mobilisation date which was in April 2017. There is no evidence that at that date EWH ought to have anticipated that the project would fall into delay. I note that M+W has neither pleaded nor adduced any evidence as to the length of deferment that it contends EWH should then have anticipated. Accordingly, M+W has failed to establish the alleged failure to mitigate EWH's loss.

448. For the reasons explained above, the Delay Damages Cap covers, among other additional costs and losses, the extended mobilisation fee payable up until 4 March 2019 but is of no relevance post-termination.

449. Accordingly, subject to clause 45.3 and any further causation argument, I award EWH the additional extended mobilisation fees paid of £877,963.34.

THE BISL CLAIM

450. Engie's termination left EWH in need of a new O&M contractor. EWH therefore contracted with Bioenergy Infrastructure Services Limited ("BISL"). EWH now pursues two claims in respect of the BISL contract:

450.1 First, it seeks the additional costs of £4,195,061.17 of the BISL contract in the period to 31 March 2021. This is slightly in excess of the pleaded sum. Since no application has been made to amend the schedule of loss, the claim is limited to the sum pleaded in Appendix 6 to the Particulars of Claim, namely £4,189,085.98.

450.2 Secondly, it seeks its additional costs of £14,031,648 of the BISL contract over the first ten years of operation over and above the Engie contract.

The related-company point

451. BISL is related to Bioenergy Infrastructure Holdings Limited, one of the major shareholders in EWH through its parent company. M+W therefore pleads that the BISL contract was not entered into at arm's length and puts EWH to proof that it mitigated its loss by properly carrying out a competitive tender and obtaining the best available price: Annex 4 to the Defence, para. 30(ii). By its closing submissions, M+W submits that the claims "cannot

survive” the evidence of Mr Hodgen that EWH replaced Engie as the O&M contractor by contracting with a related company for an additional £14 million without any procurement process.

452. Mr Burgess explains that Engie underestimated the cost and complexity of the O&M services required under their contract with EWH, and that the contractor effectively took advantage of the opportunity offered by the missed longstop date to escape unattractive commercial terms. The parties entered into commercial negotiations recognising that any new contract was always going to be more expensive once it had been appreciated that the original O&M agreement had under-priced staffing and risk. The new O&M contract would also not be able to benefit from the terms of the EPC contract that had then been terminated.
453. EWH then decided to take the O&M contract “in house” by engaging BISL. In doing so, EWH acknowledges the conflict of interest. Mr Burgess explains that such conflict was managed by the directors appointed by Bioenergy leaving all decisions about the BISL contract to the other members of the board. In any event, the BISL contract was in large measure placed on terms that had been negotiated with Engie but upon which Engie was ultimately not willing to contract. Mr Burgess adds that the open issues in the aborted negotiation with Engie were resolved in EWH’s favour.
454. None of this evidence was challenged and I accept it as accurate. Instead, M+W focused its firepower on establishing from EWH’s forensic accounting expert, Mr Hodgen, the fact of the relationship between Bioenergy and BISL; that there had been no procurement process; and that it is reasonable to assume that Bioenergy will have benefitted from any profits made by BISL. None of these propositions were ever in dispute between the parties.
455. In my judgment, M+W’s argument risks inviting the court to reverse the burden of proof. It is for M+W to plead and prove the alleged failure to mitigate EWH’s losses. A failure to conduct a proper procurement exercise or the award of a replacement contract other than at arm’s length might readily lead to an inference that the claimant failed to mitigate its losses, but the evidence before the court is that EWH essentially contracted with BISL on terms that can be benchmarked against the Engie negotiations. There is simply no evidence before the court that EWH overpaid. Accordingly, I reject the argument that EWH failed to mitigate its losses.

The Delay Damages Cap

456. M+W argues that these claims are subject to the Delay Damages Cap: Annex 4, para. 30(iii). For the reasons already explained, the Delay Damages Cap did not apply post-termination of the EPC contract and I reject M+W’s argument that these claims are excluded by such cap.

Clauses 45.1 and 45.1A

457. M+W pleads that the claim for O&M costs is too remote in that it arose out of “a particular contractual arrangement with Engie which was unusual and which M+W had no reason to

know about”. Alternatively, relying on clause 45.1, it argues that it is an excluded claim for consequential indirect losses: Annex 4, para. 31.

458. In response, EWH points out that the EPC contract expressly recorded that M+W had been provided with a copy of the Engie contract. Further, EWH relies on clause 45.1A, which provides:

“The Purchaser and Contractor agree that any losses, expenses or other liabilities of the Purchaser in respect of ... the O&M Contract arising from a breach of the Contractor’s obligations provided elsewhere under this Contract are direct losses.”

459. M+W argues that clause 45.1A only applies to losses in respect of the O&M contract with Engie and not any other O&M contract that EWH might enter into. Such submission misses the point that these claims for additional O&M costs:

459.1 arise from M+W’s breaches of the EPC contract which in turn allowed Engie to terminate the O&M contract; and accordingly

459.2 are claims in respect of the loss of the O&M contract with Engie.

460. I therefore conclude that these claims are caught by clause 45.1A and that such costs are recoverable as direct losses.

Quantum

461. There is no dispute between the experts as to the calculations of these losses. Accordingly, and subject to the further issue of causation, I would have awarded the pleaded sum of £4,189,085.98 in respect of the additional costs of the BISL contract until 31 March 2021 and the sum of £14,031,648 in respect of the additional costs of the BISL contract over the first ten years of operation.

CONCLUSIONS

462. Subject to the issue of causation, I would have awarded £19,170,125.89 under this head:

	£
Costs pending appointment of Black & Veatch	71,428.57
Mobilisation fees	877,963.34
BISL costs to 31 March 2021	4,189,085.98
BISL costs from 1 April 2021	14,031,648.00
	£19,170,125.89

OTHER TERMINATION CLAIMS

463. The remaining termination claims can be taken more quickly. In a number of instances, M+W again relies on the Delay Damages Cap. I have already rejected that argument in respect of post-termination losses at paragraphs 319-320 above and do not repeat that analysis. In some instances, M+W relies on the argument that the costs are not costs of completion as allowed by clause 44.6. Again, I have rejected that argument at paragraphs 391-393. Otherwise, M+W simply puts EWH to proof of its losses but has not challenged the evidence called in support of these heads of claim. In those circumstances, I award in each case the sums agreed by the experts subject only to the proviso that no award will exceed the pleaded sums.

(6) MAJOR CONSUMABLES

464. By paragraph 14.8.1.5 of Schedule 14 to the EPC contract, M+W was required to pay for major consumables, comprising lime, urea, powdered activated carbon, sand and gas oil, used prior to Take Over. The clause excluded the cost of the lime, powder activated carbon, urea and sand at times when steam was being directed to the turbine resulting in power export and revenue for EWH. The forensic accountants have agreed EWH's claim for the additional cost of major consumables in the pleaded sum of £4,924,884.62 and I award damages in that sum.

(7) MINOR CONSUMABLES

465. By clause 14.8.1.6 of Schedule 14 to the EPC contract, M+W was required to pay for minor consumables which included, but were not limited to, boiler water chemicals, water treatment plant chemicals, red diesel, lubricants and bottled gases. I award the sum agreed by the experts of £20,117.21.

(8) TECHNICAL SUPPORT

466. The cost of technical support during the delayed period to Take Over is agreed on a figures-as-figures basis in at least the pleaded sums, and I award £1,895,578.25 under this head:

Consultant	Support	Pleaded claim (£)
Fichtner	Project management	1,283,775.40
Faithful & Gould	Quantity surveying	377,014.56
C Spencer	Site support	192,589.24
Waste2Energy	Interfacing support	42,199.05
		£1,895,578.25

(9) SPARES

467. The EPC contract required M+W to provide certain spare and wear parts. It is not disputed that M+W had not provided all such parts at the date of termination. EWH claims and I award the sum of £1,387,108.43 as agreed by the quantum experts on a figures-as-figures basis.

(10) ELECTRICITY

468. By paragraph 14.8.1.2 of Schedule 14 to the EPC contract, M+W was required to pay for the cost of electricity prior to Take Over. The forensic accountants have agreed EWH's claim for the additional cost of electricity in a sum in excess of the pleaded sum of £1,409,098.57. Again, limiting EWH to its pleaded claim, I award that sum.

(11) WATER

469. By paragraph 14.8.1.7 of Schedule 14 to the EPC contract, M+W was required to pay for the cost of water prior to Take Over. The forensic accountants have agreed EWH's claim for the additional cost of electricity in the sum of £168,090.02 and I award that sum.

(12) CONSTRUCTION INSURANCE

470. EWH claims the cost of construction insurance cover between the date of termination and 31 March 2021 in the sum of £1,209,814.06. I award these costs as claimed.

(13) SECURITY

471. M+W was responsible for the cost of site security. The experts have agreed the security costs incurred with Rock Security Solutions prior to the engagement of BISL as the replacement O&M contractor in the sum of £662,673.95, and I award that sum.

(14) LEASE COSTS

472. It was necessary for EWH to lease land on Dalton Street that was adjacent to the plant during the construction works. The experts have agreed the additional costs incurred between termination and 31 March 2021 in the sum of £144,706.32, and I award that sum.

SUMS OUTSTANDING AT TERMINATION

473. In addition, there were sums outstanding at termination. M+W simply puts EWH to proof but the experts have agreed the outstanding liability for consumables in the sum of £2,195,848.27 and for electricity in the sum of £290,542.32. I award those sums.

EWH'S DEFECT CLAIMS

474. By Appendix 4 to the Particulars of Claim, EWH sought damages of around £12 million in respect of thirty-three different defects. Seven claims are significant in value and represent the vast majority of the pleaded claim:

Defect no.	Defect	Pleaded claim (£)	Paragraphs in this judgment	
			EWH's claim	Third-party claim
28	Noise issues	3,212,608.62	477-532	728-740
23	Over Fire Air / Under Fire Air slagging issues	3,096,199.28	533-587	741
17	Feeding system – screw and bin design	1,067,980.37	588-611	742-749
26	Defective demineralised water plant	714,226.89	612-634	
9	Inadequate corrosion protection	672,614.00	635-659	750-755
32	Blocked bed cones	563,255.84	660-672	756
24	MPT plant separation efficiency	529,823.70	673-694	

475. M+W's core obligations were set out at clauses 3.1, 3.1A, 3.2 and 3.4 of the EPC contract:

- “3.1 In consideration of payment by the Purchaser, the Contractor shall regularly and diligently carry out and complete the Works in accordance with the Contract and ensure that the Plant as constructed and completed shall comply with the Contract, including (without limitation) meeting any performance specifications set out the Specification and/or the Schedules and/or the Contractor's Proposals.
- 3.1A The Contractor shall be responsible for the design of the whole of the Plant. Any design provided by or on behalf of the Purchaser (whether contained in a Contract Document or provided in a Variation Order or otherwise) shall be verified by the Contractor.
- 3.2 All work carried out by the Contractor shall be carried out with sound workmanship and materials, safely and in accordance with good engineering practice and Legislation and shall be to the reasonable satisfaction of the Project Manager.
- 3.4 Without derogation from any other provision, and as a separate and independent obligation, the Contractor shall design the Works and every part of the Works:
- (a) using all the skill and care reasonably to be expected of duly qualified and experienced designers undertaking the design of works similar in scope, size, complexity and character to the Works or such part of the Works; and

(b) in accordance with Good Industry Practice.”

476. I have already commented upon the importance of statements of case defining and confining the issues before the court. Those observations are particularly apposite to EWH’s defects case. Mr Williamson is right to submit that a defects claim should be straightforward to plead but yet the defects claim is in part pleaded in vague and general terms.

DEFECT 28: NOISE ISSUES

477. Although predominantly in an industrial setting, the plant is in close proximity to some houses and commercial properties. The plant is designed to operate continuously 24 hours a day 7 days a week. That said, deliveries can only take place between 07:00-19:00 and the front loaders and shredders can operate an additional hour until 20:00. EWH alleges that the noise levels both on and off site failed to comply with contractual obligations, the planning consent, Environmental Permit and relevant legislation and industry standards.

THE PROBLEM

478. EWH started to receive complaints about off-site noise pollution in April 2018. Complaints variously described the noise as a constant background droning noise, like a large kettle boiling, or an aircraft taking off. By a letter dated 21 August 2019, the Environment Agency formally notified EWH that it was minded to suspend the Environmental Permit because it had identified that the noise emissions were causing “serious pollution” outside the site. It specifically identified two discrete sources of off-site noise, being the Air-Cooled Condensers and the stack. The Agency advised:

“We consider that continuing to operate the ACCs and the Stack without appropriate noise mitigation measures to prevent, or where that is not practicable, to minimise noise risks causing further serious pollution in the form of noise to nearby sensitive receptors.”

EWH was given seven days to satisfy the Environment Agency that it could identify and implement appropriate measures to prevent or minimise the noise in order to remove the risk of serious pollution.

479. EWH immediately instructed Fichtner and Black & Veatch to inspect the plant and report. They identified no fewer than eight items of plant that required mitigation and recommended both short-term and long-term solutions.

480. The Environment Agency issued compliance assessment reports on 9 and 18 October, 7 November and 18 December 2019 identifying issues with a “prominent howl noise”; a “continuously present and very prominent whine noise” such as to cause “a significant effect on human senses”; a noise like a “jet engine”; and a “whooshing noise.” On 20 December 2019, the Environment Agency again issued a formal warning of its intention to suspend the permit. It regarded the short-term measures proposed to prevent or minimise noise pollution to be inadequate. Officers particularly noted “a roar, akin to a jet engine sound that was present continuously at a level likely to have a significant impact on sensitive receptors, suspected to be emanating from the stack.” This time, a month was given to satisfy the agency as to the remedial plan.

481. EWH engaged acoustic consultants and submitted revised addenda to its noise management plan in both January and March 2020. Further short-term and long-term mitigation measures were proposed. A further compliance assessment report on 16 April 2020 advised a breach of permit in that “jet engine” noises had been recorded during a site visit in March. This was assessed as a category 2 impact, namely:

“Noise abnormal and prolonged enough to cause significant effect on human senses. This includes mild noise that occurs so frequently as to cause a greater degree of disturbance than would otherwise be expected.

- The noise would be disturbing or annoying by way of volume, duration, or characteristics.
- Abnormal means that the noise that is significantly louder or more intrusive and offensive than the normal operational noise climate, affecting people either inside or outside noise sensitive premises.”

482. A further compliance assessment report on 27 April 2020 notified a breach by reason of a “high flying jet engine type noise.” The report stated that measurements in Cornwall Street had found that the rating level of the noise was +13dB above the background level.

THE ALLEGATIONS

483. By Appendix 4 to the Particulars of Claim, EWH pleaded four allegations. The first three allegations were pleaded as breaches of clauses 3.1, 3.4 and 7.1, paragraphs 1.2 and 2.4.3 of Schedule 22A and/or paragraph 24.3.6(9) of Schedule 22B of the EPC contract. The particulars were that:

- “(i) ... the noise levels at the plant and/or at the relevant NSR locations failed to comply with the requirements prescribed by the Planning Consent, the Environmental Permit application, the Environmental Permit and/or all relevant legislation and industry standards;
- (ii) ... the noise levels at the plant and/or at the relevant NSR locations do not enable EWH to obtain the necessary approvals and/or to operate the plant in accordance with the Planning Consent, the Environmental Permit application, the Environmental Permit and/or all relevant legislation and industry standards;
- (iii) ... M+W has failed to provide all the silencers, acoustic equipment, louvers and/or other systems necessary to ensure that the design and operation of the plant comply with the Planning Consent, the Environmental Permit application, the Environmental Permit and/or all relevant legislation and industry standards.”

Further, there was a general allegation:

- “(iv) Generally, the level of noise emitted from the plant, its instrumentation, equipment and/or components fails to comply with all the relevant contractual requirements as set out above or otherwise.”

THE CONTRACTUAL OBLIGATIONS

484. In addition to core obligations at clauses 3.1, 3.1A, 3.2 and 3.4, EWH relies on clause 7.1 of the EPC contract:

“The Contractor shall ensure that on completion, the Plant, as proposed to be operated (as stated in or to be deduced from the Contract) complies with:

- (a) all relevant Legislation;
- (b) the Environmental Permit;
- (c) the Environmental Permit Application, but only to the extent compliance is required by the Environmental Permit; and
- (d) (subject to ... the following paragraph), the Planning Consent ...

For the avoidance of any doubt, and notwithstanding any other provision of this Contract, the Contractor gives no warranty nor guarantee in respect of the noise levels at the noise receptors identified as ‘E’ and ‘F’ in the Parsons Brinckerhoff Report. The foregoing shall not derogate from the Contractor's obligations in respect of noise levels as set out in sections 15.3.2 paragraph (14), 15.3.2.1 and 15.3.2.2 of Schedule 15.”

485. The Take Over procedures were at Schedule 15 to the EPC contract. Test 14 upon Take Over was defined, at section 15.3.2 as “demonstration of noise levels as defined in section 15.3.2.1 and 15.3.2.2 below.” Section 15.3.2.1 provided:

“For noise sources that are not located inside a building (outdoor noise sources):

- (1) the Contractor shall demonstrate compliance with the sound pressure levels listed in Schedule 15 Appendix A; and
- (2) the Contractor shall design and build the Plant in accordance with the drawing appended at Schedule 15 Appendix A.

For noise sources that are located inside a building (indoor noise sources):

- (1) the Contractor shall demonstrate compliance with the sound pressure levels listed in Schedule 15 Appendix B;
- (2) the Contractor shall not be allowed to increase the number of indoor noise sources by more than 10% compared to the number of indoor noise sources listed in Schedule 15 Appendix B. Additional indoor noise sources shall have a guaranteed maximum sound pressure level of 85 dBA or less; and
- (3) in any case, the Contractor shall keep the Project Manager informed of any change in location and number of indoor noise sources.

Moreover, the Contractor shall demonstrate compliance with the sound pressure levels listed in Table 15.2 below.”

486. Measurement of noise levels was to be carried out in accordance with the provisions at section 15.3.2.2.

487. The following provisions of Schedule 22A are also relevant:

“1.2 The Plant shall comply in all respects with all the latest ... relevant legislation including but not limited to:

- the Environmental Permit and the associated conditions;
- the Planning Consent; ...
- Control of Noise at Work Regulations 2005 ...

2.4.3 Noise

The Contractor shall demonstrate that the noise limits set out in Schedule 15 have been fully complied with.”

488. Paragraph 24.3.6(9) of Schedule 22B required M+W to provide “all necessary silencer, acoustic equipment, louver and other systems necessary to ensure that the Plant meets the action levels in the European Directive on Noise and that the Plant is compliant with the limits set out in the Planning Consent.”

489. Condition 30 of the Planning Consent provided:

“The development hereby approved shall be carried out and operated in accordance with Parsons Brinckerhoff report dated July 2015 or as subsequently amended and approved ...”

490. Paragraph 3.4.1 of the Environmental Permit provided:

“Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.”

ON-SITE NOISE LEVELS

491. As already noted, upon Take Over M+W was required to comply with the absolute limits in sound pressure levels specified in Appendices A (external plant) and B (indoor plant). While not undertaken for this purpose, work done by Sol Acoustics shows that a significant number of items of plant failed to comply with these limits:

Plant	Sound pressure limit, dBA at 1m	Measured dB	
		Min	Max
Airside Blower A	85	89	91
Airside Blower A	85	82	92
Airside Blower A East Side	85	85	94
Airside Blower B	85	92	104
Airside Blower B	85	80	90
Airside Blower B West Side	85	90	102
Airside blower mezzanine floor	85	86	86
Air Pollution Control Residue	85	89	91
Air Pollution Control Residue top drive intake conveyor	85	78	90
Air Pollution Control Residue top drive of vertical conveyor	85	86	86
Ash conveyor bottom drive	85	78	95
Belt conveyors river side	85	76	86
Evaporator sootblower	100	92	103
ID fan	85	79	101
ID fan (24% speed, inlet vane 100%)	85	85	89
ID fan bearing	85	92	92
ID fan motor	85	77	100
ID fan motor	85	89	89
Lime blower	85	74	87
Mezzanine level (90° branch of OFA ductwork to burner)	85	92	92
Mezzanine level adjacent to HLA31	85	89	98

OFA ductwork to gasifier	85	92	92
OFA fan	85	88	89
OFA fan	85	83	93
OFA fan	85	85	90
OFA fan (78% speed, damper closed)	85	84	92
OFA scroll	85	84	88
Sootblower drain	100	94	103
Stack outlet	85	87	90
UFA fan	85	83	92
UFA fan	85	86	93
UFA fan (86% speed, damper closed)	85	83	90
UFA fan motor	85	86	89
Under bed burner	85	73	86
Vacuum skid (hogging mode)	85	74	90
Vacuum breaker	95		102
Vibratory screen	85	82	107

492. Mr Stephenson noted that Sol had taken sound pressure levels whereas it would have been preferable to measure sound intensity. That said, taking sound pressure levels was significantly easier and used inexpensive and easily sourced equipment. Further, it allowed direct comparison with the contractual maximum sound pressure levels at 1 metre. While preferring a different methodology, Mr Stephenson found that Sol's approach was fit for purpose and allowed him to conclude that the airside blowers, evaporator sootblowers, ID fan, stack outlet, vacuum breaker, vacuum skid and vibratory screen did not comply with the maximum noise levels specified in Schedule 15. For a number of other pieces of equipment, sound intensity measurements would have been helpful in determining compliance.

493. Although Mr Clarke initially challenged Sol's measurements, the basis on which he did so was withdrawn by Mr Williams and the point was then conceded by Mr Clarke.

OFF-SITE NOISE LEVELS

Parsons Brinckerhoff

494. In the planning phase, EWH’s acoustic consultants, Parsons Brinckerhoff, identified six noise sensitive receptors in the area of the houses and commercial properties in its September 2015 noise assessment. The receptors were denoted A-F and their locations were marked on a map at Appendix B to the report. Parsons Brinckerhoff then compared the background sound level at each receptor site with the predicted sound output of the plant. In doing so, the consultant took the rating level, being the predicted sound output corrected to account for tonality, impulsivity, intermittency and other sound characteristics. The lower the rating level relative to the measured background sound level, the less likely that the sound source would have an adverse or significant adverse impact. A difference of around +5dB is likely to indicate an adverse impact whereas a difference of around +10dB is likely to indicate a significant adverse impact. The background noise levels were based on a 2011 survey.
495. Parsons Brinckerhoff’s work did not indicate an off-site sound issue. Indeed, for the most part it predicted that the rating sound levels from the plant at the receptor sites would be lower than the background noise levels:

Noise sensitive receptor	Day/ night	Back- ground dB	Modelled Rating dB	Rating minus back- ground	Description
A – 12 Bilbury Close	Day	46	41	-5	Low impact
	Night	42	41	-1	Low impact
B – 25 Mulgrave Street	Day	51	34	-17	Low impact
	Night	49	35	-14	Low impact
C – 11 Montrose Street	Day	41	35	-6	Low impact
	Night	38	37	-1	Low impact
D – Richardson’s Court / Northumberland Court, Fountain Road	Day	45	34	-11	Low impact
	Night	43	37	-6	Low impact
E –Glass House Row Flats	Day	49	53	4	Below indication of adverse impact
	Night	47	52	5	Below indication of adverse impact

F – Travellers’ site (East)	Day	49	51	2	Below indication of adverse impact
	Night	47	48	1	Below indication of adverse impact

Sol Acoustics

496. Sol Acoustics undertook a fresh background noise survey in February 2020 when the plant was not operational. It revealed significant issues with the work done by Parsons Brinckerhoff. Focusing on the night-time levels when the differentials (and therefore the risks of noise pollution) are greatest there was a discrepancy of as much as 8-10 dB between the measured levels for some receptor sites. It is common ground that Parsons Brinckerhoff overestimated the background noise levels. The experts instructed on this issue (Simon Stephenson for EWH, Edward Clarke for M+W and Samuel Williams for Outotec) cannot definitively say that an error was made, although they observe that the difference between the assessments of the background noise levels in 2011 and 2020 is unusually large. Accordingly, the Parsons Brinckerhoff assessment of background noise masked the true extent of the likely differential and therefore led to a failure to appreciate the true acoustic impact of the plant.

497. Further, the Parsons Brinckerhoff model appears to have underestimated the rating level of the noise from the plant. EWH relies on an Interim Environmental Noise Impact Assessment provided by Sol Acoustics following surveys in July 2020 to allege that adverse or significant adverse noise impacts were recorded at each receptor location. Mr Stephenson reports that a number of adjustments are necessary. First, he considers that Sol overstated the penalty to be applied at +9dBA. He makes the point, however, that neither Sol nor any of the experts had the benefit of experiencing the sound of the plant before the initial mitigation measures were taken. Secondly, its findings as to the specific sound levels are likely to be an underestimate, again because it carried out its work after the installation of a number of temporary mitigation measures. Furthermore, it is appropriate to consider not just normal operating conditions but also other than normal operating conditions. Mr Stephenson focused on the night-time position. His conclusions were as follows:

Noise sensitive receptor	Operating conditions	Back-ground, dB	Specific, dB	Rating, dB	Difference, dB
A – Housing on Brackley Close	Normal	34	42	45-48	+11 to +14
	Sootblowing	34	43	46-49	+12 to +15
	Start-up	34	43	46-49	+12 to +15
	Bypass	34	49	52-55	+18 to +21

B – Housing on Mulgrave Street	Normal	39	43	46-49	+7 to +10
	Sootblowing	39	43	46-49	+7 to +10
	Start-up	39	44	47-50	+8 to +11
	Bypass	39	59	62-65	+23 to +26
C – Housing on Montrose Street	Normal	39	45	48-51	+9 to +12
	Sootblowing	39	45	48-51	+9 to +12
	Start-up	39	47	50-53	+11 to +14
	Bypass	39	59	62-65	+23 to +26
D – Housing on Northumberland Court	Normal	34	45	48-51	+14 to +17
	Sootblowing	34	46	49-52	+10 to +13
	Start-up	34	46	49-52	+10 to +13
	Bypass	34	58	61-64	+27 to +30

498. This presents a very different picture from the work done by Parsons Brinckerhoff. These are mostly significant adverse impacts and, in all other cases, adverse impacts. Mr Stephenson then recast this table by reference to the higher estimates of background noise reported by Parsons Brinckerhoff. Such analysis still predicted significant adverse impacts at all locations in bypass conditions and at receptor site C in all operating conditions. It also showed an adverse impact at receptor site D in all conditions, worsening to a significant adverse impact in bypass conditions.

499. In his addendum report, Mr Clarke also sought to recast the Parsons Brinckerhoff report by reference to corrected levels of background noise, but his model then considered the additional impact of the different noise receptor sites used by Sol. In his words, he looked at the additional impact of bringing the assessment locations out of the shadow of the buildings. The analysis showed a very significant adverse impact.

Clause 7.1C

500. M+W relies on clause 7.1C of the EPC contract, which provides:

“With regard to noise emissions from the Plant, Drawing T00365-90001 – ‘External Noise Emitters Provisional’ at Schedule 15 (Appendix A) has been based upon the Contractor’s outline design. The Parties acknowledge that following detailed design the location or quantity of plant and equipment may differ from Drawing T00365-90001. The Contractor shall submit details of such deviations to the Purchaser and the Purchaser shall re-run its noise model (the noise model to be re-run shall be based upon the scope of the Contractor’s express obligations

under the Contract as at the date of the Contract and specifically, the external noise emitter data and location plan appended to Schedule 15 (Drawing T00365-90001). In the event that the deviations from Drawing T00365-90001 have a negative impact upon the noise model and additional localised noise attenuation is required the Project Manager shall issue a Variation Order for the addition of such localised noise attenuation measures as are required to the Works or the Plant and the time and cost consequences of such Variation Order shall be determined pursuant to the Contract provided that the maximum addition to the Contract Price shall be £205,000 and the Contractor shall bear any Cost in excess of £205,000.”

ANALYSIS

The expert evidence

501. There were no significant disputes between the experts, but I preferred Mr Stephenson’s evidence. I detected some signs in Mr Clarke’s evidence that he had rather entered the arena. The first subtle sign was when he observed, apparently referring to M+W’s position in this litigation, that “we accept” that the ID fan was noisier than it should have been. More pertinently:
- 501.1 when asked to confirm that the contract required M+W to ensure compliance with the Environmental Permit, he veered off into making a submission about the unsatisfactory position where M+W had been “encouraged to rely” on the planning model from Parsons Brinckerhoff;
 - 501.2 when asked whether he had seen evidence of M+W following a process of acoustic design in accordance with BS15664:2001, he again took the debate back to EWH’s ownership of the planning model and its responsibility to rerun the model; and
 - 501.3 when asked whether once the design had been completed one would then need to develop the noise model, he volunteered his understanding of the parties’ respective contractual obligations.

