

The anticipated acquisition by Taminco NV of the European methylamines and derivatives business of Air Products and Chemicals Inc

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Glossary

Summary

1. On 16 July 2004, the Office of Fair Trading (the OFT) referred the proposed acquisition by Taminco NV (Taminco) of certain assets representing the European Methylamines and Derivatives Business (EM&D Business) of Air Products and Chemicals Inc (APCI) and its subsidiary Air Products (Chemicals) Teesside Ltd (APCT) to the Competition Commission (CC) for investigation and report. The reference was made under section 33(1) of the Enterprise Act 2002 (the Act). We are required to decide whether the proposed merger would give rise to a relevant merger situation, and whether or not we expect a substantial lessening of competition (SLC) as a result of the proposed merger. We are required to publish our final report by 30 December 2004. Our provisional findings were published on 28 October 2004.
2. Methylamines are chemicals that are used as feedstocks for the production of methylamine derivatives (derivatives). Methylamines are gaseous under atmospheric conditions and are transported under pressure or in aqueous solutions. Derivatives are used in a diverse variety of products, including gas treatment, water treatment, solvents, coatings and animal nutrition.
3. The focus of this inquiry has been on those methylamines and derivatives that were, until September 2004—see paragraph 9—produced by Air Products¹ EM&D Business and are also produced by Taminco. Both Taminco and Air Products (the main parties) produced all three methylamines: monomethylamine (MMA), dimethylamine (DMA) and trimethylamine (TMA). They also both produced the following derivatives: dimethylformamide (DMF), choline chloride, monomethylethanolamine (MMEA), methyldiethanolamine (MDEA) and dimethylaminoethanol (DMAE). MMEA, MDEA and DMAE belong to a class of derivative known as alkylalkanolamines (AAAs).
4. Taminco is majority owned by AlInvest Partners Private Equity, a Dutch private equity investor which in 2003 acquired from Union Chimique Belge (UCB), the latter's methylamines and derivatives business, known as Taminco. Its headquarters are in Ghent, and it employs approximately 500 people worldwide. Taminco specializes in the production of methylamines and derivatives. In 2003 it generated worldwide revenues of €182 million.
5. APCI, which was founded in 1940, is a publicly owned company traded on the New York Stock Exchange with a market capitalization of approximately US\$12 billion. Its headquarters are in Pennsylvania and it has approximately 17,200 employees worldwide. Its principal activities include production of gases, chemicals and equipment. In 2003, Air Products' worldwide annual revenues were approximately US\$5.4 billion.
6. Air Products had acquired its EM&D Business from ICI in 1998. That acquisition included the production facility at Billingham, Teesside, in the UK, primarily producing methylamines, DMF and choline chloride. ICI also produced AAAs at its facility at Chocques in northern France, using as a feedstock methylamines shipped from Billingham. The acquisition did not include ownership of the Chocques facility; instead Air Products entered into a toll manufacturing agreement with ICI under which ICI agreed to produce certain derivatives for Air Products using methylamines supplied by Air Products from its Billingham facility.

¹We use the term Air Products to describe the Air Products group of companies, of which Air Products and Chemicals Inc is the parent.

7. On 20 April 2004, APCT and APCI entered into a business sale agreement with Taminco. The assets being sold under that agreement are:
 - intellectual property, information and know-how, and goodwill in relation to the business;
 - stock (raw materials and finished goods), up to a certain monetary amount;
 - all contracts and arrangements for the sale or swap of methylamines and derivatives, including sales agreements with the customers of the business, swap agreements with two large chemical producers and the benefit and burden of the toll manufacturing agreement; and
 - business records in relation to the business, with certain exclusions.
8. We concluded that the acquisition would result in the enterprises concerned ceasing to be distinct, and that the share of supply test is met in respect of the supply of methylamines and derivatives. We found that arrangements are in progress which, if carried into effect, would result in a relevant merger situation.
9. In early September 2004, during the course of the CC's inquiry, Air Products announced the closure of the Billingham facility.
10. We analysed the substitutability of the three methylamines. We found that there was no demand-side substitution between these products but that there was some scope for supply-side substitution. We examined price and margin data; this was consistent with the view that methylamines were part of the same product market, which had put been forward by the main parties and others. We conclude that there is one product market for methylamines.
11. We also considered the geographic market for methylamines. These products are hazardous and costly to transport. Although there is considerable trade within the EEA, there is little trade over longer distances. We conclude that the geographic market for methylamines is EEA-wide.
12. We analysed the substitutability of the three relevant AAAs (MMEA, MDEA and DMAE). We found that although there were demand-side substitutes for some applications of these chemicals, these would provide only a weak constraint on pricing and did not indicate that the product market was wider than the relevant AAAs. However, we found that the production processes gave scope for supply-side substitution between these products. We conclude that there is one product market for the relevant AAAs.
13. We considered supply-side and demand-side substitution for both DMF and choline chloride. For each of these chemicals, we found that although there were substitutes for some applications, these would provide only a weak constraint on prices and did not indicate that the product market was wider than the product itself. We conclude that there is one product market for DMF and one product market for choline chloride.
14. We considered the geographic markets for the AAAs, DMF and choline chloride. In each case, we conclude that due to the current levels of international trade, and the scope for such trade, the relevant geographic markets are worldwide.
15. In considering competition within the relevant markets, we were told that in each of the markets the products of each manufacturer are almost identical and that whilst

service levels are very important they are not the current focus of competition; competition is almost entirely based upon price.

16. The main parties, and others, told us that it was very common for larger customers to have contractual arrangements with several suppliers. We were told that it was easy for customers to switch between suppliers. The only significant barrier appeared to be where the products are destined for pharmaceutical use. In these cases, there is a rigorous process of customer accreditation for new suppliers.
17. We assessed what would be likely to happen in the absence of the merger (the counterfactual). Air Products told us that it had taken a decision to withdraw from its EM&D Business and would do so even if it were unable to sell any of the assets which formed part of that business. We examined the financial performance of Air Products' EM&D Business and the various reviews that Air Products had conducted of its viability. We considered that in the absence of the merger Air Products would have closed the Billingham facility and exited its EM&D Business.
18. We considered that it might be worthwhile for Air Products, as part of its exit from the EM&D Business, to sell all or some part of the business to a third party, if one showed interest. We considered that we did not expect a party other than BASF to be a likely purchaser.
19. We therefore conclude that the appropriate counterfactual is that, in the absence of the merger, Air Products would have closed the Billingham facility and exited the EM&D Business; it might have sold assets, including the benefits and burden of the toll manufacturing agreement, to BASF, but not to another party.
20. The assessment of whether the merger would result in an SLC involves comparing the expected competitive situation in the relevant markets if the acquisition were to take place, with the counterfactual, which might involve a sale of assets to BASF. Our conclusion on the counterfactual indicates that the number and identity of the competitors is the same with the merger as compared with what we expect would have happened in the absence of the merger.
21. We examined the market shares and market concentration expected as a result of the merger. We did not find these to be significantly different from the situation under the counterfactual. We also considered whether the merger would be expected to have an adverse effect on the level of capacity in the relevant markets. We conclude that it would not.
22. We considered the possibility of coordinated effects. We conclude that the acquisition would neither be sufficient to increase the likelihood of coordinated effects where none existed before, nor would it increase the effectiveness of any pre-existing coordinated effects, relative to the counterfactual which would still see Air Products exiting the markets.
23. We therefore conclude that, as a result of the proposed merger, we do not expect there to be any substantial lessening of competition.

Findings

1. The reference

- 1.1 On 16 July 2004, the OFT referred the proposed acquisition by Taminco of certain assets representing the EM&D Business of APCI and its subsidiary APCT to the CC for investigation and report. The reference was made under section 33(1) of the Act. We are required to decide whether the proposed merger would give rise to a relevant merger situation, and whether or not we expect a substantial lessening of competition (SLC) as a result of the proposed merger. We are required to publish our final report by 30 December 2004.
- 1.2 This document, together with the appendices, constitutes our final report which we are required to publish under section 38(1) of the Act. Further information, including non-sensitive versions of main party and third party written submissions, summaries of third party key arguments and views, and our provisional findings published on 28 October 2004, can be found on our web site.² We cross-refer to these documents as appropriate.

2. The methylamines and derivatives business and the companies

The methylamines and derivatives business

- 2.1 Methylamines are chemicals that are used as feedstocks for the production of derivatives. Methylamines are gaseous under atmospheric conditions and are transported under pressure or in aqueous solutions.
- 2.2 The focus of this inquiry has been on those methylamines and derivatives that were produced by both Air Products³ EM&D Business and by Taminco. Until September 2004 both main parties produced all three methylamines: MMA, DMA and TMA.⁴
- 2.3 Methylamine derivatives are used in a diverse variety of products and applications, including gas treatment, water treatment, solvents, coatings and animal nutrition.
- 2.4 There is a wide variety of derivatives. The derivatives that were produced by Air Products' EM&D Business and by Taminco are listed below and in this report we use the term derivatives to refer only to the following derivatives:
- DMF;
 - choline chloride;⁵
 - AAAs;
 - MMEA;
 - MDEA; and

²www.competition-commission.org.uk.

