Mooring system for a loading station, i.e. a mooring system for a loading station which can be located in a safe distance from a production platform/vessel, where a conventional tanker with dynamic positioning and bow loading equipment can be connected for loading/unloading from a stationary floating platform/vessel, where a loading station (4) is connected to a flexible conduit (3) anchored to the seabed in a point (9) by at least one line (13) to at least one anchor (5) and at least one weight (6) resting on the seabed.
MOORING SYSTEM FOR A LOADING STATION

[0001] The present invention relates to a mooring system for a loading station, i.e. a moorings system for a loading station which can be positioned in a safe distance from a production platform/vessel according to the claim preamble.

[0002] Mooring of conventional tankers by Dynamic Positioning (DP) and bow load equipment for load transfer to/from a fixed or floating platform/vessel is traditionally done via a loading station comprising a hawser connecting the tanker to the platform. Transfer of load takes place through a hose brought from the platform to the bow manifold of the ship. The tanker is kept in normal position by means of its DP.

[0003] If a change of the direction of wind and/or current takes place, this can result in a loading operation being interrupted. An interrupted loading operation can easily entail one or several days delay, of which can be very costly for a conveyor, but also for supplier due to tight delivery conditions. Further, it may also be risky for a vessel to operate near fixed or floating platforms/ship.

[0004] It is therefore an object of the present invention to provide a mooring system for a loading station which is positioned in a safe distance from a production platform/ship and which will reduce the risk and the need for interruption of the loading. This is achieved by the loading system according to the present invention, such as defined by the features of the appended claims.

[0005] The invention will be described further in connection with an embodiment and with reference to the drawings, in which

[0006] FIG. 1 shows the mooring system for the loading station according to the invention in a standby position before a tanker is connected, and

[0007] FIG. 2 shows the same mooring system when the loading station is connected to a tanker.

[0008] Under reference to FIGS. 1 and 2, the system comprises a flexible conduit 1 or a fixed conduit 2 to the platform/ship. The flexible conduit 1 will usually be directed through the sea, but can also be directed on the seabed, whereas the fixed conduit 2 will be directed via the seabed. The last part of the pipeline will be a flexible conduit 2 arranged in a wave configuration. At the end of the wave configuration the loading station 4 will be provided. From the loading station a pick-up-arrangement 11 is fastened and it will be floating on the surface. The flexible conduit 3 which has a wave configuration, will be moored in a lower point 9 in the wave configuration by means of one anchor 5 and at least one weight 6. The entire system, except the pick-up-arrangement 11, is under the surface.

[0009] In order to obtain a S-formed wave form for the flexible conduit 3, it is necessary to place some buoyancy elements 10 along some part of the conduit in order to create a positive buoyancy for the entire, flexible conduit 3. The last part of the S-form will be provided by the loading station which has a positive buoyancy.

[0010] The loading station 4 comprises a swivel pipe-end-piece 7 as well as a buoyancy element 8 which provide a positive buoyancy for the part of the flexible conduit 3 which are located after the buoyancy element 10, as well as for the swivel pipe-end-piece 7. At a point 9 on this part of the flexible conduit 3, there is by means of at least one line (13) connected an anchor 3 and a weight 6 which will rest on the seabed when the loading station 4 is not connected to a tanker. The line 13 can comprise of a wire, chain and/or a polyester rope. When the system is not connected to a tanker 12 the weight 6 will compensate for the positive buoyancy of the buoyancy element 8 and the weight 6 will drop to the bottom and place the loading station 4 at a suitable depth under water with an pick-up-arrangement 11 floating on the surface. The purpose of the at least one anchor is to ensure the loading station 4 will be kept at approximately the same position compared to the platform or vessel independent of wind and/or current direction.

[0011] When a tanker 12 arrive to be connected to the system in order to load to/from the platform/vessel, it will after positioning itself with the bow in correct position to the loading station 4, first pick up the pick-up-arrangement 11 and then pull in the loading station 4 until the swivel pipe-end-piece 7 can be connected to the bow manifold 12 of the vessel and the loading/unloading can start. When the loading station 4 is pulled up, the weight 6 will be lifted from the bottom and "hover" freely until the loading station 4 is lowered into the water after the completion of the loading operation.

[0012] With such a system the tanker will, if the wind and/or the current should change, by means of its dynamic positioning system, rotates around the loading station 4 without this creating an immediate risk for the production platform/vessel.

1. Mooring system for a loading station, i.e. a mooring system for a loading station which can be located in a safe distance from a production platform/vessel, where a conventional tanker with dynamic positioning and bow loading equipment can be connected for load transfer to/from a fixed floating platform/vessel, wherein the loading station is connected to a flexible conduits anchored to the seabed in a point by at least one line to at least one anchor and at least one weight resting on the seabed.

2. Mooring system according to claim 1, wherein the loading station comprises a swivel pipe-end-piece and a buoyancy element which provides a positive buoyancy for the loading stations and part of the flexible conduit.

3. Mooring system according to claim 1, wherein the loading station is kept under the surface by the weight resting on the seabed.

4. Mooring system according to claim 1, wherein the line consisting consists of a wire, chain and/or polyester rope.

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