The discrepancies in the noise receptor sites

502. M+W and Outotec place considerable reliance on the Parsons Brinckerhoff report and on discrepancies between the receptor sites used by Parsons Brinckerhoff and Sol. The point was properly made that buildings can cast a considerable acoustic shadow and that such discrepancies can make real differences to the local levels of noise pollution. Further, both M+W and Outotec cast the issue in respect of off-site noise in terms of compliance with the Parsons Brinckerhoff model.
503. If the exercise before the court were simply to audit actual performance against the Parsons Brinckerhoff model, I would agree that great attention might properly be focused on the precise locations of the noise receptor sites; although Mr Stephenson makes the point that such locations were meant to be representative of the local noise levels. Indeed, that much is clear from paragraph 1.2.2 of Parsons Brinckerhoff’s report. I agree, however, with Mr Dennison that the touchstone for assessing M+W’s liability is not the Parsons Brinckerhoff model but rather the contractor’s performance in preventing noise pollution and adverse impacts. By clause 7.1 and paragraph 1.2 of Schedule 22A, M+W was required to ensure compliance with the Environmental Permit. Unlike Schedule 15, the permit did not impose

clear maximum sound levels but, as is the agency's usual practice, the rather more subjective test of levels that would be "likely to cause pollution ... as perceived by an authorised officer of the Environment Agency." That said, one can anticipate that the officer would follow the guidance in BS4142:2014 that a difference of around +5dB is likely to indicate an adverse impact whereas a difference of around +10dB is likely to indicate a significant adverse impact. Such levels can only then be exceeded where "the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration."

The planning consent

504. It is difficult to identify precisely the effect of Condition 30 of the planning consent. In Trump International Golf Club Scotland Ltd v. Scottish Ministers [2015] UKSC 74, [2016] 1 W.L.R. 85, the issue was the proper approach to construing conditions imposed under s.36 of the Electricity Act 1989. Before turning to the proper approach under the 1989 Act, Lord Hodge observed, at [33]:

"There is a modern tendency in the law to break down the divisions in the rules on the interpretation of different kinds of document, both private and public, and to look for more general rules on how to ascertain the meaning of words. In particular, there has been a harmonisation of the interpretation of contracts, unilateral notices, patents and also testamentary documents ...

Differences in the nature of documents will influence the extent to which the court may look at the factual background to assist interpretation. Thus third parties may have an interest in a public document, such as a planning permission or a consent under s.36 of the 1989 Act, in contrast with many contracts. As a result, the shared knowledge of the applicant for permission and the drafter of the condition does not have the relevance to the process of interpretation that the shared knowledge of parties to a contract, in which there is no third-party interest, has. There is only limited scope for the use of extrinsic material in the interpretation of a public document, such as a planning permission or a s.36 consent: R v. Ashford Borough Council, Ex p Shepway District Council [1999] PLCR 12, per Keene J at pp.19C-20B; Carter Commercial Developments Ltd v. Secretary of State for Transport, Local Government & the Regions [2003] JPL 1048, per Buxton LJ at [13] and Arden LJ at [27]. It is also relevant to the process of interpretation that a failure to comply with a condition in a public law consent may give rise to criminal liability... This calls for clarity and precision in the drafting of conditions."

505. Summarising the approach to construction, Lord Hodge said, at [34]:

"When the court is concerned with the interpretation of words in a condition in a public document such as a s.36 consent, it asks itself what a reasonable reader would understand the words to mean when reading the condition in the context of the other conditions and of the consent as a whole. This is an objective exercise in which the court will have regard to the natural and ordinary meaning of the relevant words, the overall purpose of the consent, any other conditions which cast light on the purpose of the relevant words, and common sense. Whether the court may also look at other documents that are connected with the application for the consent or are referred to in the consent will depend on the circumstances of the case, in

particular the wording of the document that it is interpreting. Other documents may be relevant if they are incorporated into the consent by reference ... or there is an ambiguity in the consent, which can be resolved, for example, by considering the application for consent.”

506. Commenting on earlier cases in which judges had sought to lay down specific principles for the interpretation of planning conditions, Lord Carnwath added, at [53], that he saw dangers in an approach that might lead to the impression that there is a separate set of rules applicable to planning conditions or indeed that the process is one of great complexity.

507. Although the Supreme Court in Trump was not construing the terms of a planning permission, it is plain that the court intended its approach to be of wider application. Indeed, the approach in Trump has since been applied by the Supreme Court in the planning context in Lambeth London Borough Council v. Secretary of State for Housing, Communities & Local Government [2019] UKSC 33, [2019] 1 W.L.R. 4317. In Lambeth, Lord Carnwath observed, at [19], in terms that will be familiar to any contract lawyer:

“In summary, whatever the legal character of the document in question, the starting point – and usually the end point – is to find ‘the natural and ordinary meaning’ of the words there used, viewed in their particular context (statutory or otherwise) and in the light of common sense.”

508. Here, I do not have the benefit of full argument upon the proper construction of the planning consent. Such argument should, in accordance with the authorities cited above, be focused not on the contractual issues between the parties but upon condition 30 within the overall context of the planning consent. Given the paucity of the argument on this issue, I set out my preliminary conclusions in my draft judgment but expressly invited the parties to address me further on the proper construction of condition 30. In the event, no party elected to make further submissions on the construction issue and accordingly I confirm the conclusions that I had reached upon the evidence and argument at trial:

508.1 In my judgment, condition 30 should be construed broadly as an obligation to build and operate the plant so that any noise impact was, in accordance with the Parsons Brinckerhoff model, “below any indication of an adverse impact.”

508.2 Taking that approach together with the publicly available BS4142:2014, I consider that the planning obligation was principally to avoid adverse and substantial adverse impacts, namely a noise differential at any of the noise receptor sites in excess of +5 db(A).

509. In any event, I am satisfied that M+W’s core contractual obligations in respect of noise were to design and build the plant such that the on-site noise complied with the limits in Schedule 15 and the off-site noise was reduced or mitigated so that the plant complied with the Environmental Permit. Furthermore, as already identified at paragraph 498 above, the plant was not constructed in accordance with the Parsons Brinckerhoff model in that, even if its estimates of background noise had been accurate, there would have been a breach of the permit.

Clause 7.1C

510. I do not consider that M+W can rely on clause 7.1C to avoid liability in this case. Such clause was concerned with the position that might arise in the event that M+W's detailed design work involved some change in the "location or quantity of plant." In such circumstances, M+W was to submit such deviations to EWH in order that EWH could in turn re-run the noise model. There is no evidence before me that M+W notified changes in the location or quantity of plant in accordance with clause 7.1C or that the off-site noise issues in this case arose because of such changes. The clause did not apply because the same quantity of plant in the same locations proved to be noisier than anticipated in the model. Accordingly, clause 7.1C is simply not engaged upon the evidence.
511. In any event, clause 7.1C was directed not at absolving M+W from its core obligations to limit or mitigate the levels of on and off-site noise but at allocating the risk between the parties in respect of the cost of any additional noise attenuation measures caused by such deviations in the location or quantity of plant.
512. In my judgment, M+W is not entitled to abdicate all responsibility for noise levels by relying solely on the Parsons Brinckerhoff report:
- 512.1 Clause 3.1A expressly provided that any design provided by the Purchaser should be verified by the Contractor.
- 512.2 Clause 6.2 added:
- "The Purchaser shall not be responsible for (and gives no warranty as to the completeness, accuracy or suitability of) any Documentation or information provided by him or on his behalf (whether before or after the entering into of this Contract ..."

Conclusions

513. EWH asserts that M+W failed to carry out a noise and vibration design study. While there was evidence adduced at trial as to the importance of good acoustic design, that is not the case that M+W must meet. The pleaded case is principally concerned with actual noise levels and not any failure of design. I do not doubt that one important aspect of industrial design is acoustic design, but the ultimate issue is not the quality or otherwise of M+W's design work but whether it breached its contractual obligations in respect of the actual noise levels on and off site. While there is no separately pleaded case that M+W failed to undertake a proper acoustic design, it plainly cannot absolve itself from responsibility for the noise pollution so evident from the significant level of complaints generated from neighbours, the independent assessments of the Environment Agency and the noise surveys undertaken by the various noise consultants in this case.
514. I also accept that the level of on-site noise is relevant also to the case in respect of the off-site noise. There is, as Messrs Clarke and Williams observed, no direct link between the levels of on and off-site noise, but it is equally obvious that the higher the level of noise on site, the greater the likely problem of mitigating measures in order to prevent or reduce the levels of off-site noise pollution.

515. Accordingly, I find that M+W was in breach of contract in failing to ensure that:
- 515.1 the on-site noise levels were within the absolute limits set out in Schedule 15; and
 - 515.2 the plant complied with the Environmental Permit in that emissions were free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator had used appropriate mitigating measures to prevent or where that is not practicable to minimise the noise and vibration.

QUANTUM

516. By its closing submissions, EWH reduced the claim in respect of defect 28 from circa £3.2 million to £1,906,352.85.

Investigation and temporary attenuation costs

517. EWH seeks the following damages in respect of the cost of investigating the noise issues and installing temporary attenuation measures:

	£
Noise surveys (WSP)	4,125.00
Initial diagnostic noise and vibration study (INVC)	11,180.00
Thermal study and investigations (Uniper)	2,672.45
Environment Agency charges	2,459.52
Temporary noise attenuation measures for Air Pollution Control Residue conveyors (IEIS)	5,211.56
Insulation of steam turbine bypass line (Jade)	8,218.74
BOP roof silencers	28,308.73
	£ 62,176.00

518. These claims have been agreed on a figures-as-figures basis by the quantum experts and M+W takes no specific point about these losses in its submissions. I am satisfied that it was essential to undertake these surveys, investigations and temporary mitigation works as a matter of urgency in order to keep the plant operational while a permanent solution could be found and implemented. The measures adopted varied in their effectiveness in reducing the levels of noise pollution but I accept Mr Stephenson's evidence that the steps taken were reasonable.
519. I am satisfied that these losses were caused by M+W's breaches of contract and award the sum claimed of £62,176.

Sol's costs

520. At trial, EWH claims £352,660.25 in respect of Sol's fees, being £313,316.25 in respect of general consultancy services and £39,444 in respect of the Scope A works. The claim is, however, pleaded at £348,419.08 which is therefore the limit of the sum that can be awarded. Such costs and a little more were both invoiced and subsequently agreed by the quantum experts on a figures-as-figures basis. I am satisfied that they were incurred by reason of M+W's breaches of contract and award the pleaded sum of £348,419.08.

Further mitigation works

521. Sol recommended thirty-one permanent mitigation measures which it classified Scope A, B and C. The twenty-five measures listed in Scope A comprised high priority works which Sol advised were essential to resolve the Environment Agency's concerns and therefore avert the risk of suspension of the Environmental Permit. At trial, the bulk of this work had been completed save for various silencers that were still to be procured and installed. By this claim, EWH seeks damages for the cost of implementing the Scope A works. There is no claim for the Scope B or C works. The sums sought in respect of the Scope A works are as follows:

Sol item	Mitigation measure	£
1.	ID fan stack outlet: install rectangular attenuation	246,238.07
2.	ID fan inlet duct: install rectangular attenuation	165,430.99
3.	ID fan motor and casing: construct acoustic enclosure	188,321.08
4.	Airside blower A: construct acoustic enclosure	29,342.06
5.	Airside blower B: construct acoustic enclosure	29,342.06
6.	Airside blower mezzanine floor: provide nominal vibration insulation	346.33
7.	Sky valve: construct acoustic enclosure	6,811.00
8.	Sky valve outlet: provide steam blowoff attenuator	11,118.50
9.	OFA volume control dampers: install acoustic enclosure	31,876.96
10.	Air Pollution Control Residue incline and horizontal conveyors: upgrade conveyors with low-noise nylon types and enclose acoustically	Nil
11.	Fly ash incline and horizontal conveyors: upgrade conveyors with low-noise nylon types and enclose acoustically	Nil
12.	BOP HVAC extract fans: replace existing attenuators	41,455.46

13.	Steam turbine drain tank outlet: provide steam blowoff attenuator	8,349.25
14.	Gland steam bypass vent: provide steam blowoff attenuator	8,349.25
15.	Steam turbine warm-up line: provide steam blowoff attenuator	8,790.05
16.	OFA fan motor and casing: construct acoustic enclosure	88,010.37
17.	OFA fan inlet cowl: install secondary attenuator	13,021.31
18.	OFA fan inlet ductwork: install acoustic attenuator	9,947.00
19.	UFA fan motor and casing: construct acoustic enclosure	8,060.00
20.	UFA fan inlet grille: install secondary attenuator	104,332.91
21.	Steam turbine bypass valve: construct acoustic enclosure	Nil
22.	Turbine bypass ductwork: construct acoustic enclosure	Nil
23.	Vibratory screen: install silencers to all pneumatic blowoffs	1,416.10
24.	Atomising air fan: to be incorporated into UFA fan acoustic enclosure	2,601.90
25.	Vacuum breaker: fit attenuator	5,892.95
		£ 1,009,053.60

522. The EWH and M+W quantum experts agreed the value of the Scope A works in the marginally lower sum of £1,009,048.59. Further, they agreed the sum of £231,070.81 in respect of the additional costs of insulation, scaffolding, electrical, installation and manufacture costs are added. The total claim, as assessed by the quantum experts, is therefore £1,240,119.40.

523. Mr Stephenson says that the logarithmic nature of decibels affects how individual mitigation measures impact the total level of noise at receptor sites. Mitigation measures addressing the most significant noise sources are most effective for noise attenuation. As one works down the list of noise sources, there is something of a law of diminishing returns; although if high cumulative levels of attenuation are required then it may be necessary to implement mitigation measures that individually have little impact. He broadly agrees with the mitigation measures at Scope A. He adds, in the Joint Report:

“Whilst I agree that it would have been desirable to introduce noise control in an even more staged approach, it is my opinion that the heightened sensitivity and

time pressures due to the threat to the permit meant that it was not sensible to wait longer in between installation of each mitigation measure.”

524. Mr Clarke and Mr Williams disagree. They jointly report:

“We consider Scope A to be unreasonably wide in scope, containing twenty-five noise control measures, while Scope B includes five and Scope C includes just one noise control measure. It would seem that the single greatest benefit has come about from installing the ID fan silencer. The majority of complaints reference a jet/helicopter noise which is attributed to the pre-mitigation operation of the ID fan. The noise survey method used by Sol Acoustics in determining the sound emissions from equipment is susceptible to influence from other nearby or dominant noise sources, and it is likely that the noise emissions from some of the middle-ranking noise sources in their noise model are overestimated, leading to noise control where it may not have been necessary.”

525. In his addendum report, Mr Clarke graphically demonstrates both the significant mitigation achieved by attenuation of the ID fan stack outlet and, to a lesser extent, the Air Pollution Control Residue conveyors, but also the limited advantage of the further mitigation measures.

526. There is force in M+W’s complaint that EWH has gold-plated its noise attenuation strategy and that a more sensible approach would have been to focus first on the parts of the plant that were responsible for the most significant noise pollution and then review what further mitigation might be required. Properly analysed, the complaint is one that EWH has failed to mitigate its losses. Accordingly, the burden is on M+W to establish that EWH acted unreasonably in carrying out such works. In my judgment, M+W’s argument runs immediately into two difficulties:

526.1 First, EWH was under significant pressure both from public complaints and the Environment Agency to resolve the situation. Its initial temporary mitigation had not solved the problem and more extensive action was required. Had EWH failed to resolve this issue, it ran the risk of suspension of its Environmental Permit and would very quickly have incurred considerable additional costs by reason of the consequent further delay to achieving Take Over. Indeed, in agreeing that liquidated damages should run at the rate of £84,800 per day, the parties themselves anticipated that delay would cause EWH losses at such rate. I note that the cost of undertaking all of the Scope A works was less than the anticipated loss suffered by 15 days’ delay. Such calculation is an overestimate since there would have to have been some mitigation works in any event to address the noisiest items of plant.

526.2 Secondly, EWH instructed and relied upon competent independent acoustic engineers for advice as to a mitigation strategy. Sol advised that the Scope A works were the works which needed to be completed urgently in order to satisfy the Environment Agency. It is difficult to contend that EWH acted unreasonably by following such professional and expert advice.

527. Therefore, although there is a proper basis for contending that the mitigation measures should have been limited to the attenuation required to the noisiest parts of the plant, I find

that M+W has failed to discharge the burden of proving that EWH acted unreasonably in acting upon Sol's advice. Accordingly, I award EWH damages to cover the cost of the works actually carried out to implement the Scope A recommendations.

Forecast further costs

528. While EWH no longer pursues the estimated costs of the Scope B and Scope C works, it does claim:

528.1 The forecast cost of fitting silencers to the sky valve outlet, the steam turbine drain tank outlet, the gland system bypass vent, the steam turbine warm up line and the vacuum breaker, and the ancillary scaffolding costs, in the sum of £171,397.20.

528.2 The forecast costs of Sol's final verification work in the sum of £80,000.

529. It is one matter to award the cost of remedial works already undertaken and quite another to award the costs of yet further works. I am not satisfied on the evidence that it would be reasonable to carry out these further works without first a proper analysis of the effectiveness of the mitigation already put in place.

530. While there might well be some further costs to be incurred with Sol, there is no proper evidence to support the claim in the sum of £80,000.

Clause 7.1C

531. Relying again on clause 7.1C of the EPC contract, M+W contends that EWH should bear the first £205,000 of the claim for defect 28. I reject that argument since, upon the evidence the need for additional noise attenuation does not arise from changes to the location or quantity of plant.

Conclusions

532. Accordingly, I award EWH the sum of £1,650,714.48 under defect 28:

	£
Investigation costs & temporary attenuation measures	62,176.00
Sol's consultancy fees	348,419.08
Scope A costs	1,240,119.40
	£1,650,714.48

DEFECT 23: SLAGGING

533. Ash that is light enough to be carried upwards by the combustion gases is known as fly ash. When fly ash particles are heated in the gasifier beyond their initial deformation temperature

(their “IDT”), they sinter and then melt. This sticky molten ash then agglomerates to form slag. At sufficiently high temperatures the ash will melt completely and, on cooling, form large, fused masses of slag. While initially the slag will stick to the walls of the gasifier, large lumps fall downwards on to the fluidised bed once it becomes too heavy to support its own weight.

534. The Fuel is fed into the gasifier at Hull through the fuel inlets. It is gasified, rather than combusted, in the fluidised bed to form the syngas. The temperature of the bed is controlled at around 750°C by adjusting the flow of air to the bed. The syngas together with some fly ash rises in the gasifier and is combusted in the vapour space by the injection of overflow air. The temperature at the top of the vapour space is controlled at around 927°C. The overfire air is controlled to maintain the temperature above 850°C and the oxygen levels over 2%.
535. The fundamental design point is that, in order to avoid slagging, one needs to avoid heating the ash beyond its IDT. This is achieved either by controlling the temperature of the vapour space such that it stays safely below the IDT of the ash or by removing the ash before the introduction of overfire air.
536. There is no dispute that the gasifier at Hull creates substantial amounts of slag because the fly ash is heated beyond its IDT. Indeed, Professor Beckmann put it pithily when he said that there was no doubt that there was an unacceptable level of slagging. The principal issue is whether slagging was caused by some design flaw, operator error or because of the characteristics of the Fuel.

BACKGROUND

537. Paragraph 2.2 of Schedule 22A provided:
- “The gasification stream (fuel inlet to stack discharge) shall be designed to be capable throughout its Design Life of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.”
538. The like obligation in the subcontract was not fully aligned with the EPC contract in that section 3.2.1 of Appendix B to the Outotec subcontract provided:
- “The boiler operating campaign life shall be not less than 7,500 hours of operation within normal operating parameters and without requiring a shut-down for manual cleaning.”
539. Paragraph 6.4.5 of Schedule 22B provided:
- “All refractory materials and their means of support shall be designed to achieve a long operating life (as specified in Schedule 10) whilst protecting the tubes from erosion and corrosion and minimising the build-up of slag.”

540. EWH's case is pleaded in Appendix 4 to the Re-Amended Particulars of Claim:

“Nature of Defect

In breach of paragraph 2.2 of Schedule 22A and/or paragraph 6.4.5 of Schedule 22B of the Contract, the design of the gasifier does not allow for stable combustion of fuel. As a result, combustion of fuel while in operation will result in the accumulation of slag, which will likely require manual cleaning before 8,000 hours of operation of the gasification stream has been achieved. This is due to, inter alia, the following issues:

- i) The ongoing and excessive agglomeration of ash, slag and tramp on the bed, shelf and walls of the gasifier due to the inability of the gasifier to maintain stable gasification/combustion temperatures at an appropriate level;
- ii) Blockages of the bed cones caused by falling pieces of slag;
- iii) Damage to the bed thermocouples caused by falling pieces of slag; and/or
- iv) Damage to the syngas probes and protection frame caused by falling pieces of slag.”

541. There is no doubt that excessive slag formed and that the plant was unable to achieve anything like 8,000 hours of operation before needing to shut down for manual cleaning:

541.1 Mr Carlassara and Mr Roberts produce in evidence photographs of slag that was removed from the gasifier on 19 November 2018. Mr Carlassara comments that the discovery of slagging at such an early stage of hot commissioning was alarming. Such observation was well made given that the gasifier was first fired on waste on 10 November 2018. Nevertheless, hot commissioning works soon ended and it was not until after termination that the true extent of the issue became clear.

541.2 Post termination, Outotec gave a presentation entitled “Ash Agglomeration Concerns.” Outotec explained that Ince Park had suffered moderate ash accumulations that had not forced any outages. By contrast, Levensat suffered significant ash accumulations that impacted the operation of the fluidised bed by blocking air nozzles and the bed cleaning system when they fell off the walls. Slag removal was also more difficult at Levensat. The bulk gas velocities at Hull were higher than at Ince Park and similar to the conditions at Levensat. Mr Carlassara concluded that severe slagging was to be expected at Hull.

541.3 Slagging was found in Hull at a shutdown in September 2019 after further very limited operation of the gasifier. More significant slagging was found during a shutdown at Christmas 2019. Pieces of slag had fallen down blocking the bed cone and badly damaging two bed thermocouples. Significant levels of slag and further damage from falling deposits were found in January and March 2020.

541.4 Mr Roberts says that the gasifier has had to be run on a 14 days on, 7 days off cycle so that it can be regularly shut down for manual cleaning and the removal of bed cone blockages. Pieces of slag were sometimes as big as a small vehicle and were removed with jackhammers. He says that lumps of removed slag were so vast that they could form piles 6 metres high which needed to be broken down into 20 kg chunks in order to be removed. He estimates that the amount of slag removed in any clean could vary between 10 and 70 tonnes. Chris Higman says that he

witnessed the removal of about 100 tonnes of slag in January 2021 after a 14-day run.

THE MELTING POINT OF ASH

542. Determining the IDT of ash is difficult. Ash is not a defined material but comprises various mineral components such as silicon, calcium, aluminium, sulphur, sodium and potassium. These elements are often present as sulphates, hydroxides, oxides, silicates and calcium-silicon-aluminium compounds.
543. Uniper identified that the IDT for the slag material and tramp ash was between 1,110-1,190°C. Professor Beckmann (Outotec's expert) confirmed that Uniper used state-of-the-art methodology. All three experts agree that this laboratory test provides a useful indicator of the likely IDT at Hull but cannot yield a precise result:
- 543.1 First, caution is required before assuming that the deformation temperature of slag (being ash that melted, fused and cooled) is the same as the ash itself.
- 543.2 Secondly, Mr Richards (M+W's expert) points to the fact that the ash might well have a significantly lower IDT in reducing conditions (i.e. low oxygen conditions) as opposed to oxidising conditions. He puts the difference at potentially as much as 250°C.
- 543.3 Thirdly, Professor Beckmann cautions that the eutectic effect, whereby different substances combine to form a homogeneous mixture that has a single melting point which is lower than the melting points of the individual constituents, might also be a factor. He says that this is a particular factor at Hull because the levels of chlorine and heavy metals were out of specification.
544. Nevertheless, the Uniper results are within the expected range for fly ash of 1,100-1,400°C. Further, Chris Higman (EWH's expert) calculated the likely IDT of the ash at Hull on the basis of known levels of SiO₂, Al₂O₃ and CaO in the slag. Such prediction supported the measured ash fusion temperatures. Since this temperature was some 160-180°C higher than the design temperature, Mr Higman therefore rules out the possibility that the ash generated by gasifying the Fuel had an unusually low IDT. Neither Mr Richards nor Professor Beckmann rule out such possibility.
545. Professor Beckmann accepted that one could in principle measure the IDT of the ash at Hull but regarded this as a very difficult and expensive investigation. He did not attempt to replicate Mr Higman's calculation and said that it was a very, very complex calculation and would depend on the combination of elements in the ash and, in particular, whether they formed oxides, sulphates or other compounds.

THE TEMPERATURE IN THE VAPOUR SPACE

546. Mr Higman and Mr Richards considered the available computational fluid dynamics ("CFD") modelling:
- 546.1 First, CFD modelling showed temperatures at Ince Park above 1,200°C and up to 1,400°C.

- 546.2 Secondly, Outotec undertook CFD modelling for the Hull plant in August 2017. The report predicted temperatures across the full width of the gasifier between the upper two overfire air nozzles in excess of 1,180°C. This, Mr Higman observes, should have served as a warning to Outotec since, as Mr Gossard confirms, it was aware that RDF ash melting temperatures typically fall between 1,100-1,400°C.
- 546.3 Thirdly, M+W's own CFD modelling in June 2017 and February 2018 predicted even higher temperatures. The June 2017 model predicted temperatures between 1,400-2,000°C with a mass flow average temperature of 1,485°C. The February 2018 model predicted hot spots of 1,100-1,300°C in the vapour space. Further, by a report dated 1 July 2017, Lars Fritz Technology advised M+W upon compliance with the obligations under the European Directive to ensure a flue gas residence time of at least two seconds and a temperature above 850°C. Lars Fritz reported that the CFD modelling showed that the temperature would be too high and advised that this could be controlled by the introduction of recirculated flue gas. This was noted not to be entirely straightforward since such solution would reduce the gas residence time and might take it below two seconds. If that risk materialised, Lars Fritz recommended reducing the load.
547. Professor Beckmann recognised the value of CFD modelling but urged caution since the models had not been validated. While Mr Higman agrees that a degree of tolerance is required when interpreting the CFD models, he points out that both the Outotec and M+W models predicted a hot zone across the gasifier at the same location and temperatures in excess of the expected fusion temperature of ash.
548. All of the experts endorse Lars Fritz's advice to M+W that experienced designers are aware of the difficulty of keeping recycled fuels within specification and that they adopt prudent allowances.

