EUROPEAN COMMISSION
DG Competition

Case M.8297 - GE / BAKER HUGHES

Only the English text is available and authentic.

REGULATION (EC) No 139/2004
MERGER PROCEDURE

Article 6(1)(b) NON-OPPOSITION
Date: 31/05/2017

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EUROPEAN COMMISSION

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 Where possible the information omitted has been replaced by ranges of figures or a general description.

Brussels, 31.5.2017
C(2017) 3860 final

PUBLIC VERSION

To the Notifying party

Subject: **Case M.8297 - GE / Baker Hughes**
Commission decision pursuant to Article 6(1)(b) of Council Regulation No 139/2004[1] and Article 57 of the Agreement on the European Economic Area[2]

Dear Sir or Madam,

(1) On 20 April 2017, the Commission received notification of a proposed concentration pursuant to Article 4 of the Merger Regulation by which General Electric Company ("GE", the United States) intends to acquire within the meaning of Article 3(1)(b) of the Merger Regulation sole control over Baker Hughes Incorporated ("BHI", the United States) by way of purchase of shares ("the proposed Transaction").[3] GE is hereinafter referred to as "the Notifying Party". GE and BHI are collectively referred to as the 'Parties', whilst the undertaking resulting from the proposed Transaction is referred to as "the merged entity"

1. THE PARTIES

(2) GE has a broad and diversified range of activities, including GE's oil and gas manufacturing and technology solutions spanning across subsea & drilling, rotating equipment, imaging and sensing.

1 OJ L 24, 29.1.2004, p. 1 (the 'Merger Regulation'). With effect from 1 December 2009, the Treaty on the Functioning of the European Union ('TFEU') has introduced certain changes, such as the replacement of 'Community' by 'Union' and 'common market' by 'internal market'. The terminology of the TFEU will be used throughout this decision.

2 OJ L 1, 3.1.1994, p. 3 (the 'EEA Agreement').

3 Publication in the Official Journal of the European Union No C 133, 27/04/2017, p. 7.

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(3) BHI is active in the provision of oilfield services (OFS) on a global scale to oil and gas exploration and production companies (E&P) with a focus on the drilling and evaluation of wells as well as on the completion and production of wells.

2. THE OPERATION

(4) The Parties have entered into a Transaction Agreement pursuant to which GE will acquire sole control over BHI by way of purchase of shares. GE will own 62.5% of the voting and economic rights of a newly-formed company that will include BHI and GE's Oil & Gas business.

3. EUROPEAN UNION DIMENSION

(5) The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million[4]. Each of them has a Union-wide turnover in excess of EUR 250 million, but they do not achieve more than two-thirds of their aggregate Union-wide turnover within one and the same Member State. The notified operation therefore has an Union dimension within the meaning of Article 1(3) of the Merger Regulation

4. MARKET DEFINITION

(6) The Parties activities in the OFS industry overlap in a number of areas. In addition, the Transaction leads to a number of vertical relationships. More precisely[5]:

- Horizontal overlaps:
    - Electrical submersible pumps (ESPs);
    - Inline inspection services (ILI);
    - Downstream and upstream chemicals;
    - Permanent downhole gauges;
    - ESP sensors.
- Vertically relationships:
    - Sensors (upstream) and wireline and drilling services (downstream);
    - Electric motors (upstream) and cementing services (downstream);

4 Turnover calculated in accordance with Article 5 of the Merger Regulation.

5 Both Parties are active in the provision of cased hole wireline services. However, no affected market arises whether at EEA or worldwide level. At worldwide level, BHI's market share is [5-10]% and GE's is [0-5]%. In the EEA BHI's market share is [20-30]% [information on GE's sales]. This horizontal overlap will therefore not be further discussed in this decision.

- Pressure transmitters (upstream) and surface data logging (SDL, downstream);
- Wireline tools (upstream) and wireline logging services (downstream);
- ESP sensors, ESP bypass systems and autoflow valves (upstream), and ESPs (downstream).

4.1. Electric submersible pumps (ESP)

4.1.1. Product market definition

(7) Artificial lift systems are used to lift the fluids up to the surface of the well by increasing the pressure inside the production tubing. They are needed in wells where the natural pressure in the reservoir is insufficient to lift hydrocarbons. Only a small proportion of wells have enough natural pressure to allow the free flow of fluids to the surface without artificial means. Moreover, this natural energy decreases as wells age and come closer to the end of their production life-span. In wells that do have enough natural pressure, the installation of an artificial lift can also respond to commercial decisions of the oil company wishing to increase the production of the well.

(8) The activities of the Parties in the EEA only overlap in the supply of ESPs, which are a type of artificial lift system. Worldwide, the Parties' activities also overlap in the provision of progressive cavity pumps (PCPs) and gas lifts.[6]

(9) The Commission has not previously assessed the market(s) for artificial lift systems.

(10) The Notifying Party submits that ESPs should be considered a product market separate from other types of artificial lift systems because each system has its own specific features and cannot be interchangeably used. It argues, however, that horizontal pumping systems should be considered as forming part of the same market as ESPs. Finally, the Notifying Party submits that segmentation between onshore and offshore ESPs is not warranted.[7]

4.1.1.1. Different types of artificial lift systems

(11) ESPs consist of a downhole pumping system that is electrically driven and comprised of a series of centrifugal pumps which vary according to wellbore characteristics. ESPs force fluids to surface by augmenting fluid pressure through centrifugal force. They can be used in both vertical and horizontal wells to a maximum depth of 15,000 feet, both onshore and offshore. Both BHI and GE provide ESPs in the EEA and worldwide.

(12) There are several other types of artificial lifts, including PCP, Gas Lift, Rod lift, Plunger lift, Hydraulic lift which function with different technologies.

6 Form CO, paragraph 279.
7 Form CO, paragraphs 304 to 306.

(13) While there is some overlap between the capabilities of different artificial lifts (and different systems can be installed in the same well albeit at different stages of its production life[8]), the market investigation consistently indicated that different types of artificial lift systems have different specifications and address different needs depending on the well's characteristics.[9]

(14) The Commission considers that ESPs constitute a separate product market for the reasons set out below.

(15) First, from a demand-side perspective, each type of artificial lift is selected according to the specific conditions of the well and the properties that adapt to it. For example, lift requirements and pump rates differ for every pump. Gas lifts and ESPs can cover the largest ranges of depth and flow rate, going until 14,000 ft. deep and 14,000 bbl/d (barrels per day), while rod pumps and PCPs are very limited, only going 8,000 ft. and 4,000 ft. deep each and pumping 2,000bbl/d and 5,000 bbl/d respectively.[10] Customers[11] and competitors[12] who responded to the market investigation confirmed that artificial lift systems cannot be used interchangeably. Temperature, depth and liquid rate are aspects that affect the performance of artificial lift systems. In wells combining high temperature, depth and high liquid rate for instance, an ESP is typically the preferred system because of its enhanced performance as compared to other lifts.[13] In general, ESPs are viewed as the most sophisticated and versatile type of lift.

(16) Second, prices also vary greatly depending on the type of artificial lift. ESPs are the most efficient artificial lift system and can be used in complex wells but they tend to be more expensive than other systems, mainly because of the high cost for repairing or replacing the ESP in case of damage.[14] A competitor explained: "*ESPs are generally the most expensive form of lift because they provide higher horsepower, higher flow rate, and higher pressure due to being at deeper levels and more prolific wells. Rod Lift and PCP are next in line with lower flow rates and lower depths and the systems will be 25-50% less expensive than ESP. Hydraulic Lift is similar. Plunger Lift is the lowest cost form of lift since it uses no external power and consists of only a few components. Gas Lift can vary widely in cost depending on the size of the well.*"[15]

(17) Third, from a supply-side perspective, the Commission notes that the set of available suppliers varies by type of artificial lift. The Parties are not active in all systems[16] and similarly, competitors do not offer the entire range of artificial lift systems. Competitors also indicated that supplying different types of artificial lift

8 For instance, ESP are often installed first and replaced by rod lifts when the flow rate declines, given they are more efficient in low production wells and less costly than ESPs (Replies to question 2.1 of Questionnaire 7 – Customers ESP/ ILI).

9 Minutes of a call with a customer on 16 March 2017; Replies to question 3 of Questionnaire 7 – Customers ESP/ ILI; Replies to question 6 of Questionnaire 2 – Competitors ESP.

10 Form CO, paragraph 310.

11 Replies to question 2.1 of Questionnaire 7 – Customers ESP/ ILI.

12 Replies to questions 6 and 7.1 of Questionnaire 2 – Competitors ESP.

13 Minutes of a call with a customer on 16 March 2017.

14 Form CO, paragraph 314; replies to question 7 of Questionnaire 2 – Competitors ESP.

15 Replies to question 7.1 of Questionnaire 2 – Competitors ESP.

16 GE does not provide plunger lifts or hydraulic lifts and BHI does not supply rod lifts, plunger lifts or hydraulic lifts anywhere in the world.

requires different expertise and production facilities.[17] The market investigation has confirmed the Notifying Party's view that horizontal pumping systems should be considered as part of the ESP market. An horizontal pumping system is an ESP mounted on a skid that is not installed downhole in a well to lift oil but on the surface to transfer any type of fluids or inject them below the surface. The market investigation indicated that all ESP manufacturers can provide horizontal pumping because the equipment and the knowhow are fairly similar from an engineering perspective.[18]

(18) In view of the above and in light of the results of the market investigation, the Commission considers that ESPs, including horizontal pumping systems, form a separate product market from other types of artificial lift systems.

4.1.1.2. Onshore and offshore ESPs

(19) The market investigation has revealed that from a technical point of view, the pumps used in ESPs placed offshore follow the same technical principles as those used for onshore.[19]

(20) However, the ESP systems need to be adapted/modified to cope with the specific conditions present in wells located offshore.[20] When deployed offshore, ESPs typically feature higher horsepower to provide increased flow rates in order to work efficiently in deeper wells found offshore. Also, offshore ESP systems need to be more resistant to cope with harsher environmental conditions for a long period of time.[21] Offshore equipment imposes higher safety checks and testing requirements by customers.[22] The higher requirements of offshore ESPs lead to higher costs, not only related to the price of the ESP system but also for installation and maintenance. Installation costs for ESPs onshore are typically around USD 180,000, while offshore they range between USD 500,000 to USD 1 million.[23] The costs of maintenance and repair are also higher offshore than onshore because of the large costs associated with intervening offshore due to higher flow rate, ESP systems requiring additional inspections and enhanced processes as well as the possible need of a rig. Moreover the increased costs of non-productive time[24] of offshore wells are also significantly higher given offshore wells have typically higher oil production.[25] As explained by a competitor when referring to offshore ESP systems: "*This level of sophistication and cost may be considered overkill for the typical onshore well, while for an offshore well, where the consequences of failure are much more serious,*

17 Replies to questions 4 and 5.1 of Questionnaire 2 – Competitors ESP.
18 Replies to questions 5.2 and 5.2.1 of Questionnaire 2 – Competitors ESP; minutes of a call with a competitor on 3 April 2017.
19 Replies to question 6 of Questionnaire 7 – Customers ESP/ ILI.
20 Replies to questions 4 and 6 of Questionnaire 7 – Customers ESP/ ILI.
21 Replies to question 4 of Questionnaire 7 – Customers ESP/ ILI.
22 Replies to question 11 of Questionnaire 2 – Competitors ESP.
23 Form CO, paragraph 314.
24 Non-productive time (NPT) is time that is spent by an operator without producing. It corresponds to foregone revenue during repair or maintenance operations that entail to stop the production of a well.
25 Replies to question 12 of Questionnaire 2 – Competitors ESP; minutes of a call with a customer on 24 January 2017.

customers are likely to demand such higher standards and will be willing to pay accordingly."[26]

(21) In the EEA, only two providers are active offshore, namely BHI and Schlumberger (SLB). On the contrary, a number of additional suppliers are active onshore, including GE, Canadian Advanced (CAI) and Novomet. While GE has some offshore ESP installations outside the EEA, these installations are located in shallow water where onshore equipment can be used (as they do not require motors as powerful as the ones required to operate in the North Sea). In view of the above and in light of the results of the market investigation, the Commission considers that a segmentation of the ESP market between onshore or offshore is appropriate for the purposes of this decision.

4.1.2. Geographic market definition

(22) The Notifying Party submits that the geographic scope of the market for ESPs is at least EEA-wide, or worldwide in scope, owing to the fact that transport costs are low and prices do not vary depending on geographic location. Differences in regulations also do not play a role in segmenting the market and quality requirements are generally tailored to the well characteristics regardless of geographic location. Finally, the Notifying Party argues that local service teams are not required.[27]

(23) The Commission considers that the geographic scope cannot be considered wider than the EEA in view notably of the need for the suppliers to be able to send a service team on site in a short timeframe. Suppliers who do not operate a local base may cause customers to incur higher costs, mainly because longer lead times would prolong the non-productive time (NPT) of the well.[28] Customers will typically require suppliers to be able to service their ESPs within 24 to 48h in case of failure, and therefore suppliers that are located outside the EEA are typically not considered as viable alternatives.[29] ESP suppliers indicated that it is not necessary to have a base in the country where ESPs are provided but at least within the same region.[30]

(24) The arguments above are valid for both onshore and offshore, with the possible exception of Norway. Norway applies specific standards issued by DNV Norsok that results in higher costs as compared with equipment used in the UK sector of the North Sea. However, given that GE is not active anywhere offshore in the EEA the exact geographic market definition for the EEA offshore market can be left open.

(25) In view of the above and in light of the results of the market investigation, the Commission considers for the purposes of this decision that the geographic scope of the potential onshore market for ESPs is the EEA. For the potential market for offshore ESPs, the market could be narrower than the EEA, potentially segmented into the UK and Norwegian sectors of the North Sea. However, the exact

26 Replies to question 11 of Questionnaire 2 – Competitors ESP.
27 Form CO, paragraphs 361 to 376.
28 Minutes of a call with a customer on 13 January and on 16 March 2017.
29 Minutes of a call with a customer on 12 and 24 January 2017; replies to question 7.1 of Questionnaire 7 – Customers ESP/ ILI.
30 Replies to questions 17.1 and 18 of Questionnaire 2 – Competitors ESP.

geographic market definition for offshore ESPs can be left open given the proposed Transaction does not give rise to competition concerns under any plausible geographic market definition.

4.2. Inline inspection services

4.2.1. Product market definition

(26) Inline inspection services are a type of pipeline services which seek to identify threats bearing on oil or gas pipelines such as third party pipeline damage, metal loss from internal and external pipeline corrosion, cracks, manufacturing defects and pipeline mechanical damage.

(27) Pipeline inspections are mostly performed by robotic inspection vehicles ("pigs") which, while travelling through the pipeline, will collect data then used to identify the various threats. Around 70% of the pipelines can be inspected with a pig ("piggable pipelines"). Unpiggable pipelines can be assessed through a number of other ways.

(28) The Commission has not previously assessed the market for ILI services. The Notifying Party submits that ILI services should be considered as a single product market without any further segmentation. A narrower product market definition, distinguishing between either different services or between onshore and offshore applications is not warranted. The Notifying Party argues that the suppliers of ILI services are the same across the different segments of the market even though experience might have a larger impact for offshore applications. [31]

4.2.1.1. Different types of ILI services

(29) ILI services mainly comprise the four following types of services:

- *Metal loss services:* detection of corrosion in liquid and gas lines;
- *Crack detection services*: detection of cracks and axial flaws in liquid and gas lines;
- *Geometry and mapping services*: measurement of the consistency of the geometry of the pipeline;
- *Integrity services*: additional and more in-depth analysis of the data obtained from the inspection services, providing information *i.a.* on the corrosion growth rate or the strain of the equipment concerned.

(30) Both BHI and GE provide all these services in the EEA and worldwide.

(31) The market investigation confirmed that the various ILI services can be considered to be part of a single product market as most of the suppliers offer the full range of services (though some smaller providers may focus on specific services).[32]

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31 Form CO, paragraphs 682 *et seq*.

32 Replies to question 5 of Questionnaire 1 – Competitors ILI.

(32) In view of the above and the evidence available from the market investigation, the Commission takes the view that a further segmentation of the ILI services market by type of services provided may not be appropriate. In any event, the precise market definition can be left open as the proposed Transaction would not give rise to competition concerns under any plausible product market definition.

4.2.1.2. Offshore and onshore ILI services

(33) The market investigation yielded mixed results regarding the difference between tools and services for onshore and offshore applications. While some respondents stated that they do not consider the differences between offshore and onshore services to be significant[33], as in both settings the tools are placed within a pipeline[34], others underscored that for certain offshore applications, specific services and tools were required due to more difficult operating conditions, thicker pipeline walls and flow conditions.[35] Further, more stringent certifications are required by some customers for tools used in offshore settings.[36]

(34) The Commission considers that the precise market definition can be left open as the proposed Transaction does not give rise to competition concerns under any plausible product market definition.

