(54) Title: SUB-SEA MEMBRANE SEPARATION SYSTEM WITH TEMPERATURE CONTROL

(57) Abstract: A system and method for recovery of hydrocarbon gas and liquids from a sub-sea environment utilizing a sub-sea membrane separation system. The system includes a production string (12) located in a sub-sea wellbore (14) for removing hydrocarbons and contaminants from a sub-sea formation (16). At least one membrane separator (18) for separating contaminants from hydrocarbons removed from the sub-sea formation (16) is located underwater between the production string (12) and a hydrocarbon collection tank (22) such that a predetermined temperature of the hydrocarbons is obtained by the location of the membrane (18). In another embodiment, a tube (24) is connected to a sub-sea production string (12) for removing hydrocarbons and contaminants from a sub-sea wellbore. At least one membrane separator (18) for separating contaminants from hydrocarbons in the tube (24) is positioned between the production string (12) and a hydrocarbon collection tank wherein the temperature of the hydrocarbons and contaminants is controlled by the location of the membrane (18).
Published:

— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:

22 January 2004
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : E21B 43/36
US CL. : 166/267,357; 210/747,170

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 166/267,357,75.12; 210/747,170

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of database and, where practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WO 00/58603 (CHEVRON) 5 October 2000 (05.10.2000), whole document.</td>
<td></td>
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<tr>
<td>A</td>
<td>US 5,232,475 A (JEPSO) 3 August 1993 (03.08.1993), whole document.</td>
<td></td>
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<tr>
<td>A</td>
<td>US 3,590,919 A (TALLEY, JR.) 6 July 1971 (06.06.1978), whole document.</td>
<td></td>
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</tbody>
</table>

* Further documents are listed in the continuation of Box C.  

See patent family annex.

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&" document member of the same patent family

Date of the actual completion of the international search
23 August 2002 (23.08.2002)

Date of mailing of the international search report
09 DEC 2003

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Form PCT/ISA/210 (second sheet) (July 1998)
Continuation of B. FIELDS SEARCHED Item 3:
JPO, EPO, DERWENT

Terms: membrane separator, membrane, separator, wellbore