THE QUALITY OF THE FUEL IN 2019-20

549. All of the experts agreed that one cannot expect the same performance from gasifying non-compliant Fuel. Thus far, I have considered the quality of the RDF delivered before termination. In order to understand the reasons for slagging, it is necessary also to consider the evidence as to the quality of the RDF delivered in 2019-20. Professor Beckmann analysed the RDF delivered on twenty-six days between 13 June and 4 November 2019. The analysis is as follows:

Parameter	No. of samples	No. of non-compliant samples	Percentage
Total combustible material	26	5	19.2%
Non-combustible metals	26	10	38.5%
Fines	26	0	0%

RDF size distribution	26	3	11.5%
	26	15	57.7%
Bulk density	26	3	11.5%
Net calorific value	26	0	0%
Ash	26	0	0%
Moisture	26	2	7.7%
Nitrogen	26	1	3.8%
Sulphur	26	0	0%
Chlorine	26	0	0%
Fluorine	26	0	0%
Cd & TI	26	0	0%
Mercury	26	2	7.7%
As, V, Pb, Cr, Co, Cu, Mn, Ni, Sb, Sn & Zn	26	4	15.4%

550. Further, he analysed the Fuel data for forty-two days between 12 July and 31 October 2019:

Parameter	No. of samples	No. of non-compliant samples	Percentage
Total tramp material	42	13	31.0%
Non-combustible metals	42	7	16.7%
Glass tramp material	42	13	31.0%
Fines	42	36	85.7%
Fuel size distribution	42	2	4.8%
	42	0	0%
Bulk density	42	11	26.2%

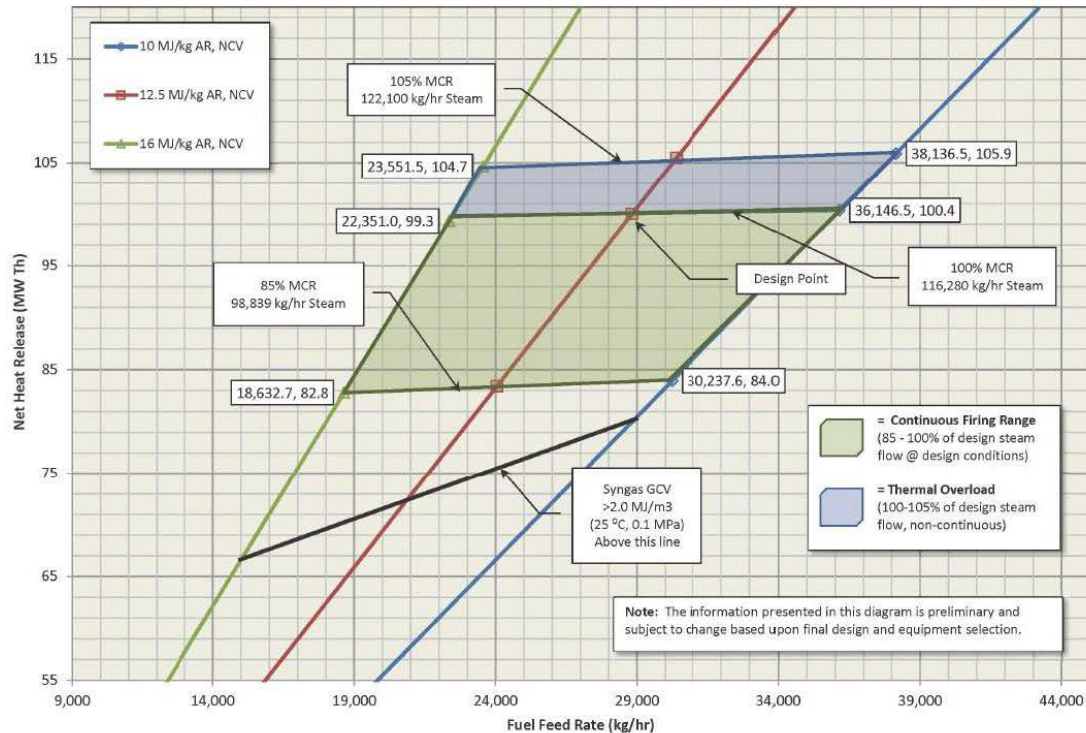
Net calorific value	42	21	50.0%
Bulk energy density	42	4	9.5%
Ash	42	0	0%
Moisture	42	5	7.1%
Nitrogen	42	0	0%
Sulphur	42	0	0%
Chlorine	42	3	7.1%
Fluorine	42	0	0%
Cd & Tl	42	0	0%
Mercury	42	3	7.1%
As, V, Pb, Cr, Co, Cu, Mn, Ni, Sb, Sn & Zn	42	15	35.7%

Fuel quality: fines

551. Mr Higman notes that the level of fines between December 2019 and January 2020 was 20.21% against the contractual specification of 15%. A high fines content is associated with more fly ash rising with the syngas from the bed into the vapour space. Unless, however, the temperatures in the vapour space are high enough to melt the ash, slag will not be formed. At lower temperatures, the fly ash passes harmlessly through the vapour space as dust. Thus, a high fines content does not of itself cause slagging but will - at high temperatures - cause there to be more slag and therefore reduce the time between shutdowns. Mr Richards adds the generic point that smaller particles burn faster and hotter and the level of fines can therefore impact upon combustion temperatures.
552. EWH's obligation in respect of fines extended only to the RDF. Professor Beckmann's analysis revealed no issue with the fines in the RDF but indicated that MPT plant (for which neither EWH nor Outotec were responsible) was creating additional fines through the shredding process and then failing adequately to screen out the excess fines. While a separate issue, the professor also notes that the data, the photographic evidence showing tramp material and wires in the bottom of the gasifier, and the retrofitting of an additional magnetic separator indicated that the MPT plant failed adequately to separate out non-combustible metals.

Fuel quality: net calorific value

553. Professor Beckmann reports that ten of the twenty-one non-compliant Fuel samples had a net calorific value between 16-17 MJ/kg; six between 17-18 MJ/kg and five exceeded 18 MJ/kg. He explains the effect of increased calorific value by identifying that the maximum (or adiabatic) combustion temperature of fuel at 16 MJ/kg is 1,870°C whereas at 18 MJ/kg it is 1,940°C and at 20 MJ/kg it is 1,990°C.
554. There is also a snapshot analysis from RJM International of the Fuel on 16-17 December 2020. RJM recorded a broad spread of results between 13.38-22.16 MJ/kg. That said, these were spot-compliance results and, as already discussed, the obligation was to provide RDF that could be blended to achieve Fuel with a net calorific value of 10-16 MJ/kg. Further data obtained from Jonathan Scroggie for the longer period of 17 July 2019 to 20 August 2020 recorded a range for net calorific value of 8.7-20.6 MJ/kg with an average of 15.9 MJ/kg.
555. RJM commented:
- “Nearly half of the fuel data shows [net calorific value] exceeding the design range for the plant (reflecting the findings of the Site Survey report). The design range assumed for the [flue gas recirculation] installation will need to account for this. The data suggests a design value of 16 MJ/kg, with a range of 12.5-20 MJ/kg would be appropriate for the [flue gas recirculation] retrofit design.”
556. Fuel with a net calorific value in excess of the Fuel specification (10-16 MJ/kg) but with a low bulk density will contain a high proportion of plastics. When gasified, plastics will increase the gross calorific value of the syngas which in turn influences temperatures in the vapour space. Professor Beckmann explains the impact of a high level of plastics at paragraph 12.1 of his report:
- “Calorific volatile matter (plastics), rapidly released from the fuel bed contributes to the corresponding reactions to the heat release in the combustion zone. This means that with an increasing calorific value (exceeding the specification), the amount of high calorific value volatile components increases, these are rapidly released from the fuel (bed) and enter the combustion zone where the energy is released, contributing to a corresponding temperature increase.”
557. Mr Higman agrees that gasifying volatile plastics with a high net calorific value will increase the gross calorific value of the syngas and lead to higher temperatures in the vapour space. That said, he observes that the effects of feeding such Fuel can be controlled simply by reducing the fuel-feed rate, as demonstrated by the Firing Diagram:



558. Mr Higman therefore concludes that while Fuel with a high net calorific value might require the operator to reduce the throughput, it should not cause slagging or a shutdown. On circulation of the draft judgment, EWH directed my attention to paragraphs 35-38 of Mr Higman’s reply report. I already had this evidence in mind in my observation about Mr Higman’s evidence as to reduced throughput. For completeness, Mr Higman added, at paragraph 37:

“In fact the Outotec Control Philosophy allows for such a load reduction automatically since the rotational speed of the feed plug screws can be controlled by the steam production (although so far as I am aware this particular loop has not yet been taken into service).”

Thus, Outotec’s design meant that the required reduction in load was capable of automation, although Mr Higman’s evidence is that he was not aware whether such automation had been commissioned.

559. Further Mr Higman notes that the minimum gross calorific value of the syngas was given at Table 17.2 of Schedule 17 to the Outotec subcontract as 2 MJ/Nm³. Mr Gossard noted in his evidence values of 3-5 MJ/Nm³. In January 2021, there was a peak value of 3.9 MJ/Nm³ with an average of 2.5 MJ/Nm³. These were not out of the ordinary and remained within the range that should have been expected by Outotec. Mr Richards confirms that he would have expected Outotec to design the plant on the basis that the minimum gross calorific value might well be exceeded. Professor Beckmann explains that it made no sense to include a maximum value since that could not be controlled.

THE EXPERTS' CONCLUSIONS

560. Mr Higman concludes that there was a fundamental flaw in the design of the gasifier which led to poor mixing of the overfire air and syngas in the vapour space and caused excessive local temperatures. He said that there was no control of temperatures local to the overfire air injection ports such that while the temperature at the top of the gasifier was controlled at 927°C, the temperature local to the ports could be 1,200°C or more. He adds that the gasifier at Hull did not incorporate a cyclone which is used in some gasifiers to recycle solids before introducing overfire air. This, he says, is a proven method of avoiding slagging where very high temperatures are expected.
561. When, however, Mr Higman was asked to focus on the contractual obligations it was less clear that he supported EWH's case:
- 561.1 Mr Higman was cross-examined by Mr Williamson about Outotec's own obligation at paragraph 3.2.1 of Appendix B to the Outotec subcontract, which provided:
- “The boiler operating campaign life shall be not less than 7,500 hours of operation within normal operating parameters and without requiring a shut-down for manual cleaning.”
- 561.2 Mr Higman agreed that the “normal operating parameters” referred to firing the gasifier with compliant Fuel in accordance with the Firing Diagram. While matters of contractual construction are for me, his own construction of the expression is important to understanding his subsequent answer in cross-examination. In fact, Mr Higman was right to make such concession at least in respect of the net calorific value of the Fuel and the firing diagram. Indeed, paragraph 1.3.3 of Appendix B to the subcontract repeated the familiar requirement that the net calorific value should be between 10-16 MJ/kg and added that the consequence of exceeding such limit would be that the Fuel would lie outside the firing diagram for which operations are guaranteed.
- 561.3 Mr Higman accepted in cross-examination that while the net calorific value of the Fuel had “sometimes” been below 16 MJ/kg, that had not occurred “very often.” On a spot-compliance basis, he noted 70 occasions out of 112 when the net calorific value had exceeded 16 MJ/kg. The highest daily average was 19.963 MJ/kg while the average daily average was 16.653 MJ/kg.
- 561.4 Mr Higman was then asked the ultimate question that arises on the third-party claim:
- “Mr Williamson KC: Is it your opinion that the boiler operating campaign life is less than 7,500 hours within normal operating parameters?”
- Mr Higman: At this present time, that's not really determinable.”
562. Mr Richards observes that the court does not have any design analysis to show how Outotec sought to address the risks of slagging. He agrees that the design team should have been alerted to the risk of high temperatures. Mr Richards says that the root cause of the slagging was the lack of control of the oxygen content to the overfire air supply. He attributes the air supply issues to the high net calorific value of the Fuel which increased the plant's oxygen

demand beyond the design level. This, he says, was in turn caused by the delivery of non-compliant RDF. He reports, at paragraph 2033 of his report:

“The consequence of all these impacts of non-compliant RDF and Fuel indicate to me that it would have been near impossible for M+W to demonstrate compliance with Schedule 22A section 2.2 that required a minimum operation time of 8,000 hours between a shutdown for cleaning.”

563. If that is right it would seem to be a complete answer also to M+W’s claim against Outotec. Mr Richards reports, however, that Outotec was in breach of the subcontract in that the gasifier control system was unable to account for changes in the fuel quality before combustion.

564. In his reply report, Mr Richards says that the poor mixing of overfire air and syngas would be less of an issue if the oxygen content were controlled by flue gas recirculation. He adds that the CFD modelling showed that the combustion chamber temperature was not uniform and that there would be local high temperatures changing dynamically over space and time. He says that the modelling also showed that the geometry of the gasifier was a contributory factor to the inability to meet the maximum inlet temperature. Mr Richards concludes that the large quantity of slag formed was due to both high temperatures and a reduced ash fusion temperature.

565. Professor Beckmann says that fuel quality is one of the most important parameters and that deviation from the fuel specification can have significant consequences. He reports, at paragraph 8.8:

“Certainly, a technical plant such as the gasifier in Hull will not experience significant difficulties because of a slight excess of one value, but the excess of several values, and among them some with significant deviations, will lead to performance losses and problems in operation ...”

566. Professor Beckmann concludes that the principal cause of slagging was the quality of the Fuel. He explains how non-compliant Fuel sets off a domino effect ultimately leading to overheating in the vapour space and the formation of slag and concludes that flue gas recirculation was required because the Fuel was out of specification.

ANALYSIS

567. Slagging is caused by allowing the gasifier to run too hot such that fly ash reaches its IDT. The sticky molten ash fuses and adheres to the gasifier walls. Once it becomes too heavy to support its own weight, it falls to the gasifier bed impeding performance and sometimes causing damage. I accept the clear evidence before the court that slagging has been a major problem at Hull and that the gasifier has had to be operated for a maximum run of 14 days before having to be shut down for 7 days for deslagging.

568. This is not an issue as to the choice of refractory materials or their means of support. Accordingly, the relevant contractual obligation is paragraph 2.2 of Schedule 22A of the

EPC contract that the gasifier would be designed to be capable “of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.” Two things are clear from the evidence:

- 568.1 First, the gasifier has not in fact proved capable under the actual operating conditions at Hull of anything like 8,000 hours of continuous operation.
- 568.2 Secondly, the consistently high net calorific value of the Fuel processed through the gasifier has meant that it has rarely been operated in accordance with the Firing Diagram which provided for firing with Fuel with a net calorific value between 10-16 MJ/kg.
569. Accordingly, the historical performance of the gasifier when fed with more calorific Fuel does not of itself assist with the question of whether it was capable of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours. That issue requires me to grapple with the expert evidence of Messrs Higman and Richards and Professor Beckmann. While all three experts were helpful, I was particularly impressed by the professor’s enormous academic and industrial experience and by the clarity of his written and oral analysis of the issues posed by the evidence.
570. I accept Professor Beckmann’s evidence that unvalidated CFD models should be treated with caution. That said, I observe that the CFD models for both Ince and Hull consistently predicted very high temperatures. Furthermore, as Mr Higman notes, each of the CFD models for Hull predicted temperatures in the vapour space at or in excess of the typical IDT of ash. Whatever the temperature in the vapour space would be when combusting compliant Fuel, it is clear that the temperatures will have been elevated by combusting volatile plastics with a net calorific value in excess of 16 MJ/kg.
571. While the Uniper report and Mr Higman’s own analysis are each useful in seeking to estimate the IDT of the ash at Hull, I accept Professor Beckmann’s evidence that one cannot reliably estimate the IDT from either laboratory analysis of the fused slag or mathematically from the chemical composition of the slag. Furthermore, I accept that the actual IDT of the ash at Hull will be further affected by the presence of both reducing and oxidising conditions and the eutectic effect.
572. One cannot therefore be definitive as to either the likely operating temperature in the vapour space when gasifying compliant Fuel or as to the IDT of the ash at Hull. Nevertheless, I was initially attracted to the proposition that the CFD modelling and the analytical evidence in respect of the ash might provide sufficient evidence that there was a fundamental design flaw in that, even if fed compliant Fuel, the gasifier would simply run too hot such that slagging would result. Ultimately, however, that analysis is not supported even by Mr Higman’s evidence (see his answers to Mr Williamson’s cross-examination at paragraph 561 above). If Mr Higman, despite his expertise in these matters and careful analysis, is unable to determine whether the gasifier was capable of being operated for 7,500 hours within normal operating parameters then there is no proper basis upon which the court can find breach of Outotec’s performance guarantee. Furthermore, if that cannot be determined upon the evidence before the court, then there is likewise no basis on which I can determine on EWH’s claim against M+W that the gasifier was not capable of maintaining full-load

operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.

573. In any event, I accept that the consistently high net calorific value of the Fuel was at least a substantial cause of slagging. Accordingly, EWH has failed to prove on the balance of probabilities that the plant was incapable of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.

574. On circulation of the draft judgment, EWH invited me to reconsider these findings. It queried whether I had overlooked paragraph 1.4.3 of Schedule 22A to the EPC contract, which provided:

“The Contractor is responsible for providing the Fuel to the gasifier in accordance with Table 22A.2.3 provided that the incoming RDF is in accordance with Table 22A.2.0.”

575. I already had such point well in mind. Indeed, I have explained M+W’s obligations under paragraph 1.4.3 at paragraphs 61 and 68.1 above. Such provision does not, however, cause me to revisit my conclusions on defect 23:

575.1 First, the focus must be upon the alleged breach. The complaint under defect 23 is not that M+W was in breach of its obligation under paragraph 1.4.3 of Schedule 22A to provide compliant Fuel to the gasifier but that the gasifier was not capable of maintaining full-load operation in accordance with the Firing Diagram (which, I interpolate, means among other things with Fuel with a net calorific value of between 10-16 MJ/kg) for a minimum of 8,000 hours without the need to shut down for manual cleaning. Seeking to blame M+W for the net calorific value of the Fuel does not assist in proving such allegation.

575.2 Secondly, it was EWH’s obligation to supply RDF that not only met the RDF specification (and in particular a net calorific value of 8-20 MJ/kg), but which was also capable after blending of meeting the stricter Fuel specification for a net calorific value of 10-16 MJ/kg: see section 3.6(3) of Schedule 3 to the EPC contract and paragraphs 46, 57 and 68.4 above.

CAUSATION & QUANTUM

576. Given the value of defect 23 and its potential importance to the termination claims, I have nevertheless considered the evidence and arguments on causation and quantum lest I am wrong in my principal conclusions. Defect 23 is a good example of the way in which EWH has sought to move the goalposts on quantum. Its Re-Amended Appendix 4 was pleaded one month before trial and sought damages of £3,096,199.28 in respect of defect 23. By its opening submissions, and without any attempt to amend Appendix 4, EWH asserted a claim of £3,124,042.17. By EWH’s closing submissions, it breezily asserts that the claim now stands at £3,583,746.68 following the fourth joint statement of the quantum experts. It doesn’t. The claim remains that pleaded in Appendix 4 to the Re-Amended Particulars of Claim.

Cleaning costs

577. The first and obvious consequence of slagging is that the plant has had to be repeatedly cleaned and deslagged. By its closing submissions, EWH seeks to recover £516,129.96 under this head on the basis that such costs have been agreed by the quantum experts, Ms Nash and Mr Gordon, on a figures-as-figures basis. That is as may be, but the pleadings are the definitive statement of the losses claimed and I therefore limit the claim for cleaning costs to the pleaded sum of £101,711.34. Once the claim is so limited, there is no merit in M+W's argument that some cleaning costs would have been incurred in any event. Further, paragraph 2.2 of Schedule 22A required M+W to design the plant to operate on the basis of a single 14-day annual shutdown.
578. Had I found defect 23 to have been proved, I would therefore have awarded £101,711.34 under this head.

CoMate system

579. The quantum experts have agreed that EWH has incurred costs of £8,631.36 in respect of the pipework and connections required to operate the CoMate Ash Modifier system and £30,618.36 in respect of the costs of supply of the additive itself.
580. The defect experts are sceptical as to the utility of trying an additive such CoMate:
- 580.1 Professor Beckmann says that the use of the CoMate additive was always going to fail to prevent slagging given that the fuel was so significantly out of specification.
- 580.2 Mr Richards says that the use of CoMate was entirely unproven at the temperatures being experienced at Hull. He adds that no competent designer would have implemented the CoMate solution until the cause of the high temperatures had been rectified. He describes the CoMate proposal as entirely experimental.
- 580.3 Mr Higman is also sceptical of the use of additives such as CoMate.
- 580.4 Furthermore, in a May 2020 letter from the suppliers of CoMate, Atlantic Combustion Technologies Inc., Mr Digdon cautioned:

“Presently, the temperatures in the OFA zone are higher than ideal, approaching averages of almost 1,300°C at the second OFA level. Some of the CoMate itself will start to become slag as temperatures begin to go higher than this. As we have not previously added CoMate to a furnace with temperatures quite as high as those at EWH, we cannot predict how much of the CoMate may become molten itself. There is a possibility that enough of the CoMate will remain in its activated form and render deposits more friable and less sticky. This will require some experimentation on the unit at EWH. In addition, we are beginning to do some of our own testing in house to see what we can learn that may be of help.

We maintain that the ideal would be to get the OFA temperatures lower, and based on your engineering team's assessment, it appears the best route to do that is via furnace gas recirculation. This would likely set up the most ideal situation for applying CoMate, and one in which EWH will be able to enjoy much longer operating cycles.”

581. Against that, the claim for CoMate is under £40,000 and a mere fraction of the cost of the very expensive flue gas recirculation solution. Furthermore, it was Mr Roberts' evidence that he had personal experience of the use of CoMate at Ince. While it did not solve the problem, he confirmed that it led to some improvements in performance and made the slag softer and easier to clean.
582. In my judgment, M+W has failed to prove that EWH acted unreasonably in seeking to control the substantial slagging problem by the relatively inexpensive use of the CoMate. Had I found defect 23 to be proved, I would therefore have awarded £38,631.36 under this head; being the cost of the pipework and the pleaded sum of £30,000 in respect of the cost of the additive.

Flue-gas recirculation

583. It is common ground that the appropriate long-term solution to the slagging problem was the installation of a flue-gas recirculation system. Flue-gas recirculation works to reduce temperatures because the flue gas has a low concentration of oxygen. The flue gas is mixed with air to obtain better and rather finer control over oxygen levels.
584. The pleaded claim is for £248,164.57 for the initial engineering works and air ingress survey and estimated future costs of £2,674,938.86. The quantum experts have agreed that EWH has incurred actual costs of the initial works in excess of the pleaded amount. They have also agreed incurred costs of £2,447,774 in respect of the implementation of the flue-gas recirculation solution.
585. The quantum experts have been unable to identify any evidence in support of the further claims for modifications to the existing steelwork (£50,000); modifications to the switchgear (£20,000); the new control system (£50,000); the utility supplies to RJM's cabins (£10,000); or the contingency allowance (£87,047.27). In the absence of any supporting expert evidence, EWH falls back on paragraph 25.2 of Mr Read's third witness statement. Such statement simply lists these claims without any additional detail. In view of the lack of any other evidence to support these claims and the quantum experts' view that there was insufficient evidence before them to support these claims, I find that EWH has failed to prove such claims on the balance of probabilities.
586. Accordingly, had I found for EWH upon defect 23, I would have awarded £2,695,938.57 in respect of the flue-gas recirculation solution.

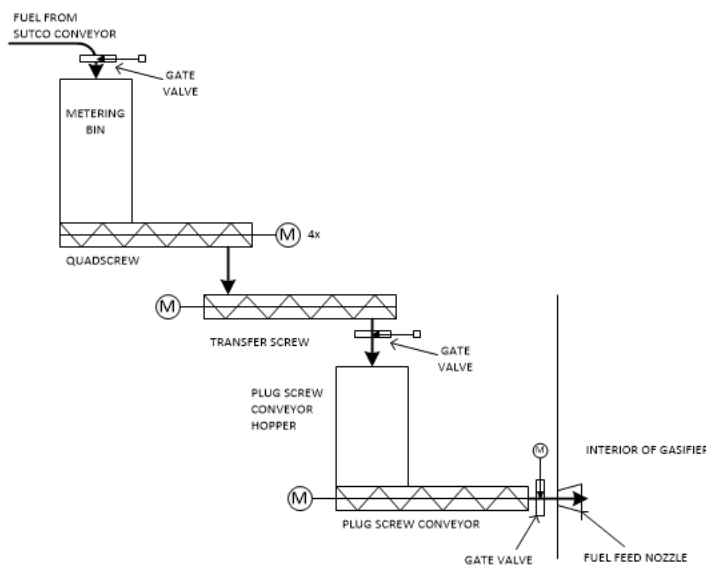
Summary

587. Thus, had liability been established, I would have awarded £2,836,281.27 for defect 23:

Defect 23	Award if liability had been established (£)
Cleaning costs	101,711.34
CoMate	38,631.36
Flue-gas recirculation	2,695,938.57
	£ 2,836,281.27

DEFECT 17: THE FUEL-FEED SYSTEM

588. The purpose of the fuel-feed system is to supply a continuous and controlled supply of Fuel to the gasifier. The Fuel is delivered from a holding bunker via a conveyor to one of four fuel-feed lines. The Fuel is delivered first to metering bins which provide sufficient Fuel to operate the gasifier for 20-25 minutes. Fuel is fed on demand from the metering bins via the four counter-rotating metering, or quad, screws, through a chute and into the fuel-transfer screws to the plug screw conveyor hoppers. These hoppers hold sufficient Fuel to operate the gasifier for 4-5 minutes. The Fuel is then fed into the gasifier by the four plug screw conveyors. It is discharged through a water-cooled fuel feed nozzle that forms a fuel plug to prevent the ingress of air. The arrangement is shown diagrammatically below:



589. Paragraph 6.4.2 of Schedule 22B provided:

“Each fuel feed line shall be automatically controlled to allow the fuel feed rate to be adjusted to each line independently. The whole system shall be integrated so that the fuel flow throughout each system is controlled to prevent build ups ...

The Contractor shall include for sufficient equipment, and describe the methods adopted, to ensure consistency of feed to the bed in order to minimise the fluctuations in combustion conditions.

Sufficient fuel distribution points shall be provided to ensure that relatively even gasification and temperatures are achieved across the bed.”

THE ALLEGATIONS

590. EWH’s pleaded case is set out in Appendix 4 to the Re-Amended Particulars of Claim. It merits recitation in full:

“Nature of Defect

M+W failed to provide a fuel feed system that complied with paragraph 6.4.2 of Schedule 22B. Specifically, the system provided by M+W failed to prevent build ups and failed to prevent even gasification and temperatures across the bed. In particular:

- i) In breach of paragraph 6.4.3 of Schedule 22B of the Contract, M+W has failed to install functional metering bin switches. The contractor engaged by EWH after termination of the Contract has been required to re-configure the metering bin switches in order to allow sustained hot commissioning to proceed.
- ii) In breach of paragraph 6.4.3 of Schedule 22B of the Contract, M+W did not position the feeder screw bin level transmitters in locations that allow the transmitters to provide reliable readings. As a result, the fuel feed system is not functional without remedial work to the transmitters.
- iii) In breach of paragraph 6.4.3 of Schedule 22B and/or clause 3.2 of the Contract, the quad screw welds on the upper feed bin are defective. Upon investigation, these quad screw welds were found to have cracks of various depths and sizes.
- iv) In breach of paragraph 6.4.3 of Schedule 22B and/or clause 3.2 of the Contract, moisture damage has been found in the four metering bin motor gear boxes. This was due to water ingress through the breather.
- v) In breach of paragraph 6.4.3 of Schedule 22B and/or clause 3.2 of the Contract the quad screws are defective as they were found to be shearing.

M+W carried out modification works on the fuel feed system between November 2018 and around February 2019, although the works carried out by M+W were not sufficient to enable sustained hot commissioning to proceed.

M+W has therefore been well aware of the defective design and/or installation of the fuel feed system, and it is also aware of the ineffectiveness of the modifications works carried out in 2018 and 2019. In particular:

- i) M+W issued Defect Notices to Outotec on 23 November 2018 and 26 November 2018, which recorded the ongoing issues and outages despite Outotec’s previous attempts to modify the fuel feed system.
- ii) Further, M+W’s letter dated 7 January 2019 recorded Outotec’s delay in completing its modification works to the fuel feed system and in providing the revised design details for the air cannons and the electrical design.

In the event, notwithstanding the modifications to the fuel feed system in 2018 and 2019, M+W failed to proceed with sustained hot commissioning as a matter of fact, and the design and/or installation of the fuel feed system remained defective as at the date of M+W's termination.

As a result of the trips and outages of the plant caused by this defect, the gasifier has been rendered unavailable with consequential delays to the commissioning and testing activities.”