4.2.1.3. MFL vs UT technology

(35) Two different technologies can be used for ILI services, UT and MFL. UT uses acoustic tools to measure directly the diameter of the pipeline[37] and MFL tools measure disturbances in an electro-magnetic field.[38] Even though both technologies serve the same purpose of identifying threats bearing on the pipeline, each technology has its own advantages and limitations, and there are also some defects that only either of the two can detect (although both technologies can be used to identify most of defects).[39]

(36) Broadly speaking, UT performs better in term of accuracy and precision.[40] It also performs particularly well with smaller diameters and shorter pipelines.[41] MFL is more suited for longer lines and larger diameter. [42] UT can only be used with a liquid medium while MFL can be used both in gas and liquid pipelines.[43] The majority of customers indicated that they typically procure the two technologies[44] through separate tender procedures [45] and for different types of applications.[46][47] In

33 Minutes of a call with a customer on 13 January 2017.
34 Minutes of a call with a customer on 13 January 2017.
35 Replies to question 14.1 of Questionnaire 1 – Competitors ILI.
36 Minutes of a call with a competitor on 31 March 2017, and on 22 March 2017.
37 Minutes of a call with a competitor on 22 March 2017.
38 Minutes of a call with a competitor on 22 March 2017.
39 Replies to question 10 of Questionnaire 1 – Competitors ILI.
40 Form CO, paragraph 636.
41 Minutes of a call with a competitor on 22 March 2017.
42 Minutes of a call with a competitor on 17 March 2017.
43 Minutes of a call with a competitor on 31 March 2017, on 29 March 2017.
44 Replies to question 60 of Questionnaire 7 – Customers ESP/ILI.
45 Minutes of a call with a competitor on 29 March 2017; replies to question 62 of Questionnaire 7 – Customers ESP/ILI.
46 Replies to question 61.1 of Questionnaire 7 – Customers ESP/ILI.
47 Their choice is based on the specific requirements of the tendered project such as the type of defect to be inspected, the configuration of the pipeline, wall thickness or the accuracy required (Minutes of a call with a competitor on 22 March 2017).

the tender specifications customers typically indicate the technology (either UT or MFL) that they require. Both technologies will generally not compete in the same tender in view of their specificities. Therefore, demand side substitutability between the two technologies appears to be limited.

(37) Supply-side substitutability however is possible. The market investigation has confirmed that the main actors are able to offer both technologies, both at EEA and worldwide level.[48] Although some small suppliers specialise and offer only one of them, according to providers which responded to the market investigation, the decision not to offer the two technologies is rather a strategic direction[49] than due to technological limitations.[50] It is feasible for an established player providing one of the two technologies to start providing the other.[51]

(38) In light of the above, and the evidence available from the market investigation, the Commission takes the view that a segmentation of the ILI services market by technology could be plausible. However, the Parties' position in the ILI market does not significantly vary whether it is segmented per technology. In any event, the precise market definition can be left open as the proposed Transaction would not give rise to competition concerns under any plausible product market definition.

4.2.2. Geographic market definition

(39) The Notifying Party submits that the relevant geographic market is at least EEA-wide and possibly global in scope. It argues that the competitive conditions and the main competitors are broadly the same worldwide. Further, local presence is a benefit but is not critical as staff and equipment are readily available across regions. Finally, the Notifying Party indicates that there are no regulatory or other restrictions constraining the provision of services across the world or in the EEA.[52]

(40) The market investigation suggests that the market for ILI services is at least EEA-wide and possibly worldwide in scope. The vast majority of respondents stated that suppliers operate at worldwide level[53] and customers do not restrict tenders to those bidders with a base in the region where the project is located.[54] The majority of respondents also confirmed that even if local presence may represent a competitive advantage, it is not essential to compete on the ILI services market.[55] This is because staff and equipment can be moved from one region to another without significant difficulties/costs.[56] Personnel are only required to be on site when the tools are being deployed in the pipeline. Once the tools are in

48 Minutes of a call with a competitor on 31 March 2017; replies to questions 7 and 9 of Questionnaire 1 – Competitors ILI.
49 Replies to questions 8 and 9 of Questionnaire 1 – Competitors ILI.
50 Minutes of a call with a competitor on 31 March 2017 and on 17 March 2017.
51 Minutes of a call with a competitor on 22 March 2017.
52 Form CO, paragraph 687.
53 Minutes of a call with a competitor on 22 March 2017, on 29 March 2017, on 17 March 2017, and on 31 March 2017..
54 Minutes of a call with a customer on 13 January 2017 and on 12 January 2017.
55 Minutes of a call with a competitor on 22 March 2017, on 29 March 2017 and on 31 March 2017; minutes of a call with a customer on 13 January 2017 and on 12 January 2017.
56 Minutes of a call with a competitor on 31 March 2017; minutes of a call with a customer on 13 January 2017.

place, the data analysis can be carried out remotely.[57] ILI suppliers generally operate from one single base that serves at least an entire region, if not the world.[58]

(41) In view of the above and in light of the results of the market investigation, the Commission considers that in the present case, it can be left open whether the geographic market are to be defined worldwide or EEA-wide as the proposed Transaction does not raise competition concerns under any plausible geographic market definition.

4.3. Downstream chemicals

(42) The Parties horizontally overlap in the production and sale of downstream chemicals, i.e. chemicals used by a variety of industries in their production processes. The Parties' activities mainly overlap in the supply of chemicals to refineries and to the petrochemical industry. Contrary to GE, BHI is not active in the supply of equipment for water treatment; hence this area will not be discussed in this decision.

4.3.1. Product market definition

(43) The market for downstream chemicals can be segmented in different ways. First, the market for downstream chemicals can be segmented by product categories, namely water treatment chemicals, process treatment chemicals and fuel additives. Each of the segments could be further segmented by product type, sector or end-use.

4.3.1.1. Segmentation by product category

(44) While there are no precedents discussing this segmentation, in past cases[59] the Commission considered water treatment chemicals to be part of a separate market.

(45) The Notifying Party considers that water treatment chemicals, process treatment chemicals and fuel additives should be regarded as constituting separate product markets. [60] The market investigation supported the Notifying Party's view

(46) From the demand-side, all the customers responding to the market investigation indicated that the different product categories cannot be used interchangeably. For example, one customer said that "*the products are very application specific*" and another customer explained that "*the goals and the technological circumstances are different for water treatment, process treatment and fuel additives*".[61] A customer indicated that although some chemicals in different product categories ultimately perform the same task (for example, corrosion inhibition), "*these products are not interchangeable as they have very different properties*".[62]

57 Minutes of a call with a competitor on 17 March 2015, and on 31 March 2017.
58 Minutes of a call with a competitor on 22 March 2017, on 17 March 2017 and on 31 March 2017.
59 Case COMP/M.6388 - *Ecolab/ Nalco Holding Company*; Case COMP/M.5327 – *Ashland / Hercules.*
60 Form CO, paragraphs 103 et seq.
61 Replies to question 5.1 of Questionnaire 6 – Customers downstream chemicals.
62 *Ibid.*

(47) As regards the supply-side, competitors indicated that there is limited substitutability as the chemicals in different product categories are manufactured with different input components which cannot be easily interchanged in the same production line.[63]

(48) In light of the above and the results of the market investigation, the Commission considers that each of downstream water treatment chemicals, downstream process treatment chemicals and fuel additives are likely to form separate product markets. However, the precise market definition can be left open as the proposed Transaction would not give rise to competition concerns under any plausible product market definition.

(49) The proposed Transaction does not lead to affected markets as regards fuel additives, therefore they will not be discussed further in this decision.[64]

4.3.1.2. Segmentation by industry

(50) Chemical compounds are used by a number of different industries in their production processes.

(51) Many manufacturing processes require water of a certain quality to ensure proper equipment functioning and to prevent damage to finished products. Water treatment chemicals have long been used – to varying degrees – in manufacturing applications across the world. The standard practice is to distinguish among the following sectors: petroleum refining; chemical processing, including petrochemical; pulp and paper; textile; and other (such as the food and beverage industry).

(52) Similarly, process treatment chemicals are employed in a number of sectors, albeit predominantly in the hydrocarbon processing industry (HPI) and the chemical processing (CPI) industry. The main sectors in which downstream process chemicals are used are: HPI; CPI, including petrochemical; food and beverage industry; power generation; and, the pulp and paper industry. The Parties' activities overlap in the supply of downstream chemicals to the HPI and CPI industries. The outcome of the market investigation suggests that a segmentation by industry may be appropriate for the following reasons.

(53) First, suppliers indicated that chemicals used in different industries are specific to the industrial sector for which they are manufactured and that depending on the industry there are differences in the characteristics of the chemical product, such as "*viscosity, concentration / dosage rate, ph level... etc.*"[65] A competitor said that "*there are certain differences in the demand of different industries which might need a special adjustment of the product formulation or a special selection of the raw materials used for the product*".[66] Second, the majority of the suppliers responding to the market investigation indicated that they are not capable of serving all the industries requiring water treatment chemicals.[67] Manufacturers of

63 Replies to question 6 of Questionnaire 4 – Competitors dpwnstream chemicals.
64 The Parties' activities overlap in the supply to fuel additives in the HPI industry where BHI and GE have a share of, respectively, [5-10]% and [0-5]%.
65 Replies to questions 9.1 and 12.1 of Questionnaire 4 – Competitors downstream chemicals.
66 *Ibid.*
67 Replies to question 10 of Questionnaire 4 – Competitors downstream chemicals.

process treatment chemicals are typically less specialised in some sectors compared to suppliers of water treatment chemicals but nonetheless they rarely serve all industries.

(54) In light of the above and the results of the market investigation, the Commission considers it plausible that each industry within the relevant product categories (water treatment and process treatment chemicals) forms a separate relevant market. In any event, the precise market definition can be left open as the proposed Transaction would not give rise to competition concerns under any plausible product market definition.

4.3.1.3. Segmentation by end-use application

(55) Downstream chemicals have several end-use applications. The primary chemicals used in downstream services include antifoulants, corrosion inhibitors, emulsion breakers, fuel additives, and anti-foaming agents.

(56) The Notifying Party claims that a segmentation by end-use application is not appropriate because of the high degree of supply-side substitutability. [68]

(57) According to the Notifying Party, chemicals are produced in batches and the same equipment can be used to produce different chemical compositions. All production lines are configured to allow the manufacturing of multiple products. Thus, although the production of these chemicals requires different raw materials, the same production lines are used and the main adjustments that need to be made are: (a) clean the production line; (b) change raw materials; (c) change the set-up of the production line. All these steps can be done in less than one day and entail limited costs.

(58) The market investigation supported the Notifying Party's view. Suppliers indicated that in general they are able to supply the full range of downstream chemicals in any product category in which they are active.[69]

(59) The majority of the suppliers also confirmed that the same equipment can be employed to manufacture different types of downstream chemicals. For example, a supplier noted that "*the same production line can be technically used to produce all type of downstream chemicals although cleaning of the equipment would be necessary to avoid contamination*".[70] The outcome of the market investigation suggests that shifting production between different types of chemicals typically takes only a few hours.

(60) In light of the above and the results of the market investigation, the Commission considers that a further segmentation by product or end use is unlikely to be appropriate.

4.3.2. Geographic market definition

(61) The Notifying Party submits that, irrespective of the precise product market definition adopted, the geographic scope of the markets for the supply of

68 Form CO, paragraph 121.
69 Replies to question 7 of Questionnaire 4 – Competitors downstream chemicals.
70 Minutes of a call with a competitor.

downstream chemicals is at least EEA-wide. This is because: (i) suppliers and customers tend to be active in multiple countries; (ii) transport costs are low (below 5%); (iii) there are no trade and regulatory barriers in the EEA; (iv) there is substantial cross-border trade in the EEA; and, (v) the entire EEA region can be served by a few manufacturing facilities, without the need of a local presence. [71]

(62) The outcome of the market investigation supports the Notifying Party's view that the geographic market is at least EEA-wide in scope.

(63) First, customers and suppliers consistently indicated that downstream chemicals, irrespective of the product category, can be shipped from afar, and even further than the EEA.[72] Some suppliers noted that downstream chemicals can be imported to the EEA from other regions, but this may have a negative impact on the overall price of the chemical.[73]

(64) Second, while customers typically require suppliers to provide additional services at their premises,[74] customers and suppliers responding to the market investigation share the view that a pre-existing local presence in the vicinity of the customers' premises is not necessary to win business. For example, a customer noted that it "*invites to tender not only suppliers who already have a local office (or a subsidiary) in the region where the site is located, but also those who do not currently have a presence near the site as long as the suppliers commit to establishing a local presence once the contract is awarded*". [75]

(65) Third, the market investigation confirmed that regulations and industry requirements are harmonised across the EEA.[76]

(66) Fourth, all the suppliers responding to the market investigation indicated that they can serve the entire EEA territory and they can either relocate employees in the proximity of the customer's locations or hire new local staff to provide support/service to the customers.[77]

(67) In light of all the above and the results of the market investigation, and for the purpose of this decision, the Commission considers that the geographic market for downstream chemicals, irrespective of how the product market is defined, is EEA-wide in scope.

4.4. Upstream chemicals

(68) The Parties' activities also overlap in the provision of upstream chemicals. Upstream chemicals include a broad range of chemistries to address flow

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71 Form CO, paragraphs 139 and 146.

72 Replies to question 11 of Questionnaire 6 – Customers downstream chemicals, and Replies to question 18 of Questionnaire 4 – Competitors downstream chemicals.

73 Replies to question 18.1 of Questionnaire 4 – Competitors downstream chemicals.

74 These services generally consist of regular checks to the dosage and effectiveness of the chemicals and solving any technical problem that may arise while using chemicals.

75 Along a similar line, another customer said that: *"A commitment to install a local base would be sufficient […] to engage in commercial relations with a supplier, especially if they already cooperate on another site"*. (minutes of the call with a customer, 23 January 2017).

76 Replies to questions 10 and 11 of Questionnaire 6 – Customers downstream chemicals,

77 Replies to question 19 of Questionnaire 4 – Competitors downstream chemicals.

assurance, asset integrity, and product optimisation challenges in both onshore and offshore oil fields and related applications.[78]

(69) The market for upstream chemicals could be segmented along similar lines as for downstream chemicals, namely by product categories, industry and application. However, the product as well as the geographic market definition can be left open as the proposed Transaction does not raise any competitive concern even under the narrowest plausible market definition.

4.5. Directional drilling services

4.5.1. Product market definition

(70) Directional drilling (DD) is a form of drilling which enables the drill string to change direction in order to reach a target which is not directly beneath the surface location of the rig. Such wells are called horizontal or deviated wells. The objective of directional drilling is to hit multiple reservoirs from a single rig site and/or to maximise the point of contact within a single reservoir.

(71) DD is always sold with Measurement-While-Drilling (MWD) services, which consists of sensors that measure azimuth and inclination of the drill string thus informing the directional driller about the location and direction of the drill string in real time.

(72) Most of the time, DD/MWD services are provided together with Logging-While-Drilling (LWD) services, which consist of sensors that measure and collect data on the characteristics of the formation surrounding the bore head thus informing the directional driller about the characteristics of the formation through which he is drilling and the nature of the fluids which it contains.

(73) The Notifying Party submits that a distinction can be made between DD/MWD, on the one hand, and LWD services, on the other hand, because DD services will always be provided with MWD services, whereas LWD services are optional.[79]

(74) However, in a previous decision, the Commission considered DD, MWD and LWD to be part of the same market for directional drilling, because they were part of an integrated system that is often priced and sold together.[80]

(75) The Commission notes that the markets for DD, MWD and LWD services may further be segmented into onshore and offshore services. O&G companies' requirements with regard to the track record and the portfolio of OFS providers are usually higher for offshore wells than for onshore wells. This is so, because the costs of operating an offshore rig are usually much higher than for an onshore rig. This is also in line with the fact that the markets for offshore services are more concentrated than the markets for onshore services.

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78 They are used primarily (i) to protect and extend the life of oilfield production equipment, production tubing (downhole), and pipelines; (ii) to support the production process; and (iii) to treat and separate hydrocarbons from water that is produced by oil and gas wells".

79 Form CO, paragraph 1155.

80 Case COMP/M.5839 – *Schlumberger/Smith International*, paragraphs 10 *et seq*.

(76) However, for the purpose of this decision, the Commission considers that the exact scope of the product market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition. The notion of 'DD' will subsequently be used to describe the entire scope of DD/MWD/LWD services.

4.5.2. Geographic market definition

(77) In a previous decision the Commission considered that the market for DD services is at least regional in scope, but left the decision open.[81] There are indications that the geographic scope of the market for DD services may be EEA-wide or even smaller. In that regard, the Commission notes that the identity of the relevant service providers and their respective market shares are different when looking at the EEA and the worldwide figures and may vary according to different regions within the EEA.

(78) However, for the purpose of this decision, the Commission considers that the exact scope of the geographic market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.6. Wireline Logging Services

(79) Wireline logging services describe a range of services which are performed by lowering tools, which are fixed on the end of an electric cable (i.e. the "wireline"), into the borehole. Wireline logging services are generally segmented into open-hole-wireline logging (OHWL) services and cased-hole-wireline-logging (CHWL) services.

