

Review of the London Array Export Cable Costs and the Cleve Hill Incident

FINAL REPORT

- Final V 2.1
- 15 February 2013



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1. Executive Summary

Ofgem (Office of the Gas and Electricity Markets) are in the process of setting a final transfer value for the Round 2 London Array Wind Farm which falls under the transitional regime. This forms the final assessment of the economic and efficient costs incurred by the developer.

As part of the process Ofgem has engaged SKM to provide an independent view on costs associated with two specific areas of the project:

- 1) Cleve Hill incident - To provide a view on repairs undertaken at the onshore substation to rectify the failure of 400kV sealing end at Cleve Hill substation and the impact that this had on onshore substation costs; and
- 2) Export cable installation costs – To provide a view on the costs incurred for installation of the export cables. These have increased significantly since the indicative transfer value was set in November 2011.

The review is based on the latest transmission asset cost breakdown (cost template) provided by Ofgem¹, data room contents, and information provided by London Array Limited (LAL) at the direct request of SKM.

During the course of the investigation, export cable costs were progressed at LAL and an updated export cable installation costs tab² was provide to SKM on two occasions. The analysis presented in this report is based on these updated figures, as agreed with Ofgem.

Cleve Hill Incident

On 28 March 2012, a 400kV cable sealing end type ABB APEGA 4202 on the 400kV cable circuit designated LAL2, which is located in the National Grid Electricity Transmission (NGET) Gas Insulated Switchgear (GIS) compound of the Cleve Hill substation, suffered a disruptive failure. Subsequent investigations revealed all six (6) terminations at the "LAL End" of circuits LAL1 and LAL2 had evidence of electrical activity. Following an investigation and advice from their cable consultant, LAL subsequently reviewed a number of options and decided to replace the ABB cables and terminations with those of Sudkabel design and manufacture.

In reaching their decision to proceed with the Sudkabel option as replacements for the ABB cable and terminations, the LAL management team considered technical, commercial and programme implications of all the options proposed by Siemens Transmission and Distribution Ltd (STDL). LAL has provided SKM with a technical evaluation spreadsheet, correspondence between management team members summarising the outcome of discussions with STDL and Executive Committee minutes that demonstrate that due process has taken place in reaching their decision.

¹ "Cost Template Oct 12 231012"

² Update 1 - "Cost Template Oct 12 – PK6 Update OFGEM" received 10/12/12. Update 2 - "Cost Template Oct 12 – PK6 Update OFGEM Jan 13"

Hence it is the opinion of SKM that the decision to change cable supply contractors was reasonable, economic and efficient from the point of view of benefit to the London Array Offshore Windfarm (LAOWF) generation and transmission project as a whole.

The LAL decision to choose the Sudkabel option incurred additional cost and did not enhance the functionality and performance of the transmission assets. As such the value of the transmission assets themselves has not been increased, although the approach pursued by LAL saved significant time on the overall project programme. It also gave additional assurance as to the integrity of the final cable connection and associated terminations.

Export Cable Installation

It is our opinion that the costs submitted by LAL are fluid and subject to significant and frequent change based on ongoing negotiations. SKM understands that the cost settlements with regard to export cable installation were reaching the final stages of negotiations during the course of the preparation of this report and as such whilst the values cannot be considered as “final” it is not expected that there will be significant changes to the values quoted within this report.

It is clear that significant additional costs have been incurred on the cable installation contract, most triggered by a single incident of the late supply of the export cable by the supplier, Nexans.

Claims on third parties by LAL for costs due to the various detailed incidents have not generally been considered in the detailed analysis though they have been accounted for in the overall variation values when detailed in the cable installation cost template items.

Liquidated damages relating to the Nexans supply issues are not included in the total variation analysis. They total £7,555,540 and generally reduce the total transmission asset submitted value though there has been no direct offset of specific installation costs.

LAL has provided SKM with internal minutes of Executive Committee meetings and internal reports outlining the considerations given to the supply and installation of the export cables following the incidents during manufacture of HV2 and HV3 and the need change the design of HV3, HV1 and HV4.

In the opinion of SKM LAL reacted in an appropriate manner to the failure of HV2 and the consequential load out delays to HV2 and HV3, in particular efforts to mitigate the additional costs associated with cable installation which were directly attributable to the delays caused by Nexans. Evidence provided by LAL suggests that the decision to shift the HV2 cable installation period to winter was taken by LAL after considering the most significant implications to the cost and programme for cable installation. Evidence of a complete cost, benefit analysis has however not been provided to SKM.

Detailed conclusions reached are as follows:

- a) In total the basic installation contract price of ■ (excluding contingencies) has been increased by ■ which represents an 80% increase.

- b) 99% █████ of the total cost variation from the basic installation contract has been reviewed.
- c) 59% █████ of the cost variation reviewed is standby costs, of which 96% is related to the damage caused to HV2 and the resulting delays.
- d) The variation in cost incurred on this project for export cable installation is very large. However in total approximately 66% █████ of the cost variations reviewed are directly or indirectly caused by damage to HV2 during manufacture and the resulting delays and knock on effects.
- e) No items reviewed by SKM are considered as being specifically unreasonable for the contractor (specific contractor varies by individual cost, see section 5.5) to be eligible for compensation. Item **129** (detailed in section 5.6.9) is the only exception to this due to a lack of information though the item is of relatively low value.
- f) Unit rates benchmarked by SKM are reasonable in comparison with other similar projects and the SKM database.
- g) The export cable installation costs incurred appear reasonable based on the information provided, and in particular due to the supply delay which resulted in offshore works during the winter period.

2. Introduction

Ofgem (Office of the Gas and Electricity Markets) are in the process of setting a final transfer value for the Round 2 London Array Wind Farm which falls under the transitional regime. This forms the final assessment of the economic and efficient costs incurred by the developer.

As part of the process Ofgem has engaged SKM to provide an independent view on costs associated with two specific areas of the project:

- 1) Cleve Hill incident - To provide a view on repairs undertaken at the onshore substation to rectify the failure of 400kV sealing end at Cleve Hill substation and the impact that this had on onshore substation costs; and
- 2) Export cable installation costs – To provide a view on the costs incurred for installation of the export cables. These have increased significantly since the indicative transfer value was set in November 2011.

Cleve Hill Incident

On 28 March 2012 a 400kV cable sealing end type on a 400kV cable circuit which is located in the NGET GIS compound of the Cleve Hill substation, suffered a disruptive failure.

SKM has been engaged to provide:

- A description of the incident
- An overview of the repair works
- A summary and description of outstanding claims and contract variations
- A independent view as to whether the decision to change contractors was reasonable, economic and efficient in the circumstances

The review is based on the latest transmission asset cost breakdown (cost template) provided by Ofgem¹, data room contents, and information provided by London Array Limited at the direct request of SKM.

Export Cable Installation

London Array Wind Farm has incurred a significant increase in export cable installation costs compared to initial estimates.

SKM has been engaged to provide:

- A overview of export cable installation cost increases since the indicative valuation was set in November 2011;
- A rationale for each of the costs increases and an independent view on the justification of these cost increases;
- A view on how the export cable installation costs benchmark relative to other projects; and

- A summary and description of outstanding claims and contract variations and a view on the claim levels in relation to the work and efficiency of the project management of the contract works.

