II

(Acts whose publication is not obligatory)

COMMISSION

COMMISSION DECISION

of 3 May 2000

declaring a concentration to be compatible with the common market and the functioning of the EEA Agreement

Case COMP/M.1671 — Dow Chemical/Union Carbide

(notified under document number C(2000)1304)

(Only the English text is authentic)

(Text with EEA relevance)

(2001/684/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to the Agreement on the European Economic Area, and in particular Article 57(2)(a) thereof,

Having regard to Council Regulation (EEC) No 4064/89 of 21 December 1989 on the control of concentrations between undertakings [1], as last amended by Regulation (EC) No 1310/97 [2], and in particular Article 8(2) thereof,

Having regard to the Commission's Decision of 22 December 1999 to initiate proceedings in this case,

Having given the undertakings concerned the opportunity to make known their views on the objections raised by the Commission,

Having regard to the opinion of the Advisory Committee on Concentrations [3],

Whereas:

(1) On 29 October 1999, the Commission received a notification of a concentration pursuant to Article 4 of Regulation (EEC) No 4064/89 (the Merger Regulation), whereby Dow Chemical Company (Dow) acquires sole control of the whole of Union Carbide Corporation (UCC).

(2) This notification, which had been declared incomplete, was completed on 22 November 1999.

(3) After examination of the notification, the Commission concluded that the notified operation fell within the scope of the Merger Regulation and raised serious doubts as to its compatibility with the common market. Therefore, on 22 December 1999, the Commission decided to initiate proceedings pursuant to Article 6(1)(c) of the Merger Regulation.

I. THE PARTIES

(4) Dow is a global science- and technology-based company and integrated producer of chemicals. It develops and manufactures a portfolio of chemicals, plastics, agricultural chemicals and other specialised products. Its annual sales were approximately USD 18 400 million in 1998. The company has 123 manufacturing sites in 32 countries and supplies more than 3 500 products.

[1] OJ L 395, 30.12.1989, p. 1; corrected version OJ L 257, 21.9.1990, p. 13).
[2] OJ L 180, 9.7.1997, p. 1.
[3] OJ C 256, 14.9.2001.

(5) UCC is a global integrated producer of chemicals and advanced process technology. Its annual sales were approximately USD 5 700 million in 1998.

II. THE OPERATION

(6) The parties have concluded an Agreement and Plan of Merger, dated 3 August 1999. The overall financial structure of the Agreement and Plan of Merger is a stock-for-stock merger. Pursuant to this agreement the concentration will be effected through a vehicle, Transition Sub Inc., a wholly-owned subsidiary of Dow, created solely for the purpose of this transaction, which will acquire shares in UCC. The vehicle will be merged with and into UCC whereby the separate corporate entity of Transition Sub Inc., will cease to exist. UCC will thus become a wholly-owned subsidiary of Dow. Each share of the common stock of the Transition Sub Inc., will be converted into one share of the common stock of the surviving UCC.

(7) The parties wish to complete the transaction before the end of […]* (*). However, the completion of the transaction is subject to all relevant authorities' approvals.

(8) Upon completion of the transaction, UCC will, as a wholly-owned subsidiary of Dow, continue to be a New York corporation. The directors of Transition Sub at the effective time of the merger will become the directors of the surviving corporation. Dow's certificate of incorporation provides that its Board may not have less than six and more than 21 members. The actual number is determined by a majority vote of Dow's entire Board. Currently, the Board is comprised of 16 members. At the effective time of the merger, two current UCC directors will be appointed as additional members of the Board of the parent. UCC will thus be a wholly owned subsidiary of Dow with Dow exercising control upon completion of the transaction.

III. CONCENTRATION

(9) The transaction, by which Dow intends to acquire sole control of the whole of UCC by way of purchase of shares, is a concentration within the meaning of Article 3(1)(b) of the Merger Regulation.

(*) Parts of this text have been edited to ensure that confidential information is not disclosed; those parts are enclosed in square brackets and marked with an asterisk.

IV. COMMUNITY DIMENSION

(10) The operation has a Community dimension within the meaning of Article 1(2) of the Merger Regulation as the combined aggregated worldwide turnover of all the undertakings concerned exceeds EUR 5 000 million (Dow: EUR 16 449 million; UCC: EUR 5 048 million). The aggregate Community wide turnover of each of the undertakings exceeds EUR 250 million (Dow: EUR 4 517 million; UCC: EUR 385 million). Furthermore, the parties do not achieve more than two-thirds of their turnover in one and the same Member State.

(11) The operation does not constitute a cooperation case under the EEA Agreement.

V. ASSESSMENT OF THE OPERATION

(12) The operation concerns several markets in the chemical sector. Eleven affected markets or categories of markets have been identified:

— polyethylene resins (PE resins),

— polyethylene compounds,

— polyethylene technology (PE Technology),

— ethyleneamines,

— ethanolamines,

— alkyl alkanolamines,

— glycol ethers, oxygenated solvents,

— ethylene glycols,

— polyglycols,

— aminocarboxylates (chelants),

— heat transfer fluids

(13) The Commission's investigation has identified three areas where the transaction would lead to the creation or strengthening of a dominant position held by the merging parties on the relevant markets. As a result, competition would be significantly impeded within the common market within the meaning of Article 2(3) of the Merger Regulation. These areas are:

— PE resins,

— PE technology,

— ethyleneamines.

PE RESINS

A. RELEVANT PRODUCT MARKETS

(i) ***Presentation of products***

(14) Ethylene is one of the base chemicals that belong to the olefin group (ethylene, propylene, butadene, etc.). Polyethylene (PE) is a thermoplastic belonging to a group of polyolefins that also includes polypropylene. PE and polypropylene are among the world's most widely used plastics. PE is derived from ethylene through a process of polymerisation ([4]), whereby PE resins are produced. The properties of PE are influenced by the degree of crystallinity determined by the total degree of branching along the PE molecule. The resins are used in downstream manufacture of consumer goods, i.e. films, packaging, bottles (for example for milk and water), plastic bags, water and gas pipes, insulation for wire and cable, moulded products and other end-uses.

(15) Within PE resins, three main families with varying characteristic properties can be identified: low-density polyethylene (LDPE), high-density polyethylene (HDPE) and linear low-density polyethylene (LLDPE). Within each of these three families there are different grades produced by varying the conditions of polymerisation within the reactor (catalyst, temperature and pressure) or by using different additives.

(16) The different PE process technologies used to produce PE resins are analysed elsewhere, in the section on PE technology.

(17) LDPE is manufactured by high-pressure processes, i.e. in high-pressure autoclave or tubular reactors by free radical polymerisation. The processes generally operate at pressures up to 3 000 bars and temperatures in excess of 200 °C. The polymer is removed in molten state and pellitised. LDPE is primarily used in film and coating applications and is characterised by high clarity, flexibility and good water and vapour properties. The parties estimate western European sales of LDPE at around […]* thousand tonnes in 1998.

(18) HDPE is manufactured by low-pressure processes, i.e. gas-phase, solution and slurry processes. It is stiffer than LDPE, has better chemical resistance and lower permeability to gases and vapours. It is mainly used for rigid bottles and large blow mouldings (drums, automotive fuel tanks and large pipes). HDPE resins are also used for the production of injection-moulded articles. The parties estimate western European sales of HDPE at between […]* thousand tonnes in 1998.

(19) LLDPE was developed as a low-pressure manufacturing alternative to the high-pressure LDPE processes. The LLDPE resins are principally used in film or packaging applications and increasingly in injection- or roto-moulded articles, membranes and pipes. Within the LLDPE family, three distinct groups can be distinguished depending on the copolymer used in the manufacturing process: C4 LLDPE (which use butene as copolymer), C6 LLDPE (which use hexene as copolymer) and C8 LLDPE (which use octene as copolymer). The parties estimate western European sales of LLDPE at around […]* thousand tonnes in 1998.

(ii) ***Arguments of the parties***

(20) According to the parties all PE resins belong to one single relevant product market due to the high degree of supply side substitutability between them. From the parties' point of view there is also a high degree of demand side substitutability between LPDE and LLDPE resins. The parties submit that at least LDPE and LLDPE resins constitute one separate market.

(21) The narrowest possible market would, in the parties' view, be LDPE, C4 LLDPE and C6 LLDPE due to the high degree of demand-side substitutability between all of these resins and the high degree of supply-side substitutability between C4 LLDPE and C6 LLDPE.

(22) Furthermore, the parties submit, that the current substitutability among PE resins produced by different PE processes is expected to increase as a result of improvements through advanced catalyst technology. Catalyst technology is also explained in the section on PE technology of this Decision.

(iii) ***HDPE constitutes a relevant market separate from LLDPE and LDPE***

(23) In earlier Decisions ([5]) the Commission has distinguished between high density polyethylene (HDPE)

([4]) A process during which monomers are reacted with each other to produce long chains of repeated series of monomers, called polymers.

([5]) Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995, Case IV/M.708 — Exxon/DSM, OJ C 306, 15.10.1996, p. 4, and Case IV/M.1163 — Borealis/IPIC/OMV/PCD, OJ C 280, 9.9.1998, p. 3.

and the other PE resins, low density polyethylene (LDPE) and linear low density polyethylene (LLDPE). According to those Decisions this distinction is based on the production methods, performance characteristics and differences in end uses. HDPE, which has good resistance to chemicals and is more impervious to gases, is used primarily for making rigid products, bottles, drums, automotive fuel tanks and large diameter pipes while LDPE and LLDPE are used primarily for making film for the packaging industries. These findings have been confirmed in the present investigation. Therefore, HDPE constitutes a relevant market separate from LLDPE and LDPE.

(iv) ***C8 LLDPE constitutes a relevant product market separate from other LLDPEs and LDPE***

(24) In a previous Decision ([6]) the Commission found that C8 LLDPE was to be considered as belonging to a product market separate from LDPE and the other LLDPEs. This conclusion was reached on the basis that C8 LLDPE has particular properties allowing its use for the manufacture of stretch films and the fact that its production was limited to certain processes. The Commission also considered whether C6 LLDPE and C8 LLDPE formed part of the same market. However, the Commission left open whether C6 LLDPE belonged to the same market as C8 LLDPE.

(25) In the present case the Commission's investigation confirms that C8 LLDPE has unique properties necessary for specific high performance applications. These properties are necessary for specific applications like stretch film (power stretch), multi layer food packaging and laminated films. Other products cannot normally be substituted without significant disadvantages, for example increased thickness.