591. There appear to be two typographical errors in this formulation:
- 591.1 First, and most obviously, the contractual requirement was of course to achieve relatively even gasification and temperatures across the bed, and not the converse. Such error has not, however, caused any confusion and was noted by Mr Higman, Mr Wakefield and Professor Fottner in their joint report.
- 591.2 Secondly, the references to paragraph 6.4.3 appear to be in error since that paragraph is concerned with the fluidised bed gasifier and not with the fuel-feed system. Consistently with the opening words of the pleading, I take it that the pleaded breaches are intended to be of paragraph 6.4.2.
592. The natural reading of EWH's case is that M+W was in breach of contract in the five respects identified in the first set of numbered points, and that such position persisted at the date of termination despite the modifications undertaken between November 2018 and February 2019. It will be noted that there is no plea that the fuel-feed system was defective in that there were fundamental flaws in the geometry of the plug screw conveyor. While it is right to record that Appendix 4 goes on to claim the cost of remedial works that included the design, procurement, installation and commissioning of four new mass flow feed screws, those are particulars of the alleged remedial costs and not of the alleged breaches of contract said to constitute defect 17.
593. This is not, however the case that EWH advanced at trial:
- 593.1 EWH's written opening asserted:
- “For the purpose of Defect 17, the crux of EWH's claim is based on the damaged quad screws and gearboxes in the metering bin at the top and, above all, the defective design of the plug screw conveyor at the bottom (as supplied by Thomas & Muller Systems Ltd) which has resulted in significant bridging and blockages and disrupted the flow of fuel into the gasifier.”
- 593.2 Defect 17 is covered in detail over 26 pages of Appendix 1 to EWH's closing submissions. EWH sets out its case on liability between paragraphs 67 and 69. It focuses on the geometry of the plug screws which was said to be “the predominant cause of the persistent and severe bridging and blockages at Hull.” The analysis presents no argument whatever in support of the five pleaded breaches, although they are touched on in a later section dealing with the remedial costs.
594. M+W sought further information as to EWH's case under defect 17. EWH draws my attention to the following responses provided on 3 April 2020:

“16.1(i) At all material times, M+W and/or Outotec (as the specialist designer-contractors under the Contract) were responsible for ensuring that the design and installation of the fuel feed system fully complied with all relevant requirements of the Contract. Therefore, the details of a proper and contractually compliant design for the fuel feed system are matters strictly within the knowledge and experience of M+W and/or Outotec ...

16.3 Without prejudice to the foregoing and without intending to be exhaustive, EWH maintains that M+W and/or Outotec were under a contractual obligation at all material times to design and install the fuel feed system in a manner which complies with, amongst other things, paragraph 6.4.2 of Schedule 22B of the Contract, such that the system is able to ensure consistency of feed to the bed in order to minimise fluctuations in combustion conditions.”

595. In my judgment, this Further Information does not assist EWH:

595.1 Response 16.1(i) simply identifies who was contractually responsible for the design and installation of the fuel feed system and asserts that the details of what was required was within M+W and Outotec’s knowledge and experience.

595.2 Response 16.3 simply repeats the contractual obligation at paragraph 6.4.2 of Schedule 22B.

595.3 Neither response purports to give any further particulars of the alleged breaches of such obligation.

596. Accordingly, M+W and Outotec are right to submit that the pleaded breaches bear very little relationship to the case now advanced. While I acknowledge that there is substantial evidence and argument before me as to, in particular, the need for major modifications to the plug screw conveyor, it is not now open to EWH to seek to establish defect 17 on the basis of the unpleaded case advanced at trial. (See the discussion at paragraphs 26-29 above.)

597. Before turning to the individual pleaded allegations, it is common ground between the experts that, while the fuel-feed system contained all of the elements and components to make it capable of providing a continuous and steady flow of material to the gasifier, such components required “significant rectification in order to secure operational safety and robustness.” The principal issue is whether, as Chris Higman (EWH’s expert) asserts, the fuel-feed system was defective or whether, as David Wakefield (M+W’s expert) and Professor Johannes Fottner (Outotec’s expert) respond, these issues were within the scope of the commissioning process.

598. EWH submits that in many ways it matters little whether one characterises the issues (to take a neutral term) with the fuel-feed system as defects or matters to be resolved during commissioning:

598.1 In so far as the court is considering the critical path in order to determine M+W’s claims for extensions of time, the fact that works were required to the gasifier is the critical matter whether they are viewed as remedial or commissioning works.

598.2 Likewise, after termination, EWH contends that it is entitled to its reasonable costs of completing the works whether the works were defective or simply incomplete.

599. Both points are well made. As to the second, although the draftsmen used the shorthand “defect”, just as all parties have in this trial, the actual allegation pleaded at paragraph 78 of the Particulars of Claim is that, in breach of contract, M+W “failed to carry out and complete the works in accordance with the terms of the contract.”

METERING BIN SWITCHES AND BIN LEVEL TRANSMITTERS

600. The experts agreed:

Metering bin switches

“The level detector is not capable of distinguishing between moving material (normal operation) and static material (when bridging takes place). It can only detect the presence or absence of material. Issues with the level detector are a symptom or result of bridging, which was the main non-functionality not a cause of it.

Note that M+W moved the sensor at Outotec’s request before first fire.”

Feeder screw bin level transmitters

“If the material is bridging and the sensor is positioned in the bridge void THEN the sensor would not detect material. Positioning of sensors is dependent upon material flow properties and feed bin design i.e. it is a symptom not a cause. Basically, there is nothing wrong with the sensors.”

601. Professor Fottner added that the repositioning of sensors is a normal process during commissioning. While I do not accept that more significant work such as changing the geometry of the plug screw conveyor can properly be described as commissioning, I accept Professor Fottner’s evidence that the repositioning of sensors is a matter of commissioning. As already noted, EWH’s case extends, however, to an alleged failure to complete the works.

602. While there is no evidence that the sensors were defective or indeed that they were the cause of any bridging in the hoppers, there is evidence that this work was incomplete:

602.1 Mr Higman reports that the reinstallation of the switches was necessary.

602.2 Mr Wakefield observes that this work might not have been necessary but refers to it being part of the problem of incomplete commissioning.

602.3 Professor Fottner does not appear to disagree and simply reports that this type of adjustment is part of the ordinary commissioning process.

QUAD SCREWS

603. There is no doubt that the quad screws cracked and sheared. The issue is the cause of such defects. The experts agreed:

“There is no evidence to evaluate whether this failure was due to a design/manufacturing issue or caused by out-of-spec (i.e. oversize) Fuel.”

604. Mr Higman observes, however:

“If there had been material slipping from the MPT sufficient to block the quad screws then one would have expected that to have been observed and noted in the damage report. This was not the case, so the conclusion is that outsize items in the fuel were not the cause of the failure.

In any case the quad screws should have been fitted with torque-limiting switches (with time delay for start-up under load if necessary) to prevent self-destruction.”

605. Mr Wakefield disagrees and asserts that mechanical damage was most likely to have been caused by “fundamentals associated with shape and speed of screws rather than poor workmanship.” He adds that it is likely that mechanical damage was a “function of screw pitch, screw speed and ‘stringiness’ of the RDF fuel.” Such combination is, he says, capable of shearing flights. Professor Fottner agrees with Mr Wakefield and adds:

“As the torque of such screws is significantly increased by tramp material, causing blockages between screw and housing, but this tramp material was according to the contract not possible because of the mechanical pre-treatment, this seems not to be necessary. In several applications, it is common use not to have torque limiters in order to allow extremely high torques in case of restarting after emergency stop. If the screws are controlled by frequency inverters, the electric current and thus the torque can be limited without the use of mechanical torque limiters.”

606. While the experts could not rule out damage being caused by oversized Fuel, the sampling and testing did not identify an issue with oversized RDF. Nor is there evidence that the MPT plant failed properly to shred the RDF and thereby further reduce the size of the processed RDF that constituted the Fuel that would have been fed through these quad screws. Accordingly, I accept that on the balance of probabilities that the defects were caused either by manufacturing issues or by design issues. It is unnecessary to determine which and the claim is therefore made out.

GEARBOXES

607. All three experts agreed that moisture damage was found in the four metering bin motor gearboxes and that the problem arose because of water ingress through the breather. Professor Fottner observes that there is evidence that the breathers of the housings were not working properly.

608. The evidence is thin on this issue but on the balance of probabilities I find that the breathers were either defective or poorly installed such that they did not prevent water ingress to the gearboxes.

CAUSATION & QUANTUM

609. It is, as M+W and Outotec have properly submitted, difficult to correlate the pleaded case on liability in respect of defect 17 with the claimed remedial works and quantum. The claim is pleaded on the basis of two rounds of remedial works:
- 609.1 Initially, it was pleaded that:
- a) new feed bin level transmitters and metering bin switches were installed in June/July 2019;
 - b) a metering bin deflector plate was installed, adjusted and modified in October/November 2019; and
 - c) modifications to the fuel feed system were made in late 2019 and early 2020 followed by a period of testing.
- 609.2 It was then pleaded that further works would be carried out in September 2020, comprising the design, procurement, installation and commissioning of:
- a) four new mass flow feed screws;
 - b) four new gearboxes with 37kW motors capable of operating at higher revolutions per minute; and
 - c) four new rotary seal valves including motors, sensors and flange adapter assemblies to reduce air ingress; and
 - d) associated instrumentation, electrical equipment and works.
610. Much of this pleaded claim relates to remedial works that were not, on the evidence before me, caused by the failure properly to install and position bin switches and level transmitters; the defective quad screws; or the moisture damage to the gearboxes. Indeed, I cannot find any reference to quad screws in the joint statement of the quantum experts on defect 17. Nor is it possible easily to strip out the costs of remedying the moisture issue from the no doubt rather larger cost of replacing the motors that it is said were wrongly designed for a 60 Hz supply.
611. It is possible to identify agreed costs of £1,423.86 that were clearly referable to defects 17(i)-(ii), and I award that sum. I invite the parties to lodge further written submissions identifying with precision the evidence already before the court as to any further loss that arises solely from the breaches pleaded at defects 17(i)-(v).

DEFECT 26: DEMINERALISED WATER PLANT

THE CLAIM

612. Excessive levels of salts in the water supply can cause scaling in the boiler and pipework which is detrimental to performance and can ultimately cause damage to the plant. Furthermore, acidity can lead to corrosion. Accordingly, a reliable and effective demineralised water supply is essential for any steam generation plant. M+W was therefore required to supply a demineralisation plant in order to reduce the hardness of the town's potable water supply.

613. By paragraph 13.3.1 of Schedule 22B to the EPC contract, the design specification provided:

“The demineralisation plant shall be designed to satisfy the main functional requirements, which include the following: ...

(2) A demineralisation system capacity to operate the Plant continuously at MCR with maximum water consumption with only one demineralisation stream in operation ...

(7) Each stream shall be of at least 5 m³/hr (net) capacity ...

The demineralised water system shall supply the water/steam system directly and shall be automatically controlled to maintain the water level in the system.

A control panel shall be provided which shall indicate the status of all of the equipment within the water treatment facility.

The demineralisation plant shall be designed for full automatic operation.”

614. Further, paragraph 13.3.5 provided:

“The demineralised water plant shall be dimensioned to allow for all continuous operation with all consumers operating at peak demand.”

615. EWH pleads, at Appendix 4 to the Particulars of Claim:

“In the premises, the demineralised water plant as supplied, installed and commissioned by M+W prior to the termination of the Contract is therefore defective in that:

a) In breach of clause 3.2, clause 3.4 and/or paragraph 13.3.1 of Schedule 22B of the Contract, defects in the controls system and/or the demineralised water plant generally have resulted in frequent trips and outages of the demineralised water plant when attempts were made to fill it; and/or

b) In breach of clause 3.4, paragraph 13.3.1 and/or paragraph 13.3.5 of Schedule 22B of the Contract, the demineralised water plant as designed and installed by M+W does not achieve the specified functional capacity of 5 m³/hour per stream (either at all or with adequate availability) and/or does not otherwise sufficiently soften the water supply to a level which is compatible with the operation of the plant.

Further, in breach of clause 3.4 of the Contract, there were errors and/or deficiencies in the design of the demineralised water plant, such that the necessary remedial solution will probably involve softening the water supplied (for instance, by means of a water softening plant) before further processing.”

THE EVIDENCE

616. Mark Roberts says that the streams of demineralised water did not flow consistently or continuously. He estimates that the water went offline every 25-30 minutes. Furthermore, the water stream went offline every eight hours as it needed to regenerate and would then be down for some 1-2 hours. Rather than one stream going offline at a time, both would be unavailable at the same time. Mr Roberts calculates that the demineralised water supply was unavailable for up to 25% of each 24-hour period. Further, Mr Roberts says that analysis of

the two streams showed that stream 1 had an average flow rate of 3.7 m³/h while stream 2 averaged around 4 m³/h.

617. Mr Roberts relies on the memorandum from Jon Scroggie of Bioenergy Infrastructure Group dated 19 June 2020 in which he summarised the status of the demineralisation plant. This confirmed the flow rates of 3.7 and 4 m³/h and the findings in respect of availability.
618. M+W called no lay evidence on this issue. Outotec called evidence from David Gaukroger who asserted that, on one occasion in October 2019, Black & Veatch came incredibly close to running out of demineralised water during a start-up. He said that this could have led to a catastrophic failure of the gasifier and boiler steam systems. Mr Gaukroger attended site with his colleague, Mark Reilly, and found significant issues with the operation of the water and steam cycle. They checked the chemistry of the boiler water and found extremely low pH levels. He explains that the problem was that the ammonia dosing pumps were not working such that the pH of the boiler water was too acidic at 6-7 pH, against the design of over 9.5 pH. Mr Reilly also gave brief evidence upon this issue.
619. Mr Roberts responds in his second statement that the water chemistry was not evidence of operational failures but rather an indication of the long-term issue of a defective demineralised water system. Each of Mark Roberts, David Gaukroger and Mark Reilly gave evidence at trial but none of these witnesses were cross-examined about defect 26.
620. The experts, Dr Craig Edgar and Simon Richards, considered defect 26. Dr Edgar reports that the plant has not achieved a flow rate of 5 m³/h and has been offline for considerable periods. He calculates the average continuous flow rate for both streams at 7.7 m³/h and the total daily flow available at 136.8 m³. Such rate was insufficient to fill the 200 m³ water tank in 24 hours.
621. The experts concluded that the town's water supply was much harder than allowed in the design. The hardness of the potable water has a significant effect upon the performance of the demineralisation plant. Water hardness can be reported as mg/l of either calcium (Ca) or calcium carbonate (CaCO₃). The local water in Hull is classed as very hard. Its historical hardness by each measure was as follows:

Year	Average total hardness	
	mg/l Ca	mg/l CaCO ₃
2017	136	339
2016	137	341
2015	141	351
2014	144	359

622. The demineralisation plant was designed by Envirogen. Ian Pearson of Envirogen advised in 2019 that M+W had insisted that the plant be designed on the basis of 142 mg/l whereas he found that they were getting actual results nearer to 400 mg/l. Dr Edgar notes that it appears that there was some confusion around these measures of water hardness and that, in error, the plant was designed around 142 mg/l CaCO₃ rather than 142 mg/l Ca. These are, as I demonstrated above, very different levels of hardness. Such an error would end up underestimating hardness by a factor of 2.5. Designing around a lower hardness would lead to the softener resin becoming saturated more quickly thereby causing more frequent regeneration and lower overall throughput.
623. Mr Richards confirms that M+W appears to have provided an incorrect water specification to Envirogen. He notes that section 2.6.5 of Schedule 1 to the EPC contract identified the flow rate of the town's water supply but gave no information as to the water pressure or its hardness. He asserts that such information should have been provided by EWH. Against that, section 2.10 provided:
- “The adequacy of the service supplies are (sic) not the responsibility of the Purchaser. It is the Contractor's responsibility to ensure that the service supplies are sufficient for his requirements or provide alternative arrangements at the Contractor's expense.”

ANALYSIS

624. I am satisfied that the demineralisation plant was designed on the basis of a simple error as to whether the quoted hardness was measured in mg/l of calcium or calcium carbonate. Such error meant that the plant was significantly under-designed and was not able either to sustain continuous operation or the required flow rate of 5 m³/h.
625. I reject the suggestion that EWH bears responsibility for not having advised M+W as to the hardness of the water:
- 625.1 There is readily published data as to the hardness of the local water. Indeed, M+W had no difficulty in finding out this information even if at some point between it and its subcontractor a mistake was made in understanding or communicating such data.
- 625.2 In any event, it was easy enough to take a sample of the local water and subject it to laboratory analysis.
- 625.3 EWH took no contractual responsibility for the composition of the water.
626. Accordingly, I find that M+W was in breach of the EPC contract as alleged in defect 26.

CAUSATION & QUANTUM

627. While pleaded in the sum of £714,226.89, EWH now seeks damages of £215,789.57 in respect of defect 26 comprising the cost of replacement reverse osmosis membranes (£22,548.11) and a temporary demineralisation unit (£193,241.46).

Replacement membranes

628. Mr Roberts says that EWH sought assistance from Envirogen to get the plant operational. He explains:

“Given that the reverse osmosis membranes in the demineralisation plant were commissioned around late 2018 / early 2019 but were not put into regular operation immediately thereafter, the membranes had in fact been left idle by M+W for an extended period without any preservation by the time the EPC contract was terminated (bearing in mind that chemical preservation should have been carried out for breaks in production lasting more than 48 hours in order to prevent microbiological growth).”

629. Dr Edgar advises that this was “sensible” but that replacing the membranes did not address the underlying issue that the plant had been specified against the wrong level of water hardness. Mr Richards adds that the new membranes were only required because the original membranes were not preserved properly post-termination.

630. In my judgment, EWH has failed to establish that the membranes needed to be replaced by reason of the pleaded breaches at defect 26. Rather, on the balance of probabilities such work was necessary because the membranes were not properly preserved during an extended period when the plant was not operational.

Temporary demineralisation unit

631. From termination to January 2020, EWH hired a large temporary demineralisation trailer from Suez. From January 2020, it hired a smaller unit from Veolia. Dr Edgar advises that the Suez trailer would always have been required during commissioning because there would be an increased demand for demineralised water during such period. He adds at paragraph 627 of his report:

“On the other hand, I am of the view that the smaller temporary trailer from Veolia from January 2020 onwards (which, according to paragraph 369 of Mr Roberts’ witness statement, provides up to 25 m³/h of treated water either in isolation or in conjunction with the existing demineralisation system) is the result of the inadequate capacity of the demineralised water plant installed by M+W, and it is a reasonable mitigation measure pending a permanent solution for this defect.”

632. Mr Richards observes that the claim for the temporary unit “exceeds by some margin” the cost of the new water softening plant claimed pursuant to defect 18. He adds that such permanent solution should have been installed sooner thereby saving a considerable sum.

633. Dr Edgar was cross-examined at trial on the basis that the capacity of the temporary supply amounted to betterment because of its capacity to achieve a higher flow rate. Dr Edgar replied that the front end would always require a higher capacity and flow rate in order to ensure that the plant could maintain a downstream flow rate of 5 m³/h per stream.

634. I am satisfied that a temporary demineralisation unit was required in order to address the established breaches of contract pending a permanent solution. M+W's argument that the chosen temporary solution was too expensive either because the flow rate specified was too high or because the permanent solution should have been implemented more quickly is a complaint that EWH failed to mitigate its loss. As such, it is an issue on which M+W bears the burden of proof. In my judgment, M+W has failed to discharge such burden and accordingly EWH is entitled to recover the costs of hiring the unit from Veolia in the sum of £193,241.46.

DEFECT 9: INADEQUATE CORROSION PROTECTION

THE CLAIM

635. Paragraph 3.4.2.1 of Schedule 22C provided:

“All paint systems shall ensure a minimum time to first maintenance of 15 years ...

Paint systems for the different plant areas shall be selected in accordance with the following classification according to BS EN ISO 12944 and, where local atmospheric conditions dictate, the use of a higher classification may be required to satisfy the minimum time to first maintenance.

	Atmospheric category	Durability
General exterior:	C4 high	High
Interior:	C3 medium	High”

636. EWH asserts that, in breach of contract, M+W failed adequately to paint pipework, ductwork, plant items, vessels and structural steelwork. Specifically, it alleges that M+W installed steel members that:

- 636.1 were not painted at all;
- 636.2 had only had an application of a shipping coat of paint; or
- 636.3 had been painted and/or prepared defectively.

As a result, EWH pleads that exposed steel members were already exhibiting corrosion.

637. EWH asserts that M+W was in further breach of contract in that it:

- 637.1 failed to paint steel components, plant and members to ensure a minimum time to first maintenance of 15 years;
- 637.2 failed to apply paint finishes to exterior areas that were appropriate for a C4 environment; and
- 637.3 failed to apply paint finishes to interior areas that were appropriate for a C3 environment.

638. In support of its claim, EWH relies on the fact that M+W itself asserted a claim against Outotec in respect of defective paintwork in August 2017. M+W's letter of 21 August 2017

gave notice of defects as recorded in twenty-five quality observation reports and six non-conformance reports.

PAINT SYSTEMS

639. The EPC contract did not specify a particular paint system in terms of paint type, thickness or number of coats. Rather it specified the paint by atmospheric category and durability. Different suppliers will then specify coatings, the appropriate film thickness (measured in microns, μm) and the number of coats by reference to the required atmospheric category. As the required duty becomes more arduous, so the specification of the coating might increase and, if the same coating could be used, the required thickness of the coating increases and additional coats might be required.
640. Although the contract referred simply to a “minimum time to first maintenance”, the British Standard defines the term time to “first major maintenance.” Putting to one side the later version cited in Dr Edgar’s report, section 5.5 of the version of BS EN ISO 12944 that was current at the time of the EPC contract provided:

“It has been assumed in compiling the tables in Annex A that the first major maintenance painting would normally need to be carried out for reasons of corrosion protection once the coating has reached Ri 3 as defined in ISO 4628-3. Based on this precondition, durability has been indicated in this part of ISO 12944 in terms of three ranges:

- a) low (L): 2 years to 5 years;
- b) medium (M): 5 years to 15 years;
- c) high (H): more than 15 years.

The durability range is not a ‘guarantee time.’ Durability is a technical consideration that can help the owner set up a maintenance programme. A guarantee time is the subject of clauses in the contract and is not within the scope of this part of ISO 12944. There are no rules that link the two periods of time ... The guarantee time is usually shorter than the durability range.”

641. ISO 4628-3 describes a pictorial method for assessing the degree of rusting of industrial coatings. The Ri value is the rating used to indicate the degree of rust formation.

THE EVIDENCE

642. In February 2019, Fichtner issued its updated observation lists to M+W. Such lists recorded, among other things, outstanding issues with the paintwork that had been identified during regular walkdowns. The list of paintwork defects did not purport to be a full snagging list or survey but included a number of reports of unpainted steelwork and rust.

643. Pöyry Energy Limited carried out a condition survey in April and July 2019. By its final report, it recorded the following findings:

“c) Surface corrosion on external galvanised steelwork (structural steelwork, handrails, floor gratings, etc.); ...

- i) Paint chips / corrosion on equipment (mainly motors and manual isolating valves);
- j) Incomplete painting of some piping systems (e.g. compressed air, vacuum piping around ACC);
- k) Rusty carbon steel bolts on flanged connections. Also isolating flange kits not provided on bolt sets joining carbon and stainless-steel flanges; ...”

644. There is no evidence that the design of the paint system did not meet the contractual standards. Further, Dr Edgar did not inspect the condition of the interior paintwork. There is also no evidence in this case of measurements being taken of the thickness of the coatings applied. Nor is there any evidence calculating the likely corrosion rate in accordance with the methodology in ISO 9224. Rather, EWH pursues its case on the basis of observational evidence which is necessarily more subjective.

645. Dr Edgar rightly observes that on any industrial facility there is likely to be some damage to the paintwork during the construction works. Such damage can be reduced on a well-controlled site but is very difficult to avoid entirely. Such damage then needs to be made good in the usual way by the contractor responsible for constructing and commissioning the facility.

646. Dr Edgar observes that inadequate corrosion protection has the potential to cause significant lifecycle costs not just through damage to plant and components and the costs of repainting but also, given that the plant was targeting 8,000 operating hours per annum (being over 333 days), through lost income should the need for repainting cause extended outage times.

647. Dr Edgar reports that, as at 2020, there was already far more corrosion on certain items of equipment than should have been expected after 15 years. He accepts that there was no current evidence of functional issues arising from the defective paintwork, but he stresses that uncoated pipework could not simply be left rusting over the lifetime of the plant and that there would be functional problems in later years if the pipework was not properly coated. He also accepts that it is difficult from some of the photographs to say whether certain pipework had been coated but explains that it had either not been coated at all or it had been inadequately coated. Otherwise, he maintains, you would not be seeing as much rust.

648. During the works, M+W argued that BS EN ISO 12944 was not applicable to lagged pipework since the standard was concerned with exposed external metalwork. Dr Edgar accepts that there might be a valid argument as to the use of the methodology in the standard and ISO 4628 in respect of lagged pipework. He observes, however, that the contractual obligations in respect of protective coatings did not distinguish between lagged and unlagged equipment. He adds:

“It is important to emphasise that in terms of corrosion, the fact that pipework or equipment is lagged does not remove the risk. This is widely recognised and indeed is discussed in HSE Technical Guidance SPC/TECH/GEN/18 ‘Corrosion under insulation of plant and pipework v3.’”

649. Dr Edgar advises that it is his “firm view” that pipework under lagging should have been painted. Dr Callow agrees that the contract did not differentiate between lagged and unlagged pipework. Dr Callow acknowledges that there is some risk of condensation on the surface of lagged pipes as they cool which could in turn lead to corrosion. Shown an example of a lagged pipe that had been opened up to reveal its condition, Dr Callow agreed that the particular pipe was heavily corroded along its length and that such corrosion in a pipe carrying steam under high pressure was serious and, if left unrepaired for a further 13 years, posed a risk of catastrophic failure. Such defect was not cosmetic but pernicious and a credible integrity threat. Dr Callow refused to extrapolate such findings to all lagged pipework since the majority of the many kilometres of lagged pipework was protected by rather more substantial insulated aluminium cladding. He did agree that, whether or not paint was applied to insulated pipes, in at least some cases that paint was entirely ineffective.

ANALYSIS

650. There is clear evidence before me that certain external steelwork was either not painted at all or was inadequately painted. I reject the submission that it is not open to EWH to pursue a claim for unpainted or inadequately painted steelwork that was under insulation. While there was no specific pleaded allegation to this end, there did not need to be since neither the contractual obligation nor the particulars of breach differentiated between lagged and unlagged steelwork. EWH therefore succeeds in proving that M+W was in breach of contract.

CAUSATION & QUANTUM

651. EWH’s pleaded claim is for the cost of patch repairs carried out to date in the sum of £134,835 and further annual patch repairs of £537,779, comprising:
- 651.1 estimated costs of £342,779 for initial access, inspections/surveys and remedial works in 2021/2; and
 - 651.2 £15,000 per year thereafter for thirteen years.
652. Dr Edgar comments that EWH’s proposal to carry out annual patch repairs rather than seeking to correct all of the defective paintwork at one time is both sensible and pragmatic.

The claim for past patch repairs

653. Although pleaded at £134,835, EWH sought the higher figure of £136,705.74 at trial. It is, however, limited to its pleaded claim. The claim is agreed on a figures-as-figures basis by the quantum experts. While the evidence is thin, I am satisfied on the balance of probabilities that such costs were incurred in carrying out patch repairs to plant and equipment that, in breach of contract, were not properly painted. I therefore award damages of £134,835.

The claim for future patch repairs

654. This claim is now pursued for the rather rounder figure of £515,000 comprising:
- 654.1 £20,000 for an initial survey in 2021/2;

- 654.2 £300,000 for the initial remedial costs; and
- 654.3 £15,000 for annual patch repairs in each of the subsequent thirteen years.

655. The origin of these figures is to be found in Lee Read's evidence. In his second statement, Mr Read explained that he planned to commission a survey to determine the likely extent of the issue. He confirmed that he had received quotations for the necessary survey work of £22,779 plus VAT (from RSG Industrial Services) and of £10,026 plus VAT (from R&A Kay Inspection Services). The cheaper quote was, however, on the basis of relying upon data collected from an earlier inspection that was undertaken for a different purpose. He intended to instruct a contractor to carry out the rectification work determined to be necessary. He then explained, at paragraphs 9-10:

“9 I plan to get the inspection completed as soon as possible and then I will plan the high priority rectification works as soon as possible in 2021 (hopefully in the dry months – i.e. Spring/Summer 2021) but with lower priority work pushed back to later in 2021 or early 2022, given budget constraints.

10 As a result of the above, I no longer consider that the estimates I gave at paragraph 202 of my First Witness Statement are accurate; I anticipate the cost of rectifying this defect being substantially more. I anticipate that EWH will need to spend the following in order to address this defect:

10.1 Cost of commissioning inspection / survey to determine extent and location of non-compliances: in the region of £22,779 plus VAT based on the quotation from RSG Industrial Services I refer to above.

10.2 Cost of providing access by way of scaffolding and mobile plant for the inspection: based on experience I would estimate this would require spend of approximately £20k.

10.3 Cost of carrying out works to ensure appropriate corrosion protection to pipework: Exact costs are unknown at this stage and will be dependent on the results of the inspection. However, as a ballpark figure, I would anticipate initial outlay of £250-300k to cover this work to ensure that the required standards are complied with in respect to corrosion protection.

10.4 Cost of annual touch-ups: I would still anticipate the need for annual touch-ups and consider that my previous estimate of £15k a year from 2023 onwards remains reasonable.”