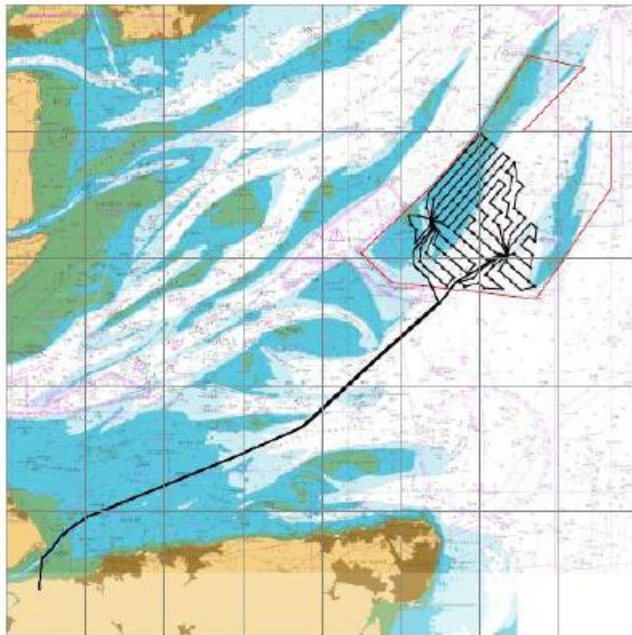
The review is based on the latest transmission asset cost breakdown (cost template) provided by Ofgem, data room contents, and information provided by London Array Limited (LAL) at the direct request of SKM.

During the course of the investigation, export cable costs were progressed by LAL and an updated export cable installation costs tab² was provide to SKM on two occasions. The analysis presented in this report is based on these updated figures, as agreed with Ofgem.

Furthermore, it has been agreed to limit the analysis to positive variances (i.e. increases to transfer value) greater than £100,000 and remove focus from variance against previous transfer value, to total variance against basic contract value.

London Array Phase 1 Offshore Wind Farm Overview

The London Array Phase 1 Offshore Wind Farm (LAOWF) is located in the Outer Thames Estuary midway between the Kent and Essex coastlines more than 20 km from each shore. The offshore connection point is on the offshore platforms (OSPs) located within the boundaries of the London Array Phase 1 Wind Farm as illustrated in Figure 1 below. The wind farm consists of 175 x 3.6 MW Siemens wind turbine generators (WTGs) with a combined output and Transmission Entry capacity (TEC) of 630MW.

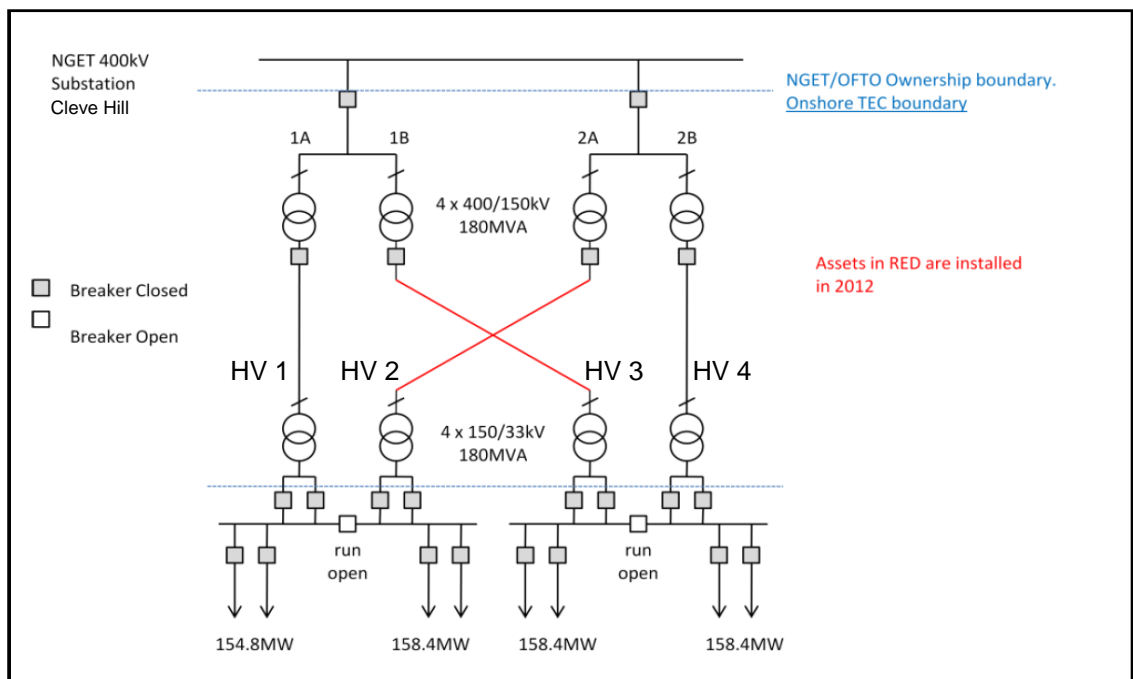


■ **Figure 1 – Location of London Array Phase 1 Offshore Wind Farm**

Four subsea cables connect the 2 OSPs to the mainland, with the onshore connection point being at the new Cleve Hill Substation, near Graveney in North Kent which in turn will connect at 400kV to the transmission network. The London Array Phase 1 transmission assets and wind farm are all located within UK territorial waters.

A simplified single line diagram for the OFTO (Offshore Transmission Owner) assets is shown in Figure 2.

It should be noted that the indicated crossover of cables HV2 and HV3 is at the onshore substation. The main export cables do not cross each other.



■ **Figure 2 – London Array Simplified SLD³**

³ London Array PIM November 2012

3. SKM Approach to Comparison of Project Costs

SKM has an extensive track record of providing project and equipment cost comparisons on transmission and distribution projects and assets in both onshore and offshore environments in the UK, Middle East, South East Asia, Australasia and South America. Included in this experience are many offshore wind projects in the UK since 2004.

The SKM unit cost database is derived from this broad range of transmission and distribution infrastructure projects and individual equipment and service proposals from manufacturers and contractors covering all aspects of likely projects.

SKM data is validated based on SKM's engineering judgement before it is accepted into the database, taking particular cognisance of the project location and specification for the service/equipment. Significant variations can occur based on not only the environmental and project engineering considerations in different countries but also the different price levels between countries for equipment due to specifications or local market factors.

Future prices for equipment or services can be extrapolated based on factors linked to assumed inflation rates, exchange rate movements as well as raw material prices.

This typically allows SKM to undertake cost comparison in four specific areas for clients:

1. Project cost review
2. Unit cost review
3. Benchmarking exercise
4. Deriving and comparing cost escalation factors

On this particular review of the London Array export cable installation costs SKM has focused on a project cost review approach utilising the contractor costs and rates provided and benchmarking these with the SKM database to assess the reasonableness of the costs provided.

4. Cleve Hill Incident

4.1. Description of Incident

On 28 March 2012 a 400kV cable sealing end type ABB APEGA 4202 on the 400kV cable circuit designated LAL2, which is located in the NGET GIS compound of the Cleve Hill substation, suffered a disruptive failure. The failure resulted in a red phase earth fault registering 19.5kA on fault recording equipment. The 400 kV cable and terminations had been fully tested and commissioned which London Array Limited (LAL) state had been in service⁴ for 150⁵ hours.