(26) Some competitors have explained that C8 LLDPE offers the highest performance in terms of mechanical properties (puncture and tear resistance), elongation at break, mechanical/optical property balance, heat sealing properties (hot tack), cling effect for stretch film etc. Moreover, they argue that all C8 LLDPE is made commercially in the solution process.

(27) The Commission has asked customers how they would react if the prices of C8 LLDPE were increased by 5 % to 10 %. In the opinion of the customers who purchase only C8 LLDPE, they would generally continue to buy C8 LLDPE. They explained that this would be due to technical reasons (they would not be able to switch to other LLDPEs) or due to economic reasons (a switch would incur high development and application costs). With regard to supply-side substitutability, only producers operating solution processes would be able to produce C8 LLDPE. Only DSM and Polimeri, both of whom already produce C8, operate solution processes in western Europe.

(28) The parties anticipated that the Commission might consider C8 LLDPE as a separate relevant market. In this context, the parties argued that C6 and C8 LLDPE do not form part of the same market but that C6 LLDPE should be viewed together with C4 LLDPE and LDPE resins. Moreover, the parties have stated that there is no supply-side substitutability and only limited demand-side substitutability between C6 and C8 LLDPE. These statements also tend to confirm the Commission's view that C8 LLDPE constitutes a market separate from LDPE, C4 and C6 LLDPE.

(29) In conclusion, C8 LLDPE is a relevant product market separate from LDPE, and C4 and C6 LLDPE.

(v) ***Superhexenes***

(30) The results of previous investigations ([7]) indicated that new variants of C6 LLDPE, particularly 'superhexene' C6 LLDPE, have properties more in common with C8 LLDPE. Therefore there may be grounds for considering C6 and C8 LLDPE or at least superhexene C6 and C8 as the relevant product market.

(31) At present the production of superhexenes appears to be very limited with UCC's joint venture Polimeri the sole supplier of C6 superhexenes in western Europe. Their sales of C6 superhexene account for less than [< 5 %]* of the sales of C8 LLDPE in volume terms. The customers who purchase C8 LLDPE only have, until now, generally not regarded the new variants of C6 LLDPEs (including superhexenes) as being important for the end use applications of their companies. Some of these customers find the development of superhexene interesting due to its higher quality level in comparison with standard C6 LLDPE. However, at present these customers are only in the process of testing superhexene to find out whether it would work for their end user applications and whether their end users would accept the products using superhexene.

(32) Competitors recognise that super hexene has significantly improved mechanical performance compared to standard C6 LLDPE but its processability and opticals are still less than those of C8 LLDPE. Therefore, superhexene appears to be used for some film applications where standard C6 cannot be used. Some competitors argue that super hexene has

([6]) Case IV/M.708 — Exxon/DSM, OJ C 306, 15.10.1996, p. 4.

([7]) Case IV/M.708 — Exxon/DSM, OJ C 306, 15.10.1996, p. 4.

improved properties compared to standard C6 but that its extra cost is not matched by a price premium in the market place. One respondent replied that 'some resin producers may use the term "superhexene" to underline that there might be a slight performance difference for film producers compared to C6 LLDPE'.

(33) For all these reasons superhexene is not regarded as forming part of the same market as C8 LLDPE.

(vi) ***It can be left open whether LDPE, C4 LLDPE and C6 LLDPE taken together are a single product market or whether LDPE is separate from C4 LLDPE and C6 LLDPE.***

(34) In the most recent Decisions it was left open whether LDPE or LLDPE form part of the same market or constitute separate relevant markets ([8]). However, it was recognised that LDPE and LLDPE are to a certain extent substitutable, at least for commodity products. On the other hand it was also acknowledged that for specific applications one of the resin families may be more suitable than the other. For instance LLDPE offers significant advantages over LDPE, including the ability to downgauge film and improve tear, puncture and heat resistance and stiffness for injection moulded parts. On the other side, traditionally LLDPE grades have not been able to achieve the clarity and processability of LDPE, which considerably limited the penetration of LLDPE into certain sectors of the market, like flexible film for food packaging.

(35) The Commission also considered that the relative ease with which manufacturers can switch production from one grade to another gives rise to a high degree of supply-side substitutability.

(36) Additional new applications appeared with the development of LLDPE (for example stretch films). The investigation indicates that LLDPE is absorbing a major part of growth in PE and is growing significantly faster than LDPE. Some estimates forecast average growth rates in LLDPE of more than 5 % per annum, compared to 0 to 1 % per annum for LDPE in the next few years. LLDPE takes the majority of the market growth in new applications but LDPE is still used in the film market where its specific properties are required.

(37) The Commission's investigation has shown that LDPE and LLDPE are often used in blends to achieve the exact mix of properties the customer requires. While LDPE and LLDPE may be used in the same applications they are not necessarily fully or even largely substitutable. LLDPE is directly replacing LDPE in some applications where in the past only LDPE could be used due to its better mechanical properties mentioned above (down-gauging, improved tear, puncture, heat resistance and sealability). As a result LLDPE is being used in applications either by itself or in blends that were previously the domain of LDPE.

(38) The uses of blends are largely determined by the physical characteristics required for the end use (customers' specifications) and strongly influenced by differences in cost and processing equipment of customers ([9]). Third parties conform that LLDPE or blends of LLDPE/LDPE to some extent exert competitive pressure on LDPE.

(39) Further penetration by LLDPE of the LDPE market and a concentration of customers and suppliers are expected. Some old equipment is less suitable for processing LLDPE (LLDPE is less processable than LDPE and therefore requires more powerful equipment to achieve the same results). Some customers are investing in more powerful conversion equipment to enable them to process blends with higher levels of LLDPE.

(40) As mentioned in recital 21, the narrowest possible market definition in the view of the parties would be LDPE, C4 LLDPE and C6 LLDPE. According to the parties this is due to the high degree of demand-side substitutability between all of these resins and a high degree of supply-side substitutability between C4 LLDPE and C6 LLDPE, particularly in gas phase plants.

(41) In the earlier Decision where the Commission concluded that C8 LLDPE was a separate market ([10]) it argued that due to the volatility of the copolymer (octene), it can only be produced in the solution process ([11]) rather than the high pressure and gas phase processes used for the manufacture of LDPE and C4 and C6 LLDPE respectively. The customers who can use LDPE, C4 LLDPE or C6 LLDPE for their end use application would normally not use C8 LLDPE due to its higher costs.

([8]) Case IV/M. 1287 — Elenac/Hoechst, OJ C 405, 24.12.1998, p. 15, Case IV/M.1041 — BASF/Shell (II), OJ C 81, 17.3.1988, p. 5, and Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995.

([9]) The most common blends LDPE/LLDPE ratios are between 90/10 and 60/40, although in certain cases up to 100 % LLDPE can be used (in stretch applications).

([10]) Case IV/M.708 — Exxon/DSM OJ C 306, 15.10.1996, p. 4.

([11]) C8 LLDPE can be made by a solution process or a slurry process. However, economically the slurry process is not viable for C8 LLDPE. Case IV/M.708 — Exxon/DSM, OJ C 306, 15.10.1996, p. 4, point 11.

(42) It remains to be decided whether C4, C6 and LDPE constitute a single market or a number of markets. C4 and C6 have similar characteristics and are used for many of the same applications. In addition, there is a high degree of supply-side substitutability. Therefore these two products must be considered as the same relevant product market.

(43) LDPE is also used in many of the applications as C4 LLDPE and C6 LLDPE. It might therefore be considered on the basis of the demand-side considerations, as being in the same market relevant product market as C4 LLDPE and C6 LLDPE. However, there is no supply-side substitutability between C4 LLDPE and C6 LLDPE, on the one hand and LDPE, on the other. This is due to the fact that C4 LLDPE and C6 LLDPE are produced by low pressure processes but LDPE is produced by high-pressure processes.

(44) However, it is not necessary to decide on the exact market definition for these products as no competition problem would arise irrespective of whether there is a single market for LDPE, C4 LLDPE and C6 LLDPE taken together or LDPE is separate from C4 LLDPE and C6 LLDPE.

(45) In conclusion the Commission will assess the following product markets:

— HDPE individually,

— C8 LLDPE individually, and either

— C4 LLDPE, C6 LLDPE and LDPE together, or

— C4 LLDPE and C6 LLDPE together, and

— LDPE individually.

B. GEOGRAPHIC MARKET DEFINITION

(46) The investigations have confirmed the conclusion reached in previous cases ([12]) in this sector that the relevant geographic market is western Europe ([13]). PE resins are easily transported. Transport costs for PE resins are relatively low (about 6 % to 7 % for a distance of 1 000 km) when compared to the value of the products and there are substantial trade flows between the European countries. Non-tariff barriers do not affect imports of PE resins from outside the EEA.

(47) However, significant custom duties (9,5 %) are imposed on all non-European production of PE resins. In addition, there is a low level of imports into western Europe, i.e. for LDPE and LLDPEs the import share is much less than 5 % measured by volume.

(48) A few third parties argue that a number of factors imply a shift towards a world market in PE resins. The factors include reduction of tariff barriers, decline of transport costs, more customers operating on a worldwide basis and consolidation of both producers and customers on a worldwide basis. The Commission acknowledges that these factors could be of importance in the future. Tariff duties will, for example, be reduced to 6,5 % by the beginning of 2004 and further consolidation of both producers and customers may take place. However, the investigation has also confirmed that at present three major geographical markets exist: western Europe, USA and the Far East. Only western Europe is relevant for the purposes of the present assessment.

C. COMPETITIVE ASSESSMENT

(49) The parties' overall strategy is to become 'the world's leading producer of polyolefins with a full range product mix and to be a low cost provider in all major markets of PE resins'. The merger also enables Dow to place UCC's low cost global products into its own distribution channels worldwide. UCC's total sales in western Europe were […]* million in 1998.

(50) Dow sells LDPE, C8 LLDPE and HDPE in EEA from three production facilities in Europe. Dow does not sell C4 LLDPE and C6 LLDPE. Dow's total sales of PE resins in western Europe were […]* million in 1998.

(51) In 1995 UCC and Enichem ([14]) entered into a joint venture agreement which resulted in Polimeri ([15]), a jointly (50 %/50 %) controlled producer and supplier of PE resins. Polimeri was established for the development, production, marketing and sale of polyethylene and olefins to the European market. It produces ethylene (the basic monomer for production of polyethylene) and has a total annual product manufacturing capacity of […]* tonnes. It has subsidiaries in Europe, namely Polimeri Europa France SA and Polimeri Europa GmbH, Germany.

