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D E C I S I O N
of 5 April 2005

Case Number: T 0948/02 - 3.3.3

Application Number: 89810680.2

Publication Number: 0360746

IPC: C08F 2/38

Language of the proceedings: EN

Title of invention:
Phosphonic compounds

Patentee:
Great Lakes Chemical (Europe) GmbH

Opponent:
Rohm and Haas (UK) Ltd. European Patent Department, City Point

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Keyword:

"Amendment of a generic chemical formula (not allowable)"

Decisions cited:

G 0001/93, T 0859/94, T 0615/95, T 0050/97

Catchword:

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Case Number: T 0948/02 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 5 April 2005

Appellant: Great Lakes Chemical (Europe) GmbH
(Proprietor of the patent) Juchstrasse 45
CH-8500 Frauenfeld (CH)

Representative: VOSSIUS & PARTNER
Postfach 86 07 67
D-81634 München (DE)

Respondent: Rohm and Haas (UK) Ltd.
(Opponent) European Patent Department, City Point
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Representative: -

Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 17 April 2002,
issued in writing on 27 June 2002 revoking
European patent No. 0360746 pursuant to
Article 102(1) EPC.

Composition of the Board:

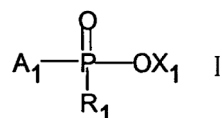
Chairman: R. Young
Members: A. Däweritz
H. Preglau

Summary of Facts and Submissions

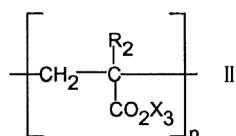
I. The grant of European patent No. 0 360 746 in respect of European patent application No. 89 810 680.2, filed on 12 September 1989 and claiming priority of 21 September 1988 of an earlier application in the United Kingdom (8822150), was announced on 17 July 1996 (Bulletin 1996/29). The above patent application had been transferred with effect from 22 March 1993 from the original Applicant to the later Patent Proprietor (FMC Corporation (UK) Ltd.). The patent was granted with 14 claims.

Independent Claim 1 as granted read as follows:

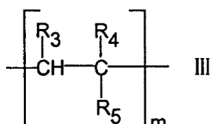
"1. Cotelomer compounds having the formula I:



and salts there of wherein A_1 is a random polymeric residue comprising at least one unit of formula II:



and at least one unit which differs from a unit of formula II and which has the formula III:



X_1 is hydrogen, C_1 - C_4 alkyl, phenyl, an alkali metal- or alkaline earth metal atom, a ammonium ion or an amine residue;

m and n are integers such that the sum of m and n is an integer of from 2 to 100, the ratio $n:m$

being from 99 to 1:1 to 99, provided that the resulting cotelomer is water-soluble;

R_1 is $-OX_2$ wherein X_2 may be the same as or different from X_1 and is hydrogen, C_1-C_4 alkyl, phenyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue, or X_1 and X_2 together may be a multivalent metal atom forming a neutral complex with anionic moieties of the cotelomer molecule, or X_1 and X_2 may be linked by a $-CH_2-CH_2-$ residue to form a ring structure;

R_2 is hydrogen, or methyl;

X_3 is the same as or different from X_1 and X_2 and is hydrogen, C_1-C_4 alkyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue;

R_3 is hydrogen, or a residue $-CO_2R_6$ wherein R_6 is hydrogen or a straight- or branched chain C_1-C_8 alkyl residue;

R_4 is hydrogen or a residue $-CO_2R_6$ wherein R_6 is hydrogen,

R_5 is a residue $-CO_2R_7$ in which R_7 is hydrogen, a straight or branched C_1-C_8 alkyl residue, a straight or branched C_1-C_8 alkyl residue substituted by one or two carboxylic acid groups, or is a phenyl residue, a phenyl residue substituted by hydroxyl or SO_3X_4 , or is an hydroxyl, aceto-methyl, $-SO_3X_4$, or $-PO_3(X_4)_2$ in which X_4 is hydrogen, an alkali metal or an equivalent alkaline earth metal, a residue $-CONR_9R_{10}$ in which R_9 and R_{10} are the same or different and each is hydrogen, a straight- or branched chain C_1-C_8 alkyl, hydroxymethyl, or a residue $-CH(OH)CO_2X_4$, $-C(CH_3)_2CH_2SO_3X_4$,

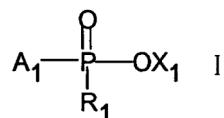
-C(CH₃)₂CH₂CO₂X₄ or -C(CH₃)₂CH₂PO₃(X₄)₂ in which X₄ has its previous significance, or -N(R₁₁)COCH₃ in which R₁₁ is hydrogen or straight- or branched C₁-C₄ alkyl, or R₅ with R₃ may form a carboxylic anhydride moiety -CO.O.CO-."

Independent Claim 6 related to a process for the production of cotelomer compounds of the above formula I, and independent Claim 9 concerned a method of treating an aqueous system by adding such a compound of formula I or a salt thereof.

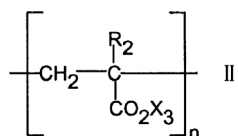
The remaining claims were appendant to their respective preceding independent claim. Thus, Claims 2 to 5 and 14 related to further elaborations of the cotelomer of Claim 1, Claims 7 and 8 to further elaborations of the process as defined in Claim 6, and Claims 10 to 13 concerned elaborations of the method of Claim 9.