656. By his third statement, Mr Read confirmed that he had instructed RSG to carry out the survey work. Its quotation was for a fresh and up-to-date scope of work. The inspection was, Mr Read explained, to be done and a report provided within 8 weeks. He added:

“The report will inform what works EWH needs to do and then we can go out to suppliers for quotations.”

657. There matters rested at trial. There was no report from RSG in evidence before me identifying the scope of the necessary remedial work or any quotation from contractors. Mr

Read is EWH's Plant Manager at Hull. He gave evidence as a factual witness. Even if he were independent, there is nothing in his professional background, described in his first statement, to suggest that he has particular expertise in the design or cost of remedial paint schemes. M+W rightly did not require him to attend court to face cross-examination on the inadmissible opinion evidence that he sought to give as to the likely costs of these remedial works. As Mr Acton Davis rightly observes in his closing submissions:

“The court will hardly award a party £300,000 in damages just because one of that party's employees thinks, without carrying out a proper factual investigation, there might be a need to carry out works which might cost that much.”

658. Beyond commenting that such approach is sensible and pragmatic, Dr Edgar does not assist as to the likely cost of the future remedial scheme. Further, the quantum experts have not agreed these sums. Faced with a dearth of evidence, Sanjay Patel, junior counsel for EWH, made a spirited attempt in cross-examination of Dr Callow to obtain his agreement to underpin the case on quantum, but the witness did not oblige.
659. I am satisfied on the balance of probabilities that there are outstanding and unresolved defects in the paintwork and that EWH will be put to further expense in remedying such defects. The court cannot, however, guess at the likely cost of such work or act on Mr Read's inadmissible but educated guess, which is not even based upon a survey of the issue. In my judgment, there is therefore no proper evidence as to the extent of the defect or the costs of the necessary remedial work. All that has been proved by the exercise of obtaining quotes is that EWH will suffer loss in at least the sum now claimed of £20,000 in obtaining a survey. I award that sum but nothing further for the future costs under defect 9.

DEFECT 32: BLOCKED BED CONES

THE CLAIM

660. The sixty-four bed cones at the bottom of the gasifier allow the bed media to be continuously cleaned of coarse ash and tramp that is not gasified. Ash and tramp material is then extracted at the bottom of the gasifier. Since there is potential for material to become stuck on its way down through the cones, rappers are provided which can be manually operated to shake particles loose.
661. There is no doubt that the bed cones were becoming blocked and that such blockages were causing shutdowns. EWH therefore argues that M+W was in further breach of its obligations pursuant to paragraph 2.2 of Schedule 22A to the EPC contract to design the plant such that it:
- 661.1 permits a single annual shutdown for planned maintenance of no greater than 14 days; and
 - 661.2 is capable throughout its design life of maintaining full-load operation in accordance with the Firing Diagram for a minimum of 8,000 hours without the need to shut down for manual cleaning.

Such obligation is of course also central to the claim in respect of slagging (defect 23) which has already been dealt with at paragraphs 533-587.

662. EWH asserts that, in breach of the general design obligation at clause 3.4 and the specific obligations at paragraph 2.2 of Schedule 22A, M+W designed the gasifier in a manner which:
- “i) fails to enable the effective removal of all material/tramp from the bed either manually or via the automated bed recycling system, without the need to shut down the plant and access the gasifier bed; and/or
 - ii) fails to allow for sufficient cooling of the bed resulting in the bed cones reaching excessive temperatures. This causes the gate valves to interlock and the bed level to increase including the accumulation of material/tramp in the bed.”
663. EWH then pleads that the combined effect of such design failures means that combustion of fuel will result in the frequent accumulation of material and tramp in the bed and that cleaning and the removal of blockages would prevent the plant from achieving 8,000 hours of continuous operation. It then pleads:
- “Based on EWH’s investigations to this date, the likely causes identified by EWH include, inter alia, the following:
- i) M+W’s defective design of the gasifier and bed cones as set out above;
 - ii) M+W’s failure adequately to commission the MPT (... Defect No. 24) such that it fails to meet the separation efficiencies (especially relating to non-combustible ferrous and inert materials), contrary to clause 3.4, paragraph 1.3.3 and/or paragraph 2.2 of Schedule 22A of the Contract; and/or
 - iii) The ongoing and excessive agglomeration of ash, slag and tramp in the gasifier (... Defect No. 23), contrary to clause 3.4, paragraph 2.2 of Schedule 22A and/or paragraph 6.4.5 of Schedule 22B of the Contract.”

THE EXPERT EVIDENCE

664. Blocked bed cones caused shutdowns on 11 September 2019, 27 January, 29 February, 3 April and 11 September 2020. Chris Higman observed:
- “While the bed cone blockage has been the immediate cause of shutdown, it has not always been the root cause. For instance, the shutdown on 11 September 2019 was caused by pieces of damaged refractory blocking the cones (defect 25). On other occasions the blockage is caused by falling slag caused by defect 23.”
665. He reported that, given that much of the blockages were caused by falling lumps of slag, it was “difficult to assess the extent to which this is a primary issue in its own right or merely a secondary problem caused by slagging.” He added that bird nesting (the process of metal wires in the waste intertwining to form so-called birds’ nests in the bed of the gasifier) from wire longer than specification slipping through the MPT had been observed and might be contributing to the problem. Further, he said that the ash cooling system in the cone area was insufficient to cool the material to a temperature acceptable for the downstream equipment and specifically the rubber conveyor belt.

666. Mr Higman identified a design issue in that the gaps between the air distribution manifolds had been measured at 95 mm which was smaller than the allowable particle size of 101 mm. It was therefore possible that larger particles were becoming jammed and that a different manifold geometry could assist.
667. As to the ash-cooling issue, Mr Higman reported that the material leaving the bed cones was much hotter than the design temperature and that it was therefore necessary to change the interlock settings on the outlet valves. A water spray had therefore been added to cool the material to prevent damage to the rubber conveyor belts. Mr Higman stressed, however, the central importance of slagging in this issue at paragraphs 342 and 344 of his report:
- “342. The cooling device was clearly designed with a loose ash in mind and not lumps of slag as currently being experienced. The residence time of the particulate matter in the cooling zone is very short and this technique can only be expected to be effective if the particles are small (e.g. dry ash) or thermally conducting (i.e. metallic). Larger non-conducting material may experience some cooling on the outside, but there is no time in the cool air for the cooling to penetrate into the core of the particle, which will therefore remain hot ...
344. The slagging problems discussed under defect 23 create a situation where the cooling system cannot be expected to perform as designed. A conclusive judgment on whether the cooling system is in itself defective or not cannot be made until the slagging problem is solved.”
668. By the Joint Statement, Mr Higman reported that the bed cone system had been “so overwhelmed with slag” that it was not possible to say how it would have performed with specification material. In cross-examination, he agreed that defect 32 was essentially a downstream consequence of defect 23. Asked about bird nesting, he said that “until the slag problem is solved, it is very difficult to see what effect on the performance overall this bird nesting is having.” Mr Higman added:
- “... until we’ve sorted out the incoming material from the MPT where there have been also problems, it is difficult to distinguish between problems caused by the slag, problems caused by performance of the MPT and then to see what is left over in terms of any possible malperformance which may or may not be there once those problems have been solved.”
669. Simon Richards reported that M+W was in breach of clause 3.4 and paragraph 2.2 of Schedule 22A in that no proper account had been taken of the possibility of metal wires in the Fuel forming birds’ nests. By the Joint Report, he reported:
- “The Bed Cones may not be designed and cannot be designed, in my view, for unpredictable sizes and quantities of slag. The pragmatic route in my view to resolving this is to minimise the slag formation so that the gasifier may operate for a longer period. For this reason, I believe that performance of the Bed Cones ought not to be assessed on its ability to remove large pieces of slag.”
670. Stephen Linwood, Mechanical Engineering expert appointed on behalf of Outotec, added:

“I am of the opinion that the bed and bed cone system has been designed to discharge ash and tramp material that would normally collect in the gasifier bed when using a fuel feed in compliance with the specification requirements.

The bed and bed cone system is not designed to discharge the quantity and size of slag and ash agglomerated materials that are collecting in the bed. The cause of this additional bed burden is the subject of separate alleged defect investigation.”

671. In reply, Mr Higman accepted that there was agreement between the experts that the bed and bed cone systems were not designed for the “currently experienced gasifier slagging operations.” He added that the problems currently experienced were overwhelmingly caused by defect 23. While he insisted that the design of the air-manifold assembly was defective, he said that this was a minor problem albeit one that needed to be addressed in the long run.

ANALYSIS

672. In my judgment, it is impossible to separate defect 32 from the issue of slagging. Having already rejected EWH’s case on defect 23 (slagging) at paragraphs 533-587 above, I accept M+W’s submission that, upon the expert evidence, that conclusion is fatal to EWH’s claim under defect 32.

DEFECT 24: MPT PLANT SEPARATION EFFICIENCY

THE CLAIM

673. The purpose of the MPT plant is obviously to process the RDF in order to produce Fuel that can be fed into the gasifier. One of its functions is to reduce the mass of non-combustible metals:
- a) The RDF specification in Table 22A.2.0 of Schedule 22A provided for a maximum of 4.5% by weight of non-combustible ferrous and non-ferrous metals.
 - b) The Fuel specification in Table 22A.2.3 provided for a maximum of 1.2% by weight of non-combustible ferrous and non-ferrous metals.
674. Paragraph 1.3.3 of Schedule 22A of the EPC contract provided:
- “The Contractor shall design, manufacture and deliver a mechanical pre-treatment (MPT) plant to treat the incoming RDF as defined in clause 1.3.2 and Table 22A.2.0 above and to:
- reduce the size of the RDF to meet the requirements in Table 22A.2.2
 - reduce the percentage of non-combustible ferrous and non-ferrous metals, non-combustible glass and non-combustible inert materials in the incoming RDF to produce a fuel to the gasifier as defined for these parameters in Table 22A.2.2 and 22A.2.3 below.”
675. Further, paragraphs 5.3.5-5.3.6 of Schedule 22B provided the specification for the separation of metals:

“5.3.5 Magnetic separators

Magnetic separators shall be supplied to remove ferrous metals from the flow of material as it passes under the magnet on the conveyor.

The efficiency of the magnetic separators shall be minimum 90% and shall be tested using a number of M20 x 120 mm ferrous bolts lying at the bottom of a bed of suitable material.

5.3.6 Eddy current separators

Eddy current separators shall be supplied to remove non-ferrous metals from the flow of material as it passes on the conveyor. The efficiency of the eddy current separators shall be minimum 85% and shall be tested using aluminium plates 80x80x3 mm lying at the bottom of a bed of suitable material.”

676. EWH’s pleaded case is that M+W was in breach of paragraph 2.2 of Schedule 22A in that it failed adequately to commission the MPT, resulting in the MPT failing a separation test that M+W undertook in November 2018. In particular, EWH asserts that there are shortfalls in the separation efficiencies of the MPT for both non-ferrous and ferrous metals.
677. The reference to paragraph 2.2 of Schedule 22A is curious since it makes no reference to separation efficiency. Like M+W, I assume that the intended reference was to paragraph 1.3.3 of Schedule 22A which was identified in Appendix 4 to the Particulars of Claim as the relevant provision within Schedule 22A. Paragraph 1.3.3 is not, however, concerned directly with separation efficiency, save that implied in reducing the levels of non-combustible metals, non-combustible glass and non-combustible inert materials in the incoming RDF to produce Fuel that met the parameters in Table 22A.2.3.
678. At trial, EWH sought also to argue that there was a breach of the requirement at item 23 of table 15.1 of Schedule 15 to demonstrate upon Take Over a separation efficiency for inert material (both metallic and non-metallic) of at least 75%. There is, however, no pleaded case as to breach of such further requirement and such allegation is accordingly not open to EWH.

THE EVIDENCE

679. At trial, EWH relied on four matters:
- 679.1 Tests carried out by M+W on 3 October 2018.
 - 679.2 Tests carried out by M+W on 7 November 2018.
 - 679.3 Analysis carried out by Fichtner on 24 March 2020.
 - 679.4 Tests carried out by EWH in May 2020.

The October 2018 test

680. Over four hours on 3 October 2018, M+W conducted the metallic and non-metallic inerts separation efficiency test in order to seek to demonstrate the MPT plant’s capability to separate inert materials (whether ferrous, non-ferrous or indeed non-metallic) from the

incoming RDF. The objective was to demonstrate a separation efficiency for inert materials of at least 75% as required by Schedule 15. The test was conducted at normal operational RDF throughput rates. M+W reported the following results:

- 680.1 Separation efficiency for ferrous metals: 86%
- 680.2 Separation efficiency for non-ferrous metals: 21%
- 680.3 Separation efficiency for all non-combustible materials: 56%

As against the 75% standard, M+W therefore reported a pass in respect of ferrous metals but fails in respect of non-ferrous metals and all non-combustibles.

681. Dr Edgar concludes that the MPT plant therefore failed the separation efficiency test under Schedule 15. Mr Wakefield points to the fact that the metal content of the Fuel was less than 1.2% such that the test demonstrated the production of compliant Fuel:

- 681.1 Ferrous metals comprised 0.09%.
- 681.2 Non-ferrous metals comprised 0.61%.

Mr Wakefield, accepted, however, in cross-examination that the plant was also required to demonstrate separation efficiency in accordance with Schedule 15.

The November 2018 test

682. Testing on 7 November 2018 again showed the metal content of the Fuel to be within specification, comprising just 0.65% of the Fuel (0.09% ferrous and 0.56% non-ferrous). The test, however, only ran for 88 minutes and involved 96.8 tonnes, as opposed to 400 tonnes, of RDF. Further, it was not conducted in accordance with the agreed test protocol in that fines were excluded from the analysis.

The March 2020 analysis

683. In March 2020, Fichtner analysed data from December 2019 and January-February 2020. It found the total metal content in December to be out of specification at 3.8% but within specification at 1.2% and 0.5% in January and February respectively. Fichtner observed that analysis of the separation efficiencies in December 2019 was not meaningful given the limited data. As to January and February 2020, it noted that the separation efficiencies for non-ferrous metals and inerts were around 60% and therefore lower than 75%, but that the separation efficiencies for ferrous metals were lower than such figure for January (66%) but higher for February (96%).

The May 2020 test

684. By contrast, the tests conducted in May 2020 sought to verify the separation efficiencies of the magnetic and eddy-current separators. Mark Roberts explains that the tests were conducted in accordance with the MPT Metals Removal Test Protocol dated 11 May 2020. The protocol's stated objectives were to demonstrate the removal efficiency of metals based on the recovery of marked standardised surrogate samples. The protocol sought to test for separation efficiencies of 95% for ferrous metals and 90% for non-ferrous metals, as opposed to the contractual efficiencies of 90% and 85% respectively.

685. Mr Roberts explains the May 2020 tests at paragraphs 347-350 of his statement:

- “347. EWH’s initial try-out of the test on the 12 May 2020 did not include the Schedule 22B specified target objects, which were still being painted I believe. The Schedule 22B targets are large targets which only report to the >75mm half of the plant, and don’t roll. They are easy to separate, specified to make the test easy to pass. We also wanted to optimise the separation performance with smaller targets with less easy shapes, which were already painted and ready on the 12th May, as in the draft Protocol.
348. So we went ahead with the initial try-out without the Schedule 22B targets as we wanted to assess whether the method in the Protocol worked as a trial run. In the event, some hatches had to be removed to execute the test, and a revised permit was required, so the test was re-scheduled for the next day.
349. The results record EWH undertook the test using the same set up as M+W on 13 May 2020. Schedule 22B Targets were painted and ready, so EWH carried out the first test with the smaller more difficult targets, all on the 13 May 2020. For the Schedule 22B test, the ferrous separation failed and the non-ferrous separation passed. The result was similar for the smaller more difficult targets.
350. The ferrous separation plant was then modified, and the ferrous separation part of the Schedule 22B test was repeated on the 21 May 2020 and this repeat test was passed. The result was similar for the smaller more difficult targets.”

686. As noted, EWH specified the use of smaller more difficult targets or coupons:

- 686.1 For the ferrous tests, the protocol described the use of steel bars measuring approximately 50x10 mm, 120x10 mm and 120x20 mm. Only the last of these different size bars was comparable in size to the contractual 120 mm long M20 bolts.
- 686.2 For the non-ferrous tests, the protocol described the use of aluminium plates measuring 40x40x2 mm and 80x80x5 mm. The smaller of the two sizes (with a volume of 3,200 mm³) was substantially smaller than the contractual standard of 80x80x3 mm (19,200 mm³), albeit the coupons were smaller than the larger size specified in the protocol (32,000 mm³).

687. The initial separation efficiency test results for ferrous metals were not passed, albeit only the test on 13 May was conducted using the contractual coupons. The separation efficiency test was, however, passed both with the contractual coupons and a mix of other size targets after the plant was modified:

Date	Sample	Separation efficiency	Pass/fail
12 May 2020	50x10 mm bar	80.9%	FAIL
12 May 2020	120x20 mm bar	83.2%	FAIL
12 May 2020	120x20 mm bar	80.0%	FAIL
13 May 2020	M20 x 120 mm bolt	78.0%	FAIL
21 May 2020	120x20 & 120x10 mm bars; and M20 x 200 mm bolts	100%	PASS
21 May 2020	120x20 & 120x10 mm bars; and M20 x 200 mm bolts	97.2%	PASS
21 May 2020	120x20 & 120x10 mm bars; and M20 x 200 mm bolts	96.3%	PASS
21 May 2020	M20 x 120 mm bolt	97.3%	PASS

688. Meanwhile, the eddy-current separators demonstrated a separation efficiency of 100% in tests on 12 May 2020 both with the contractual coupons and the alternative targets specified in the protocol.

ANALYSIS

689. EWH has failed to prove a breach of paragraph 1.3.3.

690. Paragraphs 5.3.5-5.3.6 of Schedule 22B required the separation efficiency of the over-band magnetic and eddy-current separators to be tested not by reference to a sample of RDF but by placing M20 bolts of a specified length and some aluminium plates of a specified size under a bed of “suitable material.” The obligation was to achieve the required separation efficiencies in these so-called coupon-recovery tests. Accordingly, it was only the May 2020 tests that evidence the compliance or otherwise with such tests.

691. Clearly, the May 2020 tests do not support the pleaded case that the MPT plant failed to meet the separation test for non-ferrous metals at paragraph 5.3.6 of Schedule 22B. As to the test for ferrous metals:

- 691.1 It was only the test on 13 May that demonstrated against the contractual coupons specified in paragraph 5.3.5 of Schedule 22B whether the MPT plant could meet the separation efficiency test. Nevertheless, on the basis of that test result, I find that the plant as then configured did not meet the separation efficiency test at paragraph 5.3.5.
- 691.2 I accept, however, that the plant did and could easily meet such test with adjustment of the height of the over-band magnets.
692. I accept M+W's argument that the magnetic separators were not defective and that this was simply a matter of commissioning adjustments to functioning plant. That said, I have already observed in another context that, while the parties have used the shorthand "defect", the pleaded allegation at paragraph 78 of the Particulars of Claim is that M+W "failed to carry out and complete the works in accordance with the terms of the contract." Framed in that way, I find the allegation to be made out in respect of paragraph 5.3.5.

REMEDIAL COSTS

693. Accordingly, EWH is entitled to the loss and damage caused by the failure properly to position the magnetic separators in order to meet the separation efficiency required by paragraph 5.3.5 of Schedule 22B. The quantum experts have agreed the cost of adjustments to the height of the over-band magnets in the sum of £151,806.75 and I award that sum.
694. The principal pleaded claim is for the cost of additional over-band magnets in the sum of £365,261.90. This sum is no longer pursued under defect 24. Had it not been abandoned under this defect, there would have been no further award since, on the evidence, adjustment of the existing plant was all that was required in order to meet the required separation efficiency.

MINOR DEFECT CLAIMS

695. The remaining twenty-six claims are relatively modest in amount in the context of this litigation and will be dealt with separately in my second judgment in this matter:

Defect no.	Defect	Pleaded claim (£)	Contribution claim pursued?
7	Use of ladders and specification of ladders	391,147.29	Yes
18	Blowdown tanks scaling	281,776.98	
8	Guarding protection for conveyors	244,646.06	
4	Fire water tank fill rate	208,704.68	

35	Baghouse hopper and air slides	190,652.40	Yes
19	Lack of cooling to electrical rooms	189,232.47	
25	Gasifier refractory lining failure and damage to fuel feed chute	118,011.73	Yes
36	Road drainage falls and ponding and site drainage generally	51,649.17	
31	Lack of ventilation to UPS rooms and UPS battery failures	37,974.61	
10	Motors	35,329.65	Yes
15	Syngas probe sleeve	30,636.66	
5	Building management system	30,424.22	
3	Furnace inspection equipment	27,447.29	Yes
34	OFA dampers	23,729.51	Yes
27	Leaks to underground effluent treatment plant	21,142.50	
33	Blockage of boiler screen hopper and multicyclones	20,145.61	Yes
30	Lack of ventilation to workshops	17,566.00	
21	Gaskets	15,684.61	
16	Powder activated carbon	15,661.65	Yes
37	Hydrated lime dosing	13,305.24	Yes
29	CCW pumps	9,700.93	
11	Turbine noise attenuation housing	9,242.20	

22	Flue gas treatment redundancy	7,472.26	
38	Shredder isolation switch	2,547.89	
13	High pressure steam pipe line supports	1,951.61	
14	Urea injection nozzles	1,092.13	Yes

LIABILITY OF M+W GROUP GMBH

696. EWH also seeks declarations that M+W's parent company, M+W Group GmbH, is liable to pay to and/or indemnify EWH in respect of sums awarded in these proceedings. Such liability arises under the terms of a guarantee entered into on 20 November 2015. The guarantee provided:

“[The parent company] (as a primary obligor and not merely as surety) hereby irrevocably guarantees to [EWH] the due and punctual performance and observance of, and compliance with, all agreements, obligations, liabilities, representations and warranties of [M+W] arising under or in connection with the Contract, including all addenda, exhibits and documents referenced in the Contract, and all future amendments, supplements, variations, change orders and other modifications to the Contract.”

697. The only pleaded defence is that the parent company denies the claims on the same grounds as M+W. I am satisfied and declare that M+W Group GmbH is liable under the parent company guarantee for such sums as are awarded against M+W in these proceedings.

M+W'S COUNTERCLAIM

698. In view of my findings that M+W was not entitled to an extension of time and that EWH was entitled to and did terminate the EPC contract pursuant to clause 44.1(c) and at common law, it follows that I dismiss M+W's counterclaim.

THE THIRD-PARTY PROCEEDINGS

OVERVIEW

699. By its Particulars of the First Defendant's Additional Claim, M+W asserts that Outotec is itself liable for liquidated damages pursuant to the subcontract totalling \$5,335,000. It originally sought a contribution pursuant the Civil Liability (Contribution) Act 1978 in respect of its own liability, if any, for delay damages. Such claim is no longer pursued. The sole remaining claim made against Outotec is for a contribution in respect of such defects in the subcontract plant as may be established by EWH. I have already indicated the defect claims that M+W seeks to pass on in the tables at paragraphs 474 and 695 above.

700. By its Defence and Counterclaim, Outotec relies on the contractual maximum for liquidated damages, being 10% of the subcontract price. Further, it in any event contends that its maximum liability for liquidated damages was \$2,808,000. It contends that, following the assignment of the subcontract, such claim can only be pursued by way of contribution proceedings in respect of M+W's own liability for delay damages under the EPC contract and that it falls to be dismissed because any liability under the subcontract is not for the "same damage." Further, it defends the defect claims on the basis that such claims are excluded by clause 45.2 of the subcontract and by reason of M+W's failure to notify such claims pursuant to the defects procedure under clause 37.

701. Outotec then counterclaims for payment under the subcontract or damages:

Head of claim	Claim US \$	Paragraphs in this judgment
Unpaid balance due upon milestones 7, 8, 9, 10 & 11	6,858,466.71	757-806
Liquidated damages wrongly withheld	3,987,480.64	823-852
Wrongful bond call	3,987,655.64	702
Unpaid VAT	246,979.07	702
Variations	740,056.72	703
Recharges withheld	1,036,676.08	824
	\$16,857,314.86	

702. M+W accepts that it must bring the bond monies into account and that the VAT issue will follow the court's decision on milestone 7. By trial, M+W conceded milestone 10 and Outotec abandoned two of the claimed variations. The substantial issues between the parties on the counterclaim are therefore the remaining milestones and variations. Further, M+W further relies on any defects by way of abatement of the sums outstanding upon the subcontract.

703. Consistently with the approach taken on the claim in the main proceedings and M+W's contribution claim, I address Outotec's principal claims in this judgment but will address the more modest claim for variations and the claim for interest in my second judgment.

M+W'S CONTRIBUTION CLAIM: LEGAL PRINCIPLES

THE ASSIGNMENT OF THE BENEFIT OF THE SUBCONTRACT

704. Clause 9.1 of the Outotec subcontract provided:

“Neither the Contractor nor the Subcontractor shall without the previous consent of the other transfer any benefit or obligation under the Subcontract to any other person in whole or in part, except that:

- (a) the Subcontractor may without such consent transfer the right to receive any money which is or may become due to him under the Subcontract; and
- (b) if so required by the Purchaser under the Main Contract the Contractor may assign the Subcontract to the Purchaser.”

705. Clause 44.3(d) of the EPC contract provided that on a termination pursuant to clause 44.1:

“the Contractor shall, if so required by the Purchaser and to the extent permitted by the subcontract, assign any subcontract to the Purchaser.”

706. By a solicitor's letter dated 13 March 2019, EWH formally required M+W to assign all of its subcontracts. By a series of letters, M+W purported to assign some 282 subcontracts and purchase orders suppliers to EWH. M+W argued that it had only assigned the future benefits of the contracts; alternatively, it argued that the subcontract with Outotec had been novated. In any event, M+W denied any liability for unpaid sums payable under the assigned contracts.

707. The issue of the true effect of the assignment of the Outotec contract was only resolved by the judgment of O'Farrell J on the preliminary issues in this case reported at [2020] EWHC 2537 (TCC), 192 ConLR 79. The judge found:

707.1 at [68]-[84], that upon the true construction of clause 44.3(d) of the EPC contract and clause 9.1(b) of the Outotec subcontract, the parties had not limited the rights that could be assigned to EWH and that consequently EWH was entitled to call for the assignment of the accrued and future rights under the subcontract; and

707.2 at [85]-[108], the subcontract was not novated such that M+W remained liable for sums that fell due for past performance of the subcontract.

708. Accordingly:

708.1 M+W is liable for any sums that fell due to Outotec in respect of pre-assignment performance of the subcontract.

708.2 Any claim against Outotec in respect of breaches of the subcontract has been assigned to EWH. No such claim is pursued by EWH in these proceedings.

708.3 Since M+W has no direct cause of action against Outotec under the subcontract, its only claim in the third-party proceedings is for contribution pursuant to s.1 of the Civil Liability (Contribution) Act 1978.

THE CONTRIBUTION CLAIM

709. Sections 1(1) of the 1978 Act provides:

“Subject to the following provisions of this section, any person liable in respect of any damage suffered by another person may recover contribution from any other person liable in respect of the same damage (whether jointly with him or otherwise).”

710. Section 6(1) provides:

“A person is liable in respect of any damage for the purposes of this Act if the person who suffered it (or anyone representing his estate or dependants) is entitled to recover compensation from him in respect of that damage (whatever the legal basis of his liability, whether tort, breach of contract, breach of trust or otherwise).”

711. In Royal Brompton Hospital NHS Trust v. Hammond [2002] UKHL 14, Lord Bingham said, at [6]:

“When any claim for contribution falls to be decided the following questions in my opinion arise:

- (1) What damage has A suffered?
- (2) Is B liable to A in respect of that damage?
- (3) Is C also liable to A in respect of that damage or some of it?

... I do not think it matters greatly whether, in phrasing these questions, one speaks (as the 1978 Act does) of ‘damage’ or of ‘loss’ or ‘harm’, provided it is borne in mind that ‘damage’ does not mean ‘damages’ (as pointed out by Roch LJ in Birse Construction Ltd v. Haiste Ltd [1996] 1 W.L.R. 675, at p.682) and that B's right to contribution by C depends on the damage, loss or harm for which B is liable to A corresponding (even if in part only) with the damage, loss or harm for which C is liable to A. This seems to me to accord with the underlying equity of the situation: it is obviously fair that C contributes to B a fair share of what both B and C owe in law to A, but obviously unfair that C should contribute to B any share of what B may owe in law to A but C does not.”