([12]) Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995, Case IV/M. 708 — Exxon/DSM, OJ C 306, 15.10.1996, p. 4, Case IV/M.1041 — BASF/Shell, OJ C 81, 17.3.1998, p. 4, Case IV/M.1163 — Borealis/IPIC/OMV/PCD, OJ C 280, 9.9.1998, p. 3, and Case IV/M.1287 — Elenac Hoechst, OJ C 405, 24.12.1998, p.15.

([13]) Defined as the EEA area and Switzerland.

([14]) Enichem is the leading chemical and petrochemical manufacturer in Italy.

([15]) The creation of Polimeri was cleared by the Commission. See Case IV/M.550 — UCC/Enichem — 13 March 1995.

(i) ***Overall PE***

(52) According to the parties, their market share by value in the overall PE resins market is [20 % to 30 %]* in western Europe. This figure includes the sales of Polimeri. The concentration, the parties submit, does not lead to the creation or strengthening of a dominant position in PE resins. The table shows the market shares on the various product markets discussed above.

Product	Dow	UCC (*)	Parties	Competitors
C8 LLDPE	[70 % to 80 %]*	[0 % to 10 %]*	[75 % to 85 %]*	DSM [10 % to 20 %]* Others [0 % to 10 %]*
C4, C6 LLDPE and LDPE	[5 % to 15 %]*	[10 % to 20 %]*	[20 % to 30 %]*	Borealis [10 % to 20 %]* Elenac [5 % to 15 %]* Exxon [5 % to 15 %]* Others [<10 %]* each
C4 and C6 LLDPE ([16])	0 %	[20 % to 30 %]	[25 % to 35 %]*	BP Amoco+jv [5 % to 20 %]* Exxon [5 % to 15 %]* Elenac [5 % to 15 %]* Others [<10 %]* each
LDPE ([17])	[5 % to 15 %]	[5 % to 15 %]	[15 % to 25 %]*	Borealis [10 % to 20 %]* Elenac [10 % to 20 %]* Exxon [5 % to 15 %]* Others [<10 %]* each
HDPE	[0 % to 10 %]	[5 % to 15 %]	[5 % to 15 %]*	Borealis [15 % to 25 %]* Elenac [15 % to 25 %]* BP [5 % to 15 %]* Others [<10 %]* each

(*) Through its 50 % share in Polimeri.

(ii) ***HDPE***

(53) The operation does not raise competition concerns in HDPE because of the parties' low combined markets shares and the presence of sufficiently strong competitors.

(iii) ***LDPE, C4 LLDPE, C6 LLDPE***

(54) Dow does not sell C4 LLDPE or C6 LLDPE in western Europe and neither of these products can be produced by Dow's solution process. Therefore, if C4 and C6 LLDPE constitute a separate market, there would not be any horizontal overlap between the parties on this market where they would have a market share of [20 % to 30 %]*. The parties' market share would be about [20 % to 30 %]* if LDPE, C4 LLDPE and C6 LLDPE constitute one single market. If LDPE constitutes a separate market the parties' combined market share would be [15 % to 25 %]*. On each of these markets there are sufficiently strong competitors. Therefore, the assessment would be the same whether LDPE, C4 LLDPE and C6 LLDPE constitute one single market or LDPE constitutes a market separate from C4 LLDPE and C6 LLDPE taken together. The operation does not give rise to competition problems on any of these possible market definitions.

(iv) ***C8 LLDPE***

(55) UCC adds [< 10 %]* through its joint venture Polimeri to Dow's market share. Dow's market share of [70 % to 80 %]* is already extremely high.

(56) The parties submit that there are strong competitors in the PE resins market in general. According to the parties these competitors include DSM, Elenac, Exxon, BP, Petrofina and Solvay. The parties also stress that the PE resins market in general is characterised by price competition, large multinational customers, low barriers to entry and production technologies readily available through licensing. New capacity and expansion of existing production are expected in the near future.

([16]) Volume shares but the parties assess the value share to be of approximately the same size.

([17]) Volume shares but the parties assess the value share to be of approximately the same size.

(57) Dow is one of the major producers of C8 LLDPE and has an estimated market share by value of [70 % to 80 %]* in western Europe. Polimeri also produces C8-LLDPE resins, with a share of [< 10 %]* ([18]). The parties' combined share is [75 % to 85 %]* or [at least four]* times larger than the only other significant competitor, DSM. In 1998 the parties' combined C8 LLDPE capacity ([19]) was more than [at least six]* times higher than the C8 LLDPE capacity of DSM and the parties' actual production of C8 LLDPE was about [at least five]* times higher than the production of DSM. Imports of C8 LLDPE were not significant since they accounted for […]* thousand tonnes, i.e. less than 1 % of the total western European market for C8 LLDPE.

(58) C8 LLDPE is produced in a solution process in combination with either a Zeigler-Natta or a single site catalyst. Dow owns its own solution process (Dowlex) and has developed catalysts (both conventional and single site) to work with this process. As mentioned only DSM and Polimeri operate solution processes in western Europe, in which they can produce C8 LLDPE.

(v) ***Potential competition***

(59) With regard to potential competition the parties have referred to PE capacity being built in the Middle East. According to the parties this capacity is large and a significant portion of the output of these new plants is expected to be exported to Europe. In the view of the parties, competition in the western European market would thereby effectively be increased and the parties' LLDPEs share would be reduced. However, some competitors argue that the current imports from the Middle East are mainly C4 LLDPE-based. This has not been contested by the parties in their reply to the Statement of Objections. At any rate, imports of C8 LLDPE into western Europe were not significant since they accounted for […]* tonnes, i.e. less than 1 % of the total western European market for C8 LLDPE.

(60) As regards the future developments in the LLDPE resins market segments, the parties refer to planned capacity increases based on gas-phase processes by two of their western European competitors, DSM and BP Amoco. In the view of the parties, the competitors' increase in gas-phase capacity will especially impact on the position of UCC (and Polimeri) in C4 and C6 LLDPE. However, in the Commission's view, such a capacity increase will not affect the parties' position in the market for C8 LLDPE, because C8 LLDPE can only be produced in the solution process.

(61) The parties have argued that the PE resins market in general is characterised by low barriers to entry. In the Commission's view this is not true for C8 LLDPE. Potential competitors who are not already LLDPE resins producers will not only have to fund the significant capital expenditure necessary but, to varying degrees, depending upon their situation in the petrochemical markets, will also have to secure raw materials and find outlets for their production. Apart from Dow, Polimeri and DSM very few producers (representing a very small share of LLDPE production) operate the solution process. This is the only process capable, at present, of producing C8 LLDPE. The other potential competitors would have to make significant capital expenditure and would experience substantial delays before they could produce C8 LLDPE competitively.

(62) The general expectation in the industry is that resins produced with metallocene catalyst will be very important in the future, (see the section on PE technology). This is due to the fact that metallocene catalysts offer the supplier enhanced possibilities to broaden and customise the properties of resins.

(63) The Commission understands that gas phase metallocene products (C4 mLLDPE and C6 mLLDPE) do not provide the same unique performance in stretch applications as Dow's solution-based C8 LLDPE (or its metallocene C8 LLDPE).

(64) In recent years the development of C6 LLDPE has, according to some competitors, enabled C6 mLLDPE resins to be produced which have similar characteristics to standard C8 LLDPE. Those competitors believe that in two to three years, C6 mLLDPE might challenge standard C8 LLDPE in markets such as stretch film. However, at present, C6 mLLDPE is commercially produced only in very limited quantities. In this situation C6 mLLDPE cannot be regarded in a reasonable forecast as a significant constraint on the combined entity's position in C8 LLDPE.

(vi) ***Buying power***

(65) Very large customers do press suppliers for price reductions to reduce cost per square metre of film. This applies to packaging producers which themselves are under pressure from end-users of packaging materials. In addition, thickness reduction of packaging film is one of their key goals as this, in turn, reduces the environmental taxes which are levied on a per gram basis on packaging. However, the key to thickness

([18]) Equate Petroleum Company KSC, is a joint venture in Kuwait between UCC and the State-owned Kuwait oil company; UCC has a [... %]* interest in Equate. Equate does not produce C8 LLDPE.

([19]) Dow's plant in Schkopau, Germany, started producing PE resins in 1999, whereby Dow's capacity rose from [... to ...] thousand tonnes.

reduction is as mentioned above to use enhanced performance LLDPEs like superhexene or C8 LLDPE-based products.

(66) Therefore, even if these large customers have some bargaining power in relation to the parties, they are also pulling the market towards the high performance LLDPE resins where the merger will strengthen a dominant position.

D. CONCLUSION ON PE RESINS

(67) On the basis of the foregoing, the operation as notified will strengthen a dominant position on the western European market for sales of C8 LLDPE. Dow is already a dominant player in the market for sales of C8 LLDPE and this position will be strengthened by the addition of the C8 LLDPE activities of Polimeri.

(68) In conclusion, the notified operation will strengthen a dominant position on the market for sales of C8 LLDPE.

PE TECHNOLOGY

A. INTRODUCTION

(69) The production of PE resins requires a combination of both process and catalyst (or initiator) technology. A producer or potential producer for PE resins has the choice of developing its own technology or licensing it from a company that owns a suitable technology. Not all successful technologies are licensed as their owners may prefer to exploit their technology themselves. Other things being equal the greater the potential licensor's share of the market for the products made using the technology, the more likely it is that the technology owner will prefer to exploit the technology himself. Customers of PE technology purchase a package, which enables them to build and operate a production unit using the licensor's patents and proprietary know how. The package also includes the right to use certain catalysts with the process technology, where appropriate ([20]), and may include catalyst supply agreements or a licence to manufacture the catalyst. The licensor generally gives performance guarantees.

(70) Licences are usually granted for a plant of a fixed size and for a fixed period and/or for the production of a given tonnage. They require the payment of a fixed lump sum and/or a royalty based on production. All licences contain further provisions setting out the rights of the parties. These provisions often deal with the rights of licensor and licensee to improvements the other has made to processes, and extensions to capacity and/or product ranges of the licensee.

(71) The process technologies for the manufacture of PE can be divided into high-pressure processes, which are used almost exclusively for the manufacture of LDPE, and low-pressure processes, which are used for LLDPE and HDPE.

(72) High-pressure processes can be further subdivided into tubular and autoclave processes. In high-pressure processes no catalysts are used but initiators (peroxides, etc.) are used to start the polymerisation reaction.

(73) Low-pressure technologies are divided into the solution, slurry and gas phase processes. In addition there are a number of hybrid processes, using more than one reactor and sometimes more than one process. According to the parties all of these processes can be used for the production of both HDPE and LLDPE. However solution processes are normally used to produce LLDPE and are the only processes capable of producing C8 LLDPE. Slurry processes are normally used to produce HDPE and gas phase processes to produce both HDPE and C4 and C6 LLDPE. New process and catalyst developments are allowing wider ranges of densities to be produced by both the slurry and the solution processes. For low pressure processes the catalysts used can be divided into conventional catalysts (Ziegler/Natta and chromium) and single-site catalysts (including metallocene).

