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Datasheet for the decision of 21 May 2015

Case Number: T 0038/11 - 3.3.05

Application Number: 03017657.2

Publication Number: 1391430

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Language of the proceedings: EN

Title of invention:
Synergistic biocidal mixtures

Patent Proprietor:
Solenis Technologies Cayman, L.P.

Opponent:
Kemira Oyj

Headword:
Synergistic biocides/SOLENIS TECHNOLOGIES CAYMAN L.P.

Relevant legal provisions:
EPC Art. 83, 114(2), 101(3)(a), 113(1)
RPBA Art. 11

This datasheet is not part of the Decision.
It can be changed at any time and without notice.

Keyword:
Sufficiency of disclosure - (no)
Sufficiency of disclosure - undue burden (yes)
Remittal to the department of first instance -
fundamental deficiency in first instance proceedings (no)
Examination of the opposition -
discretion of opposition division
Right to be heard - opportunity to comment (yes)
Right to be heard - substantial procedural violation (no)

Decisions cited:
G 0007/93, T 0032/85, T 0435/91, T 0433/93, T 1164/00, T 0809/07

Catchword:

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Case Number: T 0038/11 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 21 May 2015

Appellant: (Patent Proprietor)	Solenis Technologies Cayman, L.P. Rheinweg 11 8200 Schaffhausen (CH)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Respondent: (Opponent)	Kemira Oyj P.O. Box 44 02271 Espoo (FI)
Representative:	Kreller-Schober, Maria Bardehle Pagenberg Partnerschaft mbB Patentanwälte, Rechtsanwälte Prinzregentenplatz 7 81675 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 26 October 2010 revoking European patent No. 1391430 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	H. Engl
	P. Guntz

Summary of Facts and Submissions

I. European patent No. 1 391 430 was granted with 26 claims.

II. The independent claims 1 and 26 of the granted patent read:

"1. A method for controlling the growth of microorganisms in aqueous systems comprising adding an effective amount of an ammonium salt activated by an oxidant and at least one non-oxidizing biocide to an aqueous system, said amount of activated ammonium salt and non-oxidizing biocide being selected to result in a synergy index of less than 1, wherein the non-oxidizing biocide is selected from the group consisting of aldehydes, formaldehyde releasing compounds, halogenated hydrocarbons, phenolics, amides, carbamates, heterocyclic compounds containing nitrogen and sulfur atoms in the ring structure, electrophilic active substances having an activated halogen group in the α-position and/or in the vinyl position to an electronegative group, nucleophilic active substance having an alkyl group and at least one leaving group, aliphatic diamines, guanidines, biguanidines, n-alkyl dimethyl benzyl ammonium chloride, and didecyl dimethyl ammonium chloride."

"26. A synergistic mixture comprising an ammonium salt activated by an oxidant, a non-oxidizing biocide and an aqueous system, wherein the non-oxidizing biocide is defined as in claim 1."

III. The granted patent was opposed under the grounds of opposition according to Articles 100(a) and (b) EPC. The latter ground was admitted into the procedure by

the opposition division during oral proceedings because it was considered to be *prima facie* relevant.

IV. The opposition division considered that the patent did not teach how to determine the desired synergistic combinations of biocides without undue experimental burden. The patent in suit was therefore revoked (Article 83 EPC). This is the contested decision.

V. The notice of appeal of the patentee (henceforth: the appellant) was received with letter dated 4 January 2011. The statement of grounds of appeal, dated 3 March 2011, was accompanied by new claims as a main request and auxiliary requests 1, 2 and 3.