(80) The Notifying Party submits that some critical measurements can only be obtained by wireline logging and notes that wireline logging services are usually tendered separately from other oil field services.[82] The Notifying Party further submits that a distinction can be made between OHWL and CHWL services. According to the Notifying Party, both services are performed at different stages of the well development. Moreover, OHWL services tend to be more demanding, because they are carried out during the drilling phase in the uncased well, whereas CHWL services are performed after the well has been cased. The Notifying Party also submits that both types of services are often tendered separately.[83]

4.6.1. Product market definition

4.6.1.1. Distinction between OHWL and CHWL services

(81) The Commission has not previously assessed the markets for wireline services. However, on the basis of the outcome of the market investigation the Commission considers that OHWL services constitute a distinct product market different from CHWL services.

81 Case COMP/M.5839 - *Schlumberger/Smith*, paragraph 32.
82 Form CO, paragraph 806.
83 Form CO, paragraph 807.

(82) OHWL services are primarily reservoir evaluation services, which are performed during the drilling phase in the uncased (i.e. open) borehole. By contrast, CHWL services are performed after the borehole has been cased.

(83) The main purpose for OHWL services is the characterisation and evaluation of the reservoir in order to determine whether to complete the well for production.[84] By contrast, CHWL services are usually performed for a variety of other reasons, only after the initial decision to complete the well for production has been taken.[85] CHWL services are generally considered to be less sophisticated and more commoditised than OHWL services.[86]

(84) A distinction between OHWL and CHWL services is in line with the fact that the competitive landscape differs significantly between the two services. While a few large OFS providers, such as BHI, provide both OHWL and CHWL services, their respective market shares differ significantly between the two types of services. In addition, the market for OHWL services is much more concentrated, because it has higher barriers to entry, whereas the markets for CHWL services are usually characterised by the additional presence of a number of smaller providers some of which have entered this market in the EEA and worldwide in the last five years.[87]

4.6.1.2. Onshore vs offshore

(85) The Commission further notes that the markets for OHWL and CHWL may further be segmented into onshore and offshore services. O&G companies' requirements with regard to the track record and the portfolio of OFS providers are usually higher for offshore wells than for onshore wells. This is so, because the costs of operating an offshore rig are usually much higher than for an onshore rig. This is in line with the fact that the markets for offshore services are more concentrated than the markets for onshore services.

4.6.1.3. Conclusion

(86) However, for the purpose of this decision, the Commission considers that the exact scope of the product market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.6.2. Geographic market definition

(87) There are indications that the geographic scope of the markets for OHWL and CHWL may be EEA-wide in scope, and possibly even smaller. In that regard, the Commission notes that the identity of the relevant service providers and their

84 Form CO, paragraph 790.

85 CHWL services cover a variety of activities, including additional reservoir evaluation services, which may verify the best spot for the perforation of the casing, perforation services, which start the production, production logging services, which analyse the flow and the nature of fluids in the cased borehole in order to optimise the productivity of the well, or well integrity services, which analyse the state of the casing of the well and the completion equipment in order to detects faults or defects (Form CO, paragraph 792).

86 Form CO, paragraph 812.

87 Form CO, paragraphs 839 – 843.

respective market shares are different when looking at the EEA and the worldwide figures.

(88) However, for the purpose of this decision, the Commission considers that the exact scope of the geographic market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.7. OFS Sensors

(89) GE manufactures sensors, which are then purchased by the large integrated OFS providers, such as BHI, or by independent tool manufacturers for their respective drilling tools. The customers integrate these sensors in their tools in order to take a variety of measurements downhole.

(90) The Notifying Party submits that a distinction can be made between gamma sensors, neutron sensors and directional sensors, because they have different product characteristics and perform different types of measurements.[88]

4.7.1. Product market definitions

4.7.1.1. OFS Gamma sensors

(91) Gamma sensors are radiation detection devices, which use a crystal to measure mainly the types of rocks and fluids in the borehole, in order to collect data about the presence of hydrocarbons. There are various types of gamma sensors such as gross-counting gamma sensors, which measure primarily the rock type and density gamma sensors which measure primarily fluid types. Customers may use various gamma sensors on the same tool in order to take multiple measurements.

(92) The market investigation suggests that the manufacturing of gamma sensors is essentially an assembly business. Gamma sensors consist of a crystal, a photomultiplier, electronics and a power unit.[89] The crystal converts the gamma ray radiation into a light pulse. Gamma sensors usually run sodium iodide (NaI) crystals. The photomultiplier converts the light pulse into an electric signal. The electronics process the data and the power unit provides the required amount of high voltage.[90]

(93) Some suppliers manufacture one or more of these components in-house. However, all of these components can also be purchased on the open market. For example, crystals can be bought from a variety of crystal growers,[91] such as Saint Gobain (USA) or Alpha Spectra (USA).[92] Photomultipliers can be bought from companies like Hamamatsu (Japan) or ElectronTubes (UK). Electronics can be bought from companies such as AHV (USA) or Antares (UK).[93] In addition, data

88 Form CO, paragraph 1109.

89 Form CO, paragraph 1067.

90 Form CO, paragraph 1067.

91 Minutes of a call with a competitor on 11 April 2017.

92 Replies to question 4 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

93 Minutes of a call with a competitor on 11 April 2017.

acquisition software can be bought from companies like Scientific Data Systems (USA).

(94) The added value provided by OFS gamma sensor manufacturers therefore lies in the packaging.[94] OFS sensors must often withstand high temperatures as well as shock and vibrations. Specialised manufacturers such as GE and its competitors have the relevant know-how to protect the sensor from these strains while maintaining the functionality of the sensor.

(95) The market investigation confirmed that OFS customers cannot replace gamma sensors with neutron sensors or vice versa, because both types of sensors perform different measurements.[95]

(96) The market investigation further suggests that a distinction can be made between gamma sensors for DD applications, sensors for OHWL applications and sensors for CHWL applications. This is in line with the fact that each of these applications presents a distinct set of challenges for the respective sensors. The market investigation further suggests that a distinction can be made between gamma sensors for directional drilling applications, sensors for open hole wireline logging (OHWL) applications and sensors for cased-hole-wireline-logging (CHWL) applications. This is in line with the fact that each of these applications presents a distinct set of challenges for the respective sensors.

(a) Gamma sensors for DD applications need to be small (i.e. small enough to fit into a pocket on a drill string), vibration resistant (i.e. rugged enough to resist the vibrations from the drilling process) and heat resistant (i.e. resistant enough to withstand the heat from the fluids present downhole).[96]

(b) Gamma sensors for OHWL applications also need to be heat resistant, but they are not exposed to the vibrations of the drilling process, because the OHWL sensors are lowered into the borehole while the drilling process is interrupted. One market player considered OHWL gamma sensors to be the least demanding of the three applications, partly because they can use larger sensors than CHWL applications.[97] However, larger crystals may impose their own challenges as regards the 'packaging' of said crystal.[98]

(c) Gamma sensors for CHWL applications also need to be heat resistant, but they do not need to be particularly vibration resistant, because they are lowered into the borehole only after the drilling has stopped. In addition, they operated in the cased borehole, so that they are shielded from the formation by the cement casing. However, CHWL applications are often smaller than OHWL tools in order to fit into the cased borehole, which puts additional constraints on the size of the gamma sensor.

(97) While the Notifying Party submits that the design of the relevant sensors is essentially the same across these applications, it acknowledges that the size and

94 Minutes of a call with competitors on 11 April 2017, and on 16 February 2016.

95 Replies to question 5 of Questionnaire 5 - Customers Gamma and Neutron Sensors.

96 Minutes of a call with a competitor on 16 February 2017.

97 Minutes of a call with a competitor on 16 February 2017.

98 Minutes of video conference with GE on 10 March 2017.

packaging of the sensors varies between the drilling applications and wireline applications, mostly because OFS gamma sensors for drilling applications need to be smaller, in order to fit into the drill string, as well as more rugged, because they operate close to the drill bit and are thus subject to higher levels of vibration and longer exposure to higher temperatures.[99]

(98) The market investigation indicated that there is only limited demand-side substitution between OFS gamma sensors for different applications.[100] While sensors intended for DD applications may in some cases be used for OHWL and CHWL applications, sensors for wireline applications may not be used in DD applications, presumably, because their specifications do not qualify them to withstand the vibration of the drill string (see recital (96)).

(99) The Notifying Party argues that in any case there is significant supply side substitution between sensors for the OFS industry, because the main sensor suppliers can easily customise and move into a different sensor type within a reasonable period of time and without high expenses.[101]

(100) The market investigation suggests that suppliers of OFS gamma sensors for one application may be able to start supplying OFS gamma sensors for another application in a relatively short timeframe (within 9 to 24 months) depending on the application and at costs of less than EUR 1 million. However, since this may not be sufficiently swift to assume that OFS gamma sensors for the different application belong to the same product market, these aspects will be assessed further in the context of potential entry (see recitals (225) to (232)).

(101) While the downstream markets for DD services, OHWL services and CHWL services may further be segmented in onshore and offshore services, the market investigation indicates that no such distinction can be made with regard to sensors.

(102) For the purpose of this decision, the Commission considers that it can be left open whether the market for gamma sensors should be considered as whole or sub-segmented between DD, OHWL and CHWL applications since the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.7.1.2. OFS neutron sensors

(103) Neutron sensors are radiation detection devices, which measure the porosity of the rock formation, in order to collect data about the prospects of extracting the hydrocarbons captured in the formation. Neutron sensors usually operate with He-3 gas or Li-6 glas. While there may be various gamma sensors on the same tool taking different measurements, there is usually only one neutron sensor on each tool in order to measure porosity.

(104) Neutron sensors are most commonly used in DD or OHWL applications where porosity measurements are important for the drilling process. By contrast, neutron

99 Form CO, paragraphs 1126 to 1129.

100 Replies to question 6 of Questionnaire 5 - Customers Gamma and Neutron Sensors.

101 Form CO, paragraphs 1118 and 1146.

sensors are only rarely used in CHWL applications, because the OFS provider will usually have already gathered porosity measurements before the casing of the well and because it is difficult to make these measurements through the cement layer of the cased well.[102]

(105) As for gamma sensors, the manufacturing of neutron sensors is essentially an assembly business. Neutron sensors work with two types of technologies, either a Helium-3 filed sealed tube or a Lithium-6 ("Li-6") doped glass scintillator. GE offers both types of neutron sensors. In an Li-6 neutron sensor, neutrons interact with Li-6 doped glass to produce a light pulse. A photomultiplier converts the light pulse into an electric signal. In a He-3 neutron sensor, neutrons interact with the He-3 gas and ionised particles are then captures as pulses on an anode wire that runs through the centre of the tube.[103]

(106) While some suppliers develop one or more of these components in-house, they can also be purchased on the open market. For instance, Detector Products, a specialised manufacturer of neutron sensors, submitted that they purchase most of the individual components from specialised vendors and then assemble them in-house.[104]

(107) As mentioned above (see paragraph (96)), the market investigation confirmed that OFS customers cannot replace neutron sensors with gamma sensors because both types of sensors perform different measurements.[105]

(a) Similarly to gamma sensors, the market investigation suggests that a distinction can be made between neutron sensors for DD applications, for OHWL applications and for CHWL applications as each of these applications presents a distinct set of challenges for the respective sensors. Neutron sensors for DD applications need to be small (i.e. small enough to fit into a pocket on a drill string), vibration resistant (i.e. rugged enough to resist the vibrations from the drilling process) and heat resistant (i.e. resistant enough withstand the heat from the fluids present downhole).[106] In addition, with regard to He-3 based neutron sensors, DD applications require the manufacturer to fit a relatively large quantity of He-3 gas in a very small tube, imposing challenges with regard to the sealing of said tube.

(b) Neutron sensors for OHWL applications also need to be heat resistant, but they are not exposed to the vibrations of the drilling process, because the OHWL sensors are lowered into the borehole while the drilling process is interrupted. OHWL tools may allow for larger tools, since the uncased hole provides more space than the cased hole. Therefore, neutron sensors on OHWL tools may be larger, which allows for larger He-3 tubes with lower pressure and less strain on the sealing.[107]

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102 Minutes of a call with a competitor on 4 April 2017.

103 Form CO, paragraph 1170.

104 Minutes of a call with a competitor on 4 April 2017.

105 Replies to question 5 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

106 Minutes of a call with a competitor on 16 February 2017.

107 Minutes of a call with a competitor on 16 February 2017.

(c) Neutron sensors for CHWL applications also need to be heat resistant, but they do not need to be particularly vibration resistant, because they are not used during the drilling process. In addition they operate in the cased borehole, so that they are shielded from the formation by the cement casing. However, CHWL applications are often smaller than OHWL tools in order to fit into the cased borehole, which puts additional constraints on the size of the neutron sensor.[108]

(108) As for gamma sensors, the market investigation showed that there is only limited demand-side substitution between OFS neutron sensors for different applications.[109]

(109) The Notifying Party argues that there is significant supply-side substitution between sensors for the OFS industry, because the main sensor suppliers can easily customise and move into a different sensor type within a reasonable period of time and without high expenses.[110]

(110) The market investigation suggests that suppliers of OFS neutron sensors for one application may be able to start supplying OFS neutron sensors for another application in a relatively short timeframe (within 2 to 24 months) depending on the application and at costs of less than EUR 1 million. However, since this may not be sufficiently swift to assume that OFS gamma sensors for the different application belong to the same product market, these aspects will be assessed further in the context of potential entry (see recitals (257) to (266)).

(111) While the downstream markets for DD services, OHWL services and CHWL services may further be segmented in onshore and offshore services, the market investigation indicates that no such distinction can be made with regard to sensors.

(112) For the purpose of this decision, the Commission considers that the it can be left open whether the market for neutron sensors should be considered as whole or sub-segmented between DD, OHWL and CHWL applications since the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.7.1.3. Directional sensors

(113) Directional sensors describe a group of sensors, which help the OFS provider to locate the downhole tools in space by measuring the position of the drill string or the wireline tool relative to the earth's magnetic and gravitational fields. Directional sensors are used in drilling and wireline applications. A typical directional sensor consists of 3 single-axis accelerometers and 2 bi-axial magnetometers mounted in a chassis that ensures alignment and orthogonality.[111] The assembly also includes electronics to drive the sensors and process their output. A further distinction may therefore be made according to the specific measurements that the directional sensor performs.

108 Minutes of a call with a competitor on 16 February 2017.

109 Replies to question 5 of Questionnaire 3 – Competitors Gamma and Neutron Sensors..

110 Form CO, paragraphs 1118 and 1146.

111 Form CO, paragraph1071.

(114) While the downstream markets for DD services, OHWL services and CHWL services may further be segmented in onshore and offshore services, the market investigation indicates that no such distinction can be made with regard to sensors.

(115) However, for the purpose of this decision, the Commission considers that the exact scope of the product market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.7.2. Geographic market definitions

(116) The Notifying Party submits that market for OFS gamma, neutron and directional drilling sensors is global in scope, because sensor providers offer their products globally and ship them to the various locations of their customers where they will be incorporated in the relevant drilling tool.

(117) While the U.S. administration may prohibit the sale of sensors to certain countries on sanction lists, the market investigation has confirmed that both customers[112] and competitors consider the market to be otherwise global in scale without transport costs or other barriers limiting the supply of sensors to certain areas. Indeed, most sensor providers seem to have only one main manufacturing site from where they supply their customers on a global level.[113]

(118) The Commission therefore considers that the markets for the supply of OFS sensors are global in scope.

4.8. Wireline Tools

(119) GE manufactures wireline tools, which are then purchased by the large integrated OFS providers, such as BHI, or by smaller OFS provider for their respective drilling tools. There are two main types of wireline tools, namely OHWL tools and CHWL tools.

(120) The Notifying Party submits that a distinction can be made between OHWL and CHLW tools given that the two types of tools are used at different stages of the well development and are used for different purposes.[114]

4.8.1. Product market definition

(121) OHWL tools are tools which perform reservoir evaluation services in the uncased ("open") well, while CHWL tools perform a variety of services in the cased well. OHWL tools differ from CHWL tools in many ways.

(122) OHWL tools are lowered into the wellbore during or directly after the drilling process, but always before the borehole has been cased. OHWL tools usually

112 Replies to questions 8 to 10 of Questionnaire 3 – Competitors Gamma and Neutron Sensors; Replies to questions 8 to 10 of Questionnaire 5 – Customers Gamma and Neutron Sensors.

113 Form CO, paragraph 1147; replies to questions 36 to 38 of Questionnaire 3 – Competitors Gamma and Neutron Sensors; minutes of a call with a competitor on 16 February 2017; minutes of a call with a competitor on 4 April 2017.

114 Form CO, paragraph 881.

perform reservoir evaluation services. OHWL tools are larger in diameter than CHWL tools and include probes and sensors for measuring rock properties and fluids trapped in the rock formations.[115]

(123) By contrast, CHWL tools are lowered into the wellbore after the well has been cased. They operate in the relatively protected environment of the cased well and perform a variety of different tasks. CHWL are typically more commoditised tools and often available off-the-shelf.[116]

(124) However, for the purpose of this decision, the Commission considers that the exact scope of the product market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.8.2. Geographic market definition

(125) The Notifying Party submits that the markets for OHWL tools and CHWL are worldwide or at least EEA-wide in scope. The Notifying Party submits that tool manufactures sell their tools globally from a limited number of manufacturing locations.[117] While some competitors have regional sales offices, others do not have regional hubs.[118] However, for the purpose of this decision, the Commission considers that the exact scope of the geographic market definition can be left open, as the proposed Transaction does not give rise to serious doubts even under the narrowest possible market definition.