712. Lord Steyn, at [27], stressed that the critical words are “liable in respect of the same damage.” He added:

“The legislative technique of limiting the contribution principle under the 1978 Act to the same damage was a considered policy decision. The context does not therefore justify an expansive interpretation of the words ‘the same damage’ so as to mean substantially or materially similar damage. Such solutions could have been adopted but considerations of unfairness to parties who did not in truth cause or contribute to the same damage would have militated against them. Moreover, the adoption of such solutions would have led to uncertainty in the application of the law. That is the context of s.1(1) and the phrase ‘the same damage’. It must be interpreted and applied on a correct evaluation and comparison of claims alleged

to qualify for contribution under s.1(1). No glosses, extensive or restrictive, are warranted. The natural and ordinary meaning of ‘the same damage’ is controlling.”

713. Accordingly, the claim for contribution can only arise if:

713.1 M+W is liable to EWH under the terms of the EPC contract.

713.2 Outotec is also liable to EWH in respect of the same damage under the terms of the assigned subcontract or collateral warranty.

714. In the event that the contribution claim is made out, the amount of the contribution shall be “such as may be found by the court to be just and equitable having regard to the extent of that person’s responsibility for the damage in question.”

OUTOTEC’S LIABILITY UNDER THE SUBCONTRACT

715. Clause 45.2 of the subcontract provided:

“... the liability of either party to the other arising out of or in connection with the Subcontract or the Subcontract Works, whether by reason of any breach of contract or of statutory duty or tortious or negligent act or omission shall be limited to the damages, remedies and reimbursements expressly provided in the Subcontract.”

716. This is an exclusive remedies clause. I have already referred to Lord Diplock’s speech in Gilbert-Ash (Northern) Ltd v. Modern Engineering (Bristol) Ltd [1974] A.C. 689, and to his observation at 717H that in construing a contract “one starts with the presumption that neither party intends to abandon any remedies for its breach arising by operation of law, and clear words must be used to rebut this presumption.” In Scottish Power & UK plc v. BP Exploration [2016] EWCA Civ 1043, Christopher Clarke LJ said, at [29]:

“The fact that there are two possible meanings is the beginning of the inquiry, not its end. It is then necessary for the court to apply ‘all its tools of linguistic, contextual, purposive and common-sense analysis to discern what the clause really means’: per Briggs LJ in Nobahar-Cookson v. The Hut Group Ltd [2016] EWCA Civ 128, at [19]. If as a result of so doing the answer becomes clear the court should give effect to it even though the interpretation may deprive a party of a right at law which he might otherwise have had. It is open to parties to make an agreement which has that effect.”

717. Clause 45.2 is, in my judgment, clear and is effective to bar any liability that might otherwise arise for damages or other remedy that does not expressly arise from the contract. I am fortified in that conclusion by the fact that clause 45.2 is contained in the Yellow Book of subcontract terms issued by the Institute of Chemical Engineers. As Outotec points out, such terms provide express remedies for contractor breach (clause 4.4); costs incurred by reason of inaccurate information (clause 6.3); adjustments in price due to a change of law (clause 7.3); additions to the price for preparing a justification (clause 11.2); extensions of time (clause 14); liquidated damages for delay (clause 15); variations (clause 16.7); additions to price for incomplete documentation (clause 21.12); additions to the price set for errors,

discrepancies and omissions (clause 21.13); costs of contractor's abortive activity (clause 21.14); increases in price due to additional tests (clause 22.4); mutual environmental indemnities (clause 26.7); care of subcontract works (clauses 30.2-30.3); performance damages (clauses 30.13-30.14); reimbursement of insurance premiums (clause 31.7); costs for deferment of Take Over procedures (clause 33.11); damages arising from defects (clause 37); payment of the subcontract price (clause 41.1); right to suspend work for non-payment (clause 41.9); costs of complying with an instruction to suspend (clause 42.4) and terminations (clauses 43, 44 and 44A).

718. Liability for defects is dealt with by the careful scheme set out at clause 37. The key elements of the scheme are as follows:

- “1.1 ‘Defect’ means any work done or any Subcontract Materials or the Subcontract Plant or any part of it which does not comply with the Subcontract, provided that such matter shall not be a Defect if it is caused by:
- (a) normal wear and tear;
 - (b) a failure by the Contractor or the Purchaser to operate and maintain the Subcontract Plant in accordance with any operating and maintenance manuals provided by the Subcontractor and/or with good engineering practice; and/or
 - (c) a failure by the Contractor to comply with any of his obligations under the Subcontract.
- 37.2 If at any time before the Subcontract Plant is Taken Over in accordance with Clause 33 (Taking Over) or during the Defects Liability Period, the Contract Manager:
- (a) decides that any matter is a Defect; and
 - (b) as soon as reasonably practicable notifies the Subcontractor of the particulars of the Defect;
- the Subcontractor shall as soon as reasonably practicable make good the Defect so notified and the Contractor shall so far as may be necessary place the Subcontract Plant at the Subcontractor's disposal for this purpose. The Subcontractor shall, if so required by the Contract Manager, submit his proposals for making good any Defect to the Contract Manager for his approval which shall not be unreasonably withheld.
- 37.6 If the Subcontractor does not make good within a reasonable time any Defect which he is liable to make good under Sub-clause 37.2 ... then the Contractor may, in addition to any other remedies or relief available to him under the Subcontract, proceed to do the work in such a manner as the Contract Manager may decide, including the employment of a third party, provided that the Contractor gives at least ten days' notice of his intention.
- 37.7 If the Purchaser or the Contractor reasonably requires that any Defect notified to the Subcontractor under Sub-clause 37.2 which arises during the Defects Liability Period be made good urgently and the Subcontractor is unable or fails to comply within a reasonable time, the Purchaser or the Contractor may, in addition to any other remedies or relief available to him under the Subcontract and without further notification, proceed to

do the work in such a manner as the Project Manager or the Contract Manager may decide, including the employment of a third party.

- 37.8 If the Contractor, or as applicable the Purchaser, has made good a Defect in accordance with Sub-clause 37.6 or 37.7, the Subcontractor shall reimburse the Contractor his reasonable costs, or as applicable pay to the Contractor the Purchaser's reasonable costs, of so doing provided that the Contractor complies with Sub-clause 4.3 and submits a claim in accordance with Sub-clause 19.5. The Contract Manager and the Subcontractor may agree the amount to be paid by the Subcontractor, or in the absence of agreement the Contract Manager shall determine such amount as may be reasonable. Such amount shall be:
- (a) deducted from any money that would otherwise be payable under the Subcontract; or
 - (b) paid by the Subcontractor to the Contractor.
- Any disagreement arising under this Sub-clause 37.8 which is not settled in accordance with Clause 46 (Disputes) may be referred to an Expert in accordance with Clause 48 (Reference to an Expert).”

719. This careful scheme has the following key features:

- 719.1 Outotec’s obligation to make good any defects under clause 37.2 arose upon the Contract Manager first deciding that the subcontract works were defective and then notifying Outotec timeously with the particulars of the alleged defect.
- 719.2 The right (initially vested in M+W but assigned to EWH) to carry out the remedial works and seek reimbursement either upon Outotec’s failure to make good the defects within a reasonable time (clause 37.6) or in the case of urgency (clause 37.7) only arises where notification of the defect has first been given under clause 37.2.
- 719.3 Where M+W/EWH seeks damages for remedial works undertaken pursuant to clause 37.6, it must also have first given ten days’ notice of its intention to undertake the works.

720. Accordingly, in my judgment there can be no claim under clause 37 of the subcontract for failing to make good defects save where the Contract Manager first decided that there was a defect and then notified Outotec of the particulars of such defect “as soon as reasonably practicable” thereafter. In view of clause 45.2, there is no freestanding right to bring a claim for defects save through the clause 37 machinery.

721. M+W further argues that even if prior notification is a condition precedent to liability under clause 37.2, it is not also a condition precedent that such notification should have been given as soon as was reasonably practicable. I disagree. In my judgment, the reference to the “Defect so notified” is to a defect that has been notified in accordance with clause 37.2(b).

722. I do not, however, accept Outotec’s argument that the “notification” requirement (with a small “n”) imports the formal provisions about the giving of “Notice” (with a capital “N”) at clauses 1.1 and 1.8 of the subcontract.

NOTIFICATION

723. Accordingly, I find that M+W can only seek a contribution in respect of an alleged defect where the Contract Manager notified Outotec of the particulars of such defect as soon as was reasonably practicable. In such eventuality:

723.1 By its Further Information given on 3 April 2020, M+W pleaded particulars of its case on notification in respect of defects 7, 9, 10 and 17, but asserted no positive case in respect of defects 14 and 23, pleading:

“M+W was first informed of this claim in the Particulars of Claim and Outotec was first informed by way of the Additional Claim. There was no prior notification.”

723.2 By paragraph 6B of its Re-Amended Reply and Defence to the Third Party’s Counterclaim dated 30 October 2020, M+W repeated the April particulars in respect of defects 7, 9 and 10, and pleaded new particulars in respect of defects 14 and 17.

723.3 By paragraph 6C, it asserted no positive case as to notification in respect of defects 23, 25, 28, 32, 33, 35 and 37:

“The alleged defects numbered 23 and above were only notified to M+W subsequent to termination. It is assumed that EWH has notified Outotec of these defects.”

724. As to the two generic pleas as to notification:

724.1 I reject M+W’s argument that notification was given by the statements of case in this litigation:

- a) The required notification under clause 37.2 is notification of particulars of defects that the contractor wants Outotec to make good. Such notification has to be made as soon as reasonably practicable.
- b) Even in cases where the remedial works are urgent, prior notification is required: clauses 37.2 and 37.7.
- c) In non-urgent cases, further notification is required giving ten days’ notice before the remedial works are undertaken and charged to Outotec: clause 37.6.
- d) Even if there were no other objection, notification is a condition precedent to liability. Accordingly, there can be no liability until after notification.

724.2 Further, I reject for lack of any supporting evidence the suggestion that EWH had notified the defects in this case.

OUTOTEC’S LIABILITY UNDER THE WARRANTY

725. M+W argues that clause 45.2 does not bar a claim under the warranty for defects that were not notified under clause 37. I reject this submission:

725.1 First, clause 45.2 does not simply bar claims under the subcontract but extends to claims “arising out of or in connection with the subcontract or the subcontract works.”

725.2 Secondly, clause 8.1 of the warranty given by Outotec provided:

“In any claim under this Deed for breach of clause 1 (Duty of care) there shall be available to the Subcontractor any defence that:

- (a) arises from or in connection with the Subcontract; and
- (b) would have been available if the claim had been brought by the Beneficiary had the Beneficiary been the contractor under the Subcontract,

excluding any set-off or counterclaim available against the Contractor.”

Thus, the intention of the warranty was not to extend Outotec’s liability beyond that which it would have had if EWH had been named as the contractor. Outotec cannot therefore be liable to EWH under the warranty for a claim that would, if pursued under the subcontract, be defeated by clause 45.2. O’Farrell J came to a like conclusion on slightly different wording in Swansea Stadium v. City & County of Swansea [2018] EWHC 2192 (TCC), [2018] B.L.R. 652.

CONCLUSIONS

726. I dismiss the contribution claims in respect of defects 23, 25, 28, 32, 33, 35 and 37 for want of notification under clause 37.2 of the subcontract. I will consider the adequacy of the pleaded notifications in respect of the other defects separately as I address each defect.

727. Even where a defect was not notified under the subcontract, it will nevertheless be convenient to consider the underlying merits of the defect claims in order properly to address M+W’s defence of abatement to Outotec’s counterclaim. The defence of abatement is dealt with below at paragraphs 807-822 below.

M+W’S CONTRIBUTION CLAIM: DEFECTS

DEFECT 28: NOISE ISSUES

728. I have awarded EWH damages of £1,650,714.48 for M+W’s breaches of contract in respect of onsite and offsite noise: see paragraphs 477-532 above.

729. The contribution claim fails for want of notification: see paragraphs 723-727. Nevertheless, I briefly consider the position in the event that the claim had been notified and in order that the matter can be considered further in the context of the defence of abatement.

The subcontract obligations

730. Paragraph 1.4 of Appendix A to the subcontract provided:

“The works shall be designed to take account of all relevant regulations, standards and codes of practices as updated by the latest editions and amendments, including but not limited to:

- (10) the Environmental Permit and the associated conditions;
- (11) the Planning Consent;”

731. Further, paragraph 1.2 of Appendix B provided:

“The plant shall comply in all respect (sic) with all the latest (unless otherwise indicated) relevant legislation including, but not limited to:

- the Environmental Permit and the associated conditions;
- the Planning Consent; ...”

732. Table 17.5 of Schedule 17 to the subcontract provided a number of performance indicators. Failure to meet the action limits in the table triggered Outotec’s obligation under paragraph 17.6.1 to carry out remedial work to bring the plant within the action limits. Performance indicator 6 was in respect of the maximum noise emissions and provided that the “maximum sound pressure level at point source noise limit measured 1 m away from any item of Plant ... which is a source of noise” should be less than 85 dB(A). Such provision excluded the operation of intermittent equipment such as pressure relief valves or mechanical rappers.

733. Mr Williamson rightly submits that there is a complication in considering the contribution claim in that only M+W, as the main contractor, had overall responsibility for the plant. As the experts agreed in their evidence, the main contractor necessarily “held the budget” for sound levels on site. A useful approach therefore to subcontractors, like Outotec, who were only responsible for discrete parts of the plant would have been to allocate them an appropriate proportion of the overall sound budget. That said:

- 733.1 Schedule 17 imposed absolute limits on the sound pressure levels of the subcontract plant; and
- 733.2 irrespective of the noise contribution from other plant, it is possible to consider whether the subcontract plant of itself gave rise to breaches of the Environmental Permit.

On-site noise

734. For the reasons already explained at paragraphs 491-493 above, I am satisfied that the airside blowers, evaporator sootblowers, ID fan, stack outlet, vacuum breaker, vacuum skid and vibratory screen failed to comply with a maximum sound pressure noise level at one metre of 85 dB(A). Of these, the evidence is that:

- 734.1 the vacuum breaker and vacuum skid were not within the Outotec scope of supply; and
- 734.2 the evaporator sootblower and the vibratory screen are intermittent equipment and therefore excluded from the requirement to meet the action limit of 85 dB(A).

735. In my judgment, Outotec was in breach of the subcontract in that it failed either to ensure that the airside blowers, ID fan and stack outlet were within the action limit of 85 dB(A) at one metre, or to carry out the necessary remedial work to achieve such limit.

Off-site noise

736. The case against Outotec is more difficult in respect of off-site noise since one would need to strip out all of the other sources of noise. Mr Williams advised:

“To establish appropriate off-site noise limits that could have been used as design criteria would have required further studies. Importantly, the design criteria would apply to the cumulative noise levels from the operation of the whole plant, not just those items designed and supplied by Outotec. As setting appropriate off-site noise limits would affect all equipment including that in M+W’s scope of supply, and potentially the operation of the plant by EWH, in my view establishing off-site noise design criteria was incumbent on M+W or EWH, rather than the supplier of discrete part of the overall equipment (such as Outotec).”

737. Both Mr Stephenson and Mr Clarke accepted that proposition in cross-examination. Mr Clarke recognised the point at paragraph 5.1 of his Reply report:

“At 2.1.1.4 of Mr Williams’ evidence he explains the difficulty in Outotec being held responsible for an alleged breach relating to cumulative noise emissions due to the operation of the whole plant, of which Outotec only supplied a certain amount of the equipment. Although there is some logic to this statement, the primary sources of off-site noise pollution agreed by the experts to be problematic were within Outotec’s package and would have required mitigation even if all of the other sources were silent. To that extent, Outotec is solely responsible for the excess noise impact of at least the ID fan and the Air Pollution Control Residue incline conveyor.”

738. In my judgment, M+W has established that Outotec was in breach of its obligation to ensure compliance with the Environmental Permit by failing properly to mitigate the noise of the ID fan and the Air Pollution Control Residue conveyor. It has not, however, established any wider case in respect of the other items of plant supplied by Outotec.

Liable for the same damage

739. I am satisfied that, had this claim been notified in accordance with clause 37, Outotec would have been liable to EWH pursuant to the assigned subcontract and the warranty for the cost of the temporary noise attenuation measures for the Air Pollution Control Residue Conveyors, the cost of the Scope A noise attenuation measures attributable to the ID fan, the Air Pollution Control Residue conveyors, the air blowers, the UFA fan inlet grille and the OFA fan outlet ductwork, and the associated costs of noise surveys, the Environment Agency’s charges, consultancy fees and the incidental costs of insulation, scaffolding, electrical and installation works.

Just and equitable contribution

740. In my judgment, had liability been established for this contribution claim, it would have been just and equitable to order Outotec to pay a contribution in respect of such liability in the sum of £1,041,724.31, comprising:
- 740.1 the full cost of the temporary noise attenuation measures for the Air Pollution Control Residue conveyors of £5,211.56;
- 740.2 the full cost of the Scope A noise attenuation measures for the ID fan and airside blowers, being items 1-6 in the table at paragraph 521 above, totalling £659,020.59; and
- 740.3 a proportionate share of the cost of noise surveys, the Environment Agency's charges, Sol's costs and the insulation, scaffolding, electrical and installation works of £377,492.16 calculated as follows:

	£
Outotec's liability for temporary noise attenuation measures (Air Pollution Control Residue conveyors)	5,211.56
Outotec's liability for Scope A noise attenuation measures (ID fan and airside blowers)	659,020.59
Sub-total	664,232.15

Initial survey and investigation costs and Environment Agency charges (see the table at paragraph 517 above)	20,436.97
Less Uniper costs that related to the Gland Steam investigations	(2,750.00)
Sol's consultancy fees (see paragraph 520 above)	348,419.08
Insulation, scaffolding, electrical and installation works (being the difference between the total of the cost of the Scope A items set out in the table at paragraph 521 above) and the total costs of £1,240,199.40	231,070.81
Sub-total	597,176.88

Total award against M+W (see paragraph 532 above)	1,650,714.48
Less survey & investigation costs; Environment Agency charges; insulation, scaffolding, electrical & installation costs, including Uniper costs	(599,926.88)
M+W's net liability for noise attenuation measure	1,050,787.60
Outotec's proportionate share of additional costs, being $\frac{664,232.15}{1,050,787.60} \times 597,176.88$	£ 377,492.16

DEFECT 23: SLAGGING

741. I dismissed EWH's claim against M+W in respect of slagging: see paragraphs 533-587 above. Thus, even if it had been properly notified, M+W's claim for a contribution in respect of defect 23 does not arise.

DEFECT 17: THE FUEL-FEED SYSTEM

742. I have found for EWH on defect 17 for damages to be assessed following further argument: see paragraphs 588-611 above.

Notification

743. By the Further Information served in April 2020, M+W relied on letters dated 23 and 26 November 2018 and 7 January 2019 in support of its case on notification. These three letters were also pleaded at Annex 1 to the Particulars of the Third Party Claim. By the reamendment to the Reply and Defence to Counterclaim served in October 2020, it relied on a letter dated 7 November 2017. Curiously, M+W did not repeat its reliance on the three letters pleaded in the Further Information. Nevertheless, I am satisfied that M+W is entitled to seek to rely on all four letters.
744. The letter of 7 November 2017 was not referred to by any witness or in either the examination of witnesses or submissions at trial. It was subsequently identified within the bundle in answer to my request for supplementary submissions on the issue. In any event, the letter did not give particulars of any of the defects pleaded under defect 17 at Annex 4. Rather it was notice of misalignment of the gasifier flanges which caused the screw feeders to be out of alignment. This was an example of notice under clause 37.6 that M+W intended to carry out these urgent repairs itself. The letter of 7 January 2019 was concerned with delay. Neither gave particulars of any alleged defect.

745. M+W issued Defect Notices to Outotec on 23 and 26 November 2018. The first letter alleged that the fuel feed system did not work without significant manual intervention to break up blockages and push through stranded material. The second recorded that blockages had overwhelmed the fuel feed system forcing a shut down on 23 November. The requirement under clause 37.2 was to give particulars of the defect, and not of the alleged breaches of the subcontract that might cause such defect. I am satisfied that these letters did notify Outotec of the alleged defect, namely blockages in the fuel feed system. Such notification was made as soon as reasonably practicable after the defect arose.

Breach of the subcontract

746. M+W pleads the following terms of the subcontract:

746.1 Paragraph 2.1.2.3 of the subcontract specification provides:

“... each fuel line shall be automatically controlled to allow independent adjustment of fuel to each line. The whole system shall be integrated so that build-ups can be prevented.”

746.2 Paragraph 1.3.4.3 of Schedule 1 to the subcontract provides:

“The Subcontractor shall include for sufficient equipment, and describe the methods adopted, to ensure consistency of feed to the bed in order to minimise fluctuations in combustion conditions.

Sufficient fuel distribution points shall be provided to ensure that relatively even gasification and temperatures are achieved across the bed.”

747. It is here that the distinction between commissioning and defects is more significant since M+W was responsible for commissioning on site while Outotec’s role during commissioning was advisory. Accordingly, in view of the absence of evidence that the bin switches and sensors were defective, M+W has failed to establish Outotec’s own liability for these two items.

748. Conversely, I have already found that the quad screw defects were either caused by manufacturing issues or by design issues, and that the breathers in the gearbox housings were either defective or poorly installed such that they did not prevent water ingress to the gearboxes. Accordingly, I find that Outotec was liable for the same damage under the subcontract and that the claim for contribution succeeds to this extent.

Just and equitable contribution

749. In the event that after further submissions it is possible to identify any loss and damage flowing from these items then I consider that it is just and equitable, having regard to the extent of Outotec’s responsibility for the damage in question, that it should provide a 100% contribution in respect of these matters.

DEFECT 9: INADEQUATE CORROSION PROTECTION

750. I have awarded EWH damages of £154,835 for M+W's breaches of contract in respect of the painting of the plant: see paragraphs 635-659 above.

Notification

751. M+W relies on Ben Purcell's letter dated 21 August 2017 which asserted:

“M+W has previously notified Outotec about defective paintwork across the entire gasification chain spanning from the gasifier to the baghouse. Twenty-five separate Quality Observation Reports ... (“QARs”) and six non-conformance reports (“NCRs”) have been raised notifying Outotec of defective paintwork and corrosion. Despite this Outotec has carried out limited paintwork repairs leaving it down to M+W to take responsibility for the rectification of these works.

The widespread extent of the defects has led M+W to issue NCR 45055_QAM_NCR_0055 (dated 14 August 2017) which records that the paint system across Outotec's Subcontract Works generally fails to comply with the Subcontract Specification and is defective. In particular the dry film thickness does not comply with environment class C4H as described in BS 12944 and corrosion is visible on the surface of painted areas.”

752. M+W gave notice that it intended to carry out remedial works and seek to recover the cost from Outotec pursuant to clause 37.8 of the subcontract. Works were indeed carried out, but this contribution claim is not a claim to recover M+W's costs of rectifying these defects but a claim for contribution in respect of EWH's claim which, logically, must be for remedial works for defects that were not repaired by M+W or for the cost of carrying out further works where M+W's own works were incomplete or inadequate.
753. It is at least doubtful that this was therefore notification of the claim now pursued. Nevertheless, the claim is in any event hopeless in respect of causation and accordingly I decide the matter on that basis.

Causation

754. For present purposes, I assume that M+W might make out some pleaded breach of the subcontract. Even on that assumption, it cannot establish causation:
- 754.1 First, it is common ground that M+W cannot maintain a contribution claim in respect of the remedial work to the ACC ducts. More significantly, Dr Callow accepted that he was unable to assist as to what items were attributable to Outotec's supply. M+W has not made out any basis that would allow the court to make findings as to cost of the works for which Outotec was responsible.
- 754.2 Secondly, there is no evidence that allows me to allocate the survey costs as between the items of plant that were within the Outotec scope of supply and those that were not.

755. Absent such evidence I cannot properly value the claim that EWH might have under the assigned subcontract and collateral warranty. Further, for the same reason, it would not be just and equitable to order the payment of any contribution.

DEFECT 32: BLOCKED BED CONES

756. I dismissed EWH's claim against M+W in respect of the blocked bed cones: see paragraphs 660-672 above. Thus, even if it had been properly notified, M+W's claim for a contribution in respect of defect 32 does not arise.

OUTOTEC'S COUNTERCLAIM: THE MILESTONE PAYMENTS

757. Outotec counterclaims for the unpaid balance alleged to be payable by M+W upon milestones 7, 8, 9, 10 and 11. The relevant milestones were as follows:

Event no.	Description of Milestone Event	Month	Amount %	US \$	Cumulative %
7	Ready for Shipment of Equipment				
[7.1]	Boiler	14	2%	797,496.13	76%
[7.2]	Baghouse/Scrubber	14	2%	797,496.13	78%
[7.3]	Economizer	13	2%	797,496.13	80%
[7.4]	Multiclone	13	1%	398,748.06	81%
[7.5]	Fan's (sic)	13	1%	398,748.06	82%
[7.6]	OEG Mfg	12	2%	797,496.13	84%
[7.7]	Balance of Plant	16	1%	398,748.06	85%
8	Approval of Final O&M Manuals and other documentation	30	2.5%	996,870.16	87.5%
9	Installation of Major Equipment – not to exceed 18 months from shipment	20	5%	1,993,740.32	92.5%
10	G59 – not to exceed 26 months from shipment	28	5%	1,993,740.32	97.5%

11	Take Over – not to exceed 28 months from shipment	30	2.5%	996,870.16	100%
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758. M+W's liability for milestone 10 was conceded at the opening of the trial. The remaining milestones remain in dispute although very little time was taken at trial in challenging these counterclaims.

759. Outotec's entitlement to payment for milestones is governed by clause 41 of the subcontract:

“41.1 The Contractor shall pay the Subcontractor the Subcontract Price in instalments as provided in Schedule 19 (Subcontract Price and Payment).

41.2 If any instalment is to be paid upon the completion of a specified task or milestone, the Subcontractor shall only be entitled to apply for payment for that instalment when he can provide evidence of completion of the task or milestone as stated in Schedule 19 ...

41.3 The Subcontractor shall submit a request for payment to the Contract Manager at intervals of not less than one calendar month showing:

(a) the Subcontractor's assessment of the amount to be paid for Subcontract Works carried out up to the end of the period for which it is submitted, together with any other scheduled payments as may have become payable;

plus

(b) the amounts to which the Subcontractor considers himself entitled in connection with all other matters for which provision is made under the Subcontract;

less

(c) the total of all sums previously certified by the Contract Manager for payment.

The Subcontractor's requests for payment shall be supported by all relevant documentary evidence appropriately itemised.

41.4 Within fourteen days of the receipt of an interim request for payment, ... the Contract Manager shall issue a certificate to the Subcontractor and the Contractor for the instalment to which the request for payment relates. The certificate shall show the sum which the Contract Manager considers to be due at the payment due date determined in accordance with Sub-clause 41.5, and the basis on which it has been calculated. The total certified shall comprise all sums listed in the Subcontractor's statement which, in the opinion of the Contract Manager are properly payable under the Subcontract and shall show separately any elements within the sums certified in respect of nominated Sub-subcontractors.

The Contract Manager may in any certificate delete, correct or modify any sum previously certified by him as he shall consider proper.”

760. By its Defence, M+W relies on the alleged defects asserted by EWH. Outotec responds by pointing out that defects are dealt with under the defects regime at clause 37 of the subcontract. That is right insofar as the court is considering the contribution claim. While one must be astute not to double count the same defect, abatement is, however, a remedy open to M+W by way of defence to Outotec's counterclaim.
761. In an internal M+W email sent on 7 March 2018, Matthew Crawley said that the mandate given to the commercial team was to ensure, if possible, that Outotec was not overpaid as he suggested it had been in the past. He added:
- “This is becoming increasingly difficult due to a number of payment milestones that are likely to become due in March.”
- He then identified milestones 7, 8 and 9.
762. Outotec relies on Nicklas Morén's evidence in respect of the outstanding milestones. Save for some brief cross-examination in respect of milestone 7.7, Mr Morén's evidence was not challenged. Mr Williamson fairly submits that while some matters might be said to be matters of contract, others obviously require close consideration of the factual material.
763. I am conscious that time at trial was tight and advocates had to be selective as to the areas that they were able to explore in cross-examination. They had agreed a chess clock approach to the fair division of time. No advocate was, however, prevented from seeking more time properly to put its client's case and I made clear that, whatever was agreed between the parties, I was unlikely to close down proper and efficient cross-examination merely because another party asserted that the cross-examiner was out of time. Indeed, I observed that I considered the trial estimate to be too tight, that I did not consider that anyone was wasting time and that if the parties needed more time, they had only to ask. In the event, counsel only sought, and were readily given, one additional day for evidence and another for oral closing submissions.
764. Ultimately, the proper way in which to challenge Mr Morén's evidence was through cross-examination and, if available, the calling of M+W's own witnesses. That was not done.