³We use the term Air Products to describe the Air Products group of companies, of which Air Products and Chemicals Inc is the parent. Please also refer to the glossary.

⁴In September 2004 Air Products ceased production at Billingham and its EM&D business no longer produces methylamines, DMF or choline chloride. See also paragraph 3.9.

⁵Choline chloride is sometimes referred to as Vitamin B4. Except where indicated, we use the term choline chloride to refer to animal grade choline chloride and not to product of human grade standards. See paragraphs 4.10 and 4.11.

— DMAE.⁶

There are other alkylalkanolamines, but in this report we use the term AAA to refer only to MMEA, MDEA and DMAE.

2.5 Table 1 gives an overview of the relationship between the various chemicals. More technical detail about the chemicals and their production is provided in Appendix D.

TABLE 1 Methylamines and their derivatives

Inputs	Methylamines	Inputs	Derivatives	Key end applications
Methanol + Ammonia	{ MMA { { { DMA { { { TMA	MMA + Ethylene oxide (EO) DMA + EO	AAAs { MMEA { { { MDEA DMAE	Coatings Brightening agent Fabric softener Gas treatment Water treatment
=	DMA	DMA + carbon monoxide	DMF	Solvents
=	TMA	TMA + hydrochloric acid and EO	Choline chloride	Animal feed

Source: CC based on information from the main parties.

Taminco NV

2.6 Taminco NV is majority owned by AlInvest Partners Private Equity (formerly NIB Capital Private Equity), a Dutch private equity investor which in 2003 acquired the methylamines and derivatives business, known as Taminco, from UCB. Its headquarters are in Ghent, Belgium and it employs approximately 500 people worldwide. Taminco specializes in the production of methylamines and derivatives. In 2003 its worldwide turnover was €182 million.

2.7 UCB was formed in 1928 from a merger of several chemical companies. Prior to the sale of Taminco, UCB had been involved in industrial scale methylamine production since 1932, in DMF production since 1957 and in choline chloride production since 1963. AAAs have been produced by UCB since 1998.

2.8 Appendix B provides further information on Taminco, including, in particular, more financial data.

Air Products and Chemicals Inc

2.9 APCI, which was founded in 1940, is a publicly owned company traded on the New York Stock Exchange with a market capitalization of approximately US\$12 billion. Its headquarters are in Pennsylvania, USA and it has approximately 17,200 employees worldwide. Its principal activities include gases, chemicals and equipment which account for about 70 per cent, 25 per cent and 5 per cent of its worldwide revenue respectively. In 2003, Air Products' worldwide annual revenues were approximately US\$5.4 billion. In the UK, APCI's subsidiaries include Air Products plc and APCT.

⁶DMAE is sometimes referred to as DMEA.

- 2.10 Air Products' chemicals business is organized around two divisions: performance materials and chemical intermediates. Principal products of performance materials are emulsions, specialty additives, polyurethane additives and epoxy additives. Principal chemical intermediates are amines (including methylamines and their derivatives as well as higher amines) and polyurethane intermediates.
- 2.11 Appendix B provides further information on Air Products, including, in particular, more financial data.

3. The proposed merger and the relevant merger situation

Background to the merger

- 3.1 Air Products acquired the EM&D Business from ICI in 1998. That acquisition included the production facility at Billingham, Teesside in the UK, primarily producing methylamines, DMF and choline chloride as well as limited quantities of DMAE (one of the AAAs). ICI also produced AAAs at its facility at Chocques in northern France as well as other products unrelated to the business sold to Air Products. The acquisition did not include ownership of the Chocques facility which was retained by ICI, as subdividing the plant was not deemed in the best interest of the parties at the time of the acquisition. Instead, Air Products entered into a toll manufacturing agreement with ICI (the Chocques Agreement, described in Appendix K) under which ICI agreed to produce AAAs for Air Products using methylamines supplied by Air Products from its Billingham facility and technology which was also supplied by Air Products.
- 3.2 Air Products' EM&D Business has suffered significant losses in recent years (described in more detail in Appendix B). There has been strong downward pressure on margins, due to falling product prices and increasing costs of raw materials. Despite a number of cost reduction initiatives, Air Products concluded that it could not expect the business to achieve adequate profitability.
- 3.3 In April 2003, Air Products decided to sell its EM&D Business. [REDACTED]
- 3.4 [REDACTED]
- 3.5 [REDACTED] in March 2004 Air Products, taking account of the relative values and terms of the bids, and the progress of negotiations, decided to proceed with Taminco.

The transaction

- 3.6 On 20 April 2004, APCT and APCI entered into a business sale agreement with Taminco (see details in paragraphs 3.7 and 3.8). On 22 April 2004, Air Products announced its intention to close the facility at Billingham. The Billingham facility was closed in September 2004 (see details in paragraph 3.9).
- 3.7 The assets being sold under the agreement with Taminco are:
- (a) from APCI:
- (i) intellectual property, information and know-how,⁷ and goodwill owned by APCI in relation to the business; and

⁷These include the Amietol brand name and the rights under the irrevocable licence for technical know-how granted to Air Products by ICI on Air Products' acquisition of the EM&D Business in 1998.

- (ii) stock (raw materials and finished goods), owned or agreed to be purchased by APCI or its affiliates and held by APCI, up to a certain monetary amount.
- (b) from APCT:
 - (i) all contracts and arrangements for the sale or swap⁸ of methylamines and derivatives, including sales agreements entered into between Air Products and the customers of the business, swap agreements entered into with two companies ([REDACTED]), and the benefit and burden of the Chocques Agreement, but excluding any agency or distribution agreements entered into by Air Products;
 - (ii) business records used exclusively or primarily in relation to the business, excluding those which APCI or its affiliates are required to retain due to regulatory and data protection requirements; and
 - (iii) stock (raw materials and finished goods), owned or agreed to be purchased by APCI or its affiliates and held by APCT in relation to the business, up to a certain monetary amount.

3.8 The agreement provides for consideration of [REDACTED]. The transaction is subject to a number of conditions including regulatory clearance in Germany, Spain and the UK. Only the UK clearance, by the CC, is outstanding.

Closure of the Billingham facility

3.9 In early September 2004, during the course of the CC's inquiry, Air Products announced the closure of the Billingham facility [REDACTED]

Jurisdiction

3.10 Under our terms of reference (see Appendix A), we are required to investigate and report on whether arrangements are in progress or in contemplation which, if carried into effect, will result in the creation of a merger situation qualifying for investigation. Under the Act, there are two considerations relevant to determining whether there is a relevant merger situation:

- (a) whether two or more enterprises cease to be distinct; and
- (b) whether either the turnover test or share of supply test is satisfied.

3.11 In terms of (a), an 'enterprise' is defined as the activities or part of the activities of a business (section 129(1) of the Act). The sale of the goodwill, assets and contracts described in paragraph 3.7, led us to conclude that the transaction is one in which, if carried into effect, two or more enterprises would cease to be distinct.

3.12 The share of supply test is satisfied if, as a result of the merger, the following condition prevails or does so to a greater extent:

In relation to the supply of goods of any description, at least one-quarter of all the goods of that description which are supplied in the UK, or in a substantial part of the UK:

⁸Swap arrangements are described in paragraph 5.10 ff.

- (a) are supplied by one and the same person or are supplied to one and the same person; or
- (b) are supplied by the persons by whom the enterprises concerned are carried on, or are supplied to those persons.

Both Taminco and Air Products indicated that their combined shares of supply of methylamines for 2003 in the UK would be [X] per cent, a very substantial share. Post-merger, the merged enterprise will account for more than 25 per cent of the supply of methylamines in the UK. Similarly for each of the methylamine derivatives produced by both parties (see paragraph 2.4) the combined share of supply for 2003 was in excess of 25 per cent. The share of supply test is therefore met.

3.13 Since the share of supply test is met, we are not required to consider whether the turnover test is met.

3.14 For the reasons set out in paragraphs 3.10 to 3.13, we therefore conclude that arrangements are in progress which, if carried into effect, will result in the creation of a relevant merger situation.

