

Bourbon Dolphin: Public Hearings Process

Public Hearings of September 25 to 27, 2007 in Oslo (Trident)

- **Witness No. 2 took the stand:**

Name: Sean Christopher Johnson
Date of birth: 22 April 1959
Post: Marine Superintendent, Trident
Address: Aberdeen, Scotland

Johnson testified that he went to sea in 1977. He took his deck officer's certificate as second officer in 1980, as first officer in 1982 and his Master's certificate in 1987. He then began offshore, first as bargemaster on semi-submersible rigs in New Zealand and later as chief officer and then master on an anchor-handling vessel in Australia. He also worked a period as port captain in Australia. From 2000 until the present he had been working for Trident Offshore. Trident is a maritime consultancy that offers services to the offshore industry. They have a marine department consisting of experienced people with a marine background from the offshore industry, and a technical department consisting of naval architects who inter alia perform mooring analyses, plus a service division. Trident has between 25 and 30 permanent employees, plus about 50 who work on a consultancy basis. Johnson's duties were to liaise with clients and rig owners, to participate in the preparation of rig move procedures, brief vessels before operations etc. The client in this case was Chevron, but Trident also has a contract with Transocean. In response to a question whether he regarded the operation and its planning as a joint project between Trident, Transocean and Chevron, Johnson testified that in many ways they had a rig move team consisting of himself, the naval architect in Trident, the rig manager, the marine representative (Macklin) and in other cases instead a drilling engineer. Of the vessels involved in the operation, Johnson knew the "Olympic Hercules", the "Vidar Viking" and the "Highland Valour" from before. He had also been aboard the "Olympic Hercules" previously in connection with a rig move off Rotterdam in December 2005. He had worked with the "Transocean Rather" since they came to Scotland. He was involved in moving it from Angola, via the Canaries, to Invergordon. The "Transocean Rather" was first hired by British Petroleum (BP), and Johnson was then involved in the planning and choice of towmasters. He had also worked with the sister rig, the "Transocean Richardson". He had once been on board the rig when it was in Invergordon.

Johnson's experience with deep-water operation derived first from jobs as master and chief deck officer on two anchor-handling vessels off the coast of the Philippines, where the water depth was about 4500 feet [about 1500 metres]. The vessels had bollard pulls of 130 and 120 tonnes respectively, and there was strong current in the area. For Trident he had been towmaster on eleven deep-water operations, all in the Eastern Mediterranean. Johnson testified that he had participated in planning the move of the "Transocean Rather" from Invergordon to Location G, and also briefed the vessels that participated. After mooring at Location G they commenced the preparations for the move from Location G to Location I. They gained some experience from the G move that they incorporated into the planning of the next move, inter alia the chasing system did not work, so that they had to use J-hooks. During the deployment of anchors at Location I, there were also problems with the winches on the rig, which did not tolerate the mooring weights on the rig end. The rig move was delayed several times. It looked as if the rig was ready to be moved in January, and they had a "recap" meeting on 22 December 2006 at which they discussed all the factors surrounding the rig move. After Christmas they held a new meeting at which status was discussed, and

before the move they held yet another couple of meetings. Then they made a plan for hire and choice of vessel. Internally in Trident he worked particularly with Martin Kobiela (the technical manager). They were both involved in writing of the plan and had meetings with the client. They held "wash-up meetings" with the two towmasters from the move to Location G. These were not the same towmasters as had been on the rig move in March/April 2007.

Johnson could not remember when he signed the rig move procedures, but normally they are not signed until just before the rig move. Normally it takes 5-7 working days from when the procedures are signed until when the rig move begins.

Johnson was shown pp. 6 to 8 of the rig move procedures and he was asked whether Trident had any of the roles described there. He testified that Trident's personnel filled the posts as Chevron marine representative, towmaster and rig positioning supervisor. The Commission put questions as to whether the work of inspecting vessels was apparent from the procedures, and Johnson then testified that it was not apparent from the actual procedures but that section 4 of the procedures concerned briefing of the vessels, which he performed. Johnson inspected the vessels on behalf of both Chevron and Transocean, since both were interested in the condition of the vessels. They had a negative reporting system, so that the client only received feedback if something was wrong with the vessels that meant that they ought not to charter them. In response to questions about what grounds he could envisage for not hiring a vessel. Johnson testified that he himself had been a master for many years, and one forms an impression of the vessel's condition quite quickly. He starts by looking at details such as whether the vessel is moored correctly, whether the gangway is secured with a net, whether the evacuation routes are unimpeded and so forth. Before one reaches the wheelhouse, one can form a certain impression of the vessel's condition, and then one gets a better impression from talking to the crew.

In the pool of towmasters in Trident they have about 15 senior towmasters who would be considered for such a move. All of them have long experience from the offshore industry. Almost all have worked on rigs, been OIMs, barge managers, and undertaken a large number of rig moves. Many have also worked as ship's masters. The towmasters are not certified, but one looks at their CVs, previous rig moves and general experience before compiling the approved list of Trident towmasters. Transocean is also part of the selection process, and both Transocean and Chevron can refuse to use one of the towmasters proposed by Trident. The list of towmasters who were to move the "Transocean Rather" had been submitted to Transocean in advance.

Johnson also received questions about the reason why Trident should supply the marine representative. Johnson then testified that the reason was to simplify everything and cut back on manning of the rig. It was therefore decided that two individuals, who were both qualified as senior towmasters, should play both roles. They were to work with the bargemaster. The philosophy behind this was that Trident has an independent role without commercial interests, so that commercial conflicts do not so easily arise. The double-role system has been practised for many years and has not created any problems. Asked whether it had not happened that conflicts arose between the rig owner and the operator, Johnson replied that he was not aware that any such conflicts had arisen. Johnson testified further that these individuals had the same background and were to accomplish the same objective, namely to move the rig in a safe manner, so that conflicts of interest should not easily arise. To questions from the Commission whether one does not lose a safety barrier if the same person plays two roles, Johnson answered in the negative and testified that there were still two individuals so that they could talk to one another, and there were also other people on the rig with whom they could discuss.

Johnson received questions about the responsibility for communicating the content of the rig move procedures to affected parties during the operation. About this he testified that the rig

is involved in an early stage of the planning and that the Transocean rig manager distributes the documents to the rig and to shore, while Chevron got its documents from Trident. It was Johnson himself who gave the rig move procedures and associated annexes to the secretaries of Macklin, Brown and the towmasters. The vessels received the rig move procedures from him personally at the briefing.

Asked by the Commission whether he was involved in the choice of technical solutions in 2005, Johnson answered in the negative. It was the same mooring system that was used for Location G and Location I, modified with extension chain in relation to the rig's chain. Johnson was not aware of the extent to which recovery/ deployment analyses were performed in 2005. It was Chevron that acquired the mooring system in question, through its supplier, and Johnson did not know when it was acquired.

Asked whether pre-installation of the mooring system was considered, Johnson replied that he was not involved in that assessment, and referred to the witness Martin Kobiela.

Johnson testified that he was aware of the guidelines for anchor-handling for the North-West European Area (NWEA). He was aware that the guidelines contained provisions about risk assessments and that it was stated there that the operator, rig owner and vessel had to perform risk assessments. Asked whether the guidelines make requirements for weather criteria, Johnson replied that Chevron and Transocean had their own guidelines for weather criteria, whereas Trident's procedures did not contain weather criteria. They nevertheless carried out the operations in conformity with the weather criteria in the guidelines for the North-West European Area (NWEA).

3Johnson was asked to what extent risk assessments underlay the preparation of the rig move procedures. On this he testified that the entire planning process was a continuous risk assessment and that all risks were accounted for in the procedures. Asked whether the procedures took account of the forces to which vessels could be exposed, Johnson testified that the process included the loads that the vessels could handle, but did not include an evaluation of the vessels' stability. That was a task for the shipping company and the vessel's master at the time. Stability was not a foreseeable risk for the operator and the rig that could be taken into account during the planning. The shipping company was to meet the criteria enshrined in the guidelines for anchor-handling for the North-West European Area, which Bourbon Offshore did. In addition, the crew had to have qualifications in conformity with the STCW Convention, which was also satisfied. Next, the vessel had to have a certified safety management system in conformity with the ISM Code, which was also fulfilled by Bourbon Dolphin. All general criteria were thereby satisfied by Bourbon Dolphin. Asked whether all known risks had been identified, Johnson replied that they identified all risks that they knew from experience a rig move could be exposed to. Johnson testified further that he was not aware of previous cases in which an anchor-handling vessel had capsized in connection with the move of a semi-submersible rig. Such a scenario was not foreseeable, according to Johnson.

Asked whether risk assessments were obtained from the vessels, Johnson replied in the negative. He assumed that the vessels had prepared risk assessments, which they indeed did. Usually risk assessments cover how one handles chain on deck and similar. On the basis of the rig move procedures the vessels can perform their risk assessments and calculations and they can also get technical support from the shipping company. The procedures identified weights and forces, and it was up to the vessels to evaluate what effect these would have on them.

Johnson was shown p. 23 of the rig move procedures discussing weather conditions with associated weather forces, and it was stated that in head sea, one could reach 10.9 tonnes total loading. Asked whether current against chain was included in this figure, Johnson

testified that the Commission would have to ask Martin Kobiela about the details, but that as far as he knew the table contained wind and current loads. The Commission referred to the fact that, according to the table, lateral sea reaches 48.8 tonnes. The Commission asked how great a bollard pull was necessary in a head sea where one has 10,9 tonnes of static forces in addition to the 196 tonnes that one gets merely from holding the mooring lines. The Commission referred to the fact that the weight of the chain and wire alone was calculated at 196 tonnes, according to the rig move procedures. Johnson did not, however, agree with this and testified that the 196 tonnes was the weight exerted on the vessel. Johnson noted that 262 tonnes was tension, whereas bollard pull was 196 tonnes. Asked whether wind and current was included in this figure, Johnson replied in the negative, and that 196 tonnes was static load. The Commission then asked whether 196 tonnes was not then the weight that was necessary merely to hold for the vessel in position, and then asked how much bollard pull was necessary for the vessel to be able to hold the weight of chain and wire, plus static forces. Johnson then referred to recovery of anchors, Stage 1. Johnson testified that he discussed this with Captain Reiersen. As regards the bollard pull of 196 tonnes static forces, Johnson referred to the curves for Stage 1 in Appendix 1 on pp. 55/56 of the rig move procedures.