II. The wording of Claims 1, 2, 6, 7 and 8 as originally filed, which played a role in these proceedings, had been as follows:

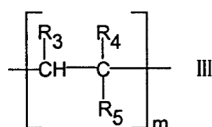
"1. Cotelomer compounds having the formula I:



and salts thereof wherein A₁ is a random polymeric residue comprising at least one unit of formula II:



and at least one unit which differs from a unit of formula II and which has the formula III:



X_1 is hydrogen, C_1 - C_4 alkyl, phenyl, an alkali metal- or an equivalent of an alkaline earth metal atom, an ammonium ion or an amine residue;

m and n are integers such that the sum of m and n is an integer of from 2 to 100, the ratio $n:m$ being from 99 to 1:1 to 99, provided that the resulting copolymer is water-soluble;

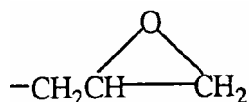
R_1 is $-OX_2$ wherein X_2 may be the same as or different from X_1 and is hydrogen, C_1 - C_4 alkyl, phenyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue, or X_1 and X_2 together may be a multivalent metal atom forming a neutral complex with anionic moieties of the copolymer molecule, or X_1 and X_2 may be linked by a $-CH_2-CH_2-$ residue to form a ring structure;

R_2 is hydrogen, C_1 - C_4 alkyl or C_1 - C_4 alkyl substituted by one or two carboxyl groups;

X_3 is the same as or different from X_1 and X_2 and is hydrogen, C_1 - C_4 alkyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue;

R_3 is hydrogen, methyl or a residue $-CO_2R_6$ wherein R_6 is hydrogen, a straight- or branched chain C_1 - C_8 alkyl residue or a straight- or branched chain C_1 - C_8 alkyl residue substituted by a hydroxy group;

R_4 is hydrogen, a straight- or branched chain C_1 - C_4 alkyl residue, hydroxymethyl or a residue $-CO_2R_7$ wherein R_7 is hydrogen, a residue of formula



a residue of formula $-\text{[CH}_2\text{-CH(R}_8\text{)O]}_z\text{H}$, in which R_8 is hydrogen, methyl or phenyl and z is an integer from 1 to 20, or R_7 is a straight- or branched chain $\text{C}_1\text{-C}_8$ alkyl residue or a straight- or branched chain $\text{C}_1\text{-C}_8$ alkyl residue substituted by hydroxy or $-\text{SO}_3\text{X}_4$ in which X_4 is hydrogen or an alkali metal- or an equivalent of an alkaline earth metal atom;

R_5 is a residue $-\text{CO}_2\text{R}_7$ in which R_7 has its previous significance, a straight or branched $\text{C}_1\text{-C}_8$ alkyl residue, a straight or branched $\text{C}_1\text{-C}_8$ alkyl residue substituted by one or two carboxylic acid groups, or is a phenyl residue, a phenyl residue substituted by hydroxyl or SO_3X_4 , or is an acetyl residue, hydroxymethyl, hydroxyl, acetomethyl, $-\text{SO}_3\text{X}_4$, $-\text{CH}_2\text{SO}_3\text{X}_4$ or $-\text{PO}_3(\text{X}_4)_2$ in which X_4 has its previous significance, a residue $-\text{CONR}_9\text{R}_{10}$ in which R_9 and R_{10} are the same or different and each is hydrogen, a straight- or branched chain $\text{C}_1\text{-C}_8$ alkyl, hydroxymethyl, or a residue $-\text{CH(OH)CO}_2\text{X}_4$, $-\text{C(CH}_3)_2\text{CH}_2\text{SO}_3\text{X}_4$, $-\text{C(CH}_3)_2\text{CH}_2\text{CO}_2\text{X}_4$ or $-\text{C(CH}_3)_2\text{CH}_2\text{PO}_3(\text{X}_4)_2$ in which X_4 has its previous significance, or $-\text{N(R}_{11}\text{)COCH}_3$ in which R_{11} is hydrogen or straight- or branched $\text{C}_1\text{-C}_4$ alkyl, or R_5 with R_3 may form a carboxylic anhydride moiety $-\text{CO.O.CO-}$.

2. Cotelomer compounds of formula I according to claim 1 wherein R_2 is hydrogen or methyl.

6. Cotelomer compounds of formula I according to claim 2 wherein R_3 is hydrogen or a residue $-\text{CO}_2\text{R}_6$ in which R_6 is hydrogen or $\text{C}_1\text{-C}_8$ alkyl; R_4 is hydrogen or $-\text{CO}_2\text{R}_6$ in which R_6 is hydrogen or $\text{C}_1\text{-C}_8$

alkyl; and R₅ is -CO₂R₇ in which R₇ is hydrogen, C₁-C₈ alkyl or C₁-C₈ alkyl substituted by a hydroxy group, or R₅ is C₁-C₈ alkyl or C₁-C₈ alkyl substituted by one or two carboxyl groups, or R₅ is phenyl, or phenyl substituted by hydroxyl or SO₃X₄, or is hydroxyl, acetomethyl, -SO₃X₄ or -PO₃(X₄)₂ in which X₄ is as defined in claim 1, -CONR₉R₁₀ wherein R₉ and R₁₀ are as defined in claim 1, or -N(R₁₁)COCH₃ in which R₁₁ is as defined in claim 1, or R₅, with R₃, forms a carboxylic anhydride moiety -CO.O.CO-, R₁ is as defined in claim 1; and the sum of m and n ranges from 2 to 32.

7. Cotelomer compounds of formula I according to claim 1 wherein R₃ and R₄ are each hydrogen or carboxyl and R₅ is carboxyl, C₁-C₈ alkyl or C₁-C₈ alkyl substituted by one or two carboxyl groups, or R₅ is phenyl or phenyl substituted by hydroxyl or SO₃X₄, or is hydroxyl, acetomethyl, -SO₃X₄ or -PO₃(X₄)₂ in which X₄ has its previous significance, -CONR₉R₁₀ wherein R₉ and R₁₀ are as defined in claim 1 or -N(R₁₁)COCH₃ in which R₁₁ is as defined in claim 1.
8. Cotelomers of formula I according to claim 1 which are free of readily-hydrolyzable ester groups."

III. On 17 April 1997, a Notice of Opposition was filed in which revocation of the patent in its entirety was requested on the ground that none of the claims defined patentable subject-matter (Article 100(a) EPC). To this end, the Opponent relied initially on thirteen, later on fourteen documents including

D1: GB-A-0 996 737,
D6: US-A-4 681 686 and
D13: DE-A-30 44 214.

