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# *Case No COMP/M.4957 - PERSTORP HOLDING / SOLVAY INTEROX (caprolactones business)*

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## REGULATION (EC) No 139/2004
## MERGER PROCEDURE

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Article 6(1)(b) NON-OPPOSITION
Date: 10/01/2008

***In electronic form on the EUR-Lex website under document number 32008M4957***

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Office for Official Publications of the European Communities
L-2985 Luxembourg

COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 10-I-2008

SG-Greffe(2008) D/200032

In the published version of this decision, some information has been omitted pursuant to Article 17(2) of Council Regulation (EC) No 139/2004 concerning non-disclosure of business secrets and other confidential information. The omissions are shown thus […]. Where possible the information omitted has been replaced by ranges of figures or a general description.

PUBLIC VERSION

MERGER PROCEDURE
ARTICLE 6(1)(b) DECISION

**To the notifying party:**

Dear Sir/Madam,

**Subject:** **Case No COMP/M.4957 - Perstorp Holding/ Solvay Interox (caprolactones business)**
**Notification of 3 December 2007 pursuant to Article 4 of Council Regulation No 139/2004[1]**

1. On 3 December 2007, the Commission received a notification of a proposed concentration pursuant to Article 4 and following a referral pursuant to Article 4(5) of Council Regulation (EC) No 139/2004 ('the Merger Regulation') by which the undertaking Perstorp Holding AB, ('Perstorp', Sweden) controlled by PAI Partners SAS, acquires within the meaning of Article 3(1) (b) of the Merger Regulation control of the whole of the caprolactones business of Solvay Interox Limited ('the Target', UK).

2. After examination of the notification, the Commission has concluded that the notified operation falls within the scope of the Merger Regulation and does not raise serious doubts as to its compatibility with the common market and the functioning of the EEA Agreement.

## I. THE PARTIES

3. Perstorp is a Swedish based chemicals company owned by funds managed by the private equity firm PAI. Perstorp is primarily a supplier of specialty chemicals (predominantly coating intermediaries), performance chemicals (including feed acidifiers used in the agricultural industry, organic acids and plasticizers), and advanced composite materials used in the aerospace, aviation and transportation industries.

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[1] OJ L 24, 29.1.2004, p. 1.

4. The Target currently forms part of Solvay Interox Limited, a subsidiary of Solvay S.A. The Target is active in the development, manufacture and sale of caprolactone monomer and its derivatives: thermoplastic polycaprolactones ('TPCL') and polycaprolactone aliphatic polyester polyols ('PCL') from a single production facility in the UK. These derivative products are used in a wide variety of applications such as coatings, adhesives, sealants and elastomers.

## II. THE OPERATION AND THE CONCENTRATION

5. On 13 October 2007, Perstorp and Solvay Interox Limited signed an agreement by which Perstorp UK Ltd., a subsidiary of Perstorp, will acquire Solvay's caprolactone production facilities and other assets including goodwill by means of a carve out. As a result of the proposed transaction, the Target will become a wholly and indirectly owned subsidiary of Perstorp.

6. The transaction therefore constitutes a concentration within the meaning of Article 3(1) (b) of the Merger Regulation.

## III. COMMUNITY DIMENSION

7. The operation does not meet the jurisdictional threshold of Article 1 of the Merger Regulation as the Target's Community-wide turnover in 2006 did not exceed EUR 100 million.[2.]

8. However, in view of the filing requirements in four Member States[3] and the cross-border nature of the transaction, the notifying party submitted a request for referral under Article 4(5) of the Merger Regulation on 25 October 2007. None of the Member States competent to examine the concentration indicated its disagreement with the request for referral within the period laid down by the Merger Regulation.

9. The concentration is, therefore, deemed to have a Community dimension pursuant to Article 4(5) of the Merger Regulation.

## IV. COMPETITIVE ASSESSMENT

10. The proposed transaction does not give rise to any horizontal overlap as Perstorp is not active in the manufacture of caprolactone monomer, its derivatives or any products that may be substitutes for these products. There is however a vertical link arising from Perstorp's manufacture of polyhydric alcohols that are used in the production of PCL[4].

### Relevant product markets

*Polyhydric alcohols (upstream products)*

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2 The Target's worldwide turnover in 2006 was […] and its Community-wide turnover […]. The worldwide turnover of PAI/Perstorp in 2006 was […] of which […] was derived in the Community.

