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# D E C I S I O N
# of 2 October 2002

**Case Number:** T 0980/99 - 3.3.1

**Application Number:** 91116297.2

**Publication Number:** 0479103

**IPC:** C07C 273/04

**Language of the proceedings:** EN

**Title of invention:**
Process for the production of urea by steps with differentiated yields, and relevant implementations also on existing plants

**Patentee:**
UREA CASALE S.A.

**Opponent:**
DSM N.V.
SNAMPROGETTI S.p.A.

**Headword:**
Production of urea/UREA CASALE

**Relevant legal provisions:**
EPC Art. 56, 84, 123(2), R. 57(a)

**Keyword:**
"Main and first auxiliary request: inventive step (no) - obvious solution; third, fourth and fifth auxiliary request - support in the application as filed (no) - inadmissible combination of different parts of the application as filed - clarity (no)"

**Decisions cited:**
G 0009/91

**Catchword:**
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0980/99 - 3.3.1

**D E C I S I O N**
**of the Technical Board of Appeal 3.3.1**
**of 2 October 2002**

**Appellant:** (Proprietor of the patent)
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**Decision under appeal:** **Decision of the Opposition Division of the European Patent Office posted 3 August 1999 revoking European patent No. 0 479 103 pursuant to Article 102(1) EPC.**

**Composition of the Board:**

**Chairman:** A. J. Nuss
**Members:** P. F. Ranguis
S. C. Perryman

## Summary of facts and Submissions

I. The Appellant (Proprietor of the patent) lodged an appeal against the decision of the Opposition Division to revoke the European patent No. 0 479 103 (European patent application No. 91 116 297.2) on the ground that the patent in the form as amended during opposition proceedings according to the then pending main request or first, second and third auxiliary request did not comply with the requirements of Article 56 EPC.

II. The opposition filed by the Respondents 1 and 2 (Opponents 1 and 2) sought revocation of the patent in suit under Article 100(a) EPC on the ground that its subject-matter lacked novelty or did not involve an inventive step.

III. The oppositions were supported by several documents including:

(2) US-A- 3 091 637

(3) USSR Inventor's Certificate No. 606 858 (and translation into English)

(6) Snamprogetti process as described in the contested patent, column 1, lines 18 to 52

(16) Nitrogen, Vol. 157, Sept./Oct. 1985, pages 37 to 42, "Revamping urea plants"

IV. In its decision, the Opposition Division held that when seeking to revamp an existing total recycle plant (either conventional or stripping type) comprising one reactor, with a view to improving its performance, the

person skilled in the art would have considered the addition of a further reactor in fluid communication as taught by document (2). In the absence of unexpected improvements the choice among others (cf. document (16), in particular on page 42 "the SRR process") of this possibility did not in itself render the claimed method of retrofitting inventive.

V. In a communication dated 4 June 2002 accompanying the summons to oral proceedings, the Board questioned *inter alia* the compliance of the four pending requests (cf. point I above) with the requirements of Article 123(2) and 84 EPC.

VI. At the oral proceedings which took place on 2 October 2002, the Appellant abandoned the previous requests and filed six single claims as main request and first to fifth auxiliary request.

Claim 1 of the main request had the same wording as Claim 11 as granted and read as follows:

"1. A method of retrofitting a pre-existing plant for urea production including a reactor (R2) for urea synthesis in fluid communication with a recovery section (SE-RI) for separating urea from an aqueous solution (SC) of unreacted products leaving the reactor (R2), comprising the steps of:

(a) providing a further reactor (R1) for urea synthesis upstream of said recovery section (SE-RI);

(b) connecting said further reactor (R1) with said recovery section (SE-RI) and with means for

feeding high purity ammonia and carbon dioxide;

(c) providing conduit means (7) between said recovery section (SE-RI) and the reactor (R2) for feeding thereto said solution (SC) of unreacted products;

(d) providing conduit means (6) between said recovery section (SE-RI) and said further reactor (R1) for recycling thereto high-purity recovered ammonia (NEP)".