4. Market definition

General considerations

4.1 As stated in the CC's guidelines,⁹ an important element in deciding whether a merger would result in an SLC is to define the relevant market or markets. There are normally two dimensions to the definition of a market, the product market and the geographic market. The boundaries of these are determined by substitutability; that is, the extent to which customers can readily switch between substitute products, or suppliers can readily switch their facilities between the supply of alternative products. We sought to identify the extent to which customers and suppliers could readily demand, or supply, adequate substitute products in response to a small but significant non-transitory increase in price (SSNIP) imposed by a hypothetical monopolist. Substitutability is normally assessed within the framework of this SSNIP test, which is described in the CC's guidelines. Our guidelines also recognize that the CC does not regard market definition as an end in itself, but rather as a framework within which to analyse the effects of a merger on competition. In coming to our view on market definition, we have followed the CC's guidelines and have also taken into account the main parties' views on market definition, as well as views from customers, competitors and suppliers.

The main parties' submissions

4.2 Taminco and Air Products told us that they considered that the appropriate framework for analysis should be based on the following groupings:

- methylamines in the EEA or some wider area;
- DMF and possibly certain demand-side substitutes, worldwide;
- AAAs and possibly certain demand-side substitutes, worldwide; and
- choline chloride and possibly certain demand-side substitutes, worldwide.

⁹Merger References: Competition Commission Guidelines (CC2).

- 4.3 The main parties argued that the geographic market for methylamines was at least as large as the EEA and for the derivatives was worldwide.
- 4.4 The main parties told us that there was virtually no demand-side substitutability between the methylamines. However, they argued that there was substitutability in supply. For this reason they suggested that the three methylamines formed one product market.
- 4.5 Similarly, the main parties told us that there was virtually no demand-side substitutability between the AAAs. In this case also, they argued that there was substitutability in supply. For this reason, they suggested that the three AAAs together were part of one product market which might also include certain demand-side substitutes.
- 4.6 The main parties considered DMF and choline chloride each to be part of markets that were distinct from the markets for the other products under consideration and that these markets might include demand-side substitutes.
- 4.7 The main parties told us that the derivatives could be, and were, traded internationally. They stated that as these were homogenous commodity products, and as there were no significant non-tariff barriers to trade (such as local specifications or differences in health and safety regulations), the potential for trade ensured there was a competitive interaction between prices in national and regional markets which created a wider economic market. For some of the products, considerable trade was already taking place; for others the potential for trade was a constraint on price, and trade would take place if significant regional price disparities were to arise. Consequently, they argued that there were worldwide markets for the derivatives.
- 4.8 The main parties told us that methylamines were more difficult and costly to transport over long distances and that therefore trade in them was generally regional. The relevant geographic market for these products, they argued, was the EEA.

Assessment of the product market

- 4.9 As discussed in paragraphs 2.2 to 2.4, there are eight types of product produced by both main parties:
- methylamines: MMA, DMA, TMA;
 - derivatives:
 - DMF;
 - choline chloride; and
 - MMEA, MDEA, and DMAE (the AAAs).
- 4.10 These products are in some cases marketed in different forms; for example, methylamines may be sold in aqueous solutions of different concentrations or as an anhydrous gas. We received no indications that there were difficulties in producing the different forms of the same chemical, with the exception of choline chloride for human consumption. Therefore, given the close supply-side substitutability, we considered that there were not separate markets for any different forms of each of the relevant chemical products.

- 4.11 In the case of choline chloride, different levels of purity exist for animal feed use and human consumption. Both Air Products and Taminco told us that they do not produce human grade choline chloride. Both main parties regarded the market for human grade choline chloride to be different from that for the animal grade choline chloride they produced. [✂]

Supply-side issues

- 4.12 We first considered supply-side substitutability for the different products. We sought information from the main parties and their competitors relating to market entry and have received no evidence that suggested that other chemical producers could easily adapt their plants to produce any of the relevant products, except at considerable cost.

Methylamines

- 4.13 Methylamines are produced by reacting methanol and ammonia; this always produces all three methylamines, which are then separated by distillation. The proportions of MMA, DMA and TMA produced depend on various factors, including the production technology (especially the choice of catalyst), the age of the catalyst, and the temperatures and pressures of the reaction. We were told that it is possible to vary the ratio of the three products produced within a plant. The production process produced all three methylamines and changes to the mix of products could be achieved, albeit at additional cost.
- 4.14 It is possible that if there were differing margins for the three methylamines, producers could then change the ratios of the different types of methylamines produced, in order to raise production levels of those with higher margins. We tested whether this supply-side constraint is effective by looking at relative price and margin trends. This analysis is described in Appendix E. We considered that the data were consistent with supply-side substitutability, while recognizing that this evidence was not conclusive in itself.
- 4.15 Other producers to whom we spoke indicated that there was close supply-side substitutability between the three methylamines.

DMF

- 4.16 We have not received any suggestions that the production plants for DMF can be used for other products without substantial modifications, or that DMF can be produced in other chemical plants. Air Products told us that the DMF plant at Billingham had been capable of producing dimethylacetamide¹⁰ prior to 1998, but that this was no longer the case. Therefore, there appears to be little potential for supply-side substitution in the production of DMF.

Choline chloride

- 4.17 Based on the evidence we have seen, it does not appear possible for the choline chloride plants to be used for other products, or for choline chloride to be produced in other plants except at substantial cost. Air Products told us that its plant could be converted for other uses, but that this would require substantial investment and time. Therefore there does not appear to be any potential for supply-side substitution between choline chloride and other products.

¹⁰A chemical which we do not consider further as Air Products can no longer produce it.

AAAs

- 4.18 AAAs are produced by reacting methylamines with ethylene oxide either to produce MDEA and MMEA together, or to produce DMAE. Most producers produce all three of the AAAs (MMEA, MDEA and DMAE). Many plants are capable of producing either MDEA with MMEA, or DMAE. In order to switch between these two possible sets of products, the plants must be closed and cleaned, and the feedstocks changed. These swing¹¹ plants operate in batches producing different AAAs in the same reactor, with a short period of downtime (at most two to three days) between batches. [✂]
- 4.19 We were also told that the ratio of MDEA to MMEA produced can be varied according to the ratio of ethylene oxide to MMA in the feed stream, and that MMEA can be recycled to increase production of MDEA. However, varying the product mix in this way generally increases unit production costs.
- 4.20 The main parties told us that because of the use of swing plants and the ability to alter production of MDEA and MMEA, there is close supply-side substitutability between the different AAAs. The two or three days to switch between products is low in the context of supply-side substitution. Third parties also generally took the view that there was close supply-side substitutability.
- 4.21 We were told that swing plants can produce other products apart from AAAs; one of the Chocques reactors is sometimes used for the purpose of producing isopropanolamines (another class of amine derivative which is not produced by Taminco). This would similarly require cleaning and recharging over a few days. However, neither main party has argued that there is a wider product market than AAAs. There does not appear to be sufficient overlap in their production to constrain the relative prices of these products. Rather, Air Products uses the Chocques capability to produce isopropanolamines on an opportunistic basis using spare capacity when it is worthwhile. We have sought information from the main parties and their competitors relating to market entry and have received no evidence that suggests that other chemical producers could easily adapt their plants to produce AAAs (or any of the other relevant products) without considerable cost and time.
- 4.22 We analysed both prices and margins for the AAAs, in order to establish to what extent these moved together. This analysis is shown in Appendix E. The levels of correlation found were low and did not provide evidence of competitive interactions or supply-side substitution. Taminco told us that the price data analysed were unreliable for establishing the extent to which market prices would normally be correlated. This resulted from the short period of time for which data were available and reflected a start up of new operations during which there had been much volatility in average prices arising from the negotiation of contracts with customers. In addition they pointed out that some prices may have reflected the need to utilize base load capacity at the plant.
- 4.23 Other producers also told us that there was potential for supply-side substitutability in AAA production, and none disagreed with the view that all AAAs were in the same market.

Demand-side issues

- 4.24 We then considered the demand-side substitutability for the different products.

¹¹We understand that the term 'swing plant' denotes a plant that is used, sequentially, to produce different products; in other respects swing plants are not fundamentally different from dedicated plants.

- 4.25 We were told that, in general, there is little potential substitutability in end use between the relevant products, and little substitutability with other chemicals. Each product has defined end uses for which the other relevant products are not suitable, and there appear to be few other alternative products open to customers. The exceptions are discussed below.
- 4.26 DMF is a solvent. Some producers have argued that there are alternatives available such as acetone. [X] told us that N-Methylpyrrolidone is a substitute solvent for certain process applications, but that, since it is considerably more expensive, marginal price changes would not induce substitution. Air Products also identified dimethylacetate as another potential substitute but acknowledged that its price would constrain such substitution.
- 4.27 MDEA, one of the AAAs, is used as an ingredient in fabric softeners. Alternative formulations for fabric conditioners are available, and we are told that producers can switch between formulations and by doing so substitute other chemicals for MDEA. MDEA is also used in gas treatment and there are alternative gas treatment products for this purpose. Taminco told us that it was attempting to encourage users of other products to shift to the use of MDEA.
- 4.28 Betaine is a substitute for choline chloride in animal feed. However, it appears to be less cost-effective for most purposes and the level of use as an alternative to choline chloride is low.
- 4.29 The identified substitutes may be relevant only for a small proportion of the users of the products, and we were told that marginal price changes may be insufficient to induce substitution. Therefore, it seems that demand-side substitution is a very weak constraint for each of these products. Air Products explained that it was difficult to estimate the extent to which customers would switch to alternatives following a price rise for methylamine and derivatives, due to the fact that these products have fallen in price in recent years.