4.9. Permanent downhole gauges

(126) Permanent downhole gauges are sensors used primarily in wells not equipped with artificial lifts or with artificial lift other than ESPs to measure certain data, notably fluid temperature and pressure.

(127) Depending on the transducer technology used to measure physical changes, permanent downhole gauges can be distinguished in: (i) quartz gauges (equipped with quartz transducers) and (ii) strain gauges (equipped with strain transducers).

4.9.1. Product market definition

(128) The Parties submit that permanent downhole gauges are different from ESP sensors notably in light of their different design[119], the type of measurement,[120] and commercial strategy.[121]

115 Form CO, paragraph 881.

116 Form CO, paragraph 881.

117 Form CO, paragraph 886.

118 Form CO, paragraph 887.

119 ESP sensors are connected directly to the ESP motor and are powered by the power cable of the ESP motor, while permanent downhole gauges have their own power supply and signal cable, and operate independently of any artificial lift equipment that may be installed in the wellbore.

120 The data measured by an ESP sensor typically includes data used to optimize production and to extend the life of the ESP while permanent downhole gauges may be installed in naturally flowing wells (with no artificial lift present) or in wells that are equipped with non-ESP artificial lifts, and are used to provide information related to the well and reservoir.

(129) Customers almost unanimously indicated that the type of measurements performed by the two types of products is different and that they "*do not have the same technical capabilities*" While some customers indicated that in certain limited situations there is a degree of interchangeability, this appears to be very limited. On this basis the Commission considers that permanent downhole gauges likely constitute a separate product market from ESP sensors.

(130) The Notifying Party also argues that strain permanent downhole gauges and quartz permanent downhole gauges should be regarded as forming part of separate markets because: (i) they are based on different technology, (ii) the quartz technology allows for more accurate data measurement, faster transmission rates, and higher resolution of the information, and greater long term reliability,[122] and (iii) quartz gauges are typically three to five times more expensive than strain gauges. [123] The Commission takes the view that a segmentation of the market for permanent downhole gauges by technology, i.e. strain and quartz, is likely to be appropriate as the market investigation indicated that:

(a) Customers do not generally consider the two technologies as alternative and would not switch from one to the other in response to a small but significant and non-transitory increase in prices. In the words of a customer: "*These gauges have different levels of accuracy and are used in different applications and as such are not interchangeable*".

(b) Quartz and strain gauges generally serve different applications. Quartz gauges are primarily used in offshore wells and onshore geothermal wells while strain gauges primarily in onshore wells.

(c) Prices of strain gauges are significantly lower than prices for quartz gauges (quartz gauges can be up to ten times more expensive than strain gauges).

4.9.2. Geographic market definition

(131) The Notifying Party submits that the geographic scope of the market for permanent downhole gauges is at least EEA-wide, and possibly worldwide in scope owing to the fact that downhole gauges share the same technical characteristics irrespective of the location and are supplied by the same players worldwide. [124]

(132) The Commission considers that the precise market definition can be left open as the proposed Transaction does not give rise to competition concerns under any plausible geographic market definition.

121 While ESP sensors are mostly sold together with ESP, so that competition typically takes place for ESP and ESP sensors combined, permanent downhole gauges are typically sold without artificial lift and competition is not therefore linked to competition for artificial lift.

122 In addition, Quartz gauges can withstand higher fluid pressure and temperature than strain gauges.

123 Form CO, paragraph 1406.

124 Form CO, paragraph 1409.

4.10. ESP sensors

(133) ESP sensors are specific sensors used to optimize and/or enhance the operation of an ESP. They are installed underneath the downhole ESP motor and powered by the power cable of the motor. ESP sensors aim at optimising reservoir performance and increase the ESP run life by measuring parameters on an ongoing basis. Parameters measured are generally reservoir pressure, fluid temperature, ESP pump intake and discharge pressure, motor temperature, system vibration and current leakage. The vast majority ESPs are offered with the sensor pre-installed, but some customers prefer using ESPs without sensors.

4.10.1. Product market definition

(134) The Notifying Party submits that ESP sensors should be considered as a single product market, distinct from other types of downhole sensors.[125] The market investigation confirmed that the type of measurement performed by ESP sensors differs in scope from the data measured by other downhole sensors. Respondents to the market investigation indicated that downhole sensors are usually limited to gather information related to pressure and temperature while ESP sensors offer a wider range of data.[126]

(135) In view of the above, the Commission considers it likely that ESP sensors constitute a distinct product market.

4.10.2. Geographic market definition

(136) The Notifying Party submits that the geographic scope of the market for ESP sensors is at least EEA-wide, and possibly worldwide in scope owing to the fact that ESP sensors share the same technical characteristics irrespective of the location and are supplied by the same players worldwide.[127]

(137) The Commission considers that the precise market definition can be left open as the Transaction does not give rise to competition concerns under any plausible geographic market definition.

5. COMPETITIVE ASSESSMENT – HORIZONTAL OVERLAPS

(138) Under Article 2 (2) and (3) of the Merger Regulation, the Commission must assess whether a proposed concentration would significantly impede effective competition in the internal market or in a substantial part of it, in particular through the creation or strengthening of a dominant position.

(139) In this respect, a merger may entail horizontal and/or non-horizontal effects.

(140) As regards horizontal effects, the Commission guidelines on the assessment of horizontal mergers under the Merger Regulation (the "Horizontal Merger

125 Replies to question 41 of Questionnaire 7 – Customers ESP/ILI.

126 Replies to question 41 of Questionnaire 7 – Customers ESP/ILI.

127 Form CO, paragraph 478.

Guidelines"[128]) distinguish between two main ways in which mergers between actual or potential competitors on the same relevant market may significantly impede effective competition, namely non-coordinated and coordinated effects. Non-coordinated effects may significantly impede competition by eliminating important competitive constraints on one or more firms, which consequently would have increased market power, without resorting to coordinated behaviour. In that regard, the Horizontal Merger Guidelines consider not only the direct loss of competition between the merging firms, but also the reduction in competitive pressure on non-merging firms in the same market that could be brought about by the merger.

(141) The Horizontal Merger Guidelines list a number of factors which may influence whether or not significant non-coordinated effects are likely to result from a merger, such as the large market shares of the merging firms, the fact that the merging firms are close competitors, the limited possibilities for customers to switch suppliers, or the fact that a merger would eliminate an important competitive force. That list of factors applies equally if a merger would create or strengthen a dominant position, or would otherwise significantly impede effective competition due to non-coordinated effects.

(142) This decision will analyse whether the proposed Transaction is likely to raise doubts as to its compatibility with the internal market by the creation of non-coordinated effects in those markets on which the Parties' activities lead to horizontal overlaps.

5.1. ESPs

5.1.1. Onshore ESPs

The Notifying Party's view

(143) The Notifying Party submits that the proposed Transaction will not raise competition concerns given GE is a rather small supplier both in the EEA and worldwide. Moreover, the Parties will continue to face competition from the market leader, SLB, as well as from other smaller suppliers active in the EEA such as Borets and Novomet. The Notifying Party also explains that entry is not difficult to provide the type of standard ESP systems GE supplies. [129]

128 Guidelines on the assessment of horizontal merers under the Council Regulation on the control of concnetrations between undertakings, OJ C 31, 5.2.2004, p. 5-18.

129 Form CO, paragraphs 378 *et seq*.

The Commission's assessment

(144) The Commission has found that although GE is the third largest supplier of ESPs in the EEA, it does not exert a significant competitive constraint on BHI. The amalgamation of GE's ESP business to that of BHI will not significantly strengthen BHI's position on the relevant market. Moreover, other smaller suppliers in addition to SLB, which is and will remain the market leader, will still be competing with the merged entity post-Transaction. Some concerns were raised by a number of market participants indicating that GE is the only sizable competitor to BHI and SLB in the EEA.[130] Nevertheless, the Commission has found those concerns to be unfounded for the reasons set out below.

(145) Both GE and BHI sell ESPs for onshore applications in the EEA. In 2016, the Parties' combined market share in the EEA post-transaction would have been [30-40]%, with a [5-10]% increment brought by GE. SLB is the market leader with [50-60]%, with Novomet being the fourth supplier ([0-5]%).

Table 1: EEA Onshore ESP market shares 2013-2016

	2016		2015		2014		2013	
	Revenues (USD million)	**Share**	**Revenues (USD million)**	**Share**	**Revenues (USD million)**	**Share**	**Revenues (USD million)**	**Share**
BHI	[…]	[30-40]%	[…]	[50-60]%	[…]	[60-70]%	[…]	[70-80]%
GE	[…]	[5-10]%	[…]	[5-10]%	[…]	[5-10]%	[…]	[10-20]%
Combined	***[…]***	***[30-40]%***	***[…]***	***[50-60]%***	***[…]***	***[60-70]%***	***[…]***	***[80-90]%***
Novomet	[…]	[0-5]%	[…]	[0-5]%	[…]	[0-5]%	[…]	[0-5]%
Schlumberger	[…]	[50-60]%	[…]	[40-50]%	[…]	[20-30]%	[…]	[0-5]%
Canadian Advanced	[…]	[0-5]%	[…]	[0-5]%	[…]	[0-5]%	[…]	[0-5]%
Others	[…]	[0-5]%	[…]	[0-5]%	[…]	[5-10]%	[…]	[10-20]%
Total	**[…]**	**100%**	**[…]**	**100%**	**[…]**	**100%**	**[…]**	**100%**

Source: Form CO

(146) Although GE is third in line after SLB and BHI onshore in the EEA, the competitive constraint placed by GE on SLB and BHI appears to be limited.

(147) First, GE has a limited portfolio of customers, mainly located in [Information on GE's customers]. [Information on GE's customers]. Also, in the last three years GE has bid for business accounting for a relatively small share of the onshore market (15-20%).[131]

(148) The market investigation also revealed that GE has recently lost business with some of its largest customers [Information on GE's customers and product

130 Submission from HAL dated 23 January 2017; Minutes of a call with a customer on 13 January 2017; Minutes of a call with a competitor on 30 March 2017.

131 Form CO, annex B.6.1.

offering].[132] As a result, going forward, GE's position would likely be even smaller than suggested by its current market share.

(149) Second, the vast majority of the onshore customers indicated that they have sufficient credible alternatives to which they could switch if need be.[133] In particular, SLB, CAI, Borets and Novomet are seen as valid alternatives to the Parties.[134]

(150) Finally, customers view GE's technology as mainly limited to conventional wells and standard applications, whereas BHI's ESP systems are more sophisticated and can cover a wider range of applications.[135] [Information on GE's ESP products].[136]

(151) On the basis of the above considerations and in light of the results of the market investigation and the evidence available to iy, the Commission considers that GE does not exert a significant competitive constraint on BHI pre-Transaction and that a number of suitable alternative suppliers will remain on the market post-merger. Therefore, the proposed Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the supply of onshore ESPs.

5.1.2. Offshore ESPs

The Notifying Party's view

(152) The Notifying Party submits that the proposed Transaction will not raise competition concerns on the offshore market for ESPs given only BHI is active in the EEA. [Information on GE's sales strategy and R&D plans for ESP in the EEA].[137]

The Commission's assessment

(153) Only BHI and SLB are active offshore in the EEA with a share of respectively [40-50]% and [50-60]% in 2016. Some concerns have been raised by few market participants indicating that GE has taken part in offshore bids in the EEA, already works offshore outside the EEA and that it is making R&D efforts to upgrade its equipment.[138] Nevertheless, the Commission has found that GE is unlikely to enter the offshore market (and to place a significant constraint on BHI and SLB) in a short to medium term for the reasons set out below.

132 Minutes of a call with a customer on 16 March 2017.

133 Replies to question 20 of Questionnaire 7 – Customers ESP/ ILI.

134 Replies to questions 10, 15 and 20.1 of Questionnaire 7 – Customers ESP/ ILI.

135 Replies to question 18 of Questionnaire 7 – Customers ESP/ ILI.

136 Minutes of a call with a customer on 13 January and 27 March 2017; replies to question 30 of Questionnaire 2 – Competitors ESP.

137 Form CO, paragraphs 401 *et seq*.

138 Submission from HAL dated 23 January 2017; Minutes of a call with a customer on 13 January 2017; Minutes of a call with a competitor on 30 March 2017.

Table 2: EEA Offshore ESP market shares 2013-2016

	2016		2015		2014		2013	
	Revenues (USD million)	**Share**	**Revenues (USD million)**	**Share**	**Revenues (USD million)**	**Share**	**Revenues (USD million)**	**Share**
BHI	[…]	[40-50]%	[…]	[60-70]%	[…]	[60-70]%	[…]	[50-60]%
GE	0	0%	0	0%	0	0%	0	0%
Combined	***[…]***	***[40-50]%***	***[…]***	***[60-70]%***	***[…]***	***[60-70]%***	***[…]***	***[50-60]%***
Schlumberger	[…]	[50-60]%	[…]	[30-40]%	[…]	[30-40]%	[…]	[40-50]%
Total	**[…]**	**100%**	**[…]**	**100%**	**[…]**	**100%**	**[…]**	**100%**

Source: Form CO

(154) First, GE has participated in [a limited number of ESP tenders] during the last three years in the EEA. These tenders accounted for less than [5-10]% of the market. Despite its attempt, GE has never won any offshore ESP business yet in the EEA.[139] [Confidential].[140] GE is currently in the process of developing a new motor, [business and marketing plans].[141] Moreover, other competitors of the Parties offer this kind of motor.[142]

(155) Second, as explained above (see section 4.1.1.2), the biggest hurdle to supply ESPs in the North Sea (which is effectively the offshore ESP market in the EEA) lies in the supplier's track record required by customers.[143] New suppliers must undergo extensive testing before being able to provide ESPs offshore. However, because of the high costs involved in failure, customers are very risk averse and are generally reluctant to allow potential entrants to run tests.[144] A competitor explained: "*The offshore environment is difficult to enter from a technology point of view as well as due to the fact that customers are normally reluctant to change supplier. Reliability is very important.*"[145]

(156) In addition, a supplier's track record must have been achieved in the same or similar environment, thus onshore track record (or offshore track record in other regions of the world) is unlikely to facilitate GE's entry in the offshore space. As explained by a competitor: "*The industry moves very slowly and GE is suffering from this. For customers to change ESP supplier there needs to be a compelling factor. Price does not qualify as a compelling reason to switch suppliers in the EEA. […], especially offshore, where costs are in any case so high the price of the ESP does not play a major role. Customers would rather select an ESP supplier with a reliable track record and experience than a new supplier they have no experience with providing a cheaper ESP.*"[146]

139 Form CO, paragraph 407.

140 Minutes of a call with a customer on 21 March 2017.

141 Form CO, paragraph 404.

142 Replies to question 31 and 31.1 of Questionnaire 2 – Competitors ESP

143 Replies to question 36.2 of Questionnaire 2 – Competitors ESP.

144 Minutes of a call with a competitor on 30 March 2017; minutes of a call with a customer on 13 January 2017; minutes of a call with a customer on 12 January 2017; minutes of a call with a competitor on 22 March 2017.

145 Minutes of a call with a competitor on 30 March 2017.

146 Minutes of a call with a competitor on 22 March 2017.

(157) As explained by a competitor: "*The industry moves very slowly and GE is suffering from this. For customers to change ESP supplier there needs to be a compelling factor. Price does not qualify as a compelling reason to switch suppliers in the EEA. […], especially offshore, where costs are in any case so high the price of the ESP does not play a major role. Customers would rather select an ESP supplier with a reliable track record and experience than a new supplier they have no experience with providing a cheaper ESP*."[147]

(158) Responses to the market investigation also indicated that other suppliers are in the process of cooperating with customers operating offshore in the EEA to develop alternative solutions.

(159) On the basis of the above considerations and in light of the results of the market investigation , the Commission considers that GE is unlikely to enter the offshore segment given the high barriers to entry in the form of track record and reliability. Therefore, as only BHI and SLB are active suppliers of offshore ESPs, the proposed Transaction does not raise serious doubts as to its compatibility with the internal market with respect to that market (regardless of whether the Norwegian section of the North Sea is included or excluded).

5.2. ILI

The Notifying Party's view

(160) The Notifying Party submits that the proposed Transaction will not raise serious doubts in view of the limited combined position of the Parties and the fact that a significant number of players are active in the market, including Rosen, the market leader by quite some distance.[148]

The Commission's assessment

(161) The Commission considers that the proposed Transaction will not materially alter the structure of the market in view notably of BHI's small position and the fragmented nature of the market. A market participant raised concerns indicating that the merged entity will have a very broad portfolio that could impact the ability of other suppliers to compete effectively and that both Parties are important innovators, therefore the proposed Transaction could also reduce innovation.[149] Nevertheless, the Commission has found those concerns to be unfounded for the reasons set out below.