MILESTONE 7

Milestones 7.1-7.6

765. M+W challenges its liability for milestones 7.1-7.6 on the basis that Outotec has not supplied all of the required documentation. On its face, the milestone is, however, met when the various components listed were ready for shipment. There is no doubt that the equipment has been shipped and indeed installed. There is no specific mention of documentation in the milestone, albeit Outotec concedes that it was required to provide the documentation necessary to ship the equipment. That, it asserts, was done.
766. At a meeting on 15 May 2017, M+W agreed to pay 80% of the sums payable under milestones 7.1-7.6 with the balance of 20% payable once certain documents were delivered. On 17 May 2017, Dr Luiz Salgado, M+W's Head of Corporate Management, sent Outotec

- a list of outstanding documentation for milestone 7. Such list showed the following matters to be outstanding:
- 766.1 The complete shipping lists for the full supply of subcontract plant.
 - 766.2 The documentation concerning the preservation requirements
 - 766.3 The documentation in respect of compliance with the Pressure Equipment Directive in respect of items 7.1, 7.3 and 7.6.
767. M+W seeks to rely on an earlier and different list of 13 May 2017. I reject this position:
- 767.1 First, Dr Salgado recorded in his email of 15 May 2017 that the parties had agreed at the meeting that M+W would provide Outotec with a list of outstanding documents. There was no suggestion that such list had already been given on 13 May.
 - 767.2 Secondly, internal M+W emails show that it was still seeking to finalise the list on 16 May 2017.
 - 767.3 Thirdly, M+W was later to rely on the 17 May email as containing the definitive list of outstanding documents in Mr Meakin's letter of 3 July 2019.
 - 767.4 Fourthly, the M+W witnesses who were at the meeting on 15 May 2017, namely Roy Meakin and Neil Robinson, did not give evidence about the 13 May list. While Mr Crawley seeks to give evidence on the issue, he was not there. In contrast, there is clear evidence before me from Mr Morén, who was at the meeting on 15 May 2017 and who clearly recalls consistently with the contemporaneous documents, that there was to be a new list and that such list was supplied on 17 May.
768. Mr Morén set out between paragraphs 4.19 and 4.45 of his second statement precisely how and when Outotec supplied the outstanding documents. In closing argument, M+W focused simply on the preservation requirements. As to that, Mr Morén asserted, at paragraph 4.25, that full details of the preservation requirements were contained within the O&M manuals. Mr Crawley disputed that assertion at paragraph 86 of his first statement. In turn, by his third witness statement, Mr Morén set out the detail as to where the preservation requirements were dealt with in each of the O&M manuals. Rather than challenge Mr Morén upon this evidence or respond in detail to Outotec's case, M+W instead relies on a contradictory passage in a statement from Lee Read who was not required to attend for cross-examination.
769. In cross-examination, Mr Crawley accepted that he was only able to deal with the position as it stood at December 2018. That is important since, as I discuss more fully below, the O&M manuals were updated in February 2019.
770. I am satisfied that milestones 7.1-7.6 were achieved by 11 May 2017 upon the listed equipment being ready for shipment. There was no further requirement in respect of the provision of documentation but, even if there was, I am in any event satisfied that Outotec has established its entitlement to these milestone payments by proving on the balance of probabilities its compliance with the 17 May list.

Milestone 7.7

771. By a Payment Certificate dated 7 September 2018, M+W argued that there were eight specific items that had not been supplied and which prevented this milestone from being achieved. I shall briefly review the parties' pleaded cases and the evidence on each of these items. Outotec again relies on the second witness statement of Nicklas Morén.

772. Taking each in turn:

772.1 1. Missing handrails at the economiser staircase:

- a) M+W insists that the handrails were missing and that this was noted by Fichtner in its lists in February and March 2019.
- b) Outotec denies that there was a missing handrail. There was, it says, a gap in the handrails which was resolved by January 2018. Further, it contends that the missing handrail noted by Fichtner was a reference to a handrail that was lost by M+W and which was replaced under a variation order.
- c) Mr Morén deals with this issue at paragraphs 4.51-4.53 of his second statement and was briefly cross-examined about the issue.

772.2 2. Access platform for boiler sootblowers:

- a) M+W insists this was missing and relies on contractual obligations in the subcontract specification to arrange plant and equipment "to permit easy access for operation, maintenance and replacement with minimal interruption to plant operation" (section 1.1); specific requirements for access platforms for HRSG sootblowers and boilers (sections 2.1.6.8, 2.1.6.10 & 2.2.13.2, and section 1.3.2.8 of Schedule 1); and to "provide process area platforms as required to allow safe access to all items of the Plant" (section 2.5.2.8).
- b) Outotec argues that such a platform was not within the scope of its work and that no variation was issued.
- c) Mr Morén supports Outotec's position at paragraphs 4.54-4.57 of his second statement.

772.3 3. Kickplates:

- a) M+W argues that insufficient kickplates were supplied to protect the void once the penetration had been cut on site.
- b) Outotec responds that missing kickplates were provided by agreement following an email exchange between Mr Morén and Mr Lettice in February 2018.
- c) Mr Morén deals with this issue at paragraph 4.58 of his second statement. In short, there were missing kickplates but the issue was resolved by agreement that M+W would cut and install the missing kickplates and back charge its reasonable costs.

772.4 4. Access platform for economizer ash conveyor:

- a) M+W insists this was missing and relies on contractual obligations at sections 2.1.7.6, 2.2.5.3 and 2.2.13.2, and at section 1.4.3.3 of Schedule 1.

- b) Again, Outotec responds that this platform was not within the scope of its works and that M+W had failed to issue a variation order.
- c) Mr Morén deals with this issue at paragraph 4.59 of his second statement. It was, he asserts, identified as desirable and accordingly Outotec raised a variation order on 6 March 2019. M+W did not instruct Outotec to proceed.

772.5 5. Access walkway to gasifier camera and instruments on gasifier roof:

6. Access walkway to HRSG inlet duct temperature instruments

- a) M+W again insists that these walkways were required to comply with sections 2.1.1.3 and 2.2.5.3 of the specification.
- b) Outotec denies that such walkways were within the scope of its works and again asserts that there was no variation.
- c) Mr Morén deals with these issues at paragraphs 4.60-4.61 of his second statement.

772.6 7. Grating and handrails on the top of the boiler:

- a) M+W asserts that the grating and handrails were not supplied and that their omission was included on Fichtner's observation list in February/March 2019.
- b) Outotec puts M+W to proof that this issue was noted by Fichtner.
- c) Mr Morén deals with this issue at paragraphs 4.62-4.65 of his second statement. He asserts that the handrails were delivered to site together with the structural members on 10 May 2018 and that the grating was agreed to be completed with grating which was on site. He challenges the suggestion that the issue was included in a Fichtner list and suggests that the matter is in any event a question of snagging.

772.7 8. Numerous valves, instruments, transmitters and sensors:

- a) M+W contend that some twenty instruments were missing.
- b) Outotec argues that these were snagging items and related to twenty out of 1,473 instruments. Outotec asserts that M+W procured the missing items locally; a claim that is formally denied in the M+W's Defence to Counterclaim.
- c) Mr Morén deals with this issue at paragraphs 4.66-4.67 of his second statement. He says that they are snagging items and that it is believed that some of the missing instruments were delivered to site but that M+W was unable to find them. He repeats the claim that M+W sourced the missing instruments locally and says that Outotec provided technical support. He contends that the value of the missing components was "extremely low" and that the subcontract plant could be commissioned without them.

773. In his second witness statement, Mr Crawley asserted, at paragraphs 73-74:

- "73. Towards the end of my time on the Gasification Project, the list of outstanding components was getting shorter. However, there were still significant components that were still outstanding. For example, as per

M+W's letter of 5 December 2018, there were missing handrail and walkway components ...

74. Outotec had been on notice since 20 June 2018 regarding some of these components ... M+W had instructed Outotec to carry out remedial works to the walkway gratings and flooring penetrations but Outotec refused arguing that M+W had agreed to do this on Outotec's behalf. These are some of the components, listed in ALS's survey as included in the 5 December 2018 letter ..., that were still outstanding at the time that I left the Project ... As per my First Statement, there were also other materials that were outstanding."

774. There was, however, a lack of any coherent challenge to Mr Morén's evidence. While Mr Crawley asserted a contrary position at least in respect of the handrail, walkways and flooring penetrations, he did not descend to particulars or give proper evidence (as opposed simply to assertion) in support of M+W's case. Accordingly, I find that the balance of the plant was ready for shipment, and milestone 7.7 was met, by 10 May 2018.

MILESTONE 8

775. M+W alleges that the O&M manuals contained "numerous errors or omissions" as set out in a schedule dated 15 January 2019. It also contends that Outotec failed to provide other documentation including as-built drawings; ATEX/DSEAR assessments; maintenance access studies; valve schedules; and statutory and regulatory compliance documents.
776. Outotec relies on Carey Sovereign's evidence to address in detail the schedule of 15 January 2019. Mr Sovereign explains that the majority of the comments raised by Fichtner concerned minor errors; sought information over and above that which would ordinarily be provided in an O&M manual; or sought information that Outotec was not able to provide. He explains that, following review, Outotec responded to the Fichtner list on 12 February 2019 and then provided a revised electronic copy of the manual on 20 February 2019. Further, for the purpose of this litigation, Mr Sovereign, Mr Morén and Ms Crispin methodically addressed the Fichtner list. The product of that work is a detailed 18-page schedule at Annex 1 to Mr Sovereign's statement. In addition, Mr Sovereign responded to each of the categories of documentation that were alleged to be missing.
777. There was no challenge to Mr Sovereign's evidence; indeed, he was not required to attend court for cross-examination and there has been no attempt whatever to engage with the detail of his evidence.
778. Against this, M+W called only the rather superficial evidence of Mr Crawley on this issue. He asserts, at paragraphs 96-97 of his first statement:
- "96. Milestone 8 was 'Approval of Final O&M manuals and other documentation'. I recall that Outotec submitted a number of different versions of the O&M Manuals. The first submission was received on a USB thumb-drive on or around 10 January 2018.

97. M+W wrote to Outotec on 18 January 2018 listing a series of issues that needed to be addressed before the manuals would be accepted. I know that some of these issues had still not been addressed by 15 November 2018 because I recall seeing meeting minutes from a meeting held on Site, on that date, which stated that many sections of the manuals were empty. The same minutes also record that various types of documentation had still not been received ...”

779. Mr Morén responded to this evidence in his third statement. He referred to Mr Sovereign’s detailed account of the position and simply added:

“As confirmed by Carey in his statement, Outotec provided updated O&M Manuals on 20 February 2019. The O&M Manuals have therefore moved on since November 2018 and the comments made in the November 2018 meeting are not relevant.”

780. Indeed, Mr Crawley had to accept in cross-examination that he had left before the updated O&M manuals were supplied in February 2019 and that he was not able to assist the court with whether the issues that he identified persisted after that date.

781. M+W then relies on the evidence of Mr Read that the plant did not have “complete and up-to-date operation and maintenance manuals.” Such evidence was not tested but it is not clear whether Mr Read was specifically referring to the inadequacy of Outotec’s O&M manuals, the equivalent manuals for other parts of the plant that had not been supplied by Outotec, or both. Further, it is not clear whether he had available to him the February 2019 iteration or some earlier version of Outotec’s O&M manuals. In any event, this evidence is no answer to the focused explanation of the position given by Mr Sovereign and his detailed rebuttal of the Fichtner list. Accordingly, upon the evidence before me, I am satisfied that milestone 8 was achieved on 20 February 2019 when the updated manuals were supplied.

MILESTONE 9

782. Outotec claims that it had installed all of the major equipment by 23 February 2018. By its Defence, M+W makes no admission that all of the major equipment had been “successfully installed.” In that regard, M+W relies simply on the alleged defects in Outotec’s equipment pleaded by EWH.

783. Nicklas Morén for Outotec addresses this milestone briefly. There was no cross-examination. Mr Crawley responded for M+W in respect of certain milestones but did not give any written evidence in respect of milestone 9. In his 7 March email, Mr Crawley had reported to his colleagues:

“Fabricom are due to complete the Gasifier in March and hence we cannot resist payment of this milestone much longer. We could argue that the installation is not complete until Outotec has provided all of the Documentation listed in Schedule 2 (but this would not be very convincing).”

784. In cross-examination, Mr Crawley confirmed that the documentation argument was still not very convincing. Indeed, the point is not argued by M+W.
785. The short point that does arise on milestone 9 is therefore whether the major equipment, which had undoubtedly been installed, was defective. Two points arise:
- 785.1 First, M+W argues that the milestone is not met by the defective installation of the major equipment.
- 785.2 Further or alternatively, M+W seeks to rely on the right of abatement.
786. For the reasons explained below at paragraphs 807-822, I reject Outotec's argument that the right of abatement is either excluded by clause 45.2 of the subcontract or assigned.
787. Accordingly, I find as follows:
- 787.1 Subject to the defence of abatement, this milestone was met by 23 February 2018.
- 787.2 M+W's liability for this milestone falls to be abated in so far as the court accepts EWH's claim that there were defects in the major equipment supplied by Outotec.
- 787.3 Plainly there can be no double counting such that the same damage both abates M+W's liability for an unpaid milestone and gives rise to a contribution claim. Since abatement is a defence to the price rather than a contribution claim that can only be pursued insofar as, first, the defect was notified pursuant to clause 37 and, secondly, the court considers it just and equitable, it is, in my judgment, appropriate first to consider any proven defects by way of abatement of the outstanding milestone.

MILESTONE 10

788. M+W's liability to pay milestone 10 is now admitted.

MILESTONE 11

789. The milestone event for milestone 11 was defined by table 19.3 in Schedule 19 to the subcontract as:

“Take Over – not to exceed 28 months from shipment”

790. There was then a note below the table that provided:

“Pursuant to the Conditions of Subcontract, Milestone Event 11 (Take Over) shall not be certified for payment until the Take Over Certificate has been issued and the Retention Bonds have been received by the Contractor.”

791. A little under \$1 million turns on such question. Given, however, the complexity and value of the other issues in this case, there has been very little written or oral argument on the issue. There is no dispute as to the core facts. Take Over was not achieved but equally, there is no doubt that more than 28 months have elapsed since the shipment of the plant. Liability

for this milestone therefore turns on the proper construction of the milestone event, specifically whether:

791.1 the milestone is only achieved once Take Over occurs; or

791.2 the period of 28 months provides a backstop such that the milestone payment falls payable after such period in any event.

792. Outotec argues that the milestone has been met on the basis that the final balance of the shipment of the plant was delivered by 31 August 2018 such that, even though Take Over was not achieved, the milestone was achieved 28 months later on 31 December 2020. M+W insists, however, that the Take Over Certificate must have been issued. Outotec denies such construction and argues that the note under table 19.3 clarifies the requirements for Take Over but does not affect the requirements for the alternative basis on which milestone 11 might become payable, namely the passage of 28 months from shipment. Outotec then submits:

“The obvious meaning of this provision is that Outotec is not to be kept out of its payment for longer than 28 months in the event that Take Over of the Plant as a whole (over which it, as a supplier only, has no control) has not been achieved.”

793. “Take Over Certificate” is a defined term in the Yellow Book. It has the meaning stated in clause 33.7 and “Take Over” is to be construed accordingly. Clause 33.7 provides:

“As soon as any minor items referred to in Sub-clause 32.6 have been completed and, subject to Sub-clause 33.10, all the procedures specified in Schedule 15 have been successfully carried out, including any which affect the operability or safety of the Subcontract Plant, the Contract Manager shall issue a certificate (a Take Over Certificate) for the Subcontract Plant to the Subcontractor with a copy to the Contractor stating that the Subcontractor has satisfied the requirements of the Subcontract Specification and Schedule 15, whereupon the Subcontract Plant, apart from any parts that are excluded from the Taking Over by the terms of the Certificate, shall be at the risk of the Contractor. The Contractor shall thereupon be responsible for the care, safety, operation, servicing and maintenance of the Subcontract Plant so certified and shall have the right to operate the Subcontract Plant.

The Take Over Certificate may include a list of minor items still to be completed by the Subcontractor, and a list of take over procedures omitted by operation of Sub-clause 33.10.

Any disagreement arising under this Sub-clause 33.7 concerning the issue of a Take Over Certificate which is not settled in accordance with the provisions of Clause 46 (Disputes) may be referred to an Expert in accordance with Clause 48 (Reference to an Expert).”

794. “Retention Bond” was not a defined term in the subcontract. That said, Additional Conditions A1.1-A1.2 provided:

“A1.1 Upon the execution of this Subcontract, the subcontractor shall deliver to the Contractor a performance bond in an amount equal to 10 per cent of the Contract Price, [reducing to 5 percent on Taking Over, to expire on the issue of the Final Certificate and in terms of the draft contained in

appendix 1 (or such other terms as the Contractor shall have approved) executed as a deed and delivered by a bank or insurance company previously approved by the Contractor.

A1.2 Unless a performance bond is provided in terms of clause A1.1 then the Contractor shall be entitled to retain out of any payment due to the Subcontractor a sum equal to 10 per cent of the Subcontract Price. Any amount so retained shall become due for release to the Subcontractor only when such performance bond is provided, or, if none is provided, on the date on which a bond in terms of the draft contained in Appendix 1 would have lapsed.”

795. Thus, the reference to the Retention Bond was to the performance bond that was to be provided by Outotec to M+W to cover the retention. The required performance bond was provided by Nordea Bank AB on 14 January 2016 for 10% of the subcontract price, as required by the terms of the draft performance bond at Appendix 1 to the subcontract.

796. Accordingly, insofar as it was necessary to achieve Take Over in order to meet the milestone:

796.1 The Take Over that needed to be certified was the Take Over for the subcontract plant. There was thus no question of Take Over, within the meaning of milestone 11, being delayed by reason of Take Over of other parts of the plant over which Outotec had no control not being ready.

796.2 The requirement as to receipt of the Retention Bond was met by the fact that a performance bond in the sum of 10% of the subcontract price had been received by M+W.

797. It is a principle of construction that the court will seek to give effect to all parts of a contract and will be slow to regard part of the wording as unnecessary surplusage. The draftsman plainly intended the passage of 28 months to have some significance and I reject any construction of milestone 11 that fails to give meaning to the words “not to exceed 28 months from shipment.” The 28-month period operates as some sort of longstop. Without more, two possible constructions are possible:

797.1 First, as Outotec argue, that the milestone event is met in any event once 28 months have elapsed since shipment regardless of whether Take Over has been certified.

797.2 Secondly, that the milestone is only payable in the event that Take Over is achieved within the period of 28 months.

798. I note that M+W does not argue for such alternative construction. Absent such argument, it is, however, difficult to see how M+W’s preferred construction gives any meaning to the 28-month period.

799. In my judgment, it is also helpful to consider all three of the milestones that use the formulation of “not to exceed [x] months from shipment”:

799.1 Milestone 9:

- a) The milestone event was defined as “Installation of Major Equipment – not to exceed 18 months from shipment.”
- b) The major items of plant were expected to be ready for shipment by month 14 (see milestone 7).
- c) Installation was expected by month 20.
- d) The longstop date of 18 months from shipment would therefore take one (assuming shipment ran to schedule) to month 32. Installation would then be some 12 months late.

799.2 Milestone 10:

- a) The milestone event was defined as “G59 – not to exceed 26 months from shipment.”
- b) All plant was expected to be ready for shipment by month 16 (see milestone 7.7).
- c) “G59”, being certification by Ofgem that the plant was capable of exporting power to the grid, was expected by month 28.
- d) The longstop date of 26 months from shipment would take one (assuming shipment ran to schedule) to month 42. G59 certification would then be some 14 months late.

799.3 Milestone 11:

- a) The milestone event was defined as “Take Over – not to exceed 28 months from shipment.”
- b) All plant was expected to be ready for shipment by month 16 (see milestone 7.7).
- c) Take Over was expected by month 30.
- d) The longstop date of 28 months from shipment would therefore take one (assuming shipment ran to schedule) to month 44. Take Over would then be 14 months late.

800. Such delay would be catastrophic:

800.1 As already explained, the Delay Damages Cap under the EPC contract would, absent any extension of time, expire on 7 January 2019 such that if Take Over was not achieved by such date, EWH might be entitled to terminate the contract for Contractor’s Default.

800.2 The subcontract was itself liable to be terminated pursuant to clause 44.2(d) in the event that Outotec incurred a liability for liquidated damages in excess of the maximum level payable under schedule 12.

801. It is, however, important to understand the limitations on the subcontract works. The scope of the subcontract works was defined at paragraph 1.1 of the subcontract specification as follows:

“The Subcontract Agreement comprises the design, manufacture, factory testing, painting, and advice on the following: installation and erection, commissioning, putting into normal operation, testing for performance, certification, reliability on completion, instruction of the operator's personnel in the operation and maintenance of the Works.”

802. The essential difference therefore between milestones 1-8 and 9-11 is that the former was exclusively within Outotec’s control whereas, following shipment of the plant to site, its role was advisory in respect of the installation and commissioning of the plant. That is, in my judgment, a critical part of the factual matrix that assists in the proper construction of milestone 11.

803. Applying the principles of contractual construction set out at the start of this judgment:

803.1 I consider that the natural and ordinary meaning of the words of the milestone is ambiguous as between the two meanings identified at paragraph 797 above.

803.2 I consider then the other relevant provisions of the subcontract, including the other milestones that use a similar formulation; the scope of the subcontract works, the provisions in respect of certifying Take Over of the subcontract plant; and the provisions in respect of the giving of a performance bond.

803.3 I consider that the overall purpose of the milestone provisions is to ensure that Outotec is entitled to fair payment for the work done, thereby protecting both its cashflow and that of M+W as the main contractor.

803.4 I tread with some trepidation when considering commercial common sense. It has rightly been observed that judges are not necessarily well equipped to assess what businessmen and women would regard as commercially sensible. Nevertheless, I consider that one can confidently assert that it made commercial common sense to insist on actual achievement of milestones 1-8 that were within Outotec’s control but, given its advisory role post-shipment of the plant, to provide for Outotec to receive payment for the remaining milestones in any event should installation, G59 certification or Take Over be unreasonably delayed.

804. Accordingly, I find that:

804.1 Milestone 11 could be achieved either upon Take Over or, should that not happen, upon the expiry of 28 months after the shipment of the plant.

804.2 Once one construes the milestone event as being met in two alternative ways then, consistently with such construction, the words underneath the table can be construed as giving further clarification as to precisely when one of those ways (namely Take Over) is deemed to have occurred.

805. I therefore find that milestone 11 was achieved on 31 December 2020.

CONCLUSIONS IN RESPECT OF THE MILESTONE PAYMENTS

806. Taking into account the payments already made in respect of milestone 7, I therefore find that, subject to the question of abatement, M+W is liable to pay the following milestone payments:

Event no.	Description of Milestone Event	Outstanding balance USD \$
7	Ready for Shipment of Equipment	
[7.1]	Boiler	159,499.23
[7.2]	Baghouse/Scrubber	159,499.23
[7.3]	Economizer	159,499.23
[7.4]	Multiclone	79,749.61
[7.5]	Fan's (sic)	79,749.61
[7.6]	OEG Mfg	159,499.23
[7.7]	Balance of Plant	79,749.61
8	Approval of Final O&M Manuals and other documentation	996,870.16
9	Installation of Major Equipment – not to exceed 18 months from shipment	1,993,740.32
10	G59 – not to exceed 26 months from shipment	1,993,740.32
11	Take Over – not to exceed 28 months from shipment	996,870.16
		\$ 6,858,466.71

OUTOTEC'S COUNTERCLAIM: THE DEFENCE OF ABATEMENT

807. M+W pleads that it is in any event entitled to rely on any proven defects in the subcontract works by way of abatement of its outstanding liability to Outotec under the subcontract. Outotec takes two points in response:

- 807.1 First, it contends that since the subcontract did not contain an express contractual right of abatement, any such remedy was excluded by the exclusive remedies provision at clause 45.2.
- 807.2 Secondly, the defence of abatement must fail in view of O'Farrell J's ruling that M+W has assigned its accrued and future rights under the subcontract.

THE NATURE OF ABATEMENT

808. Abatement is the right of an employer to a building contract "not to set off, by a proceeding in the nature of a cross action, the amount of damages which he has sustained by breach of the contract, but simply to defend himself by showing how much less the subject matter of the action was worth, by reason of the breach of contract": Mondel v. Steel (1841) 8 M&W 858, at 871-872. In Gilbert Ash (Northern) Ltd v. Modern Engineering (Bristol) Ltd [1974] AC 689, Lord Diplock explained, at 717:

"This is a remedy which the common law provides for breaches of warranty in contracts for sale of goods and for work and labour. It is restricted to contracts of these types. It is available as of right to a party to such a contract. It does not lie within the discretion of the court to withhold it. It is independent of the doctrine of 'equitable set off' developed by the Court of Chancery to afford similar relief in appropriate cases to parties to other types of contracts ... That it was no mere procedural rule designed to avoid circuity of action but a substantive defence at common law was the very point decided in Mondel v. Steel."

809. In Henriksens Rederi A/S v. THZ Rolimpex (The Brede) [1974] 1 QB 233, Lord Denning MR described the principle in Mondel v. Steel, at p.260, as "a true defence to a claim for the price" such that it could not be defeated by a limitation period applicable to a set-off or counterclaim. He explained:

"In every such case it is plain that the plaintiff, not having completed the agreed work in accordance with the contract, is not entitled to the whole of the agreed sum. He ought not, therefore, to recover judgment for that sum, but only for the lesser sum. When the defendant says: 'You have not done the work to the agreed standard, and you are, therefore, not entitled to the agreed price' that is a matter of defence in law and not of set-off or counterclaim."

810. Keating on Construction Contracts (11th Ed.), says, at para. 19-112:

"Thus where there is a claim on a lump-sum contract and the defendant alleges that there are defects it may either set-off its loss in diminution of the claim, or it may counterclaim for damages. An employer, whose repudiation of the contract is accepted by the contractor before completion, is nevertheless entitled to abatement of the contractor's entitlement to be paid at contractual rates for work completed, if the incomplete work is defective. The measure of an abatement is 'how much less the subject-matter of the action [is] worth by reason of the breach'. By definition, the measure of an abatement cannot exceed the total of the sum to which it is applied. Since an abatement applies only to matters that go to reduce the value of the work performed or of the goods sold, it cannot apply to a cross-claim for delay in the execution of the works, which would be a matter of equitable set-off."

EXCLUDING THE RIGHT OF ABATEMENT

811. I have already referred to the speech of Lord Diplock in Gilbert-Ash (Northern) Ltd v. Modern Engineering (Bristol) Ltd [1974] A.C. 689, in which, at 717H, he stressed that “clear express words” are required to rebut the presumption that neither party intends to abandon any remedies for breach arising by operation of law. Such statement of general principle was made in the context of the remedy of abatement.
812. In Acsim (Southern) Ltd v. Danish Contracting & Development Co. Ltd (1989) 47 BLR 55, the subcontract entitled the contractor to set off “against any money ... otherwise due under the subcontract the amount of any claim for loss and expense” which had been quantified and notified to the subcontractor in accordance with the contractual machinery for defects. Clause 15(4) then provided:
- “The rights of the parties to this subcontract in respect of set-off are fully set out in these conditions and no other rights whatsoever shall be implied as terms of this subcontract relating to set-off.”
813. The Court of Appeal held that such clause did not affect the contractor’s right to defend a claim for an interim payment by showing that the sum claimed included sums to which the subcontractor was not entitled or to defend it by showing that by reason of the subcontractor’s breaches of contract, the value of the work was less than the sum claimed under the ordinary right of defence established in Mondel v. Steel. The clause’s reference to rights “in respect of set-off” must be construed as rights of set-off as defined in law.
814. While the clause in Acsim was not effective to exclude the right of abatement, there is no doubt that the parties can exclude such right. Indeed, the point made by Lord Diplock in Gilbert Ash was not that the right of abatement cannot be excluded but that clear words are required to achieve such result. Here, the clause referred expressly to liability being limited to “the damages, remedies and reimbursements expressly provided in this subcontract.” M+W takes two points:
- 814.1 First, it argues that abatement is not a liability of Outotec to M+W, but rather a right that reduces M+W’s liability to Outotec.
- 814.2 Secondly, it argues that abatement is not a remedy but rather a clog, hindrance or limitation on Outotec’s right to payment. The exclusion of the right of abatement would lead unjustifiably to an extension of Outotec’s right to payment.
815. Abatement is properly described as a remedy; indeed it was so described by Lord Diplock in Gilbert Ash and by Ralph Gibson LJ in Acsim. The nature of the remedy in a building subcontract is, however, that it reduces the subcontractor’s right to payment for work done. The remedy does not operate as a set-off but by way of defence to the claim for the price of the works: Mondel v. Steel; Gilbert Ash; Henriksens and Acsim. It creates no freestanding liability which can found a separate action against the subcontractor but reduces the subcontractor’s own entitlement to payment. Accordingly, in my judgment, the remedy of abatement is not clearly excluded by clause 45.2 which is concerned with the limitation of liability and not the exclusion of a remedy that itself acts to reduce the contractor’s liability.