B. RELEVANT PRODUCT MARKET

(i) ***The distinction between PE resins and PE technology***

(74) Previous Decisions ([21]) have differentiated between the supply of PE resins and the supply of PE technology. A clear distinction can be made between the provision of a concrete product, PE resins, and the largely intangible PE technology which includes the intellectual property, catalysts and know how necessary for the production of PE. Approximately [60 % to 70 %]* of current polyethylene capacity is operated under licence, indicating that there is a substantial market for PE technology. This market is estimated to be worth in

([20]) High-pressure processes do not use catalysts.

([21]) Case IV/M.269 — Shell/Montecatini, OJ L 332, 22.12.1994, Case M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995, and Case M.1287 — Elenac/Hoechst, OJ C 405, 24.12.1998, p. 15.

excess of EUR […]* million a year. The table below gives details of the global and licensed capacities by process, worldwide.

Process	Capacity (*) (million tonnes)	Licensed capacity (*) (million tonnes)	Licensed (*) (%)
Solution	[…]*	[…]*	[30 % to 40 %]*
Slurry	[…]*	[…]*	[60 % to 70 %]*
Gas-phase	[…]*	[…]*	[75 % to 85 %]*
Total low-pressure	[…]*	[…]*	[65 % to 75 %]*
High-pressure	[…]*	[…]*	[55 % to 65 %]*
Total all processes	[…]*	[…]*	[60 % to 70 %]*

(*) Total may not add up due to rounding.

(ii) ***Package or separate markets for process and catalyst technology***

(75) The Commission's survey has shown that process technology is almost always licensed for use with certain nominated catalysts. One of the main reasons why companies license PE technology is to have the assurance that when the plant is built it is actually going to produce the PE resins required in the appropriate qualities and quantities. An optimum-sized PE plant would, according to the parties, cost between EUR […]* million and EUR […]* million. To produce PE resins satisfactorily it is essential that the process and the catalyst are compatible. PE technology suppliers provide guarantees of the performance of plant built using their know-how and other intellectual property. However no PE technology supplier will give open-ended warranties that the process will work satisfactorily with any catalyst or indeed that a given catalyst will work in any plant.

(76) This situation has been reflected in earlier Decisions ([22]) where the Commission has considered that the relevant product market for PE technology comprises process plus catalyst. It is certainly true that at the beginning of the process a licensee will take both process technology and catalyst from the same supplier. Although a single process may be licensed for operation with more than one catalyst the additional-catalyst technologies are nearly always supplied by the process licensor.

(77) As the life of the plant is usually considerably longer than the original catalyst supply agreements there may be a market for the subsequent supply of catalysts. However catalysts develop over time and a prudent licensee will wish to ensure that its new catalyst will work in its existing plant and will therefore seek its new supplies from the original licensor. It is not necessary to decide whether there is a single or separate market for the subsequent supply of catalyst as the strength of the various operators on such a separate market would not be significantly different from their strengths on the market for the initial packages.

(iii) ***Separate markets for high-pressure and low-pressure technology***

(78) In an earlier Decision ([23]) the Commission distinguished between high-pressure and low-pressure process technologies. High-pressure processes are the only processes capable of producing LDPE. The equipment operates at extremely high pressure (up to 3 000 atmospheres) and at temperatures above 200 °C. On the other hand low-pressure processes cannot produce LDPE and operate at low pressures and temperatures. They may also be differentiated by the fact that no catalyst is used in the high-pressure technologies, where the polymerisation is started by an initiator, whereas for low-pressure technologies catalysts are essential and have a bearing on the characteristics of the resins produced. The overwhelming majority of the respondents to the Commission's enquiry agree that a distinction can be made between high-pressure and low-pressure processes.

(79) The parties argue that the relevant product market should include both high pressure and low pressure process technology packages for the following reasons:

— all PE resins manufactured by any process compete to a large extent in most end use applications,

— in choosing a technology licensees will consider end use trends in different applications together with the advantages offered by the various technologies available. This is facilitated by the fact that all resins require the same raw material, ethylene,

— although low pressure technologies have grown faster than high pressure, all these technologies compete and the preferences could be reversed by future developments in technology or end uses,

([22]) Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995, and Case IV/M.1287 — Elenac/Hoechst, OJ C 405, 24.12.1998, p. 15.

([23]) Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995.

— there are geographic differences in the market penetration of low pressure processes. Low pressure is more prevalent in North America than in other geographic regions,

— the substitutability between resins produced by different processes is expected to increase as a result of improvements offered by advanced catalysts.

(80) Elsewhere in this Decision the question of the substitutability of the various resin types is discussed in detail. The Commission considers that although the different resins, HDPE, LDPE and LLDPE, may be used in the same or similar types of applications they are not necessarily complete substitutes. The Commission has identified a separate product market for C8 LLDPE. As C8 LLDPE cannot be made by a high-pressure process this reinforces the distinction between high- and low-pressure processes. Furthermore the different types of resin have their own range of specific properties, for example LDPE has good processability, HDPE is particularly suitable for mouldings and rigid components and C8 LLDPE is used for the production of stretch films. The argument that all PE resins compete to a large extent cannot therefore be supported.

(81) The parties appear to suggest that because all processes for the production of PE resins rely on the conversion of ethylene the various technologies should be regarded as being in the same market. This would only be conceivable if the plants, their costs and the resulting products were identical, or at least if the differences between them were largely irrelevant to the choice of process technology. A potential licensee will consider developments in end-user needs which have to be measured in terms of potential requirements for the individual resins. Having made its decisions it must then consider which of the process technologies are appropriate. If it has identified a need for LDPE then it will necessarily have to choose a high-pressure process technology as LDPE cannot be made by a low-pressure route. Similarly if it has decided that its business opportunities lie in the production of HDPE or LLDPE then he must use a low-pressure technology.

(82) The different growth rates of the different process technologies reflect the demand for the different resins. Demand for LDPE, the product made by high-pressure processes, has been stagnant while that for the low-pressure products, HDPE and LLDPE, has grown in recent years. As for possible future developments, high-pressure processes (which are used for making LDPE) are mature and are unlikely to be the subject of further major technical developments. It therefore seems unlikely that there will be any major resurgence in demand for high-pressure process technology. In relation to end use applications the signs are that customers are installing more powerful equipment that will enable them to use LLDPE with lower processability rather than the LDPE made by high-pressure technologies. This again indicates that the trends observed until now will not be reversed.

(83) Geographical differences in the penetration of different processes in different geographical regions do not indicate that all process technologies are in the same product market. Chemical plants have long lives, some of the plants have been operating for over 30 years. There is therefore a substantial stock of serviceable production equipment. As the major developments in PE low-pressure technology have been made by North American companies, notable UCC, Dow and Phillips, it is natural that there should be some time lag in these technologies penetrating other regions. A technology is first introduced by its developer in its own plants. Only after it has been shown to work is it normally possible to license it to third parties. High-pressure processes were the first practical processes to be developed, therefore, one may expect the replacement of high-pressure processes by low-pressure processes to follow the pattern seen in North America but with some time lag. This is borne out by replies to the Commission's enquiries which show that respondents expect the proportion of LLDPE, a resin produced using low pressure technology, to increase at the expense of LDPE which is produced in a high pressure process. Respondents to the Commission's questionnaire have also indicated that they do not foresee any additional demand for LDPE. This indicates that the present geographical variations in the penetrations of the various processes should disappear or at least become much less pronounced over time.

(84) Advanced catalysts seem likely to improve the characteristics and extend the range of applications of existing PE resins. This does not mean that they will become more substitutable amongst themselves. In fact, on the basis of the current limited experience of the use of advanced catalysts it seems likely that they will produce resins with new unique combinations of properties.

(85) The Commission therefore concludes that a distinction can be made between the high-pressure technology packages and low-pressure technology packages.

High-pressure processes

(86) Whether or not the tubular- and autoclave-based process technologies constitute one single or two

relevant markets need not be considered here as, whichever market definition is chosen, the operation will not give rise to competition concerns.

(87) The transaction does not appear to raise competition concerns in relation to the market for initiators used in high-pressure processes, the associated technology or, indeed, on high-pressure process technologies themselves.

Low-pressure processes

(88) A distinction can be made between the three low-pressure processes. The physical characteristics of the equipment are quite different and each process has its own specificities.

(89) The solution process is generally used to make LLDPE. It is the only process for the production of C8 LLDPE. The polymerisation process takes place in solution, so that as the resin is produced it is dissolved in an organic solvent. In a second stage the resin is reclaimed by boiling off the solvent. There are therefore two stages in the production of PE resins by solution processes.

(90) The slurry process is used primarily to make HDPE, though it is also used for LLDPE. In this process the polymerisation takes place in an inert liquid (that is one which takes no part in the reaction and which does not dissolve the resin). The PE resin is formed as a dispersion in the liquid and has to be physically separated from the liquid medium in a second stage. It is comparatively quick, easy and inexpensive to change the grade or type of resin when using a slurry process.

(91) Gas-phase processes can be used to make both HDPE and C4 and C6 LLDPE. Polymerisation takes place in an enclosed vessel and the polymer is continuously extracted from a fluidised bed in the reactor. No second stage is required. The production of gas-phase plants can be switched between LLDPE and HDPE, i.e. gas-phase plants can be designed so as to provide swing capacity. Gas-phase plants operate best under steady conditions and high throughputs of bulk products. The largest PE production facilities are gas-phase plants which can have capacities of up to 700 000 tonnes a year.

(92) Capital costs per tonne of capacity for gas-phase plants for the production of both HDPE and LLDPE are lower than those for other processes according to the replies to the Commissions enquiries.

(93) All of the respondents to the Commission's enquiries, except the parties, agreed that a distinction could be made between the three processes, solution, slurry and gas-phase.

(94) Each of the processes has its specific advantages and disadvantages. Gas phase is particularly suited to the production of large volumes of bulk products (HDPE and C4 and C6 LLDPE) and has low capital costs. Slurry offers a high level of flexibility between the production of HDPE on the one hand and the various C4 and C6 LLDPE on the other hand, solution offers the only possibility of producing C8 LLDPE. Thus once a potential licensee has identified the market or markets it intends to serve, its choice of technology is already made to a large degree. This is particularly true for gas-phase plants.