(162) First, the Parties' combined share is approx. [20-30]% with a [0-5]% increment brought by BHI. The merged entity will be the second largest supplier in the EEA after Rosen, which will remain the market leader post-merger with a share almost twice as large as the combined share of the Parties. The Parties will also face a large number of other established suppliers.[150] Customers largely confirmed they

147 Minutes of a call with a competitor on 22 March 2017.

148 Form CO, paragraph 689.

149 Submission from HAL dated 23 January 2017.

150 Replies to question 19 of Questionnaire 1 – Competitors ILI; replies to question 69 of Questionnaire 7 – Customers ESP/ILI.

will continue to have sufficient valid alternatives post-Transaction.[151] This applies equally to UT and MFL technologies.[152]

Table 3: EEA ILI market shares 2014-2016

	2016		2015		2014	
	Revenues (USD million)	**Share**	**Revenues (USD million)**	**Share**	**Revenues (USD million)**	**Share**
GE/PII	[…]	[10-20]%	[…]	[10-20]%	[…]	[10-20]%
BHI	[…]	[0-5]%	[…]	[5-10]%	[…]	[0-5]%
Combined	***[…]***	***[20-30]%***	***[…]***	***[20-30]%***	***[…]***	***[10-20]%***
Rosen	[…]	[40-50]%	[…]	[40-50]%	[…]	[50-60]%
T.D. Williamson	[…]	[0-5]%	[…]	[0-5]%	[…]	[0-5]%
NDT	[…]	[10-20]%	[…]	[10-20]%	[…]	[5-10]%
A.Hak	[…]	[5-10]%	[…]	[5-10]%	[…]	[0-5]%

Source: Form CO

(163) The market investigation also revealed that while GE is considered a strong competitor in ILI services, BHI is not seen as playing an important role and in any case considerably less than GE.[153]

(164) Second, switching is generally easy and customers tend to multi-source. They typically have 3 to 4 qualified suppliers with which they have framework agreements in place.[154]

(165) Third, GE and BHI do not appear to be leading on innovation.[155] While GE has been indicated as a pioneer in the development of Electromagnetic Acoustic Transducer (EMAT) technology (a type of UT technology for crack detection which can be used without liquid), this is not perceived as a particularly strong competitive advantage[156] because (i) EMAT is not seen as a breakthrough innovation,[157] (ii) a number of competitors seem to be able to offer (or develop) a similar technology,[158] (iii) EMAT technology is significantly more expensive that

151 Replies to question 77 of Questionnaire 7 – Customers ESP/ILI.

152 Suppliers indicated that, even if they only provide one type of technology (either UT or MFL), they can compete effectively with suppliers that offer both technologies (Minutes of a call with a competitor on 22 and on 29 March 2017) as customers typically procure different technologies through different tenders. (Replies to questions 59 and 62 of Questionnaire 7 – Customers ESP/ILI). In any case, the Parties' position in each of the two segments is not materially different from their aggregate position. The Parties' combined share of supply in UT and MFL is respectively [5-10]% and [20-30]%.

153 Replies to questions 21, 21.1 and 26 of Questionnaire 1 – Competitors ILI; replies to question 69 of Questionnaire 7 – Customers ESP/ILI.

154 Replies to question 28 to Questionnaire 1 – Competitors ILI; minutes of a call with a competitor on 17 March 2017; replies to questions 74, 75 and 76 of Questionnaire 7 – Customers ESP/ILI.

155 Minutes of a call with a competitor on 22 March 2017; replies to questions 25.2, 25.1 and 26 of Questionnaire 1 – Competitors ILI.

156 Minutes of a call with a competitor on 22 March 2017; replies to question 27.2 to Questionnaire 1 – Competitors ILI.

157 Minutes of a call with a competitor on 17 and on 22 March 2017.

158 Replies to questions 27 and 27.1 to Questionnaire 1 – Competitors ILI.

other UT technologies and still not proven.[159] The market investigation also indicated that BHI is not a particularly innovative actor on this market.[160]

(166) Fourth, although the need for a proven track record represents a possible obstacle for new companies, recent entrants in the ILI market suggest that the barriers to entry are not insurmountable.[161] For example, LinScan started operating in the EEA in 2013 and Half Wave in 2016. Both are considered as credible alternatives to the established suppliers such as GE and BHI.[162]

(167) Finally, the position of the Parties is not materially different in any of the possible segmentations considered in the product market definition: (i) per type of service, (ii) according to the onshore or offshore environment of the services or (iii) the technology provided (UT/MFL). Therefore, the assessment of the Proposed Transaction would not change. The market shares of the Parties in 2016 in the EEA are as follows:

- Per type of service:[163]

Table 4. EEA ILI market shares per type of service (2016)

	BHI		GE	
	Onshore	**Offshore**	**Onshore**	**Offshore**
Metal Loss	[5-10]%	[0-5]%	[10-20]%	[10-20]%
Crack Detection	[0-5]%	[0-5]%	[10-20]%	[0-5]%
Geometry & Mapping	[0-5]%	[0-5]%	[5-10]%	[0-5]%

Source: Form CO

- Per technology and according to the location (onshore vs offshore):

Table 5: EEA ILI market shares per technology and location (2016)

	Onshore	**Offshore**	**UT**	**MFL**
BHI	[5-10]%	[0-5]%	[0-5]%	[5-10]%
GE	[10-20]%	[10-20]%	[5-10]%	[10-20]%
Combined	***[20-30]%***	***[10-20]%***	***[5-10]%***	***[20-30]%***

Source: Form CO

(168) Similarly, the assessment would not change if the market were to be considered global given that on a worldwide basis the Parties' combined market share would amount to [20-30]% and a large number of competitors are active globally.

(169) In view of the above considerations and in light of the results of the market investigation, the Commission considers that the proposed Transaction does not

159 Minutes of a call with a competitor on 17 and on 29 March 2017.

160 Replies to questions 25.2, 25.1 and 26 of Questionnaire 1 – Competitors ILI.

161 Replies to questions 33 and 34 of Questionnaire 1 – Competitors ILI; replies to question 84 of Questionnaire 7 – Customers ESP/ILI.

162 Replies to question 82 of Questionnaire 7 – Customers ESP/ILI.

163 The Notifying Party explained that it is not able to estimate shares of integrity services because in 99% of the cases they follow another, previous, inspection service and are requested as a result of that previous work. Therefore, the market shares would be very similar to the ones of the listed inspection services in the table. Very rarely would a supplier provide the integrity services after another supplier has carried out the initial inspection.

raise serious doubts as to its compatibility with the internal market with respect to the market for the provision of ILI services .

5.3. Downstream chemicals

Introduction

(170) The Parties' activities overlap in the supply of water treatment and downstream process treatment chemicals to the CPI and HPI industries.

The Notifying Party's view

(171) The Notifying Party submits that the proposed Transaction will not raise competitive concerns on the market for downstream chemicals, irrespective of the exact market definition adopted, because (i) the Parties' combined share is limited; (ii) Nalco, the market leader, will continue to exercise a significant competitive constraint on the merged entity; (iii) the Parties are not particularly close competitors; (iv) the merged entity will continue to face competition from several credible suppliers; and (v) there is significant spare capacity in the market.[164]

The Commission's assessment

(172) The Parties' market shares in the supply of water treatment chemicals in the EEA are presented in the Tables below, separately for HPI and CPI.

Table 6: EEA water treatment chemicals market shares (2016)

Competitor	Estimated market share range HPI	Estimated market share CPI
GE	[10-20]-[20-30]%	[30-40]%
BHI	[0-5]-[5-10]%	[0-5]%
Combined	***[10-20]-[20-30]%***	***[30-40]%***
Nalco	[20-30]-[30-40]%	[20-30]%
Kurita	[5-10]-[5-10]%	[5-10]%
Solenis	[0-5]-[5-10]%	[0-5]%
Lamirsa	[0-5]-[5-10]%	[0-5]%
Chimec	[0-5]-[5-10]%	[30-40]%

Source: Form CO

(173) The Parties' market shares in the supply of process treatment chemicals in the EEA are presented in the Tables below, separately for HPI and CPI.

164 Form CO, paragraphs 178 *et seq.*

Table 7: EEA process treatment chemicals market shares (2016)

Competitor	Estimated market share range HPI	Estimated market share CPI
GE	[10-20]-[10-20]%	[20-30]%
BHI	[10-20]-[30-40]%	[0-5]%
Combined	***[20-30]-[40-50]%***	***[20-30]%***
Nalco	[10-20]-[30-40]%	[30-40]%
Chimec	[5-10]-[10-20]%	[10-20]%
Kurita	[0-5]-[5-10]%	[0-5]%
Others	[0-5]-[10-20]%	[0-5]%

Source: Form CO

(174) The Commission takes the view that, irrespective of the exact market definition retained, the proposed Transaction will not result in a significant impediment of effective competition on the markets for downstream water treatment chemicals and downstream process treatment chemicals for the reasons set out below.

(175) First, all the plausible markets for downstream water treatment chemicals and downstream process treatment chemicals will remain relatively fragmented post-merger.

(176) On all the plausible markets for downstream water treatment chemicals, the Parties have a relatively small combined market share ranging from [20-30]% to [30-40]%, depending on the industry, and in any case the increment brought about by the proposed Transaction is limited (less than 5%). On these plausible markets the merged entity will continue to face the competitive constraint posed by Nalco and other smaller but – as explained hereunder – credible competitors, having a market share larger or comparable to BHI's.

(177) The plausible markets for downstream process chemicals are more concentrated than those for water treatment chemicals. However, the merged entity will continue to face competition from Nalco which – on almost all the plausible markets – will have a share similar to that of the merged entity. The merged entity will also face competition from a number of regional players, such as Chimec, Kurita and Dorf Ketal which, as will be explained further in this section, pose a competitive constraint on the Parties and Nalco.

(178) Second, the Parties are not generally perceived as close competitors as they are seen as focusing on different areas: GE is perceived as stronger in downstream water treatment chemicals, while BHI is seen stronger in downstream process treatment chemicals.[165] Nor are the Parties perceived as close competitors in terms of pricing.[166] Nalco is regarded as being the best alternative for both downstream water treatment chemicals and downstream process treatment chemicals.[167]

(179) Third, customers responding to the market investigation almost unanimously indicated that there are sufficient alternative suppliers to the Parties, both for

165 As explained by a customer "*GE's position is stronger in water treatment whereas BHI is relatively better placed in* process *treatment chemicals*" (Minutes of a call with a customer on 13 January 2017).

166 Replies to questions 20 and 21 of Questionnaire 6 – Customers downstream chemicals.

167 Replies to questions 13, 15 and 16 of Questionnaire 6 – Customers downstream chemicals

water treatment and process treatment chemicals. These include Nalco, Kurita, Chimec, Solenis, Veolia, Dorf Ketal, Berardinello and Adquimica. For example, a customer noted that, "*Generally, post transaction for each product there will always be an alternative supplier to the merged entity"*,[168] that "*There are sufficient suppliers in the market with good chemicals and know how*" and that the alternative suppliers are credible "[…] *independent from product type*".[169]

(180) Customers have also indicated that local/regional suppliers (i.e. suppliers with a more limited geographic footprint than GE, BHI and Nalco) such as Kurita, Chimec and Dorf Ketal are credible alternatives.[170] Local/regional suppliers are able to offer products with quality comparable to that of the global players and generally they have a complete product portfolio.[171]

(181) Fourth, customers responding to the market investigation indicated that switching suppliers is relatively common. Almost all the customers responding to the market investigation switched suppliers in some of their plants in the last five years. Of these switches, in a very limited number of instances, customers replaced GE with BHI or vice versa.[172] Also, customers in general consider the cost of switching to be limited. For example, a customer said that "*switching is not extremely cumbersome both in terms of cost and time*".[173]

(182) Finally, the market investigation supported the Notifying Party's view that the industry is not capacity constrained. For example, a competitor indicated that it could accommodate an increase in demand up to 50% - 60% more than its current production and that, in addition, it is also looking to expand its blending capacity in the EEA.[174]

(183) On the basis of the above considerations and in light of the results of the market investigation, the Commission concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the supply of downstream water treatment chemicals (whether intended for HPI or CPI) and downstream process treatment chemicals (whether intended for HPI or CPI).

5.4. Upstream chemicals

(184) While BHI has a relatively established position with a share of approx. [20-30]% in the EEA, GE has a negligible presence in the market. GE's share in the EEA (as well as worldwide) is [0-5]% under any plausible segmentation of the upstream

168 Replies to question 18.2 of Questionnaire 6 – Customers downstream chemicals. Similar responses have also been given for downstream water treatment chemicals.

169 Replies to question 18.1 of Questionnaire 6 – Customers downstream chemicals.

170 Replies to question 26.1 of Questionnaire 6 – Customers downstream chemicals.

171 Replies to questions 26.1.1 and 26.2.1 of Questionnaire 6 – Customers downstream chemicals.

172 Out of 41 switching episodes reported in response to the market questionnaire, 5 (12%) were instances of switching between the Parties. Of the switching episodes 20 related to process treatment chemicals and in 3 instances customers switched the Parties. 13 related to water treatment chemicals and in 1 instance a customer switched the Parties. The product category of the remaining 8 switching episodes was unclear (in 1 instance a customer switched between the Parties). Source: replies to question 31 of Questionnaire 6 – Customers downstream chemicals.

173 Minutes of a call with a customer on 13 January 2017.

174 Minutes of a call with a customer on 13 March 2017.

chemicals market. In any case, a number of alternative suppliers with a share larger or comparable to the merged entity's will remain post-Transaction. These include Nalco ([20-30]%), Schlumberger ([20-30]%) and Clariant ([30-40]%).

(185) In view of the very small market position of GE, the Commission considers that the Proposed Transaction does not raise serious doubts as to its compatibility with the internal market for the supply of upstream chemicals.

5.5. Permanent downhole gauges

(186) Both GE, via its subsidiary Zenith, and BHI manufacture and sell permanent downhole gauges. GE manufactures the C-series (strain gauges) and the R-series (quartz gauges), [Information on GE's sales of gauges]. BHI also manufactures both quartz gauges (SureSENS QPT ELITE) and strain gauges (Sure SENS 125 LP), [Information on BHI's sales of gauges].

(187) [Information on the Parties' sales of strain and quartz gauges]. The table below shows the Parties' market share if one market comprising both strain and quartz gauges were to be considered.

Table 8: Permanent downhole gauges (quartz+strain) - 2016

	EEA	Worldwide
GE	[0-5]%	[0-5]%
BHI	[20-30]%	[20-30]%
Combined	***[20-30]%***	***[30-40]%***
Halliburton	[10-20]%	[20-30]%
Schlumberger	[20-30]%	[20-30]%
Weatherford	[10-20]%	[5-10]%
Sercel	[0-5]%	[0-5]%
ALS	[5-10]%	[0-5]%
Probe	[0-5]%	[0-5]%
Core Labs	[0-5]%	[0-5]%
SageRider	[0-5]%	[5-10]%
Emerson Roxar	[20-30]%	[0-5]%

Source: Form CO

The Commission's assessment

(188) The Commission considers that the proposed Transaction will not give rise to competition concerns in the market for permanent downhole gauges for the following reasons.

(189) First, the Parties combined market share is limited, [30-40]% at most, with a small increment ([0-5]%) created by the transaction if the geographic scope of the market is considered worldwide. In the EEA, [Information on GE's sales of gauges].

(190) Second, the merged entity will continue to face competition from a number of established competitors with significant market shares, such as Halliburton (HAL), SLB and Weatherford.

(191) Third, the vast majority of customers responding to the market investigation indicated that there are sufficient alternative suppliers to GE and BHI to which they could turn to post-merger.[175]

(192) Finally, all respondents to the market investigation indicated that the market for permanent downhole gauges is competitive and that the proposed Transaction will have no impact on its functioning and competitiveness.[176]

(193) On the basis of the above considerations and in light of the results of the market investigation and having regard to the minor increment created by the proposed Transaction on a worldwide level [Information on GE's sales of gauges in the EEA], the Commission considers that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market on the market for permanent downhole gauges.

5.6. ESP sensors

(194) The major ESP suppliers are vertically integrated and have in-house production of ESP sensors. As a result, external sales (ie. sales to third parties) are limited and account for less than one quarter of the total ESP sensor market.[177]

(195) The Notifying Party submits that the proposed Transaction does not raise competition concerns because (i) [Information on BHI's bidding activities for ESP sensors], (ii) [Information on BHI's sales strategy for ESP sensors], (iii) there are several alternative independent ESP sensor suppliers, and (iv) customers can easily switch between manufacturers because ESP sensors are not specifically engineered for a particular ESP and are essentially "plug and play" pieces of equipment.[178]

(196) The Commission considers that the proposed Transaction is unlikely to raise concerns in the market for ESP sensors for the reasons set out below.

(197) First, [Information on BHI's sales of ESP sensors in the EEA]. On a worldwide basis the Parties combined share on a worldwide basis is approximately [30-40]%,[179] with a relatively small increment created by the transaction ([5-10]%).