VI. The independent claims read as follows:

Main request:

"1. A method for controlling the growth of microorganisms in aqueous systems comprising adding an effective amount of an ammonium salt activated by an oxidant and at least one non-oxidizing biocide to an aqueous system,

said amount of activated ammonium salt and non-oxidizing biocide being selected to result in a synergy index of less than 1,

wherein the non-oxidizing biocide is selected from the group consisting of

1,2-dibromo-2,4-dicyanobutane,
2,2-dibromo-3-nitrilopropionamide (DBNPA),
bis(trichloromethyl)sulfone,
4,5-dichloro-1,2-dithiol-3-one,

2-bromo-2-nitrostyrene,
5-chloro-2-methyl-4-isothiazolin-3-one (CMIT),
2-methyl-4-isothiazolin-3-one (MIT),
2-bromo-2-nitro-propane-1,3-diol (Bronopol),
n-dodecylguanidine hydrochloride, and
methylene bisthiocyanate (MBT)."

"18. A synergistic mixture comprising an ammonium salt activated by an oxidant, a non-oxidizing biocide and an aqueous system, wherein the non-oxidizing biocide is defined as in claim 1."

Auxiliary request 1:

Claim 1 differs from claim 1 in accordance with the main request in that at the end of the claim the following passage is appended:

"wherein the ratio of activated ammonium salt to the non-oxidizing biocide is from 5,000:1 to 1:80."

Composition claim 16 is worded as claim 18 of the main request.

Auxiliary request 2:

Claim 1 differs from claim 1 in accordance with the main request in that at the end of the claim the following passage is appended:

"wherein the ratio of activated ammonium salt to the non-oxidizing biocide is from 5,000:1 to 1:80, and

wherein the oxidant comprises hypochlorous acid or alkali and alkaline earth hypochlorite salt."

Composition claim 13 is worded as claim 18 of the main request.

Auxiliary request 3:

Claim 1 differs from claim 1 in accordance with the main request in that at the end of the claim the following passage is appended:

"wherein the ratio of activated ammonium salt to the non-oxidizing biocide is from 5,000:1 to 1:80, and

wherein the oxidant comprises hypochlorous acid or alkali and alkaline earth hypochlorite salt; and

wherein the ammonium salt comprises ammonium bromide or ammonium chloride."

Composition claim 12 is worded as claim 18 of the main request.

VII. Under cover of a further letter, dated 21 April 2015, the appellant filed additional arguments and new requests as auxiliary requests 1a, 2a, 3a and 4.

Auxiliary request 1a:

Claim 1 reads as in auxiliary request 1.

"16. A synergistic mixture comprising an ammonium salt activated by an oxidant, a non-oxidizing biocide and an aqueous system, wherein the non-oxidizing biocide is defined as in claim 1 **and wherein the ratio of activated ammonium salt to the non-oxidizing biocide is from 5,000 to 1 to 1:80**."

Auxiliary requests 2a, 3a:

These sets of claims differ from those in accordance with auxiliary requests 2 and 3 in that the respective composition claims have been deleted.

Auxiliary request 4:

"1. A method for controlling the growth of microorganisms in aqueous systems comprising adding an effective amount of an ammonium salt activated by an oxidant and at least one non-oxidizing biocide to an aqueous system,

said amount of activated ammonium salt and non-oxidizing biocide being selected to result in a synergy index of less than 1,

wherein the non-oxidizing biocide is selected from the group consisting of

1,2-dibromo-2,4-dicyanobutane,
2,2-dibromo-3-nitrilopropionamide (DBNPA),
bis(trichloromethyl)sulfone,
4,5-dichloro-1,2-dithiol-3-one,
2-bromo-2-nitrostyrene,
2-bromo-2-nitro-propane-1,3-diol (Bronopol),
n-dodecylguanidine hydrochloride, and
methylene bisthiocyanate (MBT), and

wherein the ratio of activated ammonium salt to the non-oxidizing biocide is from 5,000:1 to 1:80,

wherein the oxidant comprises hypochlorous acid or alkali and alkaline earth hypochlorite salt; and

wherein the ammonium salt comprises ammonium bromide or ammonium chloride".

The composition claims of this request were deleted.