Vertical integration and market definition

- 4.30 Most European producers of methylamines and derivatives are vertically integrated. Those that produce methylamines mostly use them in their production of derivatives, and those that produce derivatives use their own internally produced methylamine as a feedstock. We therefore considered whether the relevant market is that for supply on a vertically integrated basis of both the methylamines and the derivative product.
- 4.31 Several advantages were quoted for being an integrated producer: security of methylamine supply, savings on transport costs where production facilities are co-located, and the possibility to gain an advantage over prices that could be achieved if buying from a producer of methylamines. (Most methylamines are used by their producers for derivative production. The balance, approximately one-quarter of total production, is sold to other producers; these external sales are known as the merchant market.) We were told that, in contrast, the industry in the USA shows a much lower degree of vertical integration, and there is a much greater share of methylamine production entering the merchant market. We asked a number of industry participants why the industry was structured differently in the USA from Europe. The common view was that these differences were the consequence of the historical development of the industries and no other explanations were put forward.
- 4.32 Air Products and Taminco both suggested it would be possible for a producer of derivatives to set itself up in Europe and agree a supply contract for large volumes of methylamines from another producer. As the USA's model indicates, there is no

operational requirement for producers to be vertically integrated. However, there could be transport cost disadvantages as well as risks in the absence of vertical integration since a derivative producer would need to secure long-term guaranteed feedstock supplies at prices that did not disadvantage it relative to competitors. [X], a major customer, told us that it would not be happy using a supplier that did not have such long-term guaranteed supplies of feedstocks due to the risks to its business if supply was disrupted. Also, customers, even if they require both methylamines and derivatives, do not require them to be sourced from the same supplier.

- 4.33 For these reasons we conclude that the market should not be considered in terms of integrated production but rather in terms of the individual products.

Conclusions on product markets

- 4.34 Each of the eight products produced by both main parties appears to have its own distinct demand. While there are some demand-side substitutes for some of the derivatives, we do not consider them to provide a sufficiently strong constraint on market prices so as to be part of the same market.

- 4.35 With regard to the three methylamines, the evidence, as described in paragraphs 4.13 to 4.15 and in Appendix E, indicates that there is some potential for supply-side substitution between them. Taking account of the views of the main parties and other producers, and having found the pricing and margin evidence to be consistent with this, we conclude that there is one product market for methylamines.

- 4.36 We found no conclusive pricing and margin evidence to indicate whether or not the AAAs constituted a single market. However, the scope for supply-side substitution by switching plant production between the AAAs (as discussed in paragraphs 4.18 to 4.21) suggests close supply-side substitutability. Moreover the general view of industry producers is that the AAAs together comprise one product market. We found very little evidence of supply-side substitution between AAAs and other chemicals. In the case of MDEA, while there was some scope for demand-side substitution, we did not consider it sufficiently strong to provide a constraint on prices (see paragraphs 4.27 and 4.29). As discussed in 4.21 we do not regard supply-side substitution of isopropanolamines to be sufficiently strong to provide a constraint upon the prices of AAAs. We therefore conclude that the AAAs constitute one product market.

- 4.37 We conclude that DMF and choline chloride each constitute separate product markets, because there is no supply-side substitution and although there is some potential for demand-side substitution, as discussed in paragraphs 4.26 to 4.29, this is too weak to provide an effective constraint on pricing.

Geographic market

- 4.38 Production facilities for methylamines and their derivatives tend to have capacities that are large relative to the levels of demand in individual European countries. We were told that for a methylamine plant to be economically viable it would need to have a capacity greater than the total UK demand. Producers supply all of their customers in the EEA from one or two facilities. With the closure of the Billingham facility, all UK requirements for methylamines and their derivatives will be imported. Air Products previously supplied methylamines from its Billingham facility to customers in countries such as Austria, Finland, Germany and Spain, and to the Chocques facility in France for production of AAAs. The evidence thus suggests that the geographic markets are wider than the UK.

- 4.39 For each product market we sought to determine whether its geographic extent was regional or worldwide, and if it was regional what area was covered.
- 4.40 The boundaries of geographic markets can be assessed using the SSNIP framework referred to in paragraph 4.1—could an outside producer supply the local market in response to a small but significant non-transitory increase in price and so undercut a monopolist in the local market? This would not occur if there were high barriers to trade, high costs of doing trade, or if, for some reason, customers or suppliers were unwilling or unable to look beyond their usual supply channels in geographic terms. If customers were unwilling or unable to look beyond their usual supply channels, we would consider whether business might be conducted through an intermediary.

Possible restrictions on the geographic market

- 4.41 A number of possible barriers to international trade were put to us.

Transport costs

- 4.42 The first potential barrier to trade is the cost of transport, which depends on the characteristics of the particular product.
- 4.43 We were told that methylamines can be transported either under pressure as anhydrous gases, or as aqueous solutions of varying strengths. Methylamines are potentially hazardous chemicals, and if shipped as an anhydrous gas great care needs to be taken when loading and unloading. Although the need for special handling procedures and specialist transport arises regardless of the distance transported, we were told that because the specialist containers required are expensive, transport costs rose as transport time increased. Aqueous solutions of methylamines are easier to transport, but transport costs of these are high because of the volume of water that must then be shipped.
- 4.44 We were told that the derivatives are much easier to transport; they are not generally hazardous and so they do not require specialist containers and handling. For example, AAAs are liquids which can be easily and safely transported in drums, isotankers or parcel tankers.¹²
- 4.45 It was put to us that shipment over long distances increased the risk of product degradation, due to factors such as water ingress during transport. The main parties told us that any such problems were most likely to arise during loading and unloading, which apply to any delivery regardless of the distance involved.
- 4.46 [X] provided the following estimates of transport costs based on contracts where it is responsible for logistics (see Table 2). These indicate that although there are higher costs in transporting products over long distances, costs do not escalate to very high levels for worldwide trade, with the possible exception of methylamines for which no estimates were provided. Other producers provided similar estimates of transport costs. We note that although the transport costs represent a relatively high proportion of the costs of DMF, it is nevertheless widely traded.

¹²Isotanks are rigid tanks designed to be transferable between different transport modes in the same way as a normal transport container. Parcel tankers are specialist bulk tanker ships.

TABLE 2 Estimates of proportionate transport costs for methylamines and derivatives

% of the selling price	Worldwide	within the EEA
Methylamines	N/A	approximately 6% of the selling price
DMF	approximately 15% of the selling price	approximately 8% of the selling price
AAAs	approximately 10% of the selling price	approximately 3–5% of the selling price
Choline chloride	approximately 7-10% of the selling price	approximately 6–8% of the selling price

Source: [X]

Note: N/A = not applicable.

Transport time

- 4.47 Where there is a long distance between producer and customer, the transport time could be problematic for the customer. We were told that most customers' businesses require continuous supplies of the product and to facilitate this they have some on-site storage facilities. A few customers expressed concern that supplies should be from a reasonably local source to avoid disruptions to transport (such as storms, strikes etc).
- 4.48 Suppliers for their own part use local storage to provide a greater assurance of continuity of supply. Air Products told us it was possible to work with customers to forecast their demands, and therefore it felt lead times were only a problem for spot purchasers rather than those with regular supply contracts.
- 4.49 We note that although there can be a lead time of several days where UK customers are supplied from mainland Europe, or where European customers were supplied from the Billingham facility, we have received evidence that the UK is part of a wider geographic market for the products.

Customs duties and other regulatory barriers to trade

- 4.50 We were told that there were few relevant restrictions on trade in methylamines and their derivatives. With regard to imports into the UK, there do not appear to be any relevant restrictions on product specifications or health and safety restrictions that could act as a barrier to imports. Choline chloride is sometimes traded as a dry crystal product rather than as an aqueous solution. As a dry product it is usually mixed with some ground vegetable or cereal carrier animal feed, such as corn cobs. In North America, genetically modified corn is often used as a carrier; this is not imported into the EC because of requirements for labelling of genetically modified organisms. However, choline chloride can be transported in pure form or aqueous solution, or on a silica carrier.
- 4.51 Import duties are payable on some products.¹³ There is a 3 per cent duty on imports of methylamines into the EC from Russia, while imports from Turkey and Romania have zero tariffs. A 6.5 per cent duty is charged on any imports from the USA, Korea or China.
- 4.52 For choline chloride, imports from Turkey face a 0 per cent tariff, while tariffs are 3.3 per cent for imports from Russia and China, and 9.6 per cent for imports from the USA.
- 4.53 Air Products told us that import duties on AAAs averaged 5 per cent. There appear to be a range of applicable tariffs varying between 0 and 9.5 per cent depending on the

¹³Data from EC Taric web site: http://europa.eu.int/comm/taxation_customs/dds/cgi-bin/tarchap?Lang=EN.

source. The 9.5 per cent rate is applicable to some of the countries from which imports are most likely, namely China, Korea and the USA.