Claim 1 of the first auxiliary request read as follows:

"1. A method of retrofitting a pre-existing plant for urea production including a reactor (R2) for urea synthesis in fluid communication with a recycling section (SE-RI), for separating urea from an aqueous solution (SC) of unreacted products leaving the reactor (R2), comprising the steps of:

(a) providing a further reactor (R1) for urea synthesis in parallel to said reactor (R2) of the pre-existing plant;

(b) providing connecting means for connecting said further reactor (R1) with said recycling section (SE-RI) and with means for feeding high purity ammonia and carbon dioxide;

(c) providing a separator (SEP) downstream of said further reactor (R1) for separating a reaction mixture coming out of said further reactor (R1) into flash vapours (VF) and a flashed urea solution (SUF);

(d) providing means for recycling the flash vapours (VF) to said reactor (R2) of the pre-existing plant;

(e) providing means for feeding the flashed urea solution (SUF) to the urea recycling section (SE-RI);

(f) providing conduit means (7) between said recycling section (SE-RI) and the reactor (R2) of the pre-existing plant for feeding thereto said solution (SC) of unreacted products;

(g) providing conduit means (6) between said recycling section (SE-RI) and said further reactor (R1) for recycling thereto high-purity recovered ammonia (NEP)".

Claim 1 of the second auxiliary request read as follows:

"1. A method of retrofitting a pre-existing plant for urea production including:

- a reactor (R2) for urea synthesis;

- a recycling section (SE-RI), for separating urea from an aqueous solution (SC) of unreacted products leaving the reactor (R2), comprising a stripper (S) for stripping a great part of carbamate and part of the free ammonia included in a urea solution coming out of said reactor (R2),

- means for recycling the stripped carbamate and free ammonia to said reactor (R2),

said method comprising the steps of:

(a) providing a further reactor (R1) for urea synthesis in parallel to said reactor (R2) of the pre-existing plant;

(b) providing connecting means for connecting said further reactor (R1) with said recycling section (SE-RI) and with means for feeding high purity ammonia and carbon dioxide;

(c) providing a separator (SEP) downstream of said further reactor (R1) for separating a reaction mixture coming out of said further reactor (R1) into flash vapours (VF) and a flashed urea solution (SUF);

(d) providing means for recycling the flash vapours (VF) to said reactor (R2) of the pre-existing plant;

(e) providing means for feeding the flashed urea solution (SUF) to the urea recycling section (SE-RI);

(f) providing conduit means (7) between said recycling section (SE-RI) and the reactor (R2) of the pre-existing plant for feeding thereto said solution (SC) of unreacted products;

(g) providing conduit means (6) between said recycling section (SE-RI) and said further reactor (R1) for recycling thereto high-purity recovered ammonia (NEP)".

Claim 1 of the third auxiliary request differed from Claim 1 of the second auxiliary request in that the expression "via a carbamate condenser" was added after "means for recycling the stripped carbamate and free ammonia to said reactor (R2)" and the expression "via said carbamate condenser" was added after the expression "providing means for recycling the flash vapours (VF) to said reactor (R2) of the pre-existing plant" (step d).

Claim 1 of the fourth auxiliary request differed from Claim 1 of the third auxiliary request in that:

the expression "upstream of said recycling section (SE-RI)" was added at the end of the feature (a),

the term "pre-existing" was inserted in the feature b) after "with said recycling section (SE-RI) and with",

a new feature c) reading "providing pumping devices between said further reactor (R1) and said pre-existing means for feeding high purity ammonia and carbon dioxide for bringing the latter reactants to operative conditions higher compared with the reactor (R2) of the pre-existing plant"

the features (c) to (e) of Claim 1 of the third auxiliary request were modified to be written (d) to (f) and the steps (f) and (g) of the third auxiliary request were replaced by the steps (g) and (h) reading:

(g) providing connecting means for connecting said recycling section (SE-RI) with the reactor (R2) of the pre-existing plant for feeding thereto said solution (SC) of unreacted products;

(h) providing connecting means for connecting said recycling section (SE-RI) with said further reactor (R1) for recycling thereto high-purity recovered ammonia (NEP)".