Novelty objections were raised against the above granted claims, in particular, on the basis of D1 and D13. Nor was an inventive step seen by the Opponent with regard to a number of citations in conjunction with D6. In a letter dated 15 February 2002 (page 3, item c), the objection of lack of inventive step was further elaborated by the Opponent with regard to D13 and/or D1 with or without D6 and some further documents, not having been relevant in these appeal proceedings.

In the course of the opposition proceedings, both parties filed experimental reports and explanatory comments thereon. Reference will be made to all the reports in further detail herein below.

Taking effect on 4 April 2001, the patent in suit was further transferred from the Patent Proprietor, to whom the patent had been granted, to a new Patent Proprietor.

At oral proceedings held before the Opposition Division on 17 April 2002, the new Patent Proprietor filed two new sets of claims to replace all previous claims, including two sets of claims (referred to as Annex A and Annex B), which had been filed with the letter dated 8 December 1997 as Conditional Submissions One and Two, and a suggested amendment of the first of these previous sets of claims (letter dated 2 April 2002, page 6).

Claim 1 of the new Main Request differed from its granted version (section I, above) by the new further limited definition of R₅ reading as follows:

"R₅ is acetomethyl or a residue -CONR₉R₁₀ in which R₉ and R₁₀ are the same or different and each is hydrogen, a straight- or branched chain C₁-C₈ alkyl, hydroxymethyl, or a residue -CH(OH)CO₂X₄, -C(CH₃)₂CH₂SO₃X₄, -C(CH₃)₂CH₂CO₂X₄ or -C(CH₃)₂CH₂PO₃(X₄)₂ in which X₄ has its previous significance, or -N(R₁₁)COCH₃ in which R₁₁ is hydrogen or straight- or branched C₁-C₄ alkyl."

In Claim 1 of the new Auxiliary Request, R₅ was further limited also to exclude acetomethyl.

The further claims remained unchanged.

According to the Minutes of the oral proceedings, the Opponent objected to these new requests under Article 123(2) EPC. Moreover, it took the view that, in view of the new claims, D13 was the closest state of the art to be considered for inventive step, because it related to the same problem as the patent in suit and provided almost the same solution therefor. The Patent Proprietor, however, "considered D6 as 'structurally' the closest prior art. The problem was to provide new cotelomers with an improved performance in the treatment of water." The skilled person would not have combined D6 with D13, "as none of these documents gave a hint to use either a phosphonic group instead of a phosphenic group of D6 or to transfer the side chains of D6 to D13". Any combination of the two documents could only be based on hindsight (Minutes, section 4).

IV. In the decision orally announced at the end of the above oral proceedings and issued in writing on 27 June 2002, the patent was revoked.

Contrary to the arguments of the Opponent, the Opposition Division found that the requirements of Articles 123(2) and (3) EPC were met by both sets of claims as amended (Main Request and Auxiliary Request; section III, above), because the definition of the claimed compounds of formula I had only been limited in respect of group R₅, ie of only one list of definitions. A new selection would have appeared only if deletions out of at least two lists had been effected.

Moreover, it was held that the subject-matter claimed was novel over each of D1, D6 and D13.

However, having regard to the fact that the technical problem to be solved vis-à-vis the closest state of the art, D6, was seen in the provision of an alternative to prior art cotelomers which had excellent corrosion and scale inhibition properties, the claimed cotelomers were found to lack an inventive step, since it had been obvious to arrive at these compounds from the combination of D6 and D13.

Both the decision (item I.10) and the minutes (item 1) contained, without further details or comments, a short mention of comparative tests submitted by the Patent Proprietor in the above oral proceedings.

V. On 5 September 2002, a Notice of Appeal was filed by the above new Patent Proprietor/Appellant against this decision. The prescribed fee was paid on the same date.

The Statement of Grounds of Appeal was received on 6 November 2002 together with three sets of claims representing a Main, a first and a second Auxiliary Request, respectively.

The new Main Request and the new first Auxiliary Request differed from their respective previous versions (section III, above) only in that, in each Claim 1, the clause "in which X₄ has its previous significance" had been replaced by "in which X₄ is hydrogen, an alkali metal or an equivalent alkaline earth metal". In Claim 1 of the second Auxiliary Request, the meaning of R₅ had been restricted to the residue -CONR₉R₁₀ and to further limited definitions of R₉ and R₁₀.

In the Statement of Grounds of Appeal, the Appellant disputed the findings in the decision under appeal concerning the issue of inventive step. Additionally, it filed experimental data, thereby pointing out that these data had already been submitted in the above oral proceedings, in order to demonstrate an improved effectiveness of compounds within the restricted scope of the claims over those of D6 (cf. section IV, last paragraph, above).

- VI. In a letter dated 23 July 2003, the Respondent disputed the arguments of the Appellant, maintained its objection of lack of novelty over D1, and reiterated its objection of lack of inventive step, specifically, with regard to D13 alone and D13 in combination with D6, respectively. Moreover, the experimental results provided by the Appellant were disputed.

In particular, the Respondent argued that by removing the possibility of R_5 being COOH or COOCH₃ in any one of the new requests, the Appellant had tried to render the claimed subject-matter novel over D13, but had not demonstrated an inventive step for the remaining claimed phosphono-cotelomers (on the basis of phosphorous acid or its derivatives as the telogen) over those known from D13, eg by providing comparative data to this end. Furthermore, with regard to the various different substituents grouped together under the single grouping R_5 , the Respondent argued that it was evident that the Appellant and the Primary Examiner of the Examining Division, who had allowed the basic application to progress to grant, must have considered that a person skilled in the art would have viewed all the R_5 substituents as having the alleged benefits of the claimed invention, in particular, since the worked examples did not represent the full range of the R_5 substituents. Moreover, a further experimental report was submitted with this letter.