Data on international trade

- 4.54 We examined the data on international trade which is described in greater detail in Appendix F. (In general these data relate to trade between Europe and non-European countries or trading blocs.) The existence of substantial international trade would suggest that the market was at least as wide as the countries trading in the products. However, the absence of significant existing trade between countries would not necessarily indicate that they are not in the same market; the potential for trade could serve to keep market prices in line.
- 4.55 We found evidence of low levels of trade in methylamines, between the EEA and other areas. Total imports are less than 1 per cent of EEA production and under 4 per cent of merchant sales. Taminco told us that exports from the EEA are negligible.
- 4.56 We found that there were significant imports of DMF into the EEA, representing about 20 per cent of final demand. Also, EEA producers appear to be substantial exporters; Taminco estimates that about two-thirds of total EEA production of DMF is exported.
- 4.57 The trade data did not provide us with good estimates of choline chloride imports. But as with DMF, EEA producers appear to be substantial exporters; Taminco estimates that 40 per cent of total EEA production of choline chloride is exported.
- 4.58 Also, the trade data did not provide a good basis for assessing imports of AAAs into the EEA from the rest of the world. The main parties advised us that most imports were from the USA. The trade data indicated that volumes imported from the USA had declined in recent years and that there had been no DMAE imports since 2001.
- 4.59 Exports, as well as imports, can indicate the scope of the geographic market. Air Products told us that 6 to 7 per cent of its AAA production was exported to the USA.
- 4.60 The trade data supported the proposition that the markets for DMF and choline chloride were worldwide. The data also provided some support for the proposition that the market for AAAs was worldwide. In the case of methylamines, the data were not conclusive one way or the other.
- 4.61 We noted that there were swap arrangements¹⁴ for derivatives between European and North American producers. These would not be included in the international trade data which only report physical flows. We considered that these swap arrangements might be evidence of a market wider than the EEA, a point we return to in paragraph 4.64.

International price comparisons

- 4.62 We considered whether international price comparisons could give us further information on the extent of the markets. However, due to the absence of reliable, long-term market price data, we were unable to draw any firm conclusions.

¹⁴Swap arrangements are described in paragraph 5.10 ff.

Conclusions on geographic market

- 4.63 For methylamines, the evidence received indicated that transport costs are such that there is not a worldwide market. There is, however, substantial intra-EEA trade, and we therefore conclude that the EEA is a distinct geographic market. Air Products noted that there are producers in adjacent regions such as Russia and Romania, and argued that these suppliers would be able to import into the EEA given the geographic proximity and the low rate of duty on imports from these countries. However, such suppliers have not in the past taken advantage of opportunities to supply the EEA market. It is possible that these suppliers may choose to enter the market in the future which would then expand the boundaries of the relevant geographic market.
- 4.64 We considered that the derivatives could be, and in certain cases were, traded extensively and over long distances. The threat of imports from outside of any geographic region would be an effective constraint on prices charged by local producers. We therefore conclude that the markets are worldwide. In forming this view we did not find it necessary to assess whether or not the swaps described in paragraph 4.61 should be taken into account.

5. Assessment of the competitive effects of the merger

- 5.1 We are required under the Act to decide whether the merger has resulted, or may be expected to result, in an SLC within any market or markets in the UK for goods or services.¹⁵ In this section of the report we look at the competitive effects of the merger having regard to our guidelines.¹⁶ We examine in particular competition in the relevant markets for methylamines and their derivatives. We first outline some key features of demand in these markets, including the nature of the customers, the types of contract entered into, the potential for switching, the price sensitivity of customers and any countervailing power they may have. We then discuss the supply of the markets including the suppliers, distribution and cost factors. Next we discuss the nature of competition and the suppliers' pricing strategies. Following a discussion of the counterfactual, we examine the competitive effects of the merger. This leads to our conclusion as to whether or not we expect an SLC as a result of the merger.

Competition in the relevant markets

Demand

- 5.2 There are many potential uses for methylamines and derivatives. Methylamines are the chemical building blocks for derivative products such as pharmaceutical products, agrochemicals, animal feed additives and water treatment chemicals. Methylamine-based AAAs are used for applications such as oil and gas treatment, water treatment, surfactants and as catalysts for polyurethane production. The main parties provided the following details of the major intermediate and end uses for the relevant products (see Table 3); they noted that there were over 200 potential end uses for methylamines.

¹⁵Section 35(1)(b).

¹⁶CC2 Merger References: Competition Commission Guidelines, June 2003.

TABLE 3 **Main uses for methylamines and derivatives**

<i>Product</i>	<i>Main intermediate uses</i>	<i>Main end uses</i>
MMA	Building block for derivatives (MDEA) and MMEA	Agrochemicals, explosives, solvents
DMA	Building block for derivatives (DMAE) and DMF	Water treatment chemicals, polyurethane foams, surfactants
TMA	Building block for choline chloride	Water treatment process; processing aid paper industry, ion exchange resins
DMF		Urethane coatings, acrylic fibres, electronics, pharmaceutical products, as well as the extraction of valuable chemicals from complex mixtures, such as butadiene extraction from a mixture of other similar hydrocarbons
Choline chloride		Principally as an additive for animal feed (Vitamin B4), but is also used as a food supplement for human consumption, a catalyst, a curing agent and a neutralising agent
MDEA		Gas treatment for the selective removal of acid gases; fabric softener; various other applications such as paints and inks
MMEA		Fine chemicals, pharmaceuticals (intermediate to produce antihistamines or local anaesthetics), optical brighteners for detergents; brightening agent in the dyeing of cotton/polyester blends
DMAE		Water treatment and paper making, industrial effluent treatment

Source: Air Products, Taminco.

5.3 Air Products told us that the categories it identified account for at least 50 per cent of usage; it can be seen that the total range of customers and uses is highly fragmented. Taminco identified AAAs and especially DMAE as having a growing number of end use applications. There are some significant uses that are very important in particular product segments. In the case of AAAs, Taminco identified the following primary uses: water treatment 41 per cent, gas treatment 23 per cent, surfactant 13 per cent, coating 10 per cent, others 13 per cent.

Prospects for demand

5.4 The UK chemicals industry has been in decline over the last few years; the merchant market demand for methylamines in the UK has reduced substantially. Air Products told us that many UK methylamine and derivative customers had ceased production or relocated abroad and that it expected this process to continue. However, Air Products told us that potentially there may be some growth in demand for derivatives, in particular, MDEA in the area of gas treatment; DMAE in the area of water treatment chemicals. MDEA and DMAE are the most commercially important AAAs by production volumes. Taminco identified AAAs as a higher value added product group with less cyclical demand than the other derivatives. There is increasing demand for choline chloride for animal feeds. Taminco told us that it believed that there will continue to be a need in Europe for methylamines, because they are key building blocks for the chemicals industry and have a great variety of applications. Worldwide, there are many uses for methylamines and derivatives, but the main market growth appears to be centred in Asia.

- 5.5 The main parties told us that they expected that demand would continue to decrease in the EEA for methylamines and DMF, but that demand is likely to increase for DMAE, MDEA and choline chloride.

Customer base

- 5.6 For some products, producers may have a small number of major customers. These are typically large chemical companies such as Ciba, often with a global presence. These companies account for a substantial percentage of sales. The gain or loss of a major customer's contracts can therefore be very significant for a producer's output levels and capacity utilisation. Air Products has a much greater proportion of output accounted for by large customers than Taminco.
- 5.7 Appendix G includes tables illustrating the distribution of customers by volume of purchases and the distribution of prices and sales quantities of Taminco's customers.
- 5.8 A number of industry players told us that it was very important to secure some large scale contracts in order to ensure that plants operated at a reasonable minimum level of capacity utilization, to ensure efficient operation and to cover fixed costs. Consequently, there could be active price competition to secure the largest contracts.
- 5.9 Another feature of the industry is that there are sales between producers, and a number of supply and swap agreements.
- 5.10 A typical swap arrangement might operate along these lines: a producer (A) situated in the EEA with a requirement for product in the USA might enter into an agreement with a producer (B) in the USA which has a requirement for product in the EEA such that A fulfils B's requirement and B fulfils A's requirement. Such arrangements exploit the essentially homogeneous nature of the products to reduce physical transport costs and, in some cases, duties. But swap arrangements do not have a direct impact on customers, whose relationship with their suppliers remains unaltered. Such agreements tend to be entered into only when there are large, long-term requirements. Thus while there tend not to be many of them, they may represent substantial volumes of product.
- 5.11 Sales between producers arise for a number of reasons. They are sometimes used to supply customers during periods when production plants are closed for maintenance, upgrades, catalyst renewal etc. There is also a number of agreements that have arisen as practical consequences of industry restructuring.