The contractual relationships between the parties involved with the procurement, installation and supply of 400kV cable are as follows:

- **Siemens Transmission and Distribution Ltd (STDL)** - Main contractor to LAL for the London Array Offshore Wind Farm (LAOWF) Offshore and Onshore Substations.
- **Carillion** – Subcontractor to STDL for HV/MV Cable Procurements, Installation and Testing.
- **ABB** – Subcontractor to Carillion for supply and termination of 400kV Cable.

STDL was immediately notified of the incident and in conjunction with Carillion and ABB commenced an investigation into the event on 02 April 2012. The termination was dismantled on 19/20 April 2012 and revealed extensive damage to the NGET 400kV GIS chamber and the cable termination.

Electrical Research Association (ERA), the cable consultant to STDL, inspected the LAL2 red phase cable and termination and recommended replacing the 150m cable section and its terminations. To facilitate the repair as quickly as possible, Sudkabel 400kV cable and accessories were used as it was type tested to IEC60267⁶ and readily available ex-stock with a 4 week lead time. A repair using ABB cable would take longer as the cable would have to be manufactured. The repair was undertaken under warranty. A strategic spare 150m length of ABB cable was also procured as part of the repair at additional cost to LAL.

4.2. Investigation

A forensic investigation by ABB into the cable termination failure commenced on 02 May 2012. The outcome of the investigation⁷ concluded that the failure was most likely due to partial discharge (PD) activity at the interface between the termination stress cone and the surface of the

⁴ "In Service" interpreted as meaning that the 400kV cables and terminations had been contractually handed over under warranty by the Contractor for commercial operation. The contractual status of other transmission assets is at that time not known to SKM.

⁵ LAL Status Update dated 8 August 2012 states 150 hours whereas ABB Report I-1304 states 123 hours. The difference is not material to the review.

⁶ Guide to the Testing of Circuit-Breakers with Respect to Out-of-Phase Switching

⁷ ABB Laboratory Reports I-1304, I-1309 and I-1311

cross-linked polyethylene (XLPE) insulation. Examination of the surface of the XLPE insulation under a microscope showed circular scoring on the XLPE insulation caused by the use of an oscillatory grinding tool and these were the probable locations of PD activity. ABB recommended that all terminations on LAL1 and LAL2 be dismantled and inspected for evidence of PD activity.

Following the dismantling and inspection of the cable terminations the status of the LAL1 (170m) and LAL2 (80m) 400kV cables was established as set out in Table 1.

■ **Table 1 Cable Status**

	LAL1 (35h service)			LAL2 (150h service)		
	R	Y	B	R	Y	B
LAL End (Terminated May 2011)	No PD* Tracking observed on stress cone	No PD* Tracking observed on stress cone	No PD* Tracking observed on stress cone	Evidence of PD* (Replaced)	No PD* Tracking observed on stress cone	No PD* Tracking observed on stress cone
NGET End (Terminated October 2011)	No PD*	No PD*	No PD*	Failed (Replaced)	No PD* Tracking observed on stress cone	No PD*

* No PD picked up on GIS Diagnostic Monitoring System

All "LAL End" terminations showed evidence of "tracking"⁸ and ABB recommended replacement of all cable and terminations. ABB stated in Report No I-1311 that the surface finish on the XLPE insulation was "unacceptable".

At this stage both 400kV circuits LAL1 and LAL2 between the LAOWF 132/400kV transformers and the NGET 400kV GIS substation were out of service and the LAOWF was devoid of an export connection.

4.3. Liability

Liability for remedial work in the first instance was STDL with sub-contract to Carillion for cable installation and testing who sub-contracted ABB for the 400kV cable and terminations.

4.4. Issues

Termination assembly process involves stripping the cable and preparing a polished surface finish on the XLPE insulation on which to seat a stress cone. SKM understands that the ABB termination process has been used for several years and has included use of oscillatory surface grinding tools with the final polish undertaken by hand using emery cloth strips.

⁸ Tracking is an electrical term describing the breakdown on the surface of an insulating material that creates a conductive leakage path across the surface of the material by forming a carbonized track.

ABB Termination Instruction No 4290,7641,10 dated January 2010 states that 400 grade of emery cloth to be used for final polishing of the XLPE. The ABB instructions are silent on the use of machine grinding tools. The ABB instructions are also silent on Quality Control (QC) checks to be undertaken on the XLPE surface finish.

- a) All six (6) terminations at the "LAL End" of circuits LAL1 and LAL2 had evidence of electrical activity.
- b) ABB admission in Report No I-1311 that the surface finish on the XPE insulation was not acceptable.
- c) The ABB APEGA 4202 cable sealing end design is NGET Type Approved and SKM is not aware from its industry sources that this approval has been withdrawn.

4.5. Remedial Work Options

The options set out below were proposed by Carillion in their letter to STDL dated 6 August 2012.

4.5.1. Option 1 – ABB (Completely Under Warranty)

ABB option using existing APEGA 4202 terminations with new stress cones, spare cable, parts of the cable removed from LAL2 faulted red phase and three new straight joints. Testing and energisation planned for 27 November 2012.

4.5.2. Option 2 – ABB (Partly Under Warranty)

ABB option using existing APEGA 4202 terminations with new stress cones and replacement cable at additional cost⁹. Testing and energisation planned for 20 November 2012.

4.5.3. Option 3 – Sudkabel (Partly Under Warranty)

Sudkabel option using identical cable and terminations as already used for the LAL2 red phase replacement. The supply of cable and terminations is outside of warranty at a cost to LAL of £1.145million¹⁰. Testing and energisation was planned for 27 October 2012 which was about four (4) weeks earlier than the ABB options. LAL/CCI did not have any reservations with Option 3 and considered the Sudkabel termination system to be superior to the ABB terminations. Accordingly LAL management instructed STDL to proceed with the Sudkabel option on 09 August 2012.

SKM View

Option 3 is a technically viable solution that is Fit-for-Purpose although if the option of replacing cables and terminations with systems other than ABB was to be considered, then a competitive tender might have resulted in a lower cost. However it is unlikely that lead times associated with

⁹ Documentation seen by SKM to date does not indicate what this cost would be.

¹⁰ £1.145million shown on LAL VO to STDL 105 (August 2012) to cover the supply of cable and terminations noting that the total Sudkabel cost was £2,048 million with the cost of installation and testing being absorbed by STDL and Carillion.

the Sudkabel option could be matched under a competitive tender scenario and the extended absence of an export transmission system would likely have a significant impact of the commissioning of LAL windfarm.

4.6. Outstanding Claims and Contract Variations

There are no obvious items on the LAL cost template, apart from the £1.145 million VO associated with the Sudkabel option that can be attributed to the Cleve Hill Incident.

4.7. Conclusion

In reaching their decision to proceed with the Sudkabel option, the LAL management team considered technical, commercial and programme implications of all the options proposed by STDL. LAL has provided SKM with a technical evaluation spreadsheet, correspondence between management team members summarising outcome of discussions with STDL and Executive Committee minutes that demonstrate that due process has taken place in reaching their decision. Hence it is the opinion of SKM that based on the information provided that the decision to change cable supply contractors was reasonable, economic and efficient from the point of view of benefit to the LAOWF generation and transmission project as a whole.

The LAL decision to choose the Sudkabel Option incurred additional cost and did not enhance the functionality and performance of the transmission assets. As such the value of the transmission assets themselves has not been increased although the approach pursued by LAL saved significant time on the overall project programme and gave additional assurance as to the integrity of the final cable connection and associated terminations.