(95) There are thus *prima facie* indications that there are three separate low-pressure technology package markets for gas phase, for slurry and for solution. This is supported, as far as gas phase is concerned, by the tendencies observed in the market (see below). However it is not necessary to decide whether there are three individual markets or a single combined market as the operation will give rise to competition problems whichever definition is chosen.

C. RELEVANT GEOGRAPHIC MARKET

(96) In its previous Decisions ([24]) dealing with polyolefin technology the Commission concluded that the relevant geographic market was global. It reached this conclusion on the basis that most polyolefin technology has been developed in North America, western Europe, or Japan and firms in these areas license their technology in these areas and in the rest of the world. There are no geographical constraints on a potential licensee's choice of technology, there are no tariff barriers and transport costs play no part. Licensors are active worldwide.

(97) Respondents to the Commission's PE technology survey, actual and potential licensees, licensors and independents and the parties supported this conclusion unanimously.

(98) The relevant geographic market for PE technology is worldwide.

D. ASSESSMENT

(99) In the assessment that follows the capacity of licenses granted to third parties are considered in the calculation of market shares. Decisions to license subsidiaries or joint-venture companies are not made on a competitive basis.

([24]) Case IV/M.269 — Shell/Montecatini, OJ L 332, 22.12.1994, and Case IV/M.550 — Union Carbide/Enichem, OJ C 123, 19.5.1995.

High-pressure process technology

(100) UCC is a licensor of high-pressure technology. Dow does not license its high pressure technology to third parties. There is therefore no overlap. UCC's market share overall (that is for both autoclave and tubular processes) is [5 % to 15 %]*, well below that of the largest competitor ICI with between 20 % and 30 %. Two other competitors have shares of between 5 % and 15 % of the capacity licensed between 1979 and 1999.

(101) UCC is active only in the licensing of high-pressure, tubular-process technology, where its market share will be well below [20 % to 30 %]*.

(102) The proposed operation will not create or strengthen a dominant position in the market for high-pressure technology nor in a market for high-pressure, tubular-process technology.

Solution and slurry low-pressure technology

(103) Neither Dow nor UCC license solution or slurry low-pressure technology packages to third parties. The operation will not therefore lead to the creation or strengthening of a dominant position in either of these markets.

Gas-phase low-pressure technology

(104) UCC is a global licensor of a gas-phase technology, Unipol, which is commercially licensed through Univation acting as its exclusive agent. Univation is a joint venture between UCC and Exxon and was established to research, develop, market and license process and catalyst systems that can be used in gas phase and slurry plants. Exxon has contributed its metallocene catalysts technology and the developments it has made in gas-phase process technology (the supercondensing mode technology) to Univation through exclusive licences. In addition the joint venture will manufacture, market and sell advanced catalysts for the manufacture of PE resins. The joint venture will seek to grant PE technology licences for both new plants and the retrofitting of existing plants.

(105) UCC has taken a share of [60 % to 70 %]* of the capacity of PE technology licensed to third parties over the 15 years between 1984 and 1998. During this period there were only two successfully licensed gas phase technology competitors in this market: BP Amoco, which has less than half the market share of UCC, and Montell, about one sixth of the size. The operation will not result in any aggregation of these market shares as Dow has not, until now, been an active licensor and does not have a gas-phase process technology. More recently Borealis has signed a licence with an associated company for its hybrid slurry/gas-phase Borstar process and Mitsui has announced its interest in granting licences for its series reactors gas-phase technology. Neither of these companies have yet licensed gas-phase technology to independent third parties.

Company	Gas-phase
UCC	[60 % to 70 %]*
BP Amoco	20 % to 30 %
Montell	5 % to 15 %

(106) One of the key factors that potential licensees will take into account is the position of each of the potential suppliers of gas-phase process technology packages in relation to the use of advanced catalysts and in particular for metallocene catalysts, which are the most developed and which appear to offer considerable advantages in improving the characteristics of the resins produced and extending the range of products that can be made. Even if potential licensees do not wish to produce resins using metallocene catalysts in the immediate future, they will wish to ensure that the package they are acquiring will enable them to use metallocene catalysts in the future. PE resin plants have lives of over thirty years and the capital cost of an optimum size gas-phase plant is between EUR […]* million and EUR […]* million. In such situations it is important for the resin producer to be certain not only that the package it is acquiring has the capability of using advanced, and particularly metallocene catalysts but that the catalyst technology available from the licensor will allow it freedom to operate and to sell his resin.

(107) Dow will obtain joint control, through its 50 % share in Univation, of the most successful gas-phase process technology, Unipol, which may in the future be used with Exxon's metallocene catalyst. Most PE producers replying to the Commission's questionnaires consider that the only other leading metallocene catalyst is already owned by Dow. They further consider that the two catalysts are protected by the leading patents in the field. This position has not been challenged by the parties. Following the proposed operation the

exploitation of these two catalysts will be under the control of Dow, directly in the case of its own metallocene catalysts and indirectly, through Univation, in relation to the Exxon catalysts.

(108) The intellectual property situation relating to metallocene catalysts is complex with over 2 300 individual patents to be considered. A majority of those replying to the Commission's questionnaires considered that the combination of Dow, UCC and Univation will severely reduce the options for companies wishing to have gas-phase process technology with metallocene capability.

(109) As one respondent to the Commission's enquiries put it 'A potential licensee expects the licensor to make available proven technology free of third-party patent rights. The licensee would take a licence from the licensor offering the technology best meeting its requirements. If a licensor cannot meet these requirements due to intellectual property constraints the licensee would turn to another licensor that could or if no such licensor is available, amend its requirements or refrain from taking a licence.' Another producer has stated that '... the combination of Dow and Union Carbide will not face serious competition in the single-site catalyst technology.' (The reference to Union Carbide has to be understood as meaning Univation).

(110) Following the concentration, and in particular following the acquisition by Dow of indirect control of the exploitation of Exxon's metallocene catalyst through its acquisition of UCC's 50 % share of Univation, the new entity will be, at least for several years, the only licensor able to offer both metallocene catalyst capability, that is to offer a package including the possibility of using such a catalyst later, and legal certainty as to the intellectual property rights. Under these circumstances potential licensees will have a natural preference for the combined entity's combination of process and catalysts. Details of the competitors are given below.

(111) BP, the most important competitor of Univation in the supply of both gas-phase and low-pressure process technology packages, had been working with Dow in a joint research and development agreement to use Dow's metallocene catalysts with BP's gas-phase technology. A memorandum of understanding provided for the joint commercial exploitation of the developed technology and if successful for the establishment of a joint venture similar to Univation. After five years' work, the parties reached a stage where the commercialisation of the jointly-developed technology was possible. However, Dow terminated the Joint Development Agreement at one of its regular Decision Points and the agreement has now lapsed. BP is, therefore left without a credible metallocene catalyst to market with its gas phase technology and is therefore less able to compete.

(112) BP has certain residual rights under the Joint Development Agreement. According to the parties BP is free to practice license and sub-license the jointly-developed catalyst in gas-phase processes. The agreement, at point […]*, provides that […]*. In the absence of any provision for submitting these issues between BP and Dow to pendulum arbitration Dow will thus have a *de facto* veto over BP's ability to license, sub-license or use the jointly developed technology. In any case the said clause does not extend to Dow's background patents.

(113) The second and only other competitor to successfully grant licences to third parties in the last 15 years is Montell with its Spherilene process. Montell has a metallocene catalyst in development but the position regarding the intellectual property rights is unclear as it is for any other potential licensor. The parties correctly state that after the realisation of Project Nicole (the creation of a joint venture combining Shell and BASF's polyethylene and polypropylene activities — Case COMP/M.1751) Montell will have access to the BASF metallocene patents. However these have been developed with a view to their use in polypropylene production.

(114) Furthermore while there were two competing metallocene catalyst systems for gas-phase processes there was an incentive for each catalyst owner to seek partners to exploit its product. Once the two catalysts are under the control of single group this incentive will be considerably reduced. This is particularly true when the group also has the dominant gas-phase process technology. The parties' natural behaviour will be to develop either one or both catalysts for use with the Unipol process technology. They would have no interest in granting licences to or collaborating with a potential competitor.

Barriers to entry

(115) This is not a market that can be easily entered. A licensee has to make very considerable capital investments, up to EUR […]* million to install the PE technology they have purchased. The plant has a life of perhaps 30 years. Potential licensees will therefore take all steps possible to ensure that they make the correct decision in choosing a PE technology package. It is not enough that the licensor should give guarantees that the technology will produce the required quantities and qualities of resins or that the licensor undertakes to pay a penalty if the agreed levels are not met. In the case of

failure, or even partial failure, the licensee's credibility with its customers would be reduced if it were to be unable to meet their requirements in terms of volume or quality. In addition the financial effects of even comparatively small divergences in terms of production costs or output can be very serious in a low-margin business such as PE resin production.

(116) PE technology is constantly evolving. A potential licensee will require assurance that its licensor has the research and development facilities to improve and upgrade the licensed technology over the life of the plant. A track record in this area is therefore indispensable.

(117) The field of PE technology is covered by a multitude of patents covering the process technology, all aspects of the catalysts used and the resins made by the various processes. A potential licensee will need assurances that the licensor has the right to grant licenses and that it will act vigorously to protect these rights and thus the ability of the licensee to continue to operate its production plant and sell its output.

(118) A licensor must be able to show that its PE technology package works, preferably on an industrial scale. The ideal way to do this would be to demonstrate the operation of the process to produce the clients' desired volume and range of PE resins in a full-scale plant or at least in a large-scale pilot plant. Secondly it must be able to demonstrate its commitment to research and development. This will require considerable investment in both laboratories and pilot plants. It should also be able to demonstrate that it has protected intellectual property rights and will continue to do so with regard to future developments.

(119) The parties set out the requirements for a successful licensor as follows 'In order to compete in the PE technology market, a prospective licensor must possess or acquire the infrastructure required for a licensing business, including engineering, technical support, marketing, legal, sales, catalyst supply and training capability.' Dow, which has a very successful solution process which it does not license at present, 'perceives that it would be a costly investment with poor prospects for an adequate return to create the infrastructure necessary to license solution PE technology.' The parties also note that 'Prospective licensees prefer licensors with an established record of successful licenses'.

(120) The established licensors therefore have a very considerable advantage in that their achievements and record are already in the public domain. Newcomers find themselves in a difficult situation of not being able to demonstrate a successful track record in licensing and the various associated activities and therefore being unable to find the customers that would enable them to gain the necessary experience.