When he talked to the master he showed him this curve and explained it to him. This is an alternative task that might be relevant, but that was not necessary. The information in the curves is set up for the sake of the towmasters. The weight of the vessels was therefore much lower in recovery of anchors, because the chain could lie on the seabed and not much bollard pull was required for recovery. The vessels did not, therefore, have any high requirement for bollard pull in this stage. It was of no significance that the chain was dragged along the seabed. Johnson also explained Stage 3 of the recovery of anchors, see p. 58 of the procedures, to Reiersen, where he (Johnson) thinks the load was 136 tonnes, which was the maximum bollard pull that Johnson expected during the mooring recovery method.

Johnson was shown Stage 5, see p. 68 of the procedures, where 180 tonnes bollard pull came from. In this stage the bolster clearance is not an issue, and the size of the bollard pull becomes very important for the vessels in this stage. Here the bollard pull shows 160 tonnes. They try to stretch the curve like this and deploy the anchors on the seabed with a good tension so that the rig does not need to take up so much wire to tension the mooring system. This is the very core of the plan. During recovery, bollard pull loads can be kept to a minimum as long as the bolster clearance is maintained. In deployment it is important that the anchors come out to a correct position and it is important that power is maintained in this stage. This was explained carefully to the vessels.

The Commission posed further questions about whether a reduction in bollard pull could be expected due to power extraction from the shaft generator. Johnson confirmed that there would be a reduction, but how big the reduction would be, would depend on what the vessel was being used for and whether the thrusters were in use. On deployment of anchors, one would not expect much use of thrusters. They would operate 2.5 to 3 knots in this stage. Johnson testified further that the curves did not include various kinds of weather conditions. He testified that one had to take the weather forces into account, and that the boat master had a right and duty to halt the operation if there was a danger to life and health. The Commission asked again what dynamic forces could be expected and how big the reduction in bollard pull for the vessels would be, and Johnson replied that the shipping company would be able to answer that.

Johnson was shown p. 25 of the presentation prepared by Trident, Transocean and Chevron [dated 11 September 2007], which recommended a winch capacity of 400 tonnes for the vessels. He then testified that the figure was a "baredrum" number. For each winch, geometry makes a certain difference, and 400 tonnes is a base figure. One must then look at the vessels' own loadings. Modern anchor-handling vessels have wide winch drums that

enable them to retain capacity of 400 tonnes. If one has a winch capacity of 400 tonnes, one can handle the stated tension throughout the operation. Johnson testified further that the winches of the "Transocean Rather" could withstand 270 tonnes. The problems that arose were not with the winch load, but with the dynamic braking system of the winches. On the first rig move, they burnt out a set of disc brakes when they were running out wire, which led to the operation being stopped.

Johnson was then questioned about what responsibility he had for selection of the vessels. He testified that the selection was an important part of the job and that they were looking for vessels with at least 180 tonnes bollard pull, 400 tonnes winch capacity, the necessary chain capacity, and vessels with sufficient area for work on deck. The shipbrokers chosen, Stewart, were asked to look for vessels that satisfied these basic criteria. The vessels come and go all the time, so that the list is concurrently updated. When the rig move approaches, the number of available vessels is limited, so that the list becomes shorter. There is then a discussion process in which they get feedback from the brokers as to which vessels are available, and Johnson then advises Macklin in Chevron on choice of vessel. He did not remember exactly when the vessels were hired.

Johnson was also asked whether he evaluated the vessels' qualities when he was on board. He testified in reply that the assessment process begins when he came to the port. He went round on the vessels and looked at factors that he described earlier in his testimony. He dealt with the experience and qualifications of the crew while he was talking to them. He listened to what Captain Reiersen had to say, and Reiersen asked sensible questions that showed that he understood what was to happen during the operation. He said that the vessel had a valid safety management system and that the shipping company's document of compliance was valid; he also noted that both certificates had been issued by a reputable classification society, DNV. Over and above that he did not discuss the safety management system.

Asked whether Trident had written systems to verify the work done, Johnson testified that all jobs are given a unique number and all information on a specific job will be linked to the relevant job number. Trident has a QA process in which procedures are reviewed, in this case by A. Holt. It is then the technical division that is responsible for the QA work. Trident's QA system is audited by an independent body, QMS (Scotland), which has issued an ISO 9001 certificate to Trident. The system is primarily a document control system, and not a system for control of the contents of the documents. The content of a document is subject to internal control by the person named in the checklist. The QA system does not include procedures for what is to be checked with regard to the content of a document. The rig move procedures contain different parts. They do not have standard rig move procedures divided into fixed sections.

To questions about how they ensured that there were no errors in the calculations, Johnson testified that all the work was checked by another person with the same background and qualifications as the one who had prepared the calculations. It is thus a naval architect who controls the weight calculations and so forth. The Commission referred to Revisions 00 and 01 and asked why there was no signature in the check. He testified that it was because this was a draft that was to be reviewed by Chevron and Transocean, and as a rule they make comments. When the document comes back, a final version is created on the basis of the incoming comments, but no one checks the internal version.

Johnson confirmed that he was present at the wash-up meeting on 31 October 2006. There was also a meeting on 22 December and another in January, plus some informal meetings. He does not remember who participated in the meetings in question. The agenda for wash-up meetings varies and is proposed by the person calling the meeting. At a wash-up meeting they take the latest version of the rig move procedures, plus the post-rig move report from

the previous rig move. The main topic of the wash-up meetings was that they had to use two vessels, plus the problems with the rig's chasing collars. They planned the next move and discussed whether they should recover all the anchors back to the rig and take off the extra chain length and tow the rig. They ended up by choosing a solution whereby they suspended the recovery of the anchors instead of recovering all of them. Minutes were kept of the meeting, which he thinks Macklin had called, but he was not sure who kept them.

Johnson testified further that he had been in Transocean's emergency response room a few days after the accident, and there was a meeting about recovery of anchor no. 2 and replacement of the wire on no. 3. He did not recall whether there was a specific wash-up meeting after the accident, but it was a rather hectic period with many discussions about various topics. He himself participated in the deployment of mooring no. 2 and the recovery and deployment of mooring no. 3. Totally new procedures for these operations came, but the method was the same as in the original procedures. There were no corrected analyses prior to the new procedures, as far as he could remember.

Asked whether there were routines in Trident for systematising experiential data, Johnson testified that everything was systematised through the job numbers, and also that a post-rig move report was prepared. These reports deal inter alia with the causes of delays, lessons learnt and recommendations for future operations. They also talk to the towmasters and obtain information about their experience with the rig move, and are then also given feedback as to whether the weights had been correctly estimated. The calculations are normally rather conservative estimates, so that the real weights are actually smaller. Nevertheless, they do not adjust the calculations even if the weights are in reality smaller, because then they get a safety margin in the operation. Asked whether experience from previous moves is used for identification of HAZOP/ HAZARD and establishing of risk assessments, Johnson testified that they note the weights observed both by the rig and the vessel during deployment of anchors, so that they can watch and make sure that the weights are not too high. They observe bolster clearance, the wire that runs out from the rig, and then check the rig's position and adjust it if necessary. Then the vessels pay out wire and they get the anchors into the correct positions.

Johnson testified further that they had no exact positioning of the anchors. Mooring analyses had to make room for how much wire was out, and the anchors were to be deployed with a radius of 50 metres. When they worked with the "Transocean Richardson" off Côte d'Ivoire, where the water depth was about 1600 metres, they used anchor tracking devices and discovered that they overshot the planned position of the anchors by between 50 and 100 metres in the early deployments stage (overextension by 50-100 metres).

Johnson then received questions about what was said at the briefing regarding the role to be assigned to the "Bourbon Dolphin". Johnson testified that Captain Reiersen, the Chief Deck Officer, and probably the First Deck Officer, participated, and that the vessel had just come in from another rig move. They reviewed the rig move procedures at the meeting. There is usually no point in reviewing all the text of the procedures. He did, however, review the introduction and general elements. They discussed the drawings that were appended to the procedures and then looked more closely at the mooring system, the rig system, wire etc. They also looked at the seabed conditions, obstacles, and what the procedures meant for the vessels.

Originally anchors 2 and 6 were to be recovered first. The vessel was to remove the chain extensions and go back to the rig with chain and chasing pennant. The "Dolphin" was to assist the "Olympic Hercules" in grappling, for they had experienced earlier with the rig that the anchors were difficult to recover from the seabed, which demanded a lot of power. The "Hercules" chased out the anchor and then the "Dolphin" came up from astern and lifted the chain up so that the anchor came up. He spent a long time explaining to Reiersen the

problems this could involve in deep water, and that it could cause considerable delays if they do not get the anchor up immediately. He told Reiersen that he must not break the anchor out until he was sure that the position was correct and the towmaster had confirmed this. It was always the plan that the "Dolphin" was to deploy the primary anchor and the "Dolphin" was also made explicitly aware that changes might be made along the way, which was also the reason why Johnson went so carefully through both recovery and deployment of anchors. The briefing that was given to Reiersen was the same as was given to the other vessels. To questions about what category [A-E] the "Dolphin" was allocated to, Johnson replied C. There were no objections from Reiersen to the briefing. The vessel had 2300 metres of work wire that was intended for deploying and recovering anchors, and the capacity to deploy and recover anchors, which it was always the plan that the "Dolphin" should do. Asked whether it was the intention that the "Dolphin" should assist the "Olympic Hercules", Johnson testified that all the vessels at some point would be assisting vessel and hold the chain up to take the weight. All the vessels were given grappels and J-hooks. The main difference, indeed, was that the "Olympic Hercules" and the "Highland Valour" were given a spare 940 chain extension, but all were given 2300 metres of work wire, specifically in order to deploy and recover anchors. The Commission referred to Reiersen's testimony in which he said he was only supposed to assist. Johnson disagreed with Reiersen's presentation and considered that it was clear from the rig move procedures that the "Dolphin" was to deploy and recover anchors, and that this was communicated to Reiersen at the briefing.

In response to a question as to whether the vessels were asked whether they had prepared risk assessments, Johnson testified that they had just gotten the procedure at the briefing, so he did not expect them to have prepared risk assessments at that point. It was something he expected they would do after having reviewed the plan with the crew. As far as Johnson was aware, the operator did nothing to assure himself that the vessels had performed risk assessments. Johnson was asked whether it was anywhere stated in the rig move procedures what a vessel was to do if it did not succeed in holding to the line. He referred to the fact that the rig move procedures did not contain instructions about what was to be done in such cases; this was because the vessel's position was only of significance when one comes to the stage in which the anchor itself is to be deployed. Whether the vessels are off line before this does not matter anyway, unless the vessel approaches an anchor that has already been deployed. When this happened on 12 April, the towmaster told them to get away from anchor no. 3. Asked what the consequences would be for the rig if the "Dolphin" had drifted over anchor no. 3, Johnson testified that it could have caused the anchor to sustain damage, but that it would not have been catastrophic for the rig. In any case the anchor would probably have to be recovered and deployed anew. He himself had never experienced such an off-line as that on 12 April. He had never seen another vessel come close to another anchor or cross another anchor line. In Johnson's opinion, therefore, it was not possible to foresee such a situation.