5. Export Cable Installation

5.1. The Export Cable System

London Array Windfarm is connected via 4 export cable circuits as shown in Figure 2

The subsea cables each consist of approximately 54km of 150kV, 3-core, copper conductor, cross-linked polyethylene (XLPE) buried cable with integrated 52-core optical fibre bundle. Each cable has a 3km 800mm² (core cross sectional area) section at the onshore end and a 4km 800mm² section at the offshore end with 630mm² in the bulk central section.

The onshore cable is a short connection between the shore landing transition joint and the Cleve Hill substation. Each onshore cable circuit consists of approximately 100m of 150kV, 3 x single core, 800mm², aluminium conductor, XLPE cables with separate 52 core optical fibre bundle.

Each export cable is assigned a number (1 to 4) as indicated in Figure 2, and generally referred to within the cost template and this document as HV1, HV2, HV3 and HV4.

The subsea cable route is as shown in Figure 1.

5.2. Subsea Cable Supply

Manufacturer – Nexans

The Subsea cable supply is outside the scope of this investigation however the issues and events associated with the cable supply are directly responsible for a significant portion of the subsea cable installation overrun and as such are detailed below. SKM also understands that the contract between Nexans and LAL provides for payment of liquidated damages in the event of delayed supply.

5.2.1. Issues

A number of issues have affected the supply of the London Array subsea export cables:

- 1) HV2, the first cable to be manufactured suffered a breakdown during factory acceptance testing (FAT)¹¹ requiring a factory joint.
- 2) HV2 was found during spooling to be further damaged following high voltage testing. The damaged sections were cut out and repaired with factory joints.
- 3) The subsequently manufactured export cables (HV3, HV1 and HV4) were to a revised design which should remove any repeat of the damage.
- 4) Further damaged was caused to HV2. A third additional factory joint was installed to repair the damage.
- 5) HV3 suffered a breakdown during FAT¹² requiring a factory joint.

¹¹ 27398-ETM-RT-24474 E4 Electrical breakdown during FAT testing on London Array L2.pdf

5.3. Cable Installation

Contractor – Visser & Smit and Global Marine Systems Ltd Joint Venture

5.3.1. Method

The major offshore sections subsea cables were installed and buried simultaneously using a plough by the cable lay vessel Stemat Spirit. An ROV (Remotely Operated Vehicle) was deployed frequently (weather permitting) to visually inspect the plough and OTDR (Optical Time Domain Reflectometry) measurements were taken continuously. Where ploughing was not practical due to shallow depths an excavator was used. At cable crossings & each offshore substation jetting was used.

The majority of the subsea route was buried to a minimum burial depth of 1m with a 1.5m target. This minimum was increased to 2m at the Princes Channel crossing.

The sea defence crossing was achieved via Horizontal Directional Drilling (HDD) of ducts under the sea defences. The subsea cables have been drawn through the ducts and then the ducts backfilled with Bentonite.

There are a number of subsea cable crossings for each LAL export cable:

- 3 x Kentish Flats windfarm export cables
- High Voltage Direct Current (HVDC) BritNed interconnection cable.

At each crossing the London Array cables are unburied at the agreed crossings and protected by Uraduct and Rock Dumping.

5.3.2. Issues

A number of issues have been experienced during installation:

- 1) Knock on effect of HV2 & HV3 supply delay.

Load out of HV2 was initially scheduled to be complete on the 29th June 2011. Due to the issues described in Section 5.2.1 load out was not completed until the 15th October 2011, which was a delay of 108 days¹³. This led to additional costs such as standby costs for the laying vessel but also had the effect of shifting the installation period into the winter months.

Cable installation was scheduled to take place over a three month window (12th June to 16th September 2011). The supply delay resulted in the cable installation works being carried out over a five month window (15th October 2011 to the 18th March 2012¹⁴), which resulted in a

¹² 2.6.8_Q1490_Unplanned_Factory_Joints.pdf

¹³ VOP 069E.pdf

¹⁴ VOP 086E.pdf

number of additional costs due to various issues including adverse seasonal weather conditions, additional work and equipment needed due to the colder conditions and specific environmental requirements.

- 2) Further cable load out delays were incurred for both HV1 and HV4.

An unspecified “distortion” in HV1 noticed during load out caused a delay of 31.5 hours while a cable specialist from CCI was called in and the cable inspected before permission being granted to restart load out¹⁵.

The load out of HV4 was delayed by “the unavailability of the Export Cable supplier, Nexans”¹⁶. The delay was in the order of 10 days.

- 3) Damage was caused to HV3 on the 15th March 2012 during installation¹⁷.

The Stemat Spirit was held for half a day while repair scenarios were discussed with the cable installer VSMC and Nexans. The cable was subject to a standard field repair with two field joints and a length of spare cable. The jointing was carried out by Nexans¹⁸. The repair program was prolonged by weather difficulties and the incident had the effect of interrupting other works including cable termination resulting in additional costs.

- 4) HV1 pull in was delayed while awaiting GL certificate.

Delays in receiving Germanisher Lloyd (GL) certification to begin pull-in resulted in vessel standby and associated costs.

5.4. Chronology

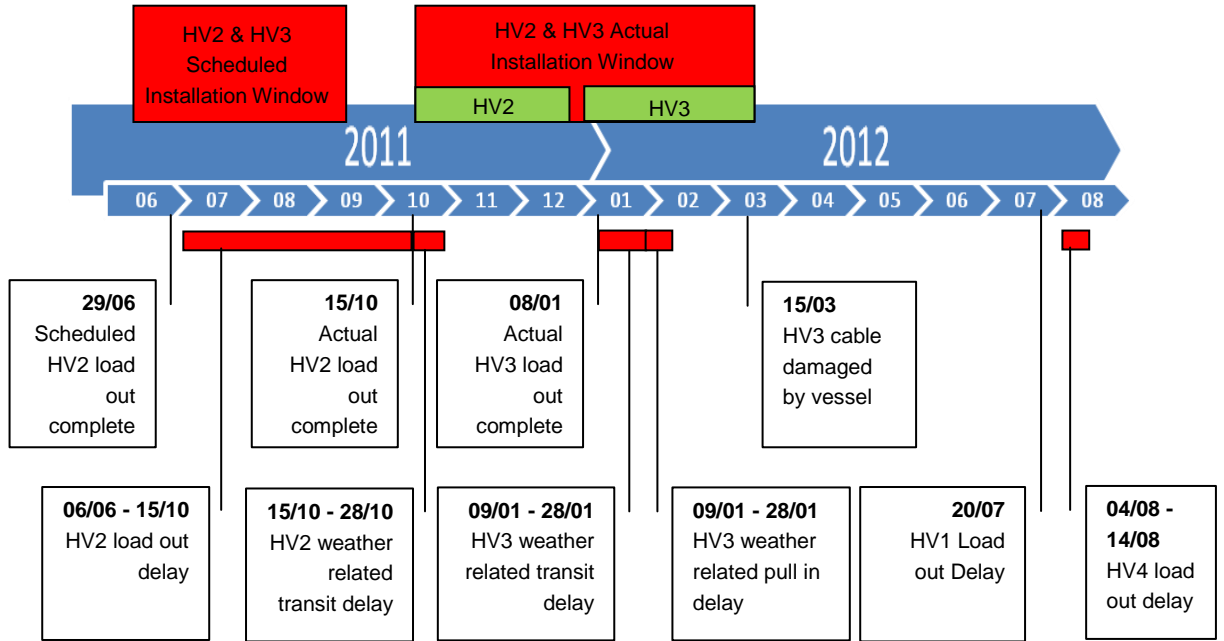
A high level overview of cable installation progress and issues is shown chronologically below.