Claim 1 of the fifth auxiliary request read as follows:

"1. A method of retrofitting a pre-existing plant for urea production including:

- a reactor (R2) for urea synthesis;

- means for feeding fresh $CO_2$ and $NH_3$ to said reactor (R2);

- a stripper (S) for stripping a great part of the carbamate included in the urea solution coming out of the reactor (R2) and part of the free ammonia present;

- means for recycling to said reactor (R2) said stripped carbamate and said part of the free ammonia;

- means for feeding a urea solution (SU) coming from said stripper (S) to a middle pressure section (SMP), where said urea solution (SU) is distilled to obtain vapours;

- means for feeding said obtained vapours to a rectification column (CR) to obtain $NH_3$ at high purity (NEP) and a carbamate solution (SC);

- a pump (P) for pumping said $NH_3$ at high purity (NEP) into said reactor (R2);

- a pump (P') for pumping said carbamate solution (SC) into said reactor (R2);

said method comprising the steps of:

(a) providing a further reactor (R1) for urea synthesis in parallel to said reactor (R2) of the pre-existing plant;

(b) providing a separator (SEP) downstream of said further reactor (R1) for separating a reaction mixture coming out of said further reactor (R1) into flash vapours (VF) and a flashed urea solution (SUF);

(c) providing means for recycling the flash vapours (VF) to said reactor (R2) of the pre-existing plant;

(d) providing means for feeding said flashed urea solution (SUF) to said medium pressure section (SMP);

(e) providing connecting for connecting said further reactor (R1) with said means for feeding fresh $CO_2$ and $NH_3$;

(f) providing pumping devices for feeding said fresh $CO_2$ and $NH_3$ to said further reactor (R1);

(g) providing connecting means for feeding said high purity $NH_3$ to said further reactor (R1) coming from said rectification column (CR)".

VII. The Appellant disputed that the claimed subject-matter

of any of the requests would have been obvious to the person skilled in the art in the light of the cited documents. In this context, he disputed in particular that document (2) was relevant to assess the inventive step of a method of retrofitting a pre-existing plant and, in any case, could not be considered as the closest state of art. Indeed, this document related to partial recycle plant, i.e. a plant wherein a part of unconverted ammonia and carbon dioxide are purged from the plant, which was transformed to a total recycle plant by adding a second reactor to which these unconverted ammonia and carbon dioxide were sent. This resulted in a loss in terms of overall efficiency and thus in an increase in the energy consumption. This modification of a pre-existing plant differed clearly from the retrofitting of a total recycle plant as disclosed in document (6) or document

(22) Nitrogen No. 185, May-June 1990, pages 22 to 29

newly cited by the Respondent 2. Furthermore, this document (2) was old and related to a process criticized in document (3). Regarding the first auxiliary request, the ammonia separation vessel (7) of document (2) could in no way be considered as equivalent to the flash separator SEP since in the latter, ammonia could be directly recycled to the pre-existing plant without energy consumption, while ammonia removed from vessel (7) was to be condensed and re-compressed with high utilities consumption before recycle.

Document (16), by contrast was a recent document wherein different methods for retrofitting total recycle plants (i.e. either "conventional" or

"stripping" processes) were disclosed and was to be considered as the closest state of the art.

The claimed retrofitting method was not a mere alternative to the methods described in document (16) but, on the contrary, was a more efficient and advantageous method which was not suggested by document (16) in combination with the other cited prior art.

Regarding the other requests, proper support for these claims could be found in Figures 1 to 3 and corresponding description, for instance page 2, lines 11 to 20; page 3, lines 6 to 39 and 58; page 4, lines 1 and 2, lines 17 to 20 and lines 29 to 31; Claim 11 of the application as published.