DOES THE REMEDY OF ABATEMENT SURVIVE ASSIGNMENT?

816. While O’Farrell J was not required to consider the question of abatement, she did rule upon the true effect of the assignment in this case. In doing so, she cited Lord Browne-Wilkinson’s speech in Linden Gardens Trust Ltd v. Lenesta Sludge Disposals Ltd [1994] 1 A.C. 85, at 103:

“It is trite law that it is, in any event, impossible to assign ‘the contract’ as a whole, i.e. including both burden and benefit. The burden of a contract can never be assigned without the consent of the other party to the contract in which event such consent will give rise to a novation ... Although it is true that the phrase ‘assign this contract’ is not strictly accurate, lawyers frequently use those words inaccurately to describe an assignment of the benefit of a contract since every lawyer knows that the burden of a contract cannot be assigned ...”

817. At [62] of her own judgment, O’Farrell J accurately identified the following propositions of law arising from the Linden Gardens case:

- “(i) Subject to any express contractual restrictions, a party to a contract can assign the benefit of a contract, but not the burden, without the consent of the other party to the contract.
- (ii) In the absence of any clear contrary intention, reference to assignment of the contract by the parties is understood to mean assignment of the benefit, that is, accrued and future rights.
- (iii) It is possible to assign future rights under a contract without the accrued rights but clear words are needed to give effect to such intention.”

818. Here, the judge found:

818.1 At [68]-[84], that upon the true construction of clause 44.3(d) of the EPC contract, clause 9.1(b) of the Outotec subcontract, and the notice of assignment, M+W had assigned the benefit of its accrued and future rights under the subcontract.

818.2 At [85]-[108], the subcontract was not novated such that M+W remained liable for sums that fell due for past performance of the subcontract.

819. The effect of the judge’s decision was that M+W has no right of action against Outotec for the alleged defects in the subcontract works such that its only claim is for contribution. Any such cause of action would be a benefit under the subcontract that has therefore been assigned to EWH. While inconvenient, that ruling does not, however, deal with the remedy of abatement:

819.1 Abatement does not give rise to a benefit since it is not a freestanding cause of action or set-off. Rather abatement acts to reduce the burden of the contract.

819.2 Since the burden of the contract cannot in law be assigned and there has been no novation in this case, M+W remains liable for the burden under this subcontract. Accordingly, the remedy of abatement has not been assigned.

820. The concept of assigning an abatement is meaningless since such remedy has no independent existence untethered from the payment obligation that it qualifies or limits. Further, since EWH has no obligation to pay the purchase price under the subcontract, there is no possible way in which it, as assignee, could avail itself of the right to abatement. I am fortified in these conclusions by the speech of Lord Hoffmann in Investors Compensation Scheme Ltd v. West Bromwich Building Society [1998] 1 W.L.R. 896, at 916:

“Now it is important to notice that a claim to rescission is a right of action but can in no way be described as a chose in action or part of a chose in action. It is a claim to be relieved of a mortgage, and such a claim can be made only by the owner of the mortgaged property. The owner cannot assign a right to rescission separately from his property because it would make no sense to acquire a right to have someone else’s property relieved of a mortgage. Likewise, the possibility of an abatement of the debt as part of the process of rescission is not a chose in action which can be assigned. It is simply part of the process of rescission, which is a right attached to the ownership of the house itself.”

821. Mr Acton Davis rightly submits:

“Just as it would make no sense to acquire a right to have someone else’s property relieved of a mortgage, so too would it make no sense to acquire a right to have someone else’s liability in debt reduced.”

CONCLUSIONS

822. Even where M+W has no claim for contribution under the 1978 Act by reason of the lack of notification under clause 37 of the subcontract, it may nevertheless rely on the defence of abatement in reduction of its liability under the subcontract for milestone payments. Having determined the principle, I shall hear the parties further upon handing down this judgment as to how the defence of abatement operates in fact in this case.

OUTOTEC’S COUNTERCLAIM: WRONGFUL DEDUCTIONS

THE CLAIM

823. Outotec’s pleaded claim under this head is brief and can conveniently be set out in full:

“65. In its Payment Certificate No. 10 dated 3 July 2019, M+W valued the measured work at \$33,016,339.70 plus \$34,148.30 for agreed Variations. However, it has deducted:

- 1) Liquidated damages in the sum of \$3,987,480.64; and
- 2) ‘Recharges’ in the sum of \$11,074,338.64

66. Outotec disputes the validity of these deductions, but in any event M+W has no basis on which to set-off against such delay damages or backcharges as the Sub-Contract has been assigned to EWH.

67. M+W has to date paid \$28,026,341.27 against Outotec’s entitlement to \$40,137,355.45. Outotec is therefore entitled to and claims \$12,111,014.18, as set out in Annex 3.”

RECHARGES

824. The recharges can be dealt with briefly. It is now common ground between the parties that M+W can only pursue claims for the alleged defects in the subcontract works through its contribution claim. Accordingly, and subject to the issue of abatement, recharges of \$1,036,676.08 fall to be recredited to Outotec's account.

LIQUIDATED DAMAGES UNDER THE SUBCONTRACT

825. Outotec expressly concedes that the subcontract was in delay and that it was in principle liable to pay liquidated damages up to the contractual cap. It argues, however, that the benefit of any claim for liquidated damages was assigned to EWH in June 2019. It submits:

“Until the assignment in 2019, that liability was a benefit under the subcontract enjoyed by M+W. In particular, that then entitled them to deduct liquidated damages under the subcontract against interim payments due to Outotec, subject to serving a pay less notice: see clause 41.6. That benefit was assigned to EWH in 2019, and at that point the right to deduct was lost.”

826. M+W argues that Outotec has no right to recover liquidated damages that were properly levied and recovered by M+W prior to the assignment. It then pleads, at paragraph 51(ii) of its Reply and Defence to Counterclaim:

“Insofar as any claims against Outotec were fully discharged prior to the assignment, they were not subject to the assignment because no further right in respect of such claims existed at the time of the assignment. In this regard:

- (a) The last interim payment certificate prior to assignment of the Outotec Sub-Contract related to 31 August 2018 and was issued on or around 7 September 2018.
- (b) In that certificate, M+W valued Outotec's milestone entitlement at \$32,697,341.24 and its variation entitlement at \$32,687.40, giving a total of \$32,730,028.64.
- (c) M+W had only paid \$28,956,341.25 previously.
- (d) In the premises, but for counterclaims, \$3,773,687.39 would have been due to Outotec.
- (e) However, no sum was paid to Outotec because M+W made deductions of: \$3,987,480.64 in relation to liquidated damages and \$7,434,792.35 in relation to recharges.
- (f) The deduction for liquidated damages was properly made. M+W's entitlement in this respect is pleaded at paragraphs 16 to 18 of the Particulars of Additional Claim.
- (g) By withholding \$3,773,687.39 which would otherwise have been paid to Outotec on this basis, M+W effectively received reimbursement for liquidated damages in or around September 2018.
- (h) In the premises, prior to termination M+W had already recovered the liquidated damages to which it was entitled. There was no remaining right to levy further liquidated damages which could be assigned to EWH. There is no legal reason why M+W must disgorge such properly levied liquidated damages to Outotec.”

827. Liquidated damages for delay are dealt with at clause 15.1 of the subcontract, which provides:
- “If the Subcontractor fails to fulfil any of its obligations under this Subcontract, and or to do any other thing in accordance with Schedule 11 (Times of completion), the Subcontractor shall pay the Contractor liquidated damages as specified in Schedule 12 (Liquidated damages for delay), but shall have no liability to pay damages in excess of the maximum (if any) stated in Schedule 12.”
828. Liquidated damages therefore accrue from time to time in accordance with the scale of damages fixed at Schedule 12 as soon as Outotec failed to meet the times for completion set out in Schedule 11.
829. By a letter dated 25 August 2017, Outotec challenged M+W’s entitlement to liquidated damages on the basis that it had not provided evidence that deliveries had not been in accordance with Schedule 11. Such position was plainly unsustainable and, as already noted, Outotec does not challenge that liquidated damages were payable under the subcontract to the contractual maximum sum.
830. By a letter dated 11 October 2017, M+W provided its then calculation of the liquidated damages payable under the subcontract under the title “Outotec Delay Damages Schedule”:
- 830.1 The calculation identified the various items of the subcontract plant that were in delay, showing for each the contractual availability date (as per Schedule 11); the actual availability date; the number of working days’ delay; M+W’s calculation of the liquidated damages payable; and providing some supporting notes with cross references to documents supporting the calculation. While the table did not also include a column to show the daily rate for liquidated damages, I have cross checked each calculation against the rates specified in Schedule 12 and it is clear that it used such daily rates.
- 830.2 With one exception, all calculations ran to dates before 11 October 2017 indicating that such periods of delay had already ended at the time of the schedule. The final item ran to 11 October 2017 itself indicating that there was continuing delay in the provision of the balance of the plant.
- 830.3 The total claim for liquidated damages on that schedule amounted to \$5,126,000.
831. Mr Crawley gives evidence in support of this calculation. He notes that Outotec failed either to respond or contest the delivery dates relied on in his calculation or the supporting documentary evidence. While Outotec served evidence dealing with the delivery dates for various pieces of plant, it neither called nor relied upon Mr Porter’s evidence. Consistently with that approach, Mr Crawley’s evidence on this issue was not challenged at trial.
832. Under cover of its letter of 30 November 2017, M+W issued its Payment Certificate 11. In summary, it certified an overpayment of \$2,833,046.07 meaning that no payment then fell due to Outotec:

Description of Milestone Event	US \$
Certified value of milestones	32,697,341.25
Certified value of variations	32,687.40
Less liquidated damages	(3,987,480.64)
Less recharges	(2,619,252.83)
Total payment assessment	\$ 26,123,295.17

Payments made to date	28,956,341.25
Balance payable	\$ (2,833,046.07)

[Note that there appear to be some rounding errors, but the original figures from the Payment Certificate are reproduced above.]

833. The deduction for “liquidated damages accrued to date as LD tracker issued 24/4/17” was at the foot of the certificate under the heading “Forecast Amounts.” The Contract Manager added a comment in the final column that this was a “provisional deduction for this assessment.” The reference to a tracker issued on 24 April 2017 is curious. Neither party has referred me to any such document in their submissions. Further, despite searching by both the date and the name of the document, I cannot find any such document in the bundle. What was included with the Payment Certificate was an updated version of M+W’s “Outotec Delay Damages Schedule.” Such schedule did not indicate that there was anything provisional or forecast about the claim for liquidated damages. The calculation now showed the claim for liquidated damages for the balance of the plant extending to 30 November 2017 itself; again indicating that such delay was continuing. The updated gross claim for liquidated damages amounted to \$5,198,000. That figure comfortably exceeded the Delay Damages Cap of 10% of the subcontract price and accordingly supported a deduction for liquidated damages in the sum of \$3,987,480.64.
834. On 13 December 2017, M+W issued a Pay Less notice pursuant to clause 41.7 of the subcontract clearly repeating the position that it certified on 30 November and showing the deduction of liquidated damages.
835. This pattern of events was repeated over the following months with Outotec making further requests for payment, on each occasion giving no credit for any liquidated damages that might be payable, and M+W repeatedly reasserting its right to deduct such damages and showing a net negative balance indicating that Outotec had been overpaid. In doing so, by Payment Certificates 12 (4 January 2018), 13 (28 March 2018), 14 (9 May 2018), 15 (10 July 2018) and 16 (7 September 2018), M+W showed the liquidated damages in the same way as it had done in November 2017. These were “further adjustments” under the heading “forecast amounts” and the elusive LD tracker issued in April 2017 was referenced together with the Contract Manager’s comment that this was a “provisional deduction for this

assessment.” Focusing on the last of this series issued on 7 September 2018, there was an updated version of the now familiar Outotec Delay Damages Schedule showing the gross claim now at \$5,600,000 before application of the Delay Damages Cap.

836. Following the assignment, M+W issued a further Payment Certificate on 3 July 2019. Again, it included a deduction for the maximum recoverable liquidated damages. This time the wording was a little different. This was simply a “further adjustment”; there was no suggestion that it was a forecast amount or indeed that it was provisional.
837. Consideration of that issue requires the court to analyse the way in which the liquidated damages claim had been asserted and accounted previously.

PAYMENT PROVISIONS UNDER THE SUBCONTRACT

838. Clause 41 of the subcontract set out the contractual scheme for the payment of instalments of the subcontract purchase price in accordance with the milestones provided at Schedule 19. Clause 41.3 provided that Outotec was required to submit its requests for payment at intervals of not less than one calendar month showing, with supporting evidence:

“(a) the Subcontractor's assessment of the amount to be paid for Subcontract Works carried out up to the end of the period for which it is submitted, together with any other scheduled payment as may have become payable;

plus

(b) the amounts to which the Subcontractor considers himself entitled in connection with all other matters for which provision is made under the Subcontract;

less

(c) the total of all sums previously certified by the Contract Manager for payment.”

839. Clause 41.4 then provided:

“Within fourteen days of the receipt of an interim request for payment, or in the case of the final request for payment within fifty-six days of its receipt, the Contract Manager shall issue a certificate to the Subcontractor and the Contractor for the instalment to which the request for payment relates. The certificate shall show the sum which the Contract Manager considers to be due at the payment due date determined in accordance with Sub-clause 41.5, and the basis on which it has been calculated. The total certified shall comprise all sums listed in the Subcontractor’s statement which, in the opinion of the Contract Manager, are properly payable under the Subcontract and shall show separately any elements within the sums certified in respect of nominated Sub-subcontractors. The Contract Manager may in any certificate delete, correct or modify any sum previously certified by him as he shall consider proper.”

840. Sums certified and notified as due in accordance with sub-clause 41.4 fell due for payment fourteen days after receipt of Outotec’s interim request for payment or fifty-six days after

the final request for payment: clause 41.5. Clause 41.6 dealt then with the default position in the absence of such notification:

“If for any reason the Contractor, or the Contract Manager on his behalf, fails to notify the sum due in accordance with Sub-clause 41.4 by the payment due date determined in accordance with Sub-clause 41.5 the sum notified by the Subcontractor in his request for payment in accordance with Sub-clause 41.3 shall be due for payment by the Final Date for Payment.”

841. Clause 41.7 provided the mechanism by which M+W was entitled to pay less than the sums certified as outstanding for the achieved milestones. It provided:

“If the Contractor intends to pay less than the sum due in accordance with Sub-clause 41.4 or 41.6 for any reason including any sum that may be due from the Subcontractor to the Contractor under the Subcontract or any sum not payable in accordance with Sub-clause 44.5, the Contractor shall notify the Subcontractor not later than one day before the Final Date for Payment, specifying the amount he considers to be due on the date the notice is given and the basis on which that sum is calculated.”

TRUE DEFENCES, SET-OFFS AND COUNTERCLAIM

842. In Henriksens Rederi A/S v. THZ Rolimpex (The Brede) [1974] Q.B. 233, the Court of Appeal had to consider whether a charterer's claims that part of a cargo of rice was lost at sea and that a further part of the cargo was damaged by the ingress of sea water amounted to a defence to the claim for the unpaid cost of the freight or a set-off or counterclaim. The charterer had deducted the sum claimed to be due for loss and damage and paid only the balance of the freight costs. If a true defence then the charterer's damages claim could be deducted from the unpaid freight charges whereas if it was to be regarded as a set-off or counterclaim, then such claim was barred by the shorter one-year limitation applicable under the Hague Rules for claims for loss or damage to the cargo. The case was decided on the basis that there is a longstanding rule that freight charges should be settled without set-off or deduction. The analysis of Lord Denning MR of the position under the general law but for such rule is, however, illuminating. He said, at pp.245-246:

“In point of principle, when applying the law of limitation, a distinction must be drawn between a matter which is in the nature of a *defence* and one which is in the nature of a *cross-claim*. When a defendant is sued, he can raise any matter which is properly in the nature of a *defence*, without fear of being met by a period of limitation. No defence, properly so called, is subject to a time-bar. But the defendant cannot raise a matter which is properly the subject of a *cross-claim*, except within the period of limitation allowed for such a claim. A cross-claim may be made in a separate action, or it may be made by way of set off or counterclaim. But on principle it is always subject to a time-bar. The period allowable to the defendant depends on the steps which he takes to enforce his cross-claim. If he brings it by a separate action or arbitration, he must start his proceedings within the prescribed time or else he will be barred. If he raises it as a 'claim' by way of set off or counterclaim the law is governed by section 28 of the Limitation Act 1939, which says:

‘For the purposes of this Act, any claim by way of set off or counterclaim shall be deemed to be a separate action and to have been commenced on the same date as the action in which the set off or counterclaim is pleaded.’”

843. Lord Denning then considered the limitation position where the defendant sought to rely on a legal set off (being a debt arising from a separate transaction) or a cross-claim for damages arising from a separate transaction by way of counterclaim. In both cases, such set-off or counterclaim would be time-barred if it was time-barred when the claimant issued its own claim. He then continued, at p.247:

“All this is when the set off or counterclaim arises out of a *separate* transaction. When it does not arise out of a separate transaction, but out of the *same* transaction, then it is not within section 28 at all. It can be raised, as I will soon show, as matter of defence, either legal or equitable, so as to reduce or extinguish the claim and, being matter of defence, it is not subject to a time-bar.”

844. Turning then to cross-claims arising from the same transaction, Lord Denning said:

“Our law has divided cross-claims (which arise out of the same transaction as the claim) into two categories:

First: when the cross-claim goes directly in diminution or extinction of the claim; such as cases where goods are sold with a warranty, and by reason of the breach of warranty the goods are worth less than the contract price; or, cases where work and labour are expended on a building and, by reason of defects, the work actually done is worth less than the contract price. In every such case it is plain that the plaintiff, not having completed the agreed work in accordance with the contract, is not entitled to the whole of the agreed sum. He ought not, therefore, to recover judgment for that sum, but only for the lesser sum. When the defendant says: ‘You have not done the work up to the agreed standard, and you are, therefore, not entitled to the agreed price,’ that is matter of defence in law and not of set off or counterclaim. This is borne out by the words of Parke B. in the leading case of Mondel v. Steel (1841) 8 M. & W. 858, 871-872:

‘... it is competent for the defendant . . . not to set off, by a proceeding in the nature of a cross-action, the amount of damages which he has sustained by breach of the contract, but simply to *defend himself* by showing how much less the subject matter of the action was worth, by reason of the breach of contract ...’ ...

Thus far I have considered only the amount by which the subject matter is of less worth owing to the breach of contract. That is matter of defence in law. In the old days it could be raised under the plea of non assumpsit or never indebted—which shows that it was defence in law... This defence is not subject to any time-bar.

Secondly: when the cross-claim does not reduce the value of the goods sold or the work done, but causes other damage; such as cases where goods are delayed in delivery and the buyer has a cross-claim for damages for delay; or where a contractor who is employed to clean windows negligently breaks the leg of a chair. In former times such damages could only be claimed in a separate action: see Mondel v. Steel, 8 M. & W. 858, 870-872, and would no doubt be subject to a time-bar, where appropriate. Since the Judicature Act 1973, however, these damages can be set up by way of an equitable

set off in diminution or extinction of the claim—leaving any over-plus to be the subject of a counterclaim. The scope of equitable set off was considered by Lord Lyndhurst L.C. in Rawson v. Samuel (1841) 1 Cr. & Ph. 161, 178; recently by this court in Morgan & Son Ltd. v. Martin Johnson & Co. Ltd [1949] 1 K.B. 107 and Hanak v. Green [1958] 2 Q.B. 9. It is available whenever the cross-claim arises out of the same transaction as the claim; or out of a transaction that is closely related to the claim...

When the contractor sues for the contract price, the employer can say to him: ‘You are not entitled to that sum because you have yourself broken the very contract on which you sue, and you cannot fairly claim that sum unless you take into account the loss you have occasioned to me.’ It is on a par with the case of a defendant who says that the plaintiff has repudiated the contract by an anticipatory breach, or that the plaintiff has been guilty of a breach going to the root of the contract. On accepting it, the defendant is discharged from further performance and can set up the breach as a defence. So also with any breach by the plaintiff of the self-same contract, the defendant can in equity set up his loss in diminution or extinction of the contract price. It is in the nature of a defence. As such it is not subject to a time-bar.”

ANALYSIS

845. Upon the evidence before me, I find that, prior to the assignment, M+W had an accrued right to liquidated damages for delay in the maximum contractual sum of \$3,987,480.64. Such claim was not, on its true analysis, within Lord Denning’s first category of cross-claims arising from the same transaction; namely a true defence that goes directly in diminution or extinction of the claim. Rather, it was a claim not that the goods and services supplied by Outotec were less valuable but that the subcontractor’s delay caused other loss. That analysis is not, in my judgment, undermined by the fact that the claim is for liquidated damages rather than general damages for delay. Unlike a defence of abatement (as to which see paragraphs 807-822), the claim for liquidated damages was therefore capable of assignment.

846. Mr Williamson submits:

“96. It does not matter that in 2018, prior to the assignment occurring, M+W had deducted or withheld the [liquidated damages]. The correct analysis is that the effect of the assignment is that the [liquidated damages] (if applicable) are now owed solely to EWH and Outotec could not obtain a good discharge by paying M+W. The fact that, in the past, M+W purported to deduct such [liquidated damages] from sums otherwise due to Outotec is irrelevant. If M+W’s contention were correct, EWH would not, in fact, have obtained by the assignment all accrued and future rights under the Subcontract and/or the sole legal right to that debt, together with all attendant remedies.

“97. Moreover, the accident of time as to when sums are paid and/or deducted cannot affect the above analysis. M+W’s new case would only be correct if the debtor (Outotec) could say that payment to the assignor (M+W) was good discharge of a debt owed to the assignee (EWH), but the above authorities do not provide any support for such a proposition. On the contrary, payment by Outotec to M+W will not give it good discharge, and it would remain liable to pay the debt as against EWH.”

847. I disagree that the “accident of time” does not affect the analysis:

847.1 Pre-assignment, liquidated damages were owed to M+W. As Mance J, as he then was, observed in National Iranian Tanker Co. v. Van der Veit Engineering Ltd [1996] C.L.C. 971:

“Until notice of any assignment, a contracting party is entitled to regard himself as party to obligations towards the assignor alone. Thus in the case of a monetary obligation he may until notice pay the assignor.”

The point is perhaps rather obvious. Pre-assignment, it is not just that the debtor “may” pay the assignor; it is his contractual obligation to do so. Further, a stranger to the contract, such as the future assignee, cannot at that point give a good discharge.

847.2 Once a debt is paid, the obligation has been discharged. The right to receive the payment is no longer a benefit under the contract and accordingly there is nothing to assign. If authority is needed for such straightforward propositions, then I refer to Turner LJ’s observations in Stocks v. Dobson (1853) 4 De G.M. & G. 11, at 15:

“The debtor is liable, at law, to the assignor of the debt, and at law must pay the assignor if the assignor sues in respect of it. If so, it follows that he may pay without suit. The payment of the debtor to the assignor discharges the debt at law. The assignee has no legal right, and can only sue in the assignor’s name. How can he sue if the debt has been paid?”

The judge was there dealing with an equitable assignment, but such distinction does not affect the core point that the debt is equally discharged upon payment to the assignor before the assignment.

847.3 Thus, Mr Acton Davis is right to submit that “the accident of time” is not just capable of affecting the analysis but is fundamental.

848. It is certainly right therefore that, following the assignment, any unsatisfied claim for liquidated damages under the subcontract was vested in EWH and not M+W. The key to the present dispute is in my use of the adjective “unsatisfied.” Outotec was solely liable for liquidated damages to M+W before the assignment. If such liability was discharged, Outotec did not also become liable for the same damage to EWH following the assignment. Further, there is no proper basis in law or equity for requiring M+W to disgorge the benefits of any liquidated damages that were properly due and payable if such damages were paid before assignment.

849. Here, M+W asserted its cross-claim for liquidated damages in a series of Payment Certificates and, in compliance with clause 41.7, by a Pay Less notice. While described as provisional, the claim had already accrued and was fully particularised. It was open to Outotec to challenge such deduction by referring the matter to the Contract Manager under clause 46.3 and, if dissatisfied with his decision, by issuing a Notice of Dispute pursuant to clause 46.4. No such dispute was raised either before or after assignment. The only point now taken is that the claim, which is otherwise not challenged, was lost upon assignment. There were, accordingly, no proper grounds to challenge the deduction before the assignment and it was properly included in the Pay Less notice.

850. While the format of payment certificates tends to show all liabilities, payments and cross-claims, the reality is that the Payment Certificate issued on 3 July 2019 did not assert a new claim to deduct liquidated damages. M+W had already asserted that claim and it had been satisfied by the deduction of liquidated damages from the sums otherwise payable under the subcontract. I am fortified in that conclusion by Turner LJ's further observations in Stocks v. Dobson (1853) 4 De G.M. & G. 11, at 16:

“Thus the case stands considered as a question of payment. Is there, then, any distinction between actual payment and a *bona fide* settlement of accounts between a debtor and his creditor without notice of any assignment. I see no substantial ground of distinction between actual payment and a release to the debtor founded upon a fair and *bona fide* arrangement. I take the true question to be whether there is evidence of there having been a fair and *bona fide* arrangement between the debtor and the only creditor of whose title the debtor had notice. Is there evidence that the arrangement between them in 1848 was a fair *bona fide* arrangement for settlement and discharge of the debt?”

851. Accordingly, I conclude:

- 851.1 First, M+W was entitled to liquidated damages of \$3,987,480.64 before the assignment.
- 851.2 Secondly, M+W asserted such claim with full particulars in payment certificates, pay less notices and correspondence.
- 851.3 Thirdly, the claim for liquidated damages was satisfied by deduction from sums otherwise payable under the subcontract.
- 851.4 Fourthly, not only was there in fact no challenge to such deduction, but there were no proper grounds to challenge the deduction.
- 851.5 Fifthly, there is no basis for requiring M+W to disgorge the benefit of liquidated damages paid before the assignment.
- 851.6 Sixthly, there was accordingly no subsisting claim for delay damages to be assigned to EWH.

852. I therefore dismiss Outotec's claim to recoup this deduction.

POST-TRIAL EVENTS

853. Four days before this judgment was handed down, EWH and M+W reached terms of settlement. Nevertheless, both parties still filed their list of editorial corrections by the deadline that day and neither asked me not to hand down this judgment. In any event, the third-party proceedings have not been settled and many of the findings are important to those ongoing proceedings.

854. In addition, on the same day, Outotec was served with notice that EWH had assigned the Outotec contract back to M+W. On 19 December 2022, Outotec lodged brief further submissions that in light of the settlement the court:

“... cannot proceed to award or allow any sum at all to M+W, absent an application to amend to set out M+W’s case as to the effect of the Settlement Agreement upon their Part 20 Claim.”

855. The crux of Outotec’s argument is that Outotec is not liable to make any contribution and/or to allow by way of abatement such sums as might have been awarded against M+W since no such award will in fact now be made against M+W following the handing down of this judgment.
856. I have not seen the purported assignment or the notice referred to by Outotec. Further, I have not received argument upon the effects of settlement, the efficacy of the assignment or its consequences for these proceedings. These events do not, however, justify a further delay in handing down this judgment. All findings in this judgment are made on the basis of events at the close of the evidence before me and therefore before the recent settlement and notice of assignment. Once the judgment has been handed down, I shall hear argument as to the consequences for this litigation of both the settlement and the purported reassignment of the Outotec contract.