VIII. The written submissions of the opponent (respondent) were received with letter dated 20 July 2011.

IX. Oral proceedings before the board of appeal took place on 21 May 2015.

X. The appellant essentially argued as follows:

Alleged substantial procedural violation, request for remittal:

At the oral proceedings the appellant had been taken by surprise by the opposition division's decision, to allow the introduction of a fresh ground of opposition under Article 83 EPC. This ground had been raised for the first time in the opponent's letter filed two months before the date of oral proceedings, on the very last day of the stated time limit for making submissions. The appellant was also not given enough time to prepare comments, tests and further sets of claims for possible auxiliary requests. The appellant referred in this context to decisions T 433/93 and T 1164/00.

The opposition division had not informed the appellant before the date of the oral proceedings that the ground of insufficiency should at all be discussed. Therefore, the factual and legal reasons which led to the revocation of the patent had not been communicated. There had neither been an opportunity to present comments in reply to the new ground and its

substantiation nor to file amended requests addressing the objection.

According to G 9/91, a fresh ground of opposition should be only admitted if it was prima facie relevant. The opposition division should have considered whether there was an excuse for the late submission of fresh objections, or whether it constituted an abuse of the procedure. In view of the established jurisprudence and given that the opponent's arguments were all based on the disclosure of the patent as such, the appellant had in good faith assumed that the fresh ground of insufficiency of disclosure would not be admitted. It followed that the opposition division should either not have admitted the fresh ground of opposition, or it should have informed the appellant in writing in good time that this ground would be admitted, and possibly postponed the oral proceedings in order to give the appellant sufficient time to react.

Admitting the fresh ground without any prior indication or written communication by the opposition division amounted to a substantial procedural violation justifying a reimbursement of the appeal fee and remittal of the case to the department of first instance for further prosecution.

Insufficiency of disclosure:

The opposition division had already acknowledged that the skilled person was able to adjust the parameters and factors of a given combination in such a way that a synergistic effect could be obtained. This adjustment procedure is done by way of routine experimentation without the need for inventive activity. Nonetheless it was held that the mere number of tests that were

allegedly to be carried out represented an undue burden for the skilled person. Therefore, the requirements of Article 83 EPC were not met by the claims as originally granted.

The claims of the new main request clearly specified the non-oxidizing biocide in accordance with granted claims 11 to 15 (corresponding to original claims 13 to 20). The examples given in the patent disclosed combinations using all of these non-oxidizing biocides, and also provided guidance at which relative compositional ratios a synergistic mixture was obtained. Thus, the patent provided the skilled person with clear guidance as to how to put the invention into practice in order to obtain a synergistic combination of an ammonium salt activated by an oxidant and the specified non-oxidizing biocide. Only few routine experiments were needed to extend the teaching beyond the specific combinations and their relative amounts described in the examples of the patent. Of the tests of the patent about 43% showed synergy, which meant that typically only one or two experiments had to be conducted to turn an initial failure into success by means of routine optimization using the parameters and the knowledge provided in the patent in suit.

The objection under Article 83 EPC was therefore not applicable to the claims of the main request. The same applied to the claims of the auxiliary requests which were narrower in scope.

Inventive step:

According to the appellant, the claimed subject-matter would also involve an inventive step (Article 56 EPC).

XI. The respondent essentially argued as follows:

Alleged substantial procedural violation:

Regarding the filing and admission of the new opposition ground, it was raised in response to the appellant's arguments according to which among the more than 460 test examples of the patent only about 125 test mixtures exhibited the desired synergistic effect (appellant's letter of 19 February 2009, page 4).

Therefore, the present case differed from T 433/93 in that the opposition ground of insufficiency of disclosure had in fact been communicated two months before the oral proceedings, together with the reasons. The appellant had sufficient time to prepare for the fresh opposition ground, and was not adversely affected in its rights. There was in the meantime ample time to carry out new experiments, but the appellant had not filed any.

The appellant's requests for remittal and reimbursement of the appeal fee were thus unfounded.

Insufficiency of disclosure:

The respondent observed that from all applicable examples (1 to 8, 13 and 15 to 18), a synergistic effect had been shown in about 100 tests only, and non-synergy in about 130 tests. So still more than 50% of the claimed compositions did not exhibit the desired synergistic effect.