Johnson thinks that the vessels made a manoeuvring error, an error he himself had made previously. He testified that the rig was static at that point, moored with 6-7 anchors. The vessels had gotten off line and tried to come back to it. The "Dolphin" had the towing pin raised, with the wire/chain up against it. He thinks that the "Dolphin" had tried to twist the weight against the rig, and the more power the vessel had used to turn, the more power it had given against the rig, and so the situation was locked. They probably tried to get the vessel towards the centreline, but the wire was dragging the vessel in the opposite direction. Johnson was asked what measures were planned if a vessel was using all its thruster capacity to stay on the line, but was nevertheless not succeeding in keeping the line. He replied that if he had been the master of the "Dolphin" he would have told the rig that they had to stop the operation. They should have reduced power and started again. Himself, he would not have started by running out from the line given the current conditions that day, but rather have started off bearing and then fallen in against the line when the anchor was to be deployed. It was therefore not a good idea to begin the operation on line, as they did.

Johnson was aware that the "Olympic Hercules" had also been in the same situation as the "Dolphin". He thinks that the "Hercules" was in the same situation, but then the anchor was in the water and he had support from chasing pins. He thinks the work wire came against the towing pins. The moment the ship gets wire or forces against the towing pin, which is located just above the rudder, the vessel is caught and one pulls in the same direction as oneself.

After the Commission was finished with its questions, Attorney Lund Mathisen asked questions about the degree to which current data had been obtained and incorporated into the rig move plan. Johnson then testified that current data was used in mooring analyses and included in dynamic calculations. To questions about whether specific current speeds or directions had been taken into account, he replied that many ocean currents have a fixed direction, and he thinks that the current there runs north-east. Very rarely does it exceed 2 knots, usually it ranged between 1.2 and 1.5 knots, and was thereby not very strong. Johnson was not aware that any particular current limitation was imposed on the vessels, and 12 April the current strength was between 1.2 and 1.5 knots.

Johnson was shown p. 30 of the rig move procedures, and answered questions from Lund Mathisen about whether there was any special action that could be taken if a vessel lost hold of the chain and the other vessel got all the force. Johnson testified that there were several tandem operations that happened along the way. There is a situation in which the chain extensions have been deployed over board and the weight will then be 120 tonnes. Apart from that there is not much vertical load. To get the anchor over board a force of 27 tonnes is required. If the other the vessel had lost hold, the tension would increase to about 110 tonnes, and he did not regard this as a big problem. Lund Mathisen also asked whether Johnson was aware that the "Dolphin" had asked the rig to run out wire. He was aware of that, but it was not possible at that point in time. The rig had done the transition to wire and this was right across the deck, and if they were to have run out wire, the disc brakes would have failed and only a few hundred metres of wire could have come out, which would not have helped the vessel particularly. Moreover, it would have subjected the vessel to even greater forces if the rig had paid out more wire, and made the situation worse. The situation when the rig fed out wire for the "Olympic Hercules" was different. Then the anchor had gone over board, the "Vidar Viking" had succeeded in grappling, and the anchor was ready to be run out. The operation had been suspended so that the "Hercules" could get back to the line. This was possible because the "Vidar Viking" was holding up the chain. It was thus not in the same stage as the "Dolphin" was in. Asked by Lund Mathisen why the "Highland Valour" could not make more grappling attempts, Johnson testified that it was because the towmasters were not sure whether they wanted to grapple anchor no. 2 or no. 3.

To further questions from Lund Mathisen about how long time the briefing of Reiersen took, Johnson replied about an hour. They talked about bollard pull and Reiersen had an explanation about the 196 tonnes in Stage 1, which he was satisfied with. Then they went through the rest of the mooring deployment stages and there was bollard pull of 160 tonnes there. No question was raised by the vessels as to whether the "Dolphin" had sufficient bollard pull, and Johnson left the briefing with a feeling that they had understood what the operation was all about. Moreover, the "Dolphin" took on board two anchors and deployed them without problems, so bollard pull was not a problem. Asked by Lund Mathisen how Johnson briefed the towmasters, he testified that he spoke on the phone to Ross Watson and gave him a status rapport. He spoke to Sapsford when he came to the rig, and also several times during the operation. He also talked to the third towmaster, Harvey Wilks.

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After having read through the statement Mr. Johnson wished to add the following to P6 line 10 onwards:

He wishes to clarify that the 196 tonnes being discussed related to stage 1 of anchor recovery. He believes that the explanation he was giving in relation to why the 196 tonnes

was not a concern is not clear from the summary. He believes that what he said was as follows:

"That the 196 T bollard pull was not required as there was no need to lift the chain off the seabed. Bollard pulls were maintained purely to keep the wire off the bolster. Loads in practice are lower than calculated. Captain Reiersen understood this straight away and was not concerned with the loads during recovery."

He adds by way of clarification that:

"The 196 T was not the weight of the wire and chain, this was only in the order of 120 T. The 196 T was the bollard pull required to get the mooring catenary off the seabed. The 262 Tonnes was the tension in the mooring which was made up of the weight of the mooring plus the tension supplied by the boat steaming and exerting bollard pull.

The point to note here is that during recovery the only factor to be considered was bolster clearance and this allowed the bollard pull to be kept to the minimum required to achieve this. "

- **Witness No. 7 took the stand:**

Name: John Graham Sapsford
Date of birth: 29 December 1949
Post: Self-employed
Address: Hampshire, England

Sapsford testified that he obtained his master's certificate in 1979 and then began to work at sea, at first on gas tankers and oil tankers. He was control-room operator from 1985 to 1990. After that he became barge master and subsequently Offshore Installation Manager and organised rig moves for Transocean on rigs where he was working. In 2001 he left Transocean and became barge master with Stena for two years. In 2003 he began in Trident Offshore as towmaster/marine representative. He was hired as a consultant and not as an employee of Trident, but he works solely for Trident. He testified that he is not normally involved in the planning of rig moves, but is sometimes called up by Trident and asked for advice at the planning stage, but this did not happen on this occasion. He had worked for Transocean and via work for Trident has been towmaster on the "Transocean Rather". That was when it was moved from Angola to the Canaries.

He seemed to remember coming on board 28 March and he then saw the rig move procedures for the first time. Sapsford testified further that Trident normally designates two individuals for the roles of both marine representative and towmaster. One reports to Chevron in the role of marine representative. When he came on board he played both roles. He worked together with Watson when he came on board. Before he came on board he talked to the Operational Manager, who was previously Sean Johnson but is now Andy Holt, or one of the other marine superintendents.

Sapsford testified that he played no role in connection with choice of vessels. Asked to whom he reported, Sapsford testified that he reported to the Offshore Installation Manager, and that he also had discussions with Chevron's Drilling Supervisor. Asked whether he also had a responsibility to follow up the safety aspects of the role as marine representative, he testified that there is always a responsibility in the post of marine representative for ensuring that the operation proceeds in a safe manner, and that this applies in relation to both Transocean and Chevron. Asked what he meant by "the operation proceeds in a safe manner", he replied that by this he meant the safety aspects in relation to the rig, whereas the masters had the responsibility for safety on the vessels. The orders he gives to the vessels are instructions on which anchor they are to work with next time: for example he gave give orders to the vessels when the vessels are in position to deploy anchors over the stern. But he cannot instruct them about how to perform operations, as the vessels know best. The instructions he gives to the vessel are related to the procedures.

Asked what role the "Bourbon Dolphin" should have had during the move, Sapsford replied that he did not remember whether the "Dolphin" was A, B, C or D. The categorisation from A to D concerned only what equipment should be loaded upon the vessels. The Commission referred to the fact that the "Dolphin" was vessel C, and asked what that role involved. He was shown p. 16/17 of the rig move procedures. The Commission asked whether it was correct that Vessels A and C should work together, while B and D were to work together. Sapsford testified that it was probably that way originally, but that changes were made along the way. Asked whether changes are logged along the way, he considered that the changes did not make any difference for the work they were doing. All the vessels were to deploy and recover a main anchor, and that they recovered two anchors made no difference. Sapsford testified that it was the towmaster who decided what assignments the vessels were to perform.

The Commission referred to page 30 in the presentation that Chevron, Transocean and Trident had prepared for the Commission [dated 11 September 2007], in which it was stated that the rig move procedures should be followed as carefully as possible in the light of the prevailing conditions and that deviation from the procedures should only be done after an evaluation that is then enshrined in writing. To questions from the Commission as to whether the change of roles ought to have been logged, Sapsford testified that since there were difficulties with J-hooks breaking and vessels that never arrived, the vessels were assigned different jobs than appeared in the rig move procedures. Asked whether he knew that the "Dolphin" was Vessel C, Sapsford replied that he could not remember for sure. The Commission referred to the fact that the operation was halted in the period 4 to 6 April, and asked who then stopped the operation. Sapsford could not, however, remember who stopped the operation.

Asked who was present in the pilot house, he replied the navigational engineer, and sometimes the barge supervisor. Asked what kind of information was given when one comes on duty, he replied that he came on duty 15 minutes before he was due to take over, and in that period, the person he is replacing tells him where the vessels are, what has happened recently, where they are in the procedure, the weather situation, generally everything that pertaining to what might happen on his shift. He was shown the rig move log sheet and asked to explain what was noted there. Sapsford testified that he writes down everything he thinks of significance. Problems shall also be logged, for example if a vessel has a fault in its fuel supply. Everything is written down in the log concurrently.

