

cracking" in which steam at about 800° C° (650 to 1000° C) is applied to the crude oil. Another approach is to spray preheated heavy oil at a hot fluidized catalyst to break down the oils into various light oils (referred to as a FCC process, or process that uses fluidized carbon cracking). The cracking methods require large amounts of hot pressured steam and produce more hot steam. The processes also require considerable amounts of electricity . Much of the pressured steam produced in the cracking process is used to drive a steam engine (piston or turbine) that, in turn, drives an electric generator. Water from the sea is used in operating the steam engine (to provide water that converts to steam, and to cool the steam after it passes through the steam engine), and in the cracking process.

There are many other known methods for cracking heavy oil.

In one aspect, there is provided a method for efficiently obtaining light oil from an undersea reservoir which produces a reservoir fluid that contains heavy crude oil, comprising: passing said produced fluid from the undersea reservoir up from said reservoir through a riser to a structure that floats at the sea surface; passing said produced fluid to a separation station on the floating structure, and, in said separation station separating the heavy crude oil into hydrocarbons and non-hydrocarbon material, and separating the hydrocarbons into gaseous hydrocarbons, light oil, and heavy oil, including disposing of said non-hydrocarbon material into the sea; flowing said heavy oil to a hydrocarbon cracking station on said floating structure wherein said cracking station is energizeable in part by electricity, and energizing said cracking station to crack said heavy crude oil to produce light oil, gaseous hydrocarbons, and heat; using said heat produced by said cracking station to produce pressured steam, using said pressured steam to drive a steam engine, using said steam engine to drive an electrical generator, and using a portion of electricity from said electrical generator to energize said cracking station.

In another aspect, there is provided an apparatus for producing hydrocarbons from an undersea reservoir which produces reservoir fluids that contains heavy oil, comprising: a floating structure that floats at a sea surface, and a riser that connects said reservoir to said floating structure; a separation station on said floating structure

which is coupled to said riser and which separates fluid from said reservoir into at least heavy oil and non-hydrocarbon material, said separation station having a heavy oil outlet and said separation station uses electrical power; a cracking station on said floating structure which is connected to a heavy oil outlet of said separation station, said cracking station having a light oil outlet and a steam outlet; an engine-generator set that receives steam from said cracking station to drive a steam engine and which uses the steam engine to drive an electrical generator, said electrical generator having an electrical outlet connected to said cracking station

The novel features of the ~~invention~~-disclosure are set forth with particularity in the appended claims. The invention will be best understood from the following description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagrammatic view of an offshore hydrocarbon production facility of the present invention, with a tanker shown in a reduced size.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 illustrates a production facility 10 of the invention, which includes a floating structure 12 which carries treatment equipment that produces and treats heavy crude oil, or heavy hydrocarbons, from an undersea reservoir or well 14. Heavy crude oil can be considered to be oil having an API (American Petroleum Institute) rating of less than 20, so the oil floats on water. Such oil generally has a high viscosity such as on the order of magnitude of at least 0.5 poise, and/or has hydrocarbons with at least 60 carbon atoms per molecule. Fluid from the seafloor reservoir passes through an electrically-energized pump 20 that lies within tubing extending down to the well or that lies in the downhole casing. The pump pumps the fluid through a riser 22 up to the vessel or other floating structure 12 at the sea surface. Part of the oil is light oil that passes through a conduit 30 from a cracking