VIII. Both Respondents approved the decision of the Opposition Division and pointed out that document (2) was to be considered as the closest state of the art since the subject of document (2) was a complete recycle urea synthesis and retrofitting of urea plants was several times mentioned therein. Furthermore, this document related to a double-reactor plant with all the essential features of the plant represented according to Figure 3 of the patent in suit. The person skilled in the art would have easily used the teaching of document (2) for retrofitting either a plant with a once-through reactor, or a plant with a conventional reactor with recycle. Therefore, the combination of document (2) with document (6) or the newly cited document (22) rendered obvious the claimed invention. Regarding the first auxiliary request, the separator (SEP) now incorporated in Claim 1 and the vessel (7) disclosed in document (2) had the same function and

this further feature could not render inventive the claimed invention either.

IX. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of Claim 1 the main request filed at the oral proceedings or of the respective Claim 1 of the first to fourth auxiliary request filed on 3 September 2002 or of Claim 1 of the fifth auxiliary request filed at oral proceedings.

The Respondents requested that the appeal be dismissed.

X. At the end of the oral proceedings the decision of the Board was announced orally.

## Reasons for the decision

1. The appeal is admissible

*Main request*

2. *Article 56 EPC - Inventive step*

2.1 The claimed invention relates to a method of retrofitting a pre-existing plant for urea production including technical features as defined in Claim 1 (cf. point VI above). In accordance with the "problem-solution approach" consistently applied by the Boards of Appeal to assess inventive step on an objective basis, it is necessary to establish the closest state of the art being the starting point, to determine in the light thereof the technical problem which the invention addresses and solves, and to

examine the obviousness of the claimed solution to this problem in view of the state of the art. The closest prior art is normally a prior art document disclosing subject-matter aiming (a) at the same objective as the claimed invention and (b) having the most relevant technical features in common.

2.2 Document (2) discloses a process in which the total synthesis of urea from ammonia and carbon dioxide is carried out in two separate and simultaneous phases (cf. column 1, lines 10 to 13). An overall result is achieved, in which the advantages of urea synthesis with a large excess of ammonia are combined with the advantages of complete recycle urea synthesis. The two phase or dual cycle synthesis thus results in large overall improvement in operating efficiency and economy (column 1, lines 25 to 30). This process refers to the same principle as the method of preparation of urea of the claimed invention, namely the combination of two reactors in a complete recycling process. Furthermore, the process of document (2) is disclosed in details by reference to the figure:

A feed of ammonia (1) and carbon dioxide (2) in a molar ratio $NH_3$:$CO_2$ between 4 and 10 is passed in an autoclave (3) to achieve high conversion to urea (cf. column 3, lines 10 to 20). The resulting urea-containing stream is passed to an excess ammonia separation vessel (7) for removing excess ammonia which is condensed and recycled or stored (column 3, lines 26 to 30; lines 57 to 60). The residual effluent stream (17) is removed and passed into ammonium carbamate decomposer (18). An additional urea synthesis effluent stream (19), also containing ammonium carbamate, is passed into ammonium decomposer (18)

together with stream (17)(cf. column 3, lines 61 to 66). This stream (19) comes from the second urea synthesis autoclave (55) which receives an aqueous ammonium carbamate solution (54) (see below) and additional ammonia (56) and carbon dioxide (57) and which operates with a relatively low proportion of excess ammonia, and achieves a lower percent conversion than the autoclave (3) (cf. column 2, lines 47 to 50; column 4, lines 63 to 75). The mixed gas-liquid stream removed from ammonium carbamate decomposer (18) is passed into decomposer separator vessel (23) to separate via (24) a mixed off-gas (cf. column 4, lines 1 to 2) and via (25) a liquid consisting primarily of an aqueous urea solution with a slight amount of residual ammonium carbamate and free ammonia (cf. column 4, lines 6 to 9). The mixed off-gases from separator (23) are passed into the condenser stripper (43) to be scrubbed to remove bulk of carbon dioxide so that a final ammonia stream free of carbon dioxide is removed via (47) and condensed to liquid ammonia stream (49) suitable for direct recycle (cf. column 4 lines 46 to 62). An aqueous ammonium carbamate solution is also withdrawn from unit (43) and passed into the second urea autoclave (55) (column 4, lines 63 to 67).