Sapsford testified further that his shift began at 08:00 on 12 April. He then took over from Harvey Wilks, the other towmaster. He does not recall who was present, but the navigation engineer must have been. That day Sapsford thinks that he came up just after 07:00, and that there was then the conference call with shoreside. When he came on duty the "Dolphin" was on anchor no. 3 and had been there for about ten hours. The "Dolphin" was just preparing to pass the pennant back. Wilks stated that the "Dolphin" did not have sufficient equipment to do the job with anchor no. 2 and so he called in the "Highland Valour" to pass the equipment. Wilks pointed out that the "Olympic Hercules" was some distance away from the intended track, but he could not remember whether the "Hercules" gave any reason for it, and Sapsford reckons that it was the weather conditions that had pushed him off line. He does not remember exactly what the weather conditions were like, but they were not abnormal, and stopping the operation was not considered. He told the "Hercules" to get back on line, but the vessel was in a static position. The anchor was being fastened to the insert chain, and the "Vidar Viking" was grappling behind the "Hercules". Once the anchor was over the stern, the "Vidar Viking" took the grapnel off the chain and moved it back to the rig and grappled again about 200 metres from the rig. This then let "Hercules" be in a position where it was ready to run the anchor. At this time they stopped the operation on anchor no. 6 and began with anchor no. 2. Asked whether the "Vidar Viking" was grappling at the time it ought pursuant to the rig move procedures, he replied in the affirmative. The "Vidar Viking" was to grapple astern of the "Hercules" so that it could assist in running the anchor out. Asked whether it was surprising that the "Hercules" did not come back on line after the rig had paid out wire, Sapsford replied that paying out wire was not what done in order to get the "Hercules" back on line. When the rig was ready to run anchor no. 6, he asked the "Hercules" to come back on line before they ran out the anchor. The "Hercules" said that they were unable to do so, but that they would be sure to get back on line once the wire was paid out. Initially he was reluctant to do this, but he spoke to the "Hercules", which said that they were sure that the vessel would come back on line if wire was paid out. This operation took about 18 minutes, and in the course of that time the "Hercules" worked itself gradually back on line. He did not remember how much drift the "Hercules" had, but thinks it could have been 700 metres. Asked whether such a drift was surprising, Sapsford replied that he was not in the pilot house when the chain was paid out, he did not come until the "Hercules" was off line, so that he did not remember whether it was surprising. When Sapsford entered the pilot house

at 07:00 and the "Hercules" paid out chain the vessel was on line, and when he went up to the pilot house at 08:00 Wilks said that he was disappointed because the vessel had drifted. Sapsford thought that this was because they were working on deck and that they had perhaps reduced their engine power. He does not remember whether the "Hercules" was asked about why they had drifted, but he remembers having asked him to come back on line. Asked about bollard pull, Sapsford replied that he thought he recalled that the "Hercules" had about 240 and the "Dolphin" around 180 tonnes in bollard pull, but that they had about the same thruster capacity.

Asked whether they considered grappling in the same way as the "Highland Valour" did later in the day on 12 April, Sapsford replied that the method for running the "Dolphin" out on anchor no. 2 would be the same as for anchor no. 6, so that the "Highland Valour" was to have grappled behind the stern of the "Dolphin", so as thereafter to be able to deploy the anchor. The "Valour" was then to come off the anchor chain and moved 200 metres from the rig and run out the anchor. The reason why the "Valour" grappled as it did was because the "Dolphin" had requested assistance in order to get back on line. The way in which anchor no. 6 was deployed was the same as for the other anchors.

Sapsford testified that the weather was rather poorer from when he came on duty and over the day. He testified further that the rig began to pay out wire at 09:47 and this operation was completed at about 10:00. The transition from chain to wire was then performed on the rig. They waited until anchor no. 2 had been run out and was on the seabed and at 12:53 they instructed the "Dolphin" to run out insert chain. Asked whether the postponement of the operation had been discussed at that time, he replied that there was no reason to consider doing so and that none of the vessels requested it. They had a conversation with all the masters about the weather conditions, and it was normally the masters who decide whether the weather conditions are acceptable. In some cases, where he knows that the weather is going to get a lot worse, it may happen that he as towmaster stops the operation. It is true that the weather got worse, but not much worse, in the course of the day.

Asked whether he was worried, since the "Hercules" had had problems, Sapsford testified that he followed carefully when the "Dolphin" began to run out the chain to see whether it kept on the line. He was therefore happy when he saw that the "Dolphin" was managing to hold the line at first. The "Dolphin" went slowly out, about a quarter-knot. Asked whether there was any reason why the "Dolphin" should be able to keep on the line when the "Hercules" had not succeeded, and whether this drifting was due to mishandling on the part of the "Olympic Hercules", he replied that he did not think that the "Hercules" had done anything wrong, but that it was due to reduced engine use. Asked whether there was reason to believe that the "Hercules" had reduced its engine power on purpose while it was deploying anchors, Sapsford replied that he was not a master on an anchor-handling vessel and therefore did not know the answer to that.

Sapsford testified that the entire operation, from passing the pennant wire until the conclusion, did not have a fixed schedule, and one takes however long one takes. The moment the "Dolphin" drifted, they asked over the VHF for the "Highland Valour" to help out, and Sapsford told the "Valour". Asked whether there was anything written about drifting in the rig move procedures, or ought to be written there, he testified that it was not necessary. One cannot write in a procedure how the master is to do his job. The procedure is only written with a view to how the anchors are to be deployed. Asked whether the rig could not develop problems if the vessel did not manage to stay on the line, he replied that the rig could get problems if it drifts across the next anchor, but he could not get the vessel back on line. Asked whether the operation should be stopped if the vessel does not manage to get back on the line, Sapsford testified that the "Dolphin" had requested assistance from the "Highland Valour" and that this was to get them back on the line. Asked what he could do if a vessel drifted and did not manage to come back on the line, Sapsford replied that in that case he

cannot do anything other than ask him to come on line. Asked what he would have done had the vessel drifted against the rig, he replied that he could see no reason why it should and that this was a wholly hypothetical situation. The "Dolphin" had contacted him and said that even if he came down to the anchor he would still be off position, but Sapsford said that he was more concerned that he should come back on the line. Sapsford also wondered how he as towmaster was supposed to stop a situation like this.

Sapsford was shown survey data from 14:02. The "Dolphin" was then 84 metre off position and Sapsford had then asked whether the "Dolphin" could come back on the line, but he was not worried at that point. Asked whether it was cause for concern that the vessel was continuing to run out chain even if drifting, he replied that the same thing occurred with "the Hercules" and he thought the situation would stabilise.

Sapsford was then shown survey data from 14:17. At this point the "Dolphin" is 185 metres from the line and he was asked whether this was worrying. He testified that he was then beginning to get worried, but he did not ask them to stop running out chain. Asked when the "Dolphin" had run out all the chain, he replied that it was just after the "Highland Valour" had been asked to grapple. The log showed 14:45, which he thinks is correct.

Around 14:30 the "Bourbon Dolphin" requested the "Highland Valour" to come in and grapple so as to take the weight of the chain. Asked what would have happened had the "Highland Valour" had gotten hold of the chain, he replied that it would have helped the "Dolphin" back towards the line, as the "Dolphin" had asked for. The situation with the "Hercules" was totally different from that with the "Dolphin". The "Vidar Viking" did not help the "Hercules" come back on line or stop the drifting, but merely did what the procedure said. The grappling that the "Highland Valour" performed was in conformity with the procedure, but happened earlier than planned. Asked whether it was a normal way of grappling, for a vessel to get hold of the chain and then move sideways towards the line, Sapsford replied that it was not normal and that he had not previously encountered a vessel continually drifting off the line in this manner. He testified further that if the "Highland Valour" had succeeded in grappling and had stabilised the "Dolphin", the anchor would have been deployed over the stern roller. Asked whether he had control of the situation, Sapsford replied that the "Dolphin" was drifting from the line, and it was this he was concerned with.

The Commission referred to the fact that at 14:30 the "Dolphin" was 337 metres off the line and at 15:00 the drift was 558 metres. Sapsford testified that at that point the "Highland Valour" had not succeeded in grappling, that did not happen until 16:10. Asked whether at this point they considered alternative solutions, since the "Highland Valour" had not succeeded in grappling, Sapsford testified that all the vessels had problems grappling and that it would be stupid to try to do something else as long as the "Highland Valour" was trying to grapple. It was the "Dolphin" that had asked for this solution, and it was this request that Sapsford was trying to comply with. Asked what a towmaster could do if a vessel did not succeed in grappling. Sapsford replied that it was the master that had to get the vessel back on the line. There was nothing he could do. After the "Highland Valour" had lost the chain and could not grapple because they were too close to anchor no. 3, Sapsford proposed to the "Dolphin" that they should connect the end of the chain to the work wire and put it between the towing pins. Until then he was following the request from the "Dolphin" that the "Highland Valour" should grapple.

Asked whether it was a defensible operation that was initiated when the "Highland Valour" began to grapple, Sapsford referred to what he had said several times previously, namely that he was merely complying with their request. Asked what options the "Dolphin" had, he replied that the option was that the "Highland Valour" managed to grapple. Asked whether the "Dolphin" expressed concern about the situation, he testified that the "Dolphin" requested

assistance from the “Highland Valour”, and subsequently it was Sapsford who asked them to come back on the line.

Asked whether what happened when the “Highland Valour” succeeded in grappling [survey data from 16:10 was shown to Sapsford], he replied that the “Dolphin” was moving westwards in order to pull the chain so that it could get back on the line. The “Valour” was going westwards, but it did not look as if it was coming back towards Line 2. Both vessels had hold of the chain and they were working to get back to the line. That they were still off line did not mean that they did not have control. Asked whether the situation was under control at this point, he replied that they had managed to grapple, and that the masters had control over their vessels. As far as Sapsford knew, the vessels were not in danger at any time.

Asked what happened in the near-collision at 16:25, Sapsford testified that there was a conversation between the “Bourbon Dolphin” and the “Highland Valour” to the effect that the “Valour” should get away from the stern of the “Dolphin”. He thought that it may have been so that they could more easily get back on the line. Afterwards the vessels came close to one another, and he saw from the pilot house that the “Highland Valour” was moving rapidly away from the “Dolphin”. He asked the “Highland Valour” whether they had come off the chain, which they confirmed. He did not ask the “Dolphin” what had happened. From his position in the pilot house he did not see how close the vessels were. Asked whether he felt that he had the situation under control, he testified that it was the masters who were controlling their vessels and that he could not exercise control over them. He himself did not have any opinion about whether the situation was under control for them. Asked whether he received a message from the “Dolphin” that they were using the thrusters at full power, he replied in the negative, but he assumed that they used full power to come back on the line. He had no opinion about how long a vessel could use the thrusters at full power or how full thruster use affected the vessel. What he was concerned about was that they should not touch anchor line no. 3. There was no one who told him that there was overheating in the engine or that the vessel had inadequate stability. This knowledge he obtained from the media afterwards. No one said anything to him that the vessel was in any sort of danger, and he thinks that the captain would have said if the “Dolphin” had been in danger.