3 […]

4 Polyhydric alcohols are not used in the manufacture of caprolactone monomer. The Target does use polyhydric alcohols in the manufacture of TPCL but these are not of a type manufactured by Perstorp.

11. Polyhydric alcohols are basic chemical building blocks that give physical and chemical properties to the products in which they are used. Polyhydric alcohols are classified according to the number of hydroxyl groups they contain: a polyhydric alcohol containing two hydroxyl groups in its molecule is known as a 'diol', one with three as a 'triol' and one with four as a 'tetrol'. According to information provided by the notifying party diols account for [90-100]% of total polyhydric alcohol sales whereas triols and tetrols represent only [0-10]% and [<5]% respectively. Polyhydric alcohols are used in a range of chemical processes and only a very small portion of the total polyhydric alcohol production is used as an [raw material] in the production of polyester polyols, including PCL and TPCL which are manufactured by the Target.

12. Perstorp produces a number of polyhydric alcohols that can be used in the production of PCL. These are neopentylglycol ('Neo'), trimethylolpropane ('TMP') and pentaerythritol ('Penta')[5]. Neo is a diol, i.e. with two hydroxyl groups, TMP is a triol and Penta is a tetrol. The notifying party submits that the most commonly used polyhydric alcohols in the manufacture of PCL are diols, which account for [the majority] of PCL production according to the notifying party whereas the remaining portion is triol and to a very limited extent [(…)] tetrol. In the case of TPCL, the notifying party submits that the [the raw material] used is [a polyhydric alcohol]. Perstorp does not manufacture this [polyhydric alcohol].

13. The notifying party submits that there is a high degree of substitutability between most polyhydric alcohols in the manufacture of PCL. In particular, all diols are considered to be suitable [raw materials] for the production of linear PCLs that are most commonly used in further downstream applications whereas triols and tetrols result in branched and cross-linkable PCLs (i.e. larger molecules) with different chemical properties which are therefore less often used in PCL production. The notifying party argues that customers are able to switch with relative ease between suppliers of Neo, TMP, glycerol and Penta due to the identical or high similarity of competing product offerings for each of these polyhydric alcohols. At the same time, it submits that switching between polyhydric alcohols having either the same or a different number of hydroxyl groups is possible within a relatively short period of time and at minimal cost even though such switching may necessitate some reformulation work.

14. Although the notifying party submits that Neo, TMP, glycerol, Penta and a wide range of other polyhydric alcohols could be considered as a single relevant product market it notes that in the absence of competition concerns even on the basis of the most narrowly defined relevant markets comprised of each of Neo, TMP, glycerol or Penta, the precise definition of the relevant product market can be left open.

15. Respondents to the Commission's market investigation did not support the notifying party's view that Neo, TMP, glycerol and Penta and a wide range of other polyhydric alcohols could be viewed as a single relevant product market when considering the manufacture of PCL. In particular, respondents emphasised the differing chemical structure and properties that result from the use of diols, triols and tetrols in the manufacture of PCL because of the number of hydroxyl groups present in each. From the supply-side perspective, the market investigation demonstrated that production plants are generally designed to manufacture a specific polyhydric alcohol and that switching between the manufacture of different polyhydric alcohols is difficult. As such,

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5 Perstorp has recently begun the production and commercialisation of glycerol (a diol).

the market investigation indicates a more narrow market definition than proposed by the parties. Respondents to the market investigation did however confirm that there are no specific features inherent in the types of polyhydric alcohols used in PCL production as supplied by Perstorp and its competitors that would exclude substitutability.

16. In the present case, the precise product market definition for polyhydric alcohols can be left open as the proposed transaction does not give rise to a horizontal overlap between the parties' activities and the competitive assessment would not be altered even if more narrow markets for polyhydric alcohols were defined.

*Caprolactone monomer and its derivatives (downstream products)*

17. *Caprolactone monomer* is either sold on the merchant market as a distinct product or further processed to produce caprolactone derivatives, namely TPCL and PCL, via a polymerisation process. In the polymerisation process, the caprolactone monomer reacts with other chemical compounds, e.g. polyhydric alcohols (see above) to form chains of molecules. The reaction conditions and raw materials determine the structure and therefore the functionality of the resulting caprolactone derivative.

