

CHARTERING OF SURVEY VESSELS ON TERMS OF SUPPLYTIME 2005: SOME LEGAL IMPLICATIONS



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Content

<u>1</u>	<u>INTRODUCTION</u>	<u>1</u>
1.1	Presentation of the subject	1
1.2	Issues to be addressed and structure of the paper	4
1.3	Legal sources used in the research	6
<u>2</u>	<u>SUPPLYTIME STANDARD FORM AS A CHARTER PARTY</u>	<u>9</u>
2.1	Short insight into time charter parties	9
2.2	General characteristic of SUPPLYTIME standard form	10
2.3	Interpretation and choice of law in SUPPLYTIME standard form	11
2.4	Other offshore charter parties and SUPPLYTIME standard form	17
2.5	NMC applicability	17
2.5.1	Is NMC a relevant document?	18
2.5.2	Applicability by analogy?	20
<u>3</u>	<u>SHORT INSIGHT INTO TECHNICAL ASPECTS AND DATA ACQUISITION CONTRACTS IMPLICATIONS BY THE EXAMPLE OF SEISMIC SURVEYS</u>	<u>21</u>
<u>4</u>	<u>SPECIFIC EQUIPMENT ON BOARD RISES SOME ISSUES</u>	<u>28</u>
4.1	Status of equipment belonging to the charterer	28
4.2	Installing of Charterer's equipment	31
<u>5</u>	<u>ROLE OF THE EQUIPMENT IN THE OFF HIRE SITUATIONS</u>	<u>33</u>
5.1	Off hire problem in general perspective	33

5.2	Being prevented from work as a condition for off hire	36
5.3	Causes for off-hire and their interpretation	37
6	<u>“WORK” OF A SEISMIC SHIP</u>	39
6.1	The formulation of the problem	39
6.2	Employment in offshore activities	41
6.3	“All reasonable services” – possible interpretations	43
6.4	Impact of Clause 3 (b) revision	46
7	<u>“EQUIPMENT” AS A CAUSE</u>	48
7.1	The wording “Equipment” as a cause – formulation of a problem	48
7.2	Ways to interpret a wording “other accidents to the vessel”	50
7.2.1	The wording “ <i>other accidents</i> to the vessel”	50
7.2.2	“The vessel” and “the equipment”	52
7.3	Deficiency of charterer’s equipment as a cause for off-hire	58
8	<u>CONCLUDING REMARKS</u>	63
	<u>REFERENCES</u>	67
	<u>ANNEX: INVITATION TO TENDER – 3D SEISMIC DATA ACQUISITION</u>	A

Abbreviations

BIMCO	The Baltic and International Maritime Council
EWHC (Admlty)	High Court of England and Wales (jurisdiction over maritime law)
Lloyd's Rep.	Lloyd's Law Reports
LMNL	Lloyd's Maritime Law Newsletter
ND	Nordiske Domme I Sjøfartsanliggender
NMC	The Norwegian Maritime Code of 24 June 1994 no. 39
NMIP	The Norwegian Marine Insurance Plan 1996 version 2003
(Offshore Support) Ops	(Offshore Support) operations
ROV	Remotely operated vehicle
SBL	Support seabed logging

1 Introduction

1.1 Presentation of the subject

This thesis is dealing with legal issues that may arise in a course of chartering of vessels for the offshore special surveys (data collection). The offshore seismic data acquisition is used as the main example to focus on. However, a large part of the discussion below can be equally applied for the charter parties intended for other survey types (e.g., pipeline surveys, electromagnetic seabed sounding, and many others). The operations¹ of special survey vessels are distinguished by certain technological peculiarities. Most of these technical features are essential for fulfilling such tasks, and many of them are interrelated with issues of chartering a ship.

Such agreements are most often based on the standard BIMCO's² SUPPLYTIME 89 or SUPPLYTIME 2005 forms. However, many practitioners in this sphere find that this standard agreement is not sufficiently adjusted for purposes of chartering of special survey vessels. Therefore riders become a part of the agreement very often.

The difference between a standard supply vessel and a survey ship is governed by purposes the vessels are used for. Supply vessels are mostly used to transport supplies necessary for the accomplishment of primary tasks of an offshore oil platform. Since this primary task is to drill a well and to explore oil afterwards, bulk cargoes of supply vessels consist of drilling mud, chemicals used in a drilling or exploring process, etc.

¹ The term "operation" is often used in the industry to denote a progression of actions made in order to complete a certain task (e.g., to collect data).

² The Baltic International Maritime Conference (<https://www.bimco.org/>) [Visited 05 June 2010]

The situation is different for the vessels used for data acquisition. They are attributed to the same category of supply vessels, but, at the same time, they are attributed to the category of *survey vessels*. They are distinguished by additional (often high technology class) equipment installed to perform their tasks, and the latter equipment (typically very expensive) normally belongs to the charterer. A technical crew employed by the charterer operates this equipment. It is very often that the ship is required to fulfill outstanding technical specifications, necessary to accomplish the survey objectives. The survey vessels are usually *not supposed to carry any cargo*. Only *consumables* are taken on board. As shown below, all these conditions give rise to a number of legal problems.

Since its first version was introduced in 1975 and until today, SUPPLYTIME standard form developed by BIMCO is a basis for many agreements in the offshore industry. The latest version was issued in 2005. Prior to adoption of the first version of SUPPLYTIME, the charter parties of supply vessels supporting the oil exploration were usually prepared by big oil and offshore companies.³ Supply charter parties embrace very different activities: transporting of cargo necessary for oil production, supply stores to an oil platform, production waste back and many others. At the same time, the special survey agreements are often concluded on the same terms. The fact that only this year (2010) BIMCO hosts three seminars devoted to SUPPLYTIME (in Aberdeen, Singapore and upcoming in Norway) clearly illustrates the actuality of this form.

It is also worth mentioning that in the nearest future chartering of survey ships may become very relevant in the context of the recent agreement on Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean signed between Norway and Russia.⁴ It is expected that “The treaty will also ensure the continuation of the extensive and fruitful Norwegian-Russian fisheries cooperation, and governs cooperation on the exploitation of

³ Gade/Woxholth (1979) pp. 15-16

⁴ Treaty between the Kingdom of Norway and Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and the Arctic Ocean signed on 15 September 2010 in Murmansk, Russia. Now the treaty has to be ratified by both Norwegian Storting and Russian Duma in order to come into force lawfully, but both leaders expect a prompt ratification by the parliaments.

any petroleum deposits that extend across the delimitation line.”⁵ Thus, large territories will be open for exploration and the offshore industry will feel an impact.

Initially the thesis was intended to analyze the actual charter parties for special surveys. Unfortunately, the actual charter parties represent sensitive market information from the point of view of all players on this market, and therefore it was very difficult to get hold of these agreements. Due to these circumstances the research is done in a way of analyzing SUPPLYTIME 2005, the standard BIMCO’s form, and juxtaposition their provisions with realities of data acquisition process and with the former version of this form, SUPPLYTME 89. Several actual contracts and practical information were kindly provided by some companies⁶. Still, due to its commercial value only part of this information was agreed to be used in the thesis, and it has affected the paper to some extent.

The aim of the current research is, in general, to develop an understanding of possible legal implications of the use of SUPPLYTIME 2005 when chartering the special survey vessels. It will be shown that the balance in legal relationship “shipowner – charterer” based on terms of SUPPLYTME 2005 has been changed if compared to the previous version of the standard form. The relevant improvements of the standard form will be further suggested.

One should also mention that the observations made in this research may be applicable to some extent to chartering of other types of ships not intended for cargo transportation, neither for survey activities, but operating special equipment: for example, for cable layers, crane vessels, drillships, fireboats, vessels involved in special salvage operations, research vessels, etc.⁷

⁵ Comments to press release on assignment of the Treaty (<http://www.norway.ph/news/Treaty-on-maritime-delimitation-and-cooperation-in-the-Barents-Sea-and-the-Arctic-Ocean-signed-today/>) [Visited 1 of October 2010]

⁶ It is necessary to mention that it was extremely difficult to get this information. The negotiations were started early spring, but first positive results came only in August.

⁷ For details see, please: http://en.wikipedia.org/wiki/Platform_supply_vessel. [Visited October 8, 2010]

Nowadays the scope of legal problems related to the chartering of special survey vessels is relatively narrow. However, constantly increasing demand of the natural resources (including oil and gas, but not limited to them) and recent advances in high technologies keep accelerating the offshore exploration activities. The very high costs of the offshore wells drilling call for methods optimizing the exploration and finding of resources. Another strong driver is the ecological factor that plays increasingly important role in today's economics. Since the offshore drilling is generally harmful and (as demonstrated by, e.g., recent BP's incident in Gulf of Mexico⁸) potentially dangerous for the marine environment, the industry is constantly searching for methods that will allow to minimize the amount of drilled wells, still keeping the high rate of discoveries. Therefore, the methods of finding and monitoring commercial deposits prior to actual drilling become more and more important. The special surveys discussed in this thesis usually serve exactly this purpose. Thus, chartering of vessels with such unconventional characteristics and tasks will inevitably be used more and more in the industry. That is why the presented analysis may turn out to be highly relevant in the nearest future.

1.2 Issues to be addressed and structure of the paper

The limitation of the issues discussed in the thesis is based to some extent on the outcomes of objective interpretation used as a basic method. The scrutiny of the subject using other methods was found to enlarge the paper significantly, and therefore was set aside.

The problems considered in the paper could be provisionally divided into two categories. Issues attributed to the first category are related to the essence of the charter party of survey ships. The second category embraces a complex of the issues related to the equipment.

Section 1.3 classifies the sources used and comments on their role in the current research.

⁸ See, e.g., <http://www.bp.com/sectiongenericarticle.do?categoryId=9034447&contentId=7063852> [Visited November 15, 2010]

Chapter 2 outlines general characteristics of SUPPLYTIME in the context of time charter parties and as a member of BIMCO's offshore standard forms suite. The overview of problems related to interpretation and choice of law in agreements based on SUPPLYTIME is also given here.

In order to provide examples of possible technical problems, a short insight into technical aspects of the offshore data acquisition and implications following from the data acquisition contracts is given in Chapter 3.

Chapter 4 is analyzing the changes in the status of the equipment provided by amendments to the lien clause of SUPPLYTIME 2005. It also addresses the question whether some additional procedures have to be stipulated in the contract for situations when structural alterations to the vessel are made.

In order to facilitate further discussion a short general introduction into off-hire problems related to equipment is given in Chapter 5.

The notion of vessel work and possible legal implications in relation to potential off-hire situations is discussed in Chapter 6.

Chapter 7 deals with a group of problems related to the equipment in off-hire situations. Perspectives of interpretation of the standard form in this respect under both, Norwegian and English, legal systems are suggested. In particular, the scenario of fairly literal interpretation of SUPPLYTIME 2005 off-hire clause is examined in respect of the absence of the expression "equipment" in the wording of cl. 13 (a). Further, possible outcomes of an analogous dispute supplemented with Norwegian law are considered. Consequences of unsuccessful repairs by the owner of the charterer's equipment will be scrutinized among the other questions.

It is important to note that the problem of understanding of the notion “work of survey ship” is primarily relevant to charter parties of the survey vessels or similar. At the same time, the complex issues related to the equipment would also be relevant for other types of charter parties. The decision to consider equipment-related problems in the same context in Chapter 7 is based on the fact that the special charter parties of survey ships provide a good example for analysis.

The Concluding remarks summarize the main findings and suggestions made in the thesis.

A document (part of an actual contract) demonstrating standards of work required under data acquisition survey is provided in the Annex. Due to confidentiality issues only selected parts of the document are attached to this paper.

1.3 Legal sources used in the research

This Chapter gives a short overview of the legal source used in the research, and provides short comments explaining the details of each (type) of the sources.

- SUPPLYTIME 2005 standard form.
Contractual freedom in respect of chartering of ships is stipulated in NMC Sec. 322. Further, it is backed by The Formation of Contracts Act of 31 May 1918 (No. 4) as the basis for Norwegian contract law in general. The principle of contractual freedom, provisioned by Sec. 1, stipulates the parties’ freedom to decide on the contents of the contract. Therefore SUPPLYTIME 2005 Time Charter Party for Offshore Service Vessels standard form and SUPPLYTIME 89 standard form was of the primary interest and the main source for the research.

- BIMCO's works.

BIMCO's commentaries to the revised SUPPLYTIME have comprised a substantial material for further analysis of the standard form. However their role as an interpretation instrument is not unanimously ascertained. The problem of its importance will be discussed in Section 2.3.

- Court and arbitration decisions.

Decisions of both Norwegian and English courts were scrutinized in the thesis. First of all, decisions solving conflicts that arose from survey activities were considered. The awards, where disputes originated from other types of charter parties or other activities were used to find pro- and contra- arguments. These awards have also been used to deduce the adopted way of thinking, which was in turn used to find other relevant reasoning. Some decisions have been used to illustrate factual circumstances and technical details. At last, few cases have been discussed to show that the room for consideration given to a court in particular circumstances is still very wide.

- Legal acts.

Since the charter parties are contracts per se, and contractual freedom is at the very core of charter parties, legal acts were not of decisive interest for the paper. On the other hand, consequences when a contract is found unclear or not regulating particular issues were discussed. Therefore, the outcomes of applying a background law or implied terms in English law were touched upon. In addition, problems of applying NMC to charter parties similar to survey ships charters were analyzed.

- Secondary literature.

Opinions of scholars particularly authoritative in the relevant spheres are often met as arguments in Norwegian court practice.⁹ Nonetheless, there is very limited amount of literature devoted to chartering of survey vessels. The sources analyzing

⁹ For details see Falkanger/Bull/Brautaset (2004) p. 32; cf. e.g., ND-1991-423 North Sea Surveyor p. 427

SUPPLYTIME standard form or other offshore charter parties are also very rare. Therefore, the literature was primarily used to give an overview and to classify interpretation problems related to the subjects of the research. These publications were of prime interest not in order to find arguments for or against suggestions made in the paper, but to employ the way of thinking used in those sources.

All citations from Norwegian sources except Falkanger/Bull/Brautaset (2004), provisions of Norwegian Maritime Code (translated into English as an unofficial student edition), Evje/Solvang 2007 and Grotmol/Glicksman (2005) *are given in writer's translation, unless otherwise indicated.*

2 SUPPLYTIME standard form as a charter party

2.1 Short insight into time charter parties

SUPPLYTIME standard form is a time charter party, and shares some characteristics common for this type of agreements.

In general, a time charter party is characterized as “a contract under which the ship’s capacity is made available to a time charterer for a specified period. The ship must, within a framework established in the charter party, perform voyages as directed by the charterer. The charterer bears the expenses connected with each voyage and pays hire to the owner based on the time the ship is at the charterer’s disposal.”¹⁰ For the purposes of Chapter 14 “Chartering of Ships” time chartering is defined by NMC, Sec. 321, 2 as “[...] chartering where the remuneration is to be calculated per time unit.”¹¹

The time charterer undertakes a ship in commercial sense, and therefore he pays expenses which in other cases the shipowner would bear (bunkers, often lubricants, etc.). At the same time, the marine crew is under the owner’s control and the owner is responsible for performing of a voyage, and consequently for compliance with the charter’s orders. As a result, the time charterer bears a number of risks, which the shipowner would have to bear under voyage chartering.¹²

An actual time charter is usually based on a standard charter party form. In most cases these forms are developed by international organizations, where BIMCO plays a central

¹⁰ Falkanger/Bull/Brautaset (2004) p. 393

¹¹ This citation has to be taken in context of the wording of the whole Section 321 of NMC.

¹² Michelet (1997) p. 1

role.¹³ However, it happens quite often that parties do not find standard form exhaustive or “tailor-made” for their potential relationship. In this case the “riders” – additional clauses, or clauses designed to change wording of the standard form are inserted.

2.2 General characteristic of SUPPLYTIME standard form

SUPPLYTIME 2005 Time Charter Party for Offshore Service Vessels standard form is developed by BIMCO and is a part of the suite of offshore industry related forms. Others included are HEAVYCON, PROJECTCON, BARGEHIRE, TOWCON and TOWHIRE. The first edition of SUPPLYTIME was developed by BIMCO in 1975. Until this form was introduced, the charter parties of supply vessels designed for support of oil exploration were usually elaborated by big oil and offshore companies.¹⁴ Second edition is SUPPLYTIME 89 and the newest one is SUPPLYTIME 2005.

Until now SUPPLYTIME 89 is still used more frequently than the latest edition.¹⁵ SUPPLYTIME 89 is characterized as pro-vessel owner contract¹⁶. SUPPLYTIME 2005, the latest edition, was recommended as a replacement of the 89 version by, for example, Nordisk Skibsrederforening.¹⁷ At the same time, an issue whether the agreement has become more balanced towards charterers is not commented explicitly in the literature, neither in BIMCO’s Explanatory Notes.¹⁸

Supply charter parties embrace very different activities: transporting of cargo necessary for producing of oil, as well as food, supply stores to an oil platform and production waste back. Everything which goes to platforms in the North Sea, except personnel, is transported

¹³ Michelet (1997) p. 2

¹⁴ Gade/Woxholth (1979); for details see pp. 15-16

¹⁵ Cf. Evje/Solvang (2007) p. 17

¹⁶ Cf. Gay (2004) Sec. 3, 36; Evje/Solvang (2007) p. 20

¹⁷ Grotmol/Glicksman (2005) p. 17

¹⁸ BIMCO’s explanatory notes

by sea: it is about three trips per week in average to each installation.¹⁹ Other tasks of such ships are pipeline supply, fire fighting and serving as a diving platform. All agreements on chartering vessels that render these services are handled as supply charter parties in Bråfelt's "Fleksibilitet i cereterpartiforhold".²⁰ Vessels of this kind are also used for salvage services and, as shown in Chapter 7.2.1, in some cases they are chartered on terms of SUPPLYTIME. However, the most notable and, perhaps, unique task of such vessels is not commented widely, i.e., the rendering of survey services.

2.3 Interpretation and choice of law in SUPPLYTIME standard form

In general, contractual provisions form a basis for construction of a time charter party, where customary interpretation principles are applied. It is important to note that these principles vary from one legal system to another. The main objective of interpretation is to find out what the parties' intent was.²¹ These rules will be applied to the interpretation of an agreement based on SUPPLYTIME standard form.

Norwegian and English law systems apply two different approaches of contract construction. Under Norwegian law the first and foremost meaning to interpret a charter party is its wording. In cases when it is impossible to find out what parties have meant, other documents and proofs will be taken into consideration in addition to the actual contract. The opposite situation is found in English law, where the general approach is expressed in "the four corners of the contract" rule. It stipulates that the final agreement reflects parties' intentions.²² Therefore other documents are not of the interest for an English court.

¹⁹ Sand (2003) p.15; for detailed overview on oil platform supply business please see pp. 13-16

²⁰ Bråfelt (2008) p.19 et seq.

²¹ Falkanger/Bull/Brautaset (2004) p. 29-30

²² Possible consequences of such approach to interpretation will be demonstrated by The A Turtle case example, see Section 6.3.

It is noteworthy that SUPPLYTIME 2005 also includes the entire agreement clause. According to cl. 38 a charter party based on SUPPLYTIME standard form, “including all Annexes [...], is the entire agreement of the parties, which supersedes all previous written or oral understandings and which may not be modified except by a written amendment signed by both parties”.²³ Thus, some difficulties may arise if such agreement will be construed under Norwegian law. However, construction implications in this respect are beyond the scope of the paper.

A meaning for interpretation of SUPPLYTIME clauses could be BIMCO’s explanatory notes, which will be cited in the paper when appropriate. In Norwegian practice there are examples when such instruments, especially commentaries, were found relevant when interpreting standard contracts.²⁴ Nevertheless, the use of such commentaries as interpretation instrument is criticized by Brækhus on the ground, that commentaries to standard charter parties developed by shipowner’s organization cannot be prioritized before contractors’ intentions.²⁵ This opinion is confirmed by Falkanger.²⁶ He concludes that concept of commentaries to standard contracts is more non-uniform and not that “sharp” when there is no commonly accepted procedure for the standard contracts development.²⁷ Furthermore, a wording of a document which (like SUPPLYTIME) is issued by international organizations is often a result of a compromise between parties, because very often they bear in mind different approaches to the way how a document is meant to be drafted.²⁸ According to BIMCO, Explanatory Notes to the revised SUPPLYTIME 89 “[...] are designed to provide some background information on the clauses of the various parts of the Charter and a general overview of the amendments made in this revision.”²⁹ In addition, these notes are short and given in a very general way. These grounds will be also relevant

²³ SUPPLYTIME 2005, lines 1425-1429

²⁴ See Falkanger (1997) p. 298, where one of such examples (ND 1925.523 H. Bauermeister) is given.

²⁵ Brækhus (1968) p. 246

²⁶ Falkanger (1997) p. 298

²⁷ Ibid. p. 300

²⁸ Mischelet (1997) p. 10

²⁹ BIMCO (2005) p. 35

for an English judge. Thus, in this thesis the latter construction instruments will not be prioritized over the wording of the standard forms and other interpretation meanings.