Asked why he refused to let the “Highland Valour” grapple, he replied that it was because they were too close to the no. 3 mooring, and there was then a danger that they would have to deploy the anchor anew. That would mean that yet another anchor that ought to be out would not be, which would make the situation of the rig less secure.

Asked how they were supposed to resolve the situation at 16:30 when the “Highland Valour” failed to grapple, and they could not make further grappling attempts either, he replied that the “Highland Valour” had reported that the “Dolphin” still had the chain in the shark-jaw. He then told the “Dolphin” if they fastened the chain to the work wire and deployed it between the pins, that might perhaps give better manoeuvrability than in an ordinary towing operation. Asked whether he thought that the “Dolphin” had control over the situation, Sapsford replied that he had no reason to believe otherwise. Asked why he made that request when he had previously testified that it was only the masters who could get the vessel back on the line, he replied that the proposal was made because the grappling had been unsuccessful. Asked whether the grappling, which was not part of the procedure, and the subsequent near-collision, gave him cause for concern and whether that was the reason why he did not want to have the “Highland Valour” grapple again, he replied that the grappling operation was the same as previously. Asked whether it would not be natural to perform a risk assessment when performing an operation one has never done before, he replied that the operation was the same, but that it was done at an earlier point.

The Commission stated that previous witnesses had testified that the "Olympic Hercules" had been told not to leave the field, and asked what the background to this message was. To this Sapsford testified that it would have been imprudent to have sent them away when they were having problems with the deployment of the anchor. Asked what he was going to use the "Hercules" for, he replied that he had no plan for its use. Asked whether the situation was out of control, since he had no plan for its use, he replied that it would have been worse to let it go than to have it stay. There was no reason to let the vessel go if a use could be found for it. Asked whether he had used three vessels to grapple previously, he replied in the negative.

Asked whether he could describe what happened after the inner starboard towing pin was depressed, Sapsford replied that he was not aware that the inner starboard towing pin had been depressed. He did not know between which towing pins the chain went. The "Dolphin" was about 1200 metres from the rig at that point and he could not see the towing pins. He saw, however, that the vessel acquired a large list, to about 45 degrees, and he then heard the master of the "Highland Valour" say, "Watch out, buddy". When the vessel listed to about 45 degrees, the entire cargo rail on the port side went under water and he could see water up the deck. He testified that he had never seen a vessel heel like that before. The "Dolphin" was in this position about 15--20 seconds, but then righted itself. After 15--20 seconds the vessel listed over again to about 45 degrees. The cargo rail once again went under water, and after having listed like that for 15-20 seconds it righted itself again. The master of the "Highland Valour" then shouted over the radio, "drop the chain". Just after that the vessel rolled again and capsized.

When the vessel capsized he went on the radio and called up the "Hercules" and told them that the "Dolphin" had capsized and asked them to assist. He then called up the stand-by vessel, but he received no reply. They were actually on Channel 16, but he did not know that then. Channel 16 was on in the control room just beside the pilot house and he heard that the stand-by vessel was on that channel. He called up the "Highland Valour", which had seen everything, asked whether they could see anyone in the water. The "Highland Valour" thought they could see five persons in the sea. About at the same time the rig went to emergency stations. In an emergency the Offshore Installation Manager has his team, and Sapsford's muster station was actually the mess room. The Offshore Installation Manager asked Sapsford to continue talking to the vessels, and he attempted to coordinate the rescue action. He asked the "Highland Valour" to find out how many were on board the "Dolphin" since they did not have a crew list. The Coastguard had also been contacted and was to send helicopters. The "Highland Valour", the "Hercules" and the stand-by vessel were searching in the area around the "Dolphin".

Asked whether he knew that first aid was given to those picked up by the rescue helicopters, he replied that it had two bodies and that the third deceased was in the stand-by vessel. He did not hear anything about whether the casualties were declared dead or whether resuscitation was attempted. When the helicopter landed he saw through the window that Medic went up to the stretcher and probably confirmed death.

Asked whether he had any explanation of why the capsizing occurred, he testified that when he saw the "Dolphin" list to 45 degrees, he had never seen anything like it. After having thought about it for some time afterwards, it struck him that the vessel had developed an "angle of loll", in other words, the vessel had no or negative stability. Given that the vessel had discharged the chain from the locker, and it had been reported that the vessel had a list to port just prior the accident, it had struck him that when they deployed chain from the locker, the centre of gravity would have become higher. Since the list was then small and the anchor line goes out on the starboard side of the stern roller, the weight comes on the starboard side. When the inner starboard towing pin was depressed, the chain would have gone against the port towing pin and increased the list. He therefore thinks that the vessel must have had negative stability and that 45 degrees was the angle where the vessel found

its equilibrium. He thinks, and had seen this in the media, that ballast was pumped from port to starboard, which would have made for a free liquid surface effect and aggravated the situation. When the vessel acquired a 45-degree list, the master probably thought that he should release the chain, and then he thought he would have pressed the emergency release on the winch. Then there would at first be less load aft, and he thinks that might be why the vessel righted itself again. Why the vessel then heeled again is difficult to say, but even if the wire went out, there was still weight present, and when the weight came back it would make the vessel heel. The only other explanation of the vessel righting itself must be that they stopped slacking wire, but he did not think they had done that. Sub Sea Viking undertook an inspection of the capsized vessel and he noted 225 metres of work wire that had been deployed from the winch. If one deducts 30 metres from the stern roller, 190 metres of wire had been run out. He does not think that the "Dolphin" had run out any wire before the capsizing, so he thinks that the master had released wire. If what he says is correct, the capsizing could well have happened when the anchor was deployed over the stern, for then both pins would have to be lowered. If it did not happen then, when the "Dolphin" was out in anchor position and other vessel had lowered its grapnel, which was the time when there was the most weight on the vessel, he thinks that the capsizing could have happened then. The "Dolphin" could therefore have capsized at any time.

Asked whether there was any communication between the rig and the "Dolphin" after the first heeling, he replied that everything happened very fast and they were all absolutely horrified. The third time the vessel listed he was on his way to the radio. He does not remember what he was going to say, but he assumes it was "let go the chain". Asked how long a time he thought the grappling operation would take, he replied that it had taken a long time for several vessels. Once he remembers that the "Hercules" had seven tries at getting hold of the chain. It was a steep angle where they were to get hold of the chain. They grappled 200 metres aft of the vessel at a depth of 750 metres, and it was a difficult operation. It was therefore not unnatural that it took some time. Asked whether it had any significance that anchor no. 2 was the last anchor, he replied that the rig move had lasted 14 days, which is quite a long time, if it took a day or two longer was of no importance. Asked about the connection of work wire after the near-accident, Sapsford said that the master of the "Highland Valour" had said that the chain was in the shark-jaw, which was one of the problems, and Sapsford therefore asked why the "Dolphin" was not to connect the wire to the chain, but on the basis of the photographs he had seen he thinks that it was already connected then. Asked whether they considered releasing chain at any point, he testified that there was no one who was worried about the vessel's safety prior to the listing.

There was a break in the testimony.

Attorney Lund Mathisen asked how much water was on deck at the time of the capsizing. A photograph taken of the vessel at 16:15 was shown to Sapsford. He showed on the photograph that the water went all the way to the superstructure and that it went over the rail and about two metres onto the deck. Lund Mathisen referred to the fact that the insurers were still calculating the stability, and drew a sketch that showed how the vessel was listing, and Sapsford confirmed that the sketch was about right. Lund Mathisen also asked about the exact time of the capsizing. It was logged in the rig move log sheet that the capsizing occurred at 17:10. Lund Mathisen showed the navigational log p. 20 that showed that the capsizing happened at 17:08. Lund Mathisen also referred to the fact that witnesses had testified that the capsizing happened at 17:05. Sapsford replied that he had written down 17:10, but several minutes had probably elapsed before it was written down, since he himself went on the VHF and called up the vessels. Sapsford testified that it was Wilks who had written the time in the log. Asked when Wilks entered the pilot house, Sapsford replied that it was at 16:00. He was then to have handed over to Wilks, but because of the situation and Wilks' lack of experience of deep-water operations, he stayed longer in the pilot house. Sapsford testified further that he had all the communication, apart from once when Wilks

asked both the vessels to come back on line, around 16:20. Asked whether he or anyone else informed the "Dolphin" about the problems that the "Hercules" was having, he replied that he did not recall it. Further to questions from Lund Mathisen about whether he received reports about tension, Sapsford replied in the negative. Nor was he informed of the problems with the engine running hot, and in general he did not get so much information from the "Dolphin" without first requesting it. On the rig he did not see more than 180 tonnes in tension. He also testified that one of the reasons why they did not pay out wire to the "Dolphin" was that it would have caused too much weight to come onto the rig's winch and would thus have created problems for the brakes. He cannot recall having asked about tension when the "Dolphin" paid out wire. Lund Mathisen asked further about the towing pin, and Sapsford testified that he did not know where the chain went. To lower the towing pin would, however, have been a normal operation, but not something he could have asked a vessel to do. Asked whether there was any communication on VHF about the vessel being in danger, he replied that the first time they saw that the vessel was in danger was when it listed for the first time. Lund Mathisen also asked whether he was sure that the vessel listed three times, and Sapsford replied that he was pretty sure of it. He was also shown survey data and asked about the arrows on the survey data, and answered that it was not the course, but the movements of the vessels. Sapsford also confirmed that they did not record radio communications on the rig, in contradistinction to newer vessels, which have a Voyage Data Recorder.

Attorney With asked questions about whether he regarded the near-collision as capable of affecting the safety of the operation. Sapsford replied that he did not know how close the vessels were before he saw a photograph some days later. As he perceived the situation at the time, it was hard to see how far they were from one another. Moreover, it had happened before during the rig move that vessels had come close to one another. Asked whether he had any opinions about the cause of the near-collision, he replied that he did not have any good explanation. Attorney With referred to the maritime inquiry of 25 April at which First Deck Officer Syversen had testified about the towing pin, and asked whether it was conceivable that Sapsford had forgotten that this had happened. To this Sapsford testified that he had given his testimony to the Health and Safety Executive, and it did not appear from this testimony that he had said anything about lowering the towing pin. He also referred to what he had said previously about not knowing where the chain went. With then asked whether Sapsford knew about the emergency release being triggered, and he replied that he had no opinion about this.