2.3 Thus, the resulting plant disclosed in document (2) comprises the same technical features as the resulting plant obtained by the claimed method. Indeed, the reactor (R2) corresponds to the reactor (55), the recovery section (SE-RI) corresponds to the system comprising the decomposer (18), the separator vessel (23) and the condenser stripper (43). The reactor (R1) corresponds to the reactor (3) also connected to the said system (18), (23) and (43) and to fresh ammonia and carbon dioxide. The said system is also connected

to reactor (55), i.e. reactor (R2), for recycling carbamate solution (unreacted products). Furthermore, since the pure ammonia removed from the condenser (43) is recycled, one of the alternatives which emerges unambiguously for the skilled reader from the disclosure of document (2) is that the ammonia is recycled to the reactor (3), i.e. reactor (R1).

2.4 Document (2) discloses, furthermore, the utilization of this process for modifying an existing 6 to 1 urea synthesis facilities to provide an economically full recycle operation (cf. column 2, lines 62 to 68). The Appellant conceded that document (2) related to a retrofitting method.

2.5 In conclusion, one of the objectives of document (2) is a method of retrofitting a pre-existing plant. The resulting plant obtained by implementing the said method of retrofitting corresponds to that now claimed (cf. point 2.3 above), the sole difference lying in the starting pre-existing plant to be retrofitted. Document (2) describes a method of modifying existing 6 to 1 urea synthesis facilities to provide an economically full recycle operation (cf. column 2, lines 62 to 68), by adding a reactor coupled with a recycling process, while the claimed method relates to a method of retrofitting a pre-existing plant including a reactor coupled with a recycling process by adding a reactor working as "once-through" (without recycle), the resulting plants being the same.

2.6 Document (6) is the Snamprogetti process as described in the patent in suit (cf. column 1, lines 18 to 52 and Figure 1). This description is not a prior art disclosure since it was part of the application as

filed and, moreover, does not refer to any source of information made available to the public which could have confirmed the content of this description. It is, therefore, not admissible from a legal point of view to consider such a description as prior art. This finding has nevertheless no consequence on the issue to be decided since the parties agreed to rely in lieu thereof on the disclosure of document (22) which discloses the said Snamprogetti process with recycling of the carbamate solution to the reactor. However, document (22) cannot be the closest prior art since it does not address the same objective as the claimed invention, namely a method of retrofitting a pre-existing plant.

2.7 Document (16) discloses several methods for revamping urea plants using "conventional" or "stripping" total recycle processes to improve performances. However, those methods do not involve a two-reactor technology and, therefore, document (16) has less relevant technical features in common with the claimed invention than document (2).

2.8 The Appellant argued that the disclosure of document (2) could not be considered as the closest state of the art since the technology disclosed was old, did not help to increase the specific throughput of the reaction volume as taught by document (3) (cf. column 2, line 12 to column 3, line 4) and, in fact, was considered as obsolete at the time the patent in suit was filed. Furthermore, the yield obtained in implementing the process according to document (2) was lower than that obtained with the preexisting plant, contrary to the claimed method.

2.9 However, in accordance with the "problem-solution approach" consistently applied by the Board of Appeal to assess inventive step, the closest prior art is normally a prior art document disclosing subject-matter aiming at the same objective as the claimed invention and having the most relevant technical features in common and that irrespective of its age. Which prior art qualifies as the closest in respect of what is claimed depends indeed on its technical closeness in respect to the latter and not on its age thereto. The Board has no reason therefore to accept an age related approach for establishing the starting point for the assessment of inventive step as advocated by the Appellant.

2.10 Since document (2) aims at the same objective as the claimed invention and has the most technical features in common with the claimed invention, it is the Board's conclusion that it represents the prior art closest to the patent in suit and thus, the starting point in the assessment of inventive step.