- VII. The above issues were further disputed between the parties (i) in a letter of the Appellant, dated 4 March 2005, including additional experimental results and new copies of claims according to the Main and first Auxiliary Requests already on file and a further amended set of claims according to a new second Auxiliary Request (dealt with further below), and (ii) a letter of the Respondent, dated 30 March 2005. With respect to the above Requests, the Respondent stated that it would make no objections with regard to novelty.
- VIII. As mentioned above, a number of experimental reports and, furthermore, explanatory submissions to these

reports were filed by both parties in the course of the opposition and appeal proceedings (numbered Reports 1 to 6, herein below):

1. In Attachment A to the Opponent's letter dated 1 July 1998, acrylamide and methyl acrylate were copolymerised by means of sodium persulphate in the presence of sodium phosphite pentahydrate, thereby following, according to the Opponent, the process of D1, Example 1. Further details of this Attachment A were given in a Declaration by Mr Weinstein submitted by the Opponent as a facsimile with its letter dated 15 February 2002. The original of the declaration was filed with a short letter dated 21 February 2002.

2. With the letter of 2 April 2002, the present Patent Proprietor/Appellant submitted an unsigned Declaration by Mr Wilson ("Attachment A"; its signed version was filed with a short letter dated 5 April 2002) containing three experiments, the products of which were evaluated with regard to the CaCO₃ inhibition threshold test (therein, the amounts were given in grams, unlike Example 1 of the patent in suit referring to parts by weight):

Experiment 1 was a repetition of the experiment of Opponent's Attachment A (Report 1, above).

Experiment 2 was identified as a repetition of Example 1 of the patent in suit, with 60 g of ethyl acrylate, 17.2 g of vinyl acetate, 7.3 g of di-t-butyl peroxide and 26.6 g of diethyl phosphite (Example 1: 27.6 parts by weight), a

final yield of 34.3 g (Example 1: 45 parts by weight) and a 1-ppm-CaCO₃ inhibition threshold value of 56.3 (the product of Example 1 was used in Example 2 of the patent in suit to give a value of 52).

Experiment 3 corresponded to Experiment 2, above, with the modification that 51.7 g of methyl acrylate and 14.2 g of acrylamide were used as the monomers.

Moreover, an Exhibit 5 "DATA DEMONSTRATING THE MULTIFUNCTIONALITY OF BELCLENE 494 AND IMPROVEMENTS OVER BELSPERSE 164 (a phosphinated homopolymer of acrylic acid)" was filed to "show the advantages of a phosphonated cotelomer over a phosphinated homopolymer" (Exhibit 5: page 2).

A brochure was also included, referring to Belclene[®] 494 ("Attachment B"; ©1994 FMC Corporation), a "novel" product first marketed in the same year (the accompanying letter: page 6, Chapter C).

3. A second declaration by Mr Weinstein, discussing the results of Opponent's Attachment A (Report 1, above) and the experimental data in Mr Wilson's Declaration (Report 2, above), was filed by the Opponent with the letter of 12 April 2002.
4. Together with the Statement of Grounds of Appeal, "Comparative Test I with Document D6" was submitted to compare the properties of "Compound 19 in D6" with "Belclene 494 (comprised by the

opposed patent)" as tested in the Calcium Carbonate Threshold Test of Example 35 of D6 and a "Test Method to Determine the Corrosion Control Activity of Polymers".

Furthermore, "COMPARATIVE TEST II", also enclosed, included four experiments. It contained the statement "Examples 1 and 2 are made in a similar manner to example 1 from EP360746B1 and examples 3 and 4 made in a similar manner to that described in D6. Examples 1 and 2 are phosphonocarboxylic acids and examples 3 and 4 are the equivalent phosphinocarboxylic acids." These examples were then described under the headings of "Experiment 1" to "Experiment 4".

Experiment 1 was based on methyl acrylate and acrylamide and corresponded to the Experiment 3 in Report 2, above, except for 27.6 g instead of 26.6 g of di-ethyl phosphite being used. The CaCO_3 inhibition thresholds at 1, 2 and 4 ppm, respectively, were, nevertheless, identical to those in Report 2 (at 2 ppm: 90 and at 4 ppm: 100) with a slight deviation at 1 ppm (Report 2: 83.8, Report 4: 84).

Experiment 2 differed from Experiment 2 of Report 2 in that 27.6 g of diethyl phosphite (instead of 26.6 g) was used, nevertheless, giving the same final yield of 34.3 g and the same 1-ppm- CaCO_3 inhibition threshold value (56.3) as Experiment 2 in Report 2, above.

In both of these experiments, the phosphonic acid and carboxylic ester groups in the respective liquid products of the reaction were hydrolysed to the corresponding free acid groups as described in Example 1 of the patent in suit (and in Report 2).

In Experiment 3, acrylic acid and acrylamide were telomerised with sodium hypophosphite.

Experiment 4 described the telomerisation of acrylic acid and vinyl acetate with sodium hypophosphite.

The resulting products were then tested in the Calcium Carbonate threshold Test (according to Example 2 of the patent in suit) and in the Test Method to determine the Corrosion Control Activity of Polymers. In these tests, the products of Experiments 3 and 4 were referred as "Product from D6". Experiments 1 and 2 showed improved results in comparison to Experiments 3 and 4 in both tests.

Additionally, the same tests were also carried out with products according to Examples 1, 2 and 19 of D6 in comparison with Belclene 494, referred to at the bottom of the last page of this report as "a phosphonated copolymer of acrylic acid and 2-acrylamido-2-methylpropanesulphonic acid sodium salt (AMPS)".

5. In a Declaration by Mr Shulman, filed with the Respondent's letter dated 23 July 2003, tests according to the method disclosed in Example 2 of the patent in suit were reported, which were based

on experimental cotelomers "synthesized according to US ... (hereafter D6) modified, as appropriate, according to DE ... (hereafter D13) or EP ..." (ie the patent in suit). In particular, a phosphino-cotelomer was synthesised by repeating Example 6 of D6 and, by repeating that example but with the modifications that sodium hypophosphite was replaced by dimethyl phosphite (as used in Example 33 of D13; experiment "SH 3742") and orthophosphorous acid (another telogen mentioned in the patent in suit), respectively, two phosphono-cotelomers were prepared.