(198) Second, the merged entity will continue to face competition from a number of established ESP sensor manufacturers including: Sercel-GRC ([30-40]%), Elekton ([10-20]%), Oxford Monitoring Solution ([10-20]%) and Triol ([5-10]%).

(199) Third, respondents to the market investigation indicated that the market is rather competitive and that there are valid alternatives to the Parties.[180]

(200) Based on the above considerations and in light of the results of the market investigation, the Commission concludes that the proposed Transaction does not

175 Replies to questions 51 and 52 of Questionnaire 7 – Customers ESP and ILI.

176 Replies to question 53 of Questionnaire 7 – Customers ESP and ILI.

177 Form CO, Chapter B, Section II.

178 Form CO, paragraphs 486 *et seq.*

179 GE, [20-30]% and BHI, [5-10]%.

180 Replies to question 45 of Questionnaire 2 – Competitors ESP, and Minutes of a call with a competitor on 11 May 2017.

raise serious doubts as to its compatibility with the internal market for the supply of ESP sensors in the EEA.

6. COMPETITIVE ASSESSMENT – VERTICAL RELATIONS

(201) According to the Non-Horizontal Merger Guidelines,[181] non-coordinated effects may significantly impede effective competition as a result of a vertical merger if such merger gives rise to foreclosure.

(202) The Non-Horizontal Merger Guidelines distinguish between two forms of foreclosure. Input foreclosure occurs where the merger is likely to raise the costs of downstream competitors by restricting their access to an important input. Customer foreclosure occurs where the merger is likely to foreclose upstream competitors by restricting their access to a sufficient customer base.

(203) Input foreclosure may raise competition problems only if the upstream product concerns an important input, if the merged entity has significant market power in the market for the provision of this input and if – by reducing access to its own upstream products or services, it could negatively affect the overall availability of these inputs for the downstream market. In its assessment the Commission also considers whether there are effective and timely counter-strategies that rival firms would be likely to deploy such as the possibility of changing their production process to reduce their dependence or the sponsoring of new suppliers in the market for the provision of the input.[182]Customer foreclosure may raise competition problems if the vertical merger involves a company, which is an important customer with a significant degree of market power in the downstream market. Customer foreclosure can in particular lead to higher input prices if there are significant economies of scale or scope in the input market.[183]

(204) The competitive assessment as regards potential input or customer foreclosure is not dependant on the downstream geographic market definition since sensors are purchased and sold on a global basis.

(205) Finally, given that the Commission considers that the Notifying Party will have no ability to foreclose its downstream rivals post-Transaction there is no need to assess whether it would have an incentive to do so.

(206) With regard to the proposed Transaction, the Commission has analysed the in particular the following vertical relations:

(a) Gamma sensors (upstream market where GE is active), and DD, OHWL and CHWL services (downstream market where BHI is active)[184];

(b) Neutron sensors (upstream market where GE is active), and DD, OHWL and CHWL services (downstream market where BHI is active)[185];

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181 Guidelines on the assessment of non-horizontal mergers under the Merger Regulation , OJ C 265, 18.08.2008, p. 6-25.

182 Guidelines for the assessment of non-horizonal mergers, paragraphs 33 to 39.

183 Guidelines for the assessment of non-horizonal mergers, paragraphs 60 to 67.

184 GE is also active on the market for CHWL, but has no activities in the EEA in that regard.

6.1. Gamma Sensors – DD, OHWL and CHWL services

(207) HAL is a large OFS provider and competes with BHI in the provision of OFS services. In its complaint and subsequent submissions, HAL noted that it purchases crystals for gamma sensors from GE and implied concerns in that regard.[186] HAL considers that GE is the leading supplier for gamma sensors.[187] Moreover, while HAL recognises that there are alternative suppliers such as Hunting-Titan and Saint Gobain, they are considered as less favourable alternatives.[188] HAL further submitted that an alternative supplier would need to develop a high degree of specialisation and expertise to meet HAL's needs and that the time and expense for switching suppliers would be significant.[189]

(208) However, for the reasons set out in the following section the Commission considers it unlikely that the merged entity will have the ability to foreclose downstream competitors from the supply of gamma sensors for DD, OHWL and/or CHWL applications or upstream competitors from access to a significant customer base as a result of the proposed Transaction.

6.1.1. Input foreclosure

No ability to foreclose

Important input

(209) The Notifying Party submits that the cost of the OFS gamma sensors is very small compared to the cost of the services. The individual prices for OFS gamma sensors may vary, but based on the information at hand, the prices for OFS gamma sensor are approximately between USD 5 000 and USD 15 000 depending on the application.

(210) These costs are relatively small compared to the costs of the downstream services. The costs for directional drilling services may vary greatly, but overall the size of the market for OFS sensors for drilling applications amounts to less than 1% of the size of the markets for DD, OHWL and CHWL services. It follows that it is unlikely that a sensor provider would be able to foreclose an OFS provider by raising prices.

(211) Nonetheless, the Notifying Party does not dispute that gamma sensors are a critical component for DD, OHWL and CHWL services from a technical perspective.

185 GE is also active on the market for CHWL, but has no activities in the EEA in that regard.

186 Submission from HAL dated 23 January 2017.

187 Submission from HAL dated 2 March 2017.

188 Submission from HAL dated 2 March 2017.

189 Submission from HAL dated 2 March 2017.

GE's market position

(212) The Notifying Party estimates that in 2016, GE had a share of up to [40-50]% in the global market for gamma sensors for DD applications and up to [20-30]% in the markets for wireline applications.[190]

(213) However, the Commission notes that these market share estimates seem highly unreliable. The Notifying Party submitted that it does not keep share data in its ordinary course of business and that it is not aware of industry reports providing share data and that the figures are "guestimates".[191] Similarly, the Notifying competitors were not able to provide reliable market shares. The Notifying Party's market share may therefore be higher or lower than the estimates.

(214) On the basis of the Notifying Party's estimates the market shares in the worldwide markets for OFS gamma sensors in 2016 are set out in the table below:

(215) On the basis of the Notifying Party's estimates the market shares in the worldwide markets for OFS gamma sensors in 2016 are set out in the table below:

Table 9: OFS gamma sensors 2016 worldwide

	DD/MWD/LWD	OHWL and CHWL
GE	[30-40]-[40-50]%	[10-20]-[20-30]%
Saint Gobain	[50-60]-[60-70]%	[60-70]-[70-80]%
Titan	[0-5]-[10-20]%	[0-5]%
Scionix	[0-5]%	[0-5]-[0-5]%
Crydet	[0-5]%	[0-5]-[0-5]%
Chinese manufacturers	[0-5]-[0-5]%	[0-5]-[5-10]%

Source: Form CO

(216) On the basis of the Notifying Party's estimates, the market shares in worldwide markets for DD services, OHWL services and CHWL services in 2016 are set out in the table below:

Table 10: OFS services 2016 worldwide

	DD/MWD/LWD	OHWL	CHWL
BHI	[20-30]%	[10-20]%	[5-10]%
GE	n/a	n/a	[0-5]%
SLB	[30-40]%	[60-70]%	[30-40]%
HAL	[10-20]%	[10-20]%	[20-30]%
WFT	[5-10]%	[5-10]%	[5-10]%
OTH	[10-20]%	[0-5]%	[20-30]%
Total	**100%**	**100%**	**100%**

Source: Form CO

(217) The market investigation confirmed that GE is an important supplier of gamma sensors. Other sensor suppliers consider GE to be an important competitor in the

190 GE submitted that they do not distinguish between sensors for OHWL and CHWL applications.

191 Form CO, paragraph 1152.

markets for OFS gamma sensors[192] and customers mentioned GE as an actual or alternative supplier of gamma sensors.[193]

Alternative suppliers

(218) However, the market investigation indicated that there are valid alternatives to GE for all relevant applications:

(a) Saint Gobain provides gamma sensors for DD, OHWL and CHWL applications to a range of customers including large OFS providers as well as OEM tool manufacturers.[194] According to Scionix, a smaller gamma sensor manufacturer, Saint Gobain can be considered the market leader in gamma sensors for DD applications.[195]

(b) Hunting-Titan is an OFS tool manufacturer, which manufactures a variety of tools and components including gamma sensors for DD, OHWL and CHWL applications.[196] Hunting-Titan sells these sensors both to large OFS providers as well as to other tool manufacturers. [Information on BHI's supply sources for gamma sensors]. Saint Gobain mentioned Hunting-Titan as a main competitor for gamma sensors.[197].[198]

(c) Scionix is a small but specialised supplier of OFS gamma sensors. Currently, Scionix manufactures gamma sensors for OHWL and CHWL applications,[199] but considers that it could develop OFS gamma sensors for LWD applications within a year and at costs of less than EUR 1 million.[200]

(d) HQTek is a small specialised supplier, who seems to have entered the market in the last few years. Saint Gobain mentioned HQTek as a main competitor for gamma sensors.[201]

(219) Besides, in the course of the market investigation, market players mentioned a number of smaller sensor manufacturers such as Centronic (UK)[202] or Rexon (USA).[203]

Switching

(220) Contrary to what seems to be suggested by HAL, the market investigation suggests that OFS customers are able and willing to switch suppliers. BHI switched from GE to [Information on BHI's supply sources for gamma sensors]

192 Replies to question 16 of Questionnaire 5 – Customers Gamma and Neutron Sensors.
193 Replies to question 16 of Questionnaire 5 – Customers Gamma and Neutron Sensors.
194 Replies to question 14 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.
195 Minutes of a call with a competitor on 11 April 2017.
196 Form CO, paragraph 1122.
197 Form CO, paragraph 1189.
198 Minutes of a call with a competitor on 16 February 2017.
199 Minutes of a call with a competitor on 11 April 2017.
200 Minutes of a call with a competitor on 11 April 2017.
201 Minutes of a call with a competitor on 16 February 2017.
202 Minutes of a call with a competitor on 4 April 2017.
203 Replies to question 22 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

for certain high-temperature gamma sensor for DD applications in 2014, [Information on BHI's supply sources for gamma sensors].[204] Another OFS provider switched to Hunting-Titan for its supply of gamma sensors for DD applications in 2012.[205] Bench Tree switched from Hunting-Titan to CBG for its supply of gamma sensors for DD applications in 2017.[206]

(221) The market investigation further suggests that OFS customers can switch their sensor providers relatively quickly. While OFS customers often require extensive testing before contracting a new supplier, the process can be significantly accelerated. Bench Tree, a smaller OFS provider, noted that it can qualify a new supplier within 5-10 months at costs between USD 100 000 and USD 700 000.[207] Another OFS provider submitted that it could qualify a new supplier within eight months at costs of USD 150 000. Saint Gobain confirmed that customers can be more lenient with the qualification process when they approach a provider with a specific problem.[208] Scionix submitted that in such situations OFS providers may be willing to test new sensor almost immediately and do not require the full test cycle.[209]

Capacity

(222) The market investigation also suggests that there are no capacity constraints in the industry.

(223) The information provided by the Notifying Party suggests that there is significant spare capacity in the markets for gamma sensors, because the total demand has significantly decreased over the last years.[210]

(224) Saint Gobain noted in that regard that there is currently sufficient capacity in the market to accommodate a significant increase in demand. This is mainly because the overall demand for OFS sensors has decreased due to the decline in activity in the OFS industry. Saint Gobain believes that the capacities which were built in 2011-2012, a period of high demand, are still around.[211] Saint Gobain submitted that it could accommodate additional demand from a major OFS customer within 6-8 months.[212] This time period is mostly necessary to train new technicians.[213]

Entry

(225) Finally, the market power of the existing suppliers of OFS gamma sensors is limited by the fact that new suppliers may enter the market.

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204 Form CO, paragraph 1189.

205 Replies to question 20 of Questionnaire 5 – Customers Gamma and Neutron Sensors

206 Replies to question 20 of Questionnaire 5 – Customers Gamma and Neutron Sensors.

207 Replies to question 19 of Questionnaire 5 – Customers Gamma and Neutron Sensors..

208 Minutes of a call with a competitor on 18 April 2017.

209 Minutes of a call with a competitor on 11 April 2017.

210 Form CO, paragraph 1151 and 1152.

211 Minutes of a call with a competitor on 18 April 2017.

212 Minutes of a call with a competitor on 18 April 2017.

213 Minutes of a call with a competitor on 18 April 2017.

(226) The Notifying Party estimates that a supplier of sensors for other industrial applications should be able to start supplying the OFS industry within 6-18 months.[214]

(227) Indeed, according to the market investigation, entry is feasible within a moderate timeframe and at moderate costs if the new entrant can rely on an experienced engineer with a relevant track-record in the development and manufacture of OFS gamma sensors.

(228) Saint Gobain considers that there are some barriers to entry with regard to know-how and IP, because gamma sensors for the OFS industry need to resist shocks, high temperatures and, in the case of DD applications, high vibrations.[215] However, Saint Gobain estimates that a gamma sensor provider, active in the manufacturing of gamma sensors for wireline applications, could start manufacturing gamma sensors for DD applications within 3-9 months.[216] A gamma sensor provider, active in the manufacturing of gamma sensors for DD applications, could start manufacturing gamma sensors for wireline applications within 2 months.[217] Even a gamma sensor provider from outside the OFS industry could – with the help of an experienced engineer - start manufacturing sensors for CHWL applications within 9 months, for OHWL wireline applications within 12 months and for DD/MWD/LWD applications within 12-24 months.[218]

(229) Scionix submitted that the manufacturing of sensors is not very high-tech and the equipment is not very expensive.[219] Moreover, Scionix notes that the manufacturing of sensors is essentially an assembly business and that all important components can be purchased from third party suppliers.[220] According to Scionix, the key is to have employees with the necessary know-how and previous experience in the sector, because the manufacturing process requires a substantial amount of manual work by highly skilled people.[221] Scionix submitted that they entered the market after Saint Gobain bought the Dutch sensor manufacturer Harshaw.[222] They entered the market in 1993 and were profitable from the first years on. Scionix does not currently manufacture OFS gamma sensors for LWD applications. However, Scionix submits that if they could hire an engineer with the relevant experience, entry could be achieved within 1 year and at costs of less than EUR 1 million.[223] Scionix added that new companies usually enter by providing ad-hoc solutions to a specific problem and that – in these cases – customers are ready to test new sensors almost immediately.[224]

214 Form CO, paragraph 1114.

215 Minutes of a call with a competitor on 16 April 2017.

216 Replies to question 26 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

217 Replies to question 26 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

218 Replies to question 26 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

219 Minutes of a call with a competitor on 11 April 2017.

220 Minutes of a call with a competitor on 11 April 2017.

221 Minutes of a call with a competitor on 11 April 2017.

222 Minutes of a call with a competitor on 11 April 2017.

223 Minutes of a call with a competitor on 11 April 2017.

224 Minutes of a call with a competitor on 11 April 2017.

(230) HQTek was mentioned as an example for a supplier that recently entered the market for the production of gamma sensors for the OFS industry.[225]

(231) In addition, the market investigation suggests that in-house production is a viable alternative. HAL submitted that it assembles some gamma sensors in-house. In that regard, HAL submits that it purchases its NaI crystals for these sensors from the Notifying Party and that other crystal growers do not meet HAL's requirements. However, the market investigation has shown that there are various other crystal growers,[226] such as Saint Gobain (USA), Alpha Spectra (USA), Amcrys (Ukraine) as well as Chinese crystal growers.[227] The market investigation suggests that these crystal growers are able to meet the requirements for gamma sensors for DD, CHWL and OHWL applications. While GE's crystals may have some specific characteristics, which make them the most favourable alternative for HAL, the competitive landscape shows that it is possible for gamma sensor providers to compete in this market without relying on GE's NaI crystals.

Conclusion

(232) In light of the evidence available to it and based on the results of the market investigation and taking into account (i) the existence of alternative suppliers (ii) the ability of customers to switch suppliers; (iii) the absence of capacity constraints in the industry; and (v) the feasibility of entry in the market, the Commission considers it unlikely that the merged entity would have the ability to foreclose downstream competitors from the supply of gamma sensors for DD, OHWL and/or CHWL applications as a result of the proposed Transaction.

6.1.2. Customer foreclosure

(233) BHI's shares in the downstream markets are relatively low. The Notifying Party estimates that in 2016, BHI's share in the worldwide market for DD services amounted to [20-30]%, its share in the worldwide market for OHWL to [10-20]% and its share in the worldwide market for CHWL to [5-10]%, with the Notifying Party adding an additional [0-5]% to the latter bringing the merged entity's combined share in the worldwide market for CHWL services to [5-10]%. Moreover, between 2014 and 2016, BHI already purchased the majority of its gamma sensors for DD applications [percentage] from GE. Besides, while BHI purchased [proportion] of its gamma sensors for wireline applications from [confidential-contains business secrets] during this period, these purchases amounted to merely [confidential][228] and represent a minor share in the overall market for gamma sensors for wireline applications which – based on the Notifying Party's estimates – amounted to at least USD [confidential-business secrets] during this period.[229]

(234) Furthermore, the Commission notes that the market investigation has shown that the sensor business is essentially a manufacturing and assembly business, where

225 Minutes of a call with a competitor on 16 February 2017.

226 Minutes of a call with a competitor on 11 April 2017.

227 Replies to question 4 of Questionnaire 3 – Competitors Gamma and Neutron Sensors

228 Form CO, paragraph 1172.

229 Form CO, paragraph 1151 – 1152.

economies of scale and scope play a less important role than in more commoditised markets.