18. *TPCL* (thermoplastic polycaprolactones) is an aliphatic polyester thermoplastic produced from the polymerisation of caprolactone monomers. TPCL is a long polymer with a molecular weight above 10,000 (usually 50,000 to 80,000). TPCL is used in a range of high performance applications, most importantly orthopaedic splints, shoe components, biodegradable films and packaging and hot melt adhesives.

19. The notifying party submits that there are several possible substitutable materials for caprolactone monomer, including [certain polyhydric alcohols], that can be used to modify resins. Similarly, it submits there are several possible substitutes to TPCL depending upon the application. However, as the transaction would not lead to any horizontal overlap or vertical links between the Parties' activities in respect of caprolactone monomer and TPCL production, the notifying party submits that the precise definition of the relevant product market can be left open.

20. *PCL* (polycaprolactone aliphatic polyester polyols) is derived through a polymerisation process of caprolactone monomer in the presence of [raw materials such as] a diol, triol or tetrol (which are examples of polyhydric alcohols). PCLs are used as the soft segment component in the production of polyurethanes for use in applications such as coatings, adhesives, sealants and elastomer applications (so called 'CASE' applications).

21. The notifying party submits that as the final PCL consist of only one polyhydric alcohol molecule and between 3 and 40 caprolactone molecules, the polyhydric alcohol part is relatively small in relation to the total PCL formulation and consequently has a relatively small influence on the overall property of the PCL. As such, the choice of polyhydric alcohol is mostly driven by the ease of manufacturing of polyurethane for any specific application and there is therefore a high degree of substitutability between most polyhydric alcohols when taking into account different PCL applications.

22. In addition, the notifying party submits that depending on the application, PCLs are substitutable with several other non-caprolactone reacted materials, in particular with certain aliphatic polyester polyols (such as 1.6 hexanediol adipate and 1.4 butanediol adipate), polytetrahydrofuran ('Poly THF') and polycarbonate polyols. It submits that customers can easily switch between PCLs and the aforementioned products and that changing the chemical composition of the polyurethane generally does not require any

modifications of the manufacturing equipment. As such, it submits that PCLs and the aforementioned alleged substitutable products could be considered as a single relevant product market. Nevertheless, as the proposed transaction would not impede effective competition even on the most narrowly defined market i.e. that of PCL only, the notifying party submits that the precise definition of the relevant product market can be left open.

23. The Commission's market investigation did not support the notifying party's submission. First, a clear majority of customers suggested that PCL offer a unique set of properties that cannot be easily achieved by other products. Switching between PCL and non-caprolactone based materials was found to be uncommon. In this regard, most customers indicated that they would not switch from PCL to other materials in their production process in the event of a 5-10% increase in price for PCL whilst other prices remained constant.

24. In addition, a majority of respondents noted that the choice of polyhydric alcohol is an important factor in determining the properties of the PCL as the use of a diol [as a raw material] would result in a linear PCL whereas the use of a triol or tetrol would lead to a branched and cross-linkable PCL. As such, a PCL based on a diol was not considered to be substitutable from a demand-side perspective with either a PCL based on a triol or a tetrol. Similarly, a PCL based on a triol was not considered to be substitutable by a PCL based on a tetrol. The market investigation indicated a certain degree of demand-side substitutability within diols, triols and tetrols respectively.

25. For the purposes of the present case, however, the precise product market definition can be left open as the proposed transaction does not raise competitive concerns under any alternative more precise product market definition within polyhydric alcohols.

**Relevant geographic market**

26. The notifying party submits that the relevant geographic market for all polyhydric alcohols, caprolactone monomer and it derivatives is worldwide or at least EEA-wide as materials are sold on a global basis, prices are generally consistent between regions and barriers to trade are low. Respondents to the market investigation have indicated that the markets are at least EEA-wide and possibly global. For the purposes of the present case, however, the exact geographic market definition may be left open as it would not alter the conclusions of the competitive assessment.

**Competitive assessment**

*The markets concerned*

27. As mentioned above, the proposed transaction does not give rise to any horizontal overlap as neither Perstorp nor any other company controlled by PAI manufactures caprolactones and its derivatives (or any other products that the parties submit could be substitutes for these products). However, the proposed transaction creates a vertical link between Perstorp's manufacture of polyhydric alcohols and the Target's manufacture of PCL. The notifying party submits that there is no actual or potential vertical link between its manufacture of polyhydric alcohols and the Target's production of TPCL as it is not a producer of [the polyhydric alcohol], which is used by the Target [as a raw material] in the production of TPCL. Moreover, any potential vertical link can be excluded as Perstorp has no intention of producing [this polyhydric alcohol].