6. Counter-experiments to the latter declaration (in the form of a further Declaration by Mr Wilson) were submitted by the Appellant with the letter dated 4 March 2005. In addition to the repetition of the above three experiments (as described in the Shulman Declaration), "SH 3742" was repeated with the subsequent hydrolysis step as described in Example 1 of the patent in suit.

IX. Oral proceedings were held on 5 April 2005.

- (a) At the beginning of the hearing, the parties were given some provisional, preliminary remarks concerning the question of whether the sets of claims on the file complied with the requirements of Article 123(2) EPC. Whilst in comparison to the granted version, the compounds of formula I had been limited in the course of the opposition proceedings only with respect to the meanings of group R₅, further limitations had already been made

during the examination proceedings in respect of, in particular, R₄, R₆ and R₇.

Hence, the basis for the specific combinations of definitions of the compounds now claimed in the application as originally filed was to be established without including additional information not directly and unambiguously derivable from the application as filed.

It was pointed out to the parties that the patent in suit contained not a single example within the scope of the claims of any one of the valid requests on file.

Specific reference was made to the arguments of the Respondent referred to in section VI, above, in particular to those concerning D13 and the amendments in the claims suggested by the Patent Proprietor/Appellant in order to avoid the anticipatory disclosure of that document.

Hence, in the Board's view, the question arose of whether the limitation of the claims in comparison to their initial version amounted to the provision of a new selection not derivable in this form from the application as filed.

- (b) In the subsequent discussion concerning the above issues, the Appellant maintained the point of view it had already maintained during the opposition proceedings, which had been accepted in the decision under appeal (section IV, above), ie that the patent in suit had only been amended in

respect of one list of definitions. Moreover, these amendments had not resulted in one single product but still encompassed a multitude of cotelomers, so that no individualisation occurred. Such amendments had already been allowed in a number of decisions of the Boards of Appeal.

Whilst it had been true that other definitions of symbols used in formula I had been amended during the examination proceedings, the Examining Division had accepted that those modifications had complied with the requirements of Article 123(2) EPC and had, consequently, granted the patent in suit, since those amendments had been based on preferred elaborations in the description and the original claims.

During subsequent opposition proceedings, the Patent Proprietor should not, in the Appellant's view, be prevented from meeting new objections raised in those proceedings on the basis of documents of which it had not been aware when filing the patent application forming the basis of the patent in suit.

By the restrictions in the claims during the opposition and appeal proceedings, only less preferred parts of the previously claimed subject-matter had been abandoned to meet the objections raised by the Opponent/Respondent. Reference could be made to the preferred elaborations according to Claims 2 and 6 or to Claim 7, as originally filed, which provided the basis for these limitations.

These restrictions in the claims did not, however, amount to a shift of the core of the claimed invention. Rather, the essence of the claimed invention remained the same, ie the provision of new cotelomers which had improved corrosion and scale inhibition properties when used in aqueous systems, in particular in comparison to the phosphino-cotelomers of D6 which had been the initial basis for the draft of the application from which the patent in suit was derived.

Thus, it had been shown in Comparative Tests I and II that switching from phosphino-telomers of D6 to the phosphono-telomers according to the patent in suit resulted in significant improvements of the properties necessary for the above use. Thus, Belclene[®] 494 (mentioned above), which complied with the definitions in present Claim 1, showed clear improvements in this respect in comparison to the products of Examples 1, 2 and 19 of D6 (section VIII, Report 4, above, wherein the products of Examples 2 and 19 had been based on the same taxogens, ie the same polymerisable compounds having ethylenic unsaturation). Since the cotelomers of D13 were not comprised in the definitions of the claims, it had not been deemed necessary to compare the claimed subject-matter with D13, which document had not, in the decision under appeal, been considered as the closest state of the art. Neither an implicit nor an explicit disclosure of the compounds now claimed was contained in documents D6 or D13.

As regards an objection concerning the fact that some of the experiments submitted during the opposition and appeal proceedings had included a hydrolysis of their products, others however not, the Appellant referred to page 6, lines 45 to 49 of the patent in suit (corresponding to page 6, lines 25 to 29 of the A-publication) where "hydrolysis had strongly been recommended" and to the fact that the definitions in Claims 1 had already included the free acid groups.

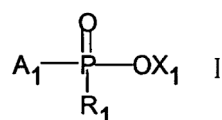
- (c) In the course of the discussion considering the individual amendments carried out in comparison to the claims as originally filed and having regard to the above objection raised by the Respondent concerning the question of hydrolysis, the Appellant replaced the claims of all pending requests by six new sets of claims, constituting a new Main and five new Auxiliary requests. These amendments found, according to the Appellant, their basis in original Claims 7 and 8 (section II, above) and on page 5, line 11 of the application as published.

The new Main and first Auxiliary Requests were modifications of the previous Main Request, the new second and third Auxiliary Requests were derived from the previous first Auxiliary Request, and the previous third Auxiliary Request formed the basis for the new fourth and fifth Auxiliary Requests. The wording of Claim 1 of the Main Request, and the passages differing therefrom in the auxiliary requests are given herein below.

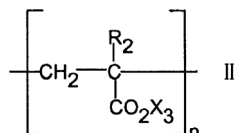
X. Since no further comments were given by the parties to the above issues, the debate about the requirements of Article 123(2) EPC was closed for all requests, and the parties were asked to confirmed their respective requests.