(121) As a minimum a potential licensor would have to be able to demonstrate that its combination of process and catalyst technology worked in its own production facilities. It follows that only existing gas-phase PE resin producers could enter the gas-phase PE technology licensing market. The number of potential competitors is therefore limited, at least in the medium term, to those operating their own gas-phase process technologies.

(122) There are only a limited number of owners of gas-phase process technology who would be able to enter the market. Even if they were prepared to take the risk they would be faced with well-established incumbents, Univation, BP Amoco and Montell with established track records. It should be noted that of the nine companies listed in Tecnon study on licensing as being licensors of gas-phase technology only three have granted licences to independent third parties in the last 15 years, the others have only licensed subsidiaries or joint ventures in which they are involved.

(123) Any competitors (whether existing licensors or merely owners of competing gas-phase process technologies) would face the similar problems in relation to metallocene catalyst capability. The most important intellectual property rights are held by Dow and Exxon.

Potential competition from other low pressure processes

(124) Gas-phase is not only the most important low pressure process technology, it is also the most important technology overall accounting for nearly half of the total licensed PE capacity and 65 % of the licensed low-pressure capacity.

(125) Gas-phase process technology is regarded by the majority of respondents to the Commission's enquiries as being the most likely production process for new capacity for the production of bulk LLDPE and HDPE.

The replies also indicate that the respondents consider that gas-phase process technology is the most likely technology to be used for new developments in LLDPE production.

(126) In relation to LLDPE, all the respondents to the Commission's questionnaires on the future development of the ratio between LDPE and LLDPE indicated that they thought the proportion of LLDPE would increase. This indicates that a considerable proportion of the new PE capacity will be for the production of LLDPE.

(127) The parties estimate that an additional [5 to 15]* million tonnes of gas-phase capacity will be required by 2004 and that [3 to 8]* million tonnes of this capacity will be licensed. Considering that in the past over [75 % to 85 %]* of gas-phase capacity has been licensed this may be an underestimate. However, it represents over [65 % to 75 %]* of their estimate of the total market for low-pressure process technology by volume.

(128) All the indications are that licensees will continue to seek gas-phase PE technology packages and that gas-phase will remain the most important low-pressure PE technology. Other processes are less suited to the future requirements of a large part of the industry and will not therefore be able to constrain the behaviour of gas-phase PE process licensors in general and the parties in particular.

Arguments of the parties

(129) In refuting the Commission's conclusion in the Statement of Objections that the operation would result in the strengthening of a dominant position in the markets for gas-phase PE technology packages (or low-pressure PE technology packages, see below) the parties have presented several arguments. The main arguments are:

— market share alone is not sufficient to show dominance,

— the market for PE technology packages is a bidding market in which all competitors have an equal chance of winning the next licence, and

— the variation in market shares over time indicates a competitive market.

(130) The first two arguments can be treated together. The Commission does not claim that the mere fact that UCC, through its sales of Unipol PE technology, has a high market share is sufficient to demonstrate that UCC is dominant. It is however an important indicator of dominance. UCC's share of [60 % to 70 %]* has been calculated on the basis of capacity licensed to third parties over a very long period, 15 years. If this overall period is broken down into five-year periods (i.e. periods sufficiently long to eliminate the abnormal effects that one or two licences can produce in shorter time periods) UCC's market share has remained uniformly high (above [45 % to 55 %]*). In addition the Commission has also taken other factors into consideration including the fact that UCC has a very large installed base, an effective licensing organisation, and a proven track record.

(131) To regard the PE technology licensing market as a bidding market is too simplistic. Potential licensees look for a successful track record both in the production of resins using a given technology and in the licensing of that technology. A licensee is about to enter into a long-term relationship with its licensor. It needs to obtain the maximum reassurance that the process it is going to license is going to produce the anticipated results, that its licensor has the research development and technical back-up resources to ensure that its plant remains effective and competitive and that its licensor can ensure his freedom to operate and sell the resins produced and that it will act to protect the licensed intellectual property rights. The new entity would be in a far better position to offer all of these elements than its competitors.

(132) According to the parties a closer examination of the year-by-year variations in market share show that the market is competitive. It is true that there are significant variations in market shares between individual years. This is due to the large size and comparative rarity of licences. However even the figures produced by the parties in support of their argument show that the parties had shares of between [50 %]* and [100 %]* of the number of licences granted in six of the last eight years. The method chosen by the Commission, which examined the capacity licensed over a 15-year period, provides a more prudent measure in a situation in which the date on which a single licence is signed may make an important difference to the figures for a single year.

(133) UCC has, over the years, established an unrivalled position in the gas-phase technology business based on its ability to meet the needs of licensees. This situation is reflected in its continuing high market share. This continuing high market share also consolidates its position since it serves as a track record. Other competitors, particularly those with no record of licensing to third parties, are at a severe disadvantage in that they have a less impressive or no track record.

(134) Other arguments put forward by the parties are:

— Dow has no access to Exxon's metallocene catalyst,

— Dow does not own or have access to a gas-phase process technology,

— Dow's metallocene catalyst is not proven in gas-phase.

(135) The parties have argued that Dow does not have access to Exxon's Exxpol metallocene catalyst. This is true but irrelevant. What Dow will acquire as a result of the proposed operation is joint control over the way in which the Exxpol metallocene catalyst is exploited by Univation. Dow will of course retain sole control over its own Insite metallocene catalyst.

(136) According to the parties Dow does not own or have access to a gas-phase process technology. This is true. The Commission's argument is not based upon a overlap in relation gas-phase process technology. The Commission considers that by acquiring UCC Dow will acquire the dominant Unipol gas-phase process technology and that this dominance will be strengthened by the combination of Unipol and the metallocene catalysts of Univation and Dow.

(137) The parties claim in their response to the Statement of Objections that Dow's metallocene catalyst is not proven in gas-phase. However the same response reports the success of the jointly developed technology in a commercial trail.

(138) The Commission therefore considers that the proposed operation would strengthen the dominant position previously held by Univation in relation to the supply of packages for the supply of gas-phase PE technology.

Conclusion in relation to gas-phase PE process technology packages

(139) UCC is dominant on the market for the supply of gas-phase process technology packages and this dominance would be strengthened by the combination of the Dow and Univation metallocene catalysts. The strengthening arises from three distinct effects:

— the new entity would control directly or indirectly both the leading metallocene catalyst technologies,

— the position of BP would be significantly weakened as it would have no access to a proven metallocene catalyst technology, and the position of third parties will be made more difficult by the combination of the parties' suites of patents,

— the new entity would combine two formerly independent licensing opportunities (Univation and Dow) for others wishing to develop and/or market metallocene catalysts.

In the event that BP and Dow would consider recommencing their cooperation as previously envisaged in order to jointly offer gas-phase technology packages on the market, there would also be a strengthening of a dominant position. Indeed this would allow Dow to control or co-control both the dominant gas-phase process technology and the largest competing gas-phase process technology, as well as the licensing of the two leading metallocene catalysts.

Low-pressure PE process technology packages

(140) The operation would also give rise to competition problems if the relevant product market were to be the supply low-pressure PE technology packages. The parties' market shares are given in the table below in relation to capacity licensed in the period 1984 to 1998.

Company	Process	Market share
UCC	Gas-phase	[40 % to 50 %]*
BP Amoco	Gas-phase	[15 % to 25 %]*
Montell	Gas-phase	[0 % to 10 %]*
Phillips	Slurry	[0 % to 10 %]*
Mitsui	Slurry	[5 % to 15 %]*
Nova	Solution	[5 % to 15 %]*

(141) Although UCC's market share was [40 % to 50 %]* over the 15-year period between 1984 and 1998, the increase in the importance of gas-phase processes over the most recent 10 years means that UCC's share was higher, at around [45 % to 55 %]*, in this period. The replies to the Commission's enquiries, including those of the parties, indicate that gas-phase processes will continue to make a majority of the licensed capacity in the future.

(142) UCC would still be very much larger than its next competitor, which would still be BP. In addition to BP and Montell which license gas-phase technologies, Phillips and Mitsui (slurry) and Nova (solution) have successfully licensed their low pressure technologies in the last 15 years. All competitors, would suffer the difficulties in competing in this wider market that have been described in relation to the market for gas-phase PE technology packages. One respondent has gone so

far as to suggest that 'In the medium term there is every possibility that the only process capable of competing with Unipol will disappear'.

(143) The difficulties faced by potential new entrants into the market for the supply of low-pressure process technology packages are considerable and it is extremely unlikely that any company not already involved in the production of PE resins would be able successfully to license low-pressure technology package. Even current producers would find it difficult to combat the advantages of the incumbents.

Conclusion in relation to low pressure technology

(144) UCC is dominant on the market for the supply of low pressure process technology packages and this dominance would be strengthened by the combination of the Dow and Univation metallocene catalysts. The strengthening arises from three distinct effects:

— the new entity would control directly or indirectly both the leading metallocene catalyst technologies,

— the position of BP would be significantly weakened as it would have no access to a proven metallocene catalyst technology,

— the new entity would combine two formerly independent licensing opportunities (Univation and Dow) for others wishing to develop and/or market metallocene catalysts.

The considerations concerning the possible recommencing of the cooperation between BP and Dow (see recital 139) also apply in the present context.

E. OVERALL CONCLUSION ON PE TECHNOLOGY

(145) The operation will strengthen the dominant position of UCC on the market for the supply of gas-phase process technology packages or the supply of low-pressure process technology packages. The same would apply to the possible market for catalyst technology, supplied in order to upgrade existing plants.

ETHYLENEAMINES

A. RELEVANT PRODUCT MARKETS

(146) Ethyleneamines are commodity chemical intermediate products which are derived from ethylene.

(147) There are two distinct production processes to obtain ethyleneamines. The EDC process (reaction of ethylene dichloride and ammonia) produces ethyleneamines by the reaction of ethylene dichloride and ammonia. This process produces the entire range of ethyleneamines, except Aminoethylethanolamine (AEEA). The reductive amination (RA) process produces ethyleneamines by the reaction of ethanolamines (MEA) with ammonia and hydrogen. This process produces a higher ratio of ethylenediamine (EDA), it does not produce a number of ethyleneamines obtainable with the EDC process, but produces AEEA. In order to produce the entire range of ethyleneamines access to both production processes is necessary.

(148) Competitors of Dow and UCC in producing ethyleneamines are BASF, Akzo, which also controls Bayer's production site in Germany, Tosoh and Delamine. The latter is a joint venture between Akzo and Tosoh. The companies Dow, Akzo (in the Bayer Leverkusen site, on the basis of a tolling agreement), Delamine and Tosoh use the EDC process. Akzo (on its Swedish production site) and BASF use the RA process. UCC uses both the EDC and the RA process.