¹⁵ LAL-PRC-63030E.pdf

¹⁶ VOP 017EX.pdf

¹⁷ 2.5.1_Update to bidders re diligence issues June 2012 FINAL.pdf

¹⁸ 2.1.1_Nexans_jointing_services_18_May_12_-_signed_Nexans_PDF.pdf



■ **Figure 3 Cable Installation Chronology**

5.5. Cost Template and Analysis Methodology

The cable installation analysis within this report is based on the cost template submission by LAL to Ofgem. Included within the cost template is an itemised list of variations to the basic contract value related to work package 6, subsea cable installation.

The use of the word **Item** always refers to an individual row from the cost template. Item numbers have been added to each cost template row to ease discussion and analysis.

For the purpose of this report, only items with a value greater than £100,000 have been analysed. A full account of the items considered is included in Appendix A along with details of the VO (Variation Order) and VOP (Variation Order Proposal) references relevant to each item and a record of which documents have been provided to SKM for review.

Extracts from the cost template are included throughout the following analysis in each case quoting the item description (exactly as presented in the cost template), SKM assigned item number and “Current Total”, that being the value of the item in GBP as recorded in the most recent submission by LAL.

During the course of this study it was necessary to replace the original cost template provided by Ofgem twice due to ongoing negotiations of cost settlements. Updated versions (cable installation section only) were provided by LAL directly to SKM.

Each item discussed in this analysis is a variation of contractor cost against LAL. No LAL internal costs have been included that SKM is aware of. The term contractor is used throughout referring to the relevant contractor for the given item, for the vast majority of items this is Visser & Smit Marine Contracting (VSMC). A full list of contractors appropriate to each item is included in Appendix A.

5.6. Cost Increases

Within this section itemised cost variations have been discussed in detail. Cost increases have, where possible, been grouped for analysis by type of variation and route cause. Summary of total variation on the basic contract value of £42,241,149 is as follows:

- **Table 2 Total Variation Summary**

Table redacted.

5.6.1. Vessel Standby

Table 3 summarises cost template items related to Vessel Standby.

■ Table 3 Vessel Standby Extract from Cost Template

Table redacted.

Standby due to HV2 and HV3 Load out delays

Overview

Prolonged delays to cable load out directly resulted in a large amount of vessel standby.

Item **86** covers 15.23 days of Stemat Spirit (Cable Installation Vessel) extra operating time at Euro 104,750 a day and 62.14 days Standby at [REDACTED] a day. These additional costs were incurred between the 6th of July and 24th of September due to the described Nexans supply delay. Item **87** covers the balance of Stemat Spirit standby costs between the 24th September and 14th October (duration of the delay period) totalling [REDACTED]. A Variation order has been received for both items but no breakdown has been provided for Item **87**. Given the contractual vessel standby day rate the item equates to approximately 12 days standby.

Items **86** and **87** together represent approximately 90 days of additional operational and standby time for the Stemat Spirit. Load out duration is estimated at 10 days in the original schedule and the actual delay was 108 days. The duration of standby therefore appears consistent with the known delay.

Items **92** and **98** cover the costs for Stemat Spirit spread vessels, ITZ (Inter Tidal Zone) marine spread and other costs during the 6th July to 14th of October delay period. A variation order has been provided for both items but no breakdown by vessel and standby time has been provided.

Note that Items **87**, **92** and **98** all refer to the same VOP. The appendix to the VOP which would contain the cost breakdown has not been provided. The sum of the item values is slightly more than the VOP value.

Justification

All standby costs described here are as a result of the prolonged delay of the export cable load out due to the cable supplier. As a result it is reasonable that the contractor was entitled to be compensated.

Standby and Additional Sailing due to Seasonal Weather

Overview

The prolonged Nexans cable load out delay resulted in the installation works being carried out during the winter period rather than the summer period which in turn resulted in standby and increased sailing times due to seasonal weather.

Item **89** covers the standby cost for delay related to the mobilisation and demobilisation of a heated tent required for load out of HV3 during the winter period and for unspecified Nexans cable stops.

Total cost of [REDACTED] is made up of [REDACTED] for Mobilisation of the Tent, [REDACTED] for cable stops and [REDACTED] for demobilisation of the tent. VO has been provided but no detailed breakdown.

Item **93** and **99** covers contractor's costs in connection with extended sailing route and delays due to adverse weather during sailing between Nexans' Norway and Site. Costs include standby costs and extended sailing for the Stemat Spirit, and standby of associated spread vessels during the extended sailing period 15th October to 28th October 2011. VO's have been provided but no detailed breakdown of costs.

Item **127** represents a bulk settlement for a range of claims related to delays of HV2 and HV3 installation and sailing due to adverse weather. Specific details of all works covered under the settlement have not been provided and so cannot be directly assessed. Overall settlement value is [REDACTED] and replaces the significantly greater total apparent previous contractor claim amount of approximately [REDACTED], suggesting that effort has been made by LAL to limit the value.

Justification

All standby costs described here are as a result of adverse weather (excluding the unspecified Nexans cable stops during load out of HV3). The prolonged delay of the export cable load out, due to the cable supplier, resulted in having to carry out cable installation operations out of the contracted season, and as such the contractor is entitled to be compensated for exceptionally adverse weather delays which exceed the Adverse Weather Contract Schedule in Schedule 4 of the works contract.

The installation works for HV2 and HV3 were carried out October 2011 – March 2012 compared to a contracted June 2011 – September 2011. As an indication of the impact the delay had the June – September average % of time where significant wave height exceeds threshold is only around 6 % compared to an October – March average of 24%.

The contractor is required to minimise delays and in all instances use all useable weather windows throughout the contacted duration. It is not possible for SKM to scrutinise this in detail but assuming the contractor met these obligations it is reasonable to conclude that compensation is appropriate.

This includes standby time required for the mobilisation and demobilisation of a heated tent for load out which would not have been required if load out had been carried out at the scheduled date.

Miscellaneous Additional Standby Costs

Overview

Item **91** covers delays to Stemat Spirit and full vessel spread arising out of damage caused to HV3 on 15th March 2012 including 9.13 hours standby for Stemat Spirit, Coastal Discovery (Anchor Handling Tug), MPR 2 (Anchor Handling Tug), Coastal Vanguard (Anchor Handling Tug), and dive vessel and divers who were mobilised and on standby at the time with a day rate of [REDACTED]. VO and detailed cost breakdown has been provided.

Item **105** covers standby costs incurred for the Coastal Worker and Sara Maatje which were forced to suspend operations due to the Sea Worker during the period 24th to 29th January 2012. The item value is slightly more than the VO value (approx ■) which matches an old revision of the VOP. A detailed breakdown of costs has been provided along with detailed justification showing that Coastal Worker and its support vessel were on standby for 94 hours as a result of the Sea Worker (Turbine installation vessel) being forced to suspend operations due to an unfinished gangway.