(235) Finally, the market investigation has also shown that sensor providers have multiple alternative markets for their sensors. For example, they can and often do sell to many other industries such as the security industry or the health industry.

(236) Based on the above considerations and in light of the results of the market investigation, the Commission considers it , unlikely that the merged entity would have the ability to foreclose upstream competitors from a significant part of their customer base as a result of the proposed Transaction.

6.1.3. Conclusion

(237) It follows from the above, that although the Notifying Party may have a high share in the markets for OFS gamma sensors, especially with regard to gamma sensors for DD applications, there are viable alternative suppliers, switching suppliers is feasible, there are no capacity constraints and providers for gamma sensors for other applications can adapt their production process relatively quickly to start manufacturing gamma sensors for other applications such as DD applications.

(238) Based thereupon, the Commission therefore concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market in relation to potential foreclosure by the merged entity, either of its competitors in the markets for DD, OHWL or CHWL services, or of its competitors in the market for the supply of gamma sensors.

6.2. Neutron sensors – DD, OHWL and CHWL tools

(239) In its complaint and subsequent submissions, HAL submitted that it purchases neutron sensors exclusively from GE. Its concerns mainly relate to neutron sensors for DD applications, for which HAL claims to have no alternative supplier.[230] HAL submitted that it would be time intensive and costly to develop an alternative supplier.[231] In that regard HAL indicated that He-3 gas is not readily available, because it does not occur naturally and must be manufactured in a lab and stored for use.[232] HAL also submitted that He-3 sensors are subject to significant regulatory requirements.[233]

6.2.1. Input foreclosure

No ability to foreclose

Important input

(240) The Notifying Party acknowledges that neutron sensors are an important input in the markets for DD, OHWL and CHWL services. As regards costs, the Notifying

230 Submission from HAL dated 23 January 2017.

231 Submission from HAL dated 23 January 2017.

232 Submission from HAL dated 23 January 2017.

233 Submission from HAL dated 10 May 2017.

Party submits that the cost of OFS neutron sensors is very small compared to the cost of the services. The individual prices for OFS neutron sensors may vary, but based on the information at hand, the prices for OFS neutron sensor are approximately between USD 5 000 and USD 15 000 depending on the application.

(241) These costs are relatively small compared to the costs of the downstream services. The costs for directional drilling services may vary greatly, but overall the size of the market for OFS sensors for drilling applications amounts to less than 1% of the size of the markets for DD, OHWL and CHWL services. It follows that it is unlikely that a sensor provider would be able to foreclose an OFS provider by raising prices.

(242) However, the Notifying Party does not dispute that neutron sensors are a critical component for DD, OHWL and CHWL services from a technical perspective.

GE's market position

(243) The Notifying Party estimates that it has a high market share in the market for neutron sensors overall ([40-50] – [50-60]% worldwide in 2016), in the market for neutron sensors for LWD services ([30-40] – [40-50]% worldwide in 2016) and in the market for neutron sensors for wireline applications ([40-50] – [50-60]% worldwide in 2016).

(244) However, the Commission notes that these market share estimates seem highly unreliable. The Notifying Party submitted that it does not keep share data in its ordinary course of business and that it is not aware of industry reports providing share data and that the figures are "guestimates".[234] Similarly, the Notifying competitors were not able to provide reliable market shares. The Notifying Party's market share may therefore be higher or lower than the estimates. The Commission further notes that – according to the information at hand – Saint Gobain is currently not active in the manufacturing of neutron sensors for DD applications, although Saint Gobain noted that it could start supplying such sensors within a moderate timeframe (see below recital (262)).

(245) On the basis of the Notifying Party's estimates the market shares in the worldwide markets for OFS neutron sensors in 2016 are set out in the table below:

Table 11: OFS neutron sensors 2016 worldwide

	DD/MWD/LWD	OHWL and CHWL
GE	[40-50]-[50-60]%	[50-60]-[60-70]%
Saint Gobain	[5-10]-[10-20]%	[10-20]-[20-30]%
Detector Products	[10-20]-[20-30]%	[0-5]%
LND	[5-10]-[10-20]%	[10-20]-[20-30]%
Chinese manufacturers	[0-5]-[5-10]%	[0-5]-[10-20]%

Source: Form CO

(246) On the basis of the Notifying Party's estimates, the market shares in worldwide markets for DD services, OHWL services and CHWL services in 2016 are set out in the table below:

234 Form CO, paragraph 1152.

Table 12: OFS services 2016 worldwide

	DD/MWD/LWD	OHWL	CHWL
BHI	[20-30]%	[10-20]%	[5-10]%
GE	n/a	n/a	[0-5]%
SLB	[30-40]%	[60-70]%	[30-40]%
HAL	[10-20]%	[10-20]%	[20-30]%
WFT	[5-10]%	[5-10]%	[5-10]%
OTH	[10-20]%	[0-5]%	[20-30]%
Total	100%	100%	100%

Source: Form CO

(247) The market investigation confirmed that GE is an important supplier of neutron sensors. Other sensor suppliers consider GE to be an important competitor in the markets for OFS neutron sensors, especially with regard to neutron sensors for DD applications,[235] and customers mentioned GE as a supplier of neutron sensors.[236]

Alternative suppliers

(248) The Notifying Party submits that there are other suppliers for neutron sensors for all relevant applications.[237] Indeed, the market investigation has confirmed that there are alternative sources of supply for neutron sensors.

(249) Saint Gobain manufactures neutron sensors for OHWL and CHWL applications. Saint Gobain does not currently manufacture neutron sensors for DD applications.[238] However, Saint Gobain also submitted that sensor providers, such as themselves, which are already active in the manufacturing of neutron sensors for wireline applications and have experienced engineers, may start supplying neutron sensors for DD applications within 12-24 months (see below recital (262)).[239]

(250) Detector Products is a specialised sensor provider, which manufactures neutron sensors for DD applications as well as neutron sensors for OHWL applications.[240] Detector Products sells mostly He-3 neutron sensors to tool manufacturers as well as to smaller OFS providers and to one large OFS provider.[241] According to Detector Products, the company [Information on GE's neutron sensors] has successfully addressed the OFS providers' demand for these types of neutron sensors.[242] Detector Products further submitted that it could easily expand its capacity to meet new demand.[243]

235 Replies to question 44 of Questionnaire 5 – Customers Gamma and Neutron Sensors.

236 Replies to question 35 of Questionnaire 5 – Customers Gamma and Neutron Sensors.

237 Form CO, paragraph 1219.

238 Minutes of call with a competitor on 16 February 2017.

239 Replies to question 53 of Questionnaire 3 – Competitor Gamma and Neutron Sensor.

240 Minutes of a call with a competitor on 4 April 2017.

241 Minutes of a call with a competitor on 4 April 2017.

242 Minutes of a call with a competitor on 4 April 2017.

243 Minutes of a call with a competitor on 4 April 2017.

(251) LND is another specialised sensor provider, which manufactures neutron sensors for DD and wireline applications.[244] Saint Gobain considers LND a competitor for neutron sensors.[245] Weatherford mentioned LND as an alternative provider of neutron sensors for OHWL applications.[246]

(252) Kihei was mentioned by several market players as another manufacturer of neutron sensors for the OFS industry. However, according to the market investigation Kihei, which was founded in 2003, was acquired by SLB in 2006 and now only supplies SLB.[247]

Switching

(253) [Information on GE's customers for neutron sensors].[248] [Information on GE's customers for neutron sensors].[249] This is in line with Detector Products' submission that it was able to replace GE for the supply of neutron sensors for several smaller clients as well as for one of the major players in the OFS industry.[250]

Capacity

(254) According to the market investigation there are no capacity constraints in the industry. The markets for neutron sensors have shrunk significantly over the last years.

(255) The information provided by the Notifying Party suggests that there is significant spare capacity in the markets for neutron sensors, because the total demand has significantly decreased over the last years.[251]

(256) Saint Gobain also notes that there is no risk of shortage of He-3 that could hinder a possible expansion.[252] While there used to be a shortage in the early 2000s due to high demand for He-3 for security portals, there is no such shortage anymore, because security portals no longer use He-3 in the USA.[253] Besides, Russia is a major supplier of He-3.[254]

Potential Entry

(257) Finally, the market power of the existing suppliers of OFS neutron sensors is limited by the fact that new suppliers may enter the market.

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244 Form CO, paragraph 1122; replies to question 43 of Questionnaire 5 – Customers Gamma and Neutron Sensors; minutes of a call with a competitor on 4 April 2017.

245 Replies to question 43.4 of Questionnaire 5 – Customers Gamma and Neutron Sensors

246 Replies to question 37.2 of Questionnaire 5 – Customers Gamma and Neutron Sensors.

247 GE, Email dated 2 May 2017.

248 Form CO, paragraph 1180.

249 Form CO, paragraph 1180.

250 Minutes of a call with a competitor on 4 April 2017.

251 Form CO, paragraphs 1151 and 1152.

252 Minutes of a call with a competitor on 18 April 2017.

253 Minutes of a call with a competitor on 18 April 2017.

254 Minutes of a call with a competitor on 18 April 2017.

(258) The Notifying Party estimates that a supplier of sensors for other industrial applications should be able to start supplying the OFS industry within 6-18 months.[255]

(259) On the other hand, HAL notes that the production process for neutron sensor is of a highly specialised nature.[256]

(260) However, according to the market investigation, entry is feasible within a moderate timeframe and at moderate costs if the new entrant can rely on an experienced engineer with a relevant track-record in the development and manufacturing of OFS neutron sensors.

(261) Saint Gobain submitted that the manufacturing of neutron sensors for the OFS industry presents several challenges related to the harsh environments in which these sensors must operate. A new entrant would have to make investments in filling stations and testing facilities and would have to undergo a lengthy qualification process with its customers. However, Saint Gobain estimates that the overall investment in equipment would amount to less than EUR 10 million.[257]

(262) Furthermore, Saint Gobain estimates that a neutron sensor provider, active in the manufacturing of neutron sensors for wireline applications, could – with the help of an experienced engineer – start supplying neutron sensors for DD applications within 12-24 months.[258] A neutron sensor provider, active in the manufacturing of neutron sensors for DD applications, could – with the help of an experienced engineer – start supplying neutron sensors for wireline applications within 2 - 6 months.[259]

(263) Moreover, while OFS customers may often require suppliers to undergo a lengthy qualification process, Saint-Gobain also submitted that customers faced with specific issues such as challenges imposed by high-temperature wells, are more lenient with regard to the qualification process.[260] In particular, they may accept a sensor with a shorter timespan between repair or replacement (i.e. "meantime-between-failures" or "MTBF") in order to address a specific problem.[261]

(264) This is in line with the fact that Detector Products, with the help of an experienced engineer, managed to successfully enter the market in 2009. According to Detector Products, the start-up capital was less than EUR 3 million. They purchased the necessary equipment on the open market and then adapted it to their needs.[262] They then built a track record solving specific problems for example related to very high temperature wells. Detector Products submits that they enjoyed a strong and steady financial growth since their inception.[263]

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255 Form CO, paragraph 1114.

256 Submission from HAL dated 2 March 2017.

257 Minutes of a call with a competitor on 18 April 2017.

258 Replies question 53 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

259 Replies question 53 of Questionnaire 3 – Competitors Gamma and Neutron Sensors.

260 Minutes of a call with a competitor on 18 April 2017.

261 Minutes of a call with a competitor on 18 April 2017.

262 Minutes of a call with a competitor on 4 April 2017.

263 Minutes of a call with a competitor on 4 April 2017.

(265) Moreover, the market investigation suggests, that an experienced engineer also founded Kihei in 2003, which produced neutron sensors for the OFS and was later acquired by SLB.[264]

(266) Scionix considers that it can start producing neutron sensors for the OFS within a year and at costs amounting to "some hundred thousand EUR".[265]

Conclusion

(267) In light of the evidence available to it and based on the results of the market investigation and taking into account (i) the existence of alternative suppliers (ii) the ability of customers to switch suppliers; (iii) the absence of capacity constraints in the industry; and (v) the feasibility of entry in the market, the Commission considers it unlikely that the merged entity would have the ability to foreclose downstream competitors from the supply of neutron sensors for DD, OHWL and/or CHWL applications as a result of the proposed Transaction.

6.2.2. Customer foreclosure

(268) BHI's share in the downstream markets are relatively low. The Notifying Party estimates that in 2016, BHI's share in the worldwide market for DD services amounted to [20-30]%, its share in the worldwide market for OHWL to [10-20]% and its share in the worldwide market for CHWL to [5-10]%, with the Notifying Party adding an additional [0-5]% to the latter bringing the merged entity's combined share in the worldwide market for CHWL services to [5-10]%.

(269) Moreover, between 2014 and 2016, BHI already purchased [proportion] of its neutron sensors for DD applications and wireline applications from GE.[266]

(270) Furthermore, the Commission notes that the market investigation has shown that the sensor business is essentially a manufacturing and assembly business, where economies of scale and scope play a less important role than in more commoditised markets.

(271) Finally, the market investigation has also shown that sensor providers have multiple alternative markets for their sensors, which they can sell to many other industries such as the security industry or the health industry.

(272) In view of the above, it is unlikely that the merged entity will have the ability to foreclose upstream competitors from a significant part of their customer base as a result of the proposed Transaction.

6.2.3. Conclusion

(273) It follows from the above, that although the Notifying Party may have a high share in the markets for OFS neutron sensors, especially with regard to neutron sensors for DD applications, there are viable alternative suppliers, switching suppliers is feasible, there are no capacity constraints and providers for neutron

264 Minutes of a call with a competitor on 4 April 2017.

265 Minutes of a call with a competitor on 11 April 2017.

266 Form CO, paragraphs 1151 and 1152.

sensors for other applications can adapt their production process relatively quickly to start manufacturing neutron sensors for other applications such as DD applications.

(274) The Commission concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market in relation to potential foreclosure by the merged entity, neither of its competitors in the markets for DD, OHWL or CHWL services, nor of its competitors in the market for the supply of neutron sensors.

6.3. Additional vertical relationships

(275) The proposed transaction gives rise to a number of additional vertical relationships between the Parties:

(a) electric motors (upstream market where GE is active), and cementing services (downstream market where BHI is active);

(b) pressure sensors and transmitters (upstream market where GE is active), and surface data logging (downstream market where BHI is active);

(c) CHWL tools (upstream market where GE is active) and CHWL services (downstream market where BHI is active).

(d) OHWL tools (upstream market where GE is active) and OHWL services (downstream market where BHI is active).

(e) ESP sensors, ESP bypass systems and autoflow valves (upstream market where GE is active), and ESPs (downstream market where BHI is active).

(276) As none of the above links raises particular competition concerns, they will be briefly discussed each in turn in the following paragraphs.

6.3.1. Electric motors (upstream) and cementing services (downstream)

(277) The proposed Transaction creates a vertical relationship between cementing services offered by BHI (downstream service) and electric motors supplied by GE that are used by BHI and its competitors to provide cementing services.

The relevant markets

(278) Cementing services refers to the cementing of the casing in the well. It involves the blending of cement, cement additives and water, which are then pumped down through the casing and back up the annulus around the casing (or in the open hole below the casing string). The pump is driven either by an electric motor or a diesel engine. Cementing services are provided for both onshore and offshore wells.

(279) In M.1140 - *Halliburton/ Dresser*, the Commission explained that storage, blending and shipment of bulk cement on one hand and the provision of cementing services in the rig are two separate markets. The Notifying Party agrees with this distinction. Only the provision of cementing services on a rig is concerned in the present case. The Commission also implicitly acknowledged a

segmentation between onshore and offshore cementing services.[267] This segmentation has not been disputed by the Notifying Party.

(280) Concerning the geographic scope of the market, in Halliburton/ Dresser the Commission found that cementing services are regional and can be divided into (i) UK sector of the North Sea, (ii) Norwegian sector of the North Sea and (iii) Continental EEA.[268] The Notifying Party agrees with this segmentation.

(281) Electric motors are used to drive the cement pump used in offshore cementing services while diesel engines can be found in both onshore and offshore cementing units. With a few possible exceptions, electric motors are not used in onshore cementing because onshore rigs are typically in remote locations and do not have access to the power grid or additional electric generation equipment necessary to run the electric motors. Diesel engines are a readily available power source for onshore cementing units and rigs usually have sufficient on-site diesel fuel storage capacity for short-duration cementing operations. In onshore applications, the cement pumping units typically are mounted on trucks that drive from well to well. Either the diesel engine of the truck, or a separate diesel engine mounted on the truck, drives the pump.