The Appellant requested that the decision under appeal be set aside and the patent be maintained on the basis either of the Main Request or one the Auxiliary Requests 1 to 5 as filed during the oral proceedings (section IX(c), above), Claim 1 of the Main Request reading as follows:

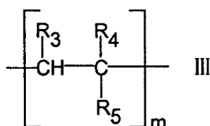
"Cotelomer compounds having the formula I:



and salts there of wherein A₁ is a random polymeric residue comprising at least one unit of formula II:



and at least one unit which differs from a unit of formula II and which has the formula III:



X₁ is hydrogen, C₁-C₄ alkyl, phenyl, an alkali metal- or alkaline earth metal atom, a ammonium ion or an amine residue;

m and n are integers such that the sum of m and n is an integer of from 2 to 100, the ratio n:m being from 99 to 1:1 to 99, provided that the resulting cotelomer is water-soluble;

R₁ is -OX₂ wherein X₂ may be the same as or different from X₁ and is hydrogen, C₁-C₄ alkyl, phenyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue, or X₁ and X₂ together may be a multivalent metal atom forming a neutral complex with anionic moieties of the cotelomer molecule, or X₁ and X₂ may be linked by a -CH₂-CH₂- residue to form a ring structure;

R₂ is hydrogen, or methyl;

X₃ is the same as or different from X₁ and X₂ and is hydrogen, C₁-C₄ alkyl, an alkali metal- or an equivalent of an alkaline earth metal atom, or an ammonium or an amine residue;

R₃ is hydrogen, or a residue -CO₂R₆ wherein R₆ is hydrogen;

R₄ is hydrogen or a residue -CO₂R₆ wherein R₆ is hydrogen, R₅ is acetomethyl, or a residue -CONR₉R₁₀ in which R₉ and R₁₀ are the same or different and each is hydrogen, a straight- or branched chain C₁-C₈ alkyl, hydroxymethyl, or a residue -CH(OH)CO₂X₄, -C(CH₃)₂CH₂SO₃X₄, -C(CH₃)₂CH₂CO₂X₄ or -C(CH₃)₂CH₂PO₃(X₄)₂ in which X₄ is hydrogen, an alkali metal or an equivalent alkaline earth metal, or -N(R₁₁)COCH₃ in which R₁₁ is hydrogen or straight- or branched C₁-C₄ alkyl."

Claim 1 of the 2nd Auxiliary Request differed therefrom by the definition of R₅, reading as follows:

"R₅ is a residue -CONR₉R₁₀ in which R₉ and R₁₀ are the same or different and each is hydrogen, a straight- or branched chain C₁-C₈ alkyl, hydroxymethyl, or a residue -CH(OH)CO₂X₄, -C(CH₃)₂CH₂SO₃X₄, -C(CH₃)₂CH₂CO₂X₄ or -C(CH₃)₂CH₂PO₃(X₄)₂ in which X₄ is hydrogen, an alkali metal- or an equivalent alkaline earth metal, or

-N(R₁₁)COCH₃ in which R₁₁ is hydrogen or straight- or branched C₁-C₄ alkyl."

In Claim 1 of the 4th Auxiliary Request, the only difference from the above versions of that claim was an amended definition of R₅, reading as follows:

"R₅ is a residue -CONR₉R₁₀ in which R₉ and R₁₀ are the same or different and each is hydrogen, a residue -CH(OH)CO₂X₄, -C(CH₃)₂CH₂SO₃X₄, -C(CH₃)₂CH₂CO₂X₄ or -C(CH₃)₂CH₂PO₃(X₄)₂ in which X₄ is hydrogen, an alkali metal- or an equivalent alkaline earth metal, or."

The remaining dependent Claims 2 to 14 in each of the above requests were identical to the granted version of these claims.

Claim 1 of each of the 1st, 3rd and 5th Auxiliary Requests differed from Claim 1 of the above respective preceding request (as shown before) by the addition of the following clause at the end of the claim reading:

"which cotelomer compounds are free of readily-hydrolyzable ester groups."

The remaining dependent Claims 2 to 13 corresponded to Claims 2 to 4 and 6 to 14 as granted.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main Request

2. *Article 123(2) EPC*

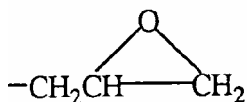
- 2.1 Claim 1 of the present Main request differs from the version as originally filed (the yardstick for Article 123(2) EPC assessments) by the following amendments (cf. sections X and II, above):

Originally, the definition of X_1 included "an alkali metal- or an equivalent of an alkaline earth metal atom", in the pending version, this passage reads "an alkali metal- or alkaline earth metal atom";

R_2 originally referring to "hydrogen, C_1 - C_4 alkyl or C_1 - C_4 alkyl substituted by one or two carboxyl groups" has been limited to "hydrogen, or methyl";

R_3 no longer includes the meanings of methyl and of a residue $-CO_2R_6$ wherein R_6 is "a straight- or branched chain C_1 - C_8 alkyl residue or a straight- or branched chain C_1 - C_8 alkyl residue substituted by a hydroxy group", but it has been restricted to "hydrogen, or a residue $-CO_2R_6$ wherein R_6 is hydrogen";

the following meanings have been deleted from the definition of R_4 : "a straight- or branched chain C_1 - C_4 alkyl residue, hydroxymethyl or a residue $-CO_2R_7$ " in which R_7 was "a residue of formula



a residue of formula $-\text{[CH}_2\text{-CH(R}_8\text{)O]}_z\text{H}$, ... or a straight- or branched chain C₁-C₈ alkyl residue or a straight- or branched chain C₁-C₈ alkyl residue substituted by hydroxy or $-\text{SO}_3\text{X}_4$ " (as to the meanings of R₈, z and X₄ reference is made to section II, above). This means a restriction of R₄ to "hydrogen or a residue $-\text{CO}_2\text{R}_6$ wherein R₆ is hydrogen", wherein R₆ has replaced R₇; and

from the original definitions of R₅, the following passages have been deleted: "a residue $-\text{CO}_2\text{R}_7$ in which R₇ has its previous significance, a straight or branched C₁-C₈ alkyl residue, a straight or branched C₁-C₈ alkyl residue substituted by one or two carboxylic acid groups, or is a phenyl residue, a phenyl residue substituted by hydroxyl or SO_3X_4 , or is an acetyl residue, hydroxymethyl, hydroxyl", " $-\text{SO}_3\text{X}_4$, $-\text{CH}_2\text{SO}_3\text{X}_4$ or $-\text{PO}_3(\text{X}_4)_2$ in which X₄ has its previous significance" and "or R₅ with R₃ may form a carboxylic anhydride moiety $-\text{CO.O.CO-}$ ".

