CONVENTION APPLICATION FOR STANDARD
PATENT OR A STANDARD PATENT OF ADDITION

71431/81

Full name(s) of Applicant(s)

1/We SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
of Carel van Bylandtlaan 30, The Hague, the Netherlands

hereby apply for the grant of a standard patent
for an invention entitled
"RECOVERY OF CONTAMINATED SEAL OILS"

which is described in the accompanying complete specification.

DETAILS OF BASIC APPLICATION(s)

Number(s) of Basic Application(s)

8018824

Name(s) of Convention Country(ies) in which Basic Application(s) was/were filed

Great Britain

Date(s) of Basic Application(s)

9th June, 1980

Our address for service is

C/- SPRUSON & FERGUSON
PATENT ATTORNEYS
CBA CENTRE, 60 MARGARET ST.
SYDNEY, NEW SOUTH WALES.
AUSTRALIA.

Dated this SEVENTH day of MAY 1981

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

By: Registered Patent Attorney

To: The Commissioner of Patents
In support of the Convention Application made by SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V. for a patent of addition for an invention entitled:

"Recovery of contaminated seal oils"

I, Abraham Keuzenkamp, of Carel van Bylandtlaan 30, The Hague, the Netherlands, do solemnly and sincerely declare as follows:

1. I am authorized by SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V., the applicant for the patent of addition, to make this declaration on its behalf.

2. The basic application(s) as defined by Section 141 of the Act was/were made in Great Britain on the ninth day of June, 1980 by SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

3. Clifford LANGRIDGE, a British subject of Dr. José Ingenieros 1245, 1636 - Olivos, Province of Buenos Aires, Argentina is/are the actual inventor(s) of the invention and the facts upon which the Applicant Company is entitled to make application are as follows: as Assignees of the inventors.

4. The basic application(s) referred to in paragraph 2 of this Declaration was/were the first application(s) made in a Convention Country in respect of the invention the subject of the application.

Declared at The Hague Dated this 27th day of April, 1981

Signature of Declarant Abraham Keuzenkamp

To: The Commissioner of Patents, Commonwealth of Australia
1. A process for removing volatile components from a contaminated seal oil which comprises stripping the contaminated seal oil in countercurrent flow with an inert gaseous material in a tray column or a packed bed column.
Name of Applicant: SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Address of Applicant: Carel van Bylandtlaan 30, The Hague, the Netherlands

Actual Inventor: CLIFFORD LANGRIDGE

Address for Service: Spruson & Ferguson, Patent Attorneys, CBA Centre
60 Margaret Street, Sydney, New South Wales, 2000 Australia

Complete Specification for the invention entitled:

"RECOVERY OF CONTAMINATED SEAL OILS"

The following statement is a full description of this invention, including the best method of performing it known to us:
RECOVERY OF CONTAMINATED SEAL OILS

The invention relates to a process for removing volatile components from a contaminated seal oil.

The sealing system of large rotary compressors, such as those handling natural gas or process gas on a refinery, in many cases consists of two liquid-film seals with sealing oil admitted to the space between the seal rings at a slightly higher pressure than the gas to be sealed. The sealing oil (which in most cases is a mineral oil based lubricating oil) flows slowly past both seal rings: the portion which escapes on the atmospheric side of the seal is fit for re-use, but the portion escaping in the high-pressure or gas side of the seal ring will be contaminated with components of these gases, which components are dependent on the composition of these gases and consist of e.g. hydrogen sulphide and/or light hydrocarbons.

The seal oil which leaks from the high pressure side of the seal assembly cannot be recycled to the compressor without being purified. Hydrogen sulphide present therein has to be removed because it will be corrosive to the linings of the seals, and light hydrocarbons have to be removed because they dilute the seal oil and lower the flash point thereof, and accordingly increase its flammability.
The invention provides a process for the removal of volatile components from contaminated seal oils by stripping in a specific way.