Attorney Craig asked whether the Offshore Installation Manager was in the pilot house 12 April, and Sapsford replied that he came in from time to time.

Attorney Nordby referred to Lund Mathisen's reading out of First Officer Syversen's testimony before the Commission of 7 August in which it was stated that the "requested" that the "Dolphin" depress the towing pin, and that Attorney With referred to the towmaster's giving the same instruction. Nordby referred to the fact that Syversen used the term "suggested" about this matter, and that it was important that the terminology be correct. Sapsford said once more that he never asked for the towing pin to be depressed.

In conclusion, Sapsford expressed his condolences to the family and friends.

▪ **Witness No. 6 took the stand:**

Name: Ross Watson
Date of birth: 30 October 1943
Address: Angus County, Scotland
Post: Self-employed

He went to sea as an apprentice in 1960 and obtained his master's certificate in 1971. He had been on a number of types of cargo ship, inter alia dry cargo ships, big oil tankers and bulk carriers. After a while he went ashore and became a pilot in the Middle East for big oil tankers and oil terminals. Then he became a towmaster in the North Sea in 1984. He had worked on the moving of semi-submersible rigs and various barges, and he had worked all over the world, mostly in Northern Europe, but also China, South Africa, West Africa, India and several other places. If it is a job he finds interesting, he goes there. Watson testified that he had been towmaster on the "Transocean Rather" several times. He had also worked with Bourbon Offshore a number of times. Watson testified that he came on board the rig on 26 March 2007 and that he left the rig on the ninth day [9 April] at 15:00 and took a helicopter ashore. He had worked at such water depths previously, also west of Shetland. That was in the period 1998 to the present. It was not on the "Transocean Rather", but on a similar rig. He testified further that there are always challenges related to rig moves, and that one of the biggest challenges in those water depths is to recover something that has fallen onto the bottom.

He testified that he was not involved in the planning of the rig move. Asked about the double role as marine representative for Chevron and towmaster for Transocean, he testified that the towmaster is primarily to look after the rig's interests, whereas the marine representative is to safeguard Chevron's interests. Watson testified that such a double role was not so common. If there was a conflict of interest he would have taken the matter up with the Offshore Installation Manager and the Oil Company Representative [Chevron] and the Marine Representative. He himself did not have a double role, he was only the towmaster. It was therefore primarily the rig's interests he was to address, but he also ensured that others' interests were addressed.

He was shown a document called Marine Operation Safety Brief and asked to explain the document in detail. Watson stated that he wrote the document some time between 1993 and 1995. He always goes through this document with the vessels and tells them that they will never be pressured and that if they feel any pressure, they must say so and the operation will be halted and will not resume until the master of the vessel is satisfied it is safe to do so. He goes through the document on VHF when the vessels arrived at the location and asks each and every one of them to confirm that they have received and understood the content. It had never happened anyone had come back and said that they had not understood the content of the document.

He went through the rig move procedures when he came on board. The procedures were reviewed on a general basis with the vessels when the vessels arrived on the field. The procedures were reviewed in detail. He was not involved in HAZID / HAZOP in the planning.

He was not involved in the selection of vessels on this occasion, but had been on previous occasions. Asked what were the most important elements in choice of vessel, Watson testified that in his inspection he looks at whether the vessel's hull has many dents and scrapes, whether the gangway is rigged correctly and has a safety net, because that gives the initial impression of how the vessel is manoeuvred and is operated, whether the vessel is correctly equipped, whether all the documentation is correct and complete, what classification society the vessel has and so forth. He also looks at the crew's experience and qualifications. Asked what weight he assigned to the effect the vessel can get out of its

bollard pull in relation to the running of its shaft alternators, he testified that the effect one gets out of the vessel depends on how the thrusters are. This depends inter alia on whether they are electrically driven or whether they receive power from a shaft generator or from a separate generator. He testified further that there is a power reduction when the thrusters are in use. He also looks to see whether the vessel has a bollard pull certificate and looks at this in relation to the rating of the vessel's engine.

Asked whether he had experienced operations being suspended, he replied in the affirmative. He first asks the master what the problem is. If the master says that it is due to a hydraulic leak that will take half an hour, he says that it's fine and they'll wait. If they have lost power on a thruster the situation may be different. There may be so many reasons for stopping an operation, and it is difficult to answer the question in general terms. Asked whether drifting is a situation that dictates that an operation should be halted, he replied that it depended on situation. If for example they had run out an anchor and there was a pipeline and a wellhead there, there is a limit to how much a vessel can be off-line. Moreover, if possible it is better to work with the weather than against it.

The Commission referred to the fact that he had worked with the "Bourbon Dolphin" before he left the rig and asked whether there was anything special about the way the vessel worked; the Commission also referred to the fact that some J-hooks were damaged during the operation. The hooks had been identified to withstand 250 tonnes, but why they had been damaged by a smaller load he did not know. He had seen metal fractures previously, and reported it, but a metallurgist would be better able to explain why the hooks were destroyed.

Watson testified further that the "Bourbon Dolphin" was a vessel that had higher specifications – 194 tonnes bollard pull – than the minimum requirements [180 tonnes] and the maximum forces they expected were 160 to 162 tonnes. The vessel had also been used so long that teething trouble should have been overcome. Moreover, the vessel was brand new, was under Norwegian flag, had a Norwegian crew, was owned by Bourbon, was classed by DNV. Who could ask for better specifications than that? asked Watson. Asked whether he had worked with the crew previously, Watson testified that he had worked with Reiersen previously in deeper waters and he had greeted him. When there was a suspension of the operation due to repairs to the rig, there was a crew change and Captain Remøy took over. He testified also that there was nothing to comment about the way the vessel performed its part of the operation while Watson was on the rig. They had decided that English should be the working language, which was normal practice, and a common VHF frequency was determined.

Asked whether he was informed that the "Dolphin" had a special role, he testified that the vessel was not at any time an assisting vessel. She had more than the necessary capacity. The first thing that had to be done was to recover the four Brest anchors. The "Dolphin" and the "Olympic Hercules" recovered two anchors each.. The Commission referred to the fact that the procedure had divided vessels between vessels A to E, and he was asked what letter the "Dolphin" had. Watson testified that the "Dolphin" was always A or B, but was also C and D, and the vessel could play all the roles. The Commission stated further that it had heard testimony that the "Dolphin" was vessel C, and to this Watson replied that it was certainly not he who had said that. The Commission then showed him a document signed by Reiersen that stated was "Dolphin" was vessel C, "Assisting anchor handler". Watson himself had never been told that the "Dolphin" was vessel C, and it was Watson himself who decided that it was vessel A or B. This was done as early as when the Brest anchors were recovered. Asked whether it was he who decided what category a vessel should have, he replied in the affirmative, unless someone had told him otherwise. In this case he had been told that two vessels had arrived and they then started the job, but he was also told that two more vessels would be coming. He did not inform Reiersen that Dolphin was vessel A or B. Watson

testified that there were no objections from Reiersen to his getting assignments other than those seen in the document that had been signed by Reiersen.

He testified further that they had halted the operation on many previous occasions on grounds of bad weather. When the weather forecast comes in they evaluate it and look at the barometer, and consult with the masters and the crane men about whether the weather is OK to operate in. This is a joint decision in which everyone involved participates, and anyone involved can stop the operation. Asked whether he had experienced that a vessel could not continue a job because it did not have enough power, he replied in the negative. He himself, however, had sent such vessels back because they did not perform well enough, but not because they lacked power.

He also testified that he had worked in the same area on a rig called the "Sovereign Explorer". They then used the same mooring system as the "Rather" and about the same quantity of chain.

He was shown page 3 section 5.3 of Semi Submersible Rigmove Marine Report (Trident Offshore) which on page 9 contained a Vessel Remark by Watson that the "Bourbon Dolphin" did not have sufficient experience for this kind of work, and was asked to amplify the remark. He testified that collaboration with the master and crew always functioned very well. The same went for the handling of the vessel and the work done on deck. Nor had the vessel any mechanical failure. The remark, "not sufficiently experienced for this type of work", he explained as lack of experience for this kind of deep-water operation where one works with different kinds of hooks.

Watson continued by testifying that he attempts to obtain an overall understanding of what is required in rig move procedures. He studies the tables and looks at the forces that are in play, the load on the rig, winches, and bollard pull. The rig move procedures did not occasion any questions on his part to the operator or the rig. Asked whether the real weight was the same as in the analyses, Watson testified that he could not see the tension that the vessel has, and that he must use what the master states. He only sees the weight on the rig. He did not see anything to suggest that there was any problem with the estimates in the rig move procedures and the analyses.

Asked whether he had experienced deviations from the plan, he replied that this had not happened to any great extent. Watson also testified that the entire operation was dynamic. Even if the wind is 20 knots, the wind increases and decreases the whole time. The sea is also dynamic and the only thing to be done is to use one's experience at understanding the weather conditions. The masters are far too busy driving the boat and do not have time to report about tension going up and down all the time. Asked whether he was accustomed to taking lateral forces into account, he replied that the vessel masters tell him what they can do. If he sees anything that he doesn't like he asks the master why he has drifted off the line, and asks whether he can get himself back. Watson testified further that he could not recall having seen any deviations in expected tension.

Asked whether he had been involved in the move from Invergordon to Location G, he replied in the negative.

Asked whether he had any opinion about why the "Bourbon Dolphin" encountered problems with drifting, Watson replied that he was completely at a loss to understand that. The vessel had thruster capacity of 4000 horsepower, which should equate to a push of 45-50 tonnes. In addition, the vessel had two propellers and a high-lift rudder that should provide 40% extra push laterally. Why the vessel did not get back using its azimuth thrusters, he finds totally incomprehensible.

After the Commission was finished with its questions, Attorney Jamieson asked whether it was normal for a vessel to get off line, and Watson testified that it was not normal to go that far off line, nor was it dangerous. Watson had seen how far off line the vessel had been and testified that it was unusually far. Watson testified further that when the anchor had been secured on the deck of "Dolphin" it should go over the stern roller so that another vessel could come in. The distance between the "Dolphin" and anchor line no. 3 was steadily closing, and the other vessel [the "Highland Valour"] needed manoeuvring room to get hold of the chain. Asked by Jamieson what he would have done if he had been towmaster then, Watson replied that at some point he would have called it up and said it was a bit far away and asked whether it had a problem. It might be that the vessel was so busy that it did not have time for contact. He would not have issued instructions for how the "Dolphin" should get back to the line, only the captain could know that. Jamieson referred to the fact that it had been said in previous testimony that a request had been made to feed out wire from the rig, and asked how he would have reacted. To this he testified that given the logs he had seen he would not have liked to have fed out wire, because then the vessel would have gone even further away and closer to anchor line no. 3. To further questions from Jamieson on thruster use, he testified that the vessel had sufficient thruster capacity to get back on the line. When he went out to the rig to remove the vessel from the rig side, he saw that all chain was out and that the working wire had been secured by the deck crew before the accident. To a question from Jamieson whether he had observed that the "Dolphin" had problems with low power, he replied in the negative.