In the course of interpretation of charter parties drafted in English some problems may arise. A clear starting point in Norwegian law is that contracts, which are drafted in a language another than Norwegian, are interpreted in the same way as contracts drafted in Norwegian.³⁰ At the same time, the issue whether to consider SUPPLYTIME as drafted in English law tradition or just in English language is not absolutely clear. For example, Bråfelt's point of view how to regard such contract is somewhat ambiguous:

Partners can [...] use a *charter party drafted in English* (emphasis added), but where drafting have taken place either in the course of negotiations between representatives of organizations of different branches (as, for example, NF- / NTK-contracts [...]) or by an organization where development of standard contracts, so called "documentary work", is one of their business activities, for example, BIMCO and INTERTANKO. These standards are not necessarily developed bearing in mind English law and corresponding law practice. [...] the standards which are developed by such organizations or through changes when bearing in mind English law will be, in principle, embraced by the first group (standard charter parties developed in relation to English law). A borderline between these two groups is not that distinct like their classification can make an impression [...]. For example, *BIMCO develops charter parties mostly bearing in mind English law* (emphasis added).³¹

At the same time, BIMCO does not in any way comment on this issue in relation to the SUPPLYTIME 2005. In my opinion, SUPPLYTIME is more an example of an agreement drafted in English, where some influence of English law is felt, but not prevailing. Therefore the choice of interpretation meanings should be done independently and notwithstanding the fact of drafting it in English.

NMC Sec. 322 provides freedom of contract in relation to the question of the applicable law. At the same time NMC Sec. 322 "[...] establishes limits on the parties' freedom of

³⁰ Selvig (1986) p. 4

³¹ Bråfelt (2008) p. 36

contract. However, it applies primarily to voyage charters. In the case of time charters, only the fourth paragraph is relevant and this is simply a reference to the mandatory rules applicable when bills of lading are issued [...].³² Therefore when bill of lading is not issued there are no mandatory rules applicable to time charter parties under Norwegian Law. Thus NMC rules on time chartering are declaratory ones. It means that parties can stipulate in a contract that Norwegian law will not be applied in this sense.³³ The issue of applicable law and consequences of its choice are complicated and tricky question. For example, with respect to the moment when declaratory rules of NMC are not applied to the charter parties Falkanger comments that “sometimes it could be difficult to determine *when* NMC rules are agreed not to be applied, so that NMC is meant not to supplement legal relationship”.³⁴

As other charter parties, SUPPLYTIME standard form is used world-wide and intended for international parties. The interpretation of a contract is a subject to an interpretation doctrine and principles of an applicable law. Therefore, choice of law is essential to foresee outcomes of contract fulfillment and potential conflicts. SUPPLYTIME 2005 provides a possibility to choose an applicable law by virtue of cl. 34. The tacit choice is English law. Norwegian law could also be well chosen by the parties. Therefore, the issues will be considered from point of view of both legal systems, Norwegian and English.

In Norwegian law there is a tendency to construe a contract in a way that the deviation from any supplementary statutory rule is as small as possible³⁵ when all other meanings to interpret a contract within frames of its wording are exhausted. It is in contrast to English law where a judge is not expected to go that far. On the other hand, the contract’s legislative background has to be taken into consideration.³⁶

³² Falkanger/Bull/Brautaset (2004) p. 393. For the discussion of related questions see, please, Section 2.5.

³³ Mischelet (1997) p. 10

³⁴ Falkanger (1996) p.141

³⁵ Falkanger/Bull/Brautaset (2004) p. 30

³⁶ Lewison (2007) p. 128-131

Another function of a background law is to supplement a contract in aspects which are not explicitly regulated by virtue of provisions of the contract. A suitable presumption is also established in Norwegian law.³⁷ Therefore issues of application of NMC Chapter 14 on Chartering and part IV on time chartering will be discussed in Section 2.5. The function of background law in the English legal system is not exactly the same as in the Norwegian one. Here one should find a solution in the contract's "indirect regulation" with a help of so-called "implied terms".³⁸

Most of the particular clauses comprising a standard charter party are found in other types of charter parties. Therefore one can say that the majority of contractual obligations are inspired by common basic ideas. Nevertheless, a wording of a particular covenant is the most decisive in an actual conflict. It is enhanced further by the fact that there are differences in a way to formulate a provision regulating the same subject in different standard forms.³⁹ Therefore, individual clauses are often subject to interpretation by the courts and legal commentators. And in the trade, certain viewpoints regarding the meaning of specific clauses tend to become established. In other words, contractual usage and understanding may have a fairly international character.⁴⁰ Thus, there are grounds to assume that English practice related to a particular provision will be taken into consideration by a Norwegian judge (obviously, to certain extent)⁴¹ solving an analogous conflict.

Decisions concerning earlier versions of SUPPLYTIME 2005, namely SUPPLYTIME (the first edition, 1975) and SUPPLYTIME 89 will be used in this research. At the same time,

³⁷ For details, please, see Falkanger (1996) where the importance of declarative legislation is discussed.

³⁸ The institute of implied terms embraces "terms implied in law" and "terms implied in fact". In general, application of implied terms would need a discussion in the paper, but due to limited volume the issue is set aside. For details see e.g., Møllmann (2007) p. 71 et seq, where a short overview is provided. At the same time, it is important to note that there are no particular rules on charter parties in English law.

³⁹ The examples of such differences will be illustrated below in Section 7.1.

⁴⁰ Falkanger/Bull/Brautaset (2004) p. 249-250; Gram (1977) p. 15-16; Lewison (2007) p.134-137 and Scrutton (2008) p. 10

⁴¹ This affirmation is very general. There are no ambitions to discuss all legal implications following from this statement in this thesis. For example, a judge in most cases will consider reasons why an English colleague have come to such decision and also whether analogous decision will be in sound with background Norwegian law, etc.

“decisions on earlier or similar versions of the same clause are to be treated with reserve”.⁴² The court and arbitration practice which analyze problems related to the survey vessels chartering is of the most interest. It was further found that other decisions which consider SUPPLYTIME terms are suitable for analyzing in this thesis.

It is also well known that the established practice on use of terms of other standard agreements often serves as a meaning to scrutiny a problem. The reason could be that “SUPPLYTIME 2005 includes wordings and solutions which can be found in other standard charter parties, for example, BALTIME and New York Produce Exchange (NYPE)”.⁴³ On the other hand, this approach was found mostly irrelevant when considering the problems discussed in this thesis. First of all, this is because in some cases different standard forms include very different wordings. For example, NYPE is a charter party intended for dry cargo⁴⁴; its purpose is considerably different from that of SUPPLYTIME. On the other hand, BIMCO is ambitious to make another dry cargo standard form, GENTIME, to concur with NYPE and BALTIME.⁴⁵ This all makes it quite doubtful that legal solutions adopted, for example, in NYPE and SUPPLYTIME necessarily follow same logic. Examples of differences in wording of off-hire clause adopted in NYPE and SUPPLYTIME will be shown below. Secondly, even two charter parties both used in oil industry may have significant differences. Examples will be provided in Section 7.1. Moreover, many elements of charter parties used in the oil industry were taken from another contract practice of oil industry, especially from fabrication contracts. It is not that much legislation connected with these contracts. In principle, they are embraced by the Sales Act⁴⁶, but the contract (regulation) and the binding custom of the trade should be prioritized.⁴⁷

⁴² Scrutton (2008) p. 10

⁴³ Rainey (2002) p. 158

⁴⁴ Mischelet considers it as the most important dry cargo charter party nowadays; see Mischelet (1997) p. 3

⁴⁵ Ibid.

⁴⁶ Bråfelt (2008) p. 42

⁴⁷ Kaasen (2006) p. 51

2.4 Other offshore charter parties and SUPPLYTIME standard form

SUPPLYTIME standard form differs from all other charter-parties included in BIMCO's offshore suite: BARGEHIRE, PROJECTCON, HEAVYLIFTVOY, HEAVYCON, TOWCON and TOWHIRE. Only SUPPLYTIME is a time charter party, while others are voyage charters per se.

BARGEHIRE, HEAVYLIFTVOY and HEAVYCON are intended for cargo transportation, while TOWCON and TOWHIRE are designated for rendering tug services. PROJECTCON is a standard agreement specially designed for tug and barge sector, where a commercial event is comprised of using them together. At the same time, as it was shown above, SUPPLYTIME is used to accomplish different tasks.

The features which make charter parties for special surveys so interesting could hardly be found in other offshore charter parties. Among those characteristics is the necessity to have hi-tech and valuable equipment on board. As a consequence, the personnel (technical crew) not belonging to the ship's crew is present on board. There are also some other features established mostly due to commercial practice (like, for example, presence of client representative on board) or other circumstances (for example, usually there are fisheries representative and representatives of ecological organizations on board). Another important characteristic of chartering of such vessels is that they trade worldwide being chartered for long periods. Thus some tax issues may be implied.⁴⁸

2.5 NMC applicability

SUPPLYTIME 2005 is issued by BIMCO for use by international parties. BIMCO's standard agreements, in general, are found to be a good basis for international contracts.

⁴⁸ Karstensen (2010)

However, it may turn out that provisions of such a contract may not regulate sufficiently the actual legal relationship. In this case one usually needs to supplement the actual contract with a background law. A possible variant would be that the parties on the stage of concluding their contract or later agree about the applicable law. SUPPLYTIME 2005 cl. 34 also gives such possibility. Parties may choose national or trans-national law (e.g., Lex Mercatoria). Although there may be no mandatory rules regulating the agreement, still, if the choice of applicable law is invalid due to some reasons, then it will be necessary to supplement the legal relationship with some legal provisions.

2.5.1 Is NMC a relevant document?

The starting point is to find the relevant law sources. “In the Norwegian context, a relevant source is the Maritime Code of 24 June 1994 no. 39...”⁴⁹ If one will go further and try to find appropriate provision of NMC 1994 issue will arise. There is Chapter 14 “Chartering of ships” of NMC. It regulates both voyage chartering and time chartering. It was mentioned above that these rules are declaratory per se. Therefore, they could be used only when parties agreed on that or when a court considers it necessary.

Nevertheless, the question is whether NMC is a relevant legal source to regulate survey charters and other charter parties not intended for cargo transportation (e.g., TOWCON, TOWHIRE, PROJECTCON, etc.). Between item II of Chapter 14 “Voyage chartering” and item IV “Time chartering” are placed “Quantity contracts” as item III. It is noteworthy that the whole Chapter 14 is embraced by Part IV “Contracts of carriage”. From point of view of systematical analysis it is doubtful that Chapter 14 regulates chartering of ships other than fleet with transportation capacity.

The scope of Chapter 14 is explained in the following way: “Part IV covers contracts of affreightment – transport of cargo under bills of lading and sea waybills, charter parties and

⁴⁹ Falkanger/Bull/Brautaset (2004) p. 26

carriage of passengers (Chapters 13-15).”⁵⁰ It is clarified that charter parties are regulated by NMC, Chapter 14. On the other hand, following syntaxes of the given sentence, it is logical to suppose that they are embraced by category of “contracts of affreightment”. Definition of contract of affreightment is found in the same source. In maritime law context it means “a contract to perform transportation services by ship or to make a ship transportation capacity available.”⁵¹ Thus it is doubtful that chartering of a ship for purposes other than transportation is regulated by NMC. It means that charter parties are regulated by NMC have to be per se contracts of carriage.

Thus it is logical to assume that the transportation as a kind of activity is a characteristic, which distinguishes the contracts obviously regulated by NMC from all others. Therefore a notion of transportation might be of some help in understanding the scope of NMC applicability. The notion of transportation was recently commented by the High Court in The Mezen case.⁵² In particular, it was established that the vessel was *not carrying* the equipment *as cargo* “for the purpose of conveying or transporting the equipment from one venue to another (emphasis added).”⁵³ Thus, the meaning of “the transportation” term was explained.

It is interesting that Norsk Lovkommentar⁵⁴ does not comment on applicability of Sec. IV to the charter parties other than for transportation cargo. The case where offshore charter parties are mentioned is, e.g., note 636 in relation to rare practice of assignment by the charterer his rights in the course of offshore charters. If to construe this comment strictly,

⁵⁰ Ibid p. 27

⁵¹ Ibid p. 240

⁵² The Mezen (2006) 693 LMLN 2(2). The newest and rare summation of seismic ship charter party essence was given in this case by the High Court. The decision is unpublished. The short overview is given in Lloyds Maritime Law Newsletter. In all likelihood, the detailed account of the facts and some commentaries can be found in case LB-2007-145991, considered by Borgarting lagmannsrett. There are grounds to suppose that both cases, Norwegian and English, stood between the same parties because: (i) the name of the ship was the same; (ii) the facts of both cases are very similar; (iii) the survey equipment was sold for the same price of USD 1.4 mill. Norwegian court did not discuss essential issues of the conflict. The decision considered issues of process law and connected to it.

⁵³ Ibid

⁵⁴ Solvang (2005) note 636 to NMC sec. 324

the given formulation does not lead to understanding that NMC, Part IV “Contracts of carriage” or Chapter 14 “Chartering of ships” regulates them. Thus, the issue is not highlighted in comments to NMC.

2.5.2 Applicability by analogy?

Comparing NMC with relevant foreign sources, one can observe that there are much more room for consideration when solving the issue of NMC applicability to charter parties not aimed for transporting cargo. For example, the Code on the Merchant Shipping of Russian Federation⁵⁵ establishes sphere of its application and notion of merchant shipping.

According to Sec. 3 the Code’s rules are spread on marine vessels, cabotage vessels and vessels of combined routes when port of call is a foreign one, during salvage and in collision with another vessel. According to Sec. 2 the latter Code, the notion of merchant shipping embraces transportation of cargoes, passengers and luggage, exploration of water biological resources, search and exploration of mineral and other non-living seabed and subsurface resources, pilotage and icebreaker assistance, etc.⁵⁶ This list is not exhaustive. Thus, the applicability of its rules to charter parties not intended to transport cargoes is explicitly provisioned, contrary to NMC.

In Norwegian law there is only one possibility to fill this gap, namely, to use the rule of applying a law by analogy. Since NMC regulates most closely connected issues, it will obviously regulate by analogy the charter parties not aimed for cargo transportation.

⁵⁵ The Code of the Merchant Shipping of the Russian Federation, Federal act nr. 81 from April 30, 1999.

⁵⁶ For the full wording, please, see Sec. 3 and 2 of Code of the Merchant Shipping of the Russian Federation.

3 Short insight into technical aspects and data acquisition contracts implications by the example of seismic surveys

This Chapter will shortly discuss some technical features and requirements imposed by the contracts of the offshore data surveys (*data acquisition contracts*).⁵⁷ The offshore seismic data acquisition is used as an illustration. However, a large part of the discussion below can be equally applied to other survey types (e.g., electromagnetic seabed sounding, pipeline surveys, etc.). It is important to emphasize that the *entity acquiring the data is the charterer* with respect to the charter parties discussed in this research. Thus, the requirements described below will affect his interests as the charterer. In turn, the data is typically acquired for a client (e.g., an oil company), and the relationship between the data provider (charterer) and the client are regulated by the data acquisition contract.

The offshore seismic surveys were invented yet before The Second World War. Being triggered by few “digital revolutions” in industry, this method was widely adopted in 1970-1980th, and constantly being empowered by latest technologies up to now. Although the method is indirect – the seismic acquisition and processing results in the mapping of geological structure rather than finding the petroleum directly – the probability of commercial success is improved more than enough to pay for seismic work. Nowadays the use of the seismic methods is principal in the oil and gas industry: it is hard to imagine a situation in which the location of the exploration well can ever be made without seismic data analysis. The data acquisition services are offered by many companies and trans-national corporations: PGS, WesternGeco, Fugro, TGS, Polarcus, Seabird, CGG Veritas are to be mentioned among the majors. To demonstrate the intensity of the use of the data,

⁵⁷ In preparation of this chapter various sources were used (referred in the text below), including the consultations with representatives of data acquisition companies. The technical principles of seismic methods are described following Telford/Geldart/Sheriff (1990)

the map in Figure 1 shows the coverage of The Barents Sea area of the Norwegian Continental Shelf by the seismic surveys available for purchase from the Norwegian Petroleum Directorate.

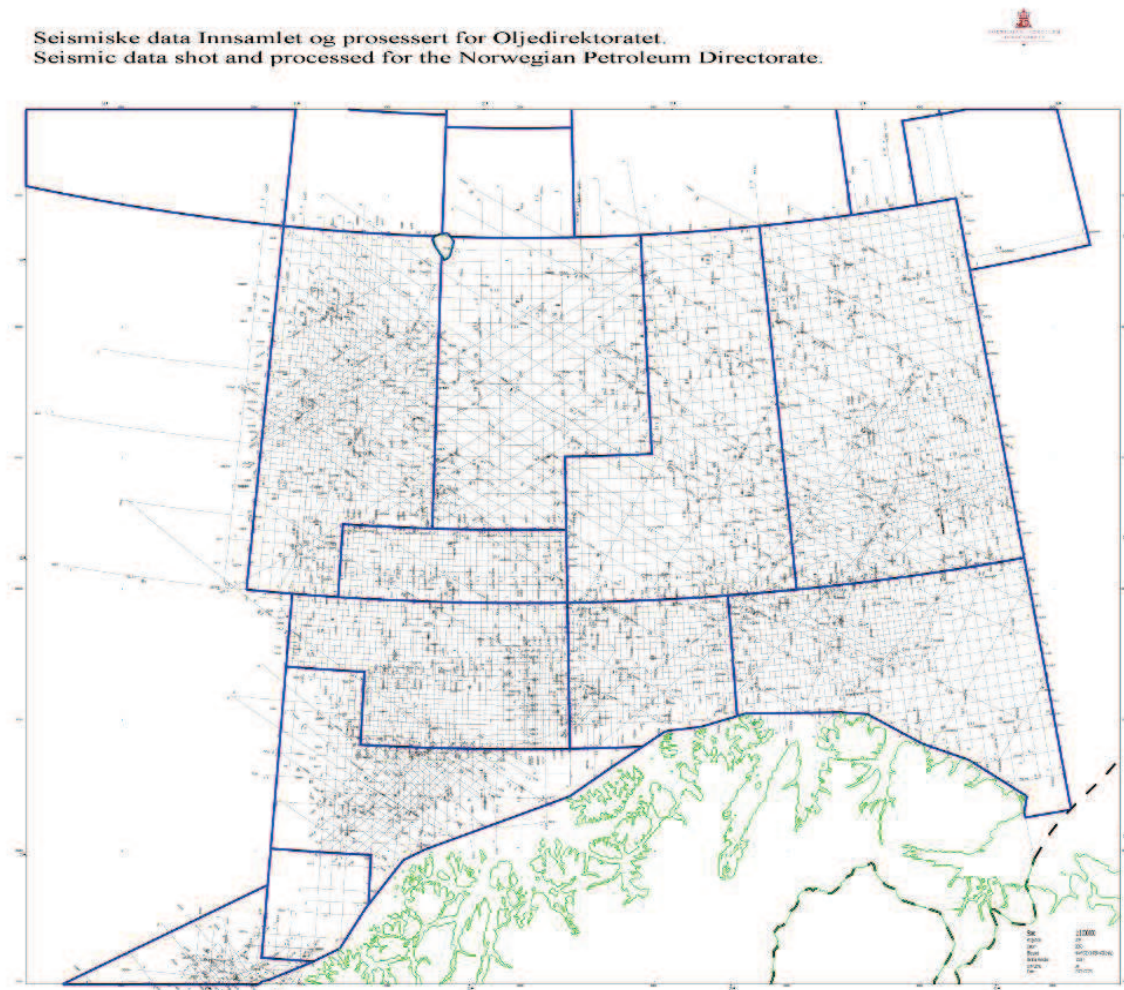


Figure 1 - Norwegian Petroleum Directorate's seismic data acquisition in the Barents Sea.⁵⁸ The seismic surveys are shown as lines and cover the shelf with a high density. The new surveys are being acquired periodically to increase the data coverage and/or quality.

⁵⁸ Available from <http://www.npd.no> [visited October 1, 2010]

The core of the seismic exploration consists of generating the seismic (acoustic) waves by some type of a signal source (e.g., so-called “air guns”), and then measuring the arrived signal at the series of receivers (e.g., geophones). The information recorded (i.e., the *seismic data*) consists of the wave shape of the acoustic signal as arrived to the receivers, as well as the highly accurate ($\pm 10\text{m}$ relative accuracy) navigation record for all the equipment. By analyzing these data (“data processing”) one is further able to deduce the information about the rock elastic properties and obtain a picture of the subsurface. Figure 2 illustrates the basics of this method by the example of so-called “towed streamer” seismic, most commonly used in today’s offshore industry.

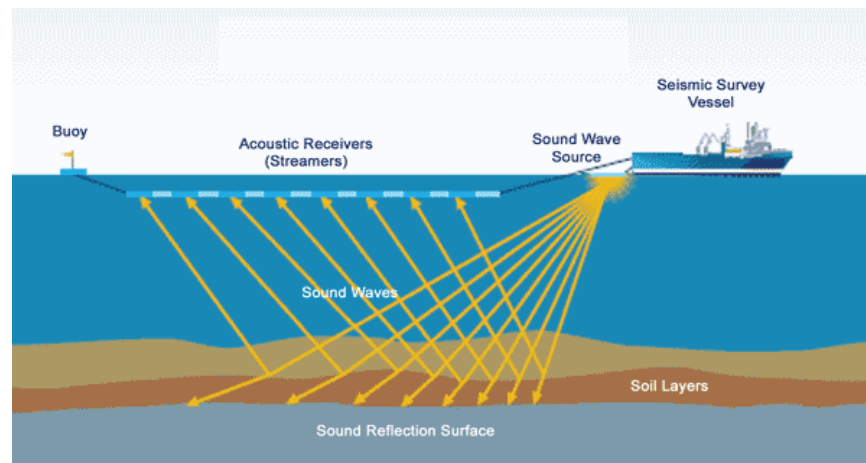


Figure 2 - Seismic survey setup⁵⁹: artificially generated sound waves are reflected from structures beneath the sea bed and then recorded by the acoustic receivers (geophones) mounted on the deployed cables (“streamers”). The equipment is towed by the survey vessel close to the water surface.