The subject-matter of Claims 2 to 14 corresponds to the content of Claims 3 to 5 and 8 to 17 as originally filed (cf. section II, above).

- 2.2 In the Appellant's view, all these amendments were based either on Claim 6 as originally filed (and Claim 2 to which Claim 6 had been appendant) or on Claim 7 in combination with page 5, line 11 of the published application (page 7, line 13 of the text as filed, referring to the same feature as original Claim 2) and, thus, restricted Claim 1 to preferred embodiments of the application as filed. Further to

amendments carried out during the examination procedure, which had already been accepted by the Examining Division under Article 123(2) EPC, the further restrictions (concerning R₃ and R₅), in the Appellant's opinion, resulted in only a small part of the previously claimed subject-matter having been given up in order to delimit Claim 1 from the prior art not known to the Patent Proprietor/Appellant before the opposition, but without having affected, let alone having shifted the core of the claimed invention (section IX(b), above).

Moreover, such amendments had repeatedly been allowed in jurisprudence of the Boards of Appeal.

2.3 In the present case, Claim 1 of the Main Request differs from Claim 1 as originally filed by limitations not only in respect of R₅, but also by restrictions of the meanings of R₂ and, in particular, R₃ and R₄, all as mentioned in formulae I, II and III of Claim 1, respectively. Residues R₆ and R₇, forming part of those previously mentioned groups, have also been modified. Moreover, in order to exclude the taxogens as used in D13, these restrictions altogether go even further than the limitations according to the preferred embodiments disclosed in those parts of the original disclosure referred to by the Appellant (cf. section VI, paragraph 2, and section 2.2, above).

2.4 In view of these amendments, it has to be examined whether all the limitations, carried out during the proceedings since the filing of the application, in combination with one another are, nevertheless, in conformity with Article 123(2) EPC or not.

2.4.1 Reference can, in this respect, be made to T 859/94 dated 21 September 1999 (none of the decisions cited herein was published in OJ EPO, unless explicitly stated otherwise). According to this decision, the idea underlying Article 123(2) EPC "is that an Applicant should not be allowed to improve his position during the examination procedure by adding subject-matter not disclosed in the application as filed thus giving him an unwarranted advantage and possibly being detrimental to the legal security of third parties relying on the contents of the application as filed (see G 1/93, OJ 1994, 541, No. 9 of the reasons of the decision). This idea holds of course also in respect to a patent proprietor and the opposition procedure." (No. 1.1 of the reasons), and the decision continued: "To which degree deletions from lists of meanings for various substituents are admissible depends on the circumstances of the specific case." (No. 2.4.3 of the reasons).

Furthermore, the above decision referred to T 615/95 dated 16 December 1997, which had allowed, under Article 123(2) EPC, deletions of **one** originally disclosed meaning from each of three independent lists of sizeable length, wherein each list specified distinct meanings for different residues in a generic chemical formula defining the subject-matter of the main claim at issue in that case. It had been found therein that such deletions were allowable, if two conditions were fulfilled:

Firstly, these deletions did not result in singling out any hitherto not specifically mentioned individual

compound or group of compounds (in the sense of a "sub-class of compounds" as referred to eg in T 859/94, above, and T 50/97 of 27 January 2000), but maintained the remaining subject-matter as a generic group of compounds differing from the original group only by its smaller size.

Secondly, these deletions did not lead to a particular combination of specific meanings of the respective residues which was not disclosed originally or, in other words, **did not generate another invention**. (cf. T 615/95: Catchword 1 and No. 6 of the reasons, emphasis added).

- 2.4.2 In particular, the latter prerequisite for a limitation of the claim can, in the Board's view, only mean that a limitation of the type as discussed in those decisions and in the present case does not provide a technical contribution to the claimed subject-matter, but merely restricts the required protection in the sense as used by the Enlarged Board of Appeal with respect to the allowability of disclaimers (cf. G 1/93, above, No. 2 of the Order and No. 16 of the reasons; it is noteworthy that G 1/93 was referred to in both T 859/94, above, and in T 615/95, above, No. 4.1 of the reasons).

In other words, if a limitation of a claim does not simply exclude certain embodiments but results in improvements or even additional effects, for which the original disclosure provides no basis, then, according to the above jurisprudence, such an amendment will not be allowable under Article 123(2) EPC.

2.4.3 As argued by the Respondent with regard to the restricted definitions in Claim 1 and the disclosure of D13 (section VI, above), a person skilled in the art would, in view of the fact that all meanings of R₅ had equivalently been grouped together in Claim 1 as granted, have viewed all the R₅ substituents as having the alleged benefits of the claimed invention.

2.4.4 This argument of the Respondent must, in the Board's view, be held equally valid for the subgroup of embodiments as specified by the definitions of residues R₃, R₄ and R₅ as disclosed in either Claim 6 or Claim 7 as originally filed (sections II and 2.2, above), in particular, because the patent in suit does not provide any information, nor a single example within the scope of the claims, to prove the contrary. Even the additional experimental reports submitted in these proceedings do not provide such information, since none of them compares the subject-matter claimed with the disclosure of D13 (this is also valid for Experiment SH 3742 of Report 5 and its repetition in Report 6, section VIII, above).

Thus, in Claim 6 as filed, the definition of each of R₃, R₄ and R₅ included carboxyl and carboxylic acid C₁-C₈ alkyl ester groups. Moreover, R₅ equally denoted a number of further residues excluded from the present claims such as carboxylic acid C₁-C₈ alkyl esters, wherein the alkyl is further substituted, carboxylic acid anhydride, an optionally substituted phenyl, a hydroxyl, a sulphonate and a phosphonate, not however, an acetoxy (acetyl) group which would have been the result of the use of vinyl acetate.

Furthermore, in Claim 7 as filed, asserted by the Appellant to form another basis for pending version of Claim 1, each of R₃, R₄ and R₅ still included carboxyl and R₅ still encompassed a number of ester, phenyl, hydroxyl, sulphonate and phosphonate groups, excluded from the pending claims.