Moreover, in all examples only a single ammonium salt

(ammonium bromide) had been used, in contrast with claim 1 of the main request and auxiliary requests 1 and 2 where the ammonium salt was not specified. It was stated on page 3, paragraph [0012], of the patent that ammonium bromide activated with sodium hypochlorite was known to be an effective biocide. However, for ammonium salts other than ammonium bromide nothing had been shown. In all the examples, the same oxidant (sodium hypochlorite) and the same "synthetic white water" had been used. The broad claims however encompassed generically all "oxidants" and all "aqueous water systems". The exact composition of the "white water" was not given in the opposed patent, making it impossible to reproduce the examples.

The patent envisaged different addition strategies for the components of the biocide mixture, namely simultaneously or sequentially. In example 1 of the patent, ammonium bromide and non-oxidising biocide were added simultaneously, in example 2 sequentially, with different results: the simultaneous addition resulted always in antagonistic effects (example 1), the sequential addition resulted in most cases in synergistic effects (example 2).

In summary, considering the multitude of possible variations concerning the ammonium salt, the oxidant, the aqueous system, the addition strategy, and the fact that more than 50% of the tested mixtures failed to show the desired effect, there was evidently lack of guidance how to obtain a synergistic effect reliably and without undue burden of experimental trial ad error.

It followed that the claimed invention was not sufficiently disclosed to be carried out by the skilled

person (Article 83 EPC).

The respondent argued that the independent composition claims of the main request and of the auxiliary requests 1 to 3 neither recited a synergy index of less than 1, in contrast to the method claims, nor were they adapted to the limitations made in the corresponding method claims of said requests.

Inventive step:

The respondent refuted the appellant's arguments in regard of inventive step.

XII. Requests

The appellant requested that the decision of the opposition division be set aside, the appeal fee be reimbursed and the case be remitted to the first instance for a discussion of the sets of claims filed with letter of 3 March 2011 as a main request and first to third auxiliary requests, or in the alternative, the auxiliary requests 1a, 2a, 3a and 4, filed with letter dated 21 April 2015.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Substantial procedural violation, remittal to first instance, reimbursement of the appeal fee

1.1 Article 114(2) EPC

Under Article 114(2) EPC, an examining or opposition division has discretion in accepting requests or admitting documents, if filed late. This discretion has to be exercised responsibly and the relevant reasons must be given (see G 7/93 (OJ 1994, 775)). A board should overrule a first instance decision of discretion only if it came to the conclusion that the division had not exercised its discretion in accordance with the right principles, or unreasonably, or that it had exceeded its proper limit of discretion.

1.2 Procedural facts

- The summons for oral proceedings, dated 26 February 2010, referred to novelty and inventive step as the issues to be discussed.
- The ground of opposition was for the first time mentioned in the opponent's letter dated 12 August 2010, page 7 (point 2.1).
- Oral proceedings before the opposition division took place on 12 October 2010. According to the Minutes, the parties' initial requests were established, including the opponent's request for, inter alia, revocation under Article 83 EPC, and the appellant's (patentee's) request that this fresh ground of opposition should not be admitted.
- In the following discussion which lasted for about 2 hours (see Minutes, pages 1 to 3), the reasons for the late filing and the substance and relevance of the

objection were extensively discussed.

- After an interruption for deliberation, the opposition division announced its interim decision that the claims of the main request did not meet the requirements of Article 83 EPC.
- At this point, the proprietor stated that it was taken by surprise, but wished to continue with the six auxiliary requests on file.
- As there were no further arguments, the auxiliary requests were also rejected under Article 83 EPC and the patent was revoked.

1.3 The appellant's complaint

It follows that in the present case, the fresh ground of opposition was filed late, but it was substantiated and prima facie relevant, since the opposition division was able to base its decision on it.