Attorney Lund Mathisen referred to the fact that there had been a near-incident about 40 minutes prior to the accident and asked what he would have done as towmaster. He would not have done anything during the situation, but afterwards he would have asked what had happened, found out how they were to resolve the situation and prevent it happening again. If the vessels had collided in this situation, it could have created a very dangerous situation for both vessels. After the near-incident, the "Dolphin" got 1000 metres off-track, and then he would have considered the situation as serious and looked at how they should solve it.

The Commission referred to the fact that the grappling was not a part of the rig move procedures and asked Watson what he would have done before the "Highland Valour" was asked to grapple. He then replied that the "Dolphin" should have had chain length on deck, and when the anchor was fastened, the other vessel should have come in. But at that point the anchor was not fastened, the chain length was on deck and the work wire was fastened to it. So he could not see why the "Highland Valour" should have been deployed. If one dragged the chain westwards, the stern of the "Dolphin" would have been dragged westwards and the bows eastwards, which was not a good solution.

...

After having read through the statement Mr. Watson wished to add the following to page 5, line 1-3:

There was nothing to comment on when Capt. Reiersen was in command but that when Capt. Remøy was in command he noted instances of inexperience in some deep water operations. He commented on that in his report (see page 5 of the summary). Furthermore Mr. Watson states that it needs to be clearly understood that he does not consider it in any way a criticism of any person that they are not experienced in a particular operation. The persons just have not done the job before, or often enough to be skilled at doing it.

Page 6, line 2 in relation to the phrase "he replied that the vessel masters tell him what they can do" :

Mr. Watson states that he do not understand this statement fully. If it is intended to convey that the masters tell me what is achievable by them, the masters in their ships, then I agree that is what happens. What I strive for is:- We work together and the masters tell me when

they are using a lot of power to achieve the necessary etc. For example, they have not got much more power to give – if things continue as they are then possibly they won't be able to deliver what I need. I expect the masters to tell me before the situation becomes critical; that they are experiencing problems or they anticipate that they may do so. An example would be something like - "The previous anchor the wind was dead ahead and the tide astern, this one the tide will be on the beam and last time I was using (X%) thrusters power so this time you can see it is going to need a lot more power, and this anchor I think will give a lot of problems" etc).

Page 6, line 10-11:

Mr. Watson thinks this is not correct. The boats were initially expected to break out the anchors from the bottom by themselves. That was changed. The move between locations was to have been done with one vessel on the tow bridle and one on each of the primary anchors, 1, 4, 5 & 8. That was changed to two vessels on No.1 and two vessels on No. 5. Being major deviations they required a "MOC" (Management Of Change) however the running of the anchors was not a big change (while I was on board) after the move was made to the new position and the first pair of anchors was deployed, No. 5 then 1.

▪ **Witness No. 8 took the stand:**

Name: Martin Allan Troup
Date of birth: 7 September 1978
Address: Aberdeen, Scotland
Post: Offshore Navigation Engineer, Trident

Troup testified that he worked offshore with rig moves, but also worked onshore with service work and the planning of future rig moves. His immediate superior in Trident is Neil Lawrence. Mike Grubb is the Survey Department Manager.

He played no role in the preparation of the rig move procedures. He came on board the rig on 26 March and his place of work was the pilot house. He mobilised equipment, performed checks, and Troup and another engineer thereafter worked shifts for the rest of the operation. The previous move occurred when he had begun in Trident, and he was on board when the rig left Invergordon for Rosebank, but only as an observer. There were two experienced engineers who carried out the operation.

He confirmed that what was shown on p. 8 of the rig move procedures was their job. They were to ensure that the equipment and the displays were correct, and that the vessels and the rig showed the right position. But checks were made onshore, and the vessels were checked again when they were mobilised in port. He and a colleague checked three times again after they had deployed the equipment, so as to make sure that it worked as it ought. They compared inter alia positions and gyrocompass. Throughout the operation all the equipment worked properly.

Asked whether it was part of his job to keep track of where the vessels were, Troup replied that they are required to observe the vessels and relay information to the towmasters and any other parties concerned. They made sure that they had a screen to themselves so as to ensure that the equipment worked properly, and one for the towmaster so that he could observe. It was not his job to give instructions to the vessels as to which anchors they should deploy. Instructions were also sent to the vessels via their computer, but that was not his job.

Troup answered in the affirmative as to whether he could register the vessel positions were on his screens. The screens showed various factors, but they always have a screen image showing the vessels' positions.

Asked when he came on duty on 12 April, he replied that they had a twelve-hour shift the first ten days, since it was a long job. After that they worked eight-hour shifts. He was finished at 06:00 that morning, while they were running out anchor no. 6. He came back on shift at 14:00. The "Bourbon Dolphin" and the "Highland Valour" had then started on anchor no. 2, and were perhaps 100 metres east of the stipulated anchor line.

Troup testified further that they kept a log at all times. It was pretty fundamental practice to log what anchor was being deployed and recovered. After the incident he wrote a brief report.

Troup testified that he could hear what was communicated over the VHF. As regards the near-collision he testified that he thought it occurred when the "Valour" tried to help the "Bourbon Dolphin" back on line by grappling. They thought that the "Valour" had come off the chain and that the "Dolphin" had reduced its engine power and was carried towards the "Valour" in such a way that the vessels almost collided. The masters, however, manoeuvred in such a way as to avoid a collision. Asked whether the near-collision ought not to have been logged, Troup answered in the affirmative. Asked whether there were rules for logging,

he replied that incidents should be logged as they occur and that they had the log in front of them.

Troup confirmed that it was his handwriting on the log from 14:00 onwards.

He testified further that he had been on board during the move from Invergordon to the next location and that he then had the opportunity to follow the vessels' positions. Asked whether he remembered whether the deployment of the anchor in that case caused any problems, Troup replied that he could not recall.

He continued by testifying that when he came on duty, he told the towmaster that the vessels were some distance off-line, and that the towmaster has already observed this, and that they were following developments carefully. The Offshore Installation Manager was in the pilot house at that time, so he was also following the situation. He cannot remember having overheard any conversations between the Offshore Installation Manager and the towmaster and masters of the boats concerning drifting off-line.

When the "Bourbon Dolphin" was between anchor lines no. 2 and 3, it was decided that the "Valour" should try to grapple the chain in order to try to come back to Line 2. It worked for a while until the grapnel slipped, and then the "Bourbon" drifted too close to no. 3 for the "Valour" to be attempt grappling again.

He observed the actual capsizing and it was not one single continuous movement. The vessel listed perhaps 10 degrees to port, and then righted itself again. After 6 to 10 seconds it then came up to 30 degrees again. He remembers that at that point the "Valour" called them up on the radio. He does not recall the exact words that were said, but thinks it might have been something like "this does not look very good, Captain, I think you should release your chain". In the course of a few minutes it listed again and rolled right over.

After the Commission was finished with its questions Attorney Lund Mathisen asked whether there was a central unit on the rig, and a navpack on every ship, which Troup confirmed. Asked how they get the signals, he replied that the signals for positions come from a GPS antenna. They have primary and secondary systems in case the primary systems fail. The vessels communicate with one another with the aid of telemetry via a radio link, and on the rig screens they can at all times see each vessel's GPS and telemetry status. This gives them an indication of whether their equipment is working properly or not. If it is possible that it is not working properly, they double-check this with the vessel.

Further to questions from Lund Mathisen, Troup confirmed that the data they get are from the vessels' GPS. He testified further that it is mobilised from Aberdeen and tested in the workshop, then in port, and thereafter they do a telemetry test in the vessels between ports, in order to reassure themselves that the GPS is in the right position, so that there is no chance that it might fail in the course of the operation. Asked whether the navpack is a separate GPS unit or whether it gets the information from the vessels' GPS, Troup replied that it was a separate Trident unit that has built-in GPS radio and PC, with a radio and a GPS antenna.

Asked how precise it is, he testified that there are three standards for precision, and that it depends what the client wants. In this case the GPS had an accuracy of between one and two metres. To further questions from Lund Mathisen about what kind of data can be obtained from the system, Troup replied that they get the vessel shape on the screen showing their exact shape), if you don't have a vessel shape you get a cross showing the stern. It gives you GPS, time, log date, position, speed, course and heading. Extra functions are available from the rig system, the primary system.

He was then shown survey data [that had been submitted to the Commission] and asked to explain what this meant. Troup testified that this was replayed on Windows Media Player, and did not have as good functionality and the same level of detail as he had on his system on the rig. The arrows on the survey data showed the vessel's direction of movement. He confirmed that you do not see "heading" when you replay the data on Windows Media Player, but they normally get this up on their own system. He testified further that they had log files for each vessel that logs the vessel's movements every tenth second. The log shows position, speed, heading and course. Asked whether there was recording of the VHF communication on the rig, Troup replied that he did not know.

The log was shown to Troup and Lund Mathisen asked questions about the logging of the capsizing, where it looked as if the figure 8 had been changed. He replied that it might have been changed because it was originally 8 minutes and 55 seconds. He testified further that it had been changed immediately. Asked by Lund Mathisen whether he was quite sure that the capsizing happened at 17:08, Troup replied in the affirmative and referred to the fact that their PCs were synchronised. He testified further that he went to the primary system and took a screen shot the moment the accident occurred. He then continued to take screenshots over the next two hours, showing the other vessels that came to help. After that they performed all their emergency response roles in a calm and efficient manner.

He was also asked by Lund Mathisen whether he had heard anything about depressing towing pins over the VHF, but he not could remember having heard it. Nor could he remember any other communication between the towmaster and the "Bourbon Dolphin" in the minutes before the accident.

As regards the capsizing he testified that the vessel first listed at 10 degrees motto port, then righted itself, before it listed at 40 degrees. Then the master of the "Highland Valour" tried to warn the "Dolphin" about what was happening. The ship then righted itself again, but then listed again and rolled right over in a few seconds. They observed three listings, including the capsizing itself. Asked by Lund Mathisen whether he could remember having seen the deck of the "Bourbon Dolphin" during the listings, he replied that he never saw the deck, but the rig was about 1400 metres from the "Dolphin".