Customer contracts

- 5.12 The main parties told us that customers negotiate a wide range of contracts. For many customers prices are negotiated on a spot basis but there are some long-term supply arrangements which have pricing formulae that take into account movements in raw material costs. However, Air Products told us that the majority of methylamine and derivative sales are made on the basis of short-term supply contracts, which are concluded for periods ranging from one to six months, frequently containing provision for automatic renewal. Those contracts generally provide that the seller is to provide a particular tonnage of methylamines and/or derivatives for the purchaser at a price which is negotiated between the parties. Taminco told us that a number of contracts, including the short-term contracts, contain 'meet-or-release' clauses, ie contractual provisions under the terms of which the seller has to meet the price offered to its customer by other producers, or allow their customer to buy from such other producers. Invoiced prices cover a wide range of different delivery, packaging and transport conditions.

- 5.13 The main parties and others told us that it was very common for larger customers to maintain more than one supplier contract. This practice offers advantages to the customer by providing an established alternative source of supply should there be any disruption to a producer's ability to supply, and by helping the customer to play one supplier off against the other when negotiating prices. Taminco estimated that only 5 per cent of its customers used it as an exclusive supplier, with 75 per cent purchasing from three or more suppliers.

Customer switching

- 5.14 The main parties argued that there were no barriers to customers switching between suppliers, or altering the balance of business between multiple suppliers. They told us that the products are homogenous and that containers for shipment are of standard design. Therefore customers could switch if they were dissatisfied with price, quality or service. However as long as suppliers remained competitive there was little incentive to switch. The only significant barrier to customer switching appears to be where the products are destined for pharmaceutical use. In these cases there is a rigorous process of customer accreditation for new suppliers (but this need not inhibit the switching of volumes between accredited suppliers). Apart from these customers, no others indicated to us that there were significant barriers to switching.
- 5.15 Taminco told us that customers do not have loyalty to particular suppliers. However, Air Products told us that it believed that provided suppliers priced in line with the market, there was a degree of customer loyalty. It told us that this may be partly based on inertia, particularly where the product did not represent a substantial proportion of the customers' costs. Air Products told us that it had retained many customers when it acquired the business from ICI; however, it did not believe that customer loyalty gave it any power to raise prices relative to its competitors.
- 5.16 The main parties argued that customers are highly sensitive to prices charged by individual suppliers. We were told that customers tend to seek the best price available, in part because customers are under pressure in their own markets. In practice these customers were often able to achieve better prices from their current supplier or suppliers without having to switch a substantial proportion of their business between suppliers.
- 5.17 We asked the main parties for details of major contracts won or lost over the last two years. They gave details of a number of contracts, both large and small, including some won and lost for the same products on the basis of pricing. Some of the lost contracts were due to customers ceasing to operate. Taminco detailed [redacted] contracts won and [redacted] lost, [redacted]. Air Products outlined [redacted] significant contracts lost over the last three years and [redacted] won, for a variety of products, although the total product volumes involved were not large in total; [redacted].
- 5.18 We have seen no significant barriers to customers switching between suppliers, with the possible exception of customers connected to the pharmaceutical industry (see paragraph 5.14). The products are in general homogenous, facilitating switching. Supply contracts are generally for six months or less and usually do not involve exclusive supply arrangements. We therefore consider that there is substantial scope for customer switching.

Price sensitivity

- 5.19 Air Products considered it difficult to assess how customers would react to industry-wide price increases; Taminco, however, argued that the customers for some down-

stream applications were highly sensitive to input prices and that in the event of an increase in European prices, these customers would relocate to Asia. Also, Taminco argued that traders would be able to arbitrage any significant price differences (see paragraph 5.30).

Countervailing power

- 5.20 Methylamine and derivative producers face some large and significant customers. In relation to DMAE, two customers, [REDACTED], were believed to account for over [REDACTED] per cent of demand in Europe. Together with [REDACTED] in the USA, these companies account for the bulk of DMAE purchased worldwide. [REDACTED]
- 5.21 The production of methylamine and derivative products is a high fixed cost industry, where producers need high rates of capacity utilization to operate profitably. Air Products argued that where customers maintain more than one supplier they can exercise considerable buyer power through the threat to reduce the proportion of business placed with a particular supplier. It was also argued that these very large customers would have the ability to promote new entry into the market, by awarding long-term contracts that would encourage the establishment or expansion of European capacity, or the development of an import supply chain from producers outside the EEA.
- 5.22 The main parties argued that the largest chemical companies were sophisticated purchasers. They would have professional buyers with knowledge of the industry and production costs. Air Products also told us that procurement processes were becoming more sophisticated, for example some customers were setting up electronic bids and auctions for global contracts. We have been unable to calculate reliable figures for the proportion of customers' costs accounted for by methylamines and derivatives, especially given the very wide range of uses to which they are put.
- 5.23 In view of the incentives for producers to achieve a high degree of capacity utilization, the high volumes that the largest customers buy and the prices they achieve (described in Appendix G), we conclude that the large customers have countervailing power. We have no evidence that small customers have countervailing power.

Supply

Producers

- 5.24 There are five producers of methylamines in the EEA: Air Products and Taminco, BASF, Akzo Nobel and Ertisa. All produce all three types of methylamines. Ertisa does not produce derivatives. Akzo Nobel does not produce AAAs; the other producers produce all derivatives. The producers each supply methylamines throughout the EEA from one or two production facilities.
- 5.25 BASF (Germany) and Akzo Nobel (the Netherlands) are major international chemicals companies with extensive operations. Ertisa (Spain) is smaller. Additional details on these companies are provided in Appendix C.
- 5.26 The main parties' estimates of actual production and potential productive capacity for methylamines in 2003 for EEA producers are shown in Appendix H. These estimates indicate that about one-quarter of all methylamine production is sold to other companies, on what is known as the merchant market. The rest is kept for internal use to produce derivatives.

- 5.27 The main parties' estimates of actual worldwide production and potential productive capacity for the derivatives in 2003 are also shown in Appendix H.

Distribution

- 5.28 The main parties sell to and arrange delivery to large customers directly. These large customers represent most of the business volume but there are a large number of small customers. Producers often use independent distributors to service small accounts. Typically, customers which purchase in less than full tanker loads will take supplies in drums and be served by a distributor which will deal in a wide range of chemical products. For example, Taminco uses distributors in China, Denmark, France, Germany, Italy, Korea, Spain, Switzerland, Taiwan and the USA. Air Products maintains networks of distributors in Europe, India, Pakistan and Taiwan. It uses these distributors to serve smaller customers, and it estimated that it distributes approximately [X] per cent of its products this way.
- 5.29 Producers will often use agents in countries where they do not have an established supply network. Air Products uses agents in locations where it does not have its own sales force, for example [X].
- 5.30 There are some independent traders active in the market which may seek out opportunities to purchase product cheaply and sell it to distributors or direct to customers. These traders may seek supplies from outside the region, and so bring a measure of pricing restraint between these markets. For example, Taminco told us it had observed DMF produced outside the EEA (for example, Russian, Chinese or Japanese material) being imported into the EEA by traders such as Caldic, Helm, Mitsui and Petrasol. Some customers told us that security of supply was important, and so such deals may be unattractive. However, traders can hold stocks of product to assure rapid delivery.

Branding

- 5.31 The AAAs produced by Air Products are sold under the brand name of 'Amietol'. We were told that other producers did not brand their methylamines or derivatives. We were told that the brand name was helpful, in that some of the chemical names were extremely long, but that Air Products derived no price premium or additional customer loyalty as a result of the brand.

Cost differences

- 5.32 Producer costs will depend on a wide variety of factors: production technology, costs of feedstocks, vertical integration, capacity of the plant, capacity utilization at the plant, the mix of products required, labour costs and transport costs. We therefore considered whether there are differences in cost that will impact on the ability of certain producers to compete for customers.

Production technologies

- 5.33 The main parties told us that producers of methylamines and their derivatives do not use markedly different production technologies. They told us that the necessary technologies are either freely known or can be licensed. The parties told us that as a consequence, access to technology had little impact on the relative cost position of producers. [X] told us that research was not geared to finding completely new technologies, but rather to finding incremental improvements in production efficiencies. The parties noted that there were gains in efficiencies to be realized from experience in the optimal workings of a plant.

- 5.34 Taminco argued that there were major differences in production between swing and dedicated plants, due to the downtime for cleaning between production runs at a swing plant. This could markedly affect the maximum capacity utilization achievable as compared with a dedicated plant.