28. All caprolactone markets are highly concentrated with a limited number of key producers. The Target's market shares in the merchant market for caprolactone monomer in 2006 were [10-20]% and [10-20]% on an EEA-wide and global level, respectively. Following the announcement in late 2006 of the Dow Chemical Company's ('Dow') intention to cease production of these products, there are now only three producers of caprolactone monomer: the Target, BASF and Daicel. However, as the proposed transaction does not create a vertical link between the parties' activities in respect of caprolactone monomer, this market is not affected by the transaction.

29. As BASF is not active in the production of PCL and TPCL, the only comparable competitor to the Target following Dow's announcement is the Japanese-based company, Daicel. There is a number of other companies active in the production of PCL. In contrast to the Target and Daicel these companies are not backwards integrated in the manufacture of caprolactone monomer and use the PCL they produce almost exclusively for further downstream processing.

30. In the market for TPCL, the Target's market share exceeds [80-90]% at both an EEA and global level. As the market for TPCL could be considered to be affected by the proposed transaction (despite the fact that Perstorp does not produce any input used by the Target), the possible effects on the TPCL market are discussed below.

*Market shares for polyhydric alcohols (upstream market)*

31. The notifying party estimates that its share of a market comprising all polyhydric alcohols would be less than [0-10]% on a global basis and [<5]% in the EEA. Table 1 shows that with the exception of diols, its market shares would be higher according to a distinction between diols, triols and tetrols, as appears warranted by the market investigation. However, only the market for tetrols would be affected by the transaction.

Table 1: Market shares of Perstorp for polyols 2006

| | **Diols** | **Triols** | **Tetrols** | **All Polyhydric alcohols** |
|---|---|---|---|---|
| EEA | [<5]% | [<5]% | [30-40]% | [<5]% |
| Global | [<5]% | [<5]% | [20-30]% | [<5]% |

*Source: Notifying party's estimates based on SRI Consulting and exports/imports statistics.*

32. The market shares of the notifying party would be higher if specific polyhydric alcohol products were to be considered to constitute distinct product markets. In this case, at the EEA level, only the market for Penta (tetrol) with a market share of [30-40]% would be affected while at the global level, the only affected market would be that of TMP (triol) with a market share of [20-30]%.[6]

*Market shares for PCLs*

6 Source: Notifying party's estimates based on SRI Consulting and exports/imports statistics.

33. On the market of PCL the Target's worldwide and EEA market share in 2006 were [50-60]% and [80-90]% respectively.[7] In case of a narrower market definition into markets for the supply of PCL based on diols, triols and tetrols, as indicated in the market investigation, the market shares of the Target in 2007, which are considered to better reflect the situation prevailing after Dow's decision to exit the market, amount to [80-90]%, [80-90]% and [90-100]% in the EEA and to [60-70]%, [60-70]% and [90-100]% at a global level.

34. If a narrower product market definition were to be retained for PCL based on a specific polyhydric alcohol initiator, the Target's market shares would be [90-100]% for Neo-based PCL, [80-90]% for TMP-based PCL and [90-100]% for Penta-based PCL on the EEA market in 2007. The shares for the same product markets at a global level would be [80-90]%, [60-70]% and [90-100]%.

*Vertical effects -PCL*

35. Input foreclosure can occur if an undertaking is likely (has the ability and incentives) to raise the costs of downstream rivals by restricting their access to an important input, i.e. polyhydric alcohols. In this respect it should first be noted that consumption of polyhydric alcohols in the manufacturing of PCLs is very small compared to the total volume of polyhydric alcohol production. Based on figures provided by the parties, in 2006, total polyhydric alcohol consumption for the manufacturing of PCLs amounted to only […] tonnes, or less than [<5]% of overall sales of polyhydric alcohol products. In the same period, the Target purchased […] tonnes (including […] tonnes from Perstorp). The market investigation revealed that some polyhydric alcohol producers are planning to increase capacity which will increase the availability of polyhydric alcohols. Looking at input from the cost perspective, the significance of polyhydric alcohols as a raw material is higher. The notifying party estimates that costs for polyhydric alcohol polyol procurement represent up to [20-30]% of the costs for producing polyols.