2.11 The Appellant argued that the claimed invention provided advantages in terms of yield over the technology disclosed in document (2). However, he submitted nothing relevant in that respect. Indeed, since the resulting plant as defined in Claim 1 is the same as that of document (2), the Board can only conclude that the yields obtained in both processes are comparable. Therefore, the problem to be solved in view of document (2) can only be seen in the provision of a further method for retrofitting a pre-existing plant for urea production.

2.12 In view of the example described in the patent in suit,

the technical problem is solved over the whole claimed area, which was not contested.

2.13 It remains to be decided whether or not the claimed solution is obvious over the cited prior art.

The relevant question to be answered is whether the person skilled in the art, starting from document (2), would have envisaged to retrofit a pre-existing plant for urea production involving a recycling process in the way as defined in Claim 1. The Board observes, in that respect, that the disclosure of document (2) is not limited to retrofitting a pre-existing urea plant involving a "once-through reactor" but also encompasses a more general embodiment involving the combination of a one-through reactor to a complete recycle process. Indeed, this document discloses that:

"Two synthesis autoclaves are employed in the process. The first autoclave receives feed streams of ammonia and carbon dioxide, with a high excess of ammonia being employed, and achieves a very high percent conversion to urea. The effluent from the first reactor is **combined** (emphasis added by the Board) with the effluent from the second reactor, and the resulting stream is processed to yield product urea solution, pure ammonia, and aqueous ammonium carbamate solution. The aqueous ammonium carbamate solution is then recycled to the second reactor, together with additional ammonia and carbon dioxide. This second reactor is operated with a relatively low proportion of excess ammonia, and achieves a lower percent conversion than the first reactor" (cf. column 2, lines 35 to 50).

This general process is also reflected by Claim 1 of

this document.

Therefore, one of the alternative methods within the teaching of document (2) for modifying a pre-existing plant is to combine a high yield reactor with a process involving a second reactor to which the aqueous carbamate solution is recycled (it being understood that the recycling of pure ammonia to the high yield reactor emerges unambiguously from the disclosure of document (2) (cf. point 2.3 above). This teaching leads the person skilled in the art, when following the description of the figure to combine the reactor (3) to the complete recycle process involving the reactor (55), the system comprising the decomposer (18), the separator vessel (23), the condenser stripper (43), namely the recycling section, and connecting means to reactor (55) for recycling carbamate solution and, thus, straightforwardly and without inventive ingenuity to the claimed invention.

2.14 The Board concludes that the subject-matter of Claim 1 does not involve an inventive step and, therefore, the present request must fail.

*First auxiliary request*

3. *Article 123(2)(3) and Rule 57(a) EPC - Amendments*

3.1 In accordance with the provisions of the decision of the Enlarged Board of appeal G 9/91 (cf. OJ EPO 1993, 408, point 19 of the reasons), the Board must examine whether the amendments to the granted claims comply with the requirements of the EPC (e.g. with regard to the provisions of Article 123(2) EPC). This applies to the subsequent requests too.

The subject-matter of present Claim 1 differs essentially from that of the main request in that the features (c) to (e) relating to the presence of a separator were added (cf. point VI above). Those amendments are designed to overcome the grounds of opposition, namely absence of novelty and/or inventive step. Therefore, those amendments can be admitted under Rule 57(a) EPC.

3.2 Those added features find support in the application as filed on pages 12 and 13, bridging paragraph. It follows that those amendments do not extend beyond the content of the application as filed. Nor do they extend the protection conferred.