The appellant complained that the fresh ground of opposition was not mentioned in the summons for oral proceedings and no explicit request for admitting the fresh ground had been filed by the opponent, so that its admittance at the oral proceedings came as a surprise to the appellant. At the oral proceedings there had not been sufficient time for preparing a defense against the fresh ground of opposition, e.g. by drafting auxiliary requests. The appellant's alleged grievance is thus understood as a violation of its right to be heard (Article 113 (1) EPC).

1.4 The board's view:

1.4.1 Although the appellant declared being surprised by the course of events, it did at no point request a postponement of the oral hearing. The appellant

continued defending its case for more than two hours, with the aid of a technical expert, not only for the main request, but also for the claims of the auxiliary requests.

For the board, this sequence of events is an indication that the appellant was in effect not prevented from pursuing its case.

1.4.2 According to another argument, the appellant was prevented from filing additional requests and/or experimental evidence. However, when asked during the oral proceedings whether it wished to file new requests, the appellant said it had none and wished to continue with the six auxiliary requests on file (see Minutes of the oral proceedings, page 3, penultimate paragraph). As to the filing of new experimental evidence, the appellant had in appeal proceedings the opportunity to do so, but did not avail itself of it, as he had not done within the two months preceding the oral proceedings before the Opposition Division.

1.4.3 The appellant referred in its written submission to T 433/93 (in particular to Headnote 1):

"If an opposition division wishes to introduce a new ground of opposition into the proceedings in addition to the ground(s) substantiated in the notice of opposition, either of its own motion or upon request by an opponent, the patent proprietor must be informed (normally in writing) not only of the new ground of opposition (ie the new legal basis for the opposition), but also of the essential legal and factual reasons (ie its substantiation) which could lead to a finding of invalidity and revocation. Thereafter the patent proprietor must have a proper opportunity to present comments in reply to the new ground and its substantiation."

However, in the board's view, the present situation differs in an important aspect: In the case decided in T 433/93, the fresh ground of opposition was mentioned for the first time at the oral proceedings, whereas in the present case the objection under Article 83 EPC and the essential reasons therefore were communicated to the appellant by the opponent's letter dated 12 August 2010 (page 7 (point 2.1)) already about two months before the oral proceedings.

In decision T 1164/00 (of 2 September 2003; Reasons point 2), the board found that an appellant had been taken by surprise and prevented from having a fair chance of preparing its defence, if it was informed for the first time during oral proceedings of the introduction of a fresh ground of opposition. In such a case, the opposition division should have adjourned the oral proceedings to give the appellant more time, in order to comply with Article 113 EPC. Here again, the present situation differs in that the fresh objection under Article 83 EPC and the supporting arguments were communicated to the appellant about two months before the oral proceedings. In the board's view, a period of time of several weeks should have been sufficient to study the new arguments and, if necessary, file a request for postponement of the oral proceedings.

Therefore, the board considers that the case law cited by the appellant is not applicable.

1.4.4 The board is also not convinced by the appellant's argument to have been caught by surprise. In the board's opinion, the appellant should have been prepared for a discussion of the patent's own examples. There is no better expert than the patentee itself in

matters regarding its own patent. So, there is no need for a long preparation time. Also, in particular, there was sufficient time because the opposition ground of insufficiency of disclosure and the reasons therefore were made known to the appellant two months before the oral proceedings. Although the written objection appeared under the heading of "Inventive step", the terms "lack of sufficiency of disclosure" and "Article 83 EPC" were explicitly mentioned so that there could have been in the board's view no doubt about the opponent's intentions. It is also implicitly clear that the opponent wished the ground to be considered at the oral proceedings and in the decision, otherwise there would have been no purpose in the whole argument.