Item **97** covers a 31.5 hour standby of the Stemat Spirit for delays in the load out of HV1 on the 20th July 2012 due to an unspecified distortion in the export cable and the time required for a cable specialist from CCI to inspect the cable and recommencement of load out to be approved. VO and detailed breakdown of costs provided.

Item **111** covers costs incurred during a 10 day delay while awaiting certificates required to commence pull in operations of HV1. This item has been finalised under bulk settlement VO-67E which is in draft form at time of writing. The item cost is primarily vessel standby at the contractual day rates. The standby costs incurred are detailed in VOP 006EX and total ■ which matches the risk recorded against the item in previous versions of the cost template, the current item value however is less than half this.

Item **114** covers an unspecified duration of standby for the Coastal Worker due to a failure of the LAL RTK (Real Time Kinematic satellite navigation) System. VOP has been provided but no detailed breakdown of cost has been provided. This item has been finalised under bulk settlement VO-67E which is in draft form at time of writing.

Item **115** covers Stemat Spirit and associated vessel spread, equipment and crew costs incurred due to a delay in the load out of HV4 caused by the undefined unavailability of Nexans. The item value is supported by a VO and a breakdown is given in VOP 017EX primarily consisting 9 days standby for Stemat Spirit, 10 days for Coastal Fighter, 11 days standby for Sorrento and 3 days for SeaRex along with associated land costs. These values are consistent with the delay duration.

Item **131** is a negative value and as such is assumed to represent costs recouped through damages etc related to changes in load out dates. As more details have not been requested or provided the item has not been investigated in more detail however it has been included in analysis of overall variation costs.

Justification

The additional standby costs outlined above are due to a range of third party delays or incidents. As the delays were beyond the contractors control it is reasonable that the contractor be eligible for compensation assuming that the delays were not foreseeable and reasonably avoidable, and that the contractor took all reasonable measures to limit standby times.

Benchmark Comparison for Standby Costs

The vast majority of standby costs are incurred for vessel standby and are calculated by duration of standby and a set standby rate for the vessel concerned. Table 4 summarises the standby rates used in the London Array project and included in the contract schedule of prices.

- **Table 4 London Array Schedule of Vessel Standby Rates**

Table redacted.

SKM has confirmed that the rates as quoted in the provided variation orders and variation order proposals are consistent with the contract schedule of rates.

The schedule of rates by vessel type is benchmarked against SKM guide costs in Table 5. SKM guide costs are based upon an average of known relevant 2011 Vessel standby costs. Costs are compared in GBP calculated from Euro where appropriate using the same methodology as that used within the cost template.

- **Table 5 Vessel Standby Benchmarking**

Table redacted.

Given the comparison in Table 5 SKM considers that the day rates agreed for the London Array subsea cable installation vessels are reasonable.

5.6.2. Fuel Costs

Table 6 summarises cost template items related to fuel cost adjustment.

- **Table 6 Fuel Variation Extract from Cost Template**

Table redacted.

The contractor is entitled to submit variations that account for differences between the actual cost of fuel and the cost of fuel used when preparing the fixed price bid.

Item **90** covers variations in fuel incurred in 2011 but further detail has not been provided. The VO is related to three monthly invoices.

Items **94**, **116** and **118** cover variations in fuel over January – March, May – July, August – October invoices. The relevant invoices and MGO (Marine Gas Oil) Reports have been provided demonstrating that the actual MGO prices are significantly higher than the contractual USD 382 and that the variation has been prepared as outlined in the Contract Schedule of Prices.

Justification

The contractor is eligible to adjust the fuel cost element of the contract price where MGO price varies from USD 382. The methodology for calculating the appropriate variation is outlined in the contract.

It is noted that the contractual fuel price of USD 382 is particularly low compared to actual MGO price which is more than double the contractual price for the entire work program.

Benchmark Comparison

The method of calculating a fixed contract with a fixed fuel cost and writing a fuel cost variation process into the contract is considered reasonable by SKM. Recent similar developments have used similar methods based on similar contractual fuel prices.

5.6.3. Project Management

Table 7 summarises cost template items related to contractor project management and site facility costs.

■ Table 7 Project Management Extract from Cost Template

Table redacted.

Original contractor project management costs were based upon a fixed project schedule. Where this schedule has slipped due to parties other than the contractor, then the contractor has sought compensation for additional project management costs incurred.

Item **31** covers additional project management and site office costs associated with delays in waiting for certification from the Marine Warranty Surveyor to begin pull-in operations for HV1 (14-24 June 2012) and the delay in loading HV4 (04-14 Sep 2012). A detailed breakdown has been provided showing a 10 day prolongation of works for both delays which matches the duration quoted in vessel standby documentation.

Item **110** covers additional contractor project management costs associated with the delays around the load out and installation of HV2 and HV3 documented in VOP 086E. The documentation provided showed that a planned winter idle time of 143 days was reduced to only 27 days with an additional 85 working days attributable to the project team. Breakdown of costs has been provided including evidence of LAL review and challenge of the submitted variation with total variation value significantly reduced from initial contractor submission.

Both items have been finalised under the bulk settlement described in VO 67E which has only been reviewed in draft format.

Justification

The contractor (VSMC) has incurred additional cost for project management and site offices due to 3rd party delays and adverse weather due to operation outside of the contract period. As such it is reasonable that the contractor is eligible to be compensated.

Benchmark Comparison

Project management and site facilities variations are largely based on an agreed contractual schedule of rates. A range of London Array rates are shown against SKM guide costs. SKM guide

costs are based upon an average of known relevant 2011 staff costs as agreed on similar projects. Based on the comparison in Table 8 the London Array rates are considered reasonable by SKM.

- **Table 8 Project Management Day Rate Benchmarking**

Table redacted.

5.6.4. Cable Tent

Table 9 summarises the cost template item related to provision of a heated cable tent.

- **Table 9 Cable Tent Extract from Cost Template**

Table redacted.

Justification

Load out of HV3 during the winter period required the use of a heated tent to protect the export cable. This would not have been required had the works been carried out during the contracted period and as such it is reasonable that the contractor be eligible for compensation.

5.6.5. HDD Duct Extension

Table 10 summarises cost template items related to HDD duct extensions.

- **Table 10 HDD Duct Extension Extract from Cost Template**

Table redacted.

The delays to load out of HV2 leading to installation within the winter period had the impact of working outside of a consents period such that works within 500m of the Swale SPA and Ramsar site are restricted between the 1st October and 31st March¹⁹. In order to complete the HDD works over the winter period consents mitigation was required. The consents mitigation includes the requirement for a 500m onshore HDD duct extension and an offshore extension above the high water mark.

HV1 and HV4 were installed outside of the restricted period. Offshore duct extensions however appear to have been installed to “ensure the safety and integrity of the Export cables in the transition area between the mobile sandy beach area and the immobile mudflats”.

Item 7 covers supply and install of offshore duct extensions for HV2 and HV3. The item is supported by a VO and VOP but without a detailed works breakdown. It should be noted that the item description appears to be incorrect in the cost template and is labelled as “Export Cable Vertical Entry Sensor to Plough” (the second of three items described as such). The referenced documentation and item value however align with the works described here and the description has been modified to avoid confusion. This is the only item description to be modified in any way.

¹⁹ 2.7.3_Ecological Mitigation_o071025 EMMP Main Body_LA.pdf

Item **10** covers onshore HDD duct extension works for HV2 and HV3 with Item **84** covering the procurement of the onshore ducts. The title of Item **10** is misleading in fact covering works to “fabricate and install HDD duct extensions for HV2 and HV3 500m from the borrow pit towards the onshore substation due to Consents mitigation measures”. As with Item **7** these items are supported by VO’s with matching values. Details have been provided for the equipment purchased but not for the overall works carried out.

Items **120** and **121** cover offshore duct extensions for HV1 and HV4. Both items are supported by VO’s and VOP’s with detailed breakdown of works. It should be noted that the cost of the offshore duct extensions for HV1 and HV4 was only 80% that for HV2 and HV3. Without a detailed breakdown of costs for Item **7** this cannot be investigated in detail and in any case is not a significant value.

The details of the consents mitigation plan have been requested but not provided.

Justification

The consents mitigation plan leading to these works is a direct result of the HV2 cable load out delay and as such it is reasonable that the contractor be eligible for compensation for the works regarding HV2 and HV3.

The works regarding HV1 and HV4 have been carried out to provide additional protection to the cables rather than meet the consents restrictions. The justification for this decision has not been detailed however the works represent a change of scope to the contractor and as such it is reasonable that the contractor be eligible for compensation.

5.6.6. Additional Installation Costs Due to Burn Damage

Table 11 summarises the cost template item related to provision of additional jetting.

■ **Table 11 Additional Jetting Extract from Cost Template**

Table redacted.

Justification

Burn damage inflicted on HV 2 during testing resulted in the installation of a transition ring between two types of armour not present in the original cable design. It could not be confirmed that this would not cause problems with the planned plough installation method. As such a revised installation methodology was applied requiring additional jetting in place of ploughing and an associated additional expense.

As this additional work was as a direct result of 3rd party damage and a design change to the export cable it is reasonable that the contractor be eligible for compensation.

Benchmark Comparison

Cost is based on vessel day rates which are considered reasonable by SKM. Cost includes 75 hours over 4 days (13 hours breakdown not included in cost) operation of the Coastal Worker and

Sara Maatje. This duration will be heavily influenced by any transit time of which there is not a specific breakdown however SKM considers 3 days reasonable for the described works.

5.6.7. Additional Installation Works due to Consent Restrictions

Table 12 summarises cost template items related to ITZ installation costs.

■ Table 12 ITZ Additional Installation costs Extract from Cost Template

Table redacted.

Cable burial within the intertidal zone was subject to consents restrictions that it wouldn't have been required if installation had been carried out during the contracted period. Items **100** and **101** cover additional installation works required under the new restrictions.

VO's have been provided but without details of the works or a breakdown of the costs. The consents mitigation plan resulting in the additional works has been requested but not provided.

Justification

The additional consents restrictions are a direct result of the HV2 cable load out delay and as such it is reasonable that the contractor be eligible for compensation however no details of the works have been provided.

5.6.8. Jointing and Termination

Table 13 summarises cost template items related to onshore jointing and offshore termination of export cables.

■ Table 13 Jointing and Termination Extract from Cost Template

Table redacted.

Justification

Justification for these works has not yet been received.

The VOP for Item **103** has been provided though without the breakdown of costs and has a value slightly greater than the item value. It is assumed that the slight disparity is reflective of the discussions with the contractor and will match the eventual variation order.

VOPs for Items **112** and **113** have not been provided and the values appear to simply be half that of Item **103**. This is likely to be appropriate given that the works associated with each cable should be the same.

Items **103**, **112** and **113** have been finalised under bulk settlement VO-67E which is in draft form at time of writing.

Item **130** is a negative value and as such is assumed to represent costs recouped through damages etc or through transfer of works from the contractor to LAL related to the cable terminations. As more details have not been requested or provided it is not possible to analyse the value in more detail however it has been included in analysis of overall variation costs.

5.6.9. Cleve Hill Clean Room Change of Specification

Table 14 summarises cost template items related to Cleve Hill clean room additional costs.

- **Table 14 Clean Room Extract from Cost Template**

Table redacted.

Changes to the specification of the Cleve Hill clean rooms have resulted in additional cost. Item **24** covers HV2 and HV3 with the provided variation order matching the cost template cost.

Items **29** and **30** cover the same works for HV1 and HV4 and are supported by VO's.

Justification

A justification for the increase of specification has not been provided by LAL and as such no judgement can be made on the reasonableness of the addition of the works to the scope and the passing on of the costs to the transfer value. Given that the works represent a change to the contractors scope of work it is reasonable that they (the contractor) be compensated for the additional works.

Justification for the increase in specification has been requested but not yet provided.

5.6.10. Pull-in Winch Relocation

Table 15 summarises the cost template item related to the relocation of the pull-in winch.

- **Table 15 Relocation of Pull in Winch Extract from Cost Template**

Table redacted.

VO has been provided but without details of the works carried out.

Justification

The pull in winch was relocated to facilitate a change to pull in methodology of a related contractor. As these works represent a change of scope it is reasonable that the contractor be eligible for compensation.

5.6.11. Provision of Site Services

Table 16 summarises cost template items related to site services.

- **Table 16 Site Services Extract from Cost Template**

Table redacted.

The contractor was requested to take over site services on behalf of the Principal contractor as Siemens who were providing site security were leaving the site.

Item **14** appears to cover the HDD site and Item **28** covers the Cleve Hill site. A variation order with detailed breakdown consistent with the cost template has been provided for Item **14**.

Only a work instruction has been provided for Item **28** with no indicated costs or detailed works breakdown. It has been indicated that this item has been finalised under bulk settlement VO-67E which is in draft form at time of writing however without the corresponding VOP this cannot be verified.

Justification

These services are a change of contract and as such it is reasonable that the contractor be eligible for compensation.

5.6.12. Independent Party Cable Survey

Table 17 summarises the cost template item related to independent party post lay survey works.

■ **Table 17 Cable Survey Extract from Cost Template**

Table redacted.

Justification

As detailed in section 5.5 the Item description in the above table is exactly as indicated on the cost template. A detailed account of the justification is provided here.

Post installation surveys had been carried out in previous transitional round 1 projects where cable installation issues had occurred, this has facilitated the close out of technical due diligence for the financiers.

Experience from transitional round 1 projects indicated that costs associated with this had been permitted to be recovered by developers subject to the costs being economic, efficient and justified.

The survey process was initiated in 2012 prior to the announcement of a Preferred Bidder to make the most of good weather, downtime during Cleve Hill repairs and to ensure that a completed report could be reviewed by the financing institutions ahead of issuance of developer and Preferred Bidder confirmations.

SKM's view is that post installation surveys provide value in confirming cable protection and providing assurance to OFTO's. The works provide direct benefit to the OFTO and as such SKM considers it reasonable that the cost be included in the transfer value.

5.6.13. Crossings / Rock Dumping

Table 17 summarises the cost template item related to Crossing Rock Dumping.

- **Table 18 Crossings / Rock Dumping Extract from Cost Template**

Table redacted.

No details or supporting documentation has been provided for Item **129**.

It is assumed that Item **128** is detailed in VOP 016EX given the similarity in description and value however the connection is not indicated in the cost template. VOP 016EX indicates that the cost was incurred as a result of changes to cable crossing rock dump procedures reference HV1 and HV4. The VOP includes a detailed breakdown of the works and cost and indicates that the works required became more specific as the overall project progressed until the original quote was no longer relevant. VO 016EX covers the difference between the original and final quote. The item value is slightly less than the VOP value (around £9,000).

Item **128** has been finalised under bulk settlement VO-67E which is in draft form at time of writing.

Item **129** is not supported by any documentation however VO-67E does note the potential for an increase in the contract cost consistent with this item in the event that LAL cannot obtain dispensation for crossing rock berms which exceed design height. The inclusion of this item in the cost template suggests that this event has now transpired though no evidence of this has been provided. Furthermore VO-67E indicates that any costs incurred above Euro 250,000 (£221,552) will be split 50:50 between LAL and the contractor.

Justification

With regard to Item **128** the works represent a change of scope and as such it is reasonable that the contractor be eligible for compensation.

With regard to Item **129** it is not clear why the rock berms have not been installed to specification and therefore it is not immediately clear that the contractor should be eligible for compensation. Furthermore the most recent documentation available indicates that this item remains a potential cost and as such has not and may not be incurred.

5.6.14. Miscellaneous Contracts

Table 19 summarises remaining cost template items.

- **Table 19 Misc Remaining Costs Extract from Cost Template**

Table redacted.

These items are associated with Pipeline Engineering and specific information has not been provided.

5.7. Outstanding Claims and Contract Variations

The cost template export cable costs have previously been presented over 2 spreadsheets. The first "CR4-Cables" tab is an itemised breakdown of costs generally relating to specific agreed or

largely agreed variation orders. These items are discussed in Section 5.6. Approximately 57% of the variation items discussed in Section 5.6 are supported by a signed Variation Order. The majority of the other items are documented by unsigned variation orders or Variation Order Proposals and could be considered outstanding. Discussions regarding the items however are sufficiently advanced and confidence is such that they will go on to be variation orders of values similar to those shown, that they have been included in the main cost template list.

The second cost template spreadsheet “CR4-Cables Risk” represents outstanding risk. There are now no items remaining on this sheet with the final items removed during the course of the preparation of this report.

The final claims have largely been agreed under two bulk settlements detailed in VO-58 and VO-67E, as discussed where relevant in Section 5.6.

It should be noted that VO-67E indicates the potential for further claims as discussed around Item **129** which while included in the cost template total is still a risk item and may not be incurred. Other outstanding items noted including LAL liquidated damages related to late delivery of as built documentation and contractor compensation for a small number of outstanding VOP’s not obviously covered in the existing cost template.

In addition some VOP’s settled under VO-67E do not appear to be included in the cost template including VOP14EX and 15EX relating to additional jetting at crossing points. The total value of cost template items covered under VO-67E is £6,966,550 compared to a variation order value of ■■■, it is not expected therefore that the inclusion of these VOP’s would increase to cost template total by more than ■■■. These issues have not been discussed with LAL due to the late provision of VO-67E to SKM.

As a result of the above indicated outstanding liabilities and uncertainty SKM cannot confirm that no further claims and variations will occur.

5.8. Claims by LAL on Contractors and Third Parties

Claims on contractors and third parties are expected to have been sought by LAL where possible and SKM would consider that any receipts from liquidated damages etc. should be recognised in the transfer value. As part of this analysis only Cable installation items with a positive variance (i.e. increase in cost) greater than ■■■ have been considered in detail at the request of Ofgem. The most significant negative cost template items have been included in Section 5.6 for information. Other items include;

- ■■■ for the collection of strategic spares which was carried out by LAL in the place of the contractor,
- and ■■■ for Trinity House Cardinal Buoys.

Particular note should be made of liquidated damages received from Nexans regarding delays in supply of all four export cables. The damages are contractually limited to 10% of the value of each cable and do not cover all the direct and consequential costs incurred. The total value of damages as recorded in the Cable Supply section of the cost template is ■ made up of ■ for HV2 and HV3, and ■ for HV1 and HV4. This aligns with the total cable supply contract value of approximately ■ and represents approximately 25% of the total increase in Installation costs above basic contract value (not including risk values).

Damages have been applied to the overall cable transfer value submission as would be expected.

Details beyond information within the cable supply contract and cost template have not been requested for this study.

5.9. Reasonableness of Passing Costs to the Transfer Value

It is clear that significant additional costs have been incurred on the cable installation contract, most triggered by a single incident of the late supply of the export cable by the supplier, Nexans.

LAL has provided SKM with internal minutes of Executive Committee meetings and internal reports outlining the considerations given to the supply and installation of the export cables following the incidents during manufacture of HV2 and HV3 and the need change the design of HV3, HV1 and HV4.

In the opinion of SKM LAL reacted in an appropriate manner to the failure of HV2 and the consequential load out delays to HV2 and HV3, in particular efforts to mitigate the additional costs associated with cable installation which were directly attributable to the delays caused by Nexans.

SKM notes that the delays due to Nexans of 3 months on HV2 and 2 months for HV3 seem excessive given the nature of the problems found by Nexans but recognise the necessity of ensuring that cables were eventually delivered with confidence that the issues experienced had been resolved.

SKM also notes however that the original programme only had some two weeks contingency on the load out date for HV2, so any problems during manufacture and HV testing were always liable to lead to delays, but it would not have been reasonable to anticipate that a reputable cable supplier would encounter such significant problems in their manufacture and test process.

Evidence provided by LAL suggests that the decision to shift the HV2 cable installation period to winter was taken by LAL after considering the most significant implications to the cost and programme for cable installation. Evidence of a complete cost, benefit analysis has however not been provided to SKM.

Sections 5.6 and 5.7 have reviewed the reasonableness of the costs being incurred by the contractor and the justification for the contractor to be compensated for those costs given the delays to the cable supply contract.

5.10. Conclusions

- a) It is the opinion of SKM that the costs submitted by LAL are fluid and subject to significant and frequent change based on ongoing negotiations. SKM understands that the cost settlements with regard to export cable installation were coming to the end of negotiations during the course of the study and as such it is not expected that there will be significant changes to the values quoted within this report.
- b) In total the basic installation contract price of ■ (excluding contingencies) has been increased by ■ which represents a 80% increase.
- c) 99% (■) of the total cost variation from the basic installation contract has been reviewed.
- d) 59% (■) of the cost variation reviewed is standby costs, of which 96% is related to the damage caused to HV2 and the resulting delays.
- e) The variation in cost incurred on this project for export cable installation is very large. However in total approximately 66% (■) of the cost variations reviewed are directly or indirectly caused by damage to HV2 during manufacture and the resulting delays and knock on effects.
- f) No items reviewed are considered by SKM as being unreasonable for the contractor (specific contractor varies by individual cost see section 5.5) to be eligible for compensation. Item 129 (detailed in section 5.6.9) is the only exception to this due to a lack of information though the item is of relatively low value.
- g) Unit rates benchmarked by SKM are reasonable in comparison with other similar projects and the SKM database.
- h) Claims on third parties by LAL for costs due to the various detailed incidents have not generally been considered in the detailed analysis though they have been accounted for in the overall variation values when detailed in the cable installation cost template items.
- i) Liquidated damages relating to the Nexans supply issues are not included in the total variation analysis. They total ■ and generally reduce the total transmission asset submitted value though there has been no direct offset of specific installation costs.
- j) The export cable installation costs incurred appear reasonable based on the information provided, and in particular due to the supply delay which resulted in offshore works during the winter period.



Appendix A Item References

Appendix redacted.