4. *Article 56 EPC - Inventive step*

4.1 Document (2) also discloses that the resulting urea-containing stream is passed to an excess ammonia separation vessel (7) for removing excess ammonia which is condensed and recycled (column 3, lines 26 to 30; lines 57 to 60) and that the residual effluent stream (17) is admitted in the recycling section (18), (23) and (43). The Appellant argued that the pressure of the urea solution leaving the "once-through" reactor (3) was reduced to a value between 14 and 41 bars, while the second reactor operated between 140 and 400 bars as could be deducted from the example. It was clear, therefore, that the ammonia which was separated in the vessel (7) should be condensed and re-compressed with high utilities consumption for recycling. By contrast, the ammonia removed from the flash separator (SEP) as defined in step (c) could be directly recycled to the pre-existing plant reactor without energy consumption. However, this difference does not emerge from the

definition of the separator (SEP) in Claim 1. It is true that the description of the patent mentions that the separator (SEP) operates **at reactor pressure (R2)**. However, this feature is not present in the wording of the claim and cannot be considered for distinguishing the vessel (7) of document (2) and the separator (SEP) of the claimed invention. The added features, therefore, cannot distinguish further the claimed invention from document (2) which remains the closest state of the art.

4.2 For the same reasons as those set out above (cf. point 2.13), the claimed subject-matter is obvious over document (2).

4.3 The Board concludes that the subject-matter of Claim 1 does not involve an inventive step and, therefore, the first auxiliary request must fail.

*Second auxiliary request*

5. *Amendments - Article 123(2), 84 and Rule 57(a) EPC*

5.1 The subject-matter of present Claim 1 differs essentially from that of the first auxiliary request in that the features related to a stripper (S) and means for recycling, from the stripper, a great part of carbamate and part of the free ammonia to reactor (R2) were added (cf. point VI above). Those amendments are designed to overcome the grounds of opposition, namely absence of novelty and/or inventive step. Therefore, those amendments can be admitted under Rule 57(a) EPC.

5.2 The Appellant argued that those added features found support in the application as filed, namely on page 4,

line 18 to page 5, line 18 in relation with Figure 1 which refers to the isobaric stripping process (Snamprogetti); on page 8, line 16 to page 10, line 18 in relation with Figure 2 which is the process according to the claimed invention "in its more significant **conceptual** features (emphasis added by the Board)" and on page 10, lines 20 to 21 and page 11, line 22 to page 12, line 10 in relation to Figure 3 which is the application to the retrofitting of the selfstripping process $NH_3$ of Snamprogetti.

5.3 The Board does not deny that for deciding whether or not one or several amendments satisfy the requirements of Article 123(2) EPC, the whole content of the application as filed is to be taken into account. This cannot mean, however, that various information belonging to different levels of disclosure (prior art, general disclosure and example) may be combined unless this intermediate generalization be directly and unambiguously derivable from the application as filed.

5.4 In that context, the subject-matter of present Claim 1 is the result of the combination of the subject-matter of Claim 1 of the first auxiliary request which essentially reflects the schematic representation of Figure 2 with part of the embodiment of the isobaric stripping process (Snamprogetti) such as set out in Figures 1 and 3. However, the latter is a complete recycling process involving a "recycling section (SE-RI)" comprising not only a stripper (S) but downstream, a middle pressure phase (SMP) and a rectification column (CR) (cf. page 5, lines 4 to 14 of the application as filed). In the present case, the fact of incorporating in the general concept a particular element makes this concept fall apart since according

to the application as filed this particular element cannot operate **without the cooperation** of the other elements (SMP) and (CR). In other terms, singling out the stripper (S) from the specific embodiment of Figures (1) and/or (3) and incorporating this element in a more conceptual definition such as set out in Figure 2 represents an intermediate disclosure of subject-matter which is not directly and unambiguously derivable from the application as filed contrary to the requirements of Article 123(2) EPC.

5.5 Furthermore, although the feature (f) in the first auxiliary request, i.e. "providing conduit means (7) between said recycling section (SE-RI) and the reactor (R2) of the pre-existing plant for feeding thereto said solution (SC) of unreacted products" is clear because the expression "recycling section" is defined at a certain conceptual level, it becomes unclear once the term "comprising a stripper" is added as is the case in this request. Indeed, that raises the question from which part of the recycling section does the conduit mean (7) start. This information is not present in the claim but in the description (Figure 3) where it is indicated that the solution (SC) is recycled from the rectification column (CR). An essential technical feature was, therefore, omitted in contravention with the requirements of Article 84 EPC.