Capital costs and economies of scale

- 5.35 Taminco noted that capital costs for chemical plants are lower in some regions (for example, China). It also argued that the level of fixed costs for each unit of output could be much lower for some producers (for example, those achieving economies of scale and scope such as BASF) or where a new facility could be integrated with other production units.
- 5.36 Air Products stated that production costs would vary significantly depending on the scale of the plant. It expected that unit production costs would fall for larger plants, due to economies of scale, production technology efficiencies, and the ability to spread fixed costs over a larger quantity of output. It also stated that there were lower purchasing costs for raw materials for larger quantities.

Capacity utilization

- 5.37 As there is a high fixed cost element in the production of methylamines and derivatives, high rates of capacity utilization are necessary in order to reduce average costs to profitable levels. Air Products and Taminco both produced evidence of the strong effect of utilization on average costs.

Variable costs

- 5.38 The main parties believed that variable costs would be similar among producers. They were not aware that any producers had particularly advantageous terms for feedstocks (for example, methanol, ammonia and EO) from third parties. Most feedstocks appeared to be priced with reference to world spot prices for the commodity inputs.
- 5.39 Taminco noted that production of methylamines accounted for a very small proportion of total usage of methanol and ammonia. Prices of these inputs have increased in recent years due to rising prices for natural gas. It said that ammonia tended to have local markets whereas methanol is sold on a wider geographic market, and so there is less regional variation according to regional natural gas prices (the major feedstock for these products).

Vertical integration

- 5.40 European producers are usually vertically integrated into the production of both methylamines and derivatives. There are also examples of producers integrated into the production of feedstocks for these chemicals. A number of advantages were claimed for such integration. It was suggested that upstream-integrated producers of methylamines are influenced to a lesser extent by increasing raw material prices and decreasing product prices where they are also integrated downstream into the production of derivatives. Air Products told us that producers dependent on third party supplies will in general face higher costs than vertically integrated producers; additionally there will be considerable risk associated with the prices of feedstocks. Further, when production is located on a single site this leads to a reduction in transport, supply and distribution costs.

- 5.41 Taminco are, and Air Products were, integrated in as much as they produce methylamines and their derivatives, although Air Products' split site operations brought a transport cost disadvantage. We were told that BASF has a much greater degree of integration, being involved in the production of feedstocks for methylamines and in downstream markets based upon derivatives. We were told that Ineos produces some AAAs and that whilst it does not produce methylamines, it does produce ethylene oxide, the other major feedstock.

Evaluation of supplier costs and competition

- 5.42 We consider that all existing producers are able to compete actively for customers and that any cost disadvantages do not appear to be large enough to prohibit them from competing.

Trade

- 5.43 There is substantial intra-EEA trade in methylamines and derivatives. As shown in Appendix F, for some of the derivatives there are currently few actual imports into the EEA; however, with the exception of methylamines there was evidence that there was the potential for imports from, or exports to, areas outside the EEA.

Competition

- 5.44 The main parties told us that competition between suppliers of these chemicals was primarily on the basis of price. It was suggested that there could be some differentiation on the basis of lead time, depending on the geographic location of producer and customer, although we were told that any lead time problems can be minimized through effective negotiation and demand forecasting with the customer. Customers indicated that reliability of supply, having more than one potential supplier, and the desire not to be dependant on a competitor were also factors. We received no evidence to suggest that innovation had been significant for either methylamines or for their derivatives.
- 5.45 Whilst it was necessary to provide good customer service and meet quality standards, customer evidence did not suggest that service levels, quality or innovation were important bases for competition. We therefore concentrated on price competition.
- 5.46 Taminco and Air Products told us that they do not publish list prices, rather prices are negotiated bilaterally. Sales managers, acting under guidance from marketing managers, negotiate sales price and the terms of sales contracts. Prices will be heavily influenced by changes in raw material costs. The main parties told us that there were sometimes public announcements of price increases due to changing raw material costs in order to strengthen the negotiating position of their sales staff, but the actual price increases achieved varied, because all prices are negotiated bilaterally.
- 5.47 The main parties told us that there was no differentiation between customers according to their nature, their location, or the end use of the product. Rather, prices varied with the nature of the contract. Prices tended to be higher for the smaller contracts, non-bulk deliveries, and short-term contracts or spot purchases. Prices would often reflect delivery charges. The result is a high degree of variation in prices to customers reflecting costs of supply.
- 5.48 We also received information that customers can be knowledgeable about average market prices and price trends.

- 5.49 Taminco provided us with data on invoiced prices for its sales between August 2003 and July 2004¹⁷ that show a wide range of realized prices. We were told that the variation in prices reflected volumes, costs and related negotiating strength.
- 5.50 The main parties provided details of average realized prices for the relevant products. Taminco's and Air Products' realized prices have generally followed a similar pattern.
- 5.51 We received evidence from several sources that average realized product prices had fallen, due to competitive pressure arising from a substantial amount of spare capacity worldwide.

New entry

- 5.52 The main parties told us that totally new entry was unlikely given current product prices. However, they argued that it was open to the major customers to promote entry by awarding large volume supply contracts, or to arrange large scale supply contracts with producers outside the EEA. The parties also noted that in the case of methylamines, there were other producers located just outside the EEA, in countries such as Russia and Romania. The parties said that these producers had excess capacity, lower costs than EEA producers and were able to supply methylamines into the EEA.

Counterfactual

- 5.53 Before we turn to the effects of the proposed merger, we need to assess what would be likely to happen in the absence of the merger (the counterfactual).
- 5.54 Air Products told us that it had taken a decision in April 2003 to withdraw from its EM&D Business and would do so even if it was unable to sell any of the assets which formed part of that business. Air Products told us that the Billingham facility was not economically viable and that, without it, continued operations at Chocques did not make commercial sense for Air Products because it would no longer be producing the methylamine feedstocks used by the Chocques facility (see paragraph 3.1). In September 2004 Air Products announced the closure of the Billingham facility [✂].
- 5.55 Air Products provided us with a discounted cash flow analysis prepared as part of its evaluation in March 2004 (see Table 4) which demonstrated that continuing operations would be a worse outcome for it than closure without a sale of the assets. [✂]

TABLE 4 Net present values from Air Products' discounted cash flow comparisons

US\$ million

Sale to Taminco	()
✂	()

Source: Air Products.

- 5.56 Air Products also told us that it considered that the appropriate counterfactual was the closure of the Billingham facility and cessation of the Chocques agreement without a sale of assets and that the AAA capacity of Chocques would no longer be available to supply the market. Air Products told us that it did not think it likely that it

¹⁷Taminco's price data are shown in Appendix I.

would have concluded an acceptable purchase agreement with BASF. Air Products told us that the terms and conditions relating to the Chocques agreement in BASF's indicative offer would have left Air Products with an unacceptable level of risk.

- 5.57 We examined the financial performance of Air Products' EM&D Business (details of which are provided in Appendix B) and the various reviews that Air Products had conducted of its viability. We expect that in the absence of the merger Air Products would have closed the Billingham facility and exited the EM&D Business.
- 5.58 We considered that, on the assumption of closure of the Billingham facility in any event,¹⁸ Air Products would have a strong incentive to sell the remainder of its EM&D Business. We considered that, if the net financial and other terms were positive for Air Products it might be worthwhile to sell all or part of the remaining business to BASF, if BASF showed interest.
- 5.59 We are of the view that we could not expect a party other than BASF to be a likely purchaser. We noted that only two initial bids had been made when Air Products started its sale process and that Air Products had contacted every major producer in the industry. We heard evidence from a number of parties that it would be unattractive for a company that did not produce its own methylamines or its own EO to enter the European derivatives business. We heard evidence from another potential purchaser ([REDACTED]) that it would not have wished to purchase the business and that this was not for reasons of price. [REDACTED]
- 5.60 We therefore conclude that the appropriate counterfactual is that, in the absence of the merger, Air Products would have closed the Billingham facility and exited the EM&D Business; it might have sold the business, or assets, associated with use of the Chocques facility, to BASF, but not to another party.

Effects of the merger

- 5.61 We consider the effects of the merger compared with the counterfactual, in relation to each of the relevant markets.

Pre and post-merger market shares

- 5.62 In order to assess the impact of the merger on market shares, we estimated what they would be after the merger and under the counterfactual. Under the counterfactual BASF might purchase some of the assets, so we analyse two cases:
- Case 1—Air Products exits the EM&D Business and sells no assets to BASF.
 - Case 2—Air Products exits the EM&D Business and sells assets, including all the customer contracts, to BASF.

First we compare the effects of the merger with Case 1 of the counterfactual.