1.4.5 As to the justification for the late filing of the fresh opposition ground, the reason given was that it was raised in response to the appellant's own arguments according to which among the more than 460 test examples of the patent only about 125 test mixtures exhibited the desired synergistic effect (see the appellant's letter of 19 February 2009, page 4). The board finds this acceptable. To be sure, the test examples were already present in the patent as granted and a corresponding objection could have been raised during the nine-month opposition period. However, the statements in the appellant's letter of 10 February 2009, drawing attention to the circumstance that the great majority of the Examples of the patent did not exhibit the desired synergy effect and that such synergy was "rather an exceptional situation", could hardly be left uncommented by the opponent. Once the opponent's objections under Article 83 EPC were known to it, the appellant was in a position to prepare itself for a discussion and a defense strategy.

1.4.6 The appellant argued that even if allegations to an objection under Article 83 EPC were made in the opponent's letter of 12 August 2010, the supporting arguments in the decision under appeal were different from those on which the revocation of the patent were based, namely that an excessive number of experiments would have to be performed in order to obtain compositions showing synergism. Such a change in arguments had additionally taken the appellant by surprise.

For the board, these arguments are not convincing. The arguments of the opponent concerned not only the incommensurate broadness of the claims, but also a lack of guidance and necessity of trial and error experimentation which caused an undue burden (see page 6, lines 1 and 11, and page 7 of the above mentioned letter). These arguments therefore correspond to those discussed at the oral proceedings.

1.5 Conclusion

In summary, the board is not convinced that the first instance proceedings were tainted with a substantial procedural violation under Article 114(2) EPC. Therefore, a remittal to the department of first instance is not justified (Article 11 RPBA).

1.6 Reimbursement of the appeal fee

According to Rule 103(a) EPC, the appeal fee shall be reimbursed in the event of interlocutory revision or when the Board of Appeal deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation.

Since the appeal is not allowed for the reasons given further below, the request for a refund must also be refused.

2. Sufficiency of disclosure (Article 83 EPC)

2.1 Statutory law and jurisprudence

Article 83 EPC stipulates that the application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

According to the jurisprudence of the Boards of Appeal of the EPO, for making a case of insufficiency of disclosure, it is necessary to identify gaps in information resulting either from limitations in teaching or a lack of guidance in general, or a lack in guidance in case of failures, or the impossibility to verify parameters, or purpose-related instructions or the absence of criteria for selection rules.
The question then to be answered is whether the skilled person with his common general knowledge can remedy any such defects, or whether the consequences of the information gaps result in an undue number of experiments to be performed ("undue burden", "research programme") (see T 32/85, of 5 June 1986).

2.2 Present case

2.2.1 In accordance with the claims of the main request, the patent in suit concerns a method of controlling the growth of microorganisms in aqueous systems by adding
a) an ammonium salt activated by an oxidant;
b) a non-oxidizing biocide selected from the ones recited in claim 1 of the main request;

wherein a) and b) are selected such that they result in a synergy index of less than 1, as defined in the specification.

The patent in suit also claims a synergistic biocidal mixture comprising compounds a) and b).

2.2.2 It is important to note that the patent in suit does not claim a mere combination of an oxidizing and a non-oxidizing biocide, but aims to provide a synergistic mixture, as is reflected in the method claims by the feature defining a synergy index (SI) of less than 1 and in the product claims by the term "synergistic mixture".

2.3 Parameters and measurement methods

2.3.1 The synergy index (SI) describes the technical effect going beyond the individual effects provided by two or more components. According to paragraphs [0043] to [0050] of the specification, SI is calculated on the basis of relative bacterial growth inhibition percentages. A synergy index of less than 1 thus denotes an improvement over the sum of the individual effects, hence synergy; for SI = 1, neither synergy nor antagonism exists; and for SI > 1, said technical effect corresponds to a deterioration over the sum of individual effects (i.e. antagonism). The board observes in this context that the formula in paragraph [0049] for calculating the synergy index SI is obviously incorrect. The exact composition of the synthetic white water is also not disclosed and its composition may vary in practice.

2.3.2 However, in view of the explanations in paragraphs [0044] to [0051] of the patent in suit and the

literature cited in paragraph [0050], the board accepts, to the benefit of the appellant, that the synergy index (SI) used in the claims for defining the claimed compositions is sufficiently disclosed for it to be reproduced by the skilled person.