(149) The information provided to the Commission by the parties and gathered in market enquiries by the Commission shows that each ethyleneamine constitutes a different product market.

(150) The said information shows that each variety of ethyleneamines has a different use and is not substitutable with other products. There is therefore no demand-side substitutability between the different varieties of ethyleneamines.

(151) Ethyleneamines are used for a large variety of applications. These include bleach activators (EDA), fungicides (EDA), epoxy hardeners (EDA, DETA, TETA, TEPA, piperazine, E100/HPA-X, AEP), lube oil additives (TETA, TEPA, E100/HPA-X), fuel additives (EDA, DETA, TETA, TEPA, AEEA), Asphalt additives (TEPA, E100/HPA-X, AEP), paper resins (DETA), detergents (AEEA, DETA), chelants (EDA, DETA, AEEA), pharmaceuticals (piperazine) to name a few. Some ethyleneamines can be used for the same applications. However, this does not indicate their substitutability, since the different varieties are being used in those applications for different purposes. The ethyleneamines are not substitutable one for the other. In such marginal cases where substitutability between different varieties of ethyleneamines would technically be a possibility this can only be achieved after expensive and time consuming testing and reformulating.

(152) Other factors are in line with the foregoing demand-side analysis. The different varieties of ethyleneamines are sold at different prices and United States import duties on ethyleneamines vary according to the different ethyleneamine varieties.

(153) According to the information provided by the parties and the market enquiries, each variety of ethyleneamines is a homogeneous product, without

specific grades. For example, EDA from any supplier can be used for any application suitable for EDA. The same is true for all other ethyleneamines. The parties do produce specific blends of ethyleneamines for certain customers, usually according to the customers' proprietary specifications.

(154) The notifying parties claim that there is one relevant product market for all ethyleneamines. The parties claim that there is supply-side substitutability between the various types of ethyleneamines.

(155) The parties first invoked, in the form CO, as reasons for this view that ethyleneamines are produced in a fixed ratio in the production process. From this the parties drew the conclusion that there is a close supply-side relationship between the various types of ethyleneamines. This argument does not, however, support the case for a single market of ethyleneamines based on supply side substitutability.

(156) The information provided by the parties at a later stage shows that producers could vary production ratios to a certain extent. In their production the different varieties of ethyleneamines are produced in a given split, which can be varied within limits by altering process and reactor conditions and by recycling finished homologues to the reactor. The parties have indicated that they can produce ethyleneamines within the following ratios:

Production range		
Product	EDC	RA
Ethylenediamine (EDA)	[0 % to 10 %]* — [45 % to 55 %]*	[55 % to 65 %]* — [80 % to 90 %]*
Diethylenetriamine (DETA)	[15 % to 25 %]* — [30 % to 40 %]*	[0 % to 10 %]* — [10 % to 20 %]*
Piperazine	[< 5 %]* — [< 5 %]*	[0 % to 10 %]* — [10 % to 20 %]*
AEEA	[< 5 %]*	[0 % to 10 %]* — [5 % to 15 %]*
Triethylenetetramine (TETA)	[5 % to 15 %]* — [15 % to 25 %]*	0
Tetraethylenepentamine (TEPA)	[0 % to 10 %]* — [5 % to 15 %]*	0
AEP	[< 5 %]* — [0 % to 10 %]*	[0 % to 10 %]* — [0 % to 10 %]*
E100/HPA-X	[0 % to 10 %]* — [25 % to 35 %]*	0

(157) The possibility of modifying production ratios within certain limits — which vary according to production process and may vary according to producer — has been confirmed by the Commission's market enquiry. These adaptations can only be made to a limited extent and involve a complex operation to change the output ratios, maintain quality and ensure stable operation of the plant. While it may be possible to increase the proportion of a given product by changing the conditions in the reactor, the changed conditions may also lead to an unwanted increase or decrease in other homologues. There is therefore only limited and conditional supply substitutability and this cannot justify a single relevant product market.

(158) The parties also claim that the market shares of the parties do not differ significantly from one variety to the other in order to support their argument in favour of one product market for all ethyleneamines. However, the market shares provided by the parties show a variation in market shares for individual ethyleneamines of between [20 % to 30 %]* and [45 % to 55 %]* for Dow and between [25 % to 35 %]* and more than [40 % to 50 %]* for UCC.

(159) On the basis of these elements the product market has to be defined as one market for each ethyleneamine. The assessment therefore has to be based on separate markets for EDA, DETA, TETA, TEPA, AEEP, piperazine, AEP and E100/HPA-X. However, even if the relevant product market were to be all ethyleneamines, the assessment would not change.

B. RELEVANT GEOGRAPHIC MARKET

(160) According to the parties the geographic market for ethyleneamines is at least European, if not worldwide.

(161) The market is characterised by five producers who supply the entire world demand. Except for Dow, which has production sites in both the United States of America and in Europe, all producers supply the rest of the world from a single production site in Europe, or in Japan or in the United States of America. UCC for instance supplies its entire European demand from the United States of America without a production site in Europe. In order to compete in a particular region of the world, in particular in Europe, it is not necessary to have a production site there. 20 % of the Community's requirements are imported.

(162) According to the parties transportation costs do not play a role. Furthermore there are no safety or other restrictions to transportation. The Commission enquiry has confirmed this view. Duties do not appear to be significant impediments to trade.

(163) On the basis of these elements the relevant geographic market for ethyleneamines is to be seen as worldwide.

C. ASSESSMENT

(164) Dow, UCC, Akzo (including its production at Bayer Leverkusen), BASF and Tosoh are currently active on the market for ethyleneamines. The sixth producer, Delamine, is a joint venture controlled jointly by Akzo and Tosoh. After the proposed concentration the market would thus effectively be left with Dow/UCC, BASF as well as Akzo and Tosoh with their joint venture Delamine.

(165) The volume of total world sales for ethyleneamines in 1998 is estimated by the parties at […]* thousand tonnes and valued at EUR […]* million. The biggest product, EDA, accounts for […]* thousand tonnes and EUR […]* million, followed by DETA with […]* thousand tonnes and EUR […]* million, TETA with […]* thousand tonnes and EUR […]* million. The details are contained in the table below:

Product	Value in EUR million	Volume in thousand tonnes
All ethyleneamines	[…]*	[…]*
AEEA	[…]*	[…]*
AEP	[…]*	[…]*
DETA	[…]*	[…]*
EDA	[…]*	[…]*
TEPA	[…]*	[…]*
TETA	[…]*	[…]*
Piperazine	[…]*	[…]*
E100/HPA-X	[…]*	[…]*

(166) On the basis of these figures for all ethyleneamines together, Dow/UCC would have a world market share of [60 % to 70 %]* and the next largest competitor, the Akzo Group (including Delamine), less than [15 % to 25 %]*. BASF, Tosoh and others all have below 10 %. The table below gives the parties' market shares for the major different ethyleneamines.

(in %)

Product	DOW	UCC	Total	Largest competitor
All ethyleneamines	[25 to 35]*	[30 to 40]*	[60 to 70]*	[15 to 25]*
AEEA	[25 to 35]*	[30 to 40]*	[60 to 70]*	[5 to 15]*
AEP	[45 to 55]*	[35 to 45]*	[85 to 95]*	[5 to 15]*
DETA	[25 to 35]*	[35 to 45]*	[65 to 75]*	[10 to 20]*
EDA	[20 to 30]*	[30 to 40]*	[55 to 65]*	[20 to 30]*
TEPA	[35 to 45]*	[30 to 40]*	[75 to 85]*	[10 to 20]*
TETA	[30 to 40]*	[25 to 35]*	[60 to 70]*	[10 to 20]*
Piperazine	0	[35 to 45]*	[35 to 45]*	[30 to 40]*
E100/HPA-X	[25 to 35]*	> [35 to 45]*	> [65 to 75]*	[< 10 to 20]*

(167) The table shows that the market share situation for all ethyleneamines is similar for most varieties of ethyleneamines. For EDA Dow/UCC will have a world market share of around [55 % to 65 %]*. For DETA, TETA and AEEA the combined market shares of the parties are well over [55 % to 65 %]*. The market shares of the parties for TEPA are above [70 % to 80 %]* and for AEP nearly [85 % to 95 %]*. The combined market share of the parties for E100/HPA-X is above [65 % to 75 %]*. For Piperazine, there is no market share addition, because Dow does not sell refined Piperazine.

(168) The parties claim that there are what they describe as 'huge overcapacities' of about […]* thousand tonnes equalling [10 % to 20 %]* of global capacity. The figures provided by the parties and the result of the investigation show however, that [35 % to 45 %]* of this spare capacity has to be attributed to the parties, whilst nearly [45 % to 55 %]* is attributable to Tosoh. As the parties indicate, Tosoh has recently (1996 and 1998) tripled its capacity and is therefore still in a start-up phase. However, even if Tosoh were to be able to put all its spare capacity on the market immediately, this capacity would not be of a magnitude that could put the dominant market position of Dow/UCC into question.

(169) The market has been characterised as a mature market with a tendency to decline by the parties. Entry has not

taken place during the last five years. Until Akzo entered the market through its acquisition of Berol Nobel in 1994, it had only been present through its joint venture with the Japanese producer Tosoh. Through its arrangement with Bayer, Akzo gained access to an EDC production facility. The establishment of a green field production facility entry would require a long-term multimillion dollar investment. In the light of these elements and the abovementioned overcapacity, it has to be concluded that entry barriers for potential competitors are high.

(170) The parties further claim that they are subject to increasing buying power from strong multinational customers manifested in globally-negotiated, long-term contracts and intense price competition. The replies to the Commission investigation indicate that even the largest multinational customers do not feel that they would be able to exercise countervailing buying power. Furthermore price competition in relation to the large customers takes place to a considerable degree between Dow and UCC, who by virtue of their large production capabilities are particularly well placed to supply the requirements of such customers. The combination of Dow and UCC would therefore be highly detrimental to this price competition. Big customers have indicated that they expect price increases after the merger.

D. CONCLUSION ON ETHYLENEAMINES

(171) In view of the market position of the parties to the concentration, the notified operation creates a dominant position of the parties in the area of the following ethyleneamines: EDA, DETA, TETA, TEPA, AEEA, AEP and E100/HPA-X. If one were to consider all ethyleneamines as one product market, a dominant position would be created on that market.

VI. **COMMITMENTS**

(172) The parties formally presented commitments (undertakings), on 23 March 2000, to resolve the competition concerns identified by the Commission. Those commitments were subsequently sent to members of the Advisory Committee and market tested. The results of the market test indicated that the commitments required clarification and some modifications to ensure that it was clear that the competition problems were eliminated. The parties later submitted adjustments to the commitments.