- 5.63 While, under the merger, Air Products would pass its customer lists and contracts to Taminco, in all cases contracts will be due for renewal within months. Many customers also have contracts with other producers and so are well placed to switch some or all of their purchases to other suppliers. To estimate the post-merger market shares it is necessary to estimate how much of the acquired business Taminco would retain and to what extent each of the other suppliers would benefit from any of the Air Products' business that Taminco did not retain.

¹⁸Following the announcement of closure, described in paragraph 3.9, the Billingham facility has now ceased production.

- 5.64 Taminco valued the acquisition based on estimated retention rates of [X] per cent by value and [X] per cent by volume. We were told that this estimate was prepared on the basis of a customer by customer assessment. Taminco's internal documents remarked that these assumptions were conservative.
- 5.65 We used Taminco's assumptions as a basis for analysis, but recognized that these might represent a lower estimate of likely retention rates. For the business that Taminco would be unable to retain, we assumed that suppliers would gain business in proportion to their existing market shares¹⁹.
- 5.66 We now turn to the counterfactual. In calculating the market shares, in Case 1 (described in 5.62), we assumed (as in 5.65) that suppliers would gain Air Products' business in proportion to their existing market shares.
- 5.67 We recognize that actual outcomes could be very different, in particular because a small number of customers account for a very high proportion of demand for some products. Therefore, market shares will vary substantially depending on which producer wins the large contracts, which is not predictable. However, we note that customers often split their purchases between two or more suppliers, mitigating this effect.
- 5.68 Based upon the above assumptions, we estimated the market shares arising from the merger and compared with these with the market shares we estimated would arise under the counterfactual. These estimates are set out in detail in Appendix J. With regard to methylamines, DMF and choline chloride, we found that the increase in estimated market shares arising from the acquisition would in each case be less than 2 per cent; in each of these cases Air Products' pre-merger market share was significantly weaker than Taminco's. In the case of the AAAs, we found that the increase in estimated market shares arising from the acquisition would be less than 10 per cent; in this case, Air Products' pre-merger market share was significantly stronger than Taminco's. Nonetheless, the post-merger market share remains below 20 per cent.
- 5.69 Another way to examine the overall structure of the industry is to look at the Herfindahl-Hirschman indices (HHI),²⁰ which provide in one figure a measure of the number of competitors and disparities in their market shares. Based upon the above assumptions we estimated the HHIs arising from the merger and compared with those we estimated would arise under the counterfactual. These estimates are set out in detail in Appendix J.
- 5.70 Markets with an HHI over 1,800 are generally regarded as highly concentrated and increments of over 50 are considered to suggest possible competition concerns.²¹ Of the relevant markets, only that for methylamines shows an increase in HHI arising from the acquisition as compared to Case 1 of the counterfactual; that increase is significantly less than 50.
- 5.71 As indicated in paragraph 5.65, Taminco described its assumed retention rates as conservative and we consider that they might be underestimates. We are not in a position to produce better estimates than Taminco, but consider that retention of customers would be far from automatic. It has been suggested that there is a degree

¹⁹This is a normal approach as it reflects any market power arising from existing market shares. There are no reasons to believe that any other allocation of customers would necessarily be more appropriate.

²⁰The HHI is the sum of the squared market shares for all suppliers, ranging between 0 (perfectly competitive) and 10,000 (monopoly). An increase in market share for a large supplier has a greater impact on the HHI than the same increase for a small supplier.

²¹For further information please refer to the CC's guidelines: *Merger References: Competition Commission Guidelines* (CC2).

of customer inertia; however, large purchasers, which represent most of the sales volumes, could be expected to negotiate actively with all suppliers and might well redistribute their business taking account of the new competitive environment. Nevertheless, some purchasers, particularly the smaller ones, might find there was little incentive to move to alternative providers if Taminco offered competitive prices. We considered the effects of Taminco retaining more of Air Products' customers (see Appendix J); if Taminco's customer retention levels were 5 per cent higher the HHI increments would not be greater than 50 as compared to the position under Case 1 of the counterfactual.

- 5.72 We also considered the effect on market shares and HHI indices under Case 2 (as described in paragraph 5.62) under which BASF would acquire Air Products' customer contracts. We used the same assumption for BASF's level of customer retention that we used for Taminco's level of customer retention if the merger proceeded. Of the relevant markets, only that for choline chloride shows an increase in HHI arising from the acquisition as compared to Case 2 of the counterfactual; that increase is significantly less than 50.
- 5.73 If BASF were to acquire some, but not all of Air Products' customer contracts, the outcome would be between that of Case 1 and that of Case 2. Therefore, taking into account the analysis of Case 1 and Case 2, for each of the relevant markets any increase in HHI would be significantly less than 50.
- 5.74 We therefore conclude that under the counterfactual, whether or not it involved any acquisition of customer contracts by BASF, we expect that in each of the relevant markets the effect on the market shares would be small, with negligible effects on competition.

Capacity constraints

- 5.75 It has been suggested that the ability of producers to compete for Air Products' customers will be restricted if they do not have spare production capacity.
- 5.76 With regard to the Chocques facility, Taminco has told us that it is unsure, if the merger goes ahead, as to whether and for how long it would use this facility. It has budgeted capital expenditure to increase its AAA capacity at Ghent, but it is not committed to this. Given the importance of the major AAA contracts it would be rational for Taminco to defer decisions relating to Chocques and new investment whilst it negotiates with the very large customers.
- 5.77 Under the counterfactual as described in paragraph 5.60 we expect that the AAA production at Chocques will also close, even if BASF were to purchase the AAA business. Although the timing of such closure is uncertain, we do not expect that the Chocques facility would be likely to remain operational for longer if the merger were to take place than under the counterfactual.
- 5.78 We do not consider that the merger would give rise to any diminished incentives to invest in capacity. We note that Taminco is undertaking this transaction to increase its presence in the AAA market and is considering expansion of its Ghent facility should it be unable or unwilling to continue with arrangements to source supplies from Chocques.
- 5.79 The main parties, competitors and customers told us that there was substantial excess production capacity in the EEA's methylamines market and in the world markets for AAAs, DMF and choline chloride. We were also told that producers often had opportunities to expand their capacity by 'de-bottlenecking'. These opportunities

arose because over time producers were gradually able to increase the effectiveness of various parts of their plant and in doing so they created imbalances in capacity and thus bottlenecks. By investing in increased capacity at the bottlenecks producers could increase overall plant capacity at relatively low cost.

- 5.80 We consider that, compared to the counterfactual, the merger is not expected to lead to a reduction in capacity.

Coordinated effects

- 5.81 We considered whether the merger would be expected either to increase the likelihood of coordinated effects where none existed before or to maintain or exacerbate any existing coordinated effects.

- 5.82 We considered the three necessary conditions that would facilitate coordinated effects, as set out in the CC's guidelines,²² which are:

- (a) awareness of competitor behaviour: the market must be sufficiently concentrated for firms to be aware of the behaviour of their competitors, and for any significant deviation from the prevailing behaviour by a firm to be observed by other firms in the market;
- (b) incentives to conform to the prevailing behaviour: it must be clear that it would be costly for firms to deviate from the prevailing behaviour; so costly that it will be in a firm's interests to conform to the prevailing behaviour rather than seek to deviate from it; and
- (c) weak competitive constraints: such parallelism can only be sustained in markets where there are relatively weak competitive constraints.

- 5.83 Regarding condition (a), we were told that price transparency was weak in all of the relevant markets, partly because there are no standard sales prices; instead these are negotiated on a private bilateral basis. Furthermore, there was considerable uncertainty over quantities supplied by competitors. We considered that overall awareness of competitor behaviour was not strong. We considered that condition (b) was not met in the worldwide market for derivatives, but that the situation with regard to methylamines was inconclusive. With regard to condition (c), we noted that competition in the relevant markets was generally strong.

- 5.84 No third party expressed concerns about the existence of coordinated effects nor argued that the merger would give rise to any. We also noted that the competitive situation if the merger were to proceed would be very similar to that under the counterfactual.

- 5.85 In conclusion, we have received no evidence to suggest that, relative to the counterfactual, the acquisition of Air Products' EM&D Business by Taminco would either increase the likelihood of coordinated effects if none existed before, or, were there any pre-existing coordinated effects, that the merger would be likely to maintain, or exacerbate, these coordinated effects to the detriment of customers.

Conclusions on SLC test

- 5.86 We did not find that the merger would give rise to adverse unilateral effects. The market conditions following the merger would not be substantially different from those

²²*Merger References: Competition Commission Guidelines (CC2).*

under the counterfactual and there would be no SLC if the merger were to take place as compared with the counterfactual.

- 5.87 With regard to coordinated effects, we do not expect the merger either to increase the likelihood of coordinated effects where none existed before, or to increase the effectiveness of any pre-existing coordinated effects.
- 5.88 We therefore conclude that, as a result of the proposed merger, we do not expect there to be any substantial lessening of competition.