(282) The Notifying Party submits that the relevant market should comprise electric motors for cementing services as well as for other drilling applications (such as mud pumping, drawworks etc…) because they are largely substitutable. The market investigation confirmed that the same electric motors are used for cementing and other drilling applications interchangeably.[269]

(283) Regarding the geographic scope of the market for electric motors, the Notifying party submits that it is at least EEA-wide or worldwide in scope given motors are built in a given facility and then shipped worldwide to the site where the cementing unit is assembled by the customer. [Information on BHI's cementing units manufacturing locations]. In any case the Commission considers that the geographic scope for electric motors can be left open given that no competition concerns arise under any plausible market definition.

Competitive assessment

(284) The Notifying Party was only able to provide market share estimates for the year 2014, where GE's share for electric motors for drilling applications worldwide was [30-40]%.[270] It has confirmed that in the meantime its share has not increased but probably dropped given other competitors such as NOV and Breuer have started marketing new models of electric motors for drilling applications.[271] BHI has a modest share in the offshore cementing market in the EEA, both in the UK and Norwegian sectors of the North Sea with respectively [5-10]% and [5-10]% in 2016.

267 COMP/M.1140 – *Halliburton/ Dresser*, 6 July 1998, paragraph 27.

268 *Ibid.*

269 Replies to question 2 of RFI 17 – Competitors Cementing.

270 [Information on GE's sales of electric motors].

271 Form CO, paragraph 982.

(285) BHI currently sources [proportion] its requirements for electric motors for cementing units from GE, therefore no customer foreclosure can arise.

(286) The Commission considers that input foreclosure is also unlikely to arise for the following reasons.

(287) GE would not have the ability to foreclose suppliers of offshore cementing services. First, there are other suppliers on the market to which GE's customers could switch such as ABB, Breuer, NOV or Siemens, were GE to stop supplying them or raise prices.[272] Second, cementing units have a long life span of approximately 20 years during which electric motors are very rarely changed and only in case of failure. Moreover, in that case, an electric motor from a different supplier could be installed (subject to some technical adaptations).[273] As a result, GE would not have the ability to foreclose BHI's downstream competitors.

(288) In view of the above, the Commission considers that the proposed Transaction will not give rise to any potential foreclosure regarding electric motors for cementing services.

6.3.2. Pressure transmitters (upstream) and Surface data logging (downstream)

(289) The proposed Transaction creates a vertical relationship between surface data logging ("SDL") services offered by BHI (downstream service) and pressure sensors/transmitters ("transmitters") supplied by GE that are used by BHI and its competitors to provide SDL services.

The relevant markets

(290) SDL involves a chemical and visual analysis of rock cuttings and gases brought to the surface in the drilling fluids ("drilling mud"). The analysis helps to identify potentially productive hydrocarbon-bearing formations.[274]

(291) The Commission considers that the supply of SDL services constitutes a distinct relevant product market. The market may be further segmented between onshore and offshore services. Regarding the geographic scope of the market, the Commission considers it likely that the market is not wider than the EEA. However, as the proposed Transaction does not raise concerns under any plausible market definition, the exact product and geographic scope of the market for SDL can be left open.

(292) Pressure transmitters are installed on the surface to measure the pressure in the drilling rig standpipe.[275] SDL providers use the pressure measurements for analysis and evaluation as well as safety services.

272 Replies to question 5 of RFI 17 – Competitors Cementing.

273 Replies to question 5 of RFI 17 – Competitors Cementing.

274 SDL also helps to ensure that the surface equipment is operating within appropriate performance, safety and environmental levels and that the drilling process proceeds in a safe manner.

275 A pressure transmitter consists of a pressure transducer, which converts pressure into an electrical signal, and of electronics that amplify the electrical signal so that it can be transmitted over distances to a computer system that processes the electrical signal into pressure data.

(293) The Parties submitted that the relevant product market includes all pressure transmitters irrespective of the end-application (whether SDL or mud pulse telemetry) as the technology is the same. Regarding the geographic scope of the market, the Parties submitted that the market is at least EEA-wide in scope, but possibly wider, as manufacturers ship their transmitters from a few manufacturing locations[276] and customers do not require suppliers to have regional support bases.[277] The Commission considers that the product and geographic markets can be left open as the proposed Transaction does not raise concerns under any plausible market definition.

Competitive assessment

(294) The Commission has assessed whether the proposed Transaction may give rise to any (either input or customer) foreclosure effect.

(295) The Commission considers that no input foreclosure would likely arise post-merger for the following reasons: (i) GE has a relatively small share of the pressure transmitters sales in the EEA ([10-20]%)[278], and (iii) there are a number of alternative suppliers of transmitters, including Viatran, Honeywell and National Oil Varco.

(296) The Commission considers that the proposed Transaction is unlikely to result in any customer foreclosure. First, while BHI is a relatively large player in the SDL market (with a share of approx. [30-40]% in the EEA), there are other large suppliers of SDL services, including HAL, SLB, Geolog and Weatherford. Second, BHI already sources [proportion] of its pressure transmitters from GE, and therefore even if post-merger BHI were to source all of its pressure transmitters from GE, the sales of other suppliers of pressure transmitters would unlikely be materially affected.

6.3.3. CHWL tools and CHWL services

(297) The proposed transaction creates a vertical relationship between the upstream supply of CHWL tools and the downstream market for CHWL services. Although this vertical relationship does not lead to a vertically affected market, the Commission has analysed this relationship given that HAL has raised some concerns in this respect and in view of the fact that the downstream market for CHWL services may be smaller than EEA-wide.

Market Shares

(298) As regards the upstream market for the supply of CHWL tools, the Notifying Party estimates that its share in this market amounted to [10-20]% over the last three years (2014-2016) both EEA-wide and globally. In addition, the Notifying Party estimates that its market share was closer to [10-20]% in 2016.[279]

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276 [Information on GE's manufacturing locations for transmitters].

277 The Parties submitted that pressure transmitters do not require maintenance and cannot be serviced.

278 This figure includes sales of pressure transmitters for both SDL and mud pulse telemetry applications. GE's share is below 5% if only transmitters used for SDL were to be considered.

279 Form CO, paragraph 899.

(299) As regards the downstream market for CHWL services, in 2016 the Parties combined share worldwide was [5-10]%. The Notifying Party does not provide CHWL services in the EEA, where BHI's market share was [20-30]%.

Complaint

(300) HAL submitted that it purchases a number of CHWL tools from the Notifying Party. Moreover, HAL purchases the relevant accessories and spare parts for its existing fleet of tools from the Notifying Party. Furthermore, HAL notes that the Notifying Party's CHWL tools have build-in telemetry systems, through which the different tools communicate with each other and with the surface.[280]

Input Foreclosure

(301) The Commission considers it unlikely that the merged entity will have the ability to effectively foreclose downstream competitors.

(302) The Commission notes that the Notifying Party has only a relatively small share in the market for the provision of CHWL tools, both in the EEA and worldwide.

(303) Moreover, there are a number of alternative suppliers for CHWL tools such as Spartek, Hunting-Titan or Hunter Well Science. According to HAL, none of the alternative suppliers has the breadth, technological capability or aftermarket support of GE. However, the Commission notes that some of HAL's main competitors in the provision of CHWL services do not seem to rely on GE for their CHWL tools and therefore rely on alternative sources of supply.

(304) Furthermore, the Commission notes that CHWL services have relatively low barriers to entry when compared to OHWL services or DD services. During the last five years a number of companies have entered the market for the provision of CHWL services in the EEA.

(305) Based on the information at hand and the available market shares, the Commission notes that the majority of CHWL service providers do not purchase their CHWL tools from GE, but rely on alternative sources. While some of GE's CHWL tools may be of higher quality than those of their competitors, the competitive landscape in the downstream market shows that it is possible to compete in the market for CHWL services without relying on the Notifying Party's CHWL tools.

(306) Besides, with regard to HAL, the Commission notes that [Information on GE's confidential contract conditions with Halliburton]. The Commission notes that – with regard to a different market - one of HAL's competitors has purchased a stock of OFS tools from its incumbent supplier in order to 'bridge' such a switching period.

(307) Finally, the Commission notes that no other OFS provider has raised any concerns with regard to this market.

280 Submission from HAL dated 23 January 2016.

Customer Foreclosure

(308) Moreover, the Commission considers it unlikely that the merged entity will have the ability to foreclose upstream competitors from a significant part of their customer base. BHI's position ([20-30]%) in market for DD services on a worldwide level is relatively modest, and its position in markets for OHWL and CHWL services are even smaller. The Commission also notes that no other OFS tool provider has raised any concerns with regard to these markets.

Conclusion

(309) The Commission concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market in relation to potential foreclosure by the merged entity, neither of its competitors in the markets for CHWL tools, nor of its competitors in the market for the supply of CHWL services.

6.3.4. OHWL tools and OHWL services

(310) There is a vertical relationship between the Notifying Party's activities in the upstream market for the manufacturing of OHWL tools and BHI's activities in the downstream market for the provision of OHWL services. Although this vertical relationship does not lead to a vertically affected market on the basis of an EEA-wide market for OHWL services, the Commission has assessed this relationship in view of the fact that the downstream market for OHWL services may be smaller than EEA-wide .

(311) The Commission considers it unlikely that the merged entity will have the ability to effectively foreclose downstream competitors, because the Notifying Party estimates that its share in this market amounted to [0-5]% over the last three years (2014-2016) on a worldwide level.[281] The Notifying Party submits that it had only sales to [business secrets] customers outside the EEA in 2016. [Business secrets] customers are smaller OFS providers.[282]

(312) Moreover, the Commission considers it unlikely that the merged entity will have the ability to foreclose upstream competitors from a significant part of their customer base, even though BHI has a significant position on the markets for OHWL in the EEA ([20-30]%) and a possibly higher market share if the markets were regional, because OHWL tool manufacturers sell their tools on a global level, where BHI's market share is relatively small ([10-20]%).

(313) The Commission concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market in relation to potential foreclosure by the merged entity, neither of its competitors in the markets for OHWL tools, nor of its competitors in the market for the supply of OHWL services.

281 Form CO, paragraph 903.

282 Form CO, paragraph 903.

6.3.5. Directional sensors – DD, OHWL and CHWL services

(314) The proposed transaction creates a vertical relationship between the upstream supply of directional sensors and the downstream market for DD, OHWL and CHWL services. Although this vertical relationship does not lead to a vertically affected market on the basis of EEA-wide markets for DD, OHWL and CHWL services, the Commission has analysed these relationships given that HAL has raised some concerns in this respect and in view of the fact that the downstream markets for DD, OHWL and CHWL services may be smaller than EEA-wide.

Market Shares

(315) As regards the upstream market for the supply of directional sensors, the Notifying Party estimates that in 2016 its share in the worldwide market for directional sensors for drilling application amounted to [5-10] – [10-20]% and its share in the worldwide market for directional sensors for wireline applications amounted to [0-5] – [10-20]%.[283]

(316) As regards BHI's activities in the downstream markets, the Notifying Party estimates that in 2016, BHI's share in the worldwide market for DD services amounted to [20-30]%, its share in the worldwide market for OHWL to [10-20]% and its share in the worldwide market for CHWL to [5-10]%, with the Notifying Party adding an additional [0-5]% to the latter bringing the merged entity's combined share in the worldwide market for CHWL services to [5-10]%.

Complaint

(317) HAL submitted that it purchases directional sensors, in particular magnetometers for its DD applications, from GE. However, HAL notes that they have a contract for additional magnetometers, which should provide HAL with sufficient magnetometers to repair the existing DD tools for several years. However, HAL is concerned about being able to repair or replace these tools if GE refuses to supply magnetometers, once the contractual protection runs out.[284]

Input Foreclosure

(318) The Commission considers it unlikely that the merged entity will have the ability to effectively foreclose downstream competitors. The Commission notes that the Notifying Party has only a small share in the market for the provision of directional sensors. There are a number of alternative suppliers such as JAE and Microtesia. Based on the information at hand and the available market shares, the Commission notes that the majority of OFS providers do not purchase their directional tools from GE, but rely on alternative sources. While some of GE's directional sensors may be of higher quality than those of their competitors, the competitive landscape in the downstream market shows that it is possible to compete in the market for DD, OHWL and CHWL services without relying on GE's directional sensors. The Commission notes that no other OFS provider has raised any concerns with regard to this market.

283 Form CO, paragraph 1152.

284 Submission from HAL dated 23 January 2016.

Customer Foreclosure

(319) The reasoning set out in paragraph (308) applies *mutandis mutandis*.

Conclusion

(320) Based on the above considerations and in the light of the results of the market investigation, the Commission concludes that the proposed Transaction does not raise serious doubts as to its compatibility with the internal market in relation to potential foreclosure by the merged entity, neither of its competitors in the markets for directional sensors, nor of its competitors in the market for the supply of DD, OHWL or CHWL services.

6.3.6. ESP sensors, ESP Bypass systems and autoflow valves - ESP

The relevant markets

a) ESP sensors

(321) The relevant market definition for ESP sensors is discussed in section 4.10 above.

b) ESP Bypass systems (Y-tools).

(322) ESP bypass systems (Y-tools) are mechanical tools that can be installed on ESPs to enable reservoir evaluation and intervention without removing the ESP. The Notifying Party estimates that less than 5% of the wells are equipped with Y-tools.

(323) The Notifying Party submits that Y-tools should be regarded as a separate product market because they serve a specific purpose, which no other piece of equipment can perform. The Notifying Party also submits that no further segmentation of the market is appropriate because all Y-tools serve the same purpose and the technical specifications depend only on the physical characteristics of the well. According to the Notifying Party all suppliers of Y-tools can meet all the technical specifications. The market investigation confirmed that Y-tools are not interchangeable with any other equipment. For the purpose of this decision, the Commission considers that Y-tools constitute a separate relevant market.[285]

(324) The Notifying Party submits that the geographic scope of the market for Y-tools is at least EEA-wide, and possibly worldwide in scope owing to the fact that Y-tools share the same technical characteristics irrespective of the location and are supplied by the same players worldwide. The Commission considers that the precise market definition can be left open as the Transaction will not give rise to competition concerns under any plausible geographic market definition.[286]

c) Autoflow valves

(325) Autoflow valves allow continued flow to the surface when the ESP is switched off and are installed when the well can produce without artificial lifts. The

285 Form CO, paragraph 509.

286 Form CO, paragraph 511.

Notifying Party estimates that less than 1% of the wells worldwide are equipped with autoflow valves.

(326) The Commission takes the view that autoflow vales constitute a separate product market because on the demand side they are not interchangeable with any other component.

(327) The Notifying Party submits that the geographic scope of the market for autoflow valves is at least EEA-wide, and possibly worldwide in scope owing to the fact that autoflow valves share the same technical characteristics irrespective of the location and are supplied by the same players worldwide. In any event, the Commission considers that the precise market definition can be left open as the Transaction will not give rise to competition concerns under any plausible geographic market definition.[287]

Competitive assessment

a) ESP sensors - ESPs

(328) The Commission considers it unlikely that the Parties will have the ability to engage post-merger either in input foreclosure toward ESP manufacturers or customer foreclosure toward ESP sensors suppliers.

(329) The Commission considers that no input foreclosure would likely arise post-merger. While the Parties have a worldwide combined share of [30-40]% in the sales of ESP sensors, there are other established players with significant shares, including Sercel-GRC ([30-40]%), Elekton ([10-20]%) and Oxford Monitoring Solutions ([10-20]%). Moreover, some of BHI's largest competitors downstream (Schlumberger, Borets and Novomet) have their own in-house production of sensors and thus are not dependent on the third parties.

(330) The Commission considers that no customer foreclosure would likely arise post-merger in light of the fact that BHI's purchases of third party ESP sensors for resale with its ESP in the EEA is [business secrets] in each of 2015 and 2016.

(331) On the basis of the above, the Transaction does not raise serious doubts as to its compatibility with the internal market as a result of the vertical overlap between ESPs and ESP sensors.

[287] Form CO, paragraph 529.

b) Y-tools and autoflow valves

(332) The Commission considers it unlikely that the Parties will have the ability to engage post-merger either in input foreclosure toward ESP suppliers or customer foreclosure toward Y-tools and autoflow valves manufacturers.

(333) The Commission considers that no input foreclosure would likely arise post-merger for the following reasons: (i) [Information on GE's sales of Y-tools and autoflow valves], (ii) there are a number of established suppliers active in these markets, including Schlumberger, RMS Pumptools, ESPCT, PFT Systems.

(334) The Commission also considers that any customer foreclosure is unlikely to arise post-merger since BHI already sources a significant proportion of its small needs of autoflow valves and Y-tools from GE ([90-100]% of autoflow valves and around [50-60]% of Y-tools). In any case, BHI accounts for approx. [30-40]% of the ESP market in the EEA and therefore even if BHI were to source all its Y-tools and autoflow valves from GE, GE's upstream competitors could still address a large portion of the market.

(335) On the basis of the above, the proposed Transaction does not raise serious doubts as to its compatibility with the internal market as a result of the vertical overlap between ESPs and Y-tools and autoflow valves.

7. CONCLUSION

(336) For the above reasons, the European Commission has decided not to oppose the notified operation and to declare it compatible with the internal market and with the EEA Agreement. This decision is adopted in application of Article 6(1)(b) of the Merger Regulation and Article 57 of the EEA Agreement.

For the Commission
(Signed)

Margrethe VESTAGER
Member of the Commission