2.4 Incomplete illustration of the invention

2.4.1 Adequate information towards success

As a rule, to satisfy the requirement of Article 83 EPC, at least one way of enabling the person skilled in the art to carry out the invention must be disclosed, this being sufficient only if it allows the invention to be performed in the whole range claimed and covering substantially all embodiments falling within the ambit of the claims. This must be possible without any inventive effort and undue burden, taking into account the original application as a whole and the general common knowledge of the skilled person. This principle has been confirmed by numerous decisions of the Boards of Appeal (see for instance those cited in "Case Law of the Boards of Appeal of the EPO", 7th Edition 2013, page 309, chapter 4.4).

2.4.2 Working examples 1 to 18

The opposed patent provides concrete working Examples 1 to 18 in which the effect of various mixtures consisting of activated ammonium bromide (AmBr) as component a) and selected non-oxidizing biocides b) on the growth of the bacteria in an artificial consortium of bacteria in synthetic white water is determined.

Examples 11, 12 and 14 do not fall under the scope of the claims as amended in accordance with the main

request.

2.4.3 Examples not suitable for generalisation

The appellant submits that once the skilled person is provided with the teaching of the present invention it requires merely a routine testing of a biocidal mixture in order to find a biocidal mixture having a synergy index of less than 1 (i.e. a synergistic mixture).

However, as the appellant itself admits, among the examples which comprise more than 460 mixtures of AmBr and a non-oxidizing biocide and which are supposed to illustrate the claimed invention, only a minor fraction (about 125 or about 27%) do fulfil the described requirements and show a synergistic effect in the sense of the patent.

For instance, in **Example 1** (AmBr and BNS under a concurrent feed strategy), synergy could not be detected at any mixture ratio and at neither pH 5.5 nor pH 8; in **Example 2** (AmBr and BND under a sequential feed strategy), there was synergy for 3 out of 5 mixture ratios at pH 5.5 and for 5 of 5 mixtures at a pH of 8. **Example 4** (AmBr and DBDCB) showed synergy in 3 of 12 mixture ratios at pH 5.5 and in 9 of 11 mixture ratios at pH 8. **Example 5** (AmBr and DBNPA) at pH 8 showed no synergy in 10 of 13 experiments; **Example 8** (AmBr and DGH) showed no synergy at pH 8 in 24 out of 27 experiments at pHs 5.5 and 8. Similar negative results are found with other combinations of AmBr and non-oxidizing biocide (see for instance **Example 10**: only 1 synergistic mixture out of 11 at pH 5.5; and 4 synergistic mixtures at pH 8) or **Example 12** (only 1 synergistic mixture containing a large excess of AmBr, out of 14 mixtures investigated at pH 5.5; and 2

synergistic mixtures, also containing a large excess of AmBr, of a total of 14 test carried out at pH 8).

Some of the mixtures exhibit a SI value of close to 1 (e.g. 0.98 and 0.99), i.e. only weakly synergistic behavior, and at very high mixing ratios (excess of AmBr) (see for instance **Example 8**: SI of 0.98 at a ratio of DGH:AmBr of 1: 2576.7). As such mixtures practically consist only of AmBr, it is questionable whether the desired "significant reduction in the total quantity of biocide required for effective treatment" is achieved (see paragraph [0018]).

Therefore, the examples of the opposed patent demonstrate that a combination of AmBr with the specific non-oxidizing biocides as claimed does in the majority of test conditions (mixture ratio, pH, addition regime) not result in a synergistic biocidal effect.

There is also no disclosure and support for a synergistic effect with activated ammonium salts other than ammonium bromide. Convincing evidence that a mixture showing synergistic behavior in synthetic white water would behave similarly in a different aqueous microbial environment is also missing.

