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**Datasheet for the decision  
of 10 July 2009**

**Case Number:** T 2289/08 - 3.2.04

**Application Number:** 99905691.4

**Publication Number:** 1053392

**IPC:** F02B 43/00

**Language of the proceedings:** EN

**Title of invention:**

Combined Cryogenic air separation with integrated gasifier

**Applicant:**

TEXACO DEVELOPMENT CORPORATION

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54, 84, 123(2)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Novelty (yes)"

"Claims - clarity (yes)"

"Amendments - added subject-matter (no)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 2289/08 - 3.2.04

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.04  
of 10 July 2009

**Appellant:** TEXACO DEVELOPMENT CORPORATION  
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White Plains  
New York 10650 (US)

**Representative:** Thomas, Simon  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 28 July 2008  
refusing European application No. 99905691.4  
pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** M. Ceyte  
**Members:** A. de Vries  
T. Bokor

## **Summary of Facts and Submissions**

- I. The Appellant lodged an appeal, received at the EPO on 29 September 2008, against the decision of the Examining Division posted 28 July 2008, refusing the European patent application no. 99 905 691.4. The appeal fee was paid simultaneously. The grounds of appeal were received on 28 November 2008.

The Examining Division held that the application did not meet the requirements of Articles 52(1) and 54 EPC having regard to the following document

D1: EP-A-0 793 070

nor those of Article 84 and 123(2) EPC.

- II. With a communication of 1 April 2009 pursuant to Rule 100(2) EPC the Board suggested a reformulation of the final features of claim 1 which would address deficiencies under Article 123(2) EPC. With letter of 29 May 2009, the Appellant filed as sole request a claim in accordance with these suggestions.
- III. The Appellant requests that the decision under appeal be set aside and the case be remitted back to the examining division for further prosecution based on the following documents

### **Claims**

No.: 1, 2 as filed with letter of 29 May 2009

No.: 3,4 as filed with letter of 27 February 2008

### **Description**

Pages: 1-6,10-14 as published

Pages: 7,7a,8 as filed with letter of 19 May 2008

Pages: 8a,9 as filed with letter of 27 February 2008

**Figures**

Sheets: 1/1 as published

As a subsidiary request, he requests oral proceedings.

IV. The wording of claim 1 is as follows :

"A process for producing oxygen to fuel an integrated gasifier combined cycle power generation system at a rate which corresponds to the power demand of the integrated gasifier combined cycle power production during peak demand periods while maintaining peak efficiency when the integrated gasifier combined cycle power and generation system operates at varying power production, comprising

    cryogenically distilling air in an air separation unit comprising distillation means (5), heat exchange means (8) and a single liquid oxygen cold storage vessel (21);

    wherein during reduction of the power demand from the integrated gasifier combined cycle system relative to its nominal power production demand, liquid oxygen is produced in excess of that required by the integrated gasifier combined cycle system and such excess liquid oxygen is collected and stored in the liquid oxygen cold storage vessel (21) of said air separation unit; and

    wherein during an increase in the power demand from the integrated gasifier combined cycle system, relative to its nominal power production demand, in an operation mode (1) excess liquid oxygen is withdrawn from the liquid oxygen cold storage vessel (21) and vaporized at elevated pressure by means of a liquid oxygen pump (31) and a vaporizer (33), and

in another operation mode (ii) excess liquid oxygen is withdrawn from the liquid oxygen cold storage vessel (21) and combined with liquid oxygen from the distillation means (5) not in excess and vaporized at elevated pressure in indirect heat exchange with the air undergoing cryogenic distillation."

## **Reasons for the Decision**

1. The appeal is admissible.

2. *Background of the invention*

The application is concerned with the production of oxygen for an integrated gasifier combined cycle power generation system. Air is cryogenically distilled in an air separation unit to produce the liquid oxygen which (once vaporized) serves as fuel in the gasifier. To respond to varying demand from the power generation system without compromising the air separation unit's design efficiency, excess liquid oxygen produced during reduced power demand is stored for later use when demand again surges.

3. *Allowability of amendments under Article 123(2) EPC*

3.1 The application as originally filed considers two alternative ways of achieving the storage of excess liquid oxygen for later use. The excess is either stored in the distillation unit itself, or in a separate storage vessel, see page 9, lines 14 to 17. Whereas the original claims are neutral to either option, the present set of claims pursues only the

latter possibility. It does so by incorporating into the combination of features of originally filed claims 1, 2 and 3 the specific detail of excess storage in a separate vessel and the different ways of drawing off the excess as set out on page 12, line 14, to page 13, line 10.

3.2 Line 14 to 18 of page 12 introduce the separate vessel 21 for storing the excess liquid oxygen, shown as a single such vessel in the sole figure. This feature appears in the first step of present claim 1, which corresponds to step (a) of original claim 1 minus liquid oxygen production which has been moved to the following storage step. That step, which now also mentions the vessel as storage means, corresponds to the first half of step (c) of original claim 1 as embodied by the features of original claim 2.

3.3 The following lines of the cited passage describe how excess liquid can be used in two different ways. In the first (page 12, final sentence) excess liquid from the storage vessel is combined with liquid oxygen stream 18. Stream 18 is the main flow of liquid oxygen product from the distillation unit (collected in its lower pressure column 5, page 12, lines 12 to 13, with page 11, lines 1 to 7, and figure) which is subsequently vaporized under high pressure and in indirect heat exchange with input air (page 13, lines 13 to 15; "gaseous" is an obvious error and should read "liquid"). This route appears as mode (ii) in present claim 1, which incorporates both step (b) of original claim 1 (vaporization of the main product flow) as well as the features of original claim 3 - minus a non-

limiting statement of effect - embodying the second half of step (c) of original claim 1.

3.4 Page 13, first paragraph, describes an optional flow of excess liquid oxygen from vessel 21 via a liquid oxygen pump 31 and a vaporizer 33, so bypassing the normal output flow in the air separation unit altogether. From the fact that the relevant lines 24, 29 are shown solid, it is deduced that the first and second alternatives are not mutually exclusive, but rather both exist together and are available as options to each other. This second route represents mode (i) of present claim 1.

3.5 The optional use of a separate vessel and its two different uses is described in the context of a specific embodiment of the air separation unit. However, it will be readily recognizable to the person skilled in the field of integrated gasifier combined cycle power generation that such an alternative storage and use is not intricately bound to the particular details of the unit by some functional or structural relationship. The entire assembly of vessel 21 and its in- and output lines 13,24,29,31,32,33,34 (link 35 is again optional) is supplementary to the main unit, see figure, with one route (29-34) bypassing the unit entirely, while the other (24) merely feeds into its main distillation outflow (18). It is thus clear from the original disclosure that the vessel and its in/output lines can be regarded in isolation from the particular configuration of the air separation unit itself.

3.6 Finally, the opening lines of claim 1 now also include a statement of the purpose or effect as stated in similar (but not identical) wording to the same effect on page 1, lines 5 to 10, of the originally filed description. This purpose is related to the storage of excess but is otherwise of no limiting character.

3.7 The Board concludes in the light of the above that claim 1 as amended does not contain subject-matter extending beyond the content of the application as filed and therefore meets the requirements of Article 123(2) EPC.

#### 4. *Clarity*

The Board is satisfied that claim 1 in its present wording provides a sufficiently clear definition of the process and its individual steps that it is desired to protect. In particular, it now differentiates clearly between the two modes of using the stored excess liquid oxygen, only the second of which involves heat exchange. Claim 1 thus meets the requirements of Article 84 EPC.

#### 5. *Novelty with regard to D1*

5.1 The Board concurs with the appealed decision's position that D1 is the most pertinent prior art for considering novelty. This document also relates to the integrated operation of a combustion turbine with a cryogenic air separation to provide (liquid) oxygen, which in turn can be integrated in a gasification or gasifier combined cycle power generation system, page 2, lines 7 to 10. It is concerned also with reconciling varying power demand with constant design capacity (page 2,



lines 41 to 47), and proposes to do so, as does the claimed invention, by storing excess liquid oxygen produced in the air separation unit during periods of low demand (page 4, line 11 to 18).

5.2 Figure 3 shows a particular example of an integrated air separation system, described in detail on page 7, lines 16 to 34. It comprises a separate vessel 303 for storing the excess liquid, fed as stream 51 from low pressure distillation column 119. The text, lines 28 to 34, mentions a further vessel 311, into which "in an alternative method ... crude liquid oxygen 33 ... is stored". The Board understands this passage to refer to an alternative, modified embodiment, where this further vessel 311 either replaces or supplements vessel 303. This is why in figure 3 vessel 311 and its supply and feed lines are drawn dashed, indicating to the skilled person that this portion of the figure 3 arrangement need not be present. The Board concludes, that in the unmodified version of the figure 3 embodiment, without optional vessel 311, the vessel 303 is the sole storage means. Contrary to the appellant's view, vessel 303 is thus disclosed in D1 as a *single* vessel in the sense of claim 1.

5.3 The cited passage in D1 also describes two separate ways or modes of withdrawing liquid oxygen from the vessel 303 when demand increases. Firstly, see page 7, lines 22 to 25, it may be drawn via line 305, valve 307 and line 308 into main liquid oxygen feed 51 (see figure 3) before it enters pump 147 and is fed to heat exchanger 117, where it is vaporized by indirect heat exchange with cooling streams, see page 6, lines 38 to 42, including, see figure 3, air feeds 15 and 26. This

manner of using the excess corresponds to mode (ii) of claim 1.

5.4 A second mode is discussed briefly in line 25 of page 7 : "A portion of liquid oxygen 305 can be withdrawn as a liquid product if desired (not shown)". The Board understands this passage as meaning that excess liquid oxygen can also be tapped directly from vessel 305 without feeding it back into the main air separation unit. This is similar to mode (i) of claim 1, which also bypasses the air separation unit proper. However, in contrast to that mode, this alternative mode in D1 does not involve vaporization at elevated pressure. This sole difference renders the process of claim 1 novel. The Board concludes that claim 1 meets the requirements of Article 52(1) in combination with Article 54 EPC.

6. So as not to deprive the Appellant of the right to have all issues decided before two instances, the Board, pursuant to Article 111(1) EPC and in accordance with the appellant's request, remits the case to the Examining Division for further prosecution based on claim 1. Examination should proceed with regard in particular to the remaining issue of inventive step.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution.

The Registrar

The Chairman

G. Magouliotis

M. Ceyte