5.6 In view of the above reasons, the present request must fail.

*Third auxiliary request*

6. *Amendments - Article 123(2), 84 and Rule 57(a) EPC*

6.1 The subject-matter of present Claim 1 differs essentially from that of the second auxiliary request in that the stripped carbamate, the free ammonia and the flash vapours (VF) are recycled to the reactor (R2) via a carbamate condenser. Those amendments are designed to overcome the grounds of opposition, namely absence of novelty and/or inventive step. Therefore, those amendments can be admitted under Rule 57(a) EPC.

6.2 However, for the same reasons as explained above concerning the second auxiliary request, mentioning the stripper (S), while omitting the other technical features necessary in the embodiment of Figures 1 and/or 3 for the recycling, amounts to an inadmissible singling out contrary to the requirements of Article 123(2) EPC. Furthermore, for the same reasons as explained above concerning the second auxiliary request, present Claim 1 is in contravention of the requirements of Article 84 EPC.

6.3 In view of the above reasons, the present request must fail.

*Fourth auxiliary request*

7. *Amendments - Article 123(2), 84 and Rule 57(a) EPC*

7.1 The subject-matter of present Claim 1 differs essentially from that of the third auxiliary request in that

(a) the stripped carbamate and free ammonia are recycled to the reactor (R2) via a carbamate condenser;

(b) The reactor (R1) is positioned in parallel to the reactor (R2) **and** upstream of the recycling section (SE-RI);

(c) Pumping devices are present for feeding high purity ammonia and carbon dioxide at operative conditions higher compared with the reactor (R2) of the pre-existing plant;

Those amendments are designed to overcome the grounds of opposition, namely absence of novelty and/or inventive step. Therefore, those amendments can be admitted under Rule 57(a) EPC.

7.2 However, for the same reasons as explained above concerning the second and third auxiliary request, mentioning the stripper (S), while omitting the other technical features necessary in the embodiment of Figures 1 and/or 3 for the recycling, amounts to an inadmissible singling out contrary to the requirements of Article 123(2) EPC. Furthermore, for the same reasons as explained above concerning the second auxiliary request, present Claim 1 is in contravention with the requirements of Article 84 EPC.

7.3 For the above reasons, the fourth auxiliary request must also fail.

*Fifth auxiliary request*

8. *Amendments - Article 123(2), 84 and Rule 57(a) EPC*

8.1 The subject-matter of Claim 1 contains some but not all the features derivable from Figure 1 and some but not all the features derivable from Figure 3. Although the

now claimed invention may be seen in a method of retrofitting a plant as set out in Figure 1 by incorporating a second reactor (R1) to provide the retrofitted plant according to Figure 3, it is however necessary that the technical features defining the present Claim 1 reflects this method. This is not the case here. Indeed:

In Figure 1, fresh ammonia is provided to reactor (R2), while it is no longer provided to reactor (R2) in Figure 3. Also, a pump (P) is present in Figure 1 for pumping $NH_3$ (NEP) into reactor (R2), while it is no longer present in Figure 3. Those features are nevertheless present in Claim 1. The claimed subject-matter, therefore, cannot find support in the combination of the embodiments of Figures 1 and 3 but goes beyond this combination and extends the content of the application as filed (Article 123(2) EPC).

Furthermore, there is an internal contradiction in this claim since, according to a feature, $NH_3$ at high purity is recycled to reactor (R2), while according to another feature, $NH_3$ is recycled to reactor (R1). This contradiction renders this claim also unclear (Article 84 EPC).

8.2 The present request must also fail.

8.3 Since the subject-matter of the main request does not comply with the requirements of Article 56 EPC and since the subject-matter of the other requests does not comply with the requirements of Article 123(2) or 84 EPC, the appeal must be dismissed.

## Order

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

The appeal is dismissed.

The Registrar: The Chairman

N. Maslin A. Nuss