Accordingly there is provided a process for removing volatile components from a contaminated seal oil, which comprises stripping the contaminated seal oil in countercurrent flow with an inert gaseous material in a tray column or a packed bed column.

In case a tray column is used the trays may e.g. consist of valve trays, bubble cap trays or perforated plates.

It is preferred to use a packed bed column, which is a column packed with solid particles, such as ceramic spheres, and in particular Raschig rings. The seal oil to be treated trickles in downward flow over the solid particles and forms liquid films on the surface thereof.

The stripping may be carried out at a wide temperature range. The temperature will in general be adapted to the type of compounds to be removed from the seal oil, and to the inert gaseous material to be used as stripping agent.

Temperatures from 20-120°C are preferred. Atmospheric pressures or somewhat above are very suitable.

An inert gaseous stripping material is a material which does not react with components of the seal oil or the contaminants thereof under the prevailing stripping
conditions. Very suitable inert gaseous materials to be used in the stripping are nitrogen, air and steam.

With the process according to the invention volatile components, in particular hydrogen sulphide, can be substantially completely removed from contaminated seal oil, and the recovered seal oil can be recycled to the compressor.

It will be understood that seal oil from which volatile components have been removed according to the process of the invention, cannot be recycled indefinitely to the compressor because non-volatile contaminants will not have been removed. For that reason it is of advantage to remove a minor part of the contaminated seal oil, and add about the same amount of fresh oil to the purified oil to be recycled to the compressor.

The invention is illustrated by way of example in the figure, which is a schematic one.

Equipment which is not essential for the process according to the invention such as liquid and gas meters, heating and cooling equipment, has been omitted from the figure.

Contaminated seal oil present in tank 1 is heated with heating equipment 2 to the required temperature and pumped with the aid of pump 3 via line 4 to the upper part of stripping column 5. Column 5 contains a bed 6 of 9.5 mm ceramic Raschig rings, which bed is supported
by grid support 7. Stripping gas is introduced into column 5 below grid support 7 via line 3. Purified seal oil leaves column 5 via line 9. The stripping gas leaves column 5 via line 10.

EXAMPLE

In a two-stage centrifugal compressor a gas, which contains about 7% H₂S, was compressed from 1 bar abs. to 23 bar abs.

In order to keep this gas removed from the seals as far as possible a buffer gas was provided to the labyrinth of the primary seals, so that the gas contacting the seal oil contained about 50 ppm H₂S at 23 bar abs. The seal oil emerging from the pressure side of the seal contained from 1-100 ppm H₂S and was forwarded to tank 1. In this tank the oil was heated with the aid of a steam coil to about 80°C, forwarded to column 5 which has a diameter of 0.30 m and contained a bed of 4 m length packed with 2.5 mm Raschig rings, and stripped with nitrogen at a pressure of 1.1 to 1.2 bar abs. The throughput was 1250 l/day of seal oil; the amount of nitrogen used was 1250 l/day. The purified oil did not contain any H₂S, had a flash point of at least 180°C, and could be recycled to the compressor. The seal rings on the compressor showed no sign of attack by corrosive agents on the biennial overhaul.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A process for removing volatile components from a contaminated seal oil which comprises stripping the contaminated seal oil in countercurrent flow with an inert gaseous material in a tray column or a packed bed column.

2. A process according to claim 1, in which a packed bed column is used.

3. A process according to claim 2, in which the packed bed consists of Raschig rings.

4. A process according to any one of the preceding claims, in which the stripping is carried out at a temperature from 20-120°C.

5. A process according to any one of the preceding claims, in which the inert gaseous material is nitrogen.

6. A process according to any one of claims 1-4, in which the inert gaseous material is air.

7. A process according to any one of claims 1-4, in which the inert gaseous material is steam.

8. A process according to claim 1, substantially as described with particular reference to the figure.

DATED this SEVENTH day of MAY, 1981

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Patent Attorneys for the Applicant
SPRUSON & FERGUSON