Attorney Craig then asked whether at 14:00 was aware that the "Bourbon Dolphin" was drifting, which Troup confirmed. Craig referred to his previous explanation that the Offshore Installation Manager was in the pilot house when he came on duty at 14:00 and asked whether this was correct, and at the same time asked when the Offshore Installation Manager was in the pilot house that day. Troup testified that he was not entirely certain whether the Offshore Installation Manager was in the pilot house at 14:00, but that he was in pilot house about half an hour before the accident, since the vessels were not in position.

Asked by the Commission whether they had routines for how long they kept backup data, Troup replied that they did so for as long as possible. As soon as they know that their equipment and that on the vessel is in order, they run them in log files every ten seconds and these are stored throughout the operation, in case anything happens or there are questions about the boats' position, speed or heading. This is stored on the rig computer's hard-drive, which is later saved for future references. After a rig move the computer data is removed and saved onto the Trident's server. Asked by the Commission whether this means that they have available plot data related to the first move, Troup replied that he did not know. After the operation was completed, and if it proceeded as it should, he did not know whether the log files were stored. He testified further that the computers were "scrubbed" for the next operation.

...

After having read through the statement Mr. Troup wished to add the following to page 2:

It is his job to send instructions to the vessels but only to deploy or recover anchors at a specified position. It is not his job to designate vessels to anchors or instruct them on any operations.

Page 3 line 5-9:

Conversations continually ensued between the above during the deployment of No. 2, although Mr. Troup could not recall what was said.

- **Witness No. 3 took the stand:**

Name: Martin Leon Kobiela
Date of birth: 12 September 1967
Post: Technical Manager, Trident Offshore
Address: Aberdeen, Scotland

Kobiela testified that is a trained naval architect and graduated from university in 1994. He worked for GEC from 1994 to 1996, and had been working for Trident since 1996. His duties in Trident consisted in the preparation of mooring analyses, riser analyses and the quality assurance of the work of the division. He had worked a number of times together with Chevron and Transocean. He testified that he had no dealings with the vessels used during an operation. He stated that he had never been on the "Transocean Rather". His assignment was to create various alternatives for the moving of the rig. They created a detailed mooring analysis and a deployment study for anchors. He was involved in the previous move of the "Rather". Kobiela testified that in Trident they worked through an integrated methodology and across divisional boundaries. Kobiela also testified that he had worked many times in the area concerned northwest of Shetland, also with Transocean and Chevron.

Kobiela was shown page 6 of the rig move procedures and asked whether he had played any role. He replied in the negative. He had no contact with the vessels during the operation. After the operation was under way, the marine superintendent, in this case Sean Johnson, had contact with the players.

He was shown page 11 of the mooring analysis and asked to explain the basis of the figures in the analysis. He then testified that they performed quasi-statistic analyses, plus dynamic analyses in the worst cases. They used a program called Seamoor 2000. Current against the mooring lines and risers was part of the program for dynamic analyses, but not quasi-static analyses. Asked whether current against mooring lines and risers was included as an external static force in the analysis, he testified that current and waves were not a part of it. The forces on the rig are based on the rig's coefficients and external forces that affect the rig. Current against the mooring lines will not lie in the rig's coefficients.

The Commission referred to the mooring analysis that was sent to Chevron on 10 May 2005, and which was updated on 17 May 2005. The analysis was prepared by Kobiela, but he could not remember what the difference was between Version 00 and Version 01. On 13 May 2005 Transocean performed its own calculations and Kobiela was asked what was the main difference between the two calculations. Kobiela replied that Trident used "directional" environmental data whereas Transocean used only "omnidirectional" environmental data and thereby obtained more pessimistic results. Trident's analysis covered only a part of the year, March and April, and was not meant to cover the whole year. Asked whether he could explain why the weather forces in Transocean's calculations were much higher for a 50-year condition, he explained that Transocean did not use "directional data", as Trident did, and that Trident used a 100-year condition whereas Transocean used a 50-year condition.

Kobiela was asked why chain was used as opposed to wire, and the Commission stated that this was chosen in a meeting on 6 June 2005. He testified that, even if wire was lighter and easier to deploy, it makes for a greater rigidity of the mooring system, which led to such a high tension that the mooring system could satisfy the POSMOOR requirements. Kobiela was shown p. 11 of the mooring analysis and asked to explain what was written there. He testified that the analysis applied to the months March and April, and did not cover year-round operations. They did not do "omnidirectional" analysis as long as they had "directional" data. The Commission referred to the fact that on p. 11 of the analysis it satisfied the POSMOOR requirements for March and April. He was then shown p. 6 of the Chevron document "Transocean Rather West of Shetland Mooring and Riser Analyses, Environmental

Data”, which showed weather statistics for all the months of the year, and asked whether they made an analysis that took account of HS in a worst-case condition all year. To this Kobiela answered in the affirmative.

Polyester was considered as an alternative solution to wire at an early date, and he seemed to remember that polyester was not available at that time, and also that it would have created problems in a steel wire mooring system. He was asked whether in 2005, when mooring analysis was performed, he looked at the deployment and recovery analyses. Kobiela replied that these preliminary analyses were not enshrined in a report; that was not until later, when the analyses were final. Of the reports to Trident, references to POSMOOR 1996 and 2001 were used, but he could not remember why POSMOOR 2004 was not used. He otherwise thought that it was not a requirement that the newest POSMOOR version be used. The same mooring system was used for Locations G and I.

The analysis assumed an 18-tonne Bruce anchor (MkIV). He stated, in response to questions from the Commission, that the holding capacity of the 12-tonne Stevpris anchors (new generation) was approximately the same as for the Bruce anchor. Kobiela testified that he was responsible vis-à-vis Chevron, who was responsible for sending the mooring analysis onward to Det Norske Veritas. Asked whether 50 metres tolerance in the deployment of anchors was taken into account in the mooring analysis, he answered in the affirmative. The 50 metres emerged in connection with the mooring analysis.

Asked whether he had any responsibility for the preparation of risk assessments in connection with the rig move procedures, Kobiela testified that right from the start, everything they did was discussed in detail with Chevron and Transocean. Asked whether the risk analyses they performed covered the total risks of the operation, he answered in the affirmative. He was not, however, involved in risk assessments that concerned the vessels. The entire operation was discussed in detail and risks looked at in connection with the analyses he undertook.

Asked how long a time the operation was to take, Kobiela estimated it at two weeks, but that would depend a lot on the weather. The weather conditions that he used in his recovery and deployment analyses were based on the weather conditions one would normally expect to meet during an anchor-handling operation, and have no connection with a one-year condition. The values apparent from p. 23 of the rig move procedures were values used in the mooring analysis, and were not specific weather criteria for the operation, but a “rough guide” for maximum criteria. It is those who perform the operation who must continuously evaluate whether the weather conditions are satisfactory. It is evaluated there and then by those taking part. They do not look at how much downtime there is expected to be during the operation.

Asked what the basis was for the recovery and deployment analyses, Kobiela replied that he used FLEXCOM and the basis was static analyses. They made an evaluation of dynamic stress on the mooring. They take as their starting-point for the analyses in a typical anchor-handling vessel, since at that point they do not know which vessels are participating. The Commission asked whether RAOs were included in the analyses. Kobiela confirmed that RAOs for a typical anchor-handling vessel were included. The Commission then asked whether the 2 m. heave referred to on p. 23 of the RMP was calculated on the basis of the analyses but Kobiela was unable to give a definite answer as to whether it was calculated or an assumption. Kobiela confirmed that current against the mooring lines was taken into account. He was shown Table 6 and asked how much of these forces were current against the lines and how much were current against the vessel. Kobiela said that Table 6 was an estimate of forces that could affect the vessels. Since at that point it was not clear which vessels would participate in the operation, they could not undertake a detailed calculation of the forces on the vessels. The current forces acting on the vessel were thereby only an

estimate for a typical anchor-handling vessel. It was confirmed that the current forces of 0.7 tonnes included only drag force on the vessel, and not on lines. Kobiela testified further that there would be about 6 tonnes on the mooring lines in addition, given a current speed of 1 m/s. In lateral seas it would be approximately the same, perhaps a slightly higher value. The anchor deployment analyses showed static forces in Stage 5 of up to 160 tonnes from the weight of the mooring lines alone, and the Commission wanted to know he then concluded that they needed an anchor-handling vessel with a bollard pull of 180 tonnes. Kobiela testified that the figure was arrived at by taking into account expected static forces, expected environmental conditions, plus previous experience. The Commission referred to page 23 where it was stated that weather forces would give a "reduction of effectiveness", and he was asked how he took account of the reduced effect. He referred to what he had said previously, that the vessels were not clarified at that point, and they had to make an estimate of how big the reduction would be.

The Commission referred to the testimony of Sean Johnson and asked how the calculations were quality-assured. Kobiela referred to the QA system and the fact that they had their own procedure, and that it was he himself who performed the analyses in this case. Asked about what the person checking the analyses looks at, he answered that input data was checked. The Commission referred to his previous testimony in which he said that he *inter alia* used his experience when the figure of 180 tonnes bollard pull was stipulated, and asked whether Trident had systems for systematic recording of experiential data that was used in the checking of the calculations. He testified that the calculations were made on the basis of mooring analyses and experience from previous rig moves, so that they check the analyses and discuss with the marine division of Trident. Kobiela stated that they had written documentation regarding the checking of the mooring analysis and the deployment analysis.

Asked whether they had systems or routines in order to systematise experiential data, Kobiela testified that they retained all analyses and stored everything that had emerged from their "wash-up meetings" and "action reviews". Normally they compare calculations to measurements. The deployment analyses do not mean that they set up recommended threshold values for the operation, since it is the rig and the vessels that must decide whether the weather conditions are acceptable. He was asked whether the calculations would be viewed as threshold values, for example whether a higher tension was measured on the winch than had been stated in the analysis. Kobiela was uncertain about that, as it would be an operational matter. Measurements of tension on rigs in general were, however, rather uncertain. He testified further that they had an informal system for evaluating experiential data after a rig move. Kobiela was also asked whether he had participated in the evaluation meetings after the accident, but he had not done so.

...

After having read through the statement Mr. Kobiela wished to add the following to page 5, line 10-15:

The reference to "experience" in relation to the recommendation in the Rig Move Procedure that vessels with a minimum bollard pull of 180 tonnes be used was a reference to the experience of those in the Trident marine operations department who drafted the Procedures.