(173) The commitments deal with the three problem areas identified by the Commission, C8 LLDPE resins, PE technology and ethyleneamines, and may be summarised as follows:

C8 LLDPE RESINS

The parties undertake to either (a) cause Polimeri Europa Srl (Polimeri) to sell its C8 LLDPE business, which would include Polimeri's entire PE resin production plant at Priolo in Italy, or (b) to divest UCC's 50 % interest in Polimeri.

PE TECHNOLOGY

OPEN LICENCES

Dow undertakes to grant to any interested third party a non-exclusive licence (with right to sub-license) under the background metallocene patents owned and controlled by Dow for use in gas phase and slurry. In some rare cases, a Dow patent may be subject to prior rights under a pre-existing contract, for example where the patent was the result of research collaboration with a university or other third party. These cases do not materially affect the scope of the open license commitment and Dow has committed to use its best efforts to resolve such situations or permit the licensee to directly negotiate to with the third party. The open licence will extend also to Dow's rights under the patents of ExxonMobil and Univation as a result of the settlement agreements among them, to the extent that Dow is free to convey such rights. This extension will have the effect of granting immunity, to the extent that Dow can convey such rights, from suit under ExxonMobil's and Univation's patents. Third parties will not be able to pass on this immunity, nor will they be able to offer sublicenses of the Dow background patents to Univation.

DIVESTITURE OF DEDICATED GAS-PHASE AND BACKGROUND METALLOCENE TECHNOLOGY TO BP AMOCO

Dow undertakes to sell to BP all of its assets which are dedicated to gas-phase metallocene PE technology, including Dow's ownership rights to the technology jointly developed with BP under the Joint Development Agreement and Dow's dedicated gas-phase metallocene resin patents. BP will also be granted non-exclusive rights under Dow's background patents and under the settlements and agreements made between Dow on the one hand and Exxon, Univation, Mitsui and Asahi on the other to the extent that Dow can convey or procure such rights.

KNOW-HOW TRANSFER

Dow is prepared to enter into a R&D service agreement with BP for up to […]* years to enable the transfer of

metallocene gas-phase know-how from Dow to BP. BP may also offer, without opposition from Dow, to extend job offers to those Dow employees involved in work under either the Joint Development Agreement or under the proposed service agreement.

SEGREGATION OF DOW'S INSITE TECHNOLOGY

Dow undertakes not to grant licences to Univation for the use of its background metallocene catalyst patents or to assign these patents to Univation, for use in gas-phase or slurry processes (other than pursuant to the Settlement Agreement between Univation and Dow). The effect of this provision and the fact that third parties are prohibited from sublicensing Dow's background metallocene patents to Univation means that Univation can only obtain these licences from BP.

ETHYLENEAMINES

Dow undertakes to divest its entire worldwide ethyleneamines business which is an integrated stand alone business unit consisting of production plants in Freeport, Texas, dedicated intellectual property rights, sales contracts, management and operating staff including marketing sales manufacturing, R&D and technical services. Dow will keep its manufacturing unit in Terneuzen, Netherlands, but will, if requested, supply the buyer of the ethyleneamines business with ethyleneamines from this plant up to 50 % of its name plate capacity.

(174) The full text of the commitments is set out in the Annex.

VII. **ASSESSMENT OF THE COMMITMENTS**

C8 LLDPE RESINS

(175) The divestment of the Priolo production facility (part of Polimeri) which is the only plant making C8 LLDPE under UCC's control will completely eliminate the overlap that would arise from the combination of Dow and UCC's C8 LLDPE operations. Similarly the divestment of UCC's 50 % shareholding in Polimeri would also remove the overlap arising from the operation completely.

PE TECHNOLOGY

OPEN LICENCES

(176) The commitment to grant open licences under Dow's background patents to interested third parties will eliminate the anti-competitive effects resulting from the bringing together of the suites of patents owned by Exxon (licensed by Univation) and by Dow. In effect any third party can now obtain a patent licence that will enable it to practice its own metallocene technology to make and sell PE resins in gas-phase and slurry processes without fear of litigation by Dow and, to the extent covered by the settlement agreements, from Exxon and Univation. The settlement agreements are intended to cover the use of metallocene catalysts in gas-phase processes.

(177) Third parties are thus in a much improved position, in that they have a right to obtain protection from litigation from Dow and to a certain extent from Univation and Exxon. This should encourage the use of metallocene catalysts and may encourage the development of new licensors.

(178) The open licence will remove the adverse effects resulting from the addition of the patent suites held by Dow and Exxon and will increase the opportunities for third parties wishing to develop metallocene catalysts.

DIVESTITURE OF DEDICATED GAS-PHASE AND BACKGROUND METALLOCENE TECHNOLOGY TO BP

(179) Dow will divest its dedicated gas-phase PE metallocene catalyst technology to BP, grant it a worldwide non-exclusive license under Dow's metallocene background patents, the Exxon and Univation patents and as far as possible transfer rights to it under the Mitsui and Asahi agreements. These measures, together with the know-how transfer discussed below, will enable BP to provide effective competition to the merged entity in the market for gas-phase technology packages, including the ability to offer metallocene catalysts.

KNOW-HOW TRANSFER

(180) Dow's offer to BP of a research and development service agreement for a period of up to […]* years will enable BP to continue the research initiated under the Joint Development Agreement while it builds its own metallocene catalyst research operation. Furthermore the fact that Dow will not oppose the transfer of research personnel with a significant involvement in the Joint Development Agreement or the proposed R&D service agreement will enable BP, if it so wishes, to recruit those people best able to forward metallocene research

in relation to gas phase operations and in particular to marry the Insite metallocene catalyst with BP's Innove gas-phase process technology.

(181) This will counteract the loss of this expertise to BP as a result of the termination of the Joint Development Agreement and enable BP to develop its own expertise.

(182) These measures contribute to eliminating the weakening of BP as a result of the operation.

SEGREGATION OF DOW'S INSITE TECHNOLOGY

(183) The commitment by Dow not to licence its background metallocene patents or assign these patents to Univation will ensure that the overlap arising from the addition of the two metallocene patent suites as a result of the proposed operation will be removed.

(184) In addition to this direct measure, open licences to the Dow background patents will contain a prohibition to prevent the licensee from sub-licensing the technology to Univation, thereby circumventing the main purpose of the commitments. In addition Dow has agreed to be bound by the non-compete covenants in the Univation Formation Agreements not to compete with Univation in the field of gas-phase and slurry PE technology packages. It cannot, therefore, licence its background technology to others, except for the purposes of the commitments given to the Commission (in particular the open licence) and pre-existing contractual obligations to third parties. Finally Dow has undertaken not to consent to any change to the non-competition clause in the Univation Formation Agreement without the agreement of the Commission.

(185) These measures will ensure that there is an effective separation between the Exxon and the Dow metallocene catalyst technologies which will be maintained to the same extent as before the concentration.

ARBITRATION

(186) The granting of open licences, the divestiture to BP of dedicated gas-phase technology, the licence of background patents and the service agreement with BP are subject to payment. The commitments provide for an arbitration mechanism (pendulum arbitration) to resolve any disputes regarding the terms of the necessary agreements. In particular, either party may initiate the arbitration procedure at any time. Upon request by the prospective licensee under the open license, that licence will take immediate effect. These provisions will contribute to the effectiveness of the remedial measures concerned.

CONCLUSION ON PE TECHNOLOGY

(187) In summary the proposed commitments in relation to PE technology address all concerns identified by the Commission in this area.

ETHYLENEAMINES

(188) The proposed divestment of Dow's entire world wide ethyleneamines business will effectively eliminate the overlap arising from the proposed operation in relation to sales to the free market. The resulting free market shares for the combined Dow/UCC business will be between [25 %]* and [45 %]* for all the individual ethyleneamines and [30 % to 40 %]* overall.

(189) Dow used a considerable part of its production in its own downstream activities. It is not therefore necessary to divest all of Dow's production facilities to enable the new owner to supply all of Dow's existing customers. However the facility for the new buyer, at its discretion, to take up to 50 % of the Terneuzen plant's nameplate capacity provides the new buyer with flexible additional capacity that will enable it to increase its market share and thereby make it a more effective competitor. The new buyer will be able to vary the tonnage it takes from the Terneuzen plant in the short term as it will only be required to indicate its needs […]* months in advance.

(190) The divestment package includes all the factors necessary for the new owner to compete effectively, including production facilities, dedicated intellectual property rights and sales contracts. Also included are management, operations, sales, marketing, technical support and R&D personnel.

(191) The fact that the divestment includes the EDC plant and an EEA production facility both at Freeport, United States of America, will allow the new owner to produce the entire range of ethyleneamines and therefore compete effectively in each of the individual homologues.

(192) The Freeport site can be made independent of Dow (apart from utilities typically shared on chemical sites) and in particular has facilities that will allow the new owner to obtain supplies of raw materials from sources other than Dow and thus ensure that Dow has no undue influence on the costs of the divested operation. In relation to the new owner's share of the output from

the Terneuzen plant this will be charged at cost so that Dow will not be able to disadvantage the new owner.

(193) The fact that the new owner will have the bulk of its production facilities in the United States of America will not be a handicap as, not only does this represent little change from Dow's current situation, but most companies, including UCC, compete successfully worldwide with only a single production facility.

(194) Finally it should be noted that while the EDC process (that is operated at Freeport and Terneuzen) has higher costs than the RA process this has not prevented companies such as Dow, Delamine and Tosoh from competing effectively to date. In fact the additional costs are compensated by the product range available using the EDC process.

VIII. **CONCLUSION**

(195) For the above reasons, the Commission has concluded that, on condition that the commitments are fully complied with, the operation is compatible with the common market and the functioning of the EEA Agreement,

HAS ADOPTED THIS DECISION:

Article 1

On condition that the undertakings submitted by the parties and set out in the Annex to this Decision are fully complied with the concentration by which the Dow Chemical Company acquires control of the whole of the undertaking Union Carbide Corporation is declared compatible with the common market and with the functioning of the EEA Agreement.

Article 2

This Decision is addressed to:

The Dow Chemical Company
Scott R. Pennock, Esq. Counsel
2030 Dow Center
Midland, Michigan 48674
United States of America.

Done at Brussels, 3 May 2000

For the Commission
Mario MONTI
Member of the Commission

ANNEX

The full English text of the undertakings referred to in Article 1 may be consulted on the following Commission website:

http://europa.eu.int/comm/competition/index_en.html