2.4.5 Firstly, it follows therefrom that Claim 1 under consideration does not relate to all the embodiments within the scope of original Claims 6 or 7 (as already indicated in section 2.3, above). Rather, as shown above, the restrictions in pending Claim 1 reach further than the limitations of those original claims. Thus, Claim 7 also encompassed cotelomers containing moieties derived from eg maleic acid, Claim 6 included not only units derived from that acid but also those derived from its alkyl esters and half esters (cf. section 2.4.4, above). This means, however, that Claim 1 amended on the basis of the full scope of Claims 6 or 7 as originally filed would not yet have excluded the products of D13 (see eg its Example 33).

2.4.6 This means, however, in the Board's view, that Claim 1 (section X, above) relates to a sub-class of compounds (as mentioned in section 2.4.1, first condition, above) based on a pattern of definitions, which is the result of further selections of individual meanings out of three lists, the choice of which had not been foreshadowed in the application as originally filed, in particular not in its Claims 6 or 7.

2.4.7 Secondly, the application, from which the patent in suit was derived, aimed, as argued by the Appellant during the oral proceedings, at the improvement of the

hitherto known cotelomers for use in the treatment of water, and it had been found that this problem could be solved by changing from phosphinic to phosphonic end groups, ie by using phosphorous acid or its derivatives as the telogen in the preparation of the cotelomers instead of hypophosphorous acid or its derivatives as used in EP-B-0 150 706, discussed in detail in the present specification (page 3, line 1 to page 4, line 5, and page 4, lines 9 to 11; application as filed: page 3, line 17 to page 5, line 4) and being a cognate to D6. The taxogens did not have any significance for this development, as could be seen from the broad overlap, close to identity, of the monomers listed, on the one hand, in the patent application and the patent specification derived therefrom and, on the other hand, in the above EP-B- or D6. This was also the reason why, according to the Appellant, in its additional experimental reports (section VIII, above) comparisons had not been made with D13, but only with D6 (section IX(b), penultimate paragraph, above).

Thus, the "core" of the patent in suit, was presented by the Appellant at this point as being the use of the taxogens (the unsaturated monomers) of D6 with the telogens (the phosphorous termination) of D13.

In this context, it must be noted, however, that the patent in suit itself contains not a single example which would show that any such improvements, as contended above, have been obtained with the cotelomers of Claim 1 of the Main Request, in general, let alone in comparison with those in D13, the cotelomers of which were clearly and unambiguously included by the definitions in both original Claims 6 and 7, on which

the present claims is allegedly based (sections 2.2 and 2.4.4, above).

2.4.8 Nor did any one of the experimental reports (Reports 2, 4 and 6, section VIII, above), submitted by the Appellant in order to demonstrate that the asserted improvements (section 2.4.7, above) were achieved with a product still covered by the claims, provide any support for an argument (a) that the claims had been restricted to embodiments showing advantages over the cotelomers as known from D13 or (b) that the cotelomers of D13 did not provide the advantages aimed at with the patent in suit.

In accordance with established jurisprudence, the onus of proof in this respect lay, however, on the Appellant, who has not discharged this burden.

2.4.9 Hence, in face of D13, it can only be concluded, on the one hand, that, due to the lack of any evidence to the contrary in the patent in suit or in Reports 1 to 6 (section VIII, above), the choice to exclude the disclosure of D13 must be construed to be an arbitrary selection not supported by the disclosure of the application as originally filed, and it is, thus, apt to give an unwarranted advantage to the Appellant contrary to the jurisprudence referred to in sections 2.4.1 and 2.4.2, above.

On the other hand, if such a demonstration had, however, been provided, this would have been a confirmation of the view that a new selection had been made which had not been foreshadowed in the original disclosure (see section 2.4.6, above).

2.4.10 Contrary to the Appellant's argument that the core of the patent in suit had never been shifted during the current proceedings (sections IX(b), paragraph 5, and 2.4.7, above), it must be noted that the above experimental reports, eg Report 4 (section VIII, above), demonstrate that not only the change of the telogen from hypophosphite to phosphite, but also the change of the taxogens (eg from vinyl acetate to acrylamide or AMPS, as in the case of Belclene[®] 494, cf. Tables 1 and 4 in Comparative Test II of Report 4) has a technical effect on the properties aimed at in the patent in suit (in the sense as referred to in section 2.4.2, above). This change does not only disclaim or exclude certain embodiments included by Claims 6 or 7 as originally filed.

In other words, whilst, originally, it had been the target to improve the cotelomers known from D6, irrespective of the taxogens, the core of the claimed invention has been shifted from the modification of the telogen to the modification of the taxogens in order to exclude the disclosure of D13.

2.4.11 The above findings are also consistent with the Statement of Grounds of Appeal (page 2, first complete paragraph) that the additional experimental reports of the Appellant (section VIII, above) were filed with the intention to demonstrate that the object underlying the patent in suit was not to provide alternative solutions for the treatment of aqueous systems, but rather to provide compounds for this purpose which show markedly improved effectiveness compared to the known compounds.

These compounds, however, according to each of original Claims 1, 6 or 7, included those of D13.

2.4.12 Consequently, in the Board's view, the second requirement for the allowability of deletions from such Markush type claims, ie that these deletions must not lead to a particular combination of specific meanings of the respective residues which would generate another invention (section 2.4.1, above), is not fulfilled by Claim 1 under consideration.

2.5 Consequently, Claim 1 does not comply with the requirements of Article 123(2) EPC.

3. Since a decision can only be made on a request as a whole, the Main Request must, for the reasons given above, be refused.

1st to 5th Auxiliary requests

4. By the same token, the above conclusion is also valid for Claim 1 of the first Auxiliary Request, which contains the same modifications as Claim 1 of the Main Request.

5. Moreover, Claim 1 of each of the second to fifth Auxiliary Requests is even further restricted. Consequently, the above reasons are *a fortiori* also valid for these auxiliary requests.

6. Since all the valid requests on file fail due to the non-compliance with Article 123(2) EPC, the decision under appeal cannot be reversed and the patent in suit cannot be maintained.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young