36. The market shares of Perstorp on the polyhydric alcohol markets indicate that it does not have market power in the upstream market. The market share of Perstorp in diols, which are the most commonly used [raw materials] in the polymerisation process, amounts to only [<5]% on the EEA level. The market investigation also confirmed that there are alternative suppliers for each polyhydric alcohol segment (i.e. diols, triols and tetrols) as well as for particular polyhydric alcohol products such as Neo and TMP. Moreover, Daicel, the main competitor of the Target in the PCL market, […] and no competition concerns regarding input foreclosure have been raised in the market investigation. Therefore it can be concluded that Perstorp would not have the ability to raise its rivals' costs for the procurement of polyhydric alcohols. It can also be noted that the Commission's market investigation indicated that the key issue concerning the availability of raw materials for PCL production is not polyhydric alcohols but rather caprolactone monomer.

37. Customer foreclosure can also be excluded in this case. Perstorp clearly integrates with a customer having a strong position in the downstream market but the Target's purchases of polyhydric alcohols are not significant relative to the overall polyhydric alcohol

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[7] In a (hypothetical) product market consisting of PCLs and their substitutes – as suggested by the notifying party – the Target's share would be less than [<5]% globally and approximately [<5]% on an EEA-wide basis.

market, as explained above. Other polyhydric alcohol producers would not be foreclosed even if the Target were to purchase all of its polyhydric alcohol requirements from Perstorp post-transaction. They would still have the possibility to supply customers for other non-PCL applications where the requirements for polyhydric alcohol are much more significant.

38. One manufacturer of polyhydric alcohols suggested during the market investigation that the proposed transaction could lead to a change in the behaviour of the merged entity which would lead to less caprolactone monomer being offered on the market. The respondent claimed that Perstorp would have an incentive post-transaction to supply its PCL business with a particular polyhydric alcohol (TMP) at a reduced price. According to the competitor, Perstorp would do this because it would have excess TMP capacity in Sweden as the company has announced plans to invest in TMP production in China. Access to cheaper TMP would, in the opinion of the competitor, cause the merged entity to produce more PCL thereby reducing its sales of caprolactone monomer on the merchant market. As a consequence, other non-backwards integrated PCL manufacturer would not have access to sufficient caprolactone monomer and would therefore reduce their demand for polyhydric alcohols. The proposed transaction could therefore have a negative effect on caprolactone customers and to a certain degree also on TMP manufacturers.

39. The Commission examined the concerns raised by this party but found they were speculative and not based on elements that are specific to the proposed transaction. Although the market investigation indicated that the supply of caprolactone monomer on the merchant market is short, as a result of Dow's exit, it should be recalled that the Target has not historically been a significant supplier to the merchant market. In 2006, its share of the merchant market for caprolactone monomer was less than [10-20]% either at an EEA or global level. […]. Regarding the alleged sales of polyhydric alcohols at a reduced price to the Target, the Commission considers that incentives to give such reductions in the presence of excess capacity would also exist absent the merger as long as the additional quantity sold contributes to fixed costs. Moreover, both BASF and Perstorp (provided the transaction is completed) have announced plans to increase their production of caprolactone monomer. As acknowledged by several respondents to the market investigation, the proposed transaction may therefore have positive effects in that it could improve the availability of caprolactone monomer on the merchant market.

*Vertical effects -TPCL*

40. As noted above, the notifying party is not active in the production of [the polyhydric alcohol] which is used by the Target [as raw material] in the manufacture of TPCL, and has informed the Commission that it has no plans to begin production of [this polyhydric alcohol]. In addition, the notifying party submits that switching from [this polyhydric alcohol used as raw material] in the production of TPCL to another [polyhydric alcohol] that is possibly produced by the notifying party would require significant laboratory tests. Even if switching were possible, the notifying party argues that the merged entity would lack the incentive to do so as [this polyhydric alcohol] is a widely available commodity product and accounts for less than [<5]% of the total cost of TPCL. In any event, as the Target's [requirements of this polyhydric alcohol] are insignificant in comparison to total [sales of this polyhydric alcohol], the risk of customer foreclosure resulting from any hypothetical switch to another [polyhydric alcohol] supplied by Perstorp can be excluded.

## V. CONCLUSION

41. For the above reasons, the Commission has decided not to oppose the notified operation and to declare it compatible with the common market and with the EEA Agreement. This decision is adopted in application of Article 6(1) (b) of Council Regulation (EC) No 139/2004.

For the Commission,
signed
Neelie KROES
Member of the Commission