A three dimensional (3D) subsurface mapping is achieved with so-called 3D seismic, which implies a series of streamers towed in parallel (Figure 3). For example, one of the world’s largest seismic vessels, Ramform Sterling (PGS), has a capacity of 22 streamers at 8 km length each, thus covering more than 1 x 8 km area of the sea-surface when all streamers are deployed.

⁵⁹ The picture is obtained from <http://www.fishsafe.eu/en/offshore-structures/seismic-surveys.aspx> [visited October 1, 2010]

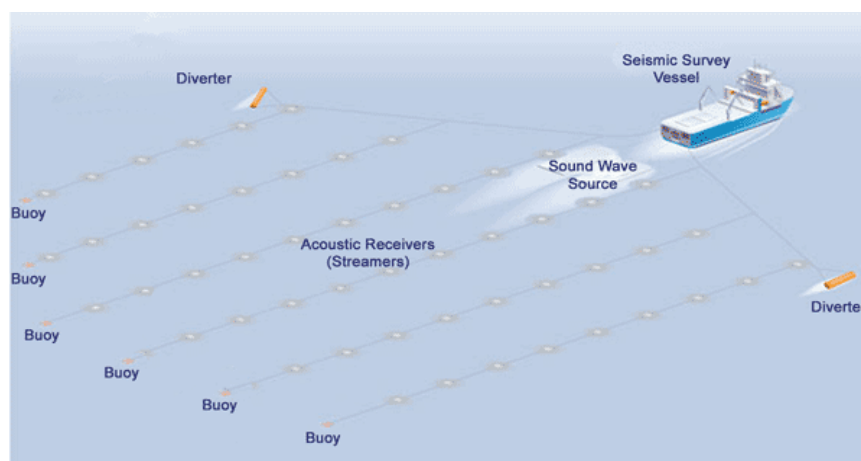


Figure 3 - Multiple streamer survey for 3D seismic acquisition⁶⁰: streamers are typically spaced 50-150m apart; a common complex of sound wave sources (air-guns) is used.

The sizes of surveys vary, but very often extensive areas of the sea surface are covered. Of course, such operations⁶¹ (especially for 3D acquisition) are complicated by the vessel's ability to maneuver. Seismic survey vessels tow at a speed of 4 - 5 knots (stability of the speed is a critical factor for data acquisition and normally included in the contract requirements) and need to follow straight line path whilst recording the data. In general, when towing a streamer, a seismic ship must avoid stopping, making sharp turns, or even drastic reduction in speed. The vessel is not allowed to circle with a diameter less than the streamer length (typically above 5 km). Otherwise the streamers may, for example, tangle with each other (thus requiring re-deployment and with possible need of expensive repairs) or even get drifted into the ship's propellers. At the same time, the deployment and recovery of the streamers is time-consuming (and, hence, expensive), therefore the transit within the survey area is very often performed with the equipment staying in the water. The seismic ship is usually accompanied by several chase boats in order to prevent collision situations where streamers are the most usual cause.⁶²

⁶⁰ The picture is obtained from <http://www.fishsafe.eu/en/offshore-structures/seismic-surveys.aspx> [visited October 1, 2010]

⁶¹ The term "operation" is often used in the industry to denote a progression of actions made in order to complete a certain task (e.g., to collect data).

⁶² For detailed factual overview, please, see *The Owners, Demise Charters and Time Charterers of the Ship "Western Neptune" v. the Owners and Demise Charterers of the Ship "St Louis Express"* [2009] EWHC 1274 (Admlty).

The details sketched above are enough to demonstrate additional complications that arise in seismic operations if compared with, for example, cargo transportation or fishing activities. The requirements imposed on the operations by the data acquisition contract introduce further constraints⁶³; therefore they will also be considered here. It is important to stress that most of the specific features discussed below are absolutely essential for seismic vessel to fulfill standard contract obligations.

Among the equipment one shall, first of all, mention the air-guns (acoustic signal sources) and the streamers. When not in use, the streamers are stored on large motor-driven reels on the stern of the ship. The air guns complexes are typically stored next to them. The functioning of the all relevant *service mechanisms installed on the vessel* (reels, windlasses, lifting apparatus, cranes etc.) is of course essential for seismic equipment to operate and thus for the survey to be completed. *Special care* is required to handle the equipment deployment and the recovery avoiding damages, and the monitoring of the equipment performance is needed during the acquisition. To give an example, a typical “drop down”⁶⁴ range prescribed by the contract does not allow any of the deployed streamers to fail as a whole, and requires at least 90% hydrophones on each streamer to operate correctly.

The high positioning accuracy is a prerequisite for the successful data acquisition. Typically the contract states numbers in the order of 10th of meters for the absolute accuracy and even less for the relative accuracy. The required *navigation precision* is achieved using a combination of acoustic networks, various compasses and GPS (often with radio correction) receivers installed both on the vessel and on the deployed equipment parts.

⁶³ See, e.g., Annex 1, Schedule 3, M.2.5 where it is stipulated that navigation/positioning data cannot be outside specifications. See also Schedule 3, M.4 Communications; M.2.8.2 Aborting Lines. See also Schedule 3, Appendix M1, Source Evaluation, para. 3, where vessel’s speed requirements are set out. See also Annex 2, Schedule 5, M.4 and M.5.

⁶⁴ The term “drop down” is used in the industry to indicate the frames in which the contractor is allowed to fail.

The large amount of the recorded data (of the order of terabytes and more) requires digital pre-processing and storage on-board⁶⁵. Thus, the *computer facilities* (typically a cluster room with proper cooling and hardware protection installed) must operate during acquisition.

Needless to say, all the above equipment requires *stable electricity supply* during operations. A shutdown of the power supply in, for example, the computer cluster room during acquisition will lead to standby until the failure is fixed. This, in turn, may lead to the inability of the seismic contractor to complete operations in time.

Another contract requirement that has become more and more common lately is the data delivery to the client during acquisition. The data transfer may be required once per day following an agreed schedule. This usually implies that *the vessel is equipped by a stably working satellite link*. The communication services are typically provided by the shipowner. Since the amount of the data that needed to be transferred is very large (gigabytes and above), the instability of the link may result in not fulfilling the contract obligations. Absence of communication service is a cause for off-hire according to many survey agreements.⁶⁶

The proper handling of all the special equipment requires *a specially trained technical crew* present on every seismic vessel. On seismic vessels this crew is headed by a Seismic Party Chief and consists of geophysicists, engineers and technicians responsible for technical aspects of the survey (e.g., navigation, equipment performance, operational safety, etc.).⁶⁷ This crew is normally employed by the company acquiring data, and not by the shipowner.

One should further distinguish two types of the data collection: *data acquisition for a particular client*, and so-called *multi-client* data. In the first case the company ordering the data (the client, e.g., an oil company) prefers to send its representative (Client

⁶⁵ See, e.g., Annex 2, Schedule 5, M.4.2

⁶⁶ Karstensen (2010)

⁶⁷ Alaei (2010)

Representative, or Company's On-Site Representative)⁶⁸ on board to monitor the data acquisition closely, and to ensure that all the contract obligations are fulfilled. Client Representative gets a special status on the ship: all the communications with the client goes through him. It is a contract obligation to provide the Client Representative with all the needed facilities, including the computer and access to the data. In the case of multi-client data the operator follows its own technical specifications (which are often more strict than the specifications fixed in standard data acquisition contract).

A contract for data acquisition always prescribes minimum *standards*. In particular, it concerns the positioning precision, the air-guns shooting frequency, communication schedule, etc. Even if some part of the multi-client data acquisition is less precise than in acquisition of some of the clients, the *standards* applied during operations are still the same.

The list of special issues arising from the data acquisition contracts can be extended, however the details presented above are enough to illustrate that the seismic equipment present/installed on the vessel gets a special status, and its functioning is essential for survey to complete and thus the data contract obligations to be fulfilled.

⁶⁸ The company representative is mentioned in many places in the documents provided in the Annex. For example, please, see Annex 1, Schedule 3, M.3.3, where the accommodation and working conditions for Company's On-Site Representative are stipulated.

4 Specific equipment on board rises some issues

As explained in Chapter 3, in order to conduct a seismic survey one needs a set of sophisticated equipment on board (e.g., streamers, air-guns, digital processing capacities, etc.). In addition, conventional vessel's systems providing operation ability of the equipment is also an essential part of the process. The latter could be winches, windlasses, electric power supply systems for devices collecting data, communication facilities, and many others. Thus, the equipment necessary to run data collection could be divided in two groups. The first group is comprised of the non-specific equipment, belonging to the owner. This one is used to handle the equipment attributed to the second group. The second group comprises specific equipment belonging to the charterer. A commercial practice when equipment installed by the charterer is agreed to come to owner's possession afterwards also takes place.⁶⁹

Problems related to equipment may be provisionally classified into three groups. The first one is the issues of the status of equipment belonging to the charterer. Second one is the problems related to the installation of the equipment. Third one consists of the problems related to the role of the equipment in off-hire situations.

4.1 Status of equipment belonging to the charterer

Under SUPPLYTIME 89 the status of equipment is considered in the court practice mostly due to conflicts arising in relation to the equipment. It seems that its status have been changed only when revising SUPPLYTIME standard form in 2005.

⁶⁹ Karstensen (2010)

Consideration of the equipment as a cargo and possibility to have a lien on equipment belonging to the charterer were discussed in North Sea Surveyor case.⁷⁰ North Sea Surveyor was chartered to run a survey of seabed conditions to establish whether it was possible to lay some pipes. The charterer had installed some measuring and EDB equipment on the ship for collecting data. In addition to the marine crew, the charterer's personnel were present on board to operate the equipment. A part of the devices was leased. A conflict arose when a bankruptcy process was initiated for the charterer. The reder⁷¹ claimed his right of detention of the equipment, including diskettes, videotapes, etc., but grounds for such detention were not found by the Highest Court. It had also found that equipment could not be considered as a cargo.⁷²

Apart from these two conclusions the decision was criticized by Selvig. According to his point of view, the Court omitted to follow logic of Brækhus⁷³ "that possession demand under right of detention in principle, is the same as under lien". While the court was concerned whether the charterer is deprived of disposal of the equipment, the relevant question should have been whether the reder had such a right of disposal (over the equipment) that could prevent its uninstallation from the ship and its use for purposes other than stipulated by the charter party.⁷⁴

In The North Sea Surveyor case The Highest Court did not go that far in its decision as the English High Court in The Mezen case.⁷⁵ In the latter it was clearly explained that it is possible to have a lien upon a cargo, but not upon equipment: "[...] the equipment was something the vessel was fitted out with in order to enable the vessel to carry out a specific type of work, geophysical survey works".⁷⁶ The logic set out in The Eschersheim was

⁷⁰ ND 1991.423 NSC North Sea Surveyor

⁷¹ A term "reder" is used here instead of a term "shipowner", since the cited case was solved by Norwegian court. For terminology peculiarities see Falkanger/Bull/Brautaset (2004) p. 139 et seq. It is noted that "with a few exceptions, 'reder' can [...] be appropriately translated as 'shipowner'". Ibid. p. 139-140

⁷² ND 1991. 423 NSC North Sea Surveyor p. 428

⁷³ Brækhus (1988) p. 498

⁷⁴ Selvig (1993) p. XVI-XVII

⁷⁵ The Mezen (2006) 693 LMLN 2(2). See also Section 2.5.1 and Section 6.1.

⁷⁶ Ibid.

confirmed: “goods” carried in a ship referred to goods carried as cargo on board a ship⁷⁷; in other words, they are the things or items carried on board a vessel for the purpose of being conveyed or transported from one place to another.⁷⁸ The High Court has found that equipment on board differs in its purpose from the goods designated for trade. Therefore the plaintiffs could not have lien upon equipment. This authority clearly demonstrates the difference between cargo and equipment under this kind of agreements. Unfortunately, in The Mezen case the terms on which the ship was chartered were not mentioned⁷⁹: The High Court substantiated its decision on the High Court (Admiralty Jurisdiction) Act. Thus, it is unclear whether the SUPPLYTIME form has been used.

The two cases cited above demonstrate examples when one of the parties having right of lien upon a cargo tried to extend this right on the equipment. The amendment made to clause on lien of the SUPPLYTIME 2005 probably reflects this tendency. Now in cl. 19 it provides that “The Owners shall have a lien upon all cargoes and *equipment* (emphasis added) [...]”. On the contrary, the previous standard agreement by virtue of its cl. 16 stipulated that the owners shall have a lien upon all cargoes, while no equipment was mentioned. It is interesting that BIMCO itself does not comment these amendments to cl. 19 of SUPPLYTIME 2005 in any way,⁸⁰ neither Norsk Shibsrederiforening in its Annual report.⁸¹ In any case, there are grounds to consider the revised wording, first and foremost, as a confirmation of the established practice that under some contracts no cargo is taken on board. This amendment also indicates that the equipment in these particular charter parties may be of crucial importance.

⁷⁷ The Eschersheim [1976] 2 Lloyd’s Rep 1, p. 3

⁷⁸ The Mezen (2006) 693 LMLN 2(2)

⁷⁹ Neither in LB-2007-145991 case – see Section 2.5.1.

⁸⁰ BIMCO’s explanatory notes. In all likelihood a technical mistake took place, since the amendment in text of Lien clause is obvious, but BIMCO expressly states that “the Clause have not been amended during revision”.

⁸¹ Grotmol/Glicksman (2005) p. 15 et seq.

Thus, the addition of the wording “equipment” in the lien clause of SUPPLYTIME 2005 changes the balance in legal relationship “shipowner – charterer”, making it more in favour of the shipowner in this respect.

4.2 Installing of Charterer’s equipment

Since special surveys extensively employ high technologies, the majority of vessels need to be tailor-made for these purposes. BIMCO comments on this to cl. 4 of SUPPLYTIME 2005 “From time to time Charterers may need to make structural alterations to the Vessel and place their own equipment on board”. SUPPLYTIME 2005 cl. 4 gives to the charterer this opportunity. It is noteworthy that SUPPLYTIME 89 cl. 23 was transformed to cl. 4 of SUPPLYTIME 2005 with both minor and significant developments.⁸² According to cl. 4 the charterers shall, at their expense, have the option of making structural alterations to the Vessel and installing additional equipment with the written consent of the Owners, which shall not be unreasonably withheld. Unless otherwise agreed, the Vessel is to be redelivered reinstated, at the Charterers expense, to her original condition [...]”.

There are several issues which arise. First, it is logical if the owner would like to have plan and drawings from the charterer in order to be aware on what is going to be installed on the ship. It is also logical to assume that the owner in all likelihood will prefer to have certain control over the installation process, so that class of the vessel or safety requirements would not be affected.

Consequently, a provision stipulating obligation of the charterer to provide the owner with the copies of the plan and drawings of the installation would enhance clarity of the standard form. To certain extent, this suggested stipulation is analogues to the already existing cl. 9 (c). It provides that “[...] the Charterers shall provide the Owners with copies of any

⁸² Other issues caused by these amendments will be discussed below, please see Section 7.3

operational plans or documents which are necessary for the safe and efficient operation of the Vessel [...]”. But the main point here is that the latter clause obliges the charterer to provide documentation concerning use of the ship, while no documentation concerning the installation of the equipment is required.

Secondly, in case if the vessel is damaged, the issue of loss reinstatement may arise. Here two ways to solve the problem are met.

The knock-for-knock principle provided by cl. 14 of SUPPLYTIME 2005 is the starting point. According to this provision the only possible decision is that each party reinstates its own losses. On the other hand, riders provisioning the charterer undertakes to reinstate such losses, are found in practice. To replace these riders, one may suggest modifying the standard form to offer *both* variants to regulate this situation, since the possibility to run structural alterations is untypical as such and parties may not assume that the knock-for-knock regime will extend that far.

5 Role of the equipment in the off hire situations

5.1 Off hire problem in general perspective

It is important to note that the paper does not aim to analyze off hire problem in full, since massive legal research was conducted in this respect.⁸³ Instead the thesis is aimed to concentrate on and scrutinize the issues which may arise in relation to circumstances leading to a loss of time by the charterer of a survey ship. These issues are not discussed extensively in legal literature so far. Thus a better understanding of chartering of survey vessels may be achieved.

There is an extensive legal practice related to conflicts where off hire problem stood in focus. The approaches in English and Norwegian law as to how this issue is solved vary. English law stipulates that hire continues to run without interruption. This is a basic rule. Only if there are reasons to the contrary the charterer may be awarded to off hire. In Scandinavian law off hire regulated through a rule of risk allocating, provisioned by virtue of NMC Sec. 392. Hence no fault implications are taken into consideration in both legal systems. According to Sec. 392, hire is not paid for time lost to the time charterer in connection with salvage, maintenance of the ship, or the repair of damage for which the time charter bears no responsibility, or otherwise because of *matters pertaining to the time carrier*. Thus NMC provides few examples of reasons falling within the scope of this expression. Hence, the question whether particular circumstances are indeed the matters, pertaining to the time carrier within the scope of Sec. 392 is often set before the court. In

⁸³ In Norwegian perspective they are: Michelet (1997) among others. For English perspective Scrutton/Boyd (2008) and Time charters (2008) are to be noted among others.

addition, according to Norwegian law suspension of hire in some cases is considered as an instance of the effect of the principle of “quid pro quo”.⁸⁴

Again it should be noted that rules of NMC Part IV on time charter parties are declaratory. Therefore they are considered as supplementary provisions applied when a contract does not include provisions on this point or contract’s wording is not clear to settle a conflict. This has been confirmed in arbitration practice. For example, in the arbitration award in case ND 1940.353 the issue to solve was whether a charterer had a right to stop to pay hire when a vessel was requisitioned by German authorities. Thus, the problem before arbitration was whether the time lost by the charterer could be attributed to the category of matters, pertaining to the time carrier in the sense of NMC, sec. 144, 2 (now sec. 392). The circumstances of that case were found to be not pertaining to the owner, and the charterer had to pay hire for the period in question.

In arbitration award on Karmøy case⁸⁵ an issue was considered whether the vessel could be placed off hire because of the time used following German order to build a day room for German crew. The arbitration commented the outcome of the case based on two presumptions. First, it was found that the owner had to bear a risk in that situation because the installation was “necessary measure to maintain the efficiency of the vessel”. Another opinion which contributed was that time was lost due to matters pertaining to the owner. The arbitration majority has formulated the understanding of NMC, sec. 144, 2 (sec. 392 now) in the following way:

It is the expression “because of matters pertaining to the time carrier” which is interesting here. It has to be understood in the same way as the corresponding expression in NMC, Sec. 83 and 84. It is not demanded that the time carrier caused loss of time, and even less that it can be his fault: with the words “or otherwise” it is stipulated that also a time lost due to an occasional average is a loss of time because of matters pertaining to the time carrier. It is usually assumed that loss of time due to matters pertaining to the owner happens when circumstances

⁸⁴ Mishelet (1997) p. 333

⁸⁵ ND 1950.398

which prevent the owner to fulfill his part of the contract, namely to let and hold an agreed ship to the charterer's disposal, are intervening. At the same time, it shall be considered whether the charterer's special use or ship disposal which led to hindrances. The latter situation cannot be considered as a hindrance on the part of the owner, even if the hindrance relates to the vessel itself.⁸⁶

There are also some other decisions where the same issue was discussed, for example, ND 1952.422 Hakefjord.

It is worth to note that in the course of eventual supplement with law provisions one may come in Norwegian law to other results than in English law. The development will go in that direction that one will follow English law in a greater degree in a larger number of interpretation problems.⁸⁷

However, the absolute majority of charter parties include an off hire clause. Being drafted in most cases in the English legal tradition they tend to be lengthy and to list all possible reasons for ship going off hire. Under both Norwegian and English law the most weight will be paid to the listing of off-hire events in the actual contract. Thus Norwegian court will consider NMC rules on off hire in unusual cases, circumstances of which will not fit expressly to the wording of off hire clause.

In English law the interpretation is done on the basis of precise construing of expressions laid as a ground [of the contract].⁸⁸ The off-hire clause, being in the nature of an exception, is to be construed narrowly against the charterer, since it is included for his sole benefit [...].⁸⁹ The approach has been formulated and repeated in a number of court decisions. For example, Bucknill J. reiterated this rule in *The Ilissos*:

[...] the cardinal rule, if I may call it such, in interpreting such a charter-party as this, is that the charterer will pay hire for the use

⁸⁶ ND 1950.398 p. 405

⁸⁷ Mischelet. (1997) p. 344

⁸⁸ Ibid., p. 339

⁸⁹ Weale (2002) p. 138

of the ship unless he can bring himself within the exceptions. I think he must bring himself clearly within the exceptions. If there is a doubt as to what the words mean, then I think those words must be read in favour of the owners because the charterer is attempting to cut down the owners' right to hire.⁹⁰

5.2 Being prevented from work as a condition for off hire

A condition to establish an off-hire situation is a “*ship being prevented from working*” when one of the events listed in an off-hire clause occurs.⁹¹ It means she will not be found off hire if, for example, breakdown of propulsion machinery occurs in a port, while loading is taking place. In English law, a condition of a ship being prevented from working was considered in several aspects. For example, prevention from work happens to be physical or legal, but to be a relevant cause it has to be intrinsic to the ship: “A vessel is not off hire just because she cannot proceed upon her voyage because of some physical impediment, like a sand bar, or insufficiency of water, blocking her path”.⁹² Thus an entirely extraneous cause like a boom on Yangtze River⁹³ will not be accepted as preventing a vessel from work. At the same time, “it is suggested that Rix, J.’s approach [in the *Laconian Confidence*], [...] is to be preferred to Webster, J.’s view in *The Roachbank* [1987] 2 Lloyd’s Rep. 498. In that case, Webster, J., said at page 507 that, by dint of a judicial gloss on the language of the charter, the words “preventing the full working of the vessel” apply only where the ship is prevented from working by an internal cause, that is to say, one which renders the ship not fully efficient in herself.”⁹⁴

⁹⁰ Royal Greek Government v. Minister of Transport [1948/49] Vol. 82 Lloyd’s Rep. 196 p. 199

⁹¹ The issue is discussed extensively in legal literature and practice. See, for example, Scrutton/Boyd (2008) and Time charters (2008) p. 441 et seq.

⁹² *The Laconian Confidence* [1997] 1 Lloyd’s Rep. 139 p. 147

⁹³ *Court Line Ltd. v. Dant & Russell Inc.* [1939] 64 Lloyd’s Rep. 212. The phrase “any other cause” was scrutinized in particular, but it is thought that this case might equally well be analyzed as one in which the full working of the ship was not prevented, according to Time charters (2008) p. 449.

⁹⁴ Time charters (2008) p. 444

It is noteworthy that the essence of the ship's work is not considered in court practice. It may be explained by the circumstance that absolute majority of time charter parties are aimed at transporting cargo. So the vision of what the ship is expected to perform under such an agreement is a commonplace knowledge. Therefore, it might be suggested that a concept of vessel's work is usually defined in court or arbitration practice by virtue of wordings like "to perform orders by the charterers" or "commercial orders by the charterers".

Legal implications regarding off hire institute seem to serve conventional charter parties in a quite logical way because the main task of a merchant ship is to navigate and to transport goods to agreed ports in time. This way of regulating off hire is adopted in full in SUPPLYTIME 2005.

5.3 Causes for off-hire and their interpretation

It was mentioned above that the wording of an off-hire clause is to be interpreted narrowly. It is important to reiterate that every individual clause will be interpreted individually by a court. It is confirmed by the tendency in the legal literature to describe off-hire institute always in relation to particular standard forms. For example, Mischelet classifies the most important off-hire situations depending on type of charter party standard form.⁹⁵ In Time charters an overview of off-hire situations is given on instances of NYPE, SHELLTIME 4, BALTIME, etc.⁹⁶ It is noteworthy that equipment is not mentioned among the most important causes⁹⁷.

⁹⁵ For details, please, see Mischelet (1997) pp. 334-339

⁹⁶ For details, please see Time charters (2008) p. 441 et seq.

⁹⁷ The actuality of this circumstance is discussed below, please, see Chapter 7.

Indeed, Michelet notes that the most important is the description of the situations which lead to an off-hire. This description varies from charter to charter.⁹⁸ Hence, practice on one type of charter party does not necessarily apply to another one. Therefore, it is questionable whether a decision taken on the basis of the wording of a particular type of charter party could be perceived to be a general practice for agreements of another type. Furthermore, listing of risks in a particular off-hire clause will be decisive to find whether a vessel is going off hire.

Therefore cl. 13 (a) of SUPPLYTIME 2005 is of primary interest for the research. It provides that “if as a result of [...] breakdown of machinery, damage to a hull or other accidents to the Vessel, the Vessel is prevented from working, no hire shall be payable [...]”. The causes leading to off hire listed in this clause will be analyzed in relevant aspects below.

⁹⁸ Michelet (1997) p. 333

6 “Work” of a seismic ship

As demonstrated above, the survey vessels have features which definitely distinguish them from the conventional merchant fleet. As a consequence their tasks can vary depending on the actual contract, such as data collecting or laying pipelines, etc. This dissimilitude to conventional charter-parties should affect an understanding of some core characteristics of this type of agreements.

6.1 The formulation of the problem

According to SUPPLYTIME 2005 cl. 13 (a) “If [...] the Vessel is prevented from working, no hire shall be payable [...]”. At the same time the issue of Vessel’s work in relation to charter parties at hand has to be considered in another aspect, namely what “the working” is supposed to be. In charters where a party transports goods for sale or similar “the work” is obviously navigating, transporting goods safely and arriving with them to ports in time. The whole concept might work perfectly for this type of agreements. But the notion of the vessel’s work in survey charter parties has to be clarified. Here from charterer’s point of view the overall task of the vessel is to collect data from the seabed according to the data acquisition contract (see details in Chapter 3). It transforms the notion of “work” from simple navigating and arriving to ports in time, to more complicated task of navigating and collecting data. This requires both efficient equipment and successful collaboration of the marine crew and charterer’s personnel, as well as ship’s capacity to move. Since this point of view is not yet well established by court practice, different interpreting may occur.

A question of “what is transportation in core?” may arise here again, now in order to distinguish survey charters from non-conventional charter parties. This issue is not discussed widely, since this notion seems to be of a general knowledge. On the other hand, the appropriate definition might be of great help when one aims to draw a borderline in a sphere where such questions were probably never asked. It is again very convenient to refer to The Mezen case⁹⁹ (see Section 2.5.1 and 4.1), where the core of transportation was explained and work under a survey charter was distinguished from transporting a cargo.

At the same time, the opinion that a ship rendering survey services does another “work” has confirmation in commercial practice too. For example, no cargo is taken on board. Everything taken on board is intended for consuming and is called “consumables”.¹⁰⁰

It is indicative that the concept of the time charter party was represented in legal literature in a very different context.

For example, some authors suggested including the rig drilling contracts in the category of time charters. This would widen the notion of “work”. For example, Whyllie draws a very solid analogy between a rig contract and survey charter¹⁰¹. However, the problem of classifying oil rigs contracts are far from clear even today, since the legal status of oil rigs are not understood consistently and unanimously in different states. In certain instances an offshore rig may be considered as a ship, but there are opinions that it can also be ascertained as an artificial island.¹⁰² In Norwegian law an offshore rig contract is acknowledged as a special form of time charter party. Notwithstanding that “rig and drilling contracts are found on another end of the scale and have most of the elements from fabrication and enterprise contracts [...][, at the same time, they have] a strong maritime character in description of the rig and its characteristics”¹⁰³. Therefore they are considered

⁹⁹ The Mezen (2006) 693 LMLN 2(2)

¹⁰⁰ Karstensen (2010)

¹⁰¹ Whyllie Spicer (1984) p. 510 et seq.

¹⁰² Esmali (2001) p. 52-53

¹⁰³ Bråfelt (2008) p. 19

as charter parties in the Bråfelt's monograph "Fleksibilitet i charterpartiforhold"¹⁰⁴.

On the other hand, others describe time charters only in respect of the cargo as a purpose of chartering a ship. Thus the time charter parties appear to be solely transportation contracts per se. A short description of time charter-parties given by Evje in his "Regelendringer i tidsbefraktningsforhold" is a good example of such understanding of the essence of time charter parties:

A charter party is a contract between a time carrier and time charterer on that the first one is going to let the *ship's cargo capacity* (emphasis added) to the disposal of the latter [...] The ship's cargo capacity, speed and bunkers consumption are specified, and the ship has to be ready to *take on board the cargo intended* (emphasis added) by the charterer [...] The charterer decides - within normally wide charter party's frames - the vessel's route and what *kind of cargo the ship is going to load* (emphasis added).¹⁰⁵

6.2 Employment in offshore activities

On the other hand, some guidelines on how the survey vessel's work has to be understood are found in the wording of the standard agreements SUPPLYTIME 2005. According to cl. 6 (a) regulating employment and area of operation, "the Vessel shall be employed in offshore activities which are lawful in accordance with the law of the place of the Vessel's flag and/or registration and of the place of operation. Such activities shall be restricted to the service as stated in Box 17..."¹⁰⁶. The only expression defining ship's employment by virtue of cl. 6 (a) is "employed in offshore activities". The expression is wide, and does not give exhaustive definition.

¹⁰⁴ Ibid.

¹⁰⁵ Evje (2007) p. 4-5

¹⁰⁶ The given wording cites only cl. 6 (a) of revised SUPPLYTIME, since no radical changes were made in it.

Usually offshore activities of a ship are specified in Box 17 of SUPPLYTIME 2005, in the following manner. For example, “Support Sea bed logging, ROV and Offshore Support Ops – always within the safe capabilities and capacities of the Vessel” or “All duties as directed by Charterers and/or Charterers’ clients, always within the Vessel’s natural capabilities and capacities, with the main function being to support Charterers’ world-wide SBL operations”¹⁰⁷. The wordings cited will not be discussed thoroughly, since they are given as examples of business practice: they are used in particular agreements and their capacity to represent well established practice is not absolutely clear. The aim is to show that the formulations used in practice do not provide necessary accuracy level in defining the vessel’s services agreed upon.

Accordingly, it follows from the wordings cited that the way of fixing the vessel’s activities in Boxes 17 as well as wording of SUPPLYTIME 2005 cl. 6 (a) do not provide exhaustive regulation of this aspect.

At the same time, the approach to defining services in SUPPLYTIME 2005 differs from the approach used under conventional charter parties. While chartering a vessel in terms of conventional charter parties the charterer is basically not limited in choosing type of activities, according to SUPPLYTIME 89 “clause 5(a) restricts the activities of the vessel to the specific services stated in box 18 (lines 72-73) and adds that the vessel is not to be used as a diving platform (lines 82-83)”¹⁰⁸. SUPPLYTIME 2005 cl. 6 (a) regulates this issue in the same way¹⁰⁹.

¹⁰⁷ Formulations are taken from actual contracts. Their wording cited here will not be discussed thoroughly since they are given as examples of business practice; are used in particular actual agreements and cannot represent well established practice.

¹⁰⁸ Gay (2004) Section 6

¹⁰⁹ Only unsubstantial corrections were inserted in revised cl. 5 (a) called to provide similarity and following to one pattern.

6.3 “All reasonable services” – possible interpretations

Further, SUPPLYTIME 2005 cl. 7 (a) (i) contributes to the contract definition of services and therefore to the definition of Vessel’s work. According to SUPPLYTIME 2005 cl. 7 (a) (i) “[...] the Vessel shall render all reasonable services within her capabilities [...].”

Using a method of objective interpretation one would construe the expression “all reasonable services” as a possibility to fulfill a task but not necessarily in a volume and/or quality of that as the standard sets out. The wording “all reasonable services” does not mean the utmost fulfillment. Quite the reverse, the criteria of reasonableness might be interpreted as a fulfillment in part, though this part might be substantial or reasonable. Therefore some problems may arise.

It is important to stress again that all the necessary elements and stages of the data acquisition must be taken exactly in a number and at the moment needed, as well as to be fulfilled by exact (or allowed minimum) number of devices. It is essential for completion of the task. To give an example, the seismic operation will not be considered successful if, for instance, one streamer will not be deployed due to failure of service mechanisms (e.g., a failure one of the ten reels, or windlasses, or cranes etc.)¹¹⁰. At the same time, the operation of only nine windlasses instead of ten have all chances to be embraced by the expression “all reasonable services”. The issue is that in this kind of agreements in order to complete the operation the charterer in most situations will need firm number of technical appliances as well as firmly guaranteed capabilities of the Vessel. In such situation the expression “all reasonable services” might turn out to be insufficient to protect the charterer’s interests.

If a conflict of this kind is considered under Norwegian law, then the concept that a contract has to be interpreted in sensible and fair manner¹¹¹ will come into play. Therefore interests of the charterer involved in such conflict could be protected. At the same time, it

¹¹⁰ Further examples are provided in Chapter 3.

¹¹¹ Kruger (1989) p. 532

is still unclear how a court will apply the concept of a sensible and fair result to the wording “all reasonable services”. Thus, it is also possible that the disposal of the vessel which renders services to a reasonable extent, though not to the extent permitting to achieve an intended result for the charterer, could also be found to be a sensible outcome. The latter outcome would, obviously, not serve charterers interest.

Outcomes of the analogous case under English law will be, most probably, in favor of the shipowner. Still, the problem of court consideration will arise here as well. From one point of view, even if the law applicable to a survey charter party is English law, one can still hope for results that are not blindly based on a contract’s wording, but also on the construction of the contract in a such a manner that an outcome will be in sound with reasonableness. This point of view is clearly expressed in *The Fina Samco*:

The fact that a particular construction leads to a very unreasonable result must be a relevant consideration. The more unreasonable the result the more unlikely it is that the parties can have intended it, and if they do intend it the more necessary it is that they shall make their intention abundantly clear.¹¹²

On the other hand, one should bear in mind the presumption that a contract must be construed firmly following the wording of a covenant. There are still some conflicts solved by English courts that are widely criticized. The *A Turtle* case¹¹³ is noteworthy in respect of ratio of reasonableness of a conflict outcome and possible extent of court’s consideration.

A situation similar to one in *The A Turtle* case may eventually occur. In this case the defendant agreed to tow *A Turtle* oil platform on TOWCON terms for the claimants. A series of errors led to that the tug ran out of fuel in the South Atlantic and needed to release the towage connection. As a result the platform had become the total loss.

¹¹² *The Fina Samco* [1995] 2 Lloyd’s Rep. 344 CA p. 350

¹¹³ *A Turtle Offshore SA v Superior Trading Inc* [2009] Vol. 1 Lloyd’s Law Rep. 177

It was found that the defendant have breached the obligation of due diligence. The main issue in this case was whether defendant's liability is exempted on the basis of knock-for-knock provision. Teare J. concluded that clause 18 was capable "of applying so long as the tug owners are actually performing their obligations under the TOWCON, *albeit not to the required standard*" (emphasis added).¹¹⁴ Accordingly, the defendant's liability was exempted on the facts of the present case, because "they had not ceased *to do anything at all* (emphasis added) in the performance of their obligations". The question arises whether the tug owner was performing his obligations. Clearly, he would not be if he chose to abandon the tow. Conversely, Teare J found that a tug owner was 'performing his obligations' (albeit not to the required standard) where he continued towing despite appreciating a risk that the tug would run out of fuel.¹¹⁵

Similarly, a question of sufficiently fulfilled obligations arises if a survey vessel is being prevented from work. The expression "to do anything at all" is probably a key phrase in defining the extent of due diligence, which defendant was obliged to fulfill in *The A Turtle* case. Despite of the fact that the frames of performing under the contract in this case were considered in relation to the knock-for-knock clause, an analogy between performing under a contract and being prevented from work is quite obvious, since both categories leaves room for court's consideration. Following Woods' way of thinking¹¹⁶ it is logical to raise an issue whether "all reasonable services" obligation may compel the owner to go into the port and to repair necessary equipment, even if the damaged device comprises a tiny part of overall equipment needed for operation.

The decision on *The A Turtle* was criticized in relation to consequences and outcomes of potential similar conflicts¹¹⁷. On the other hand, the fact that it was solved by English Court may explain such a rigorous outcome of applying the knock-for knock principle. Thus, the four corners rule and general presumption to interpret a covenant by firm sticking to the

¹¹⁴ Ibid., p. 195

¹¹⁵ Woods (2009)

¹¹⁶ Ibid

¹¹⁷ Woods (2009), Tsimplis (2009)

wording of the final document is confirmed again in English law. This example illustrates that such a loose definition of the vessel's work or services in survey charters leaves a wide room for discretion when interpreting it.

Thus, the wording "prevented from working" in conjunction with the expression "all reasonable services" leaves room for situations when the vessel renders "all reasonable services", but it is not enough for the charterer to complete the operation. It means that the situations when the vessel will be found "prevented from working" are not clearly regulated in SUPPLYTIME 2005 standard form, and the room for court's consideration is left. Accordingly, the possible contradiction in the wording of cl. 7 (a) (i) "all reasonable services" and the notion of work within the scope of cl. 13 (a) has to be eliminated. It could be done by amending the wording "all reasonable services" and stipulating higher requirements to the work of a ship running survey in this standard form. However, such amendments shall not contradict to the wording "within her capabilities" as set out in cl. 7 (a) (i), line 188, and shall not negatively affect the operational safety.

6.4 Impact of Clause 3 (b) revision

Cl. 3 (b) regulates shipowner's obligations related to the condition of the vessel. At the same time, the requirements to the work of the ship turn out to be regulated indirectly.

The wording of the cl. 3 (b) was amended to a considerable extent in SUPPLYTIME 2005. According to the revised cl. 3 (b): "The Owners shall exercise due diligence to maintain the Vessel in such Class and in every way fit for the service stated in Clause 6 throughout the period of this Charter Party". On the contrary, cl. 3 (b) of the previous ('89) version stipulates that the owners shall [...] exercise due diligence [...] to maintain the Vessel [...] in every way fit to *operate effectively* (emphasis added) at all times for the services as stated in Clause 5 [corresponds to cl. 6 of SUPPLYTIME 2005]. The expression "to operate effectively" gives much more certainty to the charterer that the vessel has to be in

the condition allowing not only to render all reasonable services, but also *to operate in the way that data acquisition task is completed*. Therefore, the formulation of the owner's obligation used in cl. 3 (b) of SUPPLYTIME 89 is much more friendly to the charterer, than the formulation used in cl. 3 (b) of SUPPLYTIME 2005. The same applies to amendments in cl. 3 (a) discussed in Section 7.2.2 below.

Thus, it may be concluded that the amended cl. 3 (b) of SUPPLYTIME 2005 have become more friendly to the owner than to the charterer.

7 “Equipment” as a cause

SUPPLYTIME 2005 cl. 13 (a) provides that “if as a result of [...] breakdown of machinery, damage to a hull or other accidents to the Vessel, the Vessel is prevented from working, no hire shall be payable [...]”. As repeatedly mentioned above, the most important feature of a survey vessel for the charterer (and consequently for running his business) is the functioning of necessary equipment on board. That is what makes him to charter a particular vessel. Thus the possibility to be awarded to an off hire as a result of deficiency of equipment becomes essential for the charterer. At the same time, the relevant clause of the standard agreement does not stipulate the deficiency of equipment as a cause to exercise an off-hire possibility by the charterer.

7.1 The wording “Equipment” as a cause – formulation of a problem

It is noteworthy, that many other standard forms of charter parties stipulate damage to the equipment as a reason for off hire. For example, PRODUCE 1993, cl. 17 provides: “That in the event of the loss of time from deficiency of men or stores, fire, breakdown or damages to hull, machinery or *equipment* (emphasis added) [...] or by any other cause preventing the full working of the vessel, the payment of hire shall cease for the time thereby lost [...]”. Cl. 13.0 of ESSO offshore charter party on off hire lists the following risks leading to off hire: “deficiency of men or stores, fires, breakdown of or damage to hull, machinery and equipment [...]”.¹¹⁸

In this respect, an example of off hire implications when a seismic ship is chartered might be very illustrative:

¹¹⁸ The wording is cited in Gade/Woxholth (1979) p. 68

In the course of seismic survey a long hose, which a ship was towing, was cut accidentally by another vessel. In the course of recovering the hose oil spill happened and due to sparks the oil on the deck resulted in a fire on board. After five weeks of reparations the hose and the ship are repaired. When “damage to hull” is the only relevant reason stipulated by the charter party, the owner states that the vessel did not go off-hire, since reparations, in principle, refer themselves to only the charterer’s equipment, namely the hose. According to the owner’s point of view, the vessel is able to run operations and ready to render “the service immediately required”.¹¹⁹

The authors adhere to the opinion that the destroyed equipment in this case has to be considered as a hindrance for which the charterer bears loss of time risk: such situation could hardly be attributed to the group of “matters pertaining to the time carrier”, NMC Sec. 144, 2” (now Sec. 392). Their opinion is confirmed by NMC, sec. 392. The important point is that the example has been given bearing in mind the terms of ESSO offshore charter party, where one of the reasons for off hire is damage to equipment.¹²⁰

On the other hand, other circumstances may well take place. For example, the electric circuit, providing power necessary to deploy streamers, can fail, or may provide unstable power, or provide a power level below the required capacity. Another situation could be that communication equipment does not provide a good, steady signal, which will definitely affect the accuracy of transferred data. This may make the data transfer impossible. These and analogous irregularities during operations are hardly attributable to the charterer since such equipment (e.g., electric circuit wiring or satellite link) is not installed by him and not in his possession. Thus, it is the shipowner who is responsible for the fulfillment of the operation on some stages. On the other hand, such events are apparently not listed in the cited wording. The wording of cl. 13 (a) cited above does not provide such a reason for off hire as breakdown of the equipment. At the same time, all these appliances are usually defined as the vessel’s equipment.

¹¹⁹ Ibid. P. 71.

¹²⁰ Ibid. P. 68.

This means that under English law the wording of cl. 13 may easily lead to that no off hire will be awarded, even when the owner did not provide fulfillment of the operation. The potential outcomes under Norwegian law will be discussed below.

7.2 Ways to interpret a wording “other accidents to the vessel”

Consequently, in the situations when, for example, the signal during transferring data is unsteady, other possibilities to be awarded to an off hire could be examined by the charterer. Such possibility for him is provided by the expression “other accidents to the Vessel”. There is very limited practice on how this wording might be construed in relation to charter parties of any kind and, probably, no court practice considering this expression in relation to survey charter parties.

7.2.1 The wording “*other accidents to the vessel*”

One of these few examples is The Appolonius case.¹²¹ A court has considered the expression “other accidents to the Vessel” of BALTIME 1939, in relation to the fact that a ship did not perform with the utmost dispatch due to fouling of the bottom. The wording “accident” was interpreted in a way that “it should be something that happens out of the ordinary course of things”.¹²²

Then the question might be “what is supposed to be out of ordinary course of things”? Or, perhaps more correctly, one shall question whether such events are limited to a radical breakdown of vessel or something in the vessel. In any case, the cited words do not ensure that insignificant irregularities in work of some part of the equipment will be definitely

¹²¹ The Appolonius [1978] 1 Lloyd’s Rep. 53. Another decision often mentioned along with The Appolonius is [1920] 4 Lloyd’s Rep. 130 Owners of Steamship “Magnhild” v. Macintyre Bros. & Co. The question whether the ejusdem generis rule applied to the wording “or other accident preventing the working of the steamer” was considered. Court had found that this rule was not applicable. Nonetheless, this authority is not of great help for the subject of the research, since factual circumstances of this case (a steamship got aground) are very different with the ones analyzed in this thesis.

¹²² Ibid, p. 66

considered as happening out of the ordinary course of things, since such failings happen quite often and, in general, are said to be a part of shipping routine.

It is easy to imagine a situation when insignificant failings in the power supply of, say, winches of the seismic ship take place or when a signal from a communication center is jammed. According to The Appolonius authority these events will not fall within the expression “other accidents to the vessel”. At the same time even these insignificant irregularities may prevent a proper fulfillment of the primary task – collecting the data. To stress again: with these irregularities the vessel might still be perfectly able to navigate and, thus, is not prevented from working, as long as one considers the work from the point of view of conventional charter parties. On the other hand, due to the specifics of survey charter parties, the bare navigating does not mean to comply with purposes of chartering of a vessel of this kind.

Consequently, the off-hire regulation adopted in SUPPLYTIME 2005 does not give grounds to state that irregularities in equipment performance will be necessarily found to be the reason for off hire.

In this relation the recent London arbitration award¹²³ dealing with an owner’s liability for breach of clause 3¹²⁴ of SUPPLYTIME 89 is of a great interest. The primary issue for the arbitration was a scope of clause 11 (b).¹²⁵ The circumstances of the case are as follows. The vessel was a diving support vessel chartered on the terms of SUPPLYTIME 89 to perform a salvage operation. “As it turned out, the vessel had various deficiencies, primarily concerning the diving system. As a result, the vessel was placed off-hire.”¹²⁶ In the context of this thesis the most important is a note made by the tribunal: “the most common cause of off-hire was breakdown of a vessel or *its equipment* (emphasis

¹²³ London Arbitration 1/02 – LMLN 58. The award is unpublished. The citation is taken from Evje/Solvang (2007) p. 17 et seq.

¹²⁴ SUPPLYTIME 89, cl. 3 “Condition of Vessel” was revised to a considerable extent in 2005 version.

¹²⁵ Cl. 11 (b) “liability for Vessel not Working” was almost not changed and corresponds to SUPPLYTIME 2005, cl. 13 (b), except that words “except as provided in Clause 11(a) (iii)” were added to cl. 13 (b).

¹²⁶ Evje/Solvang (2007) p. 17

added)”.¹²⁷ This statement of the arbitration is slightly confusing, since the wording of the clause on suspension of hire of both ('89 and '05) SUPPLYTIME standard forms does not stipulate explicitly that breakdown of equipment may lead to off hire, and analogous court practice is unknown. Unfortunately, the context in which this wording of the London arbitration was placed is not cited by Evje and Solvang. Therefore, there is still a possibility that the cited above statement was done in somewhat general context. In the latter case, the statement is clearly understandable. Nevertheless, the authority of arbitration award does not constitute a legal authority binding on other arbitration tribunals, as well as on courts.

7.2.2 “The vessel” and “the equipment”

If the minor failings of the equipment performance exemplified in the previous section will not be found by a court to be out of the ordinary course of things, then the other part of the same expression has to be scrutinized. The expression “other accidents to *the vessel* (emphasis added)” should be then analyzed in respect of the wording “the vessel”.

The wording “the vessel” may be interpreted by courts in two ways. First option is that the wording “the vessel” will enjoy a loose construction, thus including *equipment* into the notion of the vessel. The second alternative is that the expression will be interpreted more literally, and the equipment necessary for survey activities will not be embraced by the expression “other accidents to the vessel”.

Indeed, the considered wording is a part of the expression “breakdown of machinery, damage to a hull or other accidents to the Vessel”. Hence, the given expression seems to be limited to occasions of very serious character and attributable to the notion of the vessel as such. There are grounds to suppose that the notion “the vessel” here is something comparable with a hull or vessel in the meaning of something large and significant. Then, would this notion in such case embrace all devices and mechanisms, unsubstantial for a

¹²⁷ Evje/Solvang (2007) p. 17 et seq. Apparently, this note was not a part of the conclusions.

vessel as such, for her navigation characteristics, but necessary to render particular services? One should recall that under English law off-hire clauses are interpreted fairly literally. Therefore, in my opinion, English court will construe the wording “the vessel” in a way that the deficient equipment belonging to the owner, but insignificant for a vessel as such, will not be considered as “the vessel”.

A further example of apparent confusion of the terms “vessel” and “equipment” in context of off-hire clause (on terms of SHELLTIME 3) makes the problem even more complicated¹²⁸:

The cause of refusal to allow the vessel to discharge was the failure of the pump to comply with the RINA regulations in that it was unfixed. This allegation was a potential challenge to the efficiency of part of the ship's *equipment* (emphasis added), namely, the portable pump. To adapt the words of Lord Justice Griffiths in *The Aquacharm*, the incapacity of the ship to discharge was attributable to the suspected condition of the ship itself [...], and as a result the crew could not use the relevant part of the *machinery* (emphasis added), namely, the pump. Consequently I hold that the charterers have clearly established as a matter of principle the occurrence of an off-hire event at Livorno.

Here, Hirst J attributes the pump to the ship’s equipment, and thus separates this category. On the other hand, he also attributes the pump to the category of machinery. Thus, the notions of machinery (which may often be interpreted as a part of vessel) and equipment are clearly confused. Further to this, SHELLTIME 3, cl. 21 (i) provides that “In the event of loss of time [...] due to deficiency of personnel or stores, repairs, breakdown [...] of machinery or boilers, collision or stranding or accident or damage to the vessel or any other cause preventing the efficient working of the vessel [...] hire shall cease to be due [...]”. Thus, such cause as the breakdown of equipment is not listed in this clause.

The above decision could be more substantiated if based on the wording “any other cause preventing the efficient working of the vessel” (SHELLTIME 3, lines 147–148). The

¹²⁸ *Navigas International Ltd. v. Trans-Offshore Inc. (The "Bridgestone Maru no. 3")* [1985] Vol. 2 Lloyd's Rep. 62, p. 83

Bridgestone Maru no. 3 seems to be criticized both on formal and material grounds: “The report of the case is unusual, in that the relevant clause is not quoted in extenso, and nowhere in the judgment is it stated what precisely was the named cause which was found to trigger the interruption of hire.”¹²⁹ Therefore the authority of The Bridgestone Maru no. 3 is apparently very questionable.

The similarity between SUPPLYTIME 2005 and SHELLTIME 3 is very weak because the description of the vessel and the owner’s obligation in respect of condition of the vessel (provided by SHELLTIME 3 cl. 1, 2, 24) differ substantially from the relevant issues of SUPPLYTIME 2005. In addition, the form describing vessel attached to the standard SHELLTIME 3 is publicly unavailable. Therefore, it was impossible to compare it with the Annex A of SUPPLYTIME 2005.¹³⁰ The problem deserves further discussion in the context of this paper, but unavailability of materials and limited volume of the thesis do not allow going into details here.

Perhaps, it is appropriate here to formulate another question: is the presence of the wording “equipment” in off-hire clauses of the most charter party standard forms may be used as a *proof by contradiction* of the SUPPLYTIME 2005 drafters’ intention to exclude equipment from the list of the off-hire causes? Indeed, the majority of charter parties include this risk. Accordingly, non presence of it in the given wording might indicate that drafters meant to exclude the equipment risk.

When interpreting an agreement based on SUPPLYTIME 2005 under Norwegian law is that NMC sec. 372, 376, and 377 also mention “equipment” along with “vessel”. Thus, it cannot be neglected that notions of vessel and equipment meant different categories for NMC drafters. Accordingly, if parties agreed on Norwegian law, a court can conclude that they could not omit that the equipment is not listed among the off-hire causes.

¹²⁹ Weale (2002) p. 167

¹³⁰ An importance of Annex A will be discussed in this Section below.

Another argument is the wording of cl. 9 (d) of SUPPLYTIME 2005. According to it “The Charterers shall pay [...] clearance expenses, *both for the vessel and/or equipment* (emphasis added), required for or arising out of [...] Charter Party”. Thus, both notions, “vessel” and “equipment”, are separated in relation to customs issues. Further, both forms (’89 and ’05) provide Annex “A” to specify the vessel.¹³¹ The notable circumstance is that categories of vessel (cl. 1-3), machinery (cl. 4) and different equipment (cl. 5-7, 9, 10) are named and distinguished in this part of the standard form. Therefore notions of vessel and equipment do not comprise the same object according to SUPPLYTIME 2005. Therefore, it is unclear why these two notions are not distinguished in cl. 13 (a) on off hire. Perhaps, one can argue that different interpretation methods could be applied to clauses 9 (d) and 13 (a). However, such argument is unsubstantiated, since massive legal practice on off-hire problem has shown the contrary (see Section 5.2 and references therein).

One shall further note, that similarly to the cl. 13 (a), the category of equipment is not mentioned in the cl. 3 (a) of SUPPLYTIME 2005: “The Owners undertake that [...] the vessel shall be of the description and Class as specified in Annex A [...], and in a thoroughly efficient *state of hull and machinery* (emphasis added).

As emphasised by Evje and Solvang¹³² (when analyzing the London Arbitration award cited in Section 7.2.1), cl. 3 as such cannot be taken by a court into consideration when solving an off-hire dispute. In the case analyzed in the cited publication the owner’s obligation under cl. 3 of SUPPLYTIME 89 to maintain and deliver the vessel in agreed class and in every way fit to operate effectively for services stated in cl. 5 was considered in relation to the owner’s liability for the vessel not working, provided by cl. 13 (b). The latter problem does not comprise the off-hire issue as such. On the other hand, the wording of the SUPPLYTIME 2005 cl. 3 (a) may be used by a court for a system analysis of the expression “breakdown of machinery, damage to hull or other accidents to the Vessel” in cl. 13 (a). When read in conjunction, these two expressions (“breakdown of machinery,

¹³¹ The presence of the Annex specifying a vessel in standard forms is an ordinary element of a charter party, since one of the features of time charter parties is placing the particular vessel at the charterer’s disposal.

¹³² Evje/Solvang (2007) p. 18

damage to hull or other accidents to the Vessel” and “state of hull and machinery”) and the content of Annex A do not leave doubts that the wording “equipment” is omitted systematically and therefore also not meant to be in the cl. 13 (a).

In any case, the London Arbitration award mentioned above indicates that an interpreting in favor of charterers under this kind of contracts was taking place. Nevertheless, it is not sufficient to ascertain it as a tendency, since arbitration instance is not an authority for other arbitrations and courts to settle a precedent.

A presence of the concept of “equipment”¹³³ in the Norwegian Marine Insurance Plan is, perhaps, a bit remote argument. Nevertheless, it is indicative, that such concept exists. Indeed, the concept establishes “a collective term for loose objects that accompany the ship in its trade, but which cannot be deemed to be a part of it, e.g. radio and radar equipment, search lights, loose shifting, beams, furniture and other fixtures and fittings”.¹³⁴ According to NMIP Sec. 10-1 letter (a) the insurance covers “the ship”, pursuant to letter (b) the coverage includes equipment to the vessel as well. Thus, the difference between the wordings “the vessel” and “equipment” is adopted in Norwegian marine insurance. On the other hand, this argument is not upheld by English marine insurance practice, since the English insurance is based on “named risk” principle. Therefore corresponding concept of equipment is not necessary there.

The arguments above are relevant for situations when the off-hire clause is interpreted by a court based on its wording. The discussed problems may appear when the court considers that the wording of the clause is sufficient to regulate the legal relationship. However, under Norwegian law the outcomes of the dispute may be different. Pursuant to Sec. 36 of the Formation of Contracts Act, Norwegian courts have rights to adjust or set aside contracts if the contractual freedom has been misused. Therefore, other outcomes are possible. The court may find the contract insufficient. In such case, the background law

¹³³ For details, please, see *Wilhelmsen/Bull* (2007) p. 61-62

¹³⁴ Commentary to NMIP, Sec. 10-1, letter (b)

will be needed to supplement the off-hire clause. Based on Karmøy and related decisions¹³⁵ there are grounds to suppose that in situations where the equipment belonging to the shipowner failed, the vessel will be found going off hire, since these matters are unconditionally attributed to the matters pertaining to the owner. This scenario is further supported by the concept of reasonable result in Norwegian law.

On the other hand, there is a tiny possibility that the wording of off-hire clause will be found sufficient even under Norwegian law. Indeed, it was clearly shown above that the notion “equipment” appears in other parts of SUPPLYTIME 2005. At the same time it is mentioned several times in NMC along with “vessel” category. Accordingly, these arguments can evidence that the notions of vessel and equipment mean different categories for drafters of the standard form and in Norwegian law, in general. Consequently, it is not absolutely clear whether the Norwegian court will find the considered wording insufficient. Thus, the result analogous to the result under English law may also take place.

When considering the possible developments of cl. 13 (a) in respect of listing of the risks it is important to note that the simple insertion of the “equipment” cause would not solve the problem. It was shown by many examples above that even slight failings in the equipment work may interrupt the data acquisition operations. It means that breakdown of equipment is only a “degree of the inappropriate way of things” for the charterer, though often the highest one. But in addition to this, the operations may be easily disorganized on the previous stage, namely, when equipment is not broken, but just does not function in the proper way. The wording suggested is “failings and/or breakdown of equipment”. The term “deficiency” was abandoned here since it is used in the context of deficiency of personnel or stores, and the meaning of this term as a lack of the said categories is established in court practice.

¹³⁵ ND 1950.398 Karmøy, ND 1940.353, ND 1952.422 Hakefjord

7.3 Deficiency of charterer's equipment as a cause for off-hire

Another question which may arise here: is it possible that deficiency/failings of the equipment belonging to the *charterer* will place the vessel off hire?

As already mentioned, the equipment on board may belong either to the owner or to the charterer. A possessor of the equipment may be changed, either under the charter party, or when it expires, if so agreed by the contract. Typically, both types of equipment are essential for acquiring survey. It does not seem logical to make the shipowner responsible for deficiency of the charterer's equipment (cf. the example from Gade/Woxholth, cited in Section 7.1).

On the other hand, the revised wording of the clause on structural alterations and additional equipment of SUPPLYTIME 2005 gives rise to some issues. Clause 4 (cl. 23 of SUPPLYTIME 89) was added with the following provision: "However, the owners may, upon giving notice, undertake any such repair and maintenance at the Charterer's expense, when necessary for the safe and efficient performance of the Vessel."¹³⁶ BIMCO comments that these amendments are called: "To avoid the possible duplication of work caused by the Charterers sending teams on board to do work already undertaken by the Owners, the provision has been amended to contain a formal requirement for the Owners to notify the Charterers (i) that the repairs/maintenance is needed and (ii) that the Owners will undertake the work. *The responsibility for such alteration and reinstatement rests with the Owners* (emphasis added)."¹³⁷ The "alteration" here means that the repair is performed by the shipowner instead of the charterer. So, it is meant that the owner will bear costs if such repairs turn out to be unsuccessful, and will reinstate the charterer when the vessel is not working.

¹³⁶ SUPPLYTIME 2005, cl. 4, lines 98-101

¹³⁷ BIMCO's explanatory notes

This commentary seems to be questionable with respect to both obligations of the owner stated. In fact, the wording of cl.4 lines 98-101 is very limited. The regulation that the responsibility for “such alteration and reinstatement” rests with the owner *does not appear in the text of this clause*. This is only commented by BIMCO. It is worth to reiterate here that authority of BIMCO’s comments seems to be questionable (see, please, Section 2.3). Therefore, since charter parties are considered to be regulated, first and foremost, by its wording, it is very doubtful whether responsibility for “such alteration and reinstatement” will be attributed on the owner’s account. In such case one will need to consider whether the contract is clear in this sense or needs to be supplemented with the background law.

The expression “the responsibility for such alteration [...] rests with the owners” is quite vague. It is unclear what kind of responsibility is meant here and how far it might go. It may be supposed that the reinstatement of the time lost by the charterer is meant, since the negative results of this alteration may affect the charterer’s equipment. If it is damaged in the course of failed repairs the charterer becomes unable to run surveys. Generally speaking, under ordinary charter party (when the equipment does *not* belong to the charterer), it is ascertained that the breakdown of equipment results in the vessel’s inefficiency. In turn, this could result in the vessel is going off hire. On the contrary, neither SUPPLYTIME 2005, cl. 4, lines 98-101, nor cl. 13 (a) does provide the charterer with the possibility to protect his interests in the form of placing the vessel off hire in these circumstances. Thus, the perspectives to reinstate the time lost are doubtful.

The presence of cl. 13 (b) also does not make the problem clearer. According to cl. 13 (b): “The Owners’ liability for any loss, damage or delay sustained by the Charterers as a result of the Vessel being prevented from working by any cause whatsoever shall be limited to suspension of hire [...]”. Thus, the provision does not contribute to the understanding of the consequences of the unsuccessful repairs of the charterer’s equipment by the owner. The clause just reiterates that all charterer’s losses resulted from the vessel was not

working will be limited to the suspension of hire. Hence, the problem whether the charterer will be reinstated for the time lost in these circumstances is not solved.

In any case, in order to award the charterer to off hire due to failed repairs by the owner a court will need to solve two questions. First, it has to be found that the equipment is an off-hire cause within the scope of SUPPLYTIME 2005 cl. 13 (a) (see Sections 7.1, 7.2). Second, it has to be established that the status of the equipment has been changed, so that the owner bears a risk of damaging it from the moment when he starts to repair it instead of the charterer. The second question is even more unclear than the first one, and there are currently no indications that it will be solved in sound with BIMCO's commentary cited above. In general, this scheme seems to be too complicated to protect the charter's interests. The scope and the volume of this paper do not allow going into details here.

Further, the obligation of the owner to bear costs of failed repairs, noted as "reinstatement rests with the Owners" in explanatory notes to SUPPLYTIME 2005, cl. 4, seems to contradict with the knock-for-knock provision provided by cl. 14 cited in the next paragraph. As BIMCO writes in the explanatory notes, "This Clause is recognized as being at the very core of SUPPLYTIME [...]"¹³⁸

Cl. 14 (b) (ii) of SUPPLYTIME 2005 provides that "[...] the Owners shall not be responsible for loss of, damage to, or any liability arising out of [...] *the property of any member of the Charterers' Group* (emphasis added), whether owned or chartered [...], even if such loss, damage, liability [...] is caused wholly or partially by the act, neglect or default of the Owners' Group [...], and the Charterers shall indemnify, protect, defend and hold harmless the Owners from any and against all claims, costs, expenses, actions, proceedings, suits, demands and liabilities whatsoever arising out of or in connection with such loss, damage, liability [...]." At the same time, by virtue of cl. 14 (a) the expression "Charterers' Group" embraces the charterers, their contractors, sub-contractors, co-ventures, etc.

¹³⁸ BIMCO's explanatory notes to cl. 14

Since the equipment used by charterer is usually owned by him, it is attributable to the category of the property of a member of the charterers' group. Accordingly, the knock-for-knock provision stipulates that in case of damage to the charterer's equipment the owner shall stay harmless. At the same time, cl. 4 discussed above is not listed among the clauses to which the knock-for-knock principle is *not* applied, and, thus, there is no possibility to apply liability regime provided by background law. Hence, as regulated by cl. 14, the owner is not obliged to reinstate the charterer in case of unsuccessful repairs. Therefore, there are grounds to say that commentaries to SUPPLYTIME, cl. 4 cited above are somewhat confusing.

Consequently, one can conclude that the balance in the legal relationship "shipowner – charterer" was not changed and the knock-for-knock provision holds its hegemony in the revised standard form. A question whether the development of cl. 14 is necessary in respect of the amended cl. 4 could arise. In my opinion, such development is not needed, since the general approach to liability under the knock-for-knock provision has not been changed and this regime is generally accepted. The most important thing is, perhaps, to clarify the ambiguity created by the presence of the *commentary* to the cl. 4. On the other hand, the charterer's interests in this respect may become better protected if cl. 4 will be added to the list of the clauses to which the knock-for-knock regime is not applied (cl. 14 (b), lines 627-629). In such case, commentaries to the cl. 4 will find a direct confirmation.

The issue whether the owner is obliged to bear costs of unsuccessful repairs may also arise in circumstances when the equipment is leased (see e.g., North Sea Surveyor case discussed in Section 4.1). Then the question whether the owner of the equipment leased to the charterer will be found to be a contractor, sub-contractor or co-venturer of the charterer within the scope of cl. 14 (a) have to be answered. According to Kaasen, the group of contractors embraces all involved in the contract's performance¹³⁹. However, the issue is not discussed extensively and no examples, like e.g., the owner of leased equipment, are

¹³⁹ Kaasen (2006) p. 80

provided. Thus, the issue of cost bearing may still be solved pursuant to cl. 14 as discussed above. If nevertheless the owner of the equipment is found to be a not a member of the charterers' group, then the knock-for-knock provision is not applicable to this situation, and the background law will be needed to supplement the agreement.

Thus, the ambiguity between comments to cl. 4 and provisions of cl. 4, 13 (a), 14 of SUPPLYTIME 2005 should be clarified. Possible solutions were mentioned in the text above.

8 Concluding remarks

Considerable part of the outcomes of this research comprised of the findings related to the off hire. Firstly (i), it has been shown that in circumstances discussed in Chapter 6 it is very difficult to fulfill the condition of “being prevented from working” under survey charters based on SUPPLYTIME 2005. Secondly (ii), it has been argued in Chapter 7 that such a cause for the vessel going off hire as failings and/or breakdown of equipment will be hardly found as a relevant cause to award the charterer to an off-hire, since such causes are not included in the wording of cl. 13 (a). It was demonstrated that the possibility that a court will find the condition (i) fulfilled and, at the same time, the cause (ii) falling within the scope of cl. 13 (a) is very questionable. This makes the charterer a vulnerable party in relation to the off hire. Possible ways to develop the standard form in this respect were suggested.

Due to the limited volume of the thesis, it was impossible to analyze all topics intimately intervened with the discussed issues. Thus, the detailed discussion of the general characteristic of the BIMCO’s offshore charter parties’ suite was set aside, apart from its general characteristic given in Section 2.4.

The outcomes of the research may be classified in two groups.

First group concerned the essence of the charter party of survey ship. The notion of *vessel work* and its possible legal implications in relation to potential off-hire situation were analyzed in Chapter 6. It was shown that the survey ship is demanded to work following much higher standards than a conventional vessel. Therefore, a possibility to stipulate such higher requirements to the work of a ship running survey has to be reserved in the standard contract form. In addition, the possible contradiction in the wording of cl. 7 (a) (i) “all

reasonable services” and the notion of work within the scope of cl. 13 (a) has to be eliminated. Possible ways of amending the wording “all reasonable services” of SUPPLYTIME 2005, which would stipulate higher requirements to the work of a ship running survey, could be discussed further. Due to the limited volume of this research the latter discussion was set aside.

Second group of issues concerned a complex of the issues related to the *equipment*. First of all, the changes in the equipment’s status, provided by amendments to the lien clause of SUPPLYTIME 2005, were commented in Section 4.1. It was shown that under this type of charter parties the equipment is of primary interest.

The possibility to run structural alterations to the vessel was scrutinized in Section 4.2. In particular, it was suggested that a provision stipulating obligation of the charterer to provide the owner with the copies of the plan and drawings of the planned installations would enhance clarity of the standard form.

A group of problems related to the equipment in off-hire situations were discussed further in Chapter 7. The outcomes of interpretation of the standard form in this respect under both, Norwegian and English, legal systems, were considered. The situation when the off-hire clause is interpreted fairly literally (under English law) was presumed. This led to the following results. It was shown that the absence of the wording “equipment” in circumstances discussed in Section 7.2 may be considered by courts as a clear regulation that the charterer does not have right to an off-hire even if the equipment belonging to the owner is functioning with failings. Furthermore, other possibilities to exercise the right to a suspension of hire were discussed. It was demonstrated that the wording of the whole cl. 13 (a) does not give to the charterer many chances to be awarded to off hire. At the same time, possible outcomes of an analogous dispute supplemented with Norwegian law were commented. Due to limited volume, more general consideration of difficulties (shortly commented in Section 2.3) that may arise in relation to presence of Entire Agreement

clause when construing the contract based on SUPPLYTIME 2005 under Norwegian law were omitted in this paper.

It was further suggested that in order to reserve the charterer's opportunity to off hire expressly, the expression "failings and/or breakdown of equipment" have to be added to the wording of cl. 13 (a). The term "deficiency" was found inappropriate here since it is used in the context of deficiency of personnel or stores, and the meaning of this term as a lack of the said categories is established in court practice.

One could argue that the absence of the term "equipment" in the wording of off-hire clause gets too much attention in this thesis. To highlight the importance of this circumstance, The A Turtle authority was analyzed in Section 6.3. It was shown that strictly literal interpretation of the contract holds its position in English law in relation not only to the wording of off-hire clause, but also to other law institutes.

Possible consequences of failed repairs by the owner of the charterer's equipment were analyzed in Section 7.3. It has been shown that the BIMCO's commentaries to SUPPLYTIME 2005 cl. 4 are misleading. Accordingly, it is suggested to bring them in consistence with the actual wording of the standard form or to make corresponding revisions to clause on liabilities and indemnities (cl. 14). The question whether the status of the equipment changes, so that the owner bears a risk of damaging it from the moment when he starts to repair it instead of the charterer was raised. However, the scope and the volume of this paper do not allow going into details here.

In general, the research has shown that SUPPLYTIME 2005 has become even more pro-owner agreement, than pro-charterer, if compared to SUPPLYTIME 89.

The observations made in Section 2.5 regarding the applicability of NMC to non-transportation charter parties are, of course, the issue more theoretical than practical. These rules will be applied by analogy. At the same time, it was considered important to discuss

the applicability of NMC to survey charter parties, since more questions related to such charters may arise in the future, and, thus, more specific legal regulation may be required.

The market of chartering of survey ships is still limited, although the number of players increases constantly. It is characterized by high technical competence and the use of high technologies. Accordingly, these contracts are expensive, as well as the equipment used. Therefore, even in cases when one of the parties suffered big losses, it is not that often that a dispute ends up in a court or arbitration. Typically, the most acceptable solution for both parties is the negotiations. Perhaps, this is the reason why a number of cases related to the chartering of survey vessels is so limited. Therefore it is important for parties to have a comprehensive understanding of possible legal implications resulting from the use of SUPPLYTIME 2005 and its earlier versions.

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Annex: Invitation to Tender – 3D Seismic Data Acquisition

Schedule 3 (Annex 1)

Schedule 5 (Annex 2)

Schedule 3: General and Seismic Acquisition Work Standards**G GENERAL****G.1 General Personnel standards**

Contractor's Personnel shall be sufficient and capable to maintain the work standards set out in this Contract. During the execution of the Work, at least the following personnel shall be present on the Seismic Unit at all times:

- (a) Party Chief
- (b) Chief Surveyor or Chief Navigator
- (c) Chief Mechanic
- (d) Senior Observer
- (e) Medical personnel specified in Schedule 1
- (f) Safety Advisor

The leave schedule shall be as specified in Schedule 7. The leave schedule of party chief and assistant party chief shall be such that at least one function is fulfilled at any time from the start of Mobilisation.

G.2 General Work standards

The Work shall meet the standards and specifications and be carried out in accordance with the procedures set out in this Contract.

All equipment used for the Work shall at all times meet Contractor's stated or published standards, Manufacturers' published specifications and Company's standards and specifications as outlined in this Contract, and published in Company's manuals.

Before the start of the Work, Contractor shall make available to Company, if Company so requests, the Manufacturers' specifications of equipment to be used.

In the event that Contractor considers that any equipment to be used will not meet such standards and specifications, Contractor shall notify Company immediately and shall obtain Company's approval for alternative standards and specifications before the start of the work.

M MARINE OPERATIONS**M.1 Additional Personnel standards**

Contractor shall provide at all times at least one qualified hydrographic surveyor onboard the seismic vessel.

M.2 Seismic recording Work standards**M.2.1 Recording geometry and acquisition parameters**

Recording geometry and acquisition parameters shall be as specified in the following table for open water area:

	3D	2D	2D (Hi Res)
Number of streamers			
Number of sources			
Number of CMP lines per sail pass			
Crossline distance between source centers			
Firing order (if sources are 1,2,3,4 port to starboard)			
Shot interval per sail line			
Shot interval per CMP line			
Source depth			
Crossline distance between streamers			
Streamer length			
Streamer depth			
Number of channels per streamer			
Receiver group spacing			
In-line spacing of CMP's (bin length)			
Cross-line spacing between CMP lines (bin width)			
Fold per bin of subsurface coverage			
Recording length			
Sample rate			

Undershooting Configurations

The undershooting configurations might be used to collect 3D seismic data around the obstacles located in the survey area.

The acquisition parameters will be relevant to the select option of the main seismic acquisition and there must be no unreasonable differences between openwater and undershoot data.

Undershooting operations must be carefully planned and/or designed by CONTRACTOR and approved by COMPANY’s Representative. The design shall be in a way to keep the near offset collection into the bin coverage maps.

M.2.2 Instrument and tape cartridges

The instrument shall be a telemetry system (digital streamer) and shall have appropriate number of recording channels. No low-cut filter shall be set if this is an available option, otherwise a 3 Hz low-cut filter shall be used. The high-cut filter shall be set preferably at 0.7 times the Nyquist frequency, with a suppression of at least 30 dB at the Nyquist frequency. Company very strongly prefers Western WG-24, Sytrak 480, and Nessie 3 instruments.

A minimum of two tape cartridge transports is required. Recording shall be done on 3480 or 3490 tape cartridges (SEG-D format) or IBM 3590/Magstar tape cartridges. It shall be possible to read any tape cartridge on any drive, regardless of which tape cartridge drive was used to generate the tape cartridge. IBM 3590/Magstar media (or any other high density media) shall be utilised for recording or for tape copies only if

the data are either RODE encapsulated or recorded in strict SEG-D Rev. 2 format. The maximum size of individual files on high density media shall be less than two gigabytes.

The monitor camera shall preferably be an OYO GS624 or OYO DFM480 or equivalent, properly interfaced with the recording instruments and capable of displaying alphanumeric information on the monitor records.

At the completion of each Line, and using the last tape cartridge for that Line, three monitor records shall be made using the tape cartridge drive used for recording. The same three monitor records shall be made again using a tape cartridge transport other than the one used for recording said last tape cartridge. Monitor records of the same data shall be filed together.

Contractor shall use new, certified error free 3480, 3490, or IBM 3590/Magstar tape cartridges for both recording and generating SEG-Y formatted copies (required by Schedule 2). SEG-Y copies of the field data shall be of a different brand of tape cartridge from that used to record the original Data or a different Company approved recording medium must be used. Company and Contractor shall agree on acceptable tape cartridge manufacturers prior to Mobilisation.

SEG-Y headers shall as a minimum contain the data indicated in Schedule 3, Appendix M2.

M.2.2.1 Auxiliary channel assignment

As a minimum Company requires the following data to be recorded on auxiliary channels:

- (a) aiming point of gun controller
- (b) independent 50 Hz timing reference
- (c) near field hydrophone signatures.

M.2.3 Streamer

M.2.3.1 Group specifications

Individual group intervals shall not differ more than 1 % of the specified group interval.

Contractor shall maintain on board the vessel a minimum of 50 % spare groups for each streamer.

The distance from centre of each source array to the centre of the first group of the nearest streamer shall be approximately 100 m and shall not exceed 175 m. Streamer depth shall not deviate from the specified depth by more than one meter.

At least once every 40 energy release points a monitor record shall be made on which all streamer groups, time break and near field hydrophone signatures are to be displayed. In case more channels are recorded than can be displayed simultaneously, Contractor shall make monitor records in such a way that all streamer groups are displayed in multiple monitor records.

Before the start of the Work the streamer shall be balanced and streamed in the Area to be neutrally buoyant at the specified operating depth. This procedure shall take place with minimal use of depth controllers (wing angles not more than ± 4 degrees).

For digital streamers, to maintain uniform group response the system shall provide test equipment to assess leakage in the streamer groups and the resulting influence on the streamer group response. This test should be part of the daily test procedures and additionally at the request of Company's On-Site Representative.

M.2.3.2 Polarity specification

Polarity shall be in accordance with SEG specifications: compression shall be recorded as a negative number on tape and produce a downward displacement of the monitor wave form. Prior to commencement of the Work the polarity of each streamer group shall be checked. Each time the streamer has been repaired, this procedure shall be repeated before the Work is resumed.

M.2.3.3 Streamer noise

The streamer noise in microbars rms is defined as noise at the amplifier input in microvolts rms divided by the sensitivity of the detector group when under load of cable and amplifiers, in microvolts per microbar.

Traces shall be considered noisy if, under normal operating conditions, the noise measured over the full recording length exceeds:

- (a) 5 microbars rms for 12.5 m group length, or
 - (b) 3 microbars rms for 25 m group length,
- when measured or played back through an 8 Hz, 18 dB/octave low cut filter.

For traces up to and including 3 stations behind depth controllers, contiguous to the tail buoy or within 450 m from the vessel, the maximum allowable noise shall be:

- (a) 7 microbars rms for 12.5 m group length, or
 - (b) 5 microbars rms for 25 m group length,
- when measured or played back through an 8 Hz, 18 dB/octave low cut filter, always providing that Company's On-Site Representative is satisfied that streamer balancing has been properly achieved.

Specifications for 'additional' noise caused by non-optimal recording conditions (e.g. interference of other vessels, deteriorating weather) shall be given in writing to Contractor by Company or Company's On-Site Representative.

Ambient streamer noise shall be displayed, together with a sinusoidal calibration signal, on monitor records at a suitable fixed gain and shall be recorded on a tape cartridge as follows:

- (a) the record length shall be at least 6 seconds and noise shall be recorded with both production and 8 Hz low cut and high-cut filter, unless otherwise specified by Company,

- (b) the records shall be taken under normal operating conditions, especially with regard to streamer depth and speed of the vessel,
- (c) the noise records shall be taken immediately prior to the start of a Line and immediately upon completion of each Line, whenever weather conditions deteriorate during shooting, and at any time at the discretion of Company's On-Site Representative,
- (d) the records shall be recorded on the first and last production tape cartridges for each Line,
- (e) the following information shall be logged during recording of the ambient noise:
 - (i) date,
 - (ii) line number and whether run-in or run-out,
 - (iii) cable depth and depth indicator locations,
 - (iv) offset from vessel to nearest trace,
 - (v) tape cartridge and file number,
 - (vi) filter settings,
 - (vii) sea state,
 - (viii) wave and swell height and direction,
 - (ix) vessels ground and estimated water speed,
 - (x) gain,
 - (xi) rms amplitude of calibration signal,
 - (xii) comments.

As an alternative to taking noise records, digital equipment may be used to measure and analyse the noise, provided that the operation and calibration of such a system is regularly checked using noise records as described above. This procedure requires Company approval, which may be revoked at any time.

M.2.3.4 Definition of bad traces

A trace shall be considered 'bad' if it does not meet any of the following specifications:

- (a) if the trace is noisy, intermittent or insensitive by more than 3 dB down from normal adjacent traces,
- (b) if the trace has a time shift from other normal traces in excess of one-half millisecond, or
- (c) if the recording instrument, including the hydrophone response, does not meet the manufacturer's specifications.

For purposes of specifying maximum allowed limits on the numbers of bad traces, each streamer (whether 2D or 3D) shall be considered in four equal subsets, namely nears, near-mids, far-mids, and fars, with each subset comprising one-fourth of the number of channels in one streamer. No line shall be started, and any line shall be aborted, if any four (4) adjacent traces are bad in any aforementioned subset of any streamer, or if four (4) % or more of the traces are bad in any subset of any streamer.

M.2.3.5 Feather angle

The feather angle shall not exceed 12 degrees in 2D recording. The feathering angle shall be measured and recorded on the navigation tape cartridge continuously, and tail buoy measurements taken and logged at the start of every Line and every 40 energy release points thereafter.

M.2.3.6 Depth indicators

At least one functioning streamer depth indicator per 300 m of active streamer shall be provided. Depth indicators shall be accurate to within ± 0.5 m, and the streamer depth shall be maintained to an accuracy of ± 1 m of the specified value. No depth indicator shall be defective at the start of any line. Depth indicators shall be calibrated at the start of the Work, during streamer repairs, when otherwise practicable, and at the end of the survey.

M.2.3.7 Waterbreaks

At least two functioning water breaks, spread over at least 1000 m of the streamer, shall be provided unless other means acceptable to Company are provided to routinely measure acoustic velocity in the water.

M.2.4 Source

- (a) The source shall be a Bolt, Bolt Long Life, sleeve, or Soderia G-gun airgun array.
- (b) Source depth shall remain within 0.5 m of the specified depth at all times.
- (c) Far field source signature specifications shall be in accordance with the SEG recommendations as published in the Special Report of the SEG Technical Standards Committee "SEG standards for specifying marine seismic energy sources" Geophysics, Vol. 53, No. 4 (April 1988), pp. 556-575. Specifications shall be referenced to the response of a DFS-V recording system with an out-128 Hz, 72 dB/octave, bandwidth and shall be:

	3D	2D	2D (Hi Res)
Source strength (peak-to-peak)	5 MPa.m	7.5 MPa.m	0.6 MPa.m
Spectral ripple in band 10-60 Hz	<6dB	<6dB	<6dB
Primary/secondary (peak to bubble) ratio	>10:1	>10:1	>10:1
Time after which signal remains 40 dB down	<400 ms	<400 ms	<400 ms
3 dB down points	<8 and >90	<8 and > 90	<8 and >90

- (d) Each source shall be identical and comply with the above specifications.
- (e) If available, at least four (4) weeks prior to Survey Start Contractor shall provide on a tape cartridge a measured source signature and drop out tests for a source array identical to the source array to be used for the Work, measured in accordance with procedures outlined in this Schedule 3, Appendix M1.
- (f) Detailed dropout specifications shall be agreed prior to mobilisation. However, these shall not permit the source to be operated at less than 90 % of either its maximum peak-to-peak strength or primary to secondary ratio.
- (g) The actual operating pressure of the airguns shall be within 7.5 % of the nominal operating pressure.
- (h) Contractor shall provide an accurate and reliable method to determine and adjust individual firing times of each source element and to detect and monitor misfires

and autofires. During the work, each source element shall fire within one millisecond with respect to aimed firing time.

- (i) Each airgun string shall be equipped with a sufficient number of appropriately sited near field hydrophones to enable accurate verification of the near field signature of all individual airguns. Company has a strong preference for one near field hydrophone per airgun or airgun cluster, but will accept one near field hydrophone per pair of airguns or clusters. All airguns shall be operational prior to start of any Line. Near field signatures shall be recorded on auxiliary traces during each line.
- (j) Contractor shall endeavour to maintain all spare guns in the array at all times.
- (k) Each airgun string shall have at least three functioning depth indicators, situated near the front, center, and rear of the string. The accuracy of these indicators shall be ± 0.30 m. Depth indicators shall be calibrated at the start of the Work, and each time the source array is deployed. All source array elements shall be towed at the specified depth with an accuracy of ± 0.5 m. Gun depths shall be recorded in the seismic trace headers.
- (l) For areal arrays, the array geometry shall be maintained to within 15 % of the specified values. An accurate and reliable method of determining such geometry shall be provided.
- (m) Gun mask data and actual gun timing accuracy shall be recorded in the seismic trace headers.

M.2.5 Misfires

A misfire is defined as any condition resulting in an unusable record or no record at all. In addition a misfire has occurred if any of the following conditions arise:

- (a) loss of magnetic recording for any reason whatsoever,
- (b) loss of time break,
- (c) loss of recording of positioning Data,
- (d) a non-recoverable write error occurs in seismic data recording
- (e) air and hydraulic pressures vary by more than 7.5 % of the specified values,
- (f) autofiring of an airgun,
- (g) firing of an airgun outside ± 1 ms of its specified time,
- (h) two or more airguns are not within the depth limits,
- (i) loss of airgun controlling system,
- (j) gun drop-outs are out of specifications,
- (k) the maximum allowed number of bad traces is exceeded,
- (l) navigation/positioning data is outside specifications.

For each Line or Line segment the maximum allowable number of misfires shall be:

- (i) 5 % of the total number of shots for that Line, or
- (ii) 8 misfires in succession (regardless of source in multi-source operations), or
- (iii) 12 misfires in any 40 energy release points.

If any of these maximum allowable numbers is exceeded, all Data of that Line or Line segment shall be considered out of specification and the Line or Line segment shall be re-shot.

M.2.6 Run-in and Nominal Line Change time

In 2D acquisition, a minimum run-in of one and one-half (1.5) streamer lengths is required at the start of each Line or Line segment, i.e., the vessel shall be on the preplotted line headed for the first shot point at this distance from the first shot point. For time accounting purposes in Schedule 10, 2D Nominal Line Change time shall be two and one-half (2.5) hours.

In 3D acquisition, a minimum run-in of one-half (1/2) streamer length is required at the start of each Line or Line segment, i.e., the vessel shall be on the preplotted line headed for the first shot point at this distance from the first shot point. Whether the streamer has finished turning or not shall not be a consideration. For time accounting purposes in Schedule 10, 3D Nominal Line Change time is defined as one-half (0.5) hour plus an additional one-fourth (0.25) hour per kilometer of length in any one streamer.

M.2.7 Reshooting

No line segment shall be smaller than cable length plus the offset without the prior approval of Company. A part Line must be reshot in the same direction as the original Line.

In 2D, if the feathering of the streamer is within five degrees of the original feathering angle then the reshot part may be considered as a straightforward continuation of the original Line. If the feathering difference is greater than five degrees, then the continuation shall be recorded as an independent Line segment. No overlap of full fold coverage shall be required in either case.

In 3D, the reshot part shall be considered a continuation of the original line and no overlap shall be required.

M.2.8 Starting and aborting Lines

Work shall be halted when any of the above specifications or the additional specifications here below are not met, and shall not be restarted until rectification of the same.

M.2.8.1 Starting Lines

When one or more of the following conditions exist, the Work shall not start on any Line:

- (a) one or more streamer depth detectors is not functioning,
- (b) the source equipment is not operating to the standards specified in this Contract,
- (c) the streamer depth is not in accordance with the standards specified in this Contract,
- (d) one or more of the 3D positioning requirements as set out in Schedule 5 is not met,

- (e) one or more of the 2D positioning requirements as set out in Schedule 5 is not met.

M.2.8.2 Aborting Lines

When one or more of the following conditions exist, the Work on any Line shall not continue:

- (a) the vessel speed exceeds five knots relative to the water,
- (b) more than one streamer depth detector is not functioning in any one streamer,
- (c) the continuous fathometer has not been functioning for more than one hour,
- (d) the streamer depth is not in accordance with the standards specified in this Contract,
- (e) less than two monitor hydrophones per sub-array are available,
- (f) one or more of the 3D positioning requirements as set out in Schedule 5 is not met,
- (g) one or more of the 2D positioning requirements as set out in Schedule 5 is not met.

M.2.9 Test procedures

Contractor shall allow Company to have access to the equipment for acceptance tests prior to or around the time of Survey Start. Compensation for testing time shall be as stated in Schedule 10. Tests may be carried out on source array(s) to verify whether the source array meets Contractor's given specifications.

Streamers may be tested by Company prior to the start of the Work. At least four groups per streamer chosen at random may be checked for sensitivity against a calibrated hydrophone. Any group not meeting the specifications shall be considered as dead and immediate action shall be taken by Contractor to repair such group.

Conclusions of the tests shall be made available to Contractor, who shall take immediate action to remedy any deficiencies.

To maintain Data quality Contractor shall take the following measures:

- (a) A complete monthly test shall be run before the start of the Work. The results shall be available at the start of the Work.
- (b) Daily tests as specified by Contractor in Schedule 7 shall be conducted at the start of each working day and at the start of each Line.
- (c) Monthly tests as specified by Contractor in Schedule 7 shall be conducted at approximately thirty days interval, the actual day being governed by logistics and other considerations at the time.

The Company reserves the right to modify the Contractor's daily and monthly test sequence as required.

Monthly tests shall be recorded in a standard SEG format. As advised by Company, the monthly test tape cartridge shall be sent either to Contractor's Processing Centre

for evaluation or shall be handed over to Company. The results of the evaluation by Contractor's processing centre shall be communicated to Company.

Tests shall be run using the filter settings and sampling rates used in the seismic production work. Recording and evaluation of these tests shall be against the manufacturer's recommended instrument specifications.

Company reserves the right to request additional tests or specify different test sequences.

M.2.10 Bin Coverage (3D)

A complete set of coverage diagnostics shall be generated and provided to Company after each sail pass in which any acquisition occurs. A complete set of coverage diagnostics shall comprise ten sets of coverage data pertaining to that part of the 3D survey so far completed indicating the number of traces associated with each true bin, both numerically and by means of colour coded displays, and ten additional sets of coverage data pertaining to the same part of the 3D survey indicating in the same manner the number of traces associated with each true half-bin.

A true bin shall be defined as a bin with inline dimension (length) equal to one-half the receiver group length, crossline dimension (width) equal to one-half the minimum of the crossline source and streamer spacings, and which is centred on the preplotted positions of midpoints between shot and receiver positions. For each coverage diagnostic display or corresponding numerical listing, Company shall **define diagnostic bins** having a one-to-one correspondence with true bins, having the same centres as their counterpart true bins, having the same length as true bins, but having widths possibly different from true bins and possibly variable with offset.

For each display involving true bins, Company shall define a shortest offset diagnostic bin width, a longest offset diagnostic bin width, and a mathematical description of how diagnostic bin widths are to be computed from these at intermediate offsets. The number of traces associated with each true bin for a given offset range shall be the number of traces having shot/receiver midpoint positions falling within the corresponding diagnostic bin, **counted after duplicate offsets, if any, have been excluded**. These midpoint positions shall be computed from final and proven shot and receiver coordinates after post processing of navigation and positioning Data.

Company shall define five offset ranges (typically the full offset range plus four equal subdivisions of the full offset range), and two sets of diagnostic bins, leading to the ten sets of diagnostic displays and numerical data.

A true half-bin shall be defined as a bin having the length of a true bin, but one-half the width of a true bin. Proceeding crossline, every second true half-bin has a common centre with a true bin, with the remaining true half-bins centred between them. For each diagnostic display and corresponding set of numerical data (typically the same offset ranges employed with true bins shall be used), Company shall define two sets of diagnostic bins for use in associating numbers of traces with each true half-bin, similarly as with true bins. Hence ten sets of diagnostic displays and numerical data shall involve true half-bins.

The above twenty diagnostic displays and sets of numerical data shall be maintained and provided electronically to Company's On-Site Representative at sea. Contractor shall accommodate reasonable requests for paper displays, and at a minimum provide paper displays every seven days.

After survey termination, all twenty coverage displays and sets of numerical data shall be delivered in paper form and on electronic storage media to Company within seven days of the last shot. Paper copies shall have a display scale of 1:25000 for true bin coverage diagnostics and 1:12500 for half-bin coverage diagnostics.

Company shall select one (or more if Contractor's Equipment permits) of the above displays for computation and display in real time while recording is in progress, and Contractor shall generate such display. The purpose of that display shall be for vessel steering, and shot and receiver coordinates computed in real time for such display shall not be used in any of the twenty displays described above, all of which shall be generated from final and proven coordinates after post processing.

Timing of and amount of infill recording based on the above diagnostics shall be at Company's discretion.

For clarity of communication only and not as a contractual matter, the following table indicates a typical set of binning parameters defining the required twenty diagnostic displays and corresponding sets of numerical data assuming true bins are 25 meters wide and total nominal fold is 60. Widths in the table are in meters. The typical mathematical rule defining bin widths at offsets intermediate to the nearest and farthest is linear interpolation.

display number	near offset bin width	far offset bin width	offset range	nominal fold	target % of nominal	traces needed
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True bin diagnostics--single width at near trace and single width at far trace:						
1	25	25	nears	15	90	14
2	25	25	near mids	15	85	13
3	25	25	far mids	15	80	12
4	25	25	fars	15	75	11
5	25	25	all offsets	60	83	50

True bin diagnostics--double width at near trace and triple width at far trace:						
6	50	56.25	nears	15	100	15
7	56.25	62.5	near mids	15	100	15
8	62.5	68.75	far mids	15	100	15
9	68.75	75	fars	15	100	15
10	50	75	all offsets	60	100	60

True half-bin diagnostics--single width at near trace and single width at far trace:						
11	12.5	12.5	nears	7.5	90	7
12	12.5	12.5	near mids	7.5	85	6

13	12.5	12.5	far mids	7.5	80	6
14	12.5	12.5	fars	7.5	75	6
15	12.5	12.5	all offsets	30	83	25

True half-bin diagnostics--double width at near trace and triple width at far trace:						
16	25	28.125	nears	7.5	100	7 or 8
17	28.125	31.25	near mids	7.5	100	8 or 7
18	31.25	34.375	far mids	7.5	100	7 or 8
19	34.375	37.5	fars	7.5	100	8 or 7
20	25	37.5	all offsets	30	100	30

M.2.11 Steering Point

The steering point shall be as specified in Schedule 5.

M.3 The vessel(s) (seismic vessel and chase vessel)

M.3.1 Inspection

During a six week period prior to the agreed date for the start of operations, Contractor shall arrange for an opportunity for Company representative(s) to inspect the Vessel.

Contractor shall notify Company of the location of the vessel at least two weeks prior to the inspection date, and shall notify Company of the date of the inspection at least three days prior to the inspection.

The vessel shall meet the specifications of this Contract at the date of the inspection. Company may at their own discretion decide to:

- (a) inspect the Vessel at the indicated date,
- (b) appoint an independent inspector,
- (c) postpone the inspection to Mobilisation date, or cancel the inspection altogether.

No vessel may be used for the Work unless it has been formally approved by Company. Approval by Company shall not release Contractor from any liability or obligation of this Contract. Contractor shall endeavour to comply with any additional recommendations made by Company.

Contractor shall have available all required certificates which shall be valid and up to date for the duration of the Work.

M.3.2 Wheelhouse

The Wheelhouse shall be a specially designed command centre with, if possible, 360 degrees unobstructed visibility and full remote controls of all propulsion units.

M.3.3 Accommodation and supplies

Accommodation shall be subject to approval by Company and shall be of a high standard and sufficient for all personnel, such that there shall be no overcrowding of rooms or shift usage of bunks. Bathroom and shower facilities shall be sufficient to easily accommodate all personnel.

Contractor shall provide separate office and living accommodation for each of the agreed number of Company On-Site Representatives.

Contractor is responsible for the provision on board of sufficient supplies of fresh food and drinking water and safety, sanitation and hygiene equipment, at all times.

M.3.4 Substitute vessel(s)

If the proposed and accepted vessel cannot be used to perform the Work, Contractor shall provide a substitute vessel. Such vessel shall be suitably equipped for the Work and subject to prior written approval by Company. Contractor shall bear all costs arising from such substitution.

M.4 Communications

Contractor shall provide sufficient communication equipment capable to maintain good quality communications between all Seismic Units within the Area (including land based positioning base stations and land transport vehicles) and between the Vessel, Contractor's shore base and Company's offices. The Vessel and Contractor's shore base shall be equipped with satellite telephone, telefax/modem facilities and Contractor shall maintain a 24 hour per day communication watch between the Vessel and the shore base.

Schedule 3, Appendix M1, source evaluation**RECOMMENDATIONS FOR THE EVALUATION OF A MARINE SEISMIC ENERGY SOURCE**

This is a set of general guidelines with respect to the evaluation of marine seismic sources. The purpose of these guidelines is to provide a framework for a test schedule that provides confidence in the data collected.

On request, Company can provide more detailed information (e.g. actual configurations to measure, hydrophone depth etc.) given the actual design, application and operational constraints.

In view of the number of measurements required to assess the array performance, the most likely system to measure the acoustic signals is to use a 'deep-tow' hydrophone. This hydrophone is to be positioned straight below the centre of the array at a considerable depth (i.e. 50 to 200 m depending upon the actual acquisition configuration) at 'acquisition' speed (e.g. 4 to 5 knots), requiring this capability of the measurement system (e.g. heavy, stream-lined weight and 'faired' cable). In addition to the hydrophone(s), a depth sensor or even a positioning system is recommended for online QC on the hydrophone position.

Tests of measurement system and tests of the marine seismic energy source:**1. Verification of integrity of the measurement equipment**

- (a) Cross-calibration of the far-field hydrophone is considered essential. Several options are open:
 - (i) The hydrophone can be cross-calibrated at Company's facilities (preferably prior to the field trials), provided it is of a similar shape as the REFTEK-17.
 - (ii) In situ calibration. Company can provide a hydrophone for this calibration if requested.
 - (iii) All tests should preferably be carried out using dual hydrophones, requiring this capability of your deep tow gear.

The following test-signals are to be recorded with the data (for deconvolution and calibration). At the same time, the actual integrity of the deep tow cabling can be verified by injecting these test-signals also into the far-field cable.

- (b) Impulse response verification of the instrument. The impulse-test should be carried out twice with impulses of 0.5 and 0.25 times the sampling rate chosen for recording. In addition, these impulses are to be synchronised (preferably to the actual firing of the guns; aim-point). To obtain an adequate signal/noise ratio, the amplitude of the impulse should be chosen around 90 % of the maximum input signal of the instrument under test.
- (c) Amplitude calibration of the instrument. The amplitude of the calibration signal (e.g. sine-wave with a frequency of around 30 Hz) is not so critical as long as it does not overdrive the system. The actual amplitude (RMS) should be verified using a volt-meter.

2. Verification of the proper performance of all the source elements

- (a) Before trying to measure any signature, try to establish the performance of the deep-tow gear: Determine approximate location and depth at constant vessel speed and change array-offset (or even vessel-speed) such that the hydrophone is positioned straight below the centre of the array (e.g. by using a positioning system or travel-time triangulation).
- (b) Establish single gun and cluster performance. Note that for evaluating the performance of single guns or clusters, the hydrophone depth could be chosen around 50 meter to improve the signal/noise ratio. In addition, we would like to have at least three shots recorded for each measured configuration. However, the significance of a measurement in combination with noise might force you to use higher multiplicity.

Note that after changing the measurement configuration, it might be required to release a few dummy shots (preferably with the same cycle time as the actual test and not recorded) in order to enable the guns and the controller to settle.

3. Verification of array performance

- (a) Adjust far-field hydrophone depth and sub-array offset such as to acquire realistic array signatures and check the measurement geometry (e.g. by travel times, hydrophone depth etc.). Note that the optimal depth is a function of the local water-depth (avoid reflection energy), the array layout, the vessel speed and the deep-tow performance. However, as a rule of thumb you can use the following rules for a 'normal' configuration:
 - (i) minimum hydrophone-depth: $20 * \text{source-depth}$.
 - (ii) minimum water-depth: $\text{hydrophone-depth} + 300 \text{ meter}$.

Decrease the firing rate of the guns in such a way as to avoid the guns from firing in the air released by the previous shot; i.e. the cycle time should be increased to compensate for the vessel sailing at reduced speed (see the example below).

- (i) array length: 20 meters
 - (ii) shot point interval: 25 meters
 - (iii) normal speed: 5 knots (results in a normal cycle time of around 10 s).
 - (iv) reduced speed: 2.5 knots to position deep-tow fish below the centre of the array (results in a cycle time for test of around 16 s).
- (b) Measure individual sub-arrays.
 - (c) Measure full array signature. Record a minimum of ten shots (preferably twenty-five shots or more) to enable a stability analysis.
 - (d) Measure gun drop-outs to set-up specifications. Measure all single gun dropouts and try to measure the most significant multi-gun drop-outs of each single sub-array. On request, Company can supply a measurement schedule. The full sub-array signature should be checked occasionally (e.g. every half hour) to establish that the measurement configuration is still adequate. Geometry should be checked occasionally (e.g. after turning).

4. Auxiliary information

Auxiliary information like location, weather, sea state, sailing direction, hydrophone position and depth, wind, etc., should be reported. Apart from the impact of gun-dropouts on the array, also the timing of the individual guns is considered essential (e.g. if the source is to be used for a high resolution programme).

Schedule 3, Appendix M2

SEG-Y tape transcription shall be in the format described in GEOPHYSICS Vol 40 no. 2 (April 1975) by Barry et.al. with the following modifications:

1. For post stack data as many lines as possible from one survey to be recorded on one tape, but lines shall not be split over different tapes. For pre-stack data as many Shot (or CDP) records from one Shot line (or Inline/Xline) to be recorded on one tape, but records shall not be split over different tapes.
2. Lines shall be separated by one E.O.F. mark.
3. At the end of each tape a double E.O.F. mark shall be written.
4. Data shall be written in floating point format. The first data sample shall always correspond to time = 0 ms.
5. Post stack data for loading onto a workstation shall be scaled to a RMS output level of 2000 per scaling gate.
6. Each file (line) shall contain one reel identification header of 3600 bytes length which is divided in two parts. The card image EBCDIC block (3200 bytes) and the binary coded block (400 bytes), separated by an IBG (Inter Block Gap).

At least the following information shall be annotated in the EBCDIC header :

- (a) Survey name, Project number, Processing Contractor
- (b) format version number and date
- (c) Acquisition details
- (d) Processing sequence
- (e) Polarity of data
- (f) Details of codes as used in the trace header words
- (g) Definition of Projection System used for coordinates, including
 - spheroid name
 - semi-major axis
 - inverse flattening
 - datum name
 - projection name
 - zone
 - central meridian
 - latitude at origin
 - longitude at origin
 - scale factor at origin
 - false easting
 - false northing
 - units used
- (h) CDP bin grid definition
- (i) Any other relevant information

At least the following information shall be annotated in the binary coded block header :

- Bytes 3205 - 3208 Numerical part of line number
- Bytes 3209 - 3212 Reel number

Bytes 3217 - 3218 Sample interval in microseconds
 Bytes 3221 3222 Number of samples per trace
 Bytes 3225 - 3226 Data sample format
 Code Format to be used is floating point format (code 1)
 Bytes 3229 - 3230 Trace sorting code :
 1 = as recorded (no sorting)
 3 = single fold continuous profile
 2 = CDP ensemble
 4 = horizontally stacked
 Bytes 3255 - 3256 Measurement system (1 = metres)

7. Trace identification headers shall be written as integer numbers.
8. Trace header information shall be complete and include at least the information as specified below. Agreed deviations shall be consistent for a file and shall be clearly specified in the EBCDIC header.
9. Static corrections are defined to be positive if the data samples in the trace record have to be shifted downwards, in the positive time direction; negative if the data samples have to be shifted upwards, in the negative time direction.

trace header format for marine data

from m byte	to byte	Note: A = required for post stack data, B = required for prestack data		Description
		A	B	
1	4	*		Trace sequence number within a line (first trace of each line is 1)
5	8	*	*	Trace sequence number for this tape (first trace of first line on tape is 1)
9	12		*	Original field record number (i.e. SP number)
13	16		*	Trace sequence number within the record
17	20			Not used
21	24	*	*	CDP ensemble number in the form LLLLXXXX, in which LLLL is line number and XXXX crossline number
25	28			Not used
29	30	*	*	Trace identification code (1 = seismic data, 2 = dead trace, 3 = dummy)
31	32			Not used
33	34	*	*	Number of horizontally stacked traces yielding this trace, e.g., for pre-stack data adjacent trace sum if any, and bin multiplicity for post stack data
35	36	*	*	Data use : 1 = production 2 = test
37	40		*	Distance from source point to receiver group
41	48			Not used
49	52		*	Source depth below actual sea level (a positive number)
53	56		*	Datum (actual sea level) elevation at receiver group (mean sea level = 0)
57	60		*	Datum (actual sea level) elevation at source (mean sea level = 0)
61	64		*	Water depth at source (relative to mean sea level)

65	68		*	Water depth at group (relative to mean sea level)
69	72		*	Not used
73	76		*	Source coordinate - X (easting)
77	80		*	Source coordinate - Y (northing)
81	84		*	Group coordinate - X (easting)
85	88		*	Group coordinate - Y (northing)
89	90	*	*	Coordinate units : 1 = meters, 2 = feet

from m byte	to byte	Note: A = required for post stack data, B = required for prestack data		
		A	B	Description

91	98			Not used
99	100		*	Source residual static correction
101	102		*	Group residual static correction
103	104		*	Total static applied (sum of source and group statics. Zero if not applied)
105	110			Not used
111	112	*	*	Mute time—start
113	114	*	*	Mute time—end
115	116	*	*	Number of samples in this trace
117	118	*	*	Sample interval for this trace in micro seconds
119	119		*	Sample number for first sample of RMS gate 1
120	120		*	Sample number for last sample of RMS gate 1
121	124		*	Trace RMS value in gate 1
125	125		*	Sample number for first sample of RMS gate 2
126	126		*	Sample number for last sample of RMS gate 2
127	130		*	Trace RMS value in gate 2
131	131		*	Sample number for first sample of RMS gate 3
132	132		*	Sample number for last sample of RMS gate 3
133	136		*	Trace RMS value in gate 3
137	137		*	Sample number for first sample of RMS gate 4
138	138		*	Sample number for last sample of RMS gate 4
139	142		*	Trace RMS value in gate 4
143	143		*	Sample number for first sample of RMS gate 5
144	144		*	Sample number for last sample of RMS gate 5
145	148		*	Trace RMS value in gate 5
149	149		*	Sample number for first sample of RMS gate 6
150	150		*	Sample number for last sample of RMS gate 6
151	154		*	Trace RMS value in gate 6
155	156			Not used
157	158		*	Year data recorded
159	160		*	Day of year
161	162		*	Hour of day (24 hour clock)

163	164		*	Minute of hour
165	166		*	Second of minute
167	168		*	Time basis code : 1 = local, 2 = GMT, 3 = other
169	180			Not used
181	182	*	*	Start time of data in ms
183	184	*	*	End time of data in ms
185	188	*	*	CDP-coordinate X (easting); actual value for pre-stack, bin center post-stack
189	192	*	*	CDP-coordinate Y (northing); actual for pre-stack, bin center post-stack

fro m byte	to byte	Note: A = required for post stack data, B = required for prestack data			
		A	B	Description	

193	194		*	Numerical part of sailed line number
195	196			Not used
197	198		*	Cable identification number (detail number system in EBCDIC header)
199	200		*	Source identification number (detail number system in EBCDIC header)
201	202		*	Source type (use codes to distinguish between different sources, sizes, etc., with details in EBCDIC header, including nominal source strength in bar-m)
203	204		*	Receiver instrument type (use codes to distinguish between different receiver/instrument types, with details in EBCDIC header)
205	206		*	Gun mask (for more than 16 guns, continue in bytes 217-218)
207	208		*	Sailed line sequence number
209	212		*	Contractors internal source point station number (if available)
213	216		*	Contractors internal receiver group station number (if available)
217	218		*	Gun mask continued for guns 17 through 32, otherwise unused
219	220		*	Gun correction to MSL (in ms)--using depth sensor and tide level data
221	222		*	Group correction to MSL (in ms)--using depth sensor and tide level data
223	224	*	*	Inline number after binning
225	226	*	*	Crossline number after binning
227	228		*	Boat identifier (for multi boat operations)
229	230			Not used
231	234		*	Not used
235	238		*	Depth of receiver group below actual sea level (a positive number)
239	240		*	Not used

Schedule 5: Surveying and positioning Work standards**M MARINE OPERATIONS****M.1 Objectives****M.1.1 Positioning objectives**

The objectives of positioning on the seismic survey are:

- (a) To navigate the vessel(s) safely, to navigate the "steered point" within the required navigation tolerance along the planned survey lines, and to achieve the required coverage criteria, whether 2D or 3D.
- (b) To determine:
 - (i) the centre of source and all receiver group coordinates for each seismic event, whether 2D or 3D.
 - (ii) to ensure any static equipment, associated with techniques such as sea bottom cable or telemetric buoy systems, is positioned within the required tolerance.
- (c) To determine these coordinates with the required positioning accuracy.
- (d) To correctly co-register these coordinates with the seismic records, i.e., establish an infallible method of correctly associating each seismic trace with its relevant source and receiver coordinates.
- (e) To deliver these coordinates, and all other relevant support data in the correct format to the right party.
- (f) To deliver all items within the time frame required.

M.1.2 Objectives of this article

The objective of this article is to set out the minimum requirements of all positioning aspects of marine seismic surveys, in order to meet the above survey objectives. It identifies:

- (a) Positioning objectives and standards
- (b) Contractor responsibilities
- (c) Company responsibilities
- (d) Guidelines with respect to the operation, calibration and maintenance of positioning systems
- (e) Positioning processing requirements
- (f) Positioning tolerances
- (g) Navigation tolerances
- (h) Line acceptance criteria
- (i) Deliverables
- (j) Delivery schedule

For terms and definitions of quality parameters, the following document shall apply. The statistical testing and quality assessment methodology described in this document is promoted by the Company.

Ref: "Guidelines for the use of Differential G.P.S. in Offshore Surveying", UKOOA Survey and Positioning Committee, September 1994.

When items in this article only apply to 3D surveys or to 2D surveys, this is indicated as (3D) or (2D).

M.2 Positioning standards

This section includes Company's specific requirements applicable for this survey.

M.2.1 Specific requirements for this survey

Differential GPS positioning shall be done utilising a dual system, one of which shall be a backup conventional long range system (based for example on satellite transmission of differentials).

Active DGPS or rGPS tailbuoy shall be utilised on all streamers, and at least one active DGPS or rGPS forebuoy shall be utilised in positioning the airgun strings and front ends of streamers.

Acoustic networks shall be installed and utilised at the front end, tailbuoy end, and at the centre of the streamers.

M.2.2 Line numbering

- (a) All line numbers shall be specified by Company before the start of the Survey.
- (b) No other line numbers shall appear on any tape cartridges, maps, logs or other relevant documentation submitted to Company in connection with the Survey.
- (c) The Contractor shall under no circumstances change specified line numbers. In case of dog-leg lines or reshoots the line name shall not be changed by the Contractor, but Contractor shall apply the specified shotpoint numbering.

M.2.3 Shotpoint numbering

Shotpoints are defined as the positions of firing a seismic energy source or where such a source should have been fired according to the specified acquisition parameters. The numbering of the shotpoints shall be as follows: (unless directed differently by Company)

- (a) The first shotpoint on every line shall be 100;
- (b) If a line has to be reshot, or has to be shot in two or more parts, the shotpoint numbers shall be increased by 10,000 over the original numbers for the first occurrence and by 20,000 for the second occurrence etc.
- (c) The shotpoint numbers shall be increased by 5000 for infill lines;
- (d) All parts of a line shall be shot in the same direction unless this is not feasible for operational reasons. In such cases the agreement of the Company's On-Site Representative should be obtained;
- (e) If the shotpoint numbering is not in sequence, then the line shall be terminated and be reshot as above.

M.2.4 Steered point

Company shall specify, in separate communication, how the vessel shall be steered. This will involve specification of a steered point, typically the midpoint for some shot-receiver pair. Contractor's Equipment shall accommodate this method of steering. In the absence of further communication from Company, the steered point shall be the shot-receiver midpoint for the source and receiver pair nearest to the vessel.

M.3 Responsibilities

M.3.1 Contractor responsibility

With due regard to the above positioning standards for this survey, it shall be the Contractor's responsibility to:

- (a) Design the set-up of positioning systems and other survey sensors, methods and techniques, that will meet the survey positioning objectives. This will include, but not necessary be limited to:
 - (i) a survey configuration (nominal offsets, positioning systems, survey sensors, a priori standard deviations)
 - (ii) quantity of backup equipment.
 - (iii) calibration frequency, methods and procedures.
 - (iv) real-time and post mission processing methods, on the basis of least squares estimation, and including sufficient statistical testing to demonstrate that all significant errors are detected.
 - (v) a description of all quality measures and controls relevant to the positioning processing.
- (b) Prove to Company that the proposed set-up is capable of achieving the required precision, and that sufficient redundant observations are available to ensure reliability in all nodes, taking into account realistic scenarios for equipment failure.
- (c) Make available for the survey acquisition and processing sufficient, suitable and qualified personnel.
- (d) Prior to commencement of the Mobilisation agree acceptance criteria with Company and prove to Company that proper procedures are in place to execute the work, to feedback appropriate diagnostic information to the relevant parties, and to ensure that these procedures are followed by all personnel.
- (e) Make available to Company or Company's On-Site Representative at any time during or after acquisition any information requested for the purpose of verification of Data quality, including the availability of a digital interface to Contractor's positioning systems and survey sensors as required.
- (f) Make available to Company or Company's On-Site Representative all positioning systems and data processing systems user manuals.
- (g) Make available onboard the vessel upon completion of the Mobilisation, all details regarding installation and calibration of positioning systems. This information shall be available to Company or Company's On-Site Representatives on request.
- (h) Obtain all necessary licences regarding frequency allocation, import/export and land use permits.

- (i) Optionally install additional control points for the positioning system(s) or optionally derive geodetic transformation parameters (to one meter accuracy) relating the local datum to the DGPS datum, based on the existing geodetic control, by using satellite or conventional land survey methods, and sufficient redundant observations. Geodetic control shall be observed such that it is referenced to the International Terrestrial Reference Frame (ITRF), at a defined epoch, to a decimetre-level accuracy. The position and nature of any extra control point installation shall be agreed between Company and Contractor prior to survey start. Contractor shall supply proposed methods to Company for approval before mobilisation of any geodetic control surveys. The resulting coordinates of new geodetic control points or derived local datum relationships shall be supplied to Company for approval prior to mobilisation of the seismic survey.
- (j) Prior to Mobilisation deliver to Company test positioning data tapes in specified final and raw data format.
- (k) Navigate the vessel(s) safely within the required navigation tolerance.
- (l) Acquire and process all Data correctly and efficiently according to the procedures and within the tolerances as set out elsewhere in this contract.
- (m) Deliver all products to the right party and within the time frame required.

Company reserves the right to require changes to any of the positioning systems and personnel proposed, and to furnish additional specifications and procedures if deemed necessary. Company will do so not later than two weeks after receipt of these proposals.

M.3.2 Company responsibility

It shall be the Company responsibility to :

- (a) Supply to Contractor geodetic parameters (geodetic datum, spheroid and mapping projection parameters), control station coordinates and station descriptions unless otherwise arranged with Contractor. If required Company shall assist Contractor to obtain additional geodetic algorithms required for coordinate transformations.
- (b) Supply to Contractor survey parameters, survey outline, definition of local grid system to be used for binning and any other information relevant to the survey, in order to enable the Contractor to design the survey set-up that will meet the survey accuracy requirements.
- (c) Assist Contractor to obtain supporting documents, maps or charts covering the Area, when these documents, maps or charts are not obtainable through the normal market channels.

M.4 Procedures

M.4.1 Operations

- (a) All positioning systems and survey sensors shall be operated, calibrated and maintained according to manufacturers and Company specifications, Contractor's written work procedures and good survey practice.
- (b) All positioning Data shall be co-registered with all other data in order to permit unambiguous correlation with seismic record data in both time and sequence number formats.

- (c) For dynamic towed sources and streamers all records for one position fix should be referred to the same instant in time (gun firing). The maximum mismatch between event time and actual measurement time, multiplied by the rate of change in that observation, shall be less than one fifth of the standard deviation for that observation. (Example: an observation has a rate of change of 2 units/sec, and an SD of 2 units. The maximum mismatch is therefore 0.2 seconds) For positioning systems with a lower update rate, de-skewing to the time of gun firing will need to be carried out by means of extrapolation or interpolation from a consecutive number of samples. Proof of correct de-skewing techniques will be required by Company.
- (d) For static equipment such as sea bottom cables and telemetric buoys, the positioning method shall preferably be such that all positioning fixing records for both source and final receiver locations are co-registered and referred to the same instant in time (gun or shot firing). In case this is not possible, then receiver positions shall be surveyed both before and after seismic acquisition.
- (e) Except for DGPS position observations (derived), no pre-processing, smoothing or filtering shall be applied to raw positioning observations before recording. All operator controllable filtering in the positioning equipment shall be disabled.

M.4.2 Data processing and quality control

Unless otherwise agreed by Company all positioning processing (both real time and any further post processing required) and co-registration with seismic records should be completed on board. Contractor will need to be in a position within the specified time of acquisition to prove to the Company's On-Site Representative that all positioning specifications have been met for a given line and that the preparation of both raw and final Data tapes has been finalised, and the content has been checked and verified.

- (a) The calculation of source and receiver group coordinates shall be based on least squares adjustment and include full statistical testing. The Company preferred processing approach is an integrated adjustment whereby all observations are processed in one integral network adjustment per event. Alternatively, processing can be based on sequential adjustment of partial networks.

Both 2D and 3D surveys require streamer and tailbuoy processing.

In the case of single buoy deployments, positioning operations will normally be carried out both on deployment and on recovery.

In the case of sea bottom cable deployments, two separate positioning operations will be involved:

- (i) Compute provisional receiver coordinates from deployment operation surface positioning.
 - (ii) Compute final receiver coordinates using acoustic network techniques, or other suitable underwater technique, including use of seismic first arrival times. Data from survey lines to either side of sea bottom cables will normally be required in order to ensure biases are minimised.
- (b) Deliverables shall include:
 - (i) Raw Data in Company specified Industry Standard Exchange format.

- (ii) Final Coordinate Data in Company specified Industry Standard Exchange format. When more than one source is present, the final coordinate data shall include non-active source positions.
 - (iii) (3D only) Coverage maps showing coverage for offset groups as specified elsewhere in this contract.
 - (iv) (2D only) Post-plot location maps for location (typically first CMP or source), and map scales specified by Company.
- (c) Lines which do not meet the required accuracy tolerances in real time, due to factors which are known, and known to be solvable by further processing (i.e. spikes and outliers), should be marked. Lines or line parts that do not meet the required tolerances due to unknown factors or equipment malfunction, should be rejected and reshot after the malfunction has been corrected.
- (d) Contractor shall demonstrate that the results from real time processing and further processing onboard or onshore are compatible.
- (e) All smoothing and filtering parameters applied and any changes to these parameters during real time or any required further processing shall be agreed with Company's On-Site Representative and shall be recorded for latter reporting by Contractor.
- (f) The Contractor shall demonstrate to the satisfaction of Company that only noise is filtered out and not real data.
- (g) Full records of the parameters of the basic set-up and any changes shall be maintained.
- (h) QC shall be the responsibility of the Contractor and shall form an integral part of the navigation and positioning processing.
- (i) If Contractor processing method is based on full integrated network adjustment of all observations per event, QC parameters shall be expressed in time series or as the average value (graphical or numeric) and standard deviation per line of :
- (i) Standard deviation of unit weight of fixes
 - (ii) Absolute error ellipses for selected CMP locations (precision).
 - (iii) The size of error for each observation type that can be detected by using the proposed testing method (i.e. internal reliability, marginally detectable errors).
 - (iv) The effect of undetected errors in the observations of the size of the marginally detectable error for each observation on the CMP coordinates. (i.e. external reliability)
 - (v) Results of statistical testing for each observation and/or observation type.
 - (vi) Result of statistical testing for whole network.
 - (vii) Shotpoint interval tests (time and distance)
 - (viii) Inline and crossline differences between planned and shot seismic line for the "steered point" (2D only).
- (j) For dynamic towed source and streamer spreads, if Contractor processing method is based on sequential adjustment of partial networks, the QC data shall be provided in graphical form wherever possible and time plots shall be used in

preference to histograms whenever the data allows. QC summaries shall be produced as a minimum for the following items:

- (i) Standard deviation of unit weight of fixes and observation residuals for :
 - vessel antenna positions
 - tail- and front- active buoys
 - front end acoustic network
 - tail end acoustic network
- (ii) Shotpoint interval tests (time and distance)
- (iii) Results of statistical testing for each observation and/or observation type.
- (iv) Result of statistical testing for whole network.
- (v) Compass corrections applied and/or biases determined after adjustment to tail buoy positions
- (vi) Compasses rejected
- (vii) Comparison of tail buoy positions with extrapolated streamer shape, i.e. rotation angle, misclosure in meters.
- (viii) Inline and crossline differences between planned and shot seismic line for the "steered point" (2D only).

The format of the summaries shall be time plots indicating the maximum, the minimum and the average value per line or part line along the vertical axis and line number in chronological order along the horizontal axis.

- (k) In the case of static sea bottom or telemetric buoy equipment, QC summaries shall include the following:
 - (i) Standard deviation of unit weight of fixes and observation residuals for vessel antenna positions and sea bottom cable receiver positions
 - (ii) Shotpoint interval tests (distance, and time if appropriate)
 - (iii) Comparison of provisional and final as-laid receiver positions (sea bottom cables)
 - (iv) Comparison of positions at deployment and at retrieval (single telemetric buoys)
 - (v) Inline and crossline differences between planned and as-laid receiver lines, and as-shot source lines.
- (l) QC data shall be made available to Company on request for inspection during real time and any further processing for each seismic line, tape or survey.
- (m) Further checklists for quality parameters and diagnostics are available from Company on request.

M.5 Tolerances

M.5.1 Positioning tolerance

- (a) The survey configuration shall be designed such that the predicted coordinate precision for any node (such as the centres of sources, shotpoint position, steering point position, or receiver positions) shall be not greater than eight (8) meters

(semi-major axis of standard (one sigma) error ellipse). Each shot shall be fired at its planned position within this tolerance.

- (b) The survey network shall contain sufficient redundant observations to enable biases to be detected to an adequate level. The redundancy shall be evenly spread, such that the network contains no uncontrolled observations. (A well controlled network will have at least 30 % redundant observations in the design network). If the processing method is based on phased adjustments of sub-networks, this redundancy requirement shall apply to each sub-network. The strength of all networks shall be expressed by the Marginally Detectable Errors (MDE's).

M.5.2 Navigation tolerance

M.5.2.1 Navigation tolerance applicable in 2D surveys

- (a) The tolerance for each shotpoint interval is 3 meters (deviation from planned), based on smoothed positions.
- (b) The mean shotpoint interval for all shots on the line shall not vary by more than 1 % from the planned shotpoint interval.
- (c) The navigation cross line tolerance for keeping the steering point on the pre-planned survey is 10 meters.
- (d) If re-alignment of pre-planned lines is required for operational reasons, Contractor shall seek advice of Company at least 24 hours before planned shooting.

M.5.2.2 Navigation tolerance applicable in 3D surveys

- (a) The tolerance for each shotpoint interval is 3 meters (deviation from planned), based on smoothed positions.
- (b) The navigation shall be such that bin coverage criteria (as defined elsewhere in the contract) are met in a manner that keeps infill shooting to a minimum, and can be so demonstrated by Contractor's onboard binning system.
- (c) If re-alignment of binning grid is required for operational reasons, Contractor shall seek advice of Company at least 24 hours before planned shooting.
- (d) Contractor is to prove before commencement of acquisition to Company's On-Site Representative that antenna, source and receiver group configuration in conjunction with proposed start and end of line coordinates and firing sequence will satisfy the proposed bin coverage criteria.

M.5.2.3 Tolerances applicable for positioning of static equipment

- (a) In case single shot or telemetric buoy receiver locations are marked then their actual set out positions shall not deviate more than 10m from their programmed positions.
- (b) Contractor shall re-survey the shot (if marked) and receiver locations prior to recovery of the receivers and marker buoys in order to verify that they have remained on station.
- (c) Sea bottom cables shall be deployed such that as-laid receiver positions satisfy the tolerances of the type of survey involved (2D or 3D), in respect of cross line tolerance, receiver interval tolerance, and bin coverage criteria.

- (d) Contractor shall verify the position of the cable if the bottom cable (section) remains on the sea bottom in excess of 24 hours and significant wave heights have exceeded 1.5 meter or currents have exceeded 2.5 knots during that period.

M.5.3 Line acceptance criteria

- (a) Contractor shall not start a Line, when the required accuracy cannot be met.
- (b) Contractor shall reject a Line (or part of a Line), when for more than 8 consecutive events, positioning or navigation tolerances are exceeded.
- (c) Contractor shall reject a Line (or part of a Line) if for more than 5 % out of 200 adjacent events, positioning or navigation tolerances are exceeded.

M.6 Delivery Schedule

M.6.1 Deliverables

Contractor shall deliver to Company:

- (a) A final acquisition and processing report, covering:
 - (i) geodetic parameters including coordinate lists and descriptions of all control stations used
 - (ii) survey definition including full definition of local grid system used for binning (Bin Grid Definition) with respect to geodetic coordinate system
 - (iii) spread definitions (streamer dimensions, offsets and laybacks), together with dates and times of any changes
 - (iv) all installation and calibration details
 - (v) equipment performance and problems encountered
 - (vi) daily operations log
 - (vii) comments on Data quality
 - (viii) a brief description of the processing method
 - (ix) breakdown of elapse time of the processing steps, and explanation of any delays incurred
 - (x) any problems encountered in processing including sample outputs (time series plots)
 - (xi) names of personnel, both navigators and processing personnel
 - (xii) hardware and software details (including version number for software)
 - (xiii) recommendations
- (b) The following deliverables shall be produced:
 - (i) Raw Data on tapes(s) or other agreed magnetic medium in Industry Standard Exchange format (UKOOA P2/94). Note that all nominal offset data shall be relative to the vessel reference point, shall be expressed as relative rectangular coordinates, and shall be defined with the aid of diagrams in plan and elevation. Company preference is to have raw DGPS data logged in addition to derived DGPS positions. Reference: U.K.O.O.A. P2/94 Exchange Format for Raw Marine Positioning Data, Version September 1994, prepared by

UKOOA Survey and Positioning Committee for the U.K.O.O.A. Exploration Committee. (Refer to original UKOOA document).

- (ii) For dynamic towed source and streamer configurations - final coordinate data on tape(s) or other agreed magnetic medium in Industry Standard Exchange format (UKOOA P1/90). When more than one source is present, the final coordinate data shall include non-active source positions. For 2D surveys, the final coordinate data shall also include point coordinates. Reference: U.K.O.O.A. P1/90 Post Plot Data Exchange Tape 1990 Format Version 28th June 1990, prepared by the Surveying and Positioning Committee for the U.K.O.O.A. Exploration Committee. (Refer to original UKOOA document).

M.6.2 Delivery Schedule

Contractor shall deliver according to the following schedule:

With Tender Documents:

Positioning system proposal
Positioning processing proposal
List of key personnel and CV's

Prior To Mobilisation:

Number of weeks prior:

Geodetic control survey report	
Calibration reports	
Copies of signed checklists for positioning system station coordinates and coordinate system parameter entries	
Raw and final Data tapes for testing purposes	

After Line acquisition

Number of hours after:

Raw positioning Data	
Final coordinate Data	
Processing QC summaries	

After survey completion:

Number of weeks after:

Final acquisition and processing report	
(3D only) bin coverage maps	
(2D only) shotpoint location maps	

Company shall deliver according to the following schedule:

With tender documents:

Survey outline, size of survey, distances to possible shore locations, any further information regarding known local conditions to enable Contractor to prepare full proposal.
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Prior to mobilisation:	Number of weeks prior:
Geodetic parameters (datum, spheroid and projection parameters--refer to Schedule 5, Appendix G1)	
Control station information (coordinates and station descriptions)	
Survey parameters (survey outline, definition of local grid system)	
Maps or charts covering the survey area, when these are not obtainable through the normal market channels	

M.7 Performance Monitoring

- (a) The Contractor shall report to Company in writing any significant findings or problems immediately as and when they occur. During acquisition, and post mission processing onboard the Contractor shall report in writing on progress made and estimated completion dates. This shall be done at least once per week.
- (b) The Company shall monitor performance during the survey, and feedback to Contractor in writing any action regarded as non conformance to this contract.

M.8 Audit compliance

The Company will, in conjunction with the Contractor, establish a schedule of audits, to ensure compliance with agreed procedures. This schedule of audits could for example contain an initial technical audit, to ensure that the requirements are fulfilled, and follow up systems audits at a practical interval thereafter. A member of the Contractor's central or regional technical management shall be part of the audit team. Contractor shall have established procedures to follow up audit findings, as well as error reports emerging while processing the Data.