2.5 Missing instructions in case of failure

It has been discussed before that the Examples supposed to illustrate the claimed invention offer only limited guidance as most of them do not exhibit the claimed synergy effect. In such a case, there should have been provided a clear and complete teaching how the desired synergistic effect could nevertheless be obtained, taking working examples as a starting point, or other

suitable general information. Such guidance is missing in the patent in suit.

For instance, Examples 1 and 2 suggest that changing the feed strategy may give rise to synergistic behavior, irrespective of the pH, whereas Example 3 shows that synergistic behavior is found at pH 8, not at 5.5, both under concurrent feed regime.

The board is not convinced that this information gap could be filled by the skilled person's general common knowledge and by routine experimentation, in view of the fact that most of what are supposed to be the best examples illustrating the invention do not exhibit synergism, for reasons which are neither explained nor immediately obvious.

The patent specification does not bring synergistic biocidal mixtures reliably at the disposal of the skilled person, for any aqueous microbial system, any ammonium salt activated by an oxidant, and any one of the non-oxidizing biocides recited in claim 1 of the main request.

2.6 Undue burden

The appellant itself argued that a synergistic effect (i.e. a SI of less than 1) of a composition depended on a range of parameters and was rather an exceptional situation (letter of 10 February 2009, page 6, point 3.1 [emphasis added]). As such parameters are not disclosed, it follows that the patent in suit does not suffer from an occasional failure, but from a lack of a concept fit for generalization.

The situation may be aptly denoted as an invitation to

carry out a research programme, based on trial and error, with limited chances of success. See decisions T 435/91 (OJ EPO 1995, 188; Reasons 2.2.1) and T 809/07 (of 15 April 2010, Reasons 3.2). In accordance with the cited case law, sufficiency of disclosure cannot be acknowledged.

2.7 Conclusion

2.7.1 *Main request*

The requirements of Article 83 EPC are thus not met for the subject-matter of claim 1 of the main request.

2.7.2 *Auxiliary requests 1, 1a, 2, 2a, 3, 3a and 4*

The subject-matter claimed in the auxiliary requests is further restricted by the addition of one or more additional claim features. In particular, the ratio of activated ammonium salt to the non-oxidizing biocide is defined to fall within the range of from 5,000:1 to 1:80 (auxiliary requests 1, 1a, 2, 2a, 3, 3a and 4), the oxidant is defined as comprising hypochlorous acid or an alkali and alkaline earth hypochlorite salt (auxiliary requests 2, 2a, 3, 3a and 4) and the ammonium salt specifically comprises ammonium bromide or ammonium chloride (auxiliary requests 3, 3a and 4). In claim 1 of auxiliary request 4, two of the non-oxidizing biocides (MIT and CMIT) have been deleted from the list of biocides. Although these features limit the scope of the claims, the limitations are not suitable to reverse the board's negative finding of insufficiency of disclosure, for the following reasons:

Firstly, restricting the ratio of activated ammonium salt to the non-oxidizing biocide to a range of from

5,000:1 to 1:80 does not substantially reduce the number of biocidal mixtures to be screened by the skilled person in search of synergistic ones. The board considers that even the restricted range is broad enough for encompassing virtually all practically important biocidal mixtures, as can be seen from the Examples 1 to 18 of the patent in suit.

Secondly, as regards the definition of hypochlorous acid or an alkali and alkaline earth hypochlorite salt as the oxidant in auxiliary requests 2, 2a, 3, 3a and 4 and of ammonium bromide or ammonium chloride as the ammonium salt in auxiliary requests 3, 3a and 4, these salts would be the most obvious initial choices for the skilled person. The board considers that even under these narrower conditions the patent provides insufficient guidance for making synergistic mixtures available without undue trial and error.

Lastly, deleting two options from a list of 10 non-oxidizing biocides (auxiliary request 4) does not remedy the lack of guidance with respect of the remaining ones.

Therefore, the board's verdict of insufficiency of disclosure for the claims of the main request applies *mutatis mutandis* to the claims of the auxiliary requests.

These claims are therefore also not allowable (Article 83 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated