A French *société anonyme* with a share capital of €7,099,479
Registered office: Tour Maine Montparnasse, 33 avenue du Maine
75015 Paris, France
969 202 241 RCS Paris

2018

REFERENCE DOCUMENT

INCLUDING THE ANNUAL FINANCIAL REPORT

This Reference document was filed with the Autorité des marchés financiers (AMF) on April 5, 2019, in accordance with article 212-13 of the AMF General Regulations. It may be used in support of a financial transaction only if supplemented by a prospectus which received approval from the AMF. This document has been established by the issuer and is binding upon its signatories.

The following information is incorporated by reference in this Reference document:

- 2017 consolidated financial statements, presented in the Form 20-F filed with the United States Securities and Exchange Commission on March 29, 2018, and the related report from the external auditors;
- 2016 consolidated financial statements, presented in the Form 20-F filed with the United States Securities and Exchange Commission on May 1, 2017, and the related report from the external auditors.

This document is a free translation of the original, which was prepared in French. All possible care has been taken to ensure that the translation is an accurate representation of the original. However, in all matters of interpretation of information, views or opinions expressed therein, the original language version in French takes precedence over this translation.

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FORWARD-LOOKING STATEMENTS

This Reference document includes "forward-looking statements", which involve risks and uncertainties, including, without limitation, certain statements made in the sections entitled "Item 1.3 — Business Overview" and "Item 5 — Operating and Financial Review and Prospects". You can identify forward-looking statements because they contain words such as "believes", "expects", "may", "should", "seeks", "approximately", "intends", "plans", "estimates", or "anticipates" or similar expressions that relate to our strategy, plans or intentions. These forward-looking statements are subject to risks and uncertainties that may change at any time, and, therefore, our actual results may differ materially from those that we expected. We have based these forward-looking statements on our current views and assumptions about future events. While we believe that our assumptions are reasonable, we caution that it is very difficult to predict the impact of known factors, and, of course, it is impossible for us to anticipate all factors that could affect our actual results. All forward-looking statements are based upon information available to us on the date of this annual report.

Important factors that could cause actual results to differ materially from our expectations ("cautionary statements") are disclosed under "Item 2.1 — Risk Factors" and elsewhere in this Reference document, including, without limitation, in conjunction with the forward-looking statements included in this Reference document.

We undertake no obligation to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. In addition, in light of these risks, uncertainties and assumptions, the forward-looking events discussed in this Reference document might not occur. When considering forward-looking statements, you should keep in mind the risk factors and other cautionary statements included in this Reference document, including those described in "Item 2.1 — Risk Factors" of this Reference document.

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THE CGG GROUP

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THE CGG GROUP

1.1. SELECTED FINANCIAL DATA

The table below describes the main consolidated financial information in accordance with IFRS for each of the years in the three-year period ended December 31, 2018. This table should be read in conjunction with, and are qualified in their entirety by reference to, our consolidated financial statements included elsewhere in 2017 and 2016 annual reports.

	At December 31,		
(In millions of US$ except per share data)	**2018**	**2017 (restated*)**	**2016 (restated*)**
Statement of operations data:			
Operating revenues	1,193.5	1,035.1	963.3
Other revenues from ordinary activities	1.4	0.8	1.4
Cost of operations	(931.0)	(849.7)	(857.5)
Gross profit	263.9	186.2	107.2
Research and development expenses, net	(30.5)	(17.9)	(16.7)
Marketing and selling expenses	(45.9)	(46.6)	(50.1)
General and administrative expenses	(81.1)	(74.1)	(76.3)
Other revenues (expenses)	(286.1)	(105.5)	(110.7)
Operating income	(179.7)	(57.9)	(146.6)
Cost of financial debt, net	(127.4)	(211.0)	(174.2)
Other financial income (loss)	819.9	21.5	6.0
Income taxes	(7.4)	(18.7)	18.7
Equity in income of affiliates	(1.2)	(0.4)	(2.2)
Net income (loss) from continuing operations	504.2	(266.5)	(298.3)
Net income (loss) from discontinued operations	(600.0)	(247.6)	(278.3)
Net income (loss)	(95.8)	(514.1)	(576.6)
Attributable to owners of CGG SA	*$ (101.6)*	*(514.9)*	*(573.4)*
Attributable to owners of CGG SA [1]	*€ (85.9)*	*(458.6)*	*(518.6)*
Attributable to non-controlling interests	*$ 5.8*	*0.8*	*(3.2)*
Net income (loss) per share:			
Basic [2]	$ (0.17)	(11.18)	(13.26)
Basic [1]	€ (0.14)	(9.96)	(11.99)
Diluted [2]	$ (0.17)	(11.18)	(13.26)
Diluted [1]	€ (0.14)	(9.96)	(11.99)

* *In accordance with IFRS 5 "Non-current Assets Held for Sale and Discontinued Operations", the profit and loss accounts related to the discontinued operations have been presented in the separate line item "Net income (loss) from discontinued operations" at December 31 2018, 2017 and 2016.*

(1) *Converted at the average exchange rate of US$1.1828, US$1.1227 and US$1.1057 per € for 2018, 2017 and 2016 respectively.*

(2) *Basic and diluted per share amounts have been calculated on the basis of 608,437,867, 46,038,287 and 43,255,753 weighted average outstanding shares in 2018, 2017 and 2016 respectively.*
As a result of the February 21, 2018 CGG SA capital increase via an offering of preferential subscription rights to existing shareholders, the calculation of basic and diluted earnings per share for 2017 and 2016 has been adjusted retrospectively. Number of ordinary shares outstanding has been adjusted to reflect the proportionate change in the number of shares.
As our net result was a loss, stock options and performance shares plans had an anti-dilutive effect; as a consequence, potential shares linked to those instruments were not taken into account in the dilutive weighted average number of shares or in the calculation of diluted loss per share.

(In millions of US$)	At December 31, 2018	2017	2016
Balance sheet *data:*			
Cash and cash equivalents	434.1	315.4	538.8
Working capital (1)	189.3	375.8	334.6
Property. plant & equipment, net	189.2	330.3	708.6
Multi-client surveys	633.3	831.4	847.9
Goodwill	1,229.0	1,234.0	1,223.3
Total assets	3,896.7	4.264.2	4.861.5
Gross financial debt (2)	1,166.7	2,955.3	2,850.4
Equity attributable to owners of CGG SA	1,631.5	489.1	1,120.7

(1) "Working capital" is defined as net trade accounts and notes receivable, net inventories and work-in-progress, tax assets, other current assets and assets held for sale less trade accounts and notes payable, accrued payroll costs, income tax payable, advance billings to customers, deferred income, current provisions, other current liabilities and liabilities directly associated with the assets classified as held for sale.

(2) "Gross financial debt" is defined as financial debt, including current maturities and bank overdrafts.

(In millions of US$) except per ratios)	At December 31, 2018	2017 (restated *)	2016 (restated *)
Other financial historical data and other ratios:			
Segment (6) EBIT (1)	141.1	47.9	(32.5)
IFRS (7) EBIT (1)	(180.9)	(58.3)	(148.8)
Segment (6) EBITDAS (2)	556.0	434.0	386.0
IFRS (7) EBITDAS (2)	474.2	327.8	367.0
Segment (6) Operating income	142.3	48.3	(30.3)
IFRS (7) Operating income	(179.7)	(57.9)	(146.6)
IFRS (1) Free-cash flow	(4.3)	(7.1)	(198.9)
Capital expenditures (3)	78.0	67.2	73.8
Investments in multi-client surveys, net cash	222.8	251.0	295.1
Net financial debt (4)	732.6	2,639.9	2,311.6
Gross financial debt (5) / EBITDAS (2)	2.5x	9.0x	7.8x
Net financial debt (4) / EBITDAS (2)	1.5x	8.1x	6.3x
EBITDAS (2) / Cost of financial debt, net	3.7x	1.6x	2.1x

** In accordance with IFRS 5 "Non-current Assets Held for Sale and Discontinued Operations", financial information was restated to present comparative amounts for each period presented.*

(1) Earnings before interest and tax ("EBIT") is defined as operating income plus our share of income in companies accounted for under the equity method. EBIT is used by management as a performance indicator because it captures the contribution to our results of the significant businesses that we manage through our joint ventures. However, other companies may present EBIT and related measures differently than we do. EBIT is not a measure of financial performance under IFRS and should not be considered as an alternative to cash flow from operating activities or as a measure of liquidity or an alternative to net income as indicators of our operating performance or any other measures of performance derived in accordance with IFRS.

(2) "EBITDAS" is defined as earnings before interest, tax, income from equity affiliates, depreciation, amortization net of amortization costs capitalized to multi-client surveys and share-based compensation cost. Share-based compensation includes both stock options and shares issued under our share allocation plans. EBITDAS is presented as additional information because we understand that it is one measure used by certain investors to determine our operating cash flow and historical ability to meet debt service and capital expenditure requirements. However, other companies may present EBITDAS and similar measures differently than we do. EBITDAS is not a measure of financial performance under IFRS and should not be considered as an alternative to cash flow from operating activities or as a measure of liquidity or an alternative to net income as indicators of our operating performance or any other measures of performance derived in accordance with IFRS.

(3) "Capital expenditures" is defined as "total capital expenditures (including variation of fixed assets suppliers, excluding multi-client surveys)" from our statement of cash flows.

(4) "Net financial debt" is defined as gross financial debt less cash and cash equivalents. Net financial debt is presented as additional information because we understand that certain investors believe that netting cash against debt provides a clearer picture of the financial liability exposure. However, other companies may present net financial debt differently than we do. Net financial debt is not a measure of financial performance under IFRS and should not be considered as an alternative to any other measures of performance derived in accordance with IFRS.

(5) "Gross financial debt" is defined as financial debt, including current maturities and bank overdrafts.

(6) "Segment" figures are presented before IFRS 15, multi-client data library impairment, Sercel inventories provision and impairment and Restructuring costs related to the Transformation Plan. The restructuring costs correspond to the costs related to the industrial transformation of the Group and the Financial Restructuring, including personnel costs, site closure costs and fees and expenses related to the Financial Restructuring.

(7) IFRS: In accordance with IFRS, as indicated in our consolidated financial statements.

1.2. HISTORY AND SIGNIFICANT EVENTS IN THE DEVELOPMENT OF THE COMPANY'S ACTIVITIES

The CGG group provides leading geological, geophysical and reservoir products and services to its broad base of, primarily, oil and gas customers.

CGG SA, the parent company of the CGG Group (referred to hereafter as the "Company"), was founded in 1931 to market geophysical techniques that could be deployed to detect the presence of natural resources in the Earth's subsurface. Since then, the Company gradually specialized into becoming a provider of seismic techniques applied to the exploration and production of oil and gas, while continuing to remain active in other geophysical disciplines.

Its Sercel subsidiary was founded in 1960 to meet the Group's requirements for seismic recording equipment. Most notably, Sercel launched the SN 348 digital recording system which became the system of choice in the 1980's.

In the 1980's and 1990's, marine seismic expanded significantly, particularly in the Gulf of Mexico, the North Sea and West Africa. This growth in the marine market combined with the rapid arrival of new competitors offering geophysical services and equipment had an impact on the Group as it only had a small fleet of seismic vessels at that time.

The Company has been listed on the Paris Stock Market since 1981. The Company was listed on the New York Stock Exchange in 1997 to help finance its development strategy and strengthen its international reputation in the oil services sector and the Company was delisted from the New York Stock Exchange in 2018[1].

In 2007, when CGG acquired the Veritas group, it joined the ranks of the world's leading seismic companies. At that point, it took the name CGGVeritas before reverting to the simpler name of "CGG" when it acquired Fugro's Geoscience division in 2013.

Since early 2014, the CGG Group has experienced the deepest and longest downturn in its history. In the space of five years, the Group's headcount has fallen sharply from 9,700 people at the end of 2013 to around 5,100 at the end of 2018. This major and unprecedented industry crisis led to a financial crisis for CGG, resulting in having to enter into Safeguard proceedings on February 21, 2017, changing its governance in early 2018 and embarking on a new strategy announced at its Capital Markets Day on November 7, 2018. This new strategy involves exiting the contractual data acquisition segment and growing and improving the Geology, Geophysics and Reservoir ("GGR") and Equipment segments[2].

Financial restructuring process

Financial difficulties relating to the unprecedented crisis affecting the oil and oil-services industries

We have been severely hit by the unprecedented crisis impacting the oil and oil-services industries since late 2014. Our business volume is dependent on the level of investments made by our customers in the field of exploration and production (oil and gas), which is directly impacted by the fluctuations in the price of a barrel of crude oil. The price of a barrel has continued to drop since 2013 to reach levels below those anticipated by analysts. Between 2014 and 2015, the price of Brent dropped by 45%. The market conditions remained difficult in 2016 and in 2017, with no prospect of a short-term recovery. Our annual consolidated revenues in 2016 fell to a third of what was recorded in 2012.

Given this crisis, we began implementing the Transformation Plan starting in 2014. The implementation of this operational restructuring plan, resulted in, in particular, (i) the reduction of the fleet of vessels operated by us, (ii) a reduction of our workforce by 50%, (iii) a reduction of approximately 60% of overhead costs, and (iv) a reduction of our annual investments by close to 60%. This operational restructuring plan was financed in part by the capital increase completed in February 2016 for a gross amount of approximately €350,000,000.

Despite these operational efforts, we realized and announced, at the beginning of 2017, that our financial performance would not enable us to generate sufficient cash flows to service our then-current level of debt. In this context, we began discussions with the various stakeholders in order to establish a financial restructuring plan and requested the appointment of a *mandataire ad hoc* to assist us in our negotiations. By a court order dated February 27, 2017, SELARL FHB, acting through Ms. Hélène Bourbouloux, was appointed as *mandataire ad hoc* for a period of five months.

Discussions with the stakeholders resulting in the draft Safeguard Plan

Numerous meetings were held under the aegis of the *mandataire ad hoc* and in the presence of the main stakeholders, namely:

- the Company;

(1) CGG's ADSs were delisted from the New York Stock Exchange on October 2, 2018. Following such delisting, CGG maintains its American Depositary Receipt program at "level one". See 4.3.2.2.1. « Places where CGG securities are listed » of this document for more information.

(2) Following the implementation of our financial restructuring plan in February 2018, we remain subject to the undertakings and requirements set out in the safeguard plan endorsed by the Commercial Court of Paris in a ruling dated December 1, 2017 (see "Financial restructuring process" in this section for more details). Unless otherwise herein indicated, these undertakings and requirements apply to any reference made to our new strategy or to our new strategic plan in this document.

- representatives of several secured lenders under the Credit Facilities (the "Secured Lenders") which formed an *ad hoc* committee directly or indirectly representing 52.7% of the total principal amount due under the Credit Facilities (including funds or assets managed by Goldman Sachs, Makuria, Och Ziff and T. Rowe Price (with T. Rowe Price subsequently having left the committee));
- representatives of a group of holders of Senior Notes which formed an *ad hoc* committee representing approximately 52.4% of the total principal amount of the Senior Notes (including funds managed by the companies Alden Global Capital, LLC, Attestor Capital LLP, Aurelius Capital Management, LP, Boussard & Gavaudan Asset Management, LP, Contrarian Capital Management, L.L.C. and Third Point LLC, respectively);
- one of the representatives of each series of the convertible bonds (*représentant de chacune des masses*); and
- on the one hand, the representatives of the then two largest shareholders of the Company, Bpifrance Participations and AMS Énergie, holding approximately at the time 9.4% and 8.3%, respectively, of the Company's total share capital and approximately 10.8% and 8.1%, respectively, of the Company's voting rights (by a letter dated August 31, 2017, AMS Énergie declared that it had since crossed below the threshold of 1% for both the share capital and voting rights), and on the other hand, DNCA Finance and DNCA Invest (together "DNCA"), our long-term institutional partners holding approximately 5.5% of the total principal amount of the Senior Notes, approximately 20.7% of the total principal amount of the convertible bonds, approximately 7.9% of the share capital and 7.7% of the voting rights of the Company.

On June 1, 2017, we, the *ad hoc* committee of the Secured Lenders, the *ad hoc* committee of the holders of Senior Notes and DNCA reached an agreement in principle regarding a financial restructuring plan. On June 13, 2017, the agreement in principle was confirmed by legally binding documents (the lock-up agreement and the restructuring support agreement) whereby the parties thereto committed to undertake any action reasonably required to implement and carry out the financial restructuring. The terms and conditions of the lock-up agreement were relatively customary and included, in particular, the requirement for the creditors to vote in favor of the Safeguard Plan and the Chapter 11 Plan (subject to receiving appropriate disclosure material), provide various waivers, enter into the required documentation to effect the financial restructuring and not to sell their debt holdings unless the transferee entered into the lock-up agreement or was already a signatory thereto. According to the restructuring support agreement entered into with DNCA Invest and certain entities managed by DNCA Finance (together, the "DNCA Entities"), as shareholders, the DNCA Entities committed to take, as shareholders, any step and action reasonably necessary to implement and carry out the financial restructuring, including voting in favor of the appropriate resolutions at the shareholders general meeting and not selling their holdings of the Company's shares during the restructuring process.

In this context, we filed a petition with the Commercial Court of Paris to benefit from safeguard proceedings, which were opened by a ruling dated June 14, 2017. The Commercial Court of Paris appointed the former *mandataire ad hoc* as judicial administrator of CGG SA with the mission to supervise the debtor in its management and SELAFA MJA, acting through Ms. Lucile Jouve as creditors' representative.

JG Capital Management SAS, acting through its legal representative Mr. Gatty, was appointed as controller by a decision of the Paris supervisory court judge (*juge commissaire*) on September 14, 2017.

Because the Senior Notes were governed by the laws of the State of New York and the courts of such State had jurisdiction over any disputes relating thereto, we requested to benefit from the provisions of Chapter 15 of the United States Bankruptcy Code in order to have the effects of the safeguard proceedings recognized in the United States.

Accordingly, the application to have the safeguard proceedings recognized through Chapter 15 proceedings was filed with the U.S. Bankruptcy Court for the Southern District of New York on June 14, 2017 and the related order was obtained on July 13, 2017.

In addition, 14 foreign subsidiaries of the Group that were debtors or guarantors under our financial debt (namely CGG Holding BV, CGG Marine BV, CGG Holding I (UK) Ltd, CGG Holding II (UK) Ltd, CGG Holding (U.S.) Inc., CGG Services (U.S.) Inc., Alitheia Resources Inc., Viking Maritime Inc., CGG Land (U.S.) Inc., Sercel Inc., Sercel-GRC Corp, CGG Marine Resources Norge AS, CGG Canada Services Ltd. and Sercel Canada Ltd.) voluntarily applied for and obtained on June 14, 2017 the opening of reorganization proceedings under the Chapter 11 of the United States Bankruptcy Code in the U.S. Bankruptcy Court for the Southern District of New York.

As part of these judicial proceedings, the holders of claims under the Credit Facilities, Senior Notes and convertible bonds (whose principal aggregate amount amounted to approximately US$2.8 billion) were not allowed to accelerated their claims, which provided protection for us to carry out our operational activities while leaving the stakeholders a limited timeframe to approve a financial restructuring plan.

The draft Safeguard Plan was approved on July 28, 2017 by the committee of banks and financial institutions, and by the general meeting of holders of Senior Notes. In addition, the different classes of affected creditors in the context of the Chapter 11 proceedings voted in favor of the Chapter 11 Plan, which was confirmed by the U.S. Bankruptcy Court for the Southern District of New York by an order dated October 16, 2017. The works council of the Company, which was also consulted with respect to the draft Safeguard Plan, rendered a favorable opinion during its meeting held on October 2, 2017.

In order to implement the draft restructuring plan, the necessary resolutions were approved by the Company's general meeting of shareholders on November 13, 2017. The draft Safeguard Plan was then approved by a judgment of the Commercial Court of Paris on December 1, 2017. Lastly, the judgment of the Commercial Court of Paris relating to the Safeguard Plan was recognized and made enforceable in the United States under the Chapter 15 proceeding on December 21, 2017. The implementation of the Financial Restructuring Plan was finalized on February 21, 2018.

Description of the Safeguard Plan

The Safeguard Plan was aimed at restructuring our financial debt while preserving the Company as a sustainable and competitive entity, and included the following main items:

- preserving our integrity;
- giving us leeway to (i) pursue our technological and business development and (ii) face the uncertainties in the oil market; and
- maintaining and developing in France an internationally recognized center of excellence in the seismic and geoscience fields.

The Safeguard Plan was based on the following main characteristics:

a) Substantial reduction of our financial indebtedness level

This reduction was carried out by way of equitization, under the following conditions, of the principal amounts and accrued but unpaid interest as of February 2, 2018 (being the last day of the subscription period of the Rights Issue (as defined below)), in respect of:

(i) the Senior Notes, which were reduced by an amount of US$86 million (which, at the holders' election, either was repaid by way of set-off at their face value as part of the subscription for the second lien notes (without Warrants #3) or will be repaid in cash over a ten-year period subject to certain terms. The equitization of the remaining claims under the Senior Notes was carried out through a share capital increase with removal of the shareholders' preferential subscription right in favor of the holders of Senior Notes at a subscription price of €3.12 per new share. The capital increase was subscribed for by way of set-off at their face value against the amount of the claims under the Senior Notes (the "Senior Note Equitization"), which were converted into euros in accordance with the Safeguard Plan at the exchange rate of US$1.1206 per euro.

(ii) the convertible bonds, which were reduced by an amount of approximately €4.46 million (the euro equivalent of US$5 million converted in accordance with the Safeguard Plan at the exchange rate of US$1.1206 per euro), which was paid in cash on February 21, 2018. The equitization of the remaining claims under the convertible bonds was carried out via a share capital increase with removal of the shareholders' preferential right in favor of the holders of convertible bonds at a subscription price of €10.26 per new share. The subscription to the share capital increase was carried out by way of set off at their face value against the claims under convertible bonds (the "Convertible Bond Equitization").

b) New money injection up to a maximum amount of approximately US$500 million

The parties agreed to inject new money of approximately US$500 million, on the basis of a negative outlook for 2018 and 2019, relying in particular on a less favorable assumption for the oil price stabilizing at US$50-55 per barrel, and a lower level of increase in the exploration expenses. Such new money injection was carried out by way of (i) the Rights Issue, and (ii) the issuance of the new money portion of the second lien notes, as follows:

(i) The Safeguard Plan provided for a share capital increase with preferential subscription right in an amount of up to approximately €112 million (including share premium) (corresponding to approximately US$125 million on the basis of the exchange rate provided for in the Safeguard Plan of US$1.1206 per euro), by way of an issue of shares of the Company, each with a share warrant attached (the "Rights Issue") at a subscription price of €1.56 for each new share with a share warrant attached. Three of these share warrants (the "Warrants #2") gave the right to subscribe to two new shares at a subscription price of €4.02 per new share for a five-year period as from February 21, 2018. The Rights Issue had cash backstop commitments from the DNCA Entities for approximately €71.39 million (including the share premium) (euro equivalent of US$80 million converted using the exchange rate provided in the Safeguard Plan of US$1.1206 per euro) and additional backstop commitments by the holders of Senior Notes by way of set-off against part of their claims under the Senior Notes (which would have been triggered only if the backstop commitments by the DNCA Entities had not been sufficient to ensure the full subscription of the Rights Issue). These backstop commitments were not called, as the total subscription demand amounted to €132.5 million (€20.3 million higher than the target amount) with a subscription rate of 118.06%.

(ii) The Safeguard Plan provided for new money of up to US$375 million, subscribed pursuant to a private placement agreement dated June 26, 2017, by way of the issuance by the Company of new high yield notes governed by New York-law, benefitting from second-ranking security interests, bearing interest at a rate including a variable component indexed on the LIBOR (for the tranche denominated in US dollars) and EURIBOR (for the tranche denominated in euros), in each case, with a floor of 1%, plus a margin of 4.0% per annum, and payment-in-kind interest ("PIK interest") of 8.5% per annum (such notes, the "second lien notes" and such issuance, the "New Notes Issuance"). The second lien notes were issued together with share warrants (the "Warrants #3") which were exercisable within a six-month period from February 21, 2018 and gave the right to subscribe, at a subscription price of €0.01 per new share, for new shares representing in the aggregate 16% of the share capital of the Company, after dilution resulting from the issuance of shares as part of the Senior Note Equitization, the Convertible Bond Equitization, the Rights Issue, the exercise of all of the Backstop Warrants (as defined below), Coordination Warrants (as defined below) and Warrants #3, but prior to the exercise of the Warrants #1 (as defined below) and Warrants #2. Certain eligible holders of Senior Notes undertook to subscribe for the New Notes Issuance, in accordance with the terms of the private placement agreement. These subscribers received a subscription commitment fee equal to 7% of the total amount of the New Notes Issuance they subscribed. The New Notes Issuance was backstopped by the members of the *ad hoc* committee of the holders of Senior Notes (or their transferees, subject to certain conditions), who received: (x) a backstop commitment fee equal to 3% of the total amount of the New Notes Issuance (such fee having been paid by way of set-off against the subscription price of the second lien notes), and (y) share warrants with a six-month exercise period as from February 21, 2018 giving the right to subscribe, at a subscription price of €0.01 per new share, for new shares representing 1.5% of the share capital of the Company, after dilution resulting from the issuance of shares as part of the Senior Note Equitization, the Convertible Bond Equitization, the Rights Issue, the exercise of all of the Backstop Warrants (as defined below), Coordination Warrants (as defined below) and Warrants #3 but prior to the exercise of the Warrants #1 (as defined below) and Warrants #2 (the "Backstop Warrants"). As a result, on February 21, 2018, the Company issued US$355.1 million and €80.4 million in principal amounts of second lien notes (comprising US$275 million and €80.4 million as new money and US$80.2 million in exchange for part of the accrued interest claims under the Senior Notes, with the US dollar-denominated second lien notes issued as new money notes and the second lien notes issued in exchange for the accrued interest claims under the Senior Notes being fungible).

c) Free allocation of share warrants to the shareholders and certain holders of Senior Notes

The Safeguard Plan also provided for the following:

(i) the issuance and free allocation by the Company of share warrants in favor of the historical shareholders of the Company, with a four-year exercise period from February 21, 2018, with one such share warrant being allocated to each existing share and three of such share warrants giving the right to subscribe for four new shares of the Company at a subscription price of €3.12 per new share (the "Warrants #1");

(ii) the issuance and free allocation by the Company of share warrants in favor of the members of the *ad hoc* committee of the holders of Senior Notes with a six-month exercise period from February 21, 2018, giving the right to subscribe, at a subscription price of €0.01 per new share, for new shares representing 1% of the share capital of the Company, after dilution resulting from the issuance of shares as part of the Senior Note Equitization, the Convertible Bond Equitization, the Rights Issue, the exercise of all of the Backstop Warrants, Coordination Warrants (as defined below) and Warrants #3 but prior to the exercise of the Warrants #1 and Warrants #2 (the "Coordination Warrants").

d) Significant extension of the maturity of the secured debt by way of an exchange

This extension of the maturity of our secured debt allows us not to be under any repayment obligation until 2023. It was carried out by way of a cancellation of the principal amount of the claims under the Credit Facilities, reduced by the US$150 million initial cash repayment from the net proceeds of the Rights Issue and the New Notes Issuance, in exchange for the first lien notes. As a result, on February 21, 2018, CGG Holding (U.S.) Inc. issued US$663.6 million in principal amount of first lien notes, bearing floating rate interest at LIBOR (with a floor of 1%) plus 6.5% per annum in cash, and 2.05% per annum PIK interest in exchange for the remaining claims under Credit Facilities, reduced by the cash payment of US$150 million. The Company could, at any time prior to May 21, 2018, redeem these first lien notes, in whole but not in part, at 100% of their principal amount and then until August 21, 2018 at 103% of their principal amount. Beyond this date and until February 21, 2021, the Company had the option to redeem these first lien notes in whole or in part at a redemption price of 103% of the principal amount thereof plus an applicable premium until February 21, 2021. On April 24, 2018, CGG Holding (U.S.) Inc. Issued new first lien senior secured notes with maturity 2023, for a total nominal amount of US$300 million bearing interest at 9.00% plus €280 million bearing interest at 7.875%.

The new money raised as part of the Rights Issue and the New Notes Issuance (net of backstop and commitment fees and other fees related to the Rights Issue and the New Notes Issuance) was and will be used as follows:

- first, and up to an amount of US$250 million (calculated using the exchange rate provided for in the Safeguard Plan of US$1.1206 per euro), for the financing of our corporate and financial needs (including (i) the payment of the accrued and unpaid interests as of February 2, 2018 under the convertible bonds not equitized as part of the Convertible Bonds Equitization for an amount of approximately €4.46 million (calculated using the exchange rate provided for in the Safeguard Plan of US$1.1206 per euro) and (ii) the payment of costs and fees in connection with the financial restructuring, other than backstop costs and fees and other fees related to the Rights Issue and the New Notes Issuance);
- second, to make the US$150 million initial cash repayment to the Secured Lenders on a *pro rata* basis; and
- the remainder being kept by us to face (i) our financial needs (including the payment of fees and costs in connection with the financial restructuring other than the subscription and backstop fees and costs) and (ii) any delay in our redeployment.

The Chapter 11 Plan has the same characteristics as that set out above and applicable to the Safeguard Plan for the concerned creditors, namely the creditors under the Credit Facilities and the Senior Notes.

Undertakings of the Company and certain of its creditors in the framework of the safeguard proceedings

(i) Undertakings of the Company

Bpifrance Participations (which held, as of December 31, 2017, 9.35% of the share capital and 10.90% of the voting rights of the Company) voted in favor of the resolutions required to implement the Financial Restructuring Plan at the general meeting of shareholders held on November 13, 2017 on second convening, in light of the undertakings made by the Company, upon authorization from its board of directors, in a letter dated October 16, 2017 sent to the supervising judge of the Paris Commercial Court (*juge commissaire*) and the judicial administrator (*administrateur judiciaire*). Pursuant to such letter, the Company:

- undertook to refrain from any form of disposal of its significant assets until December 31, 2019, pursuant to article L. 626-14 of the French Commercial Code, as such disposals are not provided for by its three-year business plan (the "Business Plan"); consequently, should such disposals appear necessary due to the evolution of market conditions that would impede implementation of the Business Plan, the Company would have to request the prior authorization of the Commercial Court of Paris;
- confirmed that the Business Plan does not provide for any form of disposal of significant assets held in France or abroad, including by its direct or indirect subsidiaries; should the disposal of such significant assets be foreseen and likely to result in a substantial change to the means or goals of the draft Safeguard Plan, the Company would have to request the prior authorization from the Commercial Court of Paris, pursuant to article L.626-26 of the French Commercial Code; the Company will keep the necessary flexibility to take an active part, as the case may be, in the potential consolidation or other form of evolution that may occur in the seismic acquisition market;
- confirmed that pursuant to the draft Safeguard Plan and in light of the underlying market assumptions of its Business Plan, no social or industrial restructuring is contemplated in France, and that the Transformation Plan, which implementation was completed by the end of 2016, had already led to the reduction of the Group's workforce by half compared to the end of 2013; more precisely, unless otherwise authorized by the Commercial Court of Paris, the Company undertook to refrain from any redundancy plan in France until December 31, 2019 and to maintain, and to do what is necessary for the French law subsidiaries it controls within the meaning of article L.233-3 of the French Commercial Code to maintain the decision centers currently located in France, including the Company's registered office, until December 31, 2022; and
- undertook (i) not to take any measure to oppose the governance undertakings made by the Signatory Creditors (as defined below), it being specified however, that the Company assumes no responsibility, and the Safeguard Plan will not be at risk of being terminated pursuant to articles L.626-25 and L.626-27 of the French Commercial Code in the event one or more third parties separate from the Signatory Creditors were to hold a sufficient number of voting rights to impose a composition of the board of directors of the Company that would differ from the one provided for under these undertakings, and (ii) to have Bpifrance Participations participate in the discussions that will take place notably with the Signatory Creditors with respect to the new composition of the Company's board of directors, in accordance with the provisions of the lock-up agreement referred to above.

The trustees in charge of overseeing the implementation of the plan (*commissaires à l'exécution du plan*), appointed by the Commercial Court of Paris, will issue a yearly report on the compliance with the undertakings that the Company makes under the Safeguard Plan and this letter, which have been acknowledged by the Commercial Court of Paris in its judgment approving the Safeguard Plan; any breach may potentially lead to the termination of the Safeguard Plan, in accordance with applicable laws and regulations. In accordance with article L. 626-26 of the French Commercial Code, any substantial change in the goals or the means of the Safeguard Plan can only be decided by the Court, further to a report by the *commissaires à l'exécution du plan*.

(ii) Undertakings of certain Senior Notes holders creditors

Each of (i) Attestor Capital LLP[3], (ii) Boussard & Gavaudan Asset Management LP[4], and (iii) DNCA Finance, Oralie Patrimoine and DNCA Invest SICAV[5] (each, a "Signatory Creditor") agreed to give the following undertakings on October 16, 2017, upon a request from the *Direction Générale des Entreprises*, which have been acknowledged by the Commercial Court of Paris in its judgment approving the Safeguard Plan on December 1, 2017:

- to have Bpifrance Participations involved in the discussions that will be notably held with each of the Signatory Creditors regarding the Company's board of directors' new composition, in accordance with the provisions of the lock-up agreement referred to above;
- to vote, during the first ordinary shareholders' meeting of the Company that will occur after the closing of the financial restructuring, in favor of the designation as director of candidates which will have been agreed between the Company's current board of directors and the relevant Signatory Creditor in the context of the above referred process;
- neither the relevant Signatory Creditor nor its affiliates or related persons will be represented on the Company's board of directors unless such Signatory Creditor or the funds, entities or accounts managed or advised directly or indirectly by it or its affiliates (i) hold together 10% or more of the Company's share capital or (ii) demonstrate the existence of fiduciary duties (including the duties of the relevant funds' management companies to manage the money entrusted to them by investors in the best interest of such investors);
- to vote in favor of any draft resolutions and, if necessary and subject to holding a sufficient shareholding in compliance with article L. 225-105 of the French Commercial Code, to submit any draft resolutions to the shareholders' meeting in order to maintain the Company's board of directors composed of 60% of independent

(3) As of that date, Attestor Capital LLP and its affiliated funds held Senior Notes for an amount of US$118,918,787, but did not hold any Company's shares or convertible bonds.
(4) As of that date, Boussard & Gavaudan Asset Management LP and its affiliated funds held Senior Notes for an amount of US$173,971,173 and convertible bonds dor an amount of €20,020,422, but did not hold any Company's shares.
(5) As of that date, DNCA Finance, Oralie Patrimoine et DNCA Invest SICAV and their affiliated funds held (i) approximately 5.5 % of the principal total amount of the Senior Notes, (ii) approximately 20.7 % of the principal total amount of the convertible bonds, and (iii) approximately 7.9 % of the Copany's share capital.

directors and that such composition of the board continues to reflect, in accordance with the current situation, the diversity of geographical origins of the members of the board of directors, while complying with the Company's registered office location;

- to vote in favor of any draft resolutions and, if necessary and subject to holding a sufficient shareholding in compliance with article L. 225-105 of the French Commercial Code, to submit any draft resolutions to the shareholders' meeting in order to ensure that the Company's articles of association provide that any chief executive officer (*directeur général*) succeeding, as the case may be, the current chief executive officer (*directeur général*), will have his main place of residence located in France.

The abovementioned undertakings of each of the Signatory Creditors became effective when all the transactions for the implementation of the Safeguard Plan were completed (with the exception of the first undertaking, which took effect as from countersignature of the letter by the Signatory Creditors). The undertakings will remain valid until December 31, 2019, subject to the corresponding Signatory Creditor remaining a shareholder of the Company, it being specified that no undertaking to keep shares of the Company has been entered into.

The trustees in charge of overseeing the implementation of the plan (*commissaires à l'exécution du plan*) appointed by the Commercial Court of Paris, will issue a yearly report on the compliance with the undertakings that the Signatory Creditors make under the abovementioned letters; any breach potentially leading to the termination of the Safeguard Plan, in accordance with applicable laws and regulations.

Each of the Signatory Creditors also declared that it does not act in concert with any other Signatory Creditor, with Bpifrance Participations, or with any other third party.

History and significant events in the development of our "Geology, Geophysics & Reservoir" (GGR) activities

The seminal event cementing CGG as a leader in the Geoscience and multi-client activities of GGR was the acquisition, in 2007, of Veritas DGC Inc., the leader in high end seismic data processing and a significant competitor in the multi-client arena, especially in the Gulf of Mexico, the North Sea and Brazil. This was followed by the acquisition of the Geoscience Division of Fugro which contributed geologic expertise under the Robertson brand and additional reservoir software under the Jason brand.

Development of the GGR segment has otherwise been organic, through significant Research and Development expenditures, major investments in the data library and large investments in employee development and retention.

History and significant events in the development of our "Equipment" activity (Sercel)

In the geophysical equipment market, Sercel has been successful in combining organic growth with external expansion.

This expansion has enabled it to build a leading position in the manufacture and sale of marine streamers, geophones and seismic cables, the development, manufacture and sale of cableless seismic acquisition systems, and the supply of other types of sensors, such as high-pressure, high-temperature downhole gauges.

Due to the industry downturn, Sercel has suffered a drastic reduction in its annual revenue from a high of US$1.2 billion in 2012 to a low of US$241 million in 2017, and has adapted its organization and operations accordingly.

History and significant events in the development of our "Contractual Data Acquisition" activities

Over the course of the last 15 years, the Group has strengthened its market position in "Contractual Data Acquisition" activities.

By acquiring the company Exploration Resources ASA in September 2005, the company Veritas DGC Inc. in January 2007, the company Norwegian Wavefield Inseis ASA company in December 2008, and the seismic vessels of Fugro in January 2013, CGG was able to build a very strong market position in marine acquisition.

However, CGG was not able to profit from this leading market position and, beginning in 2014, with the severe downturn in the seismic market, CGG drastically reduced its seismic fleet, downsizing gradually from the 23 vessels operated in mid-2013 to 5 in 2018.

In conjunction with its acquisition of Fugro's Geoscience Division, the Group incorporated its transition zone and seabed acquisition activities (shallow water & ocean bottom systems) within the Seabed Geosolutions BV joint venture, owned 60% by Fugro and 40% by CGG.

The Group continued with this strategy of becoming a minority interest partner in non-core activities in 2014, by becoming a minority shareholder in Ardiseis, its land and transition zone acquisition subsidiary in the Middle East (except Saudi Arabia), through the sale of a 2% stake to its partner TAQA.

On November 7, 2018, at its Capital Markets Day, the Group announced a new strategic plan, which will enable it to prosper during cycle upturns and survive downturns. In this way, CGG aims to strengthen its hightly differentiated position in what it does very well already and take advantage of its abilities and expertise to grow in an improving market. This means that CGG will capitalize on its people, its data and its technologies by strengthening its positions in its three activities of Geoscience, Multi-Client and Equipment that remain profitable and cash generating throughout the different industry cycles, have high added value, and are best positioned to benefit from the market recovery.

As a result of this new strategic plan, CGG will transition to an asset light model and exit the data acquisition market which for the last few years has been faced with structural overcapacity, a lack of technological differentiation, very low prices and high fixed costs. The following changes are planned in each of our different acquisition activities:

- In Marine: we will reduce our fleet to three vessels from 2019 onwards and seek a strategic partner to operate these vessels;
- In Land: we will cease all activity after a gradual winding-down period, expected to be finished by the end of 2019; and
- In Multi-Physics: we have marketed this activity for sale.

1.3. BUSINESS OVERVIEW

CGG is a global leader in geophysical products and services. The Group provides a wide range of services, equipment (under the Sercel trademark) and technology to a broad variety of clients operating worldwide principally in the oil and gas exploration and production industry.

As of December 31, 2018, CGG was organized in two segments, as follows:

- Geology, Geophysics & Reservoir ("GGR"), including Geoscience (Subsurface Imaging, Geology, Reservoir, GeoSoftware and Smart Data Solutions, as well as Technology Function), and Multi-Client ("MC", including seismic and geologic data library); and
- Equipment, which includes the following business equipment activities: land, marine, borehole and non-oil & gas equipment, as well as trademarks, such as Sercel, Metrolog, GRC and De Regt).

As a result of the announcement of our Strategic plan, the Contractual Data Acquisition segment, including Marine, Land and Multi-Physics business lines, is now presented as discontinued operations and assets held for sale in accordance with IFRS 5.

CGG SA is the top holding company of a group composed of 71 consolidated subsidiaries as of December 31, 2018 (66 abroad and 5 in France).

Revenues by activity

In Millions of US dollars	2018	2017	2016
Multi-client data	517	469	383
Geoscience	396	351	401
Geology, Geophysics & Reservoir ("GGR") revenues	**913**	**820**	**784**
Equipment revenues	**351**	**241**	**255**
Eliminated revenues and others	**(36)**	**(26)**	**(76)**
IFRS 15 impact on pre-commitments	**(34)**	—	—
Consolidated revenues	**1,194**	**1,035**	**963**

Revenues by region — by location of customers

	2018		2017		2016	
In millions of US dollars, except percentages	MUS$	%	MUS$	%	MUS$	%
North America	244	21%	312	30%	303	31%
Latin America	268	22%	215	21%	135	14%
Europe, Africa and Middle East	447	37%	362	35%	386	40%
Asia Pacific	235	20%	146	14%	139	15%
Total	**1,194**	**100%**	**1,035**	**100%**	**963**	**100%**

The Group's clients can be broadly categorized as national oil companies, international oil companies (the "Majors") and independent oil companies. In 2018, our top two clients represented 7.1% and 6.3% of consolidated revenues, respectively.

Figures relating to the geophysical market and to the competitive positioning of the Group's GGR and Equipment segments or the activities of these segments have been derived from internal Group data. No external database is available as of the date of this document.

1.3.1. Geology, Geophysics & Reservoir ("GGR")

Overview

With its worldwide footprint, our GGR segment engages in many activities assisting our clients in identifying their exploration targets and characterizing their reservoirs. Among these are:

- developing and licensing multi-client seismic surveys;
- processing seismic data;
- selling seismic data processing and reservoir characterization software (primarily under the geovation, Hampson-Russell and Jason brands);
- providing geoscience and petroleum engineering consulting services;

- collecting, developing and licensing geological data (under the Robertson brand).
- and providing data management services and software to our clients.

With its extensive scope of competencies, our GGR segment is the cornerstone of the integrated geoscience services that we offer to our clients.

General description of activities

Geoscience

Through its Geoscience activity, CGG transforms marine and land seismic data acquired in the field into high quality images of the subsurface that can then be used by our clients in their efforts to find and produce oil and gas. These images provide a means to understand the structure of the subsurface as well as deduce various qualities of the rocks and fluids in those structures. We process seismic data acquired by our land and marine seismic acquisition crews as well as seismic data acquired by non-affiliated third parties. In addition, we reprocess the previously processed data using new techniques to improve the quality of seismic images.

We conduct our seismic imaging operations out of:

- 7 large open centers: Houston (USA), Crawley (UK), Rio de Janeiro (Brasil), Massy (France), Singapore, Perth (Australia) and Calgary (Canada), with Houston, Crawley and Singapore serving as regional hubs hosting internal cloud computing for each of the regions through their large high performance computing centers;
- 11 small to medium centers, affiliated with the three regional hubs, relaying the offering within their region;
- 10 dedicated centers or teams serving their client exclusively.

This geographic spread of centers allows for a great amount of personal collaboration with our clients as we jointly seek to produce the best subsurface images.

In addition to subsurface imaging, we offer geophysical and reservoir services. Using seismic data in conjunction with other information such as well logs, we are able to determine various rock and fluid properties and thereby assist our clients in characterizing their oil and gas reservoirs.

CGG also sells seismic data processing software, under the Geovation brand and sells software for reservoir characterization, interpretation, and modeling under the Hampson-Russell, Jason, Insight Earth and Velpro brands, allowing clients to produce their own reservoir studies.

Finally, CGG is engaged in the business of providing data storage solutions, and data transformation and digitialization services to oil companies and oil and gas government agencies under the Smart Data Solutions brand. The explosion in volume of data of all types and the need to re-format and digitalize large volumes of old data for use in current applications make this activity an interesting area for future growth.

CGG operates in those geographic and technical areas where its specific offerings can deliver significant value to customers. Based on customer feedback and industry surveys, we believe that our Geoscience activity is regarded as the technical leader in markets where it participates.

Multi-Client ("MC")

The MC business line utilizes the resources of our other business lines as well as those of sub-contractors to acquire and process seismic data for itself and license that data to our clients. Additionally, MC may contribute or otherwise use its multi-client data in certain ventures with third parties in order to achieve enhanced returns. Such new ventures may take different forms, provided that they will not expose us to any drilling or other typical oilfield operation risk.

In addition to geophysical data, MC develops and maintains large libraries of various types of geological data covering most geographic areas of interest to petroleum and mining companies. We license this data to clients, who generally use it in the early stages of their exploration efforts, often as a precursor to seismic exploration. Our geologists and other geoscientists also engage in many types of proprietary studies for clients. This activity has historically been reported under the Geoscience business line, but will be part of MC for 2019 and onward.

The seismic multi-client licenses are for lengthy terms, the maximum allowable under local law, typically ranging from 5 to 25 years. The licenses are non-transferable, and the data may not be shared with partners who do not own a license. Oil company partnerships of various forms are a common arrangement, especially in difficult and expensive exploration plays. The business model works well in venues where there is one or more of the following: significant levels of competition between oil companies exploring for assets; frequent lease turnover due to government lease rounds or lease trading activity between oil companies and frequent partnering between oil companies.

The costs of the multi-client surveys are capitalized on MC's balance sheet and then amortized. Details of our multi-client accounting methods are fully described in note 1 to our consolidated financial statements included in this document.

In 2018, MC capitalized US$242 million of total costs, of which US$223 million represented cash expenditures, and amortized US$552 million to cost of sales, including US$226 million of impairment charges.

MC operates in marine environments on a worldwide basis and on land in the United States. It has significant investments in the Gulf of Mexico, offshore Brazil, the North Sea and onshore United States. Maps and details of all surveys in our data library are available on our website. At the end of 2018, the library of 3D seismic surveys consisted of approximately 1,054,735 square kilometers of marine surveys across numerous basins and 81,456 square kilometers of land data, mostly in the United States.

Competition and Market

The Geoscience sector is led by CGG and Schlumberger (WesternGeco), but includes large companies such as PGS, TGS and a host of other small local players. Competition in the high end of seismic imaging, where Geoscience focuses its business, tends to be based on technology and service level, areas where we have an outstanding reputation.

Processing capacity has multiplied in recent years as a result of improvements in computing technology. This increase in computing power has allowed improved processing quality through the use of more complex and more accurate algorithms. We believe Geoscience is the market leader in application of the most advanced processing techniques.

Geoscience occupies a strong position in the relatively narrow market of seismic reservoir characterization software (Hampson-Russell, Jason and Insight Earth). The overall seismic and geological interpretation software market is dominated by Schlumberger and Halliburton, with numerous small players competing with niche applications. Many of these, including those of Geoscience, are designed to be compatible with the Schlumberger and Halliburton systems.

MC's main competition comes from Schlumberger (WesternGeco), PGS and TGS. Competition in the multi-client business is focused on location and availability of surveys, technology used in acquisition and processing, and price. The four main companies generally compete in all areas of the world where the multi-client business model is practical.

2018 segment figures

GGR revenues in 2018 amounted to US$913 million, an increase of 11% compared to 2017. GGR revenues represented 76% of the consolidated revenues in 2018. MC generated US$517 million of this revenue (a 10% increase compared to 2017) and Geoscience generated US$396 million (a 13% increase compared to 2017).

MC invested US$242 million in seismic data libraries in 2018, with a cash prefunding rate of 97%. After sales revenue, revenue from completed surveys, was US$302 million in 2018. The IFRS net book value of the seismic multi-client library was US$633 million at the end of the year.

2019 outlook

Increasing oil and gas prices have significantly improved the profitability and cash flow within GGR's customer base, which should lead to an improved market for GGR. However, most large clients are publicly stating that they will maintain tight spending discipline and will structure their companies to generate cash flow and returns at commodity prices lower than today's prices.

Many customers are focusing their exploration and production budgets on increasing production from current installations. GGR participates in and benefits from this activity through our leading 4D and ocean bottom nodes processing, and through sales of licenses to our multi-client surveys, covering these mature areas. Our clients also invest heavily in their land operations in the United States where GGR has established, and is expanding, its significant data library position in the popular onshore unconventional plays.

Our top line strategy for the GGR activities in 2019 continues to be:

- Maintain our investment in new MC surveys, at an acceptable level of pre-funding and returns;
- Continue to invest in research and development and people to maintain our lead in high-end imaging and advance our software offering;
- Expand our reservoir and geological operations through increased multi-client / subscription product investment and the geographic expansion of certain technologies; and
- Gain more value from integrated offerings.

1.3.2. Equipment

Overview

We conduct our equipment development and production operations through Sercel and its subsidiaries. We believe Sercel is the market leader in the development and production of seismic equipment in the land and marine seismic markets. Sercel makes most of its sales to purchasers other than CGG. As of December 31, 2018, Sercel operated six seismic equipment manufacturing facilities, located in Nantes and Saint Gaudens in France, Houston and Tulsa in the US, Krimpen aan de Lek in The Netherlands and Singapore. In China, Sercel operates through Hebei Sercel-JunFeng Geophysical Prospecting Equipment Co. Ltd. ("Sercel-JunFeng"), based in Hebei, in which Sercel has a 51% equity stake. In addition, two sites in Toulouse and Brest (France) are dedicated to borehole gauges and submarine acoustic instrumentation, respectively.

General description of activities

Sercel sells its equipment and offers customer support services including training on a worldwide basis. Sercel offers a complete range of geophysical equipment for land or marine seismic data acquisition, including seismic recording equipment, software and seismic sources either for land (vibrators) or marine (air guns). Sercel also supplies its clients with integrated solutions.

With respect to land acquisition equipment, Sercel launched, in the fall of 2013, the latest generation of its recording system, the 508XT system, which introduces a new paradigm in land seismic acquisition by offering high count channels crews the ability to record up to one million channels in real time, resulting in a new level of image resolution. First deliveries for this new system occurred during 2014 and in January 2016 the system achieved one million VPs (Vibrated Points) on a high density survey with a high channel count. The

508XT is the first member of Sercel's new generation of state-of-the-art land seismic acquisition systems designed to drive crew productivity, operating flexibility and data quality to a new level.

The 508XT has an adaptive architecture and the option of mixing different communication media (cable, radio, and fiber-optic) to form a true network allowing the user to define data routing and hence avoid obstacles in the field.

In June 2018, Sercel presented to the market a transition zone version of its 508XT system for deployment of the equipment in marsh zones and in water depths up to 25 meters.

Sercel also introduced, along with its new acquisition system, QuietSeis, a new, high-performance digital sensor based on next-generation MicroElectroMechanicalSystems (MEMS), allowing seismic signals to be recorded with three times less instrument noise than before.

The 508XT architecture combines the best of both cabled and wireless technologies. In June 2017, Sercel announced the launch of a new node, the WTU-508, which is fully integrated into the existing 508XT platform. This new product offers even greater flexibility for all types of survey operations, such as complex small-scale urban surveys or high-productivity mega-crews. The WTU-508 also features Sercel's new XT-Pathfinder transmission management technology, which provides quality control information to the land seismic recorder wirelessly and without the need for any additional infrastructure.

Sercel is also a market leader for vibroseismic vehicles used as seismic source in land and for vibrator electronic systems VE 464. Sercel's latest vibrator family, called Nomad, offers high reliability and unique ergonomic features. Nomad is available with either normal tires or a tracked drive system. The track drive system allows Nomad vibrators to operate in terrain not accessible to vehicles with tires. In sand dunes or arctic conditions, this can improve crew productivity. The Nomad was designed to optimize reliability and maintenance in order to allow an intensive use on the field. As of December 31, 2018, more than 1,100 Nomad 65 were delivered since its market introduction. Sercel also offers the Nomad 90 which is capable of exerting a peak force of 90,000 pounds and is believed to represent the heaviest vibrator on the market. The Neo version of the Nomad 65 and 90 allows the generation of a wider range of seismic wave frequencies and is therefore a facilitator for broadband seismic land surveys and adds new functionalities that improve productivity and reliability. In June 2014, Sercel also launched the Nomad 15, a small and highly maneuverable version of a vibrator.

In addition to recording systems and vibrators, Sercel develops and produces a complete range of geophysical equipment for seismic data acquisition and other ancillary geophysical products such as geophones, cables and connectors. The acquisition of a 51% stake in Sercel-JunFeng, based in China, in 2004, reinforced our manufacturing capabilities for geophones, cables and connectors, as well as our presence on the Chinese seismic market. Sercel also offers the SG5 geophone featuring a low natural frequency.

In the down-hole domain, Sercel offers its latest generation VSP tool, MaxiWave, which has received positive reviews from clients. The Geowave II, launched in 2015, is the first digital multilevel borehole tool specifically designed for high temperature, high pressure wells. Sercel built on its diversification into the well environment and more specifically the artificial lift in acquiring Geophysical Research Corporation in January 2012.

With respect to marine equipment, the Seal system is currently the sole system with integrated electronics. In 2005, Sercel launched the Sentinel solid streamer that is the outcome of the technological synergies realized in acquisitions performed in recent years. The Sentinel cables have become a standard in the accessible market. The Sentinel RD is another generation of the Sentinel solid streamer which offers a reduced diameter and lower weight.

In June 2013, Sercel introduced the Sentinel MS, a Sentinel with multi-sensors together with two additional acceleration components, providing directive measurement for both cross line and vertical wave front. This streamer technology delivers multi-sensors data sets for enhanced broadband imaging.

In April 2017, Sercel has further enhanced its cables offer with the Sentinel HR, the new high-resolution solid streamer designed to meet the specific imaging needs of shallow-target applications, such as oceanology, civil engineering and reservoir characterization, as well as high-resolution 3D (HR3D) seismic surveys for detailed mapping of geological features. The latest member of the Sentinel streamer family has been developed with a close channel separation of 3.125 meters to achieve reliable and cost-effective high-resolution surveys.

The marine range of products has been further improved with the SeaProNav, a navigation software allowing the real-time positioning of streamers, the Nautilus, a totally integrated system for positioning seismic streamers and QuietSea, a passive acoustic monitoring system for detecting the presence of marine mammals during marine seismic surveys.

In October 2015, Sercel launched the GeoTag product, an acoustic solution for seabed seismic acquisition at up to 500 meters depth.

As a result of many acquisitions since 2000, Sercel is a market leader in the development and production of both marine and land geophysical equipment. It is a global provider for the seismic acquisition industry with a balanced industrial position in terms of both product range and geographical presence on the shores of the Atlantic and in Asia Pacific. Sercel also relies on strategic partnerships to move beyond the oil exploration markets. To that end, an alliance was formed at the end of June 2017 with EFI Automotive, a French company that has created Axandus (a startup accelerator), in order to set-up a similar entity within Sercel's premises in the western part of France. Its aim is to assist startups in their industrialization process in the fields of mechatronics and connected devices. Axandus' clients benefit from access to the panel of skills and resources of Sercel in business development, design, prototyping, design to cost, industrialization, manufacturing and international supply chain.

Sercel has also, in November 2017, entered into a partnership with UK-headquartered Fotech Solutions to jointly develop a future borehole seismic solution combining electronics and distributed acoustic sensing (DAS) technology. Within the partnership, Fotech Solutions will contribute DAS measurement solutions and Sercel will contribute downhole seismic tools & software for subsurface seismic operations. This combination of expertise will lead to revolutionary new technology developments for both the borehole seismic exploration and microseismic monitoring markets.

In early 2019, Sercel has announced the execution of a strategic partnership agreement with Apave for the delivery of a structural health monitoring (SHM) solution combining Sercel's high-end sensor technology and Apave's expertise as a specialist in structural health monitoring. Sercel and Apave aim to bring their solution to market in 2019 and begin commercial deployment in France in early 2020.

Competition and market

We estimate that the worldwide demand for geophysical equipment has slightly increased in 2018 after a decrease of 41% in 2016 and a stabilization in 2017. This low level of activity remains due to a weakness of demand for land seismic equipment with the lack, in recent years, of new high-channel count megacrews operating in the Middle East and to the collapse of the marine demand due to the reduction of the global seismic fleet. We estimate that Sercel's global market share remains around 50%. Our main competitors for the manufacture of marine seismic equipment are Ion Geophysical Inc.and Teledyne. For land products, the main competitors are Inova (a joint venture between BGP and Ion Geophysical Inc.), Geospace Technologies Corporation and DTCC. Schlumberger (WesternGeco), which offered its equipment to the global market, announced early 2018 its exit of the acquisition market including the equipment manufacturing. The market for seismic survey equipment is highly competitive and is characterized by continual and rapid technological change. We believe that technology is the principal basis for competition in this market, as oil and gas companies have increasingly demanded new equipment for activities such as reservoir management and data acquisition in difficult terrain. Oil and gas companies have also become more demanding with regard to the quality of data acquired. Other competitive factors include price and customers' support services.

2018 segment figures

In 2018, the total production of the Equipment segment (Sercel), including internal and external revenues, amounted to US$351 million, a 45% increase compared to 2017.

Sercel external revenue amounted to US$314 million, an increase of 46% compared to 2017, and representing 26% of our consolidated revenue in 2018.

2019 outlook

In 2019, we expect that Sercel's revenue should improve compared to 2018 with a rebound of land activity worldwide due to the need for new equipment after years of under investment and the resumption of some high-channel count megacrews projects operating in the Middle East. Sercel should also benefit from the sales of the 508^{XT} advanced technology compared to aging systems. Geographically, pockets of new opportunities are emerging in India and Algeria, beyond our traditional markets (Russia, China and Middle East). The marine market should stabilize but at a low level. Marine contractors continue to face a difficult market, restricting their ability to invest in new equipment. However, their current fleets are aging and their excess of equipment generated by the stacking of vessels is shrinking. Sercel believes that CGG's decision to discontinue its acquisition activities should not materially impact Sercel activities. In this market environment, and notably considering its important installed base, Sercel estimates that, for 2019, it should maintain its leading position in the seismic equipment market by capitalizing on growth opportunities resulting from the strength of its current product range, the application of new technologies in all of its products as well as from its diversified geographical presence.

1.3.3. Contractual Data Acquisition

Our Contractual Data Acquisition activity includes land, marine, airborne and seabed operations, operated either directly or through joint ventures. In land and marine environments, they use the latest geophysical equipment manufactured by Sercel.

Total revenues of the "Contractual Data Acquisition" segment amounted to US$226 million in 2018. These revenues were classified as discontinued operations and assets held for sale in 2018, and the comparative years have been restated.

1.3.3.1. Marine Data Acquisition Business Line

Overview

CGG provides a complete range of marine seismic services, operating on a global basis.

Activity description

CGG's marine seismic surveys are conducted by deploying hydrophone streamers and acoustic airgun sources from specialized vessels. The commercial model entails working on an exclusive contract basis with the client where the client is the owner of the acquired data and pays for the acquistion service. The basis of the compensation may be in the form of a daily fee or fixed fee per square kilometer acquired and may compensate us for time lost to operational events beyond our control, such as bad weather or interference from other activities carried out in the oil field.

Group's fleet of seismic vessels

STATUS OF THE OPERATED FLEET AS OF DECEMBER 31, 2018

On December 31, 2018, our operated fleet consisted of four 3D high-capacity seismic vessels (14 or more streamers), down from five vessels at the end of 2017. We operated a five vessel fleet for the majority of 2018.

The following changes were made to the fleet in 2018:

- The Oceanic Endeavour, which halted operations in May 2018, was re-delivered to its owner in July 2018;
- The Geo Caribbean was re-started and chartered on April 1, 2018;
- The Geowave Voyager was sold in July 2018, with effect and delivery to the new owners on November 13, 2018.

Following the update of CGG's strategic vision announced during its Capital Markets Day in November 2018, plans were initiated to reduce our fleet to three active vessels during 2019. The Oceanic Champion halted operations at the end of November 2018 and negotiations for early redelivery to her owners commenced during December 2018. The Oceanic Champion was re-delivered to her owner early at the end of January 2019.

MARITIME MANAGEMENT OF THE OPERATED FLEET

On December 31, 2018, the maritime management of the seismic fleet operated by the Group (Oceanic Sirius, Oceanic Vega, Geo Coral and Geo Caribbean) was managed by our joint venture ship managers CGG Eidesvik Ship Management AS.

OWNERSHIP STATUS OF THE FLEET

At December 31, 2018, CGG held 50% of Global Seismic Shipping AS (GSS) which directly holds 100% of the shares of the companies that own the Oceanic Sirius, Oceanic Vega, Geo Coral, Geo Caribbean, Geo Celtic, CGG Alizé and the Oceanic Challenger.

The following table provides certain information concerning the seismic vessels operated by CGG and those that are either being prepared to return to owners or cold stacked as of December 31, 2018.

Vessel name	Year built	Year upgraded	Year entered fleet	Time charter / Bareboat expiry	Extension options [a]	2D/3D	Maximum no. of streamers [b]	Vessel length (m)
Operated vessels								
Oceanic Vega	2010	n.a.	2010	March 2027	4 × 5 years	3D	20	106
Oceanic Sirius	2011	n.a.	2011	March 2027	4 × 5 years	3D	20	106
Geo Coral	2010	n.a.	2013	March 2019	n.a. [c]	3D	16	108
Geo Caribbean	2008	n.a.	2013	March 2019	n.a. [c]	3D	14	101
Being prepared to return to owner								
Oceanic Champion	1994	2012	2009	January 2019	n.a.	3D	14	107
Stacked vessels								
Oceanic Phoenix	2000	2011	2009	March 2019	10 × 1 year	3D	14	101
Viking Vanquish	1998	2007	2007	November 2020	n.a.	3D	12	93

(a) In years.
(b) Equal to number of tow points.
(c) Within the framework agreement in the joint venture with Eidesvik, we committed to charter a certain number of vessel months per year until March 2027. The charter will be automatically extended by one year on April 1, 2019.

As of December 31, 2018, the following vessels were either fully owned or hired under bareboat charter:

- The *Oceanic Sirius*, the *Oceanic Vega* the *Geo Coral* and the *Geo Caribbean* were bareboat chartered from Global Seismic Shipping AS or one of its subsidiaries;
- The *Oceanic Champion* was bareboat chartered from Oceanic Champion AS;
- The *Viking Vanquish* was bareboat chartered from Eidesvik MPSV AS; and
- The *Oceanic Phoenix* was bareboat chartered from Master and Commander AS.

Competition and market

Five companies (CGG, PGS, Schlumberger (WesternGeco), Polarcus and Shearwater) comprised around 70% of the 3D marine market during 2018. In early 2018, Schlumberger (WesternGeco) announced its intention to exit the marine acquisition business. The Schlumberger (WesternGeco) fleet was acquired by Shearwater Geophysical later the same year. In November 2018, CGG announced during its Capital Markets Day its intention to exit the marine proprietary acquisition market by no later than 2021 most probably through formation of a strategic partnership, and that it would transition to a three vessel fleet during 2019.

Despite some improvement during 2018, the market remained over supplied with the result that there was no sustained uplift in price levels compared to 2017. Low fleet activity persisted though in 2018, particularly in the fourth quarter when competitor utilization dipped below 50% in some cases. We were able to outperform this trend with an industry leading 90% utilization rate for the full year 2018 for our 3D fleet.

2018 segment figures

Total revenues of the Marine Contractual Data Acquisition business line amounted to US$115 million in 2018, representing 49% of the total production of the "Contractual Data Acquisition" segment.

60% of our 3D fleet's utilization was dedicated to exclusive marine acquisition contracts and 40% was dedicated to acquiring multi-client surveys.

2019 outlook

During 2019, we will continue to actively pursue opportunities for a strategic partnership while reducing our fleet to three vessels, focused on serving our own multi-client needs, while pursuing limited selected proprietary opportunities.

1.3.3.2. Land Data Acquisition and Multi-Physics Business Lines

Overview

We are one of the main land seismic acquisition contractors, now focused on desert areas, particularly those requiring specific technologies and operational expertise.

Multi-Physics acquisition operates globally and is principally focused on the acquisition, processing and interpretation of airborne geophysical data on land or offshore, and on providing marine gravity and magnetic acquisition services onboard seismic vessels or independently, as well as the processing of such data. We are one of the largest airborne acquisition contractors, operating worldwide and offering a diverse portfolio of airborne geophysical technologies, with particular emphasis and expertise in electromagnetics and gravity. In 2018, our activities were conducted out of operational centers located in Canada, the United States, Brazil, Italy and Australia.

In 2018, our land data acquisition crews operated for 43 recording months. We reduced our Multi-Physics business line fleet to seven airplanes over the course of the year.

Activity description

LAND DATA ACQUISITION

Land operations may employ surveying, drilling and recording crews. When required, surveying crews lay out the lines to be recorded and mark the sites for shot-hole placement or recording equipment location. Recording crews produce acoustic impulses and record the seismic signals via geophones or hydrophones. The acoustic sources used are vibrators or explosives onshore, and air guns in transition zones. On a land survey where explosives are used as the acoustic source, the recording crew is supported by several drill crews. Drill crews operate ahead of the recording crew and bore shallow holes for explosive charges which, when detonated by the recording crew, produce the necessary acoustic impulse.

Operations in the Middle East are conducted in partnership with the Saudi company TAQA through the Argas joint venture.

Seabed acquisitions are operated through Seabed Geosolutions joint-venture which is owned 60% by Fugro and 40% by us.

MULTI-PHYSICS

Multi-Physics encompasses various segments of activity and provides services worldwide:

- Airborne activity encompasses the collection, processing and interpretation of data related to the earth's surface and the soils and rocks beneath, and provides advice based on the results to clients in the mineral, oil and gas, geothermal, governmental, engineering and environmental management sectors. We acquire electromagnetic, magnetic, radiometric and gravity data using fixed-wing airplanes and helicopter platforms. The airplanes we operate have been modified with integrated geophysical measurement systems incorporating elements of internal design and manufacture. Helicopter projects are supported using subcontracted or chartered helicopters, as the geophysical instrument systems designed for use on helicopters can be installed without significant modifications to the aircraft.
- Marine activity encompasses the acquisition and data processing of marine gravity and magnetic data in conjunction with seismic surveys or on a stand-alone basis.

In Multi-Physics, we operate under two business models:

- The first business model consists of working on an exclusive contractual basis with the client. The contract usually stipulates that we will receive a fixed remuneration per acquired linear kilometer, on client specifications. The client owns the acquired data and pays us on the agreed basis.
- The second business model consists of operating under a multi-client model, with multiple clients prefunding the acquisition. We remain the owner of the data thus acquired and gain the benefit of subsequent data licensing aftersales.

Competition and market

The land acquisition market is fragmented and extremely competitive with the presence of both international and local players. 2018 has witnessed the exit of three major players with the bankruptcy of Geokinetics and the closing of Schlumberger (WesternGeco) land acquisition and the announced closure of CGG's operations. In addition to CGG, the other significant service providers remaining in the land seismic market worldwide are BGP, Sinopec, SAE and Argas (our joint venture with TAQA in the Middle East), and in the seabed acquisition market are Seabed Geosolutions BV, Magseis Fairfield.

In this market, technology, quality of the crews, services provided and prices were the main differentiators for CGG, while the relationship with local suppliers and the expertise of personnel in complex areas were additional advantages. Our offerings were based on a technological and geographical focus with high-end activities often operated through local partnerships. In 2018, land activities may be described by the following main elements:

- In North Africa: we suffered from program delays or cancellation for administrative reasons in Algeria which resulted in a very low activity level, and two projects were conducted successfully in Morroco and Tunisia;
- In the Middle East, Saudi Aramco maintained a strong level of activity in Saudi Arabia; a fair level of activity was maintained in Egypt, in continuity of the first high resolution crew using unconstrained blended acquisition implemented in 2017/2018; United Arab Emirates had a very active 2018 with two projects awarded, including one in a transition and one blended acquisition project in Oman;
- In Europe, we continued to increase our presence on oil and gas projects (Greece, Germany) and develop our diversification offer with three acquisitions for geothermy (Netherlands, Germany and France);
- In South East Asia, activity in Papua New Guinea was sustained with a high added value crew throughout the year;
- In South America, we acquired a small 2D project in Brazil and a 70 square kilometers project was awarded by Petrobras using vibrator and an innovative geometry acquisition design developed by CGG.

The airborne acquisition market is fragmented and extremely competitive with the presence of a handful of international players, as well as many smaller and regionally focused competitors. In general, primarily due to technical specialization, most competitors have their primary focus and activity in either the mining, oil and gas, or government sectors, but not in all.

In the mining and oil and gas sectors, technology, service capability and prices are the main differentiators. For governmental sector work, price and capacity are the main differentiators on projects which are typically large in size and often require commoditized technologies.

Activity levels for Multi-Physics remained low but were better than 2017 with the improvement arising from higher levels of exploration spending in the mining sector by major mining companies. Activites in the oil and gas and government sectors were stable year-on-year.

2018 segment figures

The field of acquisition and data processing of marine gravity and magnetics continued to be affected by the overall reduction of the worldwide fleet of seismic vessels and remained at low levels of activity.

Total Land Data Acquisition and Multi-Physics production (both contract and multi-client surveys) accounted for US$118 million in 2017, representing 51% of "Contractual Data Acquisition" operating revenues.

2019 outlook

On November 7, 2018, CGG announced a new strategic roadmap which includes a transition to an asset-light model by reducing exposure to the data acquisition business, which has been impacted over the years by structural industry overcapacity, lack of differentiation, commodity pricing and a heavy fixed cost base. In that regard CGG will wind down its Land Acquisition activity in 2019 to fully exit this segment of activity before the end of the year.

In line with the annoucement of our new strategic plan, the Multi-Physics continues to be held for sale.

CGG plans to carry out these strategic changes in compliance with all legal requirements.

1.4. LIST OF THE GROUP'S LOCATIONS

The following table sets forth certain information relating to the principal properties of the Group as of December 31, 2018:

Location	Type of facilities	Headcount	Owned / Leased	Lease expiration date
France, Paris	Headquarters of CGG S.A.	34	Leased	2019
Geophysical Services (GGR and Contractual Data Acquisition segments)				
England, Crawley	Registered office (Crompton Way) of CGG Services (UK) Ltd. and Data processing center	326	Leased	2028
Australia, Perth	Registered office of CGG Services (Australia) Pty Ltd and Data processing center	67	Leased	2024
Australia, Jandokot Airport, Perth	Warehouse	29	Leased	2019
Brazil, Rio de Janeiro	Registered office of CGG do Brasil Participaçoes LTDA and Data processing center	150	Leased	2021
Canada, Calgary	Registered office of Hampson Russell Ltd Partnership and Data processing center	109	Leased	2024
China, Beijing	Registered office of CGG Services Technology (Beijing) Co, Ltd and Research and development center	59	Leased	2020
Scotland, Aberdeenshire	Birchmoss offices	9	Leased	2019
France, Massy	Registered office of CGG Services SAS and Data processing center	536	Leased	2022
Netherlands, La Haye	Registered office of CGG Holding BV, CGG Marine BV, CGG Services (NL) BV and CGG data Management (Netherlands) BV	32	Leased	2019
India, Mumbai	Registered office of CGG Services India Pvt Ltd and Data processing center	33	Leased	2023
Indonesia, Jakarta	Registered office of PT Veritas Mega Pratama and Data processing center	36	Leased	2020
Malaysia, Kuala Lumpur, Kuching	Registered office of CGG Services (Malaysia) Sdn Bhd and Data processing center	50	Leased	2020
Mexico, Villahermosa	Data processing center and offices	42	Leased	2019
Mexico, Mexico City	Registered office of CGG de Mexico SA de CV	10	Leased	2019
Norway, Oslo	Registered office of CGG Services (Norway) AS, Wavefield Inseis AS, CGG Marine Resources Norge AS, Exploration Investment Resources II AS	85	Leased	2024
North Wales, Anglesey	Data Management Solutions offices and warehouse	3	Owned	n.a.
North Wales, Llanrhos	Offices and laboratories	203	Leased	2024
North Wales, Conwy	Offices/storage facility	60	Owned	n.a.
Russia, Moscow	Registered office of CGG Vostok and Data processing center	76	Leased	2021
Singapore	Registered office of CGG Services (Singapore) Pte. Ltd. and Data Processing Center	134	Leased	2019
Singapore	Logistic Marine Warehouse	5	Leased	2019
Switzerland, Geneva	Registered office of CGG International	27	Leased	2022
Thailand, Bangkok	Offices of CGG Services SAS (branch)	3	Leased	2019
USA, Houston, Texas	Principal executive offices of CGG Services (U.S.) Inc. and data processing center	652	Leased	2024
USA, Schulenburg, Texas	Offices and Warehouse	13	Owned	n.a.

Location	Type of facilities	Headcount	Owned / Leased	Lease expiration date
Geophysical Equipment				
China, Xu Shui	Sercel manufacturing and research and development facilities	448	Owned	n.a.
USA, Houston, Texas	Offices and manufacturing premises of Sercel	242	Owned	n.a.
France, Carquefou	Sercel manufacturing and research and development facilities recording equipment (land and marine)	499	Owned	n.a.
France, Saint-Gaudens	Sercel manufacturing and research and development facilities	212	Owned	n.a.

1.5. RESEARCH & DEVELOPMENT (« R&D »)

1.5.1. Technology Strategy

CGG's ability to remain the industry market leader in Geoscience and Equipment is largely dependent on our ability to maintain our industry leading level of technological innovation.

Capitalizing on our people, CGG has consistently demonstrated our ability to deliver the most technologically advanced equipment and services that enable our customers to achieve their sub-surface imaging objectives. We will maintain this ability by:

- Continuing to invest in recruiting and developing the types of skilled people who, in turn, enable us to develop new seismic processing algorithms, software and computer infrastructure, ensuring we are the preferred service company for the most complex and challenging imaging problems.
- Maintaining a unique combination of skills within Geoscience, including geologic, geophysical and reservoir expertise.
- Developing new products answering market needs, in land and marine environments; and exploring new areas where our expertise can be valued.

Over the past years, CGG has committed over 5% of revenues in R&D. The trend in gross R&D expenditure over the past three years, including capitalized development costs, is shown below:

	2018		2017		2016	
	in MUSD	as % of net revenue	in MUSD (restated)	as % of net revenue (restated)	in MUSD (restated)	as % of net revenue (restated)
Gross research and development expenditure	71.3	6.0%	69.2	6.7%	80.8	8.4%

1.5.2. Key Innovation Highlights in 2018

The seismic industry continued a slow recovery in 2018. Throughout the recovery, CGG has maintained a steadfast commitment to continued R&D and more specifically leading edge innovation. Some examples of that are described below:

- Time-lag full waveform inversion to resolve complex geology for subsalt or pre-salt reservoir images, especially target for Ocean Bottom Nodes ("OBN") data;
- Surface wave inversion with deep neural network to improve efficiency on near surface model building of ultra-high density land data.

In the Geoscience field, CGG has initiated projects to integrate stratigraphic information into seismic starting with the ability to display geological data on seismic (so-called Stratigraphy to Seismic — STSTM). The goal is to create a new integrated workflow that would aid seismic interpretation and assist the integration process. CGG is also exploring the practical applications of artificial neural networks as applied to geology, especially in the field of image recognition. This has implications for the automated identification and tabulation of biostratigraphic species and in sedimentary petrography. New frontier basins for petroleum exploration are being identified and high-graded by using earth systems modelling techniques to predict environments of deposition of reservoir and source rocks. These earth systems models are constantly being improved by the successful implementation of a deformable global plate model for the Phanerozoic.

In subsurface imaging, CGG continues to pursue and maintain an industry leading position of excellence in complex geology imaging as well as high-end broadband and OBN imaging. Our R&D teams continue to deploy high-end compute-intensive algorithms such as least-squares migration and orthorhombic full waveform inversion to resolve the imaging challenges faced by our clients. Our latest advancement on full waveform inversion is able to provide a significant improvement on salt model accuracy in complex salt provinces such as the Gulf of Mexico, Brazil, West Africa, thus leading to a huge improvement on the images of pre-salt and subsalt reservoirs. We are deploying the latest full waveform inversion on all the ocean bottom node surveys and achieving the best possible results.

On the operational side, we continue to streamline our workflow and to explore machine-learning toolkits to perform quality control on the processing. This enables us to identify bad seismic traces among billions of recorded traces and handle the middle-east land mega surveys petabytes of data. By streamlining our processing flow, we can provide our clients with high quality seismic data faster than ever, helping them to expedite and derisk their exploration programs. In the area of production field monitoring, we expanded our toolbox to be able to handle optimally all types of time-lapse surveys, whether conventional permanent reservoir monitoring called node-to-node 4D or streamer-node 4D. This provides a complete picture of the reservoir history using all available data in the past.

We also actively improve our multi-disciplinary integration between various types of data, workflows and knowledge bases. In our reservoir characterization workflow, we have developed new tools to integrate efficiently deterministic/stochastic inversion results with static model and production data. These new technologies are essential to build or update existing static and dynamic models in a consistent way to match all available data (seismic, sedimentological model, petrophysics and production data). The satellite-mapping group has continued to develop new solutions focused upon integrated surface deformation monitoring datasets, geohazard activity targeting for the transport sector, and ground instability risk profiling for the insurance market.

In terms of our Equipment business, Sercel continues to maintain a high level of research and development justified by the high technology content of its equipment for land and marine data acquisition and by the search for applications of mastered technologies in new markets. This intense R&D activity has put Sercel at the cutting edge of cable-less data transmission technology, the design and manufacture of low-noise sensors and the design of rugged electronics that can withstand extreme environmental conditions. Sercel also conducts research into underwater acoustics. Its Nautilus (lateral and vertical positioning and steering for streamers) and SeaProNav (integrated navigation) systems have reached industrial maturity. Sercel's QuietSea aquatic activity-monitoring system used to detect the presence of sea mammals during exploration surveys continues to gain market share. This product is recognized for its efficiency and user friendliness and was approved by new regulation bodies.

In 2018, Sercel continued to market its Sentinel streamer technology, including the latest product, the multi-sensor Sentinel MS, which features an acoustic vector sensor composed of a group of accelerometers arranged around a hydrophone. Applications for the 508^{XT} land acquisition system have widened with new operating modes in different geographical areas. The WTU-508, a single channel autonomous land node, has also been deployed in different field conditions. The XT-Pathfinder technology used to deliver wirelessly quality control to the recorder has been proven. In logging, the GeoWave II offers an unrivalled performance for the acquisition of seismic data in deep, high-temperature and high-pressure boreholes. The new SpyPro gage dedicated to artificial lift market has been successfully installed in different wells in the US.

1.5.3. Prospects for Technology Innovation and R&D

On the production side, improvements in monitoring techniques both in terms of acquisition equipment and seismic data processing as well as in new technologies for data integration help to optimize production from shallow reservoirs, improve recovery rates, and extend the life of fields through appropriate management. In major oil-producing regions such as the North Sea and the Middle East, these issues are of crucial importance for operators. However, they remain an important avenue of study for expanding the application of seismic surveys as a core discipline for optimizing production from deep reservoirs where resolution and reliability need to be improved.

On the exploration side, R&D achievements in the seismic domain are helping to identify prospective fields that are increasingly difficult to detect and reduce the associated drilling risks. The improvements can be made by either the application of new processing technologies on existing data or designing next generation seismic on challenging areas to bring a step change of data quality. Our multi-client new venture business line is actively evaluating both strategies for all the key exploration basins throughout the world.

Finally, the concepts of “Digital Transformation, “Cloud”, “Big Data”, “Machine-Learning” and “Analytics” are being researched and where applicable integrated into our acquisition, Geoscience, and data storage workflows. We will continue to build our big data platform to support both internal and external data management businesses. In addition, the digital transformation of our entire geologic library continues to progress well.

1.5.4. Investing activities

In 2016 and 2017, our total capital expenditures — industrial, capitalized development costs and multi-client cash capital expenditures amounted respectively to US$369 million (US$367 million excluding asset suppliers' variance) and US$318 million (US$318 million excluding asset suppliers' variance).

In 2018, they decreased at US$301 million (US$302 million excluding asset suppliers' variance).

In 2016, 2017 and 2018, our industrial capital expenditures amounted respectively to US$40 million (US$39 million excluding asset suppliers' variance), US$35 million (US$35 million excluding asset suppliers' variance) and US$45 million (US$46 million excluding asset suppliers' variance).

Our capitalized development costs amounted respectively to US$34 million in 2016, US$32 million in 2017 and US$33 million in 2018.

In 2016, 2017 and 2018, our multi-client cash capital expenditures amounted respectively to US$295 million, US$251 million and US$223 million.

In 2018, our industrial capital expenditures and capitalized development costs (excluding asset suppliers' variance) amounted to US$54 million and US$25 million respectively for GGR and Equipment segments.

In 2019, our industrial capital expenditures and capitalized development costs are targeted to be in the range of US$80-90 million while multi-client cash capital expenditures should be in the range US$250-275 million.

From a general standpoint, industrial capital expenditures and capitalized development costs are financed through permanent funding (equity and financial debt) whereas multi-client cash capital expenditures are financed mainly with funds from original participants.

The cash prefunding rate was of 97% in 2018 and is targeted to be above 70% in 2019.

1.6. POST-CLOSING EVENTS

There has been no significant event within the Group since December 31, 2018.

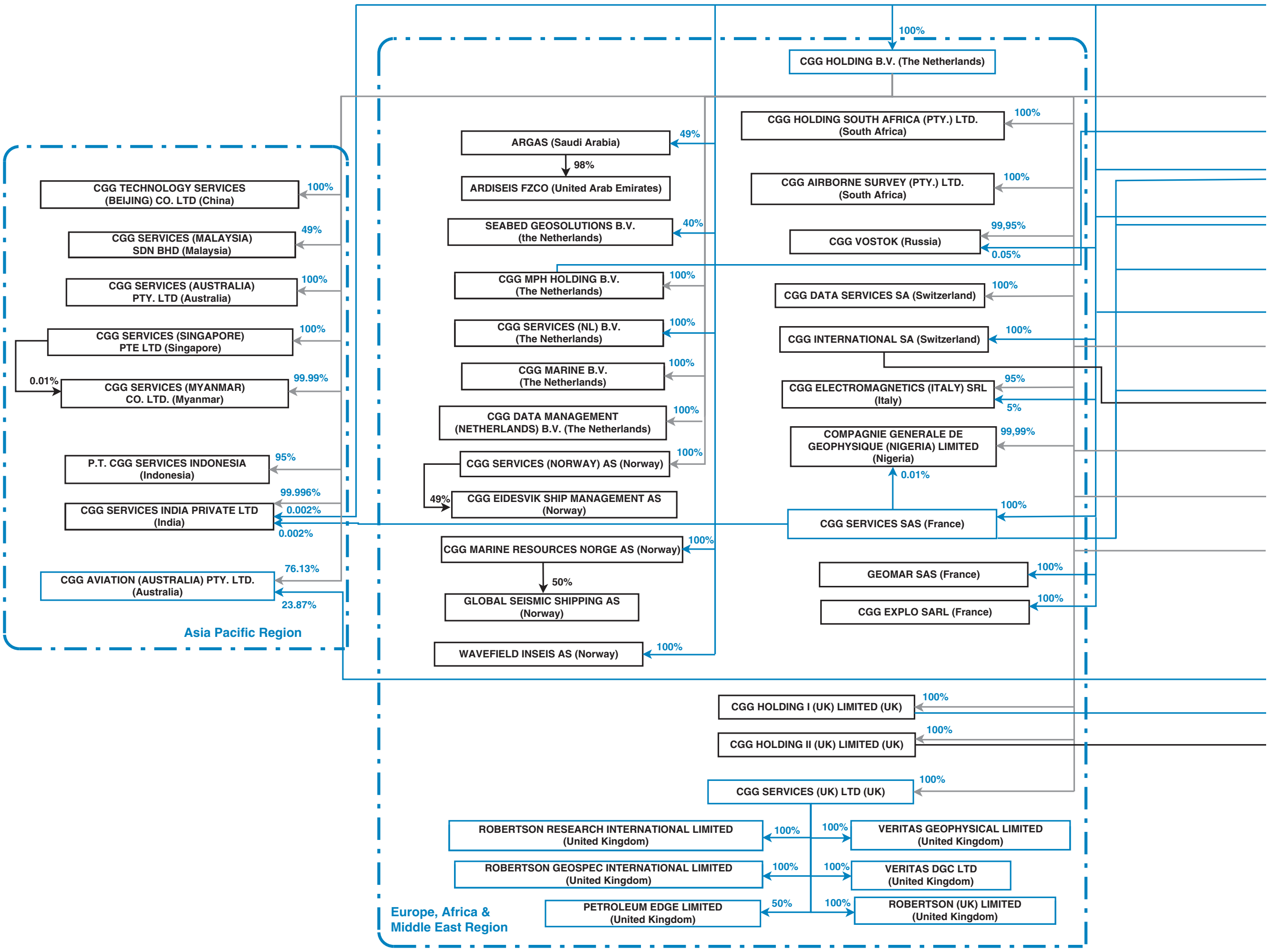
Geopolitical Context

CGG is exposed to substantial geopolitical risk, but this will be greatly reduced with the exit of the land acquisition business during 2019. This business was traditionally exposed to high risk countries in the Middle East and North Africa. The eventual exit from marine acquisition will also reduce this type of exposure.

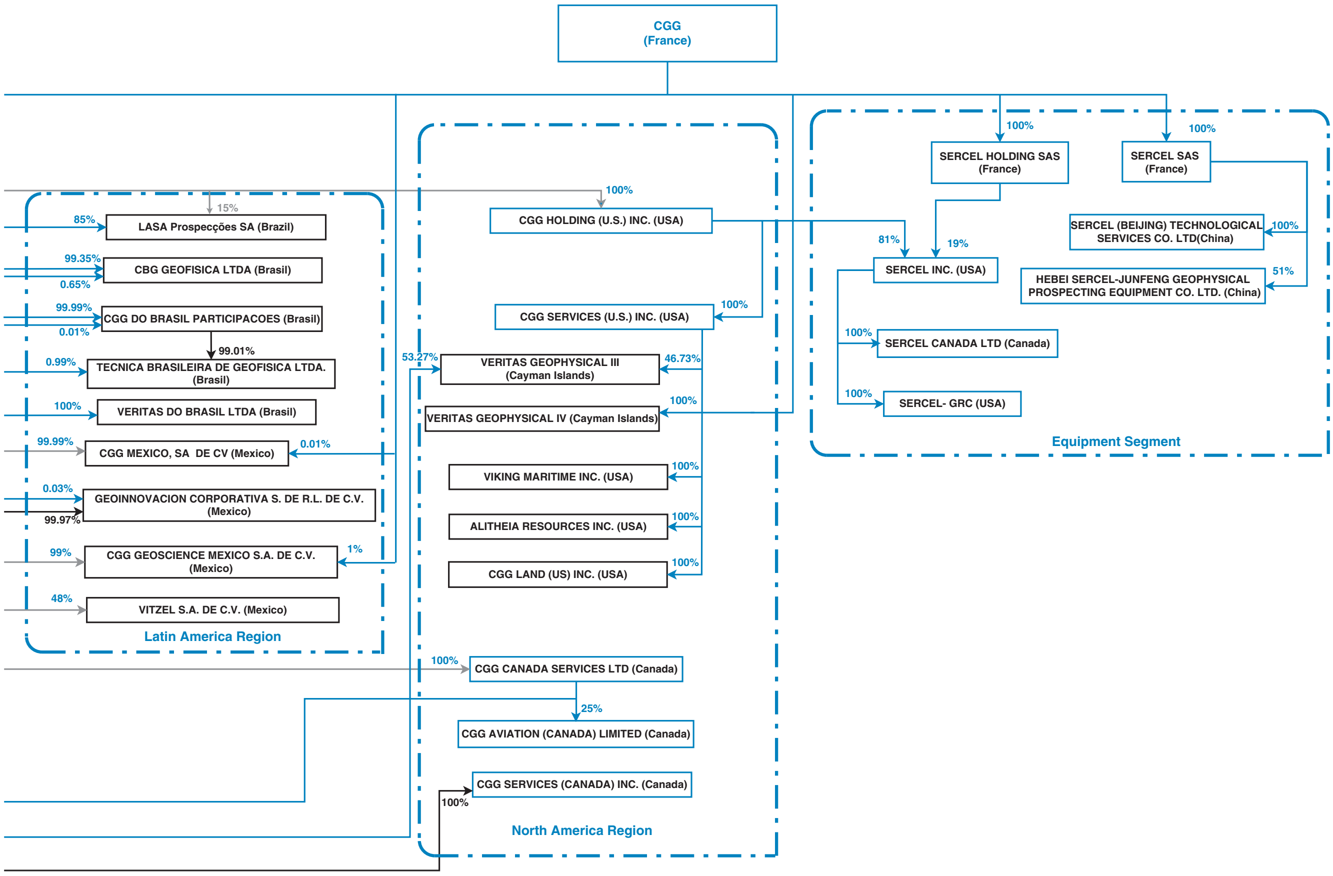
1.7. ORGANIZATION CHART — INTRAGROUP TRANSACTIONS

1.7.1. Organization chart

CGG SA is the top holding company of the CGG Group. The Group's subsidiaries are directly or indirectly owned by CGG SA. The simplified organization chart (showing the percentage of share capital owned) as of March 31, 2019 is presented below:



CGG SA has also registered branches in Yemen, Myanmar, Pakistan, Bolivia, Peru and Ecuador, most of them being now under liquidation process.


CGG
(France)
100%
SERCEL HOLDING SAS
(France)
100%
SERCEL SAS
(France)
SERCEL (BEIJING) TECHNOLOGICAL SERVICES CO. LTD(China)
100%
81%
19%
SERCEL INC. (USA)
HEBEI SERCEL-JUNFENG GEOPHYSICAL PROSPECTING EQUIPMENT CO. LTD. (China)
51%
100%
SERCEL CANADA LTD (Canada)
100%
SERCEL- GRC (USA)
Equipment Segment
100%
CGG HOLDING (U.S.) INC. (USA)
100%
CGG SERVICES (U.S.) INC. (USA)
53.27%
VERITAS GEOPHYSICAL III
(Cayman Islands)
46.73%
100%
VERITAS GEOPHYSICAL IV (Cayman Islands)
100%
VIKING MARITIME INC. (USA)
100%
ALITHEIA RESOURCES INC. (USA)
100%
CGG LAND (US) INC. (USA)
100%
CGG CANADA SERVICES LTD (Canada)
25%
CGG AVIATION (CANADA) LIMITED (Canada)
CGG SERVICES (CANADA) INC. (Canada)
100%
North America Region
15%
85%
LASA Prospecções SA (Brazil)
99.35%
CBG GEOFISICA LTDA (Brasil)
0.65%
99.99%
CGG DO BRASIL PARTICIPACOES (Brasil)
0.01%
99.01%
0.99%
TECNICA BRASILEIRA DE GEOFISICA LTDA.
(Brasil)
100%
VERITAS DO BRASIL LTDA (Brasil)
99.99%
CGG MEXICO, SA DE CV (Mexico)
0.01%
0.03%
GEOINNOVACION CORPORATIVA S. DE R.L. DE C.V.
(Mexico)
99.97%
99%
CGG GEOSCIENCE MEXICO S.A. DE C.V.
(Mexico)
1%
48%
VITZEL S.A. DE C.V. (Mexico)
Latin America Region

1.7.2. Inter-company relations

CGG Group's inter-company transactions exist in various fields (several kinds of services provided, sales of geophysical equipment, software licenses). The corresponding remuneration or royalties vary by the nature of the transaction in accordance with the arm's length principle and the Group's transfer pricing policy.

The assistance and advice provided by the parent company to the Group's main subsidiaries regarding financial, administrative, commercial and technical matters are generally paid at cost plus and allocated subsequently to the related subsidiaries or by a fixed remuneration defined in accordance with the importance and nature of the service provided.

In most situations, the payment of the services provided by the subsidiaries for the benefit of the parent company corresponds to the cost incurred plus a margin defined in accordance with the arm's length principle.

During the years 2018, 2017 and 2016, financial flows between parent company and subsidiaries were as follows:

In millions of US$	2018	2017	2016
Services provided	32.6	29.7	54.3
Expense rebilling	10.3	11.1	60.5

1.7.3. Subsidiaries main aggregates

The following table provides for the main aggregates for the top holding company CGG SA, the GGR segment and the Equipment segment (Sercel and ts subsidiaries).

IFRS

(In millions of US$ except for personnel)	CGG SA	Services Subsidiaries	Equipment Subsidiaries	Consolidation adjustments	Total CGG Group
2018					
Non-current assets	2,756.0	2,994.4	283.6	(3,663.1)	2,370.9
Financial debt	970.6	1,071.1	—	(875.0)	1,166.7
Cash and cash equivalents	235.5	117.4	81.9	(0.7)	434.1
Net cash flow provided by operating activities	(147.4)	(336.4)	22.8	826.3	365.3
Dividends paid to CGG SA	—	307.5	—	(307.5)	—
Operating revenues	32.5	880.1	350.8	(69.9)	1,193.5
Operating income	(19.0)	(129.6)	(22.1)	(9.0)	(179.7)
Net income (loss)	(320.9)	(294.6)	(17.8)	1,137.5	504.2
Total equity	2,049.7	1,725.4	780.5	(2,881.5)	1,674.1
Personnel	26	3,528	1,545	—	5,099
2017 restated					
Non-current assets	2,930.5	3,737.9	310.9	(3,849.5)	3,129.8
Financial debt	2,433.3	1,827.4	0.4	(1,306.0)	2,955.1
Cash and cash equivalents	37.7	197.7	80.0	—	315.4
Net cash flow provided by operating activities	(32.7)	406.2	110.6	(98.5)	385.6
Dividends paid to CGG SA	—	(64.2)	(95.4)	159.6	—
Operating revenues	29.8	819.7	241.2	(55.6)	1,035.1
Operating income	(35.5)	25.9	(35.9)	(12.4)	(57.9)
Net income (loss)	(1,060.8)	(108.6)	(20.1)	923.0	(266.5)
Total equity	335.9	1,555.7	819.3	(2,194.4)	516.5
Personnel	30	3,647	1,589	—	5,266
2016 restated					
Non-current assets	3,614.2	3,986.7	309.8	(4,525.7)	3,385.0
Financial debt	2,160.8	2,072.9	0.8	(1,385.7)	2,848.8
Cash and cash equivalents	330.4	141.3	67.1	—	538.8
Net cash flow provided by operating activities	(104.5)	207.8	12.1	346.3	461.7
Dividends paid to CGG SA	—	(465.5)	—	465.5	—
Operating revenues	54.3	784.1	255.0	(130.1)	963.3
Operating income	(47.0)	(31.2)	(41.9)	(26.5)	(146.6)
Net income (loss)	(929.9)	(172.8)	(41.3)	845.7	(298.3)
Total equity	1,291.3	1,711.1	877.9	(2,723.5)	1,156.8
Personnel	30	4,040	1,696	—	5,766

2 RISKS AND CONTROL

2 RISKS AND CONTROL

2.1. RISK FACTORS

2.1.1. Financial risks

2.1.1.1. Risks related to our financial restructuring

2.1.1.1.1. We remain subject to the terms and conditions of the Safeguard Plan and our new financing agreements.

Until November 30, 2027, we must comply with the terms of the Safeguard Plan, including, among others, payments of debt at the stated maturities. We also made certain undertakings pursuant to the letters exchanged notably with the *Direction Générale des Entreprises*, which were acknowledged in the judgment approving the Safeguard Plan and described in "1.2. — History and significant events in the development of the Company's activities — Financial restructuring process". In addition, we are bound by the contractual terms of the new financing agreements we entered into at the time of our restructuring and thereafter. For more details on these new financing agreements, please refer to risk factor entitled "— Risks related to our indebtedness" below and "1.2. — History and significant events in the development of the Company's activities — Financial restructuring process ".

If we do not comply with the terms of the Safeguard Plan, the Commercial Court of Paris may decide to cancel the Safeguard Plan after having obtained the opinion of the public prosecutor and the trustee (*commissaires à l'exécution*) upon presentation of its report. If we were to be insolvent (*cessation des paiements*) at that time or during the implementation of the Safeguard Plan, the Commercial Court of Paris would open a judicial reorganization proceeding (*redressement judiciaire*), or if such reorganization was obviously impossible, a judicial liquidation proceeding (*liquidation judiciaire*) (after, as the case may be, having cancelled the Safeguard Plan).

The constraints under the Safeguard Plan, our undertakings acknowledged in the judgement, and the contractual terms of our financing agreements, could significantly limit our ability to adapt to market developments and reduce our flexibility in operational management. For example, our strategic roadmap 2021 announced in November 2018 calls for our transition to an asset light model with significantly reduced exposure to the acquisition business, a leaner cost base and an optimized capital structure. Some of the changes required to implement this plan are likely to require amendments to the Safeguard Plan. We may also in the future conclude that other amendments to the Safeguard Plan are necessary to protect and enhance our business, results of operations or financial condition.

To the extent the contemplated amendments to the Safeguard Plan are not considered material for the purposes and means of the plan within the meaning of article L.626-26 of the French Commercial Code, we may be able to make such amendments without court approval, although any amendment to the new financing agreements would need to comply with the contractual provisions for lender consents and any breach of our undertakings acknowledged in the judgement (including our social undertakings) would require the prior authorization of the Commercial Court of Paris.

However, any amendment that is material within the meaning of article L.626-26 of the French Commercial Code would first require the prior authorization of the banks and financial institutions committee and the general meeting of bondholders, and the subsequent approval of the Commercial Court of Paris.

If we are delayed in obtaining, or are unable to obtain, the consents required under our Safeguard Plan or our contractual obligations to carry out our strategy or operational plans, there could be a material adverse effect on our business, results of operations, financial condition and cash flows

2.1.1.1.2. Certain of our creditors have appealed the judgment approving the Safeguard Plan.

The Company's draft Safeguard Plan was approved by the bank and financial institutions' committee and the general meeting of bondholders on July 28, 2017, and the resolutions necessary for its implementation were approved by the shareholders of CGG SA during the extraordinary general meeting convened on second notice on November 13, 2017.

On August 4, 2017, certain holders of convertible bonds (Keren Finance, Delta Alternative Management, Schelcher Prince Gestion, La Financière de l'Europe, Ellipsis Asset Management and HMG Finance) filed a claim against the Safeguard Plan approved by the bank and financial institutions committee and the general meeting of bondholders on July 28, 2017.

Without disputing the results of the general meeting of bondholders' vote, these holders of convertible bonds challenged the treatment of their claims under the Safeguard Plan, arguing that the differences in treatment between the holders of convertible bonds and the holders of Senior Notes were not justified by the differences in their situations and would be, in any event, disproportionate.

On December 1, 2017, the Commercial Court of Paris declared that the claims filed by the holders of convertible bonds were inadmissible and approved the Safeguard Plan. Four of these holders of convertible bonds (Delta Alternative Management, Schelcher Prince Gestion, La Financière de l'Europe and HMG Finance) have appealed against the judgment that rejected the admissibility of their claims. As this appeal does not stay implementation, the restructuring transactions provided for under the Safeguard Plan was implemented in February 2018.

On May 17, 2018, the Court of Appeal of Paris affirmed the December 1, 2017 judgment by the Commercial Court of Paris.

On July 17, 2018, Delta Alternative Management, Schelcher Prince Gestion, and La Financière de l'Europe (later joined by HMG Finance through a voluntary intervention) appealed the Court of Appeal's decision to the French Supreme Court (*Cour de cassation*).

If the *Court of Cassation* were to approve the appellants' requests and reverse the appeals court ruling, the case would be referred back to another Court of Appeal to re-examine the case. The decision of the new Court of Appeal, which might also be subject to a recourse before the *Cour de cassation*, could theoretically lead to the cancellation of the implementation of the Safeguard Plan with retroactive effect. However, such a cancellation may be impossible to implement in the context of a transaction that involved a public offering.

As of the date of this annual report, no assurance can be given concerning the decision of the *Cour de cassation* and the ultimate outcome of the litigation.

2.1.1.1.3. The recent French and U.S. procedures of safeguard and Chapter 11 may have affected our ability to maintain our relationships with creditors, customers, vendors, employees and other personnel and counterparties which could adversely affect our business, financial condition and results of operations.

Notwithstanding the implementation of the financial restructuring, the recent French and U.S. procedures of safeguard and Chapter 11 may have affected our relationships and our ability to negotiate favorable terms with creditors, customers, vendors, employees and other personnel and counterparties and our ability to maintain normal credit conditions with our suppliers. Moreover, public perception of our continued viability may lead to new and existing customers choosing not to enter into or continue their agreements or arrangements with us. Failure to maintain any of these important relationships could adversely affect our business, financial condition and results of operations.

2.1.1.2. Risks related to our business

2.1.1.2.1. We are subject to risks related to our international operations.

With operations worldwide, including in emerging markets, our business and results of operations are subject to various risks inherent in international operations. These risks include:

- instability of foreign economies and governments, which can cause investment in capital projects by our potential clients to be withdrawn or delayed, reducing or eliminating the viability of some markets for our services;
- risks of war, terrorism, riots and uprisings, which can make it unsafe to continue operations, adversely affect budgets and schedules and expose us to losses;
- risk of piracy, which may result in delays carrying out customer contracts in affected areas or their termination;
- difficulties in protection and enforcement of intellectual property rights;
- risk of fraud and political corruption;
- changes in legal and regulatory requirements;
- seizure, expropriation, nationalization or detention of assets, or renegotiation or nullification of existing contracts;
- foreign exchange restrictions, import/export quotas, sanctions, boycotts and embargoes and other laws and policies affecting taxation, trade and investment; and
- availability of suitable personnel and equipment, which can be affected by government policy, or changes in policy, that limit the movement of qualified crew members or specialized equipment to areas where local resources are insufficient.

We are exposed to these risks in all of our international operations to some degree, particularly in emerging markets where the political, economic and legal environment may be less stable. Our risk management procedures, internal controls and policies may not be enough to identify, evaluate and effectively manage all the risks that we may encounter. Any failure of these systems could materially adversely impact our business, results of operations and financial condition.

Revenue generating activities in certain foreign countries may require prior United States government and/ or European Union/other authorities' approval in the form of an export license and may otherwise be subject to tariffs and import/ export restrictions. These laws can change over time and may result in limitations on our ability to undertake work in affected areas. In the case of U.S. legislation, non-U.S. persons employed by our separately incorporated non-U.S. entities may conduct business legally in some foreign jurisdictions that are subject to U.S. trade embargoes and sanctions by the U.S. Office of Foreign Assets Control ("OFAC"). We may generate revenue in some of these countries through the performance of marine surveys, the provision of data processing and reservoir consulting services, the sale of software licenses and software maintenance and the sale of Sercel equipment. We may have current and ongoing relationships with customers in some of these countries.

We have procedures in place to conduct these operations in compliance with all applicable laws including those of the U.S. and European Union. However, failure to comply with U.S. or European Union laws on equipment and services exports could result in material fines and penalties, damage our reputation, and negatively affect the market price of our securities. In addition, our activities in these countries could reduce demand for our securities among certain investors.

We and certain of our subsidiaries and affiliated entities also conduct business in countries where there is government corruption. We are committed to doing business in accordance with all applicable laws and codes of ethics, but there is a risk that we, our subsidiaries or affiliates or our or their respective officers, directors, employees or agents may act in violation of such codes and applicable laws, including the Foreign Corrupt Practices Act of 1977. We cannot always prevent or detect corrupt or unethical practices by third parties, such as subcontractors, agents, partners or customers, which may result in substantial fines and penalties, in addition to reputational damage to us. Any such violations could result in substantial civil and criminal penalties and might materially adversely affect our business, results of operations, financial condition or reputation.

Further, operations in developing countries are subject to decrees, laws, regulations and court decisions that may change frequently or be retroactively applied and could cause us to incur unanticipated or unrecoverable costs or delays. The legal systems in developing countries may not always be fully developed and courts or other governmental agencies in these countries may interpret laws, regulations or court decisions in a manner which might be considered inconsistent or inequitable in developed countries, and may be influenced by factors other than legal merits, which could have a material adverse effect on our business, financial condition and results of operations.

2.1.1.2.2. We may not be able to provide performance bonds or guarantees to third parties.

Certain of our clients and suppliers, and certain tax, social security or customs authorities may request us or certain of our subsidiaries or affiliates to post performance bonds or guarantees issued by financial institutions, including in the form of standby letters of credit, in order to guarantee our or their legal or contractual obligations. As of December 31, 2018, the amount of bank guarantees or guarantees granted by us amounted to approximately US$445 million (excluding the guarantees granted to financial institutions and the guarantees related to the bareboat charters undertakings). Our financial position has led financial institutions to revise their policies by phasing out existing guarantees and requiring the establishment of cash collateral (or its equivalent in the relevant jurisdiction) for any new guarantee or renewal of existing guarantees. As of December 31, 2018, the amount of the guarantees granted by financial institutions in favor of our clients amounted to approximately US$54 million. As of the same date, the amount of the cash collateral (or its equivalent) we had implemented amounted to approximately US$27 million (reported in the financial statements as fixed assets and financial investments).

However, there is a risk that we will not be able to provide these performance bonds or guarantees in the amounts or durations required or for the benefit of the necessary parties. Failure to comply with these requests could reduce our capacity to conduct business or perform our contracts. In addition, if we provide these bonds or guarantees, our clients or the relevant authorities may call them under circumstances that we believe to be improper, and we may not be able to challenge such actions effectively in local courts.

2.1.1.2.3. We may need to write down goodwill from our balance sheet.

We have been involved in a number of business combinations in the past, leading to the recognition of large amounts of goodwill on our balance sheet. Goodwill on our balance sheet totaled US$1,234 million as of December 31, 2017 and US$1,229 million as of December 31, 2018 due to exchange rate variations. Goodwill is allocated to cash generating units ("CGUs") as described in note 11 to our consolidated financial statements. The recoverable amount of a CGU is estimated at each balance sheet date and is generally determined on the basis of a group-wide estimate of future cash flows expected from the CGU in question. The estimate takes into account, in particular, the removal from service of certain assets used in our business (such as decommissioning or cold-stacking vessels), or change in purpose of a given asset (such as the use of a seismic vessel as a source-vessel), or any significant underperformance in cash generation relative to previously expected results, which may arise, for example, from the underperformance of certain assets, a deterioration in industry conditions or a decline in the economic environment. At each balance sheet date, if we expect that a CGU's recoverable amount will fall below the amount of capital employed recorded on the balance sheet, we may write down some value on given assets and/or the goodwill in part or in whole. Such a write-down would not in itself have an impact on cash flow, but could have a substantial negative impact on our operating income and net income, and as a result, on our shareholders' equity and net debt/equity ratio. In 2016, 2017 and 2018, we did not write down any goodwill and the only movement in goodwill was linked to exchange rate variations. However, we have written down our goodwill significantly as recently as 2015, and particularly in light of our financial condition and difficult market dynamics, no assurance can be given that we will not be required to make future potentially significant goodwill write downs.

2.1.1.2.4. We have taken significant measures to adapt our fleet to changes in the seismic market, and depending on the seismic market in the future, we may make further adjustments that could impose exceptional charges.

By the end of 2016, we achieved our objective to reduce our operated fleet to five vessels, principally dedicated to multi-client production. In April 2017, we carried out certain transactions in order to change the ownership structure of our marine fleet and restructure the related financial obligations under the Nordic credit facility related thereto. Finally, in November 2018, we announced our intention to reduce our exposure to the contractual data acquisition market and, as a result, to adjust our fleet serving the marine data acquisition business line to three vessels in 2019 and to find a strategic partnership to more cost efficiently operate and control the vessels. See "1.3. Business overview — Contractual Data Acquisition — Marine Data Acquisition Business Line — Group's fleet of seismic vessels" for more information.

Past fleet reductions have generated, and we expect that the current and any future reductions will generate, non-recurring charges and could hinder our operational scope in marine acquisition activity. Restructuring charges and fixed assets impairments related to fleet reduction amounted to US$34 million in 2016, US$87 million in 2017 (including net income impact of US$69.4 million linked to Global Seismic Shipping AS ("GSS") and US$12.1 million linked to the proactive management of maritime liabilities) and US$27 million in 2018; these costs will be reported as discontinued operations with retroactive effect. See note 2 to our 2018 consolidated financial statements.

2.1.1.2.5. We invest significant amounts of money in acquiring and processing seismic data for multi-client surveys which we may not recover.

We invest significant amounts of money in acquiring and processing the seismic data that we own. See note 10 to our consolidated financial statements. By making such investments, we are exposed to the following risks:

- We may not fully recover the costs of acquiring and processing the data through future sales. The amounts of these data sales are uncertain and depend on a variety of factors, many of which are beyond our control, including the market prices of oil and gas, customer demand for seismic data in our library and the availability of similar data from competitors. In addition, the timing of these sales is unpredictable, and sales can vary greatly from period to period. Since the fourth quarter of 2018, all multi-client surveys are amortized on a straight-line basis over a period of four years after their delivery date. As a result, a survey may be subject to material amortization even if sales associated with this survey are low or nil, thus reducing the Group's net income.
- Technological or regulatory changes or other developments could also materially adversely affect the value of the data. For example, regulatory changes such as limitations on drilling could affect the ability of our customers to develop exploration programs, either generally or in a specific location where we have acquired seismic data, and technological changes could make existing data obsolete.
- The value of our multi-client data could be significantly adversely affected if any adverse change occurs in the general prospects for oil and gas exploration, development and production activities in the areas where we acquire multi-client data or more generally.
- Any reduction in the economic value of such data will require us to write down its recorded value, which could have a material adverse effect on our results of operations. We wrote down the value of our multi-client data library by US$226 million in the year 2018.

In addition, there are a number of geoscience companies that create, market and license seismic data and maintain seismic libraries. Competition for acquisition of new seismic data among geoscience service providers has been historically intense and we expect this competition will continue to be intense. The above risks could have a material adverse effect on our business, results of operations or financial condition, in particular in the competitive data acquisition environment in which we operate.

2.1.1.2.6. In order to comply with our debt commitments, refinance our debt, fund our working capital needs, or to make capital expenditures, we need significant liquidity, and our ability to generate this liquidity could be affected by events beyond our control.

Our ability to repay or refinance our indebtedness and fund our working capital needs and planned capital expenditures depends, among other things, on our future operating results, which will be partly the result of economic, financial, competitive and other factors beyond our control.

It is difficult for us to predict with certainty our working capital needs. This difficulty is due primarily to working capital requirements related to the marine seismic acquisition business, multi-client projects and the development and introduction of new lines of geophysical equipment products. For example, under specific circumstances, we may have to extend the length of payment terms we grant to customers or may increase our inventories substantially. We may therefore be subject to significant and rapid increases in our working capital needs that we may have difficulty financing on satisfactory terms, or at all, due notably to limitations in our debt agreements or market conditions. Although we expect our intended transition to an asset-light model will reduce our liquidity needs, these needs will remain significant.

As of December 31, 2018, our net financial debt (defined as gross financial debt less cash and cash equivalents, before IFRS16 application) amounted to US$733 million. Our gross financial debt, as of December 31, 2018, amounted to US$1,167 million (including US$12 million of accrued interest and bank overdrafts). As of December 31, 2018, our available financial resources amounted to US$341 million (including cash, cash equivalents and marketable securities and excluding trapped cash abroad — see note 29 to our consolidated financial statements). As of the same date, we had debt redeemable in cash in the amount of US$683 million (defined as net financial debt less financial leases).

Continued difficult conditions in the markets where we operate or volatility in the financial markets could have a material adverse effect on our ability to service or refinance all or a portion of our indebtedness or otherwise fund our operational requirements. We cannot be certain that additional funds will be available if needed to make future investments in certain projects, take advantage of acquisitions or other opportunities or respond to competitive pressures. If additional funds are not available, or are not available on terms satisfactory to us, there could be a material adverse impact on our business, financial condition and results of operation.

If we are unable to satisfy our debt obligations, we may have to seek alternative financing plans, such as refinancing or restructuring our indebtedness, selling assets, reducing or delaying capital investments or seeking to raise additional capital. Our ability and the conditions under which we may borrow funds to refinance existing debt or finance our operations depend on many factors, including conditions in credit markets, perceptions of our business and the ratings attributed to us by rating agencies which are today B- for Standard & Poors and B3 for Moody's. We cannot assure you that any refinancing or debt restructuring would be possible, that any assets could be sold or that, if sold, the timing of the sales and the amount of proceeds realized from those sales would be favorable to us or that additional financing could be obtained on acceptable terms or at all.

2.1.1.2.7. Our results of operations may be affected by the weight of intra-group production.

We dedicate a part of our production capacity to intra-group sales. For example, the Marine, Land and Multi-Physics Acquisition business lines may purchase Sercel equipment as well as acquire multi-client data, to be processed by the Subsurface Imaging business line. The relative size of our intra-group sales and our external sales has a significant impact both on our revenues and our operating results. With respect to intra-group sales, we capitalize only the direct production costs, and we treat the corresponding general and administrative costs as expenses in our income statement, which decreases operating profit for the period when the sales occur.

2.1.1.2.8. We are exposed to financial risks related to the effects of climate change and we take measures to reduce them, by implementing a low-carbon strategy in every component of our activities.

The Enterprise Risk Management and Sustainable Development Departments conducted in 2018 a study on short and long-term (2040) financial risks linked to the effects of climate change, taking into account both physical risks on assets and market risks. The Sustainable Development Scenario published in the International Energy Agency (IEA) World Energy Outlook served as a reference scenario. This scenario indeed presents fossil fuel production and consumption patterns that are compatible with a global temperature rise not exceeding 2°C, in line with the commitments taken by the States during the COP21.

This risk analysis has been reviewed by management and presented to the HSE-Sustainable Development Committee of the Board of Directors. The Committee estimated that CGG was subject to limited financial risks at short and long-term in a 2°C scenario.

CGG has been transforming its business model since 2013. The Company's geoscience profile has been sharpened while seismic data acquisition activities have been significantly reduced. This resulted in reducing CGG direct and indirect (Scope 1 and 2) greenhouse gas emissions by 43% over five years. While CGG Scope 1 and 2 emissions amount to 424 ktonnes of CO2 equivalent in 2018, Scope 3 emissions have been estimated to 386 ktonnes.

Once CGG will have opted out of seismic acquisition — representing, still in 2018, 83% of CGG's direct and indirect emissions — the Group aims at maintaining its energy efficiency efforts within the Geoscience and Equipment activities.

2.1.1.2.9. We are exposed to commercial risk and counter-party risk.

While we seek to reduce commercial risk by monitoring our customer credit profile, in 2018, our two most significant customers accounted for 7.1% and 6.3% of our consolidated revenues, compared with 11.0 and 8.3% in 2017 and 8.4% and 7.3% in 2016[6]. The loss of any of our significant customers or deterioration in our relations with any of them could materially and adversely affect our business, results of operations and financial condition.

2.1.1.2.10. We have had losses in the past and there is no assurance we will be able to restore profitability in the coming years.

We have experienced losses in the past. In 2016, 2017 and 2018, we recorded a net loss attributable to shareholders of US$576.6 million, US$514.1 million and US$95.8 million respectively. There is no assurance that we will be able to restore profitability in the coming years.

2.1.1.3. Risks related to our industry

2.1.1.3.1. Current economic uncertainty and the volatility of oil and natural gas prices could have a significant adverse effect on us.

Global market and economic conditions remain uncertain and volatile. In recent periods, economic contractions and uncertainty have weakened demand for oil and natural gas, while the introduction of new production capacities has increased supply, resulting in lower prices, and consequently a reduction in the levels of exploration for hydrocarbons by our clients and demand for our products and services. These developments have had a significant adverse effect on our business, revenue and liquidity resulting not only in a decline in activity levels but also in the prices we can charge. The price of Brent decreased from US$110.80 per barrel as of December 31, 2013 to US$37.28 per barrel as of December 31, 2015, increasing to US$66.87 as of December 31, 2017 and then decreasing again to US$53.80 as of December 31, 2018. It is difficult to predict how long the current economic conditions and imbalance between supply and demand will persist, whether oil prices will remain volatile, and whether the current market conditions will deteriorate further. The reduction in demand for our products and services and the resulting pressure on pricing in our industry could continue to negatively affect our business, results of operations, financial condition and cash flows.

(6) Figures presented for 2017 and 2016 have been restated.

Uncertainty about the general economic situation and/or the medium-term level of hydrocarbon prices has had and is likely to continue to have a significant adverse impact on the commercial performance and financial condition of many companies, which may affect some of our customers and suppliers. The current economic and oil industry climate may lead customers to cancel, delay or choose not to renew orders or leave suppliers unable to provide goods and services as agreed. Our governmental clients may face budget deficits that prohibit them from funding proposed and existing projects or that cause them to exercise their right to terminate our contracts with little or no prior notice. If our suppliers, vendors, subcontractors or other counterparties are unable to perform their obligations to us or our customers, we may be required to provide additional services or make alternate arrangements on less favorable terms with other parties to ensure adequate performance and delivery of service to our customers. These circumstances could also lead to disputes and litigation with our partners or customers, which could have a material adverse impact on our reputation, business, financial condition and results of operations.

Turmoil in the credit markets, such as has been experienced in prior periods, could also adversely affect us and our customers. Limited access to external funding has in the past caused some companies to reduce their capital spending to levels supported by their internal cash flow. Some companies have found their access to liquidity constrained or subject to more onerous terms. In this context, our customers may not be able to borrow money on reasonable terms or at all, which could have a negative impact on their demand for our products, and impair their ability to pay us for our products and services on a timely basis, or at all.

In addition, the potential impact on the liquidity of major financial institutions or on the willingness of creditors to provide us financing may limit our ability to fund our business strategy through borrowings under either existing or new debt facilities in the public or private markets and on terms we believe to be reasonable. Persistent volatility in the financial markets could have a material adverse effect on our ability to refinance all or a portion of our indebtedness and to otherwise fund our operational requirements. We cannot be certain that additional funds will be available if needed to make future investments in certain projects, take advantage of acquisitions or other opportunities or respond to competitive pressures. If additional funds are not available, or are not available on terms satisfactory to us, there could be a material adverse impact on our business, financial condition and results of operations.

2.1.1.3.2. The volume of our business depends on the level of expenditures by the oil and gas industry, and reductions in such expenditures may have a material adverse effect on our business.

Demand for our products and services has historically been dependent upon the level of expenditures by oil and gas companies for exploration, production and development activities (for our Geoscience, Multi-Client and Acquisition businesses) and upon the level of capital expenditures by seismic companies (for our Equipment business). These expenditures are discretionary in nature and are significantly influenced by oil and gas prices and by expectations regarding future hydrocarbon prices, which may fluctuate based on relatively minor changes in the supply of and demand for oil and gas, expectations regarding such changes and other factors beyond our control. Lower or volatile hydrocarbon prices tend to limit the demand for seismic services and products. In 2015 and 2016, oil and gas companies reduced their planned exploration and production spending due notably to falling oil prices, affecting demand for our products and services. Exploration and production spending remained at a relatively low level in 2017 and 2018, in light of uncertainties concerning the oil price recovery and volatility.

Factors affecting prices and, consequently, demand for our products and services, include:

- change in supply and demand for hydrocarbons;
- worldwide political, military and economic conditions, including political developments in the Middle East and North Africa, the Ukraine crisis, economic sanctions and economic growth levels;
- actions by the members of the OPEC with respect to oil production levels and announcements of potential changes in such levels, including the failure of such countries to comply with production cuts;
- the ability of non-OPEC countries to increase their oil and gas production;
- the ability of oil and gas companies to raise equity and debt financing;
- technical advances affecting energy consumption;
- laws or regulations restricting the use of fossil fuels or taxing such fuels and governmental policies regarding atmospheric emissions and use of alternative energy;
- technological developments increasing oil and gas extraction capacity or reducing costs;
- levels of oil and gas production, changes in those levels and the estimated current and future level of excess production capacity;
- the rate of depletion of existing oil and gas reserves and delays in the development of new reserves;
- more appetite for onshore activities given that offshore activities usually have a higher break-even level;
- the pressure imposed by equity markets on oil and gas companies to maintain a dividend distribution policy which could lead them to significantly reduce their capital expenditure plans in the short term;
- available pipeline, storage and other transportation capacity;
- the price and availability of alternative fuels;
- policies of governments regarding the exploration for and production and development of oil and gas reserves in their territories;
- shareholder activism or activities by non-governmental organizations to restrict the exploration, development and production of oil and natural gas; and

- general weather conditions, with warmer temperatures decreasing demand for products such as heating oil and extreme weather events potentially disrupting oil and gas exploration or production operations over a wide area.

Increases in oil and natural gas prices may not increase demand for our products and services or otherwise have a positive effect on our financial condition or results of operations. Forecasted trends in oil and gas exploration and development activities may not materialize and demand for our products and services may not reflect the level of activity in the industry. In particular, with respect to the marine acquisition market, prices remain very dependent upon the balance between supply and demand. They can thus fluctuate only slightly or even decline, despite demand increases if, at the same time, the available production capacity in the market increases to a greater degree.

2.1.1.3.3. Our backlog includes contracts that can be unilaterally delayed or terminated at the client's option.

In accordance with industry practice, contracts for the provision of seismic and other services and supply of products typically can be delayed or terminated at the sole discretion of the client without payment of significant cancellation costs to the service or product provider. As a result, even if contracts are recorded in backlog, there can be no assurance that such contracts will be wholly executed by us and generate actual revenue, or even that the total costs already borne by us in connection with the contract would be covered in full pursuant to any cancellation clause. Furthermore, there can be no assurance that contracts in backlog will be performed in line with their original timetable and any possible delay could result in operating losses as most of our costs are fixed.

2.1.1.3.4. We are subject to intense competition in the markets where we carry out our operations, which could limit our ability to maintain or increase our market share or maintain our prices at profitable levels.

In general, the recent low oil price environment has resulted in increased pricing pressure, with certain of our competitors aggressively bidding lower prices in an effort to maintain volumes. While no single company competes with us in all of our segments, we are subject to intense competition in each of our segments. We compete with large, international companies as well as smaller, local companies. In addition, we compete with major service providers and government-sponsored enterprises and affiliates. Some of our competitors are larger than we are and have greater financial and other resources than we do. These and other competitors may be better positioned to withstand and adjust more quickly to volatile market conditions, such as fluctuations in oil and gas prices and production levels, as well as changes in government regulations. In addition, if our service competitors increase their capacity (or do not reduce capacity if demand decreases), the excess supply in the oilfield services market could apply further downward pressure on prices. The negative effects of the competitive environment in which we operate could have a material adverse effect on our business, financial condition and results of operations.

2.1.1.3.5. We have high levels of fixed costs that are incurred regardless of our level of business activity, including in relation to bareboat charters.

We have high fixed costs and seismic data acquisition activities that require substantial capital expenditures and long-term contractual commitments. As a result, downtime or decreased productivity due to reduced demand, weather interruptions, equipment failures, permit delays or other circumstances that affect our ability to generate revenue could result in significant operating losses.

We have implemented our Transformation Plan in an effort to reduce our high fixed costs in light of the difficult market environment, with a focus on high value-added activities and a reduction of our fleet to five vessels principally dedicated to multi-client activity, as well as cost saving actions and a reduction in investments. We plan to further reduce our fleet to three vessels in 2019 and are seeking a strategic partner for a more cost-efficient structure. However, we cannot assure you that this plan will be sufficient to respond to market pressures, which could have a material adverse effect on our business, financial condition and results of operations.

After the implementation of the Transformation Plan, we continue to operate certain of our marine acquisition vessels under long-term bareboat charters, which generate significant fixed costs that cannot easily be reduced during the term of the charters; and in 2017 and 2018, we took steps to reduce our annual charter costs.

As of December 31, 2018, the aggregate amount of our off-balance sheet commitment for bareboat charters for our fleet was US$365 million. Of this amount, US$358 million corresponded to vessels operated by GSS, US$7 million corresponded to vessels that have already been cold-stacked. If we fail to reach an agreement with a strategic partner to more efficiently manage these assets, these costs cannot be reduced further before the charters expire. The charters of the vessels operated by GSS expire in 2027, and the last charter of the other operated vessels expires in 2020. While we believe that these steps and our announced plans for further reductions will make our marine acquisition activity more competitive, we will continue to have high levels of fixed costs in a market with historically low levels of demand and pricing, which could have a material adverse effect on our business, financial condition and results of operations.

2.1.1.3.6. The revenues we derive from marine seismic data acquisition vary significantly during the year.

Our seismic data acquisition revenues, in particular in the marine market, are partially seasonal in nature. In the marine market notably, certain basins can be very active and absorb higher capacity during a limited period of the year (such as the North Sea between April and September), triggering significant volatility in demand and price in their geographical markets throughout the year. The marine data acquisition business is, by its nature, exposed to unproductive interim periods due to vessel maintenance and repairs or transit time from one operational zone to another during which revenue is not recognized. Other factors that cause variations from quarter to quarter include the effects of weather conditions in a given operating area, the internal budgeting process of some important clients for their exploration expenses, and the time needed to mobilize production means or obtain the administrative authorizations necessary to commence data acquisition contracts.

2.1.1.3.7. We are subject to risks related to our information technology, including cyber security risks and risks of hardware and software failures.

The oil and natural gas and geothermal industries have become increasingly dependent on digital technologies to conduct certain processing activities. For example, we depend on digital technologies to perform many of our services and to process and record financial and operating data. At the same time, cyber incidents, including deliberate attacks, have increased. The U.S. government has issued public warnings that indicate that energy assets might be specific targets of cyber security threats. Our technologies, systems and networks, and those of our vendors, suppliers and other business partners, may become the target of cyberattacks or information security breaches that could result in the unauthorized release, gathering, monitoring, misuse, loss or destruction of proprietary and other information, or other disruption of business operations. In addition, certain cyber incidents, such as surveillance, may remain undetected for an extended period. Despite all the controls implemented to strengthen our cyber defense, we know that we remain vulnerable to an Information Security incident.

In addition, our success depends on the efficient and uninterrupted operation of our computer and communications systems. A failure of our network or data gathering procedures could impede the processing of data, delivery of databases and services, client orders and day-to-day management of our business and could result in the corruption or loss of data. Despite any precautions we may take, damage from fire, floods, hurricanes, power loss, telecommunications failures and similar events at our computer facilities could result in interruptions in the flow of data to our servers and from our servers to our clients.

A transfer of our data collection operations to an alternative provider of server hosting services due to a failure of our existing devices could result in significant delays in our ability to deliver our products and services to our clients and could be costly to implement. Any of these risks related to IT systems could damage our reputation and harm our business, results of operations and financial condition.

2.1.1.3.8. Technological changes and new products and services are frequently introduced in the market, and our technology could be rendered obsolete by these introductions or by evolving industry and regulatory standards, or we may not be able to develop and produce new and enhanced products on a cost-effective and timely basis.

Technology changes rapidly in the oil and gas industry and new and enhanced products are frequently introduced in the markets in which we operate. Our success depends to a significant extent upon our ability to develop and produce new and enhanced products and services on a cost-effective and timely basis in accordance with industry demands. While we commit substantial resources to research and development, we may encounter resource constraints or technical or other difficulties that could delay the introduction of new and enhanced products and services in the future. In addition, the continuing development of new products risks making our older products obsolete. Currently accepted industry and regulatory standards are also subject to change, which may contribute to the obsolescence of our products or services. New and enhanced products and services, if introduced, may not gain market acceptance or correctly address new industry standards and may be materially adversely affected by technological changes or introductions of other new products or services by one of our competitors.

2.1.1.3.9. We depend on proprietary technology and are exposed to risks associated with the misappropriation or infringement of that technology.

Our ability to maintain or increase prices for our products (such as Sercel equipment and GGR software) and services depends in part on our ability to differentiate the value delivered by our products and services from those delivered by our competitors. Our proprietary technology plays an important role in this differentiation. We rely on a combination of patents, trademarks and trade secret laws to establish and protect our proprietary technology. Patents last up to 20 years, depending on the date of filing and the protection accorded by each country. In addition, we enter into confidentiality and license agreements with our employees, customers and potential customers which limit access to and distribution of our technology. Our customer data license and acquisition agreements also identify our proprietary, confidential information and require that such proprietary information be kept confidential. While these steps are taken to strictly maintain the confidentiality of our proprietary and trade secret information, it is difficult to ensure that unauthorized use, misappropriation or disclosure will not occur. However, actions that we take to protect our proprietary rights may not be adequate to deter the misappropriation or independent third-party development of our technology. In addition, we may have lawsuits filed against us claiming that certain of our products, services, and technologies infringe the intellectual property rights of others. Although we do not have any current litigation involving our intellectual property rights or the intellectual rights of others which may have an impact on us, such litigation may take place in the future. In addition, the laws of certain foreign countries do not protect proprietary rights to the same extent as, in particular, the laws of France or the United States, which may limit our ability to pursue third parties that misappropriate our proprietary technology.

2.1.1.3.10. Our results of operations may be significantly affected by currency fluctuations.

We derive a substantial portion of our revenues from international sales, subjecting us to risks relating to fluctuations in currency exchange rates. Our revenues and expenses are mainly denominated in US dollars, and to a significantly lesser extent, in euros, Canadian dollars, Mexican pesos, Brazilian reais, Australian dollars, Norwegian kroner, British pounds and Chinese renminbi-yuan. Historically, a significant portion of our revenues that were invoiced in currencies other than US dollars related to contracts that were effectively priced in US dollars, as the US dollar often serves as the reference currency when bidding for contracts to provide our products and services.

Fluctuations in the exchange rate of other currencies, particularly the euro, against the U.S. dollar, have had in the past and will have in the future a significant effect upon our results of operations. We attempt to reduce the risks associated with such exchange rate fluctuations through our hedging policy. We cannot assure you that fluctuations in the values of the currencies in which we operate will not materially adversely affect our future results of operations. As of December 31, 2018, we estimate our annual recurring expenses in euros to be approximately €300 million and as a result, an unfavorable variation of US$0.10 in the average yearly exchange rate between the US dollar and the euro would reduce our profit before tax and our shareholders' equity by approximately US$30 million.

Our policy is to manage our balance sheet exposures by maintaining our monetary assets and liabilities in the same currency to the extent practicable and adjust imbalances through spot currency sales or equity purchases or transactions.

The following tables show our exchange rate exposure as of December 31, 2018:

	As of December 31, 2018					
	Assets	Liabilities	Currency commitments	Net position before hedging	Forward contracts applied	Net position after hedging
(Converted in millions of US$)	(a)	(b)	(c)	(d) = (a) – (b) ± (c)	(e)	(f) = (d) + (e)
US$ (1)	463.6	(865.3)	—	(401.7)	(2.2)	(403.9)
EUR (2)	69.4	(458.6)	—	(389.2)	—	(389.2)
US$ (3)	53.5	(109.1)	—	(55.6)	13.6	(42.0)
BRL (4)	11.1	—	—	11.1	—	11.1

(1) US$-denominated assets and liabilities in the entities whose functional currency is the euro.
(2) Euro-denominated assets and liabilities in the entities whose functional currency is the US$.
(3) US$-denominated assets and liabilities in the entities whose functional currency is the Brazilian real.
(4) BRL-denominated assets and liabilities in the entities whose functional currency is the US$.

Our net foreign exchange exposure is principally linked to the euro and to a lesser extent to the Brazilian real. We seek to reduce our foreign-exchange position by balancing our assets and liabilities in local currencies and by applying a policy of buying and selling forward exchange contract. Although we attempt to reduce the risks associated with exchange rate fluctuations, we cannot assure you that fluctuations in the values of the currencies in which we operate will not materially adversely affect our future results of operations.

Our annual recurring expenses in euros are equal to approximately €300 million.

Sensitivity Analysis Table

Impact of US$ variation in expenses in euros

	Impact on result before taxes		Impact on shareholders' Equity before taxes	
As of December 31, 2018	Increase of 10 cents	Decrease of 10 cents	Increase of 10 cents	Decrease of 10 cents
In millions of US$	30	(30)	30	(30)
Total	**30**	**(30)**	**30**	**(30)**

With respect to exchange rate risk related to investments in operating subsidiaries, we consider such risk to be low, since the functional currency of the majority of operating entities is the US dollar.

2.1.1.3.11. We are subject to risks that are not fully insured.

The nature of our business involves ongoing and significant operating risks for which we are not always insured, and in respect of which we may not be able to obtain adequate insurance at commercially reasonable rates, if at all.

- Our seismic data acquisition activities, particularly in deepwater marine areas, are often conducted under harsh weather and other hazardous operating conditions, including the detonation of dynamite. These operations are subject to the risk of downtime or reduced productivity, as well as to the risks of loss to property and injury to personnel resulting from fires, accidental explosions, mechanical failures, spills, collisions, stranding, ice floes, high seas and natural disasters. In addition to losses caused by human errors or accidents, we may also be subject to losses resulting from, among other things, war, terrorist activities, piracy, political instability, business interruption, strikes and severe weather events.
- Our extensive range of seismic products and services expose us to the risk of litigation and legal proceedings, including those related to product liability, personal injury and contract liability.
- We produce and sell highly complex products. Our extensive product development, manufacturing controls and testing may not be adequate and sufficient to detect all defects, errors, failures, and quality issues that could affect our customers, which could result in claims against us, order cancellations or delays in market acceptance.

We have put in place insurance coverage against certain operating hazards, including product liability claims and personal injury claims, damage, destruction or business interruption of data processing centers, manufacturing centers and other facilities, in amounts we consider appropriate in accordance with industry practice. Our risk coverage policy reflects our objective of covering major claims that could affect our facilities and equipment, as well as third-party liability claims that we may be exposed to as a result of our activities. We review the adequacy of insurance coverage for risks we face periodically.

Whenever possible, we obtain agreements from customers that limit our liability.

However, our insurance coverage may not be sufficient to fully indemnify us against liabilities arising from pending and future claims or our insurance coverage may not be adequate in all circumstances or against all hazards. We may not be able to maintain adequate insurance coverage in the future at commercially reasonable rates or on acceptable terms.

2.1.1.3.12. We are subject to disruptions in our supply chain and third party suppliers.

Disruptions to our supply chain and other outsourcing risks may adversely affect our ability to deliver our products and services to our customers.

Our supply chain is a complex network of internal and external organizations responsible for the supply, manufacture and logistics supporting our products and services around the world. We are vulnerable to disruptions in this supply chain from changes in government regulations, tax and currency changes, strikes, boycotts and other disruptive events as well as from unavailability of critical resources. These disruptions may have an adverse impact on our ability to deliver products and services to our customers.

Within our Group, Sercel makes particular use of subcontracting. Our French manufacturing sites outsource part of their production to local third-party companies selected according to certain criteria, including quality and financial soundness. Outsourced operations are distributed among several entities, each having a small proportion of aggregate outsourced activity in order to limit risk related to the failure of any one of our subcontractors.

If our suppliers, vendors, subcontractors or other counterparties are unable to perform their obligations to us or our customers, we may be required to provide additional services or make alternate arrangements on less favorable terms with other parties to ensure adequate performance and delivery of service to our customers. These circumstances could also lead to disputes and litigation with our partners or customers, which could have a material adverse impact on our reputation, business, financial condition and results of operations.

2.1.1.4. Risks related to our indebtedness

2.1.1.4.1. Our debt agreements contain restrictive covenants that may limit our ability to respond to changes in market conditions or pursue business opportunities.

Our borrowings are subject to the provisions of the indentures governing the first lien notes and the second lien notes, which contain restrictive covenants that limit our ability to, among others:

- incur or guarantee additional indebtedness or issue preferred shares;
- pay dividends or make other distributions;
- purchase equity interests or reimburse subordinated debt prior to its maturity;
- create or incur certain liens;
- enter into transactions with affiliates;
- issue or sell capital stock of subsidiaries;
- engage in sale-and-leaseback transactions;
- sell assets or merge or consolidate with another company; and
- proceed with acquisitions or joint venture transactions.

The requirement to comply with these provisions may adversely affect our ability to react to changes in market conditions, take advantage of business opportunities we believe to be desirable, obtain future financing, sell assets, fund capital expenditures, or withstand a continuing or future downturn in our business.

2.1.1.4.2. If we are unable to comply with the restrictions and covenants in the indentures governing the first lien notes and the second lien notes and other current and future debt agreements, we could be in default under the terms of these indentures and agreements, which could result in an acceleration of repayment.

If we are unable to comply with the restrictions and covenants in the indentures governing the first lien notes and the second lien notes or in other current or future debt agreements, there could be a default under the terms of these indentures and agreements.

Our ability to comply with these restrictions and covenants may be affected by events beyond our control. As a result, we cannot assure you that we will be able to comply with these restrictions and covenants. In certain events of default under these agreements, lenders could terminate their commitments to lend or accelerate the loans or bonds and declare all amounts outstanding due and payable. Borrowings under other current or future debt instruments that contain cross-acceleration or cross-default provisions may also be accelerated and become due and payable. If any of these events occur, our assets might not be sufficient to repay in full all of our outstanding indebtedness and we may be unable to find alternative financing. Even if we could obtain alternative financing, it might not be on terms that are favorable or acceptable to us.

2.1.1.4.3. We and our subsidiaries may incur additional debt.

We and our subsidiaries may incur additional debt (including secured debt) in the future. The terms of the indentures governing our first lien notes and second lien notes limit, but do not prohibit, us and our subsidiaries from doing so.

If new debt is added to our current debt levels, the related risks for us could intensify.

As of December 31, 2018, we had a bank guarantee credit line drawn for US$7 million.

2.1.1.4.4. We are subject to risks from rising interest rates

We are subject to interest rate risk on our floating rate debt and when we refinance any of our debt. As of December 31, 2018, we had US$481 million of debt, under our second lien notes, bearing variable interest, and an increase of 1 point in the applicable three-month interest rate would have had a negative impact on our net results before taxes of US$4.8 million. Our second lien notes are subjects to paid-in-kind (PIK) interests at a fixed rate of 8.5%. As a result, the principal amount increases each period and as such, the variable component of interest is paid on an increasing amount each period. Changes in the monetary policies of the US Federal Reserve and the European Central Bank, developments in financial markets and changes in our perceived credit quality may increase our financing costs and consequently adversely impact our ability to refinance our indebtedness, which could have a negative impact on our business, liquidity, results of operations and financial condition.

2.1.1.4.5. Net debt exposure to exchange rates fluctuations

Our financial debt is partly denominated in euro and converted in US dollars at the closing exchange rate. As of December 31, 2018, our US$733 million of net debt included euro-denominated net debt of €254 million based on the closing exchange rate of US$1.1450. From one year end closing to another, a variation of US$0.10 in the closing exchange rate between the US dollar and the euro would impact our net debt by approximately US$25 million.

2.1.1.5. Risks related to taxation

2.1.1.5.1. We are subject to complex tax rules in various jurisdictions, and our interpretation and application of these rules may differ from those of relevant tax authorities, which could result in additional tax liabilities.

We operate in a number of countries, and will accordingly be subject to the tax laws of several jurisdictions. The tax rules to which the Group is subject are complex, and we must make judgements (including based on external advice) as to the interpretation and application of these rules including the new IFRIC 23 regulation. Our total tax expense could be affected by changes in tax rates in various jurisdictions, changes in the valuation of deferred tax assets and liabilities or changes in tax laws or their interpretation. Additionally, our tax matters will usually be reviewed by tax authorities. Those tax authorities may disagree with our interpretation and/or application of relevant tax rules. There can be no assurance as to the outcome of these examinations. If a taxing authority disagrees with the positions we have taken, we could face additional tax liability, including interest and penalties, which could adversely affect our financial results.

2.1.1.5.2. U.S. federal income tax reform could adversely affect us.

On December 22, 2017, the United States enacted the "Tax Cuts and Jobs Act of 2017" ("U.S. Tax Reform") which provides for substantial changes to the U.S. taxation of businesses and individuals. U.S. Tax Reform, among other things, significantly reduces the U.S. federal tax rate applicable to corporations, imposes significant additional limitations on the deductibility of interest, imposes a new base erosion anti-abuse tax (intended to prevent international groups from 'earnings stripping' through certain payments to non-U.S. affiliates), temporarily allows for the expensing of certain capital expenditures, and limits the deduction for net operating losses and net operating loss carryforwards ("U.S. NOLs") to 80% of current year taxable income and eliminates net operating loss carrybacks, in each case, for losses arising in taxable years beginning after December 31, 2017 (though any such U.S. NOLs may be carried forward indefinitely).

The main consequences of U.S. Tax Reform on our projected cash taxes payable or on our net operating losses are the following:

CGG Holding (U.S.) Inc. and its subsidiaries (the "Holding U.S. Group") started paying U.S. federal income taxes beginning

2018 under the new BEAT tax (Base Erosion and Anti-Abuse Tax). Contrary to the former AMT (Alternative Minimum Tax), the BEAT tax does not give any rise to a credit to be offset against any future corporate tax payments. It is an additional tax, which increases the global cash tax burden of the Holding U.S. Group.

The deductibility of the business interest paid on the U.S. debt will be significantly limited under new rules that limit deductions for interest expense. U.S. Tax Reform generally limits net business interest expense deductions to 30% of adjusted taxable income. For 2018 through 2021, this amount generally approximates to earnings before interest, taxes, depreciation and amortization (i.e., EBITDA). For tax years beginning after December 31, 2021, adjusted taxable income is determined by adding back only interest and taxes (i.e., it generally will approximate EBIT). The amount of interest paid or accrued that exceeds 30% of adjusted taxable income is treated as excess interest expense and may be carried forward to future taxable years. However, the Holding U.S. Group will need to generate enough taxable profits to absorb the business interest expense of the current year before it can deduct any business interest carried forward from a prior year.

We do not anticipate U.S. Tax Reform to have any other significant consequences for the time being. However, since the legislation is new, we expect additional rules and regulations to be issued in the medium term. This could entail risks that cannot be fully assessed at this point in time. We continue to examine the impact U.S. Tax Reform may have on our business. For additional information on the impact of U.S. Tax Reform on the Group for 2018, see note 25 to our consolidated financial statements. The impact of U.S. Tax Reform on holders of our shares is uncertain and could be adverse. We recommend investors to consult with their legal and tax advisors with respect to such legislation and the potential tax consequences of investing in our shares.

2.1.1.5.3. Our ability to use U.S. NOLs and R&D credits to offset future income may be limited.

We have generated significant U.S. NOLs and R&D credits. We generally are able to carry U.S. NOLs forward to reduce our tax liability in future years. Federal U.S. NOLs generated on or before December 31, 2017 can generally be carried back two years and carried forward for up to twenty years and can be applied to offset 100% of taxable income in such years. Under U.S. Tax Reform, however, federal U.S. NOLs incurred in 2018 and in future years may be carried forward indefinitely, but may not be carried back and the deductibility of such federal U.S. NOLs is limited to 80% of taxable income in such years. It is uncertain whether state and local laws governing the treatment of NOLs will follow the federal treatment under U.S. Tax Reform.

In addition, our ability to use existing U.S. NOLs generated is subject to the rules of Section 382 of the U.S. Internal Revenue Code of 1986, as amended (the "IRC"). This section generally restricts the use of U.S. NOLs and R&D credits for corporations that experience an "ownership change" as defined under Section 382 of the IRC. In general, an "ownership change" occurs if a corporation's "5-percent shareholders," as defined under Section 382 of the IRC, collectively increased their ownership in us by more than 50 percentage points over a rolling three-year period. The Holding U.S. Group underwent a change of ownership on the effective date of CGG's financial restructuring. A corporation that experiences an ownership change generally will be subject to an annual limitation on the use of its pre-ownership change U.S. NOLs and R&D credits equal to the equity value of the corporation immediately before the ownership change, multiplied by the long-term tax-exempt rate for the month in which the ownership change occurs, and increased by a certain portion of any "built-in-gains."

The application of IRC Section 382 will be materially different from that described above if Holding U.S. Group is subject to special rules provided under IRC Section 382(l)(5) that apply to certain corporations who undergo an ownership change while under the jurisdiction of a bankruptcy court. Holding U.S. Group generally would qualify for these special rules if the historic holders of CGG common stock and certain holders of Holding U.S. Group's debt, taken together, own equity interests representing at least 50% of the voting power and equity value of Holding U.S. Group following CGG's financial restructuring. In that case, the Holding U.S. Group's ability to use its pre-effective date U.S. NOLs and R&D credits would not be limited as described in the preceding paragraph. However, several other limitations would apply to the Holding U.S. Group under IRC Section 382(l)(5), including (a) the Holding U.S. Group's U.S. NOLs would be calculated without taking into account deductions for interest paid or accrued in the portion of the current tax year ending on the effective date and all other tax years ending during the three-year period prior to the current tax year with respect to the debt securities that are exchanged pursuant to the financial restructuring, and (b) if the Holding U.S. Group undergoes another ownership change within two years after the effective date, the Holding U.S. Group's Section 382 limitation following that ownership change will be zero. It is uncertain whether the provisions of Section 382(l)(5) are available and, if available, how they would apply to the Holding U.S. Group. If the Holding U.S. Group qualifies for the special rule under Section 382(l)(5), the use of the Holding U.S. Group's U.S. NOLs and R&D credits will be subject to Section 382(l)(5) of the IRC unless the Holding U.S. Group affirmatively elects for the provisions not to apply. Prior to filing its 2018 U.S. federal income tax return, the Holding U.S. Group will decide whether, if it qualifies for the special rules under Section 382(l)(5), it would be advantageous for Section 382(l)(5) to apply to the ownership change resulting from consummation of the financial restructuring, or whether the Holding U.S. Group will elect not to have the provisions of Section 382(l)(5) apply to the ownership change arising from the consummation of the financial restructuring.

If the Holding U.S. Group does not qualify for, or elects not to apply, the special rule under Section 382(l)(5) of the IRC described above, the provisions of IRC Section 382(l)(6) applicable to corporations under the jurisdiction of a bankruptcy court may apply in calculating the annual Section 382 limitation. Under this rule, the limitation will be calculated by reference to the lesser of the value of the Holding U.S. Group's equity (with certain adjustments) immediately after the ownership change or the value of the Holding U.S. Group's assets (determined without regard to liabilities) immediately before the ownership change. Although such calculation may increase the annual Section 382 limitation, the Holding U.S. Group's use of any U.S. NOLs or other tax attributes, including tax credits, remaining after implementation of the financial restructuring may still be substantially limited after an ownership change.

2.1.2. Non-financial risks

The non-financial risks are further developed in Chapter 3 « Sustainable development » of this document.

2.2. INTERNAL CONTROL

The Company's internal control and risk management, effected by the Board of Directors, by the management and by other personnel is designed to provide reasonable assurance regarding the achievement of objectives in the following areas:

- completion and optimization of operations, including the safeguarding of resources,
- the reliability and accuracy of financial information, and
- compliance with applicable laws and regulations.

The principal objective of our internal control and risk management systems and processes is to identify and control risks related to the activities of the Company, as well as the risks related to errors in accounting and financial reporting.

The Company is listed in France and is therefore subject to the French "*Loi de Sécurité Financière*". The Company decided to apply the 2013 COSO internal control integrated framework, established by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO 2013"). The *Autorité des Marchés Financiers (AMF)* has subsequently integrated the principal elements of COSO in its frame of reference.

Pursuant to the provisions of article L. 225-100-1 of the French Commercial Code, this section includes a presentation of the main characteristics of internal control and risk management processes implemented by the Company with respect to the development and processing of accounting and financial information.

A. Control Environment

The control environment is the foundation of all the components of internal control and risk management of the Group, providing discipline and structure. The discussion below describes the Group's Charts and Codes setting its expectations in integrity and ethics, it describes how the Group is organized and structured and how authority and responsibilities are delegated in the Group in order to assure internal control and risk management, in particular with respect to the development and processing of accounting and financial information.

A.1. Integrity and Ethics:

Integrity and Ethics are essential values for the Group internal control.

The Company's standards and expectations in integrity and ethics are codified in its Chart of Ethics, in its Statement of Values and in its Code of Business Conduct, which apply to all employees of our Group. The Group's Code of Business Conduct is a guide to appropriate conduct and present the Group's statement of Mission, Vision and Values, i.e.

(i) operate safely and with integrity,

(ii) have a passion for innovation,

(iii) be socially responsible.

These documents are widely distributed globally in the Group and they are also available to all staff on the Group's employee internet portal, *InSite*.

To support the Business code of conduct, the Group has established an Ethics Committee. See 3.2.2. "Policy and procedures implemented in the fight against corruption" for more details.

In addition, the Board of Directors implemented a code of ethics which is applicable to the Chairman, the Chief Executive Officer, the members of the Executive Leadership Team and the Disclosure Committee. This code defines rules of conduct and integrity which the persons must follow in the performance of their function and obligations relating to disclosure.

A.2. Organization of the Group:

The Group's organizational structure provides the framework within which its activities for achieving its entity-wide objectives are planned, executed and controlled. Within this framework, key areas of authority and responsibility, as well as appropriate lines of reporting, are established. The organizational structure relative to internal control and risk management is described below.

The organizational structure of the Group fulfills three main objectives:

- Align the management structure with the Group's new profile and development strategy, taking into account the current business environment;
- Better address the new technological and commercial challenges of our markets;
- Be more agile and more efficient, allowing the Group to better face the current market conditions and be prepared for the future.

As of December 31, 2018, the Group was organized around two segments and five Corporate Functions.

Segments:

As of December 31, 2018, CGG was organized in two segments, as follows:

- Geology, Geophysics & Reservoir ("GGR"), including Geoscience (Subsurface Imaging, Geology, Reservoir, GeoSoftware and Smart Data Solutions, as well as Technology Function), and Multi-Client ("TIC", including seismic and geologic data library); and
- Equipment, which includes the following business equipment activities: land, marine, borehole and non-oil & gas equipment, as well as trademarks, such as Sercel, Metrolog, GRC and De Regt).

As a result of the announcement of our Strategic plan, the Contractual Data Acquisition segment (including Marine, Land and Multi-Physics business lines) is now presented as discontinued operations and assets held for sale in accordance with IFRS 5.

Corporate Functions:

Five Corporate functions, at the Group level, ensure a global transverse approach and provide support across all activities, i.e.: (i) the Finance Information Systems and Risk Management Function, (ii) the Human Resources Function, (iii) the Legal and Trade Compliance Function, (iv) the Health, Safety and Environment & Sustainable Development Function, and (v) the Marketing, Sales and Communication Function.

A.3. Organization of the Group with respect to finance and internal control

The Chief Executive Officer

The Chief Executive Officer is given wide authority by the Board of Directors of the Company to manage the Company.

The Chief Executive Officer has ultimate ownership and responsibility for the internal control and risk management system. He ensures the existence of a positive control environment, and he is responsible for seeing that all components of internal control and risk management are in place.

The Chief Executive Officer's responsibilities are cascaded to heads of the segments and functions. Thus they have responsibility for internal control and risk management related to their unit's objectives. They are responsible for the development and implementation of internal control rules and procedures that address their unit's objectives and ensure that these are consistent with the Group's objectives.

To achieve the goals set by the Board of Directors, the Chief Executive Officer manages the organization through the Executive Leadership team.

The Executive Leadership team

The Executive Leadership team is chaired by the Chief Executive Officer and brings together the Heads of segments and functions. It is a decision body which meets every month, and more often if necessary, for the review and general conduct of the business of the Group. The Executive Leadership team monitors and controls each business's performance as well as the implementation of the Group strategy and the carrying-out of its projects through the segments and functions. The members are interfacing regularly with the Board and the market and participate in the financial and business roadshows.

The Executive Leadership team is also a discussion and proposition body between the segments and functions for the Group, a decision body to validate and follow-up all projects and decisions with transverse impacts. It will in particular:

- Monitor and follow the execution of decisions taken,
- Conduct business review and reports on operational activities,
- Insure Group transverse initiatives consistency throughout the segments,
- Manage the business review,
- Monitor and follow the management of the support functions and shared-services.

The Executive Leadership team shapes the values, principles and major operating policies that form the foundation of the Group's internal control system. It takes actions concerning the Group's organizational structure, content and communications of key policies and the planning and reporting systems the Group will use.

The Executive Leadership team is directly responsible for internal control and risk management in the Group. It defines the orientations for internal control and it oversees its implementation. These obligations are cascaded through the organization in each segment and each function.

Due to their transversal role, certain Functions have an important role in terms of internal control and risk management.

This is the case for the Finance, Information Systems and Risk Management Function, playing a key role in terms of development and processing of accounting and financial information. The role of this function is described hereafter.

Finance and Audit

The **Finance Function** is notably composed of the following departments, each playing critical roles in internal control and risk management:

- Group Financial Control: this department oversees the budgeting process as well as the monthly, quarterly and annual financial reporting. It prepares Group financial synthesis in close coordination with segments' financial controllers and is very closely involved in the preparation of the Board Committee's meetings (Audit Committee, Investment Committee, Appointment and Remuneration Committee). Along with the segments' financial controllers, it ensures, on a regular basis, oversight of the Group's operations and follow-up of the action plans initiated at the Group level. Finally, on a case by case basis, it also provides financial support for any significant investment. It is also in direct contact with the rating agencies. Finally, in connection with the Chief Accounting Officer, it oversees the department in charge of the supervision of the financial information systems.
- Accounting and Consolidation: headed by the Chief Accounting Officer, this department is, from a general standpoint, in charge of producing and supervising financial accounts within the Group, on an individual basis for each group legal entity and on a consolidated basis and as part of the annual and quarterly reports. In this perspective, it elaborates and ensures that through the organization accounting procedures are in place and makes sure, on a continual basis, that they are in accordance with legal and regulatory reporting requirements applicable to financial information to be publicly released. This Department also has oversight of Internal Control of the Group. It oversees the implementation of process and good practice to assure the effectiveness of Internal Control across the Group. This oversight is carried out under the Group's internal control manager.

- Treasury: this department ensures management of Group available funds and their investment as well as Group long-term financial resources (bonds…) and the relationships with the banking community. It oversees and manages risks associated with currency fluctuations, credit and counterparty risks. Treasury also manages a financial committee which reviews, on a monthly basis, the Group financial condition.
- Tax: from a general standpoint, this department is in charge of managing the Group tax obligations and supervising the associated risks. In this perspective, it oversees that all tax returns are filed in a timely manner all across the organization. On a case by case basis, it is involved by the operation teams ahead of significant projects in order to analyze and determine the most appropriate tax flows.

The **Internal Audit department** has direct access to the Executive Leadership team and to the Board's Audit Committee; it assists them in carrying out their oversight responsibilities on the effectiveness of the Group's risk management, internal control and enterprise governance. As of the date of this document, the Corporate Internal Audit function was staffed with four auditors.

The Internal Audit department evaluates internal controls on the basis of the COSO 2013 framework and tools and in compliance with the code of conduct of the Institute of Internal Auditors ("IIA"). Since May 2012, Internal Audit has a charter which governs its operating procedures. This charter has been approved by the audit committee. Finally, since June 2013, Internal Audit has continuously been certified by IFACI/IIA.

Internal Audit is now planned on the basis of the Group risk analysis performed by Risk management. The Group's significant entities are reviewed every year. Priorities are established based on current operations and the supposed level of risk. The annual internal audit plan is defined by the Internal Audit department, approved by the Executive Leadership team and presented to the Audit Committee.

The Internal Audit department conducts financial and accounting audits as well as operational and compliance audits. Recommendations issued as a result of the audits are approved by the Executive Leadership team and the associated action plans are carried out by line management and monitored by Internal Audit until all open issues have been resolved.

Over the past three years, the units audited have accounted for approximately 71% of the average staff and 61% of the average revenues of the Group. In 2018, the internal audit activities were mostly dedicated to the major scope of activities of the Group, in particular Geoscience and Equipment legal entities, and processes considered as being a priority based on the assessments of risks exposure especially for the Acquisition Segment and the support functions. The annual budget of Internal Audit is slightly less than 0.1% of the Group revenues which is in compliance with the standards existing for companies in the same industrial sector.

The Internal Audit department is an independent body reporting to the Chief Executive Officer. It also reports its works to the Audit Committee.

B. Risk Management

The Group has put in place organization, process and procedure as well as working practices to manage risks, in particular for accounting and financial areas, across the organization. The management of risks is fully integrated in the decision making process in the Group. The Group identifies and evaluates the principal risks that can impact the Group's operational and financial objectives or compromise compliance with laws and regulations. The Group manages risks through robust management systems, departments focused on specific risk areas and through cross Group processes.

The Group has implemented risk management flows throughout the organization to identify, assess and control risks:

- The identification of events that can have an impact on the Group comprises a combination of techniques and supporting tools including event inventories, internal analyses, risk interviews, process flow analysis, leading event indicators and loss event data methodologies.
- Risk assessments are conducted to determine the extent to which potential events may have an impact on the Group. Risks are evaluated in terms of impact and probability. In assessing risks, managers consider impacts on people, environment, financial situation, accounts, strategic and other business objectives, compliance with laws and regulations and the Group's reputation. The Group's risk assessment methodology comprises a combination of qualitative and quantitative techniques.
- Risks are controlled through robust processes allowing their avoidance, reduction, sharing or acceptance. The Group employs comprehensive processes to reduce risk probability or risk severity or both. Control activities flow from policies and procedures established to manage risks. Control activities occur throughout the organization at all levels and in all functions.

The Group's Insurance department reports to the Finance, Information Systems and Risk Management Function to assure an integrated approach to risk in the Group. A robust Insurance program has been implemented at the Group level to share or transfer risk. Each high level risk is evaluated to determine whether the risk can be transferred through insurance policies within a practical cost structure.

Risk Mapping

One of the products of the Group's risk management program is the Risk Map. The Risk Map is a management tool which provides a shared view in the Group of the risks that have the potential of material impact on the Group. The risks in the Risk Map are organized by risk family: Operational risks, Technology risks, Accounting and Financial risks, Human Resources risks and Communications risks.

The Risk Map is presented to both the Executive Leadership team and to the Audit Committee on an annual basis.

Risk Monitoring and Coordination Committee

The Group has set up a Risk Monitoring and Coordination Committee in charge of following up the efficiency of the internal control and risk management systems. Its members are the Internal Audit Director, the Chief Accounting Officer and the Risk Management Director. The Internal Controls & Compliance manager acts as secretary of the Committee. The Committee meets on a monthly basis. The main assignments of the Committee are the following:

- Information sharing on events and facts relating to the quality of risk control and internal control;
- Follow-up the reported risks and most particularly internal control incidents which are classified by the Committee;
- Recommendation and coordination of the mitigation or improvement actions taken in these fields; and
- Ensure consistency between our risk assessment and the assessment made by the auditors.

C. Internal Control

The Group has an internal control department whose role is to support the organization in implementing and maintaining effective processes, and to ensure that that controls effectively mitigate the risks identified. It also maintains our internal control framework and coordinates the evaluation system of internal control over financial reporting.

The Group has an Internal Control guide based on the COSO 2013 internal control framework which provides Group staff with a single source of internal control guidance. This guide was rolled-out across all sites, Segments and support functions and aims at improving the Group risks management and oversight.

D. Financial Security Management

Specific processes and controls have been put in place by the Group to assure that financial reporting is reliable and pertinent.

Financial information

- Key processes such as the preparation of consolidated financial statements, documents for the Board of Directors and the Audit Committee, preparation of budgets, etc., are formally described.
- Instructions of the Executive Leadership team with respect to Financial Security principles and objectives are regularly renewed to remind all financial and operational managers of each unit, the importance of internal control and the necessity to constantly see to its implementation, based on annual objectives and training at demand.
- The Group has an accounting manual which sets forth its accounting practices, instructions and reporting rules. The accounting manual applies to all Group entities and is designed to ensure that the accounting rules are applied across the Group in a reliable and homogeneous way. It details procedures for closing the books, preparation of the income statement, balance sheet, cash flow statement as well as the consolidation process. Additionally, it outlines the principles for producing the notes to the consolidated financial statements.
- To limit risks of fraud, processes of segregation of duties are in place from approval of the orders to payment of the vendors and suppliers.
- All Group entities process consolidated accounts in the format chosen by the Group using a standardized package. All reclassifications from the corporate accounts to the consolidated accounts are documented using a specific standard format.
- Intercompany transactions are carried out in various areas (different services, geophysical equipment sales, software licenses). The corresponding fees vary according to the nature of the transaction and in compliance with market conditions and transfer pricing policy.
- Management software packages implemented within the Company in finance, logistics and procurement are critical organizational components of the internal control system as they define in detail the processes to be applied in each of these areas.

Information technology infrastructure and information systems security

- Access to the internal networks of the Group's companies and information systems are regulated.
- The networks are protected by firewalls and antivirus systems. External access is possible through secure and encrypted connections.
- Users are duly authenticated before being granted access to the system.
- Data backup, archiving and recovery systems have been put into place. Procedures are created, modified and updated by competent personnel and approved by the appropriate management. Once a year, an internal audit is carried out to test the effectiveness of such procedures, including some intrusion tests with assistance of external IT experts.

Control of the disclosure of information externally

- The Group has a procedure which outlines rules for preparing, validating and approving press releases.
- The Group follows a pre-determined process for the preparation and distribution of its regulatory documents.

Disclosure Committee

A Disclosure Committee was put in place in order to:

- analyze the importance of information and determine the appropriateness of a disclosure, and if so according to what schedule, and to this purpose:
  - » review all information to be published and their draft wording,
  - » oversee disclosure procedures and coordinate disclosures to external parties (shareholders, market authorities, investors, the press etc.),

- provide guidelines for internal control procedures to ensure the reporting of material information to be disclosed within the framework of quarterly, semiannual or annual communications to market authorities or destined for financial markets,
- inform the Chief Executive Officer and the Group Chief Financial Officer of any changes, deficiencies or material weaknesses pointed out by the Committee in the process of the reporting of information.

In 2018, the Committee was chaired by the SVP, Group Chief Accounting Officer and composed as follows:

- SEVP, Equipment and Acquisition;
- EVP, Geoscience;
- EVP, Multi-Client;
- VP Finance Marine and Acquisition;
- VP Finance Equipment;
- SVP Finance and strategy risks Geoscience and Multi-Client;
- Group Internal Audit Director;
- SVP Group Tax Director;
- SVP Group Treasurer;
- EVP Group General Counsel;
- EVP Geomarkets Sales, Marketing and Communication.

The Committee meets quarterly before periodic disclosures of the Company are published. A self-evaluation is performed each year and is adjusted for ongoing improvement of the Committee functioning.

E. Control activities

Processes implemented by the Group to identify necessary control procedures are based on risk assessments and on the necessary processes required to fulfill the Group's objectives.

Internal control procedures

Control procedures of the Group are implemented according to the hierarchical levels of personnel involved and the principles of materiality and the separation of functions. Control procedures are implemented in light of the identification of risks.

System of evaluation of Internal Control

Internal Control in the Group is evaluated through self-assessment tools and through internal audits.

Financial security annual objectives are set requiring self-assessments of all active Company entities using the *Internal Control Assessment Form (ICAF)*. This questionnaire includes approximately 60 prerequisites defined for operating Segments and support Functions. On an annual basis, the results of these reviews are consolidated, assessed and distributed to relevant managers; through these assessments, Internal Control improvement areas are identified.

Internal Control is continuously evaluated through a program of internal audits. In 2018, 11 internal audits and 4 integrated audits were conducted by the Group Internal Audit Department. The four integrated audits focused on Procurement, Assets, and Inventories in the main entities of the Group. Among the 11 internal audits, four were operational or compliance audits and seven were general audits (financial and operational and performance). Audit findings and recommendations are in each case reviewed with relevant managers and are presented to the executive management of the segment if necessary, and action plans are agreed to assure continuous improvement of internal control and risks management. Audit reports and action plans are submitted to the Executive Leadership team whose members receive on a monthly basis, the Internal Audit dashboard to monitor progress on improvement actions.

Areas of improvement from ICAF assessments and from internal audits form the base of annual strategic plans (organizational changes) and annual Financial Security objectives.

Furthermore, hub-level controllers were put in place to assure better control of far reaching geographies.

Financial and accounting controls

Internal control procedures in force in the Group are designed principally to ensure that accounting, financial and management information communicated to corporate bodies of the Group provide a fair presentation of the activity and situation of the Group.

- The financial statements of all the Group's subsidiaries are reviewed by the Finance Function. Physical inventories are carried out on a regular basis at each site, comparing the balance sheet values of inventories with those of the physical inventories. Variances noted are then corrected.
- Access to the accounting information systems is formally restricted in accordance with the function and responsibilities of each user.
- Current management information systems make it possible to record transactions in a complete and exact manner, to trace them and regularly back them up.
- All Intercompany transactions are documented and reconciled on given dates according to the transactions.
- The Company monitors its off-balance sheet commitments.
- Comparisons and reconciliations are performed at various levels, particularly between reporting and consolidation. The consolidated financial statements are reviewed by the Chief Financial Officer at corporate level and the Chief Financial Officers of the Business Lines.

The Executive Leadership team fully supports this project as a contribution to a proper business control, which is also in line with the implementation of values and the application of the financial security program with our personnel.

F. Information and Disclosure

The Group's ability to meet its objectives depends on effective dissemination of information at all levels of the Group.

Quality standards, security requirements or legal and professional obligations demand that the procedures be documented and accessible. The Group encourages the sharing of knowledge and best practices. An internal site provides all personnel with access to charters, Group policies, annual objectives, general instructions, procedures, standards and other documents on which the Group's Management System is based. Generally, the internal site of the Group allows the achievement of a better communication and cooperation between the Group entities and the operating and support functions.

The Group organizes, generally on an annual basis, seminars for the Executive Leadership team and for certain senior Management and key managers around the globe.

The Group has implemented a weekly, monthly and quarterly reporting system according to the hierarchical levels and relevance, to obtain and exchange information necessary to carry out, manage and control operations. The data distributed concerns operations, finance, or legal and regulatory compliance issues. It includes not only data produced by the Group but also data related to the external environment.

Senior management evaluates the performance of the Group on the basis of both internal and external information.

G. Monitoring and Management Review

The Group's business environment is by nature continuously changing and evolving. As a result, the internal control system is continuously adapted taking into account the environmental conditions and past experience.

Operations are managed and evaluated against performance criteria on a day to day basis and monitored by successive levels of management in the organization, finally being reviewed by the Executive Leadership team. Management carries out periodic evaluations, taking into account the nature and importance of any changes which may have occurred.

The Internal Audit Director, the Chief Accounting Officer, the Compliance Officer and the Risk Management Director, meet every month for information and mutual coordination within the Risk Monitoring and Coordination Committee.

The monitoring of risks is built into our business review processes at the project level, at the Segment level and at the Executive Leadership team level. Key indicators have been identified to signal risk environment changes and adverse trends. These are reviewed in management meetings at each level. Transverse Functions assist the Segments in monitoring these indicators and when necessary focus attention on specific Group risks.

The Group has implemented a global incident monitoring system for round the clock alerts; actual incidents and High Potential Incidents (HPIs) anywhere in our operations must be reported within 24 hours to the relevant management level through our internet based system PRISM.

The Executive Leadership team regularly reviews the Group's key risks and the measures put in place to control these risks. Executive Leadership team reviews the Group's Risk Map annually as well as the Insurance policies put in place to transfer the Group's risks. The Executive Leadership team establishes a schedule of key risks which it reviews in more depth during the year.

The Board, through its Committees regularly reviews key risks faced by the Group. The Board receives annually a mapping of the key risks facing the Group and is informed on the organization of the Group's risk management program as well as on the key risk controls put in place. Through the Audit Committee, the HSE and sustainable development Committee, the Technology Committee, the Appointment and Remuneration Committee and the Investment Committee, specific risks in the domain of each Committee are reviewed.

H. Reasonable Assurance

Every system of internal control, however well-designed and effective, has inherent limitations. Notably, there is an inherent risk that controls may be circumvented or bypassed. This means that the internal control system can offer only a reasonable assurance as to the reliability and sincerity of financial statements. Furthermore, the effectiveness of internal control procedures may vary over time, in response to new circumstances.

In order to evaluate the effectiveness of internal control procedures on a regular and formal basis and beyond the related actions undertaken by the internal audit management, the Group has put in place a tool for internal control self-evaluation for all units of the Group. At the Corporate level a compliance officer has been appointed thus showing the Group commitment to good corporate governance rules.

2.3. LITIGATION

From time to time we are involved in legal proceedings arising in the normal course of our business. We do not expect that any of these proceedings, either individually or in the aggregate, will result in a material adverse effect on our consolidated financial condition or results of operations.

Arbitration proceedings in India

On March 18, 2013, CGG Services SAS, a fully owned subsidiary of CGG SA, initiated arbitration proceedings against ONGC, an Indian company, to recover certain unpaid amounts under three commercial contracts entered into by ONGC and CGG Services SAS on one hand and ONGC and Wavefield Inseis AS on the other hand, between 2008 and 2010. The Arbitration Tribunal issued an award in favor of CGG on July 26, 2017. ONGC appealed on October 27, 2017. We believe that the on-going procedure will allow us to recover at a minimum the amount of the receivables that are recorded on our balance sheet as unpaid receivables as of December 31, 2018.

Challenge of the draft Safeguard Plan by certain holders of convertible bonds and by the representative of the holders of convertible bonds

On August 4, 2017, certain holders of convertible bonds (Keren Finance, Delta Alternative Management, Schelcher Prince Gestion, La Financière de l'Europe, Ellipsis Asset Management and HMG Finance) filed a claim against the Safeguard Plan approved by the committee of banks and assimilated creditors, and the bondholders' general meeting on July 28, 2017.

Without disputing the results of the general meeting of bondholders' vote, these holders of convertible bonds challenged the treatment of their claims under the Safeguard Plan, arguing that the differences in treatment between the holders of convertible bonds and the holders of Senior Notes were not justified by the differences in their situations and would be, in any event, disproportionate.

On December 1, 2017, the Commercial Court of Paris declared that the claims filed by the holders of convertible bonds were inadmissible and approved the Safeguard Plan.

Four of these holders of convertible bonds (the companies Delta Alternative Management, Schelcher Prince Gestion, La Financière de l'Europe and HMG Finance) have appealed against the judgment that rejected the admissibility of their claims.

As this appeal does not stay implementation, the restructuring transactions provided for under the Safeguard Plan have been implemented on February 21, 2018.

On May 17, 2018, the Court of Appeal of Paris affirmed the December 1, 2017 judgment by the Commercial Court of Paris.

On July 17, 2018, Delta Alternative Management, Schelcher Prince Gestion, and La Financière de l'Europe (later joined by HMG Finance through a voluntary intervention) appealed the Court of Appeal's decision to the French Supreme Court (*Cour de cassation*).

If the *Court of Cassation* were to approve the appellants' requests and reverse the appeals court ruling, the case would be referred back to another Court of Appeal to re-examine the case. The decision of the new Court of Appeal, which might also be subject to a recourse before the *Cour de cassation*, could theoretically lead to the cancellation of the implementation of the Safeguard Plan with retroactive effect. However, such a cancellation may be impossible to implement in the context of a transaction that involved a public offering.

As of the date of this document, no assurance can be given concerning the decision of the Cour de cassation and the ultimate outcome of the litigation.

3 SUSTAINABLE DEVELOPMENT

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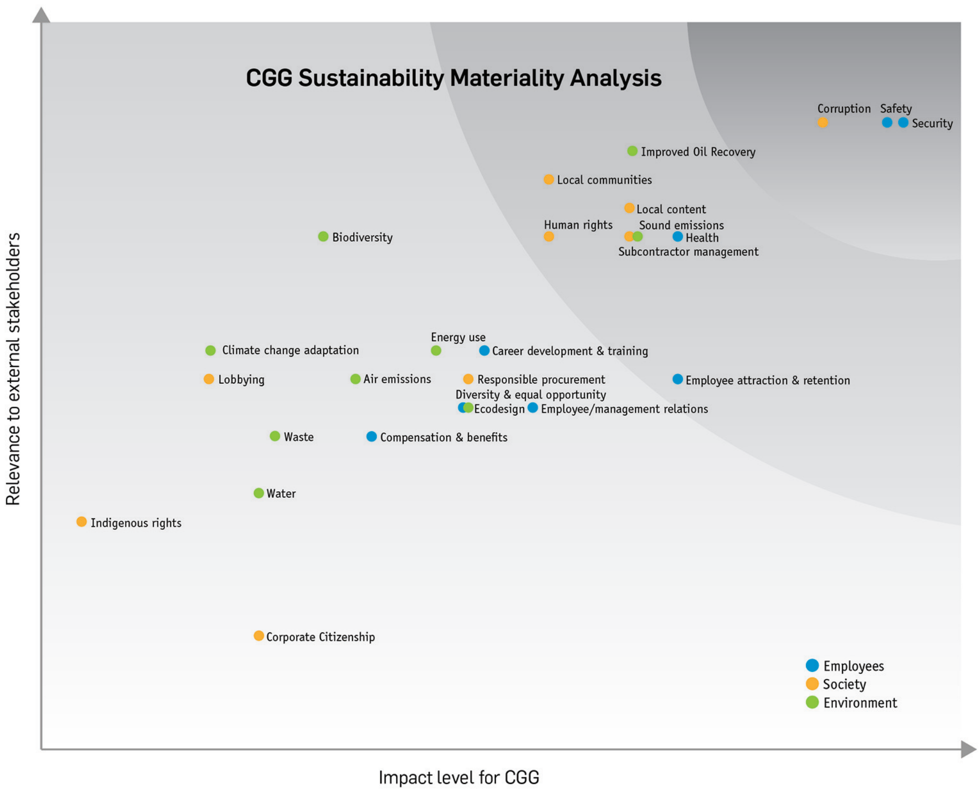
3.1. PROCEDURE FOR IDENTIFYING AND ANALYZING THE MAIN RISKS

3.1.1. Identification of the risks at the Group level

Management is responsible for all aspects of the fight against corruption, the promotion of health, safety and security, the environment and social responsibility (hereafter called "**HSE**", based on the policy that encompasses these subjects) and human capital development. They rely on Compliance, HSE and Human Resources ("**HR**") professionals to support their respective management systems.

The Group maintains a risk management program for the Company, which establishes a map in which the risks for HSE, corruption, and attraction/retention of personnel are indicated. These are also evaluated every three years by internal and external stakeholders during a materiality analysis. This extensive consultation involving CGG Management, a panel of employees, clients, investors, non governmental organization and the trade association allows CGG to identify the most critical sustainable development topics for the Group. These priority issues are highlighted in the upper right-hand dark gray and light gray sections of the graph below.

CGG's internal perceptions are plotted on the x-axis in increasing order of importance, while the weighting of the issues and therefore the expectations of the external stakeholders are shown in the y-axis in the same order. While the results shown below come from a consultation conducted at the end of 2015, an internal review prepared at the end of 2018 has allowed us to ensure that they are timely and relevant.



The risk assessment by the Enterprise Risk Management Department is in agreement with the hierarchy established by the materiality analysis.

For greater clarity in this chapter, we have broken down these risks into four categories:

- Risk of corruption;
- Risk related to the attraction and retention of key skills;
- Risks related to the security, health and safety of our personnel;
- Risks related to the acceptability of our acquisition operations (relations with local communities, sound emissions, human rights).

3.1.2. Identification and management of risks at site/project level

The HR risks related to employee retention are managed at each level by the local HR departments, in conjunction with the operational departments of each segment.

In HSE, risk management is at the heart of the management system called HSE-OMS. The Group has a structured approach aimed at identifying, evaluating and managing risk at the site/project level according to a methodology and a model for managing common risks at international level that includes the aspects of safety, health, security, environment and social responsibility.

3.1.3. Risk review by the Board of Directors

The risk of corruption is reviewed annually by the Audit Committee of the Board of Directors.

The HSE-Sustainable Development Committee of the Board of Directors analyses HSE risks and high potential incidents, assessing the pertinence of established controls.

3.2. PREVENT THE RISK OF CORRUPTION

3.2.1. Risk of corruption

The analysis of the materiality of the issues regarding sustainable development at CGG have indicated a significant risk inherent in our sector of activity and our relations with governments.

3.2.2. Policy and procedures implemented in the fight against corruption

Values and rigorous ethical standards are foundations of development for the CGG Group. They require that we comply with laws and regulations and the principles of our Business Code of Conduct with regard to our clients, shareholders, employees, and partners. The Business Code of Conduct, available in nine languages within the Group and on the site www.cgg.com, sets out the rules and expected behavior to assure that the Group conducts its business with integrity.

The Ethics Committee of CGG publishes and communicates the Business Code of Conduct, ensuring that the recommendations regarding ethics are widely circulated.

In 2018, the Ethics Committee continued a modernization of its Business Code of Conduct.

In accordance with applicable law, the Group has a professional warning system and a dedicated internal email address.

The Ethics Committee is composed of six members. The composition is divided by geographic area and area of expertise. It meets regularly, several times a year. It reports to the Chief Executive Officer and the Audit Committee of the Board of Directors.

CGG has a continual process of modernizing its program for the fight against corruption. Within this framework, the Compliance Department has continued its close collaboration with the Risk Department and the Internal Control Department, especially in the scope of the drafting of a memo on the prevention of fraud. In 2018, the Compliance Department also worked in close collaboration with the Purchasing Department on the implementation of the General Instructions for “due diligence” of third parties. These instructions were disseminated at the end of 2017. The Compliance Department also assisted in the implementation of societal initiatives in those countries that present an increased risk of corruption.

In compliance with the *Sapin II* Law, CGG follows the recommendations of the French Anti-Corruption Agency in matters related to risk management (for example: risk matrix). In addition, CGG is continuing its various actions regarding training and communication, especially with populations that are more exposed to this risk. At the Group level, the Anti-Corruption e-Learning has been distributed, with a participation rate of more than 92%.

3.2.3. Results

The Group has a complete system of procedures regarding the prevention of corruption, which allows it to control the risk well.

No act of corruption was reported in the Group in 2018.

3.3. ATTRACTING AND RETAINING KEY SKILLS IN A STIMULATING WORK ENVIRONMENT

3.3.1. Risks and opportunities related to employees and the attractiveness of the Group

The CGG Group is one of the main actors in the geoscience market, which is an integral part of the value chain of the oil and gas industry services. It operates in two distinct activity sectors, "Geophysical and Geoscience Equipment" and "Geophysical and Geoscience Services".

These activity sectors have been particularly affected by the continued deterioration of the market since 2013. In order to ensure CGG's profitability across cycles, to reinforce its position as a leader and to develop new sectors for organic growth, a three year strategic plan was unveiled at the end of 2018.

In this context of economic difficulty, the CGG Group pays particular attention to its employees in order to offer them a suitable work environment that is favorable to their professional development.

To lose the key skills related to very specific trades is a risk that can destabilize the company, especially since the gas and oil and geoscience industry sector is becoming less attractive to young people. CGG would like to attract and retain the key skills that it needs, and in particular scientific profiles and young graduates.

3.3.2. Measures in place and Human Resource policy

The Group adheres to the principles and fundamental conventions of the International Labor Organization. See Chapter 3.5.2.4 (sub-section promotion of human rights) for more details.

The Group, as it is specified in its HR Policy, rejects all forms of discrimination at hiring, or during the career of its employees. In particular, this concerns discrimination against handicapped persons. The Group respects national legislations in this matter and does not publish statistics on the subject due to the constraints related to the collection and analysis of information that may exist in certain countries and which prevent the Group from registering this information in its databases (discrimination).

In France, the Group is subject to Law No. 2005-102 of February 11, 2005 on Equal Rights and Opportunities, Participation and Citizenship of Persons with Disabilities.

The HR Policy of the Group, published in 2010 and amended in 2012, explicitly provides for non discrimination at hiring and equal opportunity for and equal treatment of men and women. This policy is being revised.

3.3.2.1. Work environment and work conditions

Enabling professional accomplishment of the employees in a difficult economic context is essential. The CGG Group promotes well-being at work through locally adapted actions and initiatives.

CGG's HR strategy consists of strengthening, mobilizing and inspiring our most important asset: the women and men of our company.

Coherent and ambitious HR practices and their implementation throughout the organization contribute to CGG's attractiveness. This vision relies on objectives and action plans that are tied to initiatives that will lead to change, assist in the development of the talents of each of our employees and prepare us for the future, through the use of succession plans implemented to address potential departures of key or high responsibility positions.

The development of a work environment that fosters equal opportunities and respect for all of our employees is encouraged by CGG. In order to eliminate all forms of discrimination, CGG makes resources available to each employee that lets him take action, anonymously, against any offense that he would have been a victim of, by contacting the members of the Ethics Committee or using a dedicated email address (see Chapter 3.2.2).

Furthermore, CGG is committed to maintaining working conditions that exceed health, safety, and ergonomic standards, to contribute to both employee well-being and performance. To achieve this, the Group has implemented measures regarding the organization of work and social relations.

Organization of work time

Regarding work time, the employees are subject to the social plans in place in their country of assignment.

"Prospector" contracts are contracts that provide for rotational work schedules, for example, five weeks of work for five weeks of rest in Marine. Land Rotations are more flexible due to the nature and duration of the projects.

In France, the work conditions in the Group are governed by a specific labor agreement, the terms and conditions of which are decided in concert with the social partners. This agreement is common to the parent company, CGG SA, and CGG Services SAS as part of the economic and social unit (ESU) implemented. It does not include Sercel SAS, which is subject to the collective bargaining agreements for the metallurgy industry.

Four types of work schedules are provided for in this agreement:

- two plans are for people working in offices (time-sheets and time-by-day);
- one is for annualized prospectors (set number of days of work per year) who work in rotation;
- one is for non-annualized prospectors who acquire rest days based on the number of days worked in the field.

The work schedule of salaried employees is governed by an agreement on the reduction of hours worked signed on August 27, 1999, implemented, according to the principle of annualization, by an application agreement dated February 17, 2000.

A time savings account was put into place at the same time as the implementation of the 35-hour work week. Similar systems for the organization of work time were put in place by Sercel SAS on the French sites.

Social assistance

The Employee Assistance Program was renewed in 2017 with the American company, ComPsych, for three years. This program, provided by a third party, guarantees confidentiality for the employee and aims to provide personal and individual assistance in case of need: medical, social, professional, or legal. It is available to all of the salaried employees of the group.

In France, this system exists in addition to the traditional social assistance systems implemented in the scope of the labor law: occupational health, infirmary, health and safety committees (CHSCT), recourse to elected representatives. This system compensates for countries where the structure or the law do not allow for recourse.

Institutional social relations

In order to promote dialogue and information exchange, the CGG SA - CGG Services SAS ESU (social and economical grouping) and Sercel SAS have, in France, representative bodies with which they organize a number of official meetings (Works Committee, Staff Representative Meetings, CHSCT, and various commissions) as well as trade union organizations with which agreements have been signed in France. Within the CGG SA - CGG Services SAS ESU, employee rights are guaranteed by a company labor agreement.

Body	Number of ordinary ESU meetings	Number of extraordinary ESU meetings	Number of ordinary Sercel SAS meetings	Number of extraordinary Sercel SAS meetings
Committee for Health, Safety and Working Conditions	4	5	8	1
Staff representative meetings (Works Council)	12	9	12 (3)	4 (0)
DP	12	0	10	2

In a similar manner, and in accordance with the law, employee representatives are elected for the employees, prospectors and expatriates of CGG International for a term of three years, under the aegis of the Swiss Code of Obligations. The Marine commission was renewed in 2017 with the election of four representatives from staff, including a delegate to be seated at the Group Committee, and the Land commission has been renewed in 2018 with the election of two delegates. The elections are organized and validated by the Chamber of Contractual Labor Relations of Geneva. The mandates are for three years.

In Singapore, 70 employees are represented under the aegis of the collective agreement of December 31, 2012. These employees are represented by the Singapore Industrial and Services Employees Union, affiliated with the National Congress of Trade Union Organizations.

In Norway, we have an agreement with an employee representative union. 21 employees are members of this union.

Agreement on gender equality

CGG makes a special effort to promote greater gender balance in managerial functions through promotions and targeted recruitment.

A new agreement was negotiated and signed January 15, 2018 for Sercel SAS to extend specific actions in the field of diversity of jobs, access to training, career paths, or pay equity. An unilateral action plan on pay and professional gender equality was signed June 1, 2018 for the CGG SA — CGG Services SAS ESU.

The Group's HR Policy, published in 2010 and amended in 2012, explicitly provides for non-discrimination in hiring and equality of opportunity and treatment between men and women.

Compensation policy

CGG guarantees homogeneity of the compensation system while ensuring adherence to local practices. Rewarding the performance of each employee is at the heart of the implementation of mechanisms aimed at sharing the value created by the company.

This policy incorporates the following parameters:

- A competitive compensation policy aimed at attracting, motivating, engaging and retaining the skills the Group needs;
- A compensation policy consistent with market practices in terms of base salary, variable portion (short term and long term), social benefits; and
- A variable compensation aligned with the strategic objectives of the Group and aimed at improving performance in the Company.

A compensation policy in line with the culture and values of CGG: fair and simple systems, the desire to actively encourage the involvement of the staff, team work, innovation and support for problems related to health, safety, environment, sustainable development.

These general principles apply, within the legal framework, in each country where CGG has employees.

Local initiatives regarding well-being at work

Numerous initiatives have been implemented in each country to promote the well-being of each employee in his workplace. In France, an ergonomist is available to the employees upon request, to examine their work station. A training module in ergonomics has been implemented, as well as a poster campaign. A campaign for flu vaccination is organized each year in France and in the U.S. Recreational or relaxation rooms are available in the workplace of most of the employees of the Group.

In the United States, a conciergerie provides various services to the employees in various areas: car maintenance, notary services, personal banking, take out dinners.

Actions related to health and physical activity have been implemented: a doctor is employed full time for the Group. In France and in the United States, a fitness room has been established in the workplace. In France, the Netherlands, Singapore, Malaysia, Indonesia, Australia, the United States, sporting events are occasionally scheduled, such as challenges (number of kilometers run on a treadmill, Fitness session during the lunch break, Yoga sessions, sports tournaments, etc.). In many countries, counselors who inform the employees of the benefits of regularly practicing a sport, as well as nutrition advice, are available.

3.3.2.2. Measures related to attracting and retaining employees

The transformation of the company, with the purpose of ensuring its profitability, relies on its employees, who are its main resource. To keep talent and be attractive to the job market is a major and unavoidable challenge for the Group.

General measures

In a complex and uncertain economic environment, it is important for the organization and for each of its employees to continually acquire and develop the knowledge and expertise that are required for adapting to changes in technology, methods and working tools, as well as to changes outside of the Company.

To do this, and to make the Group attractive, CGG continues to rely on existing HR tools and processes that encourage discussion of the professional development of the employees, through an annual performance review that allows for a discussion, in addition to the annual review, about his desires regarding professional development, as well as the development plans available in the Company.

An employee development plan allows us to formalize the actions to be implemented for him, including training activities that facilitate the acquisition of new technical skills and soft skills in the Company.

In 2018, we implemented a new hiring platform for the Group, with the goal of improving the candidate and user experience to allow us to provide greater efficiency and user friendliness. This platform natively connects the recruitment tools and the employment sites, thereby improving the communication efficiency of our job offerings.

On the other hand, regular annual studies are conducted on the highly sought after professions so that we can suitably adapt the compensation of key employees to ensure loyalty. For example, in October 2018, a review of the compensation of software developers was performed.

To assist employees in adapting to a constantly changing world, we have also deployed, on a global level, a classroom training module on resilience. Using a personalized evaluation and practical exercises and reflection, this training provides an overview of strategies for managing responses, and helps in the acquisition of skills to overcome difficulties. Regular review sessions are also held.

We have also developed an intranet for our employees, which brings together all of the information and contacts in the various areas of HR that may be useful. This central HR portal is a tool that gives our employees a single access point for finding the information that matters to them on a daily basis, either at a Group or a local level.

Finally, the HR teams also have a common intranet allowing them secure access to all the information, tools and files useful in the practice of their profession. This allows for a sharing of the same practices and a common system of reference in the Group.

Local initiatives

Recruitment at CGG is organized globally, using shared tools but with a local dynamic, which takes the specifics of each country into account. Most of the HR teams foster school relationships to promote our field with targeted candidates.

The UK conducts interviews via a video system, as well as evaluation sessions. CGG is also one of the main historic partners of Big Bang Fair South-east, a major event in the south of the United Kingdom, at which, in 2018, more than 10,00 young people and more than 200 schools participated in various activities centered around geoscience.

The US and Brazil teams focus on communication and sourcing via the social medias to attract talent from a very large area.

In Singapore, partnerships with local universities are used to attract young talent.

3.3.3. Results

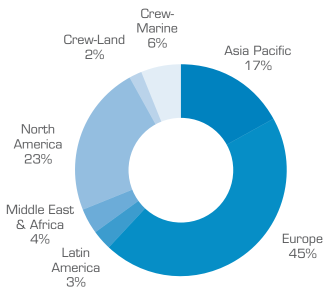
3.3.3.1. Situation and developments in 2018

Workforce

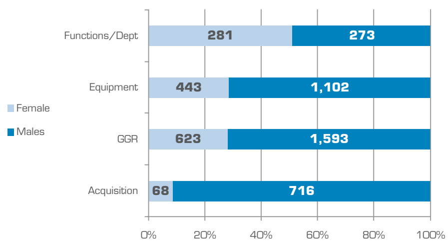
As of December 31, 2018, the Group had 5,099 permanent employees (as compared with 5,266 as of December 31, 2017), of more than 85 different nationalities and spread out over more than 50 facilities in the world.

Below is the geographical and structural distribution of the employees of the Group, as well as the distribution base on age and tenure:

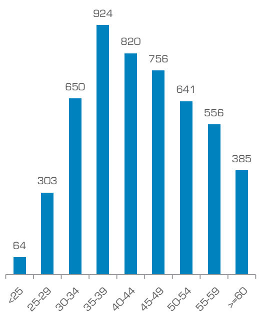
Workplace distribution



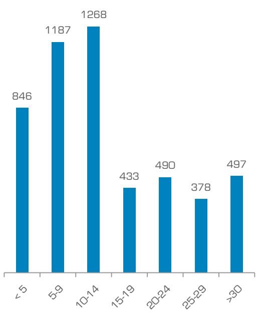
Divisions distribution



Age structure



Seniority structure

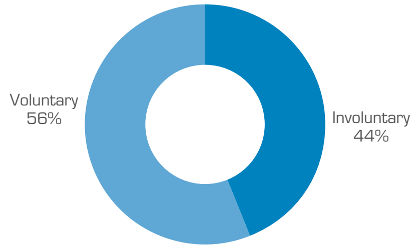


Entries and exits

In 2018, 359 entries and 523 exits were recorded for the Group's permanent employees.

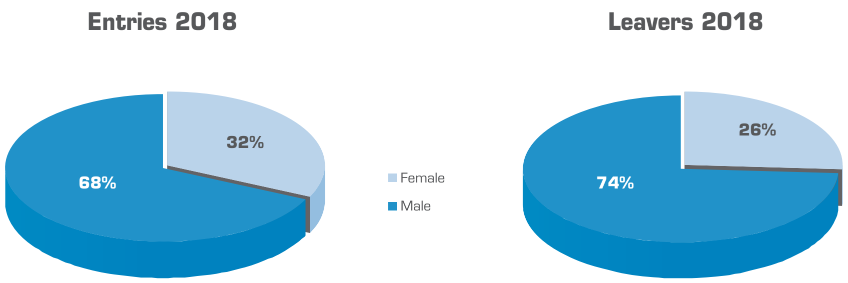
The entries included 350 new hires and 9 rehires.

The exits included both voluntary departures (retirement, resignations) and involuntary departures (dismissals). The departures are distributed as follows:



Over the whole of 2018 a balance of three people was deducted from the workforce due to the suspension of their contract or working for a joint venture.

The distribution of the entries and exits for the year are broken down as follows:

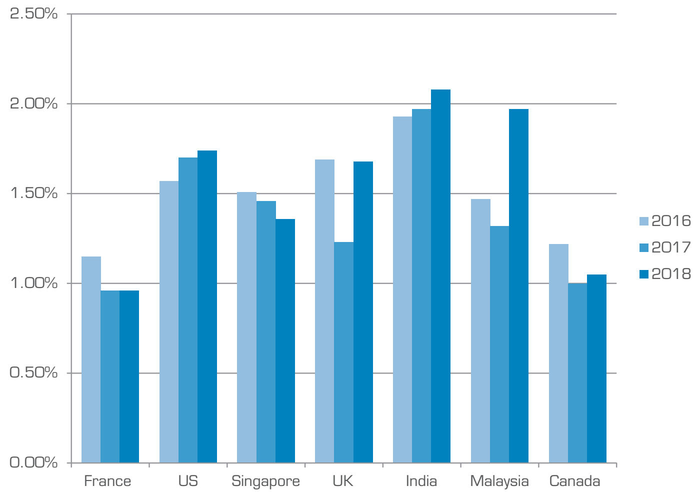


3.3.3.2. Indicators regarding quality of life and well-being at work

Absenteeism

The Group's management tool for absences allows us to provide statistics for the main countries, within the limitations of local legislation and the reliability of data that is continually being improved; it is important to note that it is difficult to compare the figures between them, the concepts of working time and absence being different, and long term absences are not taken into account in the same way in local law. We therefore only report absences of less than 100 days here.

The absenteeism rates (excluding parental and maternity leave) are detailed below (Equipment segment excluded).



In general, the rates are stable, despite an increase in long sick leaves in the United Kingdom (+0.45%) and in Malaysia (+0.65%).

The absenteeism rate for Sercel SAS in France is 2.73 % for absences of less than 100 days.

Training

In a complex economic environment, CGG continues to implement a strategy which aims at helping to develop its employees and its organization. Periodic identification and evaluation of the expertise, as well as the aptitudes and skills required for each position, are conducted on a regular basis. Employee development through training, mentoring, and coaching and the broadening of assignments and experiences foster employee mobility and challenges.

CGG University offers a set of training programs that is tailored to present and future needs. These programs are in addition to the trainings presented by external organizations.

CGG University continues to improve its training catalog in the area of reservoirs and geoscience and to offer conferences on subjects related to geoscience, NTIC (New Information and Communication Technology) and to management. CGG University also offers training programs in management and leadership, negotiation, project management and QHSE (quality, health, security and the environment) policy.

In 2018, CGG University trained 4,329 people, of which 3,794 were employees, and 535 were external clients.

CGG University provided 7,969 days of training in 2018 of which 3,783 were for external customers and 4,186 for CGG and Sercel employees. The 3,783 days of training provided to external customers concerned techniques for data acquisition and processing and reservoir geology, as well as project management.

The 4,186 training days presented to our employees are distributed as follows:

909 days devoted to technical training (introduction to the fundamentals of our businesses and to geoscience, advanced training), 867 days devoted to health, safety and the environment, 2,410 days devoted to individual managerial, leadership or development programs. This represents an average of 0.82 training days per employee.

Finally, training activities related to ethics and anti-corruption, or related to computer security, the fight against discrimination and harassment have continued to be presented (e-learning). The participation rate of these trainings are as follows:

- Ethics: 96%
- The fight against discrimination: 97%
- Information security: 84%
- Anti-corruption: 94%

3.3.3.3. Indicators regarding attracting and retaining employees

Performance, development and compensation

The Group continued to use its development tools to encourage discussion on personal and career development for employees. The main tools and features are: the annual performance review, the individual development plan, the annual review and the succession plan.

The annual employee review process allows us to maintain a succession plan for the key positions in the Group, as well as to identify the talents of tomorrow. Following this identification, personal development plans are formalized for this category of employees to help them acquire or develop skills.

Among the 102 positions senior positions, 97% have a successor identified within the Group.

In addition to training, in CGG there are many initiatives aimed at the development of employees through exposure to varied projects and experiences, especially including international or functional transfers, and also through tutoring, coaching or participation in various professional networks.

In 2018, a bonus tied to performance covering all staff was paid to the employees for 2017. This variable part of compensation was implemented in a homogeneous manner in the Group. It took place in two forms. One, for management and support entities (GPIP, for Global Performance Incentive Plan), is one half based half on the collective financial performance and one half based on individual performance. The other, for the production units, is based on their results compared to their own production objectives.

In France (CGG SA — CGG Services SAS and Sercel SAS), the remuneration policy also contains the following specific elements:

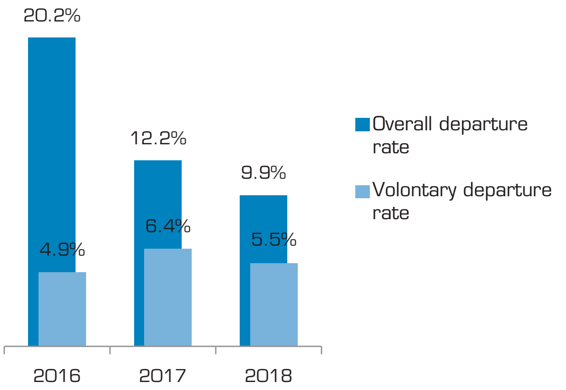
- Mandatory Annual Negotiations: wage negotiations with social partners in 2018 led to agreements being signed for CGG SA and CGG Services SAS. The 2018 pay increase was 1.8 % of the total payroll for ESU;

  For Sercel SAS, the wage negotiations with social partners led to the signing of an agreement for a salary budget increase of 1.8 % of the total payroll: a specific budget of up to 0.2% of the total payroll was devoted to promotions;
- Profit sharing: the agreement originally signed on June 30, 2007 between the ESU and social partners expired in 2014. The 2015 negotiations with the social partners did not lead to a renewal of this agreement. Sercel SAS's profit-sharing agreement was renewed on June 18, 2015 but no payment in 2018 for year 2017;
- Participation: The results of the ESU did not allow for a bonus. Within Sercel SAS, the current agreement did not give rise to any payment in 2018 for financial year 2017;
- The PEE and PERCO supplementary savings and retirement plans are still in force. As of the end of December 2018, 326 employees joined the "PEE" and 423 joined the "PERCO" in CGG SA and CGG Services SAS. In Sercel SAS, only 4 employees joined the "PEE" and 4 joined "PERCO" (not including placements in relation to maturing participations).

Recruitment and retention

Using our new recruitment tool, in 2018 we recruited more than 250 new employees in the various countries where we operate, with an average of 100 candidates per job offer. The implementation took place in April, so the information is communicated for a period of 9 months. Of the total new hires for the year 2018, 93% of the employees are part of the work force as of December 31, 2018.

Representation of the departure rate over the last three years:



Departure rate

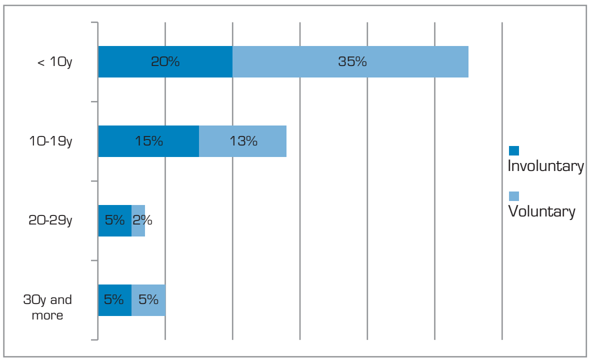
The statistical study of departures allows us to follow the most affected Segments and profiles. The overall departure rate for 2018 is distributed as follows:

- Overall departure rate: 9.9 %
- Voluntary departure rate: 5.5 %

The analysis of the departure rate for 2016 demonstrated the impact of the Group's restructuring plan. However, in 2017 and 2018, the overall numbers were down.

To keep employees that are newly recruited and trained by the company is an important issue for ensuring the profitability of recruitment. CGG pays close attention to the number of young hires who leave the company in the first few years after they arrive.

The distribution of departures for 2018 by tenure is broken down as follows:



The voluntary departure rate over the first ten years of tenure decreased by 2.4% between 2017 and 2018. The decrease was 4.4% over the first five years.

3.4. MAINTAINING THE HEALTH AND SAFETY OF ALL EMPLOYEES

3.4.1. Health, safety and security risks

The first priority of CGG is to prevent workplace accidents and occupational diseases of its employees and subcontractors within its sphere of influence, that is, the subcontractors whose performance is consolidated in HSE and for whom we have the same internal requirements. Road transport, helicopter operations, tree felling in forests, and the crossing of lakes and rivers have traditionally represented the Group's riskiest activities.

The security of its personnel is another absolute priority of CGG. The Group is exposed to threats of theft, aggression, piracy and terrorism, which it fights with a system based on prevention, protection and deterrence.

3.4.2. Policy and control measures that have been implemented

Policies and objectives

In May 2018, the Chief Executive Officer of CGG published a new HSE policy covering, in one document, the commitments and expectations going forward in terms of health, safety, security, the environment and social responsibility. This policy is based on the conviction that all accidents can be prevented. It is supported by three-year objectives set by the Chief Executive Officer and incorporated in the "*Care+Protect*" program.

The Group objectives specifically target leadership commitment and visibility on HSE, risk management, subcontractors' management, and skills and training. Each Business Line has adopted these objectives and specifies them in annual programs so as to best addres issues pertinent to e their activity. In this way, every level of the organization is clearly informed of the expected results and called on to help achieve them. These Group objectives also become personal objectives for all executive staff and line managers.

Management system

CGG has a structured approach regarding Health, Safety, Security, Environment and Social Responsibility issues based on a management system for these domains(more commonly known as *HSE Operating Management System* — HSE-OMS).

HSE-OMS applies to all of the Group's areas of activities across many domains: health, security and safety of permanent and seasonal employees and subcontractors, as well as environmental protection and social responsibility in all its projects and sites.

Risk management is at the core of our HSE-OMS. The Group has a structured approach aimed at identifying, evaluating and controlling risks, based on a common group-wide international methodology and model for risk management. Risk assessments are performed on each project or permanent installation. They incorporate the history of incidents recorded in the Group database as well as those in the database shared with the *International Association of Geophysical Contractors* (IAGC), which now covers several decades of incidents.

CGG determines the necessary controls through the use of systematic risk assessments that particularly target high risk activities. These controls include procedures, work instructions, specific risk training, on site meetings and daily inspections in the field, supplemented with cross inspections. These are conducted by a person outside of the entity being inspected. Exercises conducted periodically at the site and project level allow us in addition to verify the effectiveness of emergency response plans. At site and project level, line management performs their own inspections and observations. An annual audit plan is carried out to verify that key HSE-OMS policies and procedures are implemented and respected in all of the activities. This environment of controls and oversight is coupled with a culture of individual responsibility.

Individual risk awareness and personal responsibility are essential elements of our *HSE-OMS*. A behavioral safety program entitled "Rules to Live By" and "Things We All Must Know" has been in force since 2011. This program focuses on the Group main safety risks and is published in multiple languages across all activities. These rules are backed up with visible posting on the workplace and clear instructions, especially in terms of consequence management.

Good management of health, safety, security and social responsibility risks requires transparent reporting and fast and efficient communication. Strict reporting of all events, near-misses and hazards is critical for obtaining the best results. A tool called PRISM has been developed internally for this purpose. PRISM is an application that allows for information regarding HSE, Quality and Social Responsibility files to be shared by all CGG sites and operational units. It also allows us to produce analyses and monitor performance — including risk assessment and management — and to manage action points. All CGG employees have access to it. Incidents are assessed based on their real and potential severity. A subscription system allows for immediate notification to the appropriate level of management, including to the highest level for high potential incidents. Management reviews are held by the Business Lines, the Executive Leadership Team and the Board HSE and Sustainable Development Committee. They ensure the system's proper operation, allow to identify areas for improvement and corrective measures to be applied, and finally help ensure that appropriate resources are in place.

CGG continues to play an active role in the HSE Committee of the *International Association of Geophysical Contractors* (IAGC) and participates in a number of workgroups organized by the *International Oil and Gas Producers* (IOGP). These committees facilitate the sharing of lessons learned from the management of major near-misses or accidents, the dissemination of best practices, and the review and improvements to HSE standards in the Exploration and Production industry.

Occupational Health Program

CGG implements occupational health programs that connect public health and well-being at work, aimed at maintaining quality of life at work through medical fitness for work, and at preventing occupational diseases. The management of health risks and impacts is systematically adapted to the local environment. Therefore, it takes into account the issues specific to very isolated areas and adapts the means of protection, rescue and assistance for the staff exposed. This is especially the case for Land acquisition projects.

In 2018, operating in areas where health risks are higher (Tanzania-Uganda: the Ebola epidemic in the Democratic Republic of Congo, cholera and tse-tse fly of Kenya, Papua-New Guinea with malaria and working at high altitude), CGG has established a health monitoring system, as well as resources for prevention and emergency response. In addition, information on travelers from different sources was reviewed with a new format to better attract the attention of travelers to the main risks or health alerts in force in destination countries, drawing them to the necessary preventive care, if applicable.

The company's restructuring increased the psycho-social risks, the presence of the outside provider in France (Stimulus) was therefore completed; in addition to our Employee Assistance Program (EAP), training for local managers was also implemented to raise managers' awareness to detect employees who are suffering and to support them or even give them assistance.

Finally, training in ergonomics at the workplace was successfully launched in France starting in the summer of 2018.

Maintaining Safety

The risk analyses and prevention programs are directed first and foremost at high-risk activities (for example, road transport and offshore helicopter transfers of teams). In 2018, each Production Line established a specific prevention program: for example, in the spirit of continual improvement, the Houston factory of the Equipment segment conducted a total risk assessment of a particularly risky quality test activity, at the end of which seven key points related to the design were completely reviewed, significantly reducing the risks to people and equipment.

Security

CGG has implemented a security intelligence and monitoring system to identify and assess threats in areas prone to maritime piracy and potentially unstable areas onshore. The projects in the areas at risk are reviewed at the highest level. Their assessment is supported by security experts. Local security plans, tied to the project, are put in place before operations start. In addition, all personnel receive regular security information on their country of operations.

In terms of security, maritime piracy is still present in the Indian Ocean, in the Gulf of Aden and near Somalia. A higher level persists in the Gulf of Guinea, especially near Nigeria and neighboring countries, and to a lesser degree in Southeast Asia, especially in the Sulu Sea. The jihadist threat in North Africa, the Sub-Sahalian area and the Middle East remains high.

3.4.3. Results

The key performance indicators related to critical HSE & Social Responsibility, as well as indicators concerning more secondary topics, are listed in Section 3.6., HSE & Social Responsibility Indicators of this Reference document.

3.4.3.1. Health

Frequency rates for occupational diseases increased slightly, the severity rate is still falling.

The table below, established according to IOGP rules, covers occupational diseases to the exception of the Equipment segment.

	OD with days lost frequency rate (LTIF)	Recordable OD frequency rate (TRCF)	Severity rate Number of lost days × 1,000/hours	Hours (million)
2016	0.09	0.14	0.001	21.6*
2017	0.05	0.23	0.0005	21.4
2018	0.13	0.38	0.0003	23.9

LTIF = (FAT + LTI) x 1,000,000/hours.
TRCF = (Fatalities + Lost Time Incidents + Restricted Work Cases + Medical Treatment Cases) x 1,000,000/hours.

3.4.3.2. Safety

CGG measures safety performance by the frequency of Lost Time Injuries. These indicators include permanent and seasonal Group employeesas well as subcontractorsworking under CGG authority.

	Fatal accident rate	Lost time injury frequency rate (LTIF)	Recorded accidents frequency rate (TRCF)	Severity rate	Cases of permanent total or partial disability	Hours (million)
2016	0	0.25	1.40	0.004	0	24.3*
2017	0	0.5	1.9	0.019	0	24
2018	3.6	0.65	1.77	0.01	0	27.6

LTIF = (FAT + LTI) x 1,000,000/hours.
TRCF = (Fatalities + Lost Time Incidents + Restricted Work Cases + Medical Treatment Cases) x 1,000,000/hours

(*) In 2016, CGG changed the convention for calculating hours, aiming for greater consistency among our different Business Lines but also with our industry associations (IOGP and IAGC). Since the consolidation, the hours worked and not the hours exposed are taken into account (as at offshore sites and camps). The total of hours for 2016 is thus lower than it would have been under 2015 convention.

CGG mourns the disappearance of a subcontractor pilot during the transport of an airplane that was lost at sea near Japan.

The Group recorded for the second consecutive year a rise in the frequency rate of Lost Time Injuries. However, the frequency rate of recorded accidents fell slightly. The frequency of High Potential Incidents (potentially fatal incidents including near-misses), which is tracked worldwide, fell in 2018.

With regard to the road transport risk, which is one of the main risks that the Group is exposed to, CGG maintained in 2018 a program that focuses on driving skills and driver assessments. CGG uses *In Vehicle Monitoring Systems* s (IVMS), *Speed Limiting Devices* (SLD), *Roll-over Protection* and has defensive driving trainers on the projects at all times. Our *Motor Vehicle Crash* (MVC) rate improved again in 2018.

For all of these indicators, the limited number of cases does not allow us to perform an analysis of the trends.

	Rate of MVC	Driven Kilometers
2016	0.74	18,900,000
2017	0.31	16,100,000
2018	0.16	25,300,000

3.4.3.3. Security

CGG records high potential incidents (HPI): in 2018 we had zero HPI related to security.

	Number of safety HPI
2016	1
2017	1
2018	0

3.5. MANAGING DATA ACQUISITION'S SOCIAL LICENSE TO OPERATE

3.5.1. Nature of the "license to operate" risk

The activity of CGG has traditionally rested on four pillars: the production of geophysical equipment, the acquisition of data, and the imaging processing of these.

Due to its nomadic and wide ranging character, the acquisition of geophysical data differs significantly from manufacturing and tertiary activities. It involves traveling over wide surface areas, either by air (Multi-Physics acquisition), on land (Land acquisition) or at sea (Marine acquisition). In 2018, Land acquisition and Marine acquisition covered the equivalent of a surface of 97,578 square kilometers. These low speed trips can disturb the environment and local community livelihoods. This is why these operations are planned and managed in a way that limits the potential disturbance to as low levels as reasonably possible.

From a regulatory point of view, the acquisition of data is dependent on obtaining permits issued by national environmental authorities. When CGG acts for the account of a client, the permit obtention is the responsibility of the latter in his operator role. For a number of years, CGG has given priority to allocating its seismic fleet to the acquisition of internal data through its Multi-client activity. This operational approach further develops the Group data library, data that can be resold to several clients. When doing this, it becomes the responsibility of CGG to obtain the environmental permits, which involves conducting environmental and social impact studies as well as engaging with local communities.

Two major risks are generally assessed during these impact studies and consultations: the impact of acquisition activities on community livelihoods (for example, fishing activities, tourism) and the effect of sound emissions on marine life. The environmental and social impact study also reports on the opportunities brought by the acquisition activities in terms of local economic development through local employment and purchases.

3.5.2. Policy and controls implemented to make data acquisition socially acceptable

3.5.2.1. Maintaining mutually beneficial relationships with the communities

The CGG HSE policy requires to promote human rights, maintain mutually beneficial relationships with local communities and develop local content as much as possible. This policy is implemented both at data acquisition levels and at permanent offices and facilities level. It is, however, within the acquisition Business Lines that that social acceptability ("license to operate") is the most fragile, because of the atypical, imposing, however provisional and nomadic nature of the operations. On top of that are superimposed fears or hopes of the local population with respect to potential hydrocarbon developmentss.

In 2018, CGG commissioned environmental impact assessment with specialized consultancies and/or organized consultation and dialog with local communities in Brazil, Gabon, Mozambique, Mexico, the United States as well as Saudi Arabia, the United Arab Emirates, Egypt, Australia, Great Britain and Norway. In addition, certain operators have delegated the management of local community relation to CGG (in Mauritania, Tanzania, Uganda, Morocco and Senegal).

The management of community relations follows the general recommendations of the *Management Plan for Community Relations* and four related practical guides published by the Group. The general principle consists of understanding and respecting local populations' livelihoods in order to help our projects coexist with their activities. Community grievances are recorded and monitored in PRISM until they are resolved.

The adoption by crews in the field of the new version of PRISM in 2018, that now includes the entry of social information, has allowed us to better document relations with local communities. In 2018, no grievance remained unresolved, in the same way that no significant harm to communities and their environment was noted.

Local content

Data acquisition projects barely last a few months in constantly changing host countries. The contribution of CGG to local employment and growth is therefore necessarily temporary and limited. An exception to this are partnerships formed over the long term under the form of joint ventures, which allow us to develop employment and enhance the skills of the locals.

In Acquisition, the most significant joint venture is ARGAS in Saudi Arabia, which grew out of an alliance with the TAQA group. With 52 years experience of technology transfer and shared experience in Land Acquisition, ARGAS permanently maintains one to two large land acquisition crews in Saudi Arabia. Committed to develop national skills, ARGAS constantly increases its share of national employees, reaching 55% in 2018.

The permanent change in geographic allocation of the projects and the very high specifications of the jobs in Marine and Multi-Physics Acquisitions makes recourse to local employees very difficult.

The positions that allow the integration of locals into the teams, are those regarding the observation of marine fauna, the personnel on escort vessels, as well as the fisheries liaison officers.

3.5.2.2. Controlling sound emissions

Sound emissions emitted by seismic sources can, in certain operating conditions, disturb fauna, particularly marine mammals whose hearing is the most developed sense. This is why CGG applies on board its vessels prevention measures to mitigate the risk of impact from sound. These measures ensure that seismic sources are systematically activated in a gradual manner, assuring itself beforehand and during the progressive start-up that no animal is within a radius of at least 500 meters around these sources. The enforced safety area around the seismic source and the monitoring methods used (visual and acoustic monitoring) vary according to the risk assessment, which is closely tied to the ecological sensitivity of the relevant area of acquisition. The implementation of these measures reduces the risk of inflicting hearing damage to insignificant levels.

CGG also seeks to better understand the effects of underwater sound emissions in terms of damaging crustaceans and fish, a domain where scientific knowledge gaps remain. The Exploration and Production industry's ambitious Joint Industry Program "Sound & Marine Life", which, since 2006, has funded US$55 million in research, continually provides answers to the various questions regarding impact from sound. CGG has been participating since 2016 in the technical management of the JIP Sound&Marine Life, ensuring that research specifications are clearly defined, and monitoring the progress of the research projects (27 in 2018). In 2018, the first project aiming at assessing at sea the fish disturbance inflicted by a seismic source was conducted with the contribution of CGG, with one of our seismic vessels serving as the source. The results obtained by all of the research projects are made public on the website www.soundandmarinelife.org, published in scientific reviews and presented in scientific conferences, such as ESOMM in the Hague in September 2018.

Regarding operations for monitoring cetaceans, in 2018, CGG finished equipping the seismic fleet with QuietSea, an integrated Passive Acoustic Monitoring (PAM) system developed by the Equipment segment. The large scale deployment of this new automated technology makes detection of cetaceans possible at any time and in any weather. QuietSea was enhanced in 2018 by a module that provides for the automatic detection of porpoises. A test campaign in the North Sea enabled CGG to localize for the first time this protected species by passive acoustic methods.

Networking several hydrophones allowed QuietSea to precisely locate the cetaceans, thus guaranteeing the optimum application of protection measures for them. The performance of the detections obtained from the various acquisition projects as well as the techniques applied to machine learning were explained by Sercel to the scientific world at the DCLDE (Detection, Classification, Localization and Density Estimation) conference in Paris in June 2018 as well as at ESOMM in the Hague in September 2018.

Almost 35,000 cetaceans and turtles were detected by acoustic and visual means from the CGG fleet in 2018. The higher number of detections in 2018 compared to 2017 is contextual. CGG vessels were indeed operated in 2018 in areas with higher marine fauna density, such as Brazil, Senegal or Mozambique. Overall, vessels were stopped for 20 days in 2018 to protect the marine fauna.

3.5.2.3. Societal commitments

Significant Land, Marine or Multi-Client Marine projects generally establish a social initiative that benefits local communities. The positive impact of these initiatives remain well beyond the period of the acquisition project.

The construction work for a large recreational park in the village of Coatzacoalcos in Mexico was committed in this manner in 2018. In the same country, an innovative project for the restoration of coastal fish fauna and environmental awareness was initiated in the port of Tampico. In Uganda, CGG relied on its traditional micro finance partner Babyloan to lend to more than 40 local micro-entrepreneurs who have no traditional access to bank loans. In Morocco, CGG led awareness campaigns about road safety. In Gabon, as in Mozambique, CGG formed partnerships with institutions or Universities which allowed geoscience students to become familiar with seismic data processing. In addition to the donation of Geovation or Hampson-Russell software licenses, these partnerships encompass a substantial level of training.

For several years, CGG GeoSoftware has been providing a global response to the problem of higher level geoscience education by its University partnership program. These partners offer students the opportunity to develop new techniques for reservoir characterization on sophisticated industrial software, using real data. CGG GeoSoftware partners with 123 universities throughout the world, including 37 located in countries considered to be developing (non-OECD countries). In most of these countries, the software donation is often accompanied by logistical support and donations of computer equipment, as was the case in Mozambique in 2018.

Overall, the Universities that used GeoSoftware donations published 42 scientific articles in 2018.

95 social responsibility projects were conducted within CGG Group in 2018, for a total of 1,000 hours ofemployee volunteering during work hours.

3.5.2.4. Promotion of human rights

CGG regularly conducts activities in countries that present risks in terms of violations of fundamental rights at work. As stipulated in its HSE policy, CGG is committed to respecting and promoting the Universal Declaration on Human Rights and the ILO Declaration on the Fundamental Rights at Work (ILO). The internal HSE audits carried out in CGG's various Business Lines verify the application of the fundamental rights at work, such as eliminating forced labor and child labor, non-discrimination and respect for freedom of association. The findings of these audits regarding respect for these rights contribute to the global evaluation of the project or the site audited, and are subject to corrective actions. In 2018, among the 13 internal HSE-OMS audits conducted on data acquisition projects, 3 identified findings related to human rights risks. These findings were brought to management's attention, as is the case for any observation made in other HSE domains.

In 2018, the HR Department and the Sustainable Development Department jointly issued a practical internal guide Protecting Human Rights and Communities, explaining each of the fundamental rights and specifying Group rules and recommendations. This guide was distributed to the Ethics Committee, the HR and HSE communities, and to certain critical partners and subcontractors.

This commitment to respect human rights and the right to a clean environment is also reflected in our procurement policy, notably through a suppliers' code of conduct setting out the minimum social and environmental standards expected of our suppliers.

In addition, CGG precludes the employment of young workers below 16 years of age and strives to comply at any time with local and international laws and principles regarding child labor and the protection of young workers.

3.6. HSE & SOCIAL RESPONSIBILITY INDICATORS

In addition to the indicators mentioned below, concrete examples of the application of our HSE & Social Responsibility are available on our website: www.cgg.com/fr > Sustainable Development > HSE & Social Responsibility case studies (details of case studies only available in English).

Employees

	2014	2015	2016	2017	2018	External audits 2018
Number of nationalities	102	94	87	88	87	✓
Permanent Employees (Total) *of which female (%)*	8,540 26.9%	7,277 26.9%	5,766 *28%*	5,266 *27.5%*	5099 27,8%	✓
Europe *of which female (%)*	3,458 *28.9%*	3,138 *28.8%*	2,502 *29%*	2,330 *28.9%*	2,281 28,8%	✓
Africa & Middle East *of which female (%)*	338 *20.7%*	277 *23.8%*	230 *23.9%*	198 24.2%	184 27,2%	✓
Asia Pacific *of which female (%)*	1,258 *36.6%*	1,178 *37.0%*	1,007 *37.4%*	889 35.5%	871 34,6%	✓
North America *of which female (%)*	1,925 *31.7%*	1,496 *30.1%*	1,312 *29.5%*	1,195 29.6%	1,175 29,9%	✓
Latin America *of which female (%)*	336 *26.8%*	196 *28.6%*	168 *30.4%*	156 28.2%	170 28,8%	✓
Marine Acquisition teams *of which female (%)*	1,046 *6.1%*	841 *5%*	436 *3.4%*	404 3.2%	327 2,1%	✓
Land Acquisition teams *of which female (%)*	179 *1.1%*	151 *0.7%*	111 *0.9%*	94 0%	91 0%	✓
Hires *of which female (%)*	587 *31.2%*	240 *36.7%*	114 *27.2%*	215 34%	359 32%	✓
Total employee turnover rate *including voluntary departures*	17.83% *6.5%*	17.2% *4.9%*	20.2% 4.9%	12.2% 6.4%	9.9% 5,5%	✓
Employees covered by a collective bargaining agreement (France, Norway, Singapore)	2,120	1,901	1,626	1,505	1 344	✓
Training provided by CGG University (hours)	120,656	87,744	68,712	50,280	63,752	✓

Health and Safety

	2014	2015	2016	2017	2018	External verification 2018
Hours (million)	54.8	52.1	24.3	24	27.6	✓
Fatalities	1	1	0	0	1	✓
Fatality rate	1.8	1.9	0	0	3.6	✓
Partial or permanent disability	0	1	0	0	0	✓
Lost Time Injury frequency rate	0.42	0.29	0.25	0.5	0.65	✓
Total Recordable Cases Frequency rate	1.79	1.38	1.40	1.9	1.77	✓
Severity rate	0.01	0.01	0.004	0.018	0.01	✓
Occupational diseases with days lost frequency rate*	0.12	0.08	0.09	0.05	0.13	✓
Recordable occupational diseases with days lost frequency rate	0.35	0.33	0.14	0.23	0.38	✓
Occupational diseases severity rate*	0.001	0.003	0.001	0.0005	0.0003	✓

	2014	2015	2016	2017	2018	External verification 2018
Kilometers driven*	26,000,000	22,500,000	18,900,000	16,100,000	25,300,000	✓
Motor vehicle crash rate*	0.60	0.44	0.74	0.31	0.16	✓
Hours of on site HSE training	141,617	109,593	71,688	52,968	79,012	✓

Note on Health & Safety :

In 2016, CGG changed the convention for calculating hours, aiming for greater consistency among our different Business Lines but also with our industry associations (IOGP and IAGC). The consolidation takes into account hours worked and not exposure hours (such as on offshore sites and on Land camps).

Frequency rates are calculated on the basis of one million hours worked. The fatality rate is calculated on 100 million hours worked. The severity rates ~~is~~ are calculated on the basis of 1,000 hours worked.

Indicators marked with * do not take into account the Equipment segment (3.7 million hours worked in 2018)

Environment

	2014	2015	2016	2017	2018	External verification 2018
Territorial footprint of acquisition activities (km^2 covered)		707,814	391,310	380,946	506,828	✓
including Multiphysics airborne activity		552,000	273,658	273,354	409,250	✓
including Marine activity		135,243	98,304	90,474	78,086	✓
including Land activity		20,571	19,348	17,118	19,492	✓
Significant environmental incidents (#)	0	2	0	0	2	✓
including accidental hydrocarbon spills >200 liters (#)	0	2	0	0	2	✓
Residual hydrocarbon spills after clean-up (m^3)	0	0.4	0	0	0.1	✓
Geosciences Energy efficiency *Power Usage Effectiveness* (PUE)[1]	1.40	1.36	1.31	1.32	1.33	✓

Geoscience Subsurface Imaging requires a large computing capacity, hosted in CGG data centers. The Power Usage Effectiveness (PUE) is the leading indicator of a data center energy efficiency.

(1) The PUE relating the total energy of the data center (infrastructure) to that of computer equipment is calculated as recommended by Energy Star, Recommendations For Measuring and Reporting Overall Data Center Efficiency Version 2—Measuring PUE for Data Centers, May 2011. The data in the table takes into account the three main CGG data centers.

	2014	2015	2016	2017	2018	External audit 2018
Total direct and indirect greenhouse gas emissions (Scope 1 & 2; kton CO_2 eq.)[1]	747	649	446	482	**424**	✓
including direct emissions (Scope 1)	700	558	374	420	**354**	✓
including indirect emissions (Scope 2)	47	91	71	62	**70**	✓
including indirect emissions (Scope 3)					**386**	
Intensity of greenhouse gas emissions (Scope 1 & 2; kton CO_2 eq. per employee)	88	89	77	91	**83**	✓
Substantial fines for non-compliance with environmental regulations (#)	0	0	0	**0**	0	✓
Grievances about environmental impacts filed, addressed, & resolved through formal mechanisms	0	0	0	**0**	0	✓
Detections of marine mammals (#)	4,189	3,562	1,808	**1,538**	2,998	✓
including visual observations (#)	2,381	1,995	918	**733**	1,288	✓
including acoustic detections (#)	1,807	1,567	890	**805**	1,710	✓
Measures for the protection of marine mammals (# of hours of stopped seismic sources)	254	204	231	**361**	493	✓

Social Responsibility

	2014	2015	2016	2017	2018	External audit 2018
Management of local communities/Local content Jobs — Employees						
Employees working in a country from which they are nationals[2] (%)	Not assessed	78	79	80	77	✓
Managers working in a country from which they are nationals[3] (%)	Not assessed	70	72	72	78	✓
Grievances about human rights filed, addressed, & resolved through formal mechanisms				0	0	
Partnerships with Universities and donations of software for educational purposes from CGG GeoSoftware						
University partners of the CGG Software donation program (#)	50	116	129	116	123	✓
of which Universities located in countries considered to be developing countries (non OECD countries)	30	37	37	28	37	✓

(2) Scope: CGG Group except offshore and onshore field staff.
(3) Sites reporting more than 50 employees. Manager — employee with at least one subordinate Scope 2015: CGG Group excluding the Equipment segment; Scope from 2016: CGG Group.

ESG (Environment, Social and governance) indices

CGG was again selected by the investment register Ethibel Excellence in December 2018. This selection by the Ethibel Forum (www.forumethibel.org) indicates that the Company performs better than the average in its sector in terms of Corporate Social Responsibility (CSR).

ESG index listing CGG as of Monday, December 31, 2018	Ethibel EXCELLENCE Investment Registers

3.7. REPORTING SCOPE AND METHOD

3.7.1. Selection and pertinence of indicators

Published data is intended to inform stakeholders of CGG's HSE & Social Responsibility results for the current year. They are in line with the IOGP and IAGC recommendation regarding transparency as well as with the *Global Reporting Initiative* (GRI) for social responsibility and environmental data.

Indicators were selected to monitor:

- CGG's HSE and Social Responsibility commitments and policies integrated in management systems;
- performance relating to CGG's main risks and impacts;
- the regulatory obligations (Declaration of Extra-Financial Performance, outcome of the transposal of the European directive on extra-financial reporting).

The topics mentioned by the decree have been treated in the most transparent manner possible. The analysis of materiality did not consider eco-design and the circular economy as a material topic. Information regarding the eco-design of Sercel equipment is nevertheless available on our internet site.

The financial risks related to the effects of climate change are considered limited, but are nevertheless described in section 2.1.1.2.8. of this document.

Even if the topics of food waste, animal well-being and responsible, equitable and sustainable eating were not submitted for a materiality study, CGG does not consider them as material sustainability risks that would justify further details in this report.

Given the late publication (October 23, 2018) of the law related to the fight against fraud, we have not been able to discuss this subject in the 2018 report. This topic, if considered a significant risk, will be discussed in the next fiscal year.

3.7.2. Method

CGG's HSE & Social Responsibility reporting procedures are based on the Group's *Event Reporting, Recording and Classification Guidelines*.

3.7.3. Scope

HSE & Social Responsibility reporting covers all employees and subcontractors working under CGG's prevailing influence, namely all of our sites and acquisition activities that are at least 50% owned by CGG and consolidated in the Group's financial statements.

As an exception to this rule, HSE reporting also covers the operations of:

- ARGAS, in the Middle East;
- *Amadeus* and *Binh Minh* 2, vessels operated by the joint venture PTSC CGGV Geophysical Survey Company Limited in Vietnam.

Unless otherwise specified, all statistics provided in this report include this scope of application, which accounted for more than 27.6 million hours worked in 2018.

Every site, factory and mission for the acquisition of seismic data records its HSE activities and incidents in PRISM, which is CGG's integrated tool for reporting and assessing HSE and Social Responsibility risks.

Human Resources ("HR") indicators used cover the consolidated scope of the Group. The figures for HR have mainly been extracted from the Group's HR information system which is the HRMS ("Human Resources Management System") database. This database is used in all of the entities of the Group, with the exception of the Equipment Products Line. The Equipment data are therefore consolidated manually.

The statistical data regarding the work force of the Group conform to the following regulations (unless indicated otherwise):

- CGG employees only (subcontractors and employees working for a minority joint venture are excluded);
- no employee under long term absence (contract suspension, long term disability);
- employees leaving the group on the last day of a given month are included in said month.

The employees of the companies accounted for under the equity method are not included in the calculations. In the case of acquisition or sale, the scope is adjusted at the actual time of the operation and the differences explained.

3.7.4. Consolidation and internal control

HSE and sustainable development data are reviewed on a weekly basis by HSE and sustainable development support functions. The data are then consolidated every month at the Business Line and Group levels. The data related to certain specific indicators are calculated directly by the Business Lines. This process is subject to regular internal audits.

HR consolidation and adjustment rules are defined by a protocol followed for each report to ensure the comparability and traceability of the information provided. The data in this report may differ from the data reported on the national scope for the same domain, depending on national regulatory methodologies.

However, the information managed in this Group database does not contain all of the data that is recorded and stored in the local databaseds, mainly related to wages. It should be noted that these databases are outsourced in major countries, except in the United States and Canada. The Group database is not intended to be substituted for the various systems for treating national administrative data (typically for wages) that comply with the legislation of the relevant country.

The structure for collecting and storing individual data varies from one country to another depending on national regulations. Some information collected and subject to monitoring in France is illegal in other countries, and vice versa, which explains why certain information cannot be consolidated at Group level.

The data is recorded in HR information systems by local HR administration entities or through a service specially structured for this purpose ("*Employee Service Center*" for North America). This data is verified at two levels:

- Regular audits and implementation of continuous control points for personal data: gender, dates of birth, seniority, wages, promotions, tax situations, contract type, etc.;
- Audits of Organizational data including : reporting lines, job families, Segments, functions, Business Lines, etc., conducted by operational and functional HR during monthly reports.

Finally, some global processes implemented using directly connected HRMS tools, such as the annual performance evaluation, the annual salary review and the calculation of annual bonuses, also allow for periodic (at least once a year) cross checking, analysis and validation of the information.

The data reported are based on the 2018 calendar year. The information regarding certain topics, including training hours and absenteeism data, are not established for all of the perimeter. The tools for consolidating these figures are currently being deployed or improved; we however consider the most significant scopes (country or activities) to be covered.

3.7.5. Definitions

The following section provides definitions of the various terms used in Chapter 3 of this document.

- The Group: CGG Group, including all activities in the various countries where the Group operates;
- Office-based staff: office or workshop staff working on a weekly basis;
- Field staff: staff working in rotation over several weeks on onshore or offshore seismic activity projects.

3.8. INDEPENDENT VERIFIER'S REPORT ON CONSOLIDATED SOCIAL, ENVIRONMENTAL AND SOCIETAL INFORMATION

This is a free translation into English of the original report issued in French and it is provided solely for the convenience of English speaking readers. This report should be read in conjunction with, and construed in accordance with, French law and professional standards applicable in France.

To the General Assembly,

In our quality as an independent third party, accredited by the COFRAC under number n° 3-1050 (scope of accreditation available on the website www.cofrac.fr), and as a member of the network of one of the statutory auditors of your entity (hereafter "entity"), we present our report on the consolidated non-financial statement established for the year ended on the 31 December 2018 (hereafter referred to as the "Statement"), presented in chapter 5 of the management report pursuant to the legal and regulatory provisions of articles L. 225 102-1, R. 225-105 et R. 225-105-1 of the French Commercial Code (*Code de commerce*).

Responsibility of the entity

It is the responsibility of the Board of Directors to establish the Statement in compliance with the legal and regulatory provisions including a presentation of the business model, a description of the main non-financial risks, a presentation of the policies applied regarding these risks as well as the results of these policies, including key performance indicators.

The Statement has been established based on the procedures of the entity (hereinafter referred to as the "Criteria"), the significant elements of which are presented in the Statement.

Independence and quality control

Our independence is defined by the provisions of article L. 822-11-3 of the French Commercial Code and the Code of Ethics (Code de déontologie) of our profession. In addition, we have implemented a quality control system, including documented policies and procedures to ensure compliance with ethical standards, professional standards and applicable legal and regulatory requirements.

Responsibility of the independent third party

On the basis of our work, our responsibility is to provide a report expressing a limited assurance conclusion on:

- the compliance of the Statement with the provisions of article R. 225-105 of the French Commercial Code;
- the fairness of the information provided in accordance with article R. 225 105 I, 3° and II of the French Commercial Code, namely the results of the policies, including key performance indicators, and the actions related to the main risks, hereinafter the "Information".

However, it is not our responsibility to comment on:

- the entity's compliance with other applicable legal and regulatory provisions, particularly the French duty of care law and anti-corruption and tax evasion legislation;
- the compliance of products and services with the applicable regulations.

Nature and scope of the work

Our work described below has been carried out in accordance with the provisions of articles A. 225-1 et seq. of the French Commercial Code determining the conditions in which the independent third party performs its mission and according to professional standards as well as to the international ISAE standard 3000 - *Assurance engagements other than audits or reviews of historical financial information.*

The work that we conducted allows us to assess the compliance of the Statement with the regulatory provisions and the fairness of the Information:

- We obtained an understanding of the entity's activities and of all the entities included in the scope of consolidation, the statement of the main social and environmental risks related to this activity, and, where applicable, its effects regarding compliance with human rights, anti-corruption, tax evasion legislation, as well as the resulting policies and their results;
- We assessed the suitability of the Criteria with respect to their relevance, completeness, reliability, neutrality and understandability by taking into consideration, where relevant, the best practices of the industry;
- We verified that the Statement covers each category of information set out in article L. 225-102-1 III of the French Commercial Code regarding social and environmental matters, as well as respect of human rights and anti-corruption and tax evasion legislation;
- We verified that the Statement includes an explanation justifying the absence of the information required by the 2nd paragraph of III of Article L. 225-102-1 of the French Commercial Code;
- We verified that the Statement presents the business model and the main risks associated with the activity of the entity and of all the entities included in the scope of consolidation; including, where relevant and proportionate, the risks associated with their business relationships, their products or services, as well as their policies, actions and results, including key performance indicators;
- We verified, where relevant with respect to the main risks or the policies presented, that the Statement presents the information required under article R. 225-105 II of the French Commercial Code;
- We assessed the process used to select and validate the main risks;
- We inquired about the existence of internal control and risk management procedures put in place by the entity and of all the entities included in the scope of consolidation;

- We assessed the consistency of the results and the key performance indicators with respect to the main risks and policies presented;
- We verified that the Statement includes a clear and reasoned explanation for the absence of a policy regarding one or more of those risks;
- We verified that the Statement covers the consolidated scope, i.e. all the companies included in the scope of consolidation in accordance with article L. 233-16 of the French Commercial Code, with the limits specified in the Statement;
- We assessed the collection process implemented by the entity to ensure the completeness and fairness of the Information;
- We implemented for the key performance indicators and other quantitative results that we considered to be the most important presented in Appendix 1:
  - analytical procedures to verify the correct consolidation of the collected data as well as the consistency of their evolutions;
  - detailed tests based on samples, consisting of checking the correct application of the definitions and procedures and reconciling the data with the supporting documents. This work was carried out with a selection of contributing entities listed below : 1) CGG Services Inc. – Houston, 2) De Regt (Sercel) – Krimpen, 3) CGG Geosoftware, CGG Services (NL) B.V., The Hague, which cover between 15% and 50% of consolidated data selected for these tests (15% of employees, 50% of electricity consumption);
- We consulted documentary sources and conducted interviews to corroborate the qualitative information (actions and results) that we considered the most important presented in Appendix 1;
- We assessed the overall consistency of the Statement based on our knowledge of all the entities included in the scope of consolidation.

We believe that the work we have carried out, based on our professional judgment allows us to express a limited assurance conclusion ; a higher level of assurance would have required more extensive verification work.

Means and resources

Our verification work mobilized the skills of four people and took place between August 2018 and February 2019 on a total duration of intervention of about sixteen weeks.

We conducted interviews with the persons responsible for the preparation of the Statement including in particular the Risk Management, Compliance, Human Resources, Health, Safety and Security, Human rights and Environment.

Conclusion

Based on our work, we have not identified any significant misstatement that causes us not to believe that the consolidated non-financial statement complies with the applicable regulatory provisions and that the Information, taken together, is fairly presented, in compliance with the Criteria.

Paris-La Défense, the 5th April 2019

French original signed by:

Independent third party

ERNST & YOUNG et Associés

Partner, Sustainable Development	Partner
Christophe Schmeitzky	Jean-François Bélorgey

Appendix 1: Information considered as the most important

Social Information	
Quantitative Information (including key performance indicators)	*Qualitative Information (actions or results)*
Turnover rate (voluntary and global) % of positions with a successor identified Response rate by recruitment % salary increase Share of trained employees (%) Number of training days per employee Absenteeism rate Lost Time Injury Frequency Rate (LTIF) Total Recordable Cases Frequency (TRCF) Severity rate Motor Vehicle Crash rate High Potential Incidents	Employment (attractiveness, retention), Health and safety (prevention actions), Social relations (social dialogue, collective agreements), Training, Equal treatment (equality between men and women, fight against discrimination)
Environmental Information	
Quantitative Information (including key performance indicators)	*Qualitative Information (actions or results)*
Energy Efficiency "Geology, Geophysics & Reservoir" Significant greenhouse gas emissions (activities, goods and services) Significant environmental incidents Grievances about environmental impacts filed, addressed, & resolved through formal mechanisms Marine mammal detections	Climate change (significant emission sources due to activity, reduction objectives, adaptation measures), Control of sound emissions from marine seismic sources
Societal Information	
Quantitative Information (including key performance indicators)	*Qualitative Information (actions or results)*
Grievances about human rights filed, addressed, & resolved through formal mechanisms Sites that have been subject to human rights reviews Employees working in a country from which they are nationals	Local impact (employment, development, local residents, dialogue …), Subcontracting and suppliers (environmental and social issues), Actions in favor of human rights, Actions taken to prevent corruption

4 REPORT ON CORPORATE GOVERNANCE

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4.1. GOVERNANCE

In accordance with article L.225-37, 6th paragraph of the French commercial code, the Board of Directors approved this report on corporate governance in its meeting of March 7, 2019. This report will be presented to the general meeting to be convened to approve the 2018 financial statements.

4.1.1. Code of Corporate Governance applied by the Company

The Company complies with the AFEP-MEDEF code of corporate governance for listed companies (the « AFEP-MEDEF Code »). This Code is available on the website of the MEDEF (www.medef.fr).

However, the Company does not apply the following provisions of the AFEP-MEDEF Code:

AFEP-MEDEF Code	**CGG's practice / Justification**
Appraisal of the Board of Directors (section 9.3 of the AFEP-MEDEF Code) *« The evaluation is performed in the following manner:* *- Once a year, the Board debates its operation;* *- There is a formal evaluation at least once every three years. This can be undertaken under the leadership of the appointments or nominations committees or an independent director assisted by an external consultant ; »*	The Board of Directors organizes an annual appraisal of its operation and of its Committees. The appraisal is carried-out by the Chairman of the Appointment and Remuneration Committee based on a questionnaire sent to all Directors. Furthermore the internal rules and regulations of the Board of Directors provide for an appraisal of the Board of Directors performed by an outside consultant every three years. The last appraisal performed by an outside consultant took place in 2016 for fiscal year 2015 and as such, the following outside evaluation should be performed in 2019 for fiscal year 2018. However, given the limited hindsight into our current Board of Directors due to the short term of the newly elected Board, it has been decided to postpone the normally scheduled appraisal for fiscal year 2019 in order to give the Board of Directors the benefit of a longer record of accomplishment to proceed to their appraisal.
Long-term compensation (articles 24.3.3 of the AFEP-MEDEF Code) (…) « *These plans, the award if which must be proportionate to the annual fixed and variable compensation components, must provide for demanding performance conditions to be fulfilled over a period of several consecutive years.* » (…)	Mrs. Sophie ZURQUIYAH is entitled to a stock option scheme subject to the fulfilment of performance conditions for the years 2019, 2020, 2021 and 2022, with the possibility of acquiring 25% of the options granted each year. The implementation of this scheme departs from the conditions set out in the AFEP/MEDEF Code since Mrs. Sophie ZURQUIYAH may acquire 25% of the options granted at the end of the first year. This departure is explained by the fact that CGG does not have any other long-term compensation scheme and must, in view of the specific context encountered, have an element associating the Senior Executive Officers with the evolution of the share price from the first financial year of activity.
Non-competition benefit (articles 23.4 and 23.6 of the AFEP-MEDEF Code) *« The Board must also make provision for no non-competition benefit to be paid once the officer claims his or her pension rights. In any event, no benefit can be paid over the age of 65. »* *«The non-competition benefit must be paid in instalments during its term. »*	The recommendations of the AFEP-MEDEF Code relating to non-compete agreements were revised in June 2018. Insofar as Mrs. Sophie ZURQUIYAH's non-competition agreement entered into force before the revision of the AFEP-MEDEF Code, the Board of Directors will implement these new recommendations at the next renewal of the Chief Executive Officer's term in office or a new appointment, if any.

4.1.2. Board of Directors and Management

4.1.2.1. Board of Directors

4.1.2.1.1. Composition of the Board of Directors as of the date of this document

Name	Nationality	Independent	Gender	Age	Initially appointed	Term expires	Number of years as Directors	Committees: Audit	Committees: Appointment and Remuneration	Committees: Investment	Committees: HSE / Sustainable Development
Mr. Philippe SALLE [(a)]	French	X	M	53	2018	2021 GM	1				
Mrs. Sophie ZURQUIYAH [(b)]	French / American		F	52	2018	2022 GM	1				
Mr. Michael DALY	British	X	M	65	2015	2021 GM	4				X [(CH)]
Mr. Patrice GUILLAUME [(c)]	French		M	60	2017	2021 GM	2		X		X
Mrs. Anne-France LACLIDE-DROUIN	French	X	F	50	2017	2021 GM	2	X			
Mrs. Helen LEE BOUYGUES	American	X	F	46	2018	2020 GM	1	X			
Mrs. Colette LEWINER	French	X	F	73	2018	2019 GM	1		X [(CH)]		
Mrs. Gilberte LOMBARD	French	X	F	74	2011	2019 GM	8	X [(CH)]		X	
Mrs. Heidi PETERSEN	Norwegian	X	F	61	2018	2020 GM	1		X		X
Mr. Mario RUSCEV	French	X	M	62	2018	2019 GM	1			X	X
Mr. Robert F. SEMMENS	American		M	61	1999	2019 GM	20		X	X [(CH)]	

(a) Mr. Philippe SALLE is Chairman of the Board of Directors.
(b) Mrs. Sophie ZURQUIYAH is Chief Executive Officer of the Company.
(c) Mr. Patrice Guillaume was appointed as Director by the Group Committee pursuant to Article 8 of the Company's articles of association.
(CH) Chairman.

Mr. Philippe SALLE — Chairman — Independent Director

Born on May 17, 1965
French nationality

Number of CGG shares held on December 31, 2018:
185 061 shares

Mr. Philippe SALLE is Chairman of the Foncia group since December 1, 2017. He is a graduate of the École des Mines and holds a MBA from the Kellogg Graduate School of Management, Northwestern University (Chicago, USA). Mr. Philippe SALLE began his career with Total in Indonesia before joining Accenture in 1990. He then joined McKinsey in 1995 and became Senior Manager in 1998. In 1999, he joined the Vedior group (which later became Randstad, a company listed on Euronext Amsterdam). He became Chairman and CEO of Vedior France in 2002; In 2003, he became a member of the managing board of Vedior NV and was then appointed President for South Europe in 2006 (France, Spain, Italy and Switzerland). In 2007, he joined the Geoservices group (sold to Shclumberger in 2010, listed on the New York Stock Exchange), a technological company operating in the petroleum industry with 7 000 associates in 52 countries. He was first appointed Deputy CEO and then Chairman and CEO until March 2011. From 2011 to 2015, he was Chairman and CEO of the Altran group. He then became Chairman and CEO of Elior where he remained until October 2017. He is now CEO of Foncia.

He is a Knight of the French National Order of Merit and of the Legion of Honor and Commander of the Order of Merit of the Italian Republic.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: None

Outside of the Group:
French companies:
- Director of Banque Transatlantique
- Director of Siaci Saint-Honoré

Former Directorships

Within the Group: None

Outside of the Group:
- Director of Bourbon (France, a company listed on Euronext Paris)
- CEO of Altran (France, a company listed on Euronext Paris)
- CEO of Elior (France, a company listed on Euronext Paris)
- Director of GTT — Gaztransport and Technigaz (France, a company listed on Euronext Paris)

Mrs. Sophie ZURQUIYAH — Director and Chief Executive Officer

Born on November 24, 1966
American and French nationality

Number of CGG shares held on December 31, 2018:
41,000 shares

Mrs. Sophie ZURQUIYAH is a graduate from the Ecole Centrale de Paris. She holds a Master in digital analysis from the Pierre et Marie Curie University (Paris VI) and a Master In Aerospace engineering from the Colorado University.

Mrs. Sophie ZURQUIYAH spent 27 years in the oilfield services industry, working for Schlumberger in P&L and in positions covering R&D and Operations, in France, the United States and Brazil. Her most recent roles include Chief Information Officer (CIO), President of Data and Consulting Services that provided Processing, Interpretation and Consulting services for most of Schlumberger's business lines, and Vice President of Sustaining Engineering that included all support and improvements to commercial products, services and technologies worldwide. She joined CGG on February 4, 2013 as Senior Executive Vice President, GGR segment. Before that time, Prior to her appointment as Chief Executive Officer of CGG SA on April 26, 2018, Mrs. Sophie Zurquiyah was Chief Operating Officer in charge of the GGR business lines, Global Operational Excellence and Technology of CGG. She had also served as Corporate Officer from September 1, 2015 to January 4, 2017.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
French companies:
- Director and Member of the Audit Committee of Safran (a company listed on Euronext Paris)

Former Directorships

Within the Group:
- Senior Executive Vice President of CGG Services (U.S.) Inc. (USA)
- Director of Petroleum Edge Ltd (UK), a company 50% held by the Group

Outside of the Group:
- Member of Magnitude Microseismic LLC (USA)
- Officer of Schlumberger Technology Corp. (USA)

Mr. Michael DALY — Independent Director

Born on October 4, 1953
British nationality

Number of CGG shares held on December 31, 2018:
20,000 shares

Mr. Michael DALY is a graduate of The University College of Wales, Leeds University (PhD) and Harvard Business School (PMD).

Mr. DALY is a British geologist, oil and gas executive and academic. He joined the Geological Survey of Zambia in 1976, mapping the remote Muchinga Mountains of northeast Zambia. He began his business career with BP in 1986 as a research geologist. After a period of strategy work and exploration and production positions in Venezuela, the North Sea and London, he became President of BP's Middle East and S. Asia exploration and production business. In 2006, Mr. DALY became BP's Global Exploration Chief and a Group Vice President. He served on BP's Group Executive Team as Executive Vice President from 2010, and retired in 2014 after 28 years with the company, and also served as Senior Director at Macro Advisory Partners. He currently serves as Non-Executive Director with Tullow Oil, and as Visiting Professor in Earth Sciences at The University of Oxford.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group :

Foreign companies :

- Director of Tullow Oil (United Kingdom) (a company listed on the London Stock Exchange)
- Professor in Earth Sciences at the University of Oxford (United Kingdom)
- Director of Daly Advisory and Research Ltd. (United Kingdom)

Former Directorships:

Outside of the Group :

- Partner of Macro Advisory Partner (United Kingdom)

Mr. Patrice GUILLAUME — Director representing employees

Born on November 19, 1958
French nationality

Number of CGG shares held on December 31, 2018:
10,028 shares

Mr. Patrice GUILLAUME graduated from the Ecole Centrale of Lyon (France). He began his professional activity in 1981 as a professor of electronics at the Polytechnic of Kano Nigeria as part of the volunteer service to the national service at the French Ministry of External Relations. After a three-year stint at Air Liquide's research center as a research engineer in combustion, he joined CGG in 1985 as deputy head of mission for land acquisitions in Italy. He then returned to a career in research in geophysics in the field of imaging to become an expert in tomography and managed the team specialized in tomography. He has been a member of the CGG Works Council for about 20 years and secretary of the Group Committee for about 10 years.

Directorships in French or foreign companies within the last five years

Current Directorships: none

Former Directorships: none

Mrs. Anne-France LACLIDE-DROUIN — Independent Director

Born on January 8, 1968
French Nationality

Number of CGG shares held on December 31, 2018:
10,000 shares

Mrs. LACLIDE-DROUIN is a graduate from the Institut Commercial of Nancy (ICN) and Mannheim University. She also holds a Diplôme d'Etudes Supérieures Comptables et Financières.

Mrs. LACLIDE-DROUIN began her career at PricewaterhouseCoopers before occupying various positions in the financial division of international groups in different sectors, such as the distribution sector, where she acquired international experience. In 2001, she became Financial Director of Guilbert, then Staples, AS Watson and GrandVision. Mrs. LACLIDE-DROUIN has been CFO of Oberthur Technologies, comprising the responsibility of the financial and legal functions of the group, from 2013 to 2017. She is now CFO of Consolis Holding SAS *and a member of the Executive Committee of Consolis Group SAS.*

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
French Companies:
- Director of Bonna Sabla SA

Foreign companies:
- Director of Consolis Oy AB (Finland)
- Director of Parma Oy (Finland)
- Member of the Supervisory Board and Chairman of WPS Ujski (Poland)
- Director of Philbert Tunisie SA (Tunisia)
- Member of the Supervisory Board of ASA Epitoipari Kft (Hungary)
- General Manager of Compact (BC) SARL (Luxembourg)
- Director of Spaencom AS (Denmark)
- General Manager of Compact (BC) Lux II S.C.A. (Luxembourg)

Former Directorships

Within the Group: none

Outside of the Group:
- Director and Chairperson of the Audit Committee of SFR (France, a company listed on Euronext Paris)
- Director of Oberthur Technologies Group SAS (France)
- Director of Mali Solutions Numériques SA (France)
- Director of OT Pakistan (Private) Ltd (Pakistan)
- Director of Oberthur Technologies of America Corporation (USA)
- General Manager of Oberthur Technologies Hong Kong Limited (Hong Kong)

Mrs. Helen LEE BOUYGUES — Independent Director

Born on May 23, 1972
American nationality

Number of CGG shares held on December 31, 2018:
20,000 shares

Mrs. Helen LEE BOUYGUES received her Bachelor of Arts, magna cum laude, from Princeton University in Political Science and a Masters of Business Administration from Harvard Business School.

She started her career in 1995 at J.P. Morgan in the M&A group in New York and in Hong Kong. In 1997, she joined Pathnet Inc., a telecommunications provider based in Washington DC, as Director of Development and Finance. From 2000 until 2004, she worked at Cogent Communications Inc. as Chief Operating Officer, Chief Financial Officer and Treasurer. She thereafter became a Partner at Alvarez & Marsal Paris, where she left to launch her own consulting firm specialized in corporate turnaround and transformations in 2010. In 2014, she integrated her team at McKinsey & Company in Paris where she was Partner responsible for the division Recovery and Transformation Services. Since June 2017, she is President of LB Associés, a consulting firm.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
French companies and institutions:
- President of LB Partners
- Director and member of the Audit Committee of Vivarte
- Director and member of the Audit & Remuneration Committee of Burelle SA (a company listed on Euronext Paris)
- Governor and member of Finance and Strategy Committees of the American Hospital of Paris (non-profit)
- Director of NEOEN SA
- Director of Fives SAS

Former Directorships

Within the Group: none

Outside of the Group:
- Founder and General Manager of Lee Bouygues Partners (France)
- *Partner* of McKinsey RTS France (France)

Mrs. Colette LEWINER — Independent Director

Born on September 19, 1945
French nationality

Number of CGG shares held on December 31, 2018:
20,000 shares

Mrs. Colette LEWINER has graduated from Ecole Normale Supérieure (a leading French higher education University) and has a PhD in physics.

Mrs. LEWINER started her career as an academic at University of Paris VII as a physics researcher. In November 1979, she joined Electricité de France (EDF), first in the research department, before being responsible for fuel and uranium purchasing. In 1989, she became EDF's first woman Executive Vice President in charge of the Commercial division that she created. Mrs. LEWINER was appointed Chairman of the Board, Chief Executive Officer, of SGN (the engineering affiliate of Cogema) on March 1992. In 1998, Mrs. LEWINER joined Capgemini and headed the Utilities Global Market Unit. She had been Non-Executive Chairman of TDF (2010-2015) and member of the European Union Consultative Group on Energy (2008-2012). In 2012, she became Energy advisor to Capgemini Chairman. Since 2013, Mrs. Colette LEWINER is member of the Research Council (CSR), a High-Level Committee advizing the French government on Research and Innovation Strategy.

She is a Commander of the French National Order of Merit and of the Legion of Honor.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
French Companies:
- Director, member of the Strategy & Sustainable Development Committee of Nexans (a company listed on Euronext Paris)
- Director, Chairwoman of the Selection and Compensation Committee of Bouygues (a company listed on Euronext Paris)
- Director, member of the Accounts Committee, Member of the Ethics Committee and Chairwoman of the Selection and Compensation Committee of Colas (a company listed on Euronext Paris and at 96.6% controlled by Bouygues)
- Director, Chairwoman of the Audit Committee, Member of the Governance Committee of Getlink (formerly Eurotunnel, a company listed on Euronext Paris)
- Director, Member of the Audit Committee, Chairwoman of the Governance and Corporate Social Responsibility Committee, Member of the Nomination and Remuneration Committee of EDF (a company listed on Euronext Paris)

Former Directorships

Within the Group: none

Outside of the Group:
- Director, Member of the Strategy Committee, Member of the Audit Committee of Ingenico (France, a company listed on Euronext Paris)
- Director, Member of the Audit Committee of TGS Nopec Geophysical Company (Norway)
- Non-Executive Chairman of TDF (France)
- Director, Member of the Strategy Committee of Lafarge-Holcim (France)
- Director, Chairwoman of the Selection and Compensation Committee of Cromton Greaves (India)

Mrs. Gilberte LOMBARD — Independent Director

Born on July, 10 1944
French Nationality

Number of CGG shares held on December 31, 2018*:*
3,202 shares

Mrs. Gilberte LOMBARD holds a Masters degree in Economic Sciences and is a graduate of the INSEAD Advanced Management Program.

She began her career as a financial analyst and then joined the M&A department of Credit Commercial de France. After Credit Commercial de France was privatized in 1987, she became the Investor Relations Officer in charge of relationships with financial analysts and institutional investors. She also coordinated the information policy for both major bank shareholders and individual bank shareholders from 1987 to 2000. In 2000, she was appointed as head of financial transactions in charge of structuring and implementing sales, acquisitions and mergers for HSBC France (which by now had taken over Credit Commercial de France) and managing its industrial and financial portfolio. She was appointed a member of the Board and the Audit Committee of several companies within the HSBC group in France. She was also appointed as Secretary of the Board of Directors in 1990 and as such, managed the bank's major shareholders relationships. She retired in February 2011.

She is Knight of the Legion of Honor.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
French companies and institutions:
- Director, Chairwoman of the Compensation Committee and Member of the Strategy Committee of, Robertet SA (a company listed on Euronext Paris)
- Director of the Vernet Retraite Association

Former Directorships

Within the Group: none

Outside of the Group:
- Member of the Supervisory Board, Member of the Audit Committee and Member of the Compensation Committee of Zodiac Aérospace (France)
- Director of Nobel (France)
- Director of HBSC Assurances Vie (France)
- Director of Financière d'Uzès (France)

Mrs. Heidi PETERSEN — Independent Director

Born on March 22, 1958
Norwegian nationality

Number of CGG shares held on December 31, 2018
20,000 shares

Mrs. Heidi PETERSEN holds a M.Sc. (cand. scient. degree) from the Norwegian University of Science and Technology in Trondheim, Department of Chemistry and Mathematics.

Mrs. PETERSON started her career as research assistant at the Norwegian University of Science and Technology in Trondheim in 1983. She was employed in Kvaerner Oil & Gas from 1988 where she worked as an engineer, project manager and departmental manager engaged in offshore and land-based industrial assignments. She served as maintenance supervisor of the Gullfaks C platform for two years from 1995 to 1997. She was appointed head of Kvaerner Oil & Gas AS in Sandefjord in 1997, where she served as Vice President until 2000. In 2000, she headed a management buy-out that led to the startup of Future Engineering AS and served as its Managing Director from 2000 to 2004. In 2004, she sold the company to Rambøll and served after that as Managing Director of Rambøll Oil & Gas from 2004 to 2007. Ms. PETERSEN is an independent business woman, with 30 years of experience in the oil and offshore industry. She owns Future Technology AS, a leading consultancy and technology company located in Sandefjord and Oslo offering consultant services, engineering services and construction solutions, notably in the oil and gas market.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
Foreign companies and institutions:
- Chairman of Future Technology AS (Norway)
- Director of Arendal Fossekompani ASA (a company listed on the Oslo Stock Exchange)
- Director of HIP (Herøya Industripark) AS (Norway)

Former Directorships

Within the Group: none

Outside of the Group:
- Director of Eitzen Chemical ASA (Norway, a company listed on the Oslo Stock Exchange)
- Director of Glamox ASA (Norway, a company listed on the Oslo Stock Exchange)
- Director of North Energy ASA (Norway, a company listed on the Oslo Stock Exchange)
- Chairman of de SIV (Sykehuset i VestFold) (Norway)
- Director of NIVA AS (Norway)
- Director of CECON ASA (Norway, a company listed on the Oslo Stock Exchange)

Mr. Mario RUSCEV — Independent Director

Born on October 27, 1956
French nationality

Number of CGG shares held on December 31, 2018:
20,156 ADRs

Mr. Ruscev is a Nuclear Physicist by training holding a PhD from Pierre and Marie Curie University and from Yale University.

Mr. Ruscev spent 23 years with Schlumberger in various responsibilities in the R&D and operational areas. He was the head of the Seismic, Testing, Water & Gas services and Wireline Product Lines. He has since been CEO of FormFactor a provider of unique nanotech connectors for the semi-conductor industry, CEO of IGSS (GeoTech) the major Russian Seismic Company, CTO at Baker Hughes and EVP at Weatherford until 2017.

During his career, Mr. Ruscev had the opportunity to evolve in many environments where Technology was a differentiator and his team's successfully introduced systems as diverse as: luggage scanners differentiating between organic and inorganic materials still in use after 30 years, the first Container Scanner based on unique gaseous sensors, many Wireline and Testing tools including the PlatForm Express Wireline combo still unequalled after 25 years, the first single sensor seismic systems called Q, the first ever Aquifer Storage and Recovery in Middle East, simulators allowing to understand the formation and propagations of fractures during Frac operations or analytics applications in the Oilfield Operations. His combined Technology and Operational experiences give him a unique perspective on the evolution of the OilField business.

Directorships in French or foreign companies within the last five years

Current Directorships

Within the Group: none

Outside of the Group:
Foreign Companies:
- Director of Expro Group Holdings International Ltd., incorporated (Cayman Islands)

Former Directorships

Within the Group: none

Outside of the Group:
- Director of Global Carbon Capture and Sequestration Institute (Australia)

Mr. Robert F. SEMMENS — Director

Born on October 29, 1957
American nationality

Number of CGG shares held on December 31, 2018:
20,156 shares

Mr. SEMMENS is a private investor and adjunct professor of finance at the Leonard N. Stern School of Business (New York University). He holds a law degree from Northwestern University School of Law and an MBA in Finance and Accounting from the J.L. Kellogg Graduate School of Management at Northwestern University. He was Vice President of Goldman Sachs & Co. in Investment Banking, and at J. Aron and Principal Investing, all in energy related businesses. He was co-founder of The Beacon Group, where he raised and co-managed private equity funds in the energy business. Mr. SEMMENS joined the Board of CGG in connection with an investment made by the Beacon Group in CGG in 1999. At CGG, he has served on the Audit, Appointment and Remuneration and Strategic Committees of the Board and has been a Director of Sercel. He has served on more than 15 boards, all in the energy business.

Directorships in French or foreign companies within the last five years

Current Directorships:

Within the Group: none

Outside of the Group:
Foreign Companies:
- Director of MicroPharma Ltd. (Canada)
- Member of Bronco Holdings LLC. (USA)
- *Adjunct Professor* of Finance at the Leonard N. Stern School of Business, New York University (USA)

Former Directorships

Within the Group: none

Outside of the Group:
- Member of the *Advisory Board* of Sense Networks (USA)
- Member of DeBusk Holdings LLC. (USA)

4.1.2.1.2. Changes having occurred in the composition of the Board of Directors and its committees during the financial year

Significant changes took place in the composition of the Board of Directors and its committees throughout fiscal year 2018. These changes are presented in the following table:

	Departure	Appointment	Renewal
Board of Directors	Loren CARROLL 03/08/2018	Philippe SALLE 03/08/2018 (in place of Loren CARROLL)	
	Hilde MYRBERG 03/08/2018	Colette LEWINER 03/08/2018 (in place of Hilde MYRBERG)	
	Jean-Georges MALCOR 03/08/2018	Mario RUSCEV 03/08/2018 (in place of Jean-Georges MALCOR)	
	Bpifrance Participations (represented by Marie-Laetita VASSORT) 03/23/2018	Helen LEE BOUYGUES 03/23/2018 (in place of Bpifrance Participations)	
	Didier HOUSSIN 03/23/2018	Heidi PETERSEN 03/23/2018 (in place of Didier HOUSSIN)	
	Rémi DORVAL 04/26/2018	Sophie ZURQUIYAH 04/26/2018	
	Kathleen SENDALL 04/26/2018		
Audit Committee	Bpifrance Participations (represented by Marie-Laetita VASSORT) 03/23/2018	Helen LEE BOUYGUES 04/26/2018	
	Loren CARROLL 03/08/2018		
Appointment and Remuneration Committee	Kathleen SENDALL 04/26/2018	Colette LEWINER 04/26/2018	
	Didier HOUSSIN 03/23/2018	Heidi PETERSEN 04/26/2018	
		Patrice GUILLAUME 04/26/2018	
Investment Committee		Robert SEMMENS 04/26/2018	
		Gilberte LOMBARD 04/26/2018	
		Mario RUSCEV 04/26/2018	
HSE / Sustainable Development Committee	Kathleen SENDALL 04/26/2018	Heidi PETERSEN 04/26/2018	
	Hilde MYRBERG 03/08/2018	Mario RUSCEV 04/26/2018	
	Gilberte LOMBARD 04/26/2018	Patrice GUILLAUME 04/26/2018	

4.1.2.1.3. Directors appointed by the employees — Censors

The extraordinary general meeting held on November 13, 2017 (28th resolution) decided to amend article 8 of the Company's articles of association to provide for the appointment of Director(s) representing employees, in accordance with the provisions of Article L. 225-27-1 of the French Commercial Code applicable to the Company.

By decision dated December 15, 2017, the Group Committee appointed Mr. Patrice GUILLAUME as Director representing the employees for a term of four years, his mandate expiring, in accordance with article 8 of the articles of association of the Company, following the general meeting of shareholders called to approve the financial statements for the year ended December 31, 2020.

The credentials of Mr. Patrice GUILLAUME are set out in the paragraph 4.1.2.1.1 of the present document.

The Company did not appoint any censor.

4.1.2.1.4. Independent directors

The Appointment and Remuneration Committee and the Board review the qualification of the Directors as independent on an annual basis before release of the annual reports.

In accordance with Article 8.2 of the AFEP-MEDEF Code, the Board of Directors considers that a Director is independent when he or she has no relationship of any kind whatsoever with the company, its group or its management that may impair his or her freedom of judgment. The Appointment and Remuneration Committee and the Board of Directors rely on the criteria set out by the AFEP-MEDEF Code to assess the independence of each Director as follows:

Name of the Director	**Criterion no. 1**	**Criterion no. 2**	**Criterion no. 3**	**Criterion no. 4**	**Criterion no. 5**	**Criterion no. 6**	**Criterion no. 7**	**Criterion no. 8**	**Qualification of independence established by the Board of Directors**
Philippe SALLE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Sophie ZURQUIYAH	**No**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**No**
Michael DALY	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Anne-France LACLIDE-DROUIN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Helen LEE BOUYGUES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Colette LEWINER	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Gilberte LOMBARD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Heidi PETERSEN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Mario RUSCEV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	**Yes**
Robert F. SEMMENS	Yes	Yes	Yes	Yes	Yes	**No**	Yes	Yes	**No**

Yes = compliance with the AFEP-MEDEF Code in relation to independence criteria

No = non-compliance with the AFEP-MEDEF Code in relation to independence criteria

These criteria are the following:

Criterion no. 1: not to be:

- an employee or an Executive Officer of the corporation, or
- an employee or an Executive Officer or a Director:
  - of a company consolidated by the corporation, or
  - of the company's parent company, or
  - of a company that the parent company consolidates

and not having been in such a position for the previous five years;

Criterion no. 2: not to be an Executive Officer of a company in which the corporation holds a directorship, directly or indirectly, on in which an employee appointed as such or an Executive Officer of the corporation (currently in office or having held such office during the last five years) is a Director;

Criterion no. 3: not to be a customer, supplier, investment banker, commercial banker or consultant:

- that is material for the corporation or its group;
- or for a significant part of whose business the corporation or its group accounts;

Criterion no. 4: not to be related by close family ties to an Executive Director;

Criterion no. 5: not to have been an auditor of the corporation within the past five years;

Criterion no. 6: not to have been a Director of the corporation for more than twelve years;

Criterion no. 7: not to be a Non-Executive Officer receiving variable compensation in cash or in the form of securities or any compensation linked to the performance of the corporation or group;

Criterion no. 8: not to represent a significant shareholder of the company holding more than 10% of the voting rights.

With regard to the criterion relating to the business relationship, there is no business relationship between, on the one hand, Directors and/or companies in which they hold an office and, on the other, the Company or its group. Therefore, in the absence of such a relationship, in 2016, the Board of Directors did not have to assess the significant nature of any business relationship with regard to criteria determined in relation with the characteristics of the company and the business relationship in question.

In its meeting held on March 7, 2019, the Board therefore confirmed that 8 out of the 10 Directors who were sitting on the Board at that time qualified as independent (i.e. more than half of the Board members, which is compliant with the recommendation of the AFEP-MEDEF Code)[7]: Mrs. Gilberte LOMBARD, Mrs. Helen LEE-BOUYGUES, Mrs. Heidi PETERSEN, Mrs. Anne-France LACLIDE-DROUIN and Mrs. Colette LEWINER and Mr. Philippe SALLE, Mr. Michael DALY and Mr. Mario RUSCEV.

Mr. Patrice GUILLAUME, in his capacity of Director representing the employees, is not taken into account in the calculation of the independence rate of the Board (*section 8.3 of the AFEP-MEDEF Code).*

4.1.2.1.5. Update on the Company's application of the principle of balanced representation on the Board of Directors

The Board of Directors, based on the Appointment and Remuneration's Committee's recommendation, strives to achieve a balanced composition, with regards to complementarity of skills, expertise, experience and internationality of its membership.

When examining its membership, the Board of Directors takes into consideration the Company's strategy and its new challenges.

In 2018, especially, as part a significant renewal of the Board's membership, the Board of Directors, in line with its road map, has adjusted its composition and sought to submit, for nomination, the following Directors' profiles:

- Knowledge of the oil and gas industry, with specific skills, i.e., knowledge of the market in its variety, financial and operational experience in the sector and expertise in governance issues specific to the sector (7 Directors out of 10 at the date of the present document);
- Knowledge of technologies and digitalization processes in the oil and gas industry (4 Directors out of 10 at the date of the present document);
- Knowledge of human resources issues, especially compensation and governance-related problems, from a French as well as an international perspective (5 Directors out of 10 at the date of the present document);
- Knowledge of financial and strategic issues (6 Directors out of 10 at the date of the present document).

The Board of Directors also endeavors to maintain a balanced composition between its international and French profiles (at the date of the present document, 4 Directors out of 10 are foreign nationals), and maintain a balanced ratio of men and women (at the date of the present document, 6 female Directors out of 10).

Mr. Patrice GUILLAUME, as Director representing the employees, is not taken into account when determining these ratios.

Details of the directorships, curriculum, professional experiences, as well as information such as age and nationality of each Director are presented in the section 4.1.2.1.1 of the present document.

4.1.2.1.6. Professional address of the Directors

The professional address of the Directors is the registered office of the Company, Tour Maine-Montparnasse, 33, avenue du Maine, 75015 Paris.

4.1.2.1.7. Share ownership

The Board's internal regulations provide that each director be required to own at least 20,000 of our shares.

4.1.2.1.8. Rules applicable to transaction carried on Company's shares by Directors

The Directors may be led to hold information relative to the Company that has come to their attention because of their position as director and which, if made public, might have an appreciable effect on the Company's share price. The significant character of a piece of information is normally related to the influence it may have on the financial results of the listed Company. A significant piece of information can relate to operating revenues, financial or budgetary estimates, investments, acquisitions or divestments, main discoveries, stops of important manufacturing units, launching or withdrawal of products, significant changes in shareholding or management, transactions affecting the capital, the dividend, the appearance or the settlement of a dispute, etc..

In such a case, the internal regulations provide that the directors must refrain:

- from exploiting such information in their own behalf or in behalf of others, directly or through an intermediary, by purchasing or selling the Company's securities or financial products connected with the said issue;
- from communicating the said information for purposes other than and for an activity other than the one in connection with which it is held.

In addition to the above, Directors must abstain from carrying-out any transaction on the Company's shares, of whatever nature, during the 30-calendar days preceding the publication of quarterly, semiannual or annual results and until the day after the publication date. Such publications occur the last week of February, mid-May, the last week of July and mid-November.

In case of doubt, the Directors are invited to contact the Group Chief Financial Officer.

The Directors must notify to the Autorité des Marchés Financiers the transactions that they may carry out on the Company's shares, pursuant to the provisions of Regulation

(7) In accordance with section 8.3 of the AFEP-MEDEF Code, independent directors should account for half the members of the Board in widely held corporations without controlling shareholders.

(EU) no 596/2014 of the European Parliament and of the Council of April 16, 2014. These provisions are described in the internal rules and regulations of the Board of Directors.

4.1.2.2. General Management

4.1.2.2.1. General management organization

(a) Split of the Chairman and Chief Executive Officer positions

Since June 30, 2010, the positions of Chairman of the Board and Chief Executive Officer have been split.

(b) Role of the Chairman of the Board of Directors

The Chairman represents the Board of Directors and, except in exceptional circumstances, is the only one with the capacity to act and speak on behalf of the Board. He organizes and oversees the activities of the Board of directors and ensures that the corporate bodies operate in an efficient manner, in compliance with good governance principles. He ensures, in particular, that directors are in a position to fulfill their duties and are provided with sufficient information in this respect. He reports on annual basis to the shareholders' meeting on the board of directors' composition, preparation and organization of the board of directors' work, on internal control and risk management procedures implemented by the Company. The Chairman is regularly kept informed by the Chief Executive Officer of the significant events relating to the Group business and may request from her any information that may be necessary for the Board and its committees. He may meet with the external auditors of the Company in order to prepare the meetings of the Board. Upon request of the general management, he may represent the Company vis à vis top level representatives of governmental authorities and major partners of the group, whether in France or abroad.

(c) Role of the Chief Executive Officer

The Chief Executive Officer is in charge of the general management of the Company. She is granted the broadest powers to act on behalf of the Company in any circumstances in compliance with the corporate governance principles applied by the Company and except for those powers vested in the Company's general meeting or Board of Directors by applicable laws. She represents the Company vis-à-vis third parties. She is responsible for the financial information released by the Company and presents, on a regular basis, the Group's results and prospects to the shareholders and the financial market. She reports on significant events for the Group business to the Board and its Chairman.

4.1.2.2.2. Limitations of authority of the Chief Executive Officer

In accordance with the law and article 10 of the Company's articles of association, the Chief Executive Officer is vested with the broadest powers to act in all circumstances in the name of the Company, except in cases specifically provided by the law. In addition, the Board of Directors decided to limit the powers of the Chief Executive Officer for investments projects over US$100 million and all merger and acquisitions projects over US$10 million. Such expenditures shall first be submitted to the Investment Committee.

4.1.2.2.3. Chief Executive Officer

Mrs. Sophie ZURQUIYAH has been appointed to the role of CEO of the Company with effective date on April 26, 2018.

The credentials of Mrs. Sophie ZURQUIYAH are set out in the paragraph 4.1.2.1.1 of the present document.

4.1.2.3. Conflicts of interests

There is no family link between the members of the Board of Directors and the other main officers of the Company.

In the knowledge of the Company, none of the members of the Board of Directors or of the executive officers has been sentenced for fraud during the past five years. None of them has been associated, as executive officer, to bankruptcy, sequestration or liquidation process during the last five years nor had they received any offense and/or official public penalty from statutory or regulatory authorities. None of them has been prevented to act as member of a board or supervisory board of an issuer or to participate in the management of the conduct of business of an issuer during the last five years at least.

There are no potential conflicts of interests between the duties of the Directors, the Chairman of the Board and the Chief Executive Officer towards the Company and their respective private interests.

There are no service agreements entered into between the Directors, as well as the companies in which they have a position, and the Company or any of its subsidiaries.

4.1.2.4. Executive Leadership

The following table sets forth the names of members of our Executive Leadership Committee and their current positions at the date of the present document:

Mrs. Sophie ZURQUIYAH	Chief Executive Officer
Mr. Yuri BAIDOUKOV	SEVP Group Chief Financial Officer
Mr. Pascal ROUILLER	SEVP Acquisition and Equipment
Mr. Colin MURDOCH	EVP Geoscience
Mr. Dechun LIN	EVP Multi-Client
Mr. Eduardo COUTINHO	EVP Group General Counsel
Mr. Hovey COX	EVP Group Marketing & Sales and Communications
Mr. Jérôme DENIGOT	EVP Group Human Resources
Mr Emmanuel ODIN	SVP HSE-SD and Deputy to SEVP Acquisition

The Chief Executive Officer is the only executive officer (*mandataire social*) of the Company.

4.1.3. Board of Directors — Committees

4.1.3.1. Preparation and organization of the works of the Board of Directors

4.1.3.1.1. Role of the Board of Directors

Pursuant to article L.225-35 of the French Commercial Code, the Board lays down the guidelines governing the Company's activity and sees to their application. Subject to the powers explicitly assigned to the General meetings and within the limits of the business purpose, it considers any question affecting the proper operation of the Company and it settles the matters concerning it.

4.1.3.1.2. Preparation of meetings

The operating procedure of the Board is governed by internal rules and regulations (hereafter the "Internal rules and regulations of the Board of Directors") which are available on the Company's website (www.cgg.com). Their main provisions are summarized below.

Information to be provided to Directors

In preparation of every Board meeting, the Board's Secretary sends documentation to the Directors containing all useful information on each of the points appearing on the meeting agenda. This documentation is generally uploaded on the secured website of the Board of Directors and its committees to enable the Directors to review it before the meeting.

Furthermore, Directors are kept informed and consulted by the Chief Executive Officer between Board meetings about all events or operations of importance to the Company.

A draft version of press releases related to quarterly, semiannual and annual financial statements and all events or operations of importance for the Company are sent to Directors sufficiently in advance of their publication so they can transmit their comments to the general management. Other press releases are systematically sent to them at the same time they are published by the Company.

In general, the Chairman of the Board ensures that Directors are able to fulfill their duties. For this purpose, he assures that each of them receives the documents and information necessary to perform their duties.

4.1.3.1.3. Board meetings

At every meeting, the Board is informed of the evolution of the operating and financial performance of the main segments of the Group since the last meeting.

This information per segment is supplemented by a particular review of the consolidated financial situation of the Group in terms of debt, cash flow and financial resources available on a short-term basis and in the light of forecasts.

All transactions with a material impact on the strategy of the Group such as acquisitions, partnerships, disposals or strategic investments are subject to the prior authorization of the Board after the Investment Committee has issued its recommendation. The Board is regularly informed on the progress of the transaction in question.

The Board of Directors meets at least four times per year in the presence of the statutory auditors and whenever circumstances so require.

Pursuant to the Internal Rules and Regulations of the Board of Directors, Directors may participate in Board proceedings through videoconferences or telephone conferencing provided such telecommunication means permit the identification of participants and allow them to effectively participate to the meeting in the conditions set forth in article L.225-37 of the French Commercial Code.

They are in such cases counted as present for the calculation of the quorum and majority in accordance with the rules of the Board of Directors. However, pursuant to law the said procedure may not be used in connection with the following decisions:

- establishment of the annual financial statements and of the management report; and
- establishment of the consolidated financial statements and of the report on the management of the Group, if that is not included in the annual management report.

4.1.3.1.4. Rules applicable to Directors

Duty of expression

Each Director has a duty to clearly express his or her opinions and shall endeavor to convince the Board of the relevance of his or her position.

Diligence

Each Director must devote the necessary time, care and attention to his or her duties. Before accepting any new position or office, he or she must consider whether he or she will still be able to fulfil this obligation. Unless he or she is genuinely unable to do so, he or she must attend all meetings of the Board of Directors and of any committees of which he or she is a member, and all general meetings of shareholders.

Conflicts of interest

Each Director must inform the Board about any conflict of interest situation, even potential, that may involve him/her because of the duties he/she may hold in other companies.

In such a case, the Director shall abstain from attending the debate and taking part in voting on the related resolution.

4.1.3.1.5. Works of the Board of Directors

In 2018, the Board of Directors of the Company met eleven times. The average attendance rate of Directors at these meeting was 94%[8].

The table below summarizes the individual attendance rate of Directors in office at December 31, 2018:

Director	First appointment	Attendance rate to the Board meetings in 2018
Philippe SALLE*	March 8, 2018	100%
Sophie ZURQUIYAH*	April 26, 2018	100%
Michael DALY	September 30, 2015	91%
Patrice GUILLAUME	December 17, 2017	100%
Anne-France LACLIDE-DROUIN	October 31, 2017	91%
Helen LEE BOUYGUES*	March 23, 2018	88%
Colette LEWINER*	March 8, 2018	89%
Gilberte LOMBARD	May 4, 2011	100%
Heidi PETERSEN*	March 23, 2018	100%
Mario RUSCEV*	March 8, 2018	100%
Robert F. SEMMENS	December 13, 1999	100%

**Directors appointed in the course of 2018.*

Statutory, consolidated and interim financial statements – General Meetings

The Board approved the Company's annual financial statements and the 2017 consolidated annual financial statements and reviewed the interim quarterly and half-year results for fiscal year 2018 and the 2018 forecasts, the 2018-2020 outlook, and then the 2019-2021 outlook. The Board also convened the General Meeting held on April 26, 2018. The Board approved the various reports to be presented to the shareholders and the resolutions to be submitted for the shareholders' approval. The Board also prepared the answers to the written questions of the shareholders prior to said general meeting. Finally, pursuant to the provisions of Article L.225-40-1 of the French Commercial Code, the Board reviewed the related-party agreements authorized during previous fiscal years and which had remained in force in 2017.

(8) This average attendance rate covers all meetings that took place during 2018, including meetings held prior to the membership changes within the Board of Directors over the first half of 2018. Therefore, the average attendance rate for 2018 is not the sum of the attendance rates of each Director in office on December 31, 2018.

Governance

Throughout March 2018, the Board of Directors coopted five directors (Mr. Philippe SALLE and Mr. Mario RUSCEV, Mrs. Colette LEWINER, Mrs. Heidi PETERSEN and Mrs. Helen LEE-BOUYGUES) and suggested the appointment of Mrs. Sophie ZURQUIYAH as Chief Executive Officer. These ratifications were approved by the annual general meeting held on April 26, 2018.

In its meeting held on March 23, 2018, the Board of Directors has appointed Mrs. Sophie ZURQUIYAH as Chief Executive Officer with effect from April 26, 2018. The Board has appointed Mr. Philippe SALLE Chairman of the Board of Directors.

The Board reviewed the qualification of Directors as independent and the method of allocation of Directors' fees and the composition of the Board committees.

The Board of Directors acknowledged that the terms and conditions pertaining to the payment to Mr. Jean-Georges MALCOR, Chief Executive Officer until April 26, 2018, of the benefits under the defined retirement plan have been met.

The Board approved the report on the Group Policy on equal opportunity for and equal treatment of employees.

Compensation

The Board approved the compensation components for the Chairman of the Board and the Chief Executive Officer for fiscal year 2018. The Board also reviewed the method of allocation of Directors' fees for 2018 based on the envelop approved by the General meeting of April 26, 2018. The Board also reviewed the performance conditions of the stock-option plans allocated in 2014, 2015 and 2016 and allocated stock-options and performance shares to the Chief Executive Officer and certain employees of the Group.

Financial and strategic transactions

The Board of Directors acknowledged the completion of the share capital reduction in accordance with the terms and conditions of the financial restructuring plan of the Group. It launched complementary financial activities for this purpose, i.e. (i) share capital increases and (ii) share subscription warrants and approved the implementation of new financing agreements (issuance of bonds), as provided in the aforementioned plan.

Following this, the Board approved the refinancing of first lien senior secured notes issued by CGG Holding (U.S.) Inc. on February 21, 2018.

The Board approved the 2018-2020 business plan, the 2018 budget and the strategic directions of the Group for 2021.

Lastly, the Board approved the delisting of the Company's American Depositary Shares from the New York Stock Exchange and the Company change of registered office to the Group's premises in Massy (France).

Appraisal of the operation of the Board and its committees

The Board of Directors organizes an annual appraisal of its operation and of its Committees. The appraisal is carried-out by the Chairman of the Appointment and Remuneration Committee based on a questionnaire sent to all Directors.

Furthermore the internal rules and regulations of the Board of Directors provide for an appraisal of the Board of Directors performed by an outside consultant every three year. The last appraisal performed by an outside consultant took place in 2016 for fiscal year 2015 and as such, the following outside evaluation should be performed in 2019 for fiscal year 2018.

However, given the limited hindsight into our current Board of Directors due to the short term of the newly elected Board, it has been decided to postpone the normally scheduled appraisal for fiscal year 2019 in order to give the Board of Directors the benefit of a longer record of accomplishment to proceed to their appraisal.

4.1.3.2. Board Committees

The Internal Rules and Regulations of the Board of Directors also define the composition, duties and operating procedures of the Committees established by the Board, excluding the Audit Committee and the Appointment and Remuneration Committee which have their own charter of functioning since March 8, 2005 and July 30, 2008 respectively. These charters are attached to the Internal Rules and Regulations of the Board of Directors and available on the Company's website (www.cgg.com).

4.1.3.2.1. Appointment and Remuneration Committee

a) Responsibilities

The responsibilities of this Committee in terms of propositions and/or recommendations to be made to the Board of Directors relate to:

1. the compensation to be paid to the Senior Executive Officers ("*mandataires sociaux*") to be appointed from time to time, including the procedures for setting the variable part thereof and the grant of possible benefits in kind;
2. all provisions relative to the retirement of the Senior Executive Officers considered as "*mandataires sociaux*";
3. for the "*mandataires sociaux*", the deferred elements of the compensation packages (pension, severance payment) to be submitted to the General Meeting;
4. the evaluation of financial consequences on the Company's financial statements of all compensation elements for "*mandataires sociaux*";
5. the contracts between the Company and a "*mandataire social*";
6. the possible candidacies for filling Director's positions, positions as Senior Executive Officer considered as "*mandataire social*" or positions as a member of a Board Committee;

7. the periodical review of the independence of Board members;
8. the Directors' fees level and their allocation rules;
9. the realization of capital increases reserved for the employees; and
10. the installation of share compensation plans.

In addition to the responsibilities described above, this Committee is also in charge of:

1. examining compensation of the Executive Leadership Team members and its evolution;
2. carrying out performance evaluation of the Board and its Committees;
3. carrying out performance evaluation of the Chairman of the Board and the Chief Executive Officer;
4. reviewing the succession planning process of the Executive Leadership Team members; and
5. reviewing the compensation data and other related information to be publicly disclosed by the Company in its annual reports and any other reports to be issued pursuant to applicable laws and regulations.

The Committee may also consider any question submitted to it by the Chairman in connection with one of the matters mentioned above.

The work of the Committee is recorded in its minutes. The Committee reports to the Board on its proceedings after each meeting.

b) Composition

As of December 31, 2018, the members of the Committee were the following:

- Colette LEWINER (Independent Director), Chairman;
- Patrice GUILLAUME (Director representing the employees);
- Heidi PETERSEN (Independent Director);
- Robert F. SEMMENS.

The Chairman of the Board and the Chief Executive Officer are closely associated with the works of this Committee relating to the appointment of Directors.

c) Activity

In 2018, this Committee met eight times. The average meeting attendance rate was 97%[9].

The following table sets forth the individual attendance rate of the members of Directors in office at December 31, 2018 to the Appointment and Remuneration Committee meetings:

Member of the Appointment and Remuneration Committee	**Attendance rate to the Appointment and Remuneration Committee meetings in 2018**
Colette LEWINER (Independent Director) *	100%
Patrice GUILLAUME (Director representing the employees)	100%
Heidi PETERSEN (Independent Director) *	100%
Robert F. SEMMENS	100%

* *Director appointed in the course of 2018.*

During these meetings, the Committee examined, *inter alia*, (i) the appointment of the Company's Chief Executive Officer and the appointments/cooptations of new Directors prior to the annual General meeting held on April 26, 2018, (ii) the compensation of the Chairman of the Board, the compensation of the Chief Executive Officer (the "ex ante" component of the remuneration and the objectives of the Chief Executive Officer on one hand and determining the annual compensation and reviewing the level of achievement of the Chief Executive Officer's objectives for the purpose of calculating the annual variable compensation on the other hand), (iii) the compensation of the other members of the Executive Leadership Team, (iv) benchmarking the compensation of the Executive Leadership Team based on international data (v) the amount of the Directors' fees, (vi) the report on the qualification of Directors as independent prior to its submission to the Board of Directors, (vii) the paragraphs regarding the compensation of the Senior Executive Officers "*mandataires sociaux*" to be included in the annual reports pursuant to Article L.225-37-2 of the French Commercial Code (including the management report and Reference document), (viii) the 2018 bonus plans, (ix) the stock options and performance shares' plans, (x) the succession planning and (xi) the implementation of the evaluation process for the Board and the Chief Executive Officer, (xii) the acknowledgement that the terms and conditions pertaining to the payment to Mr. Jean-Georges MALCOR, Chief Executive Officer until April 26, 2018, of the benefits under the defined retirement plan have been met and (xiii) the report on the Group Policy on equal opportunity for and equal treatment of employees.

(9) *This average attendance rate covers all meetings that took place during 2018, including meetings held prior to the membership changes within the Committee on April 26, 2018. Therefore, the average attendance rate for 2018 is not the sum of the attendance rates of each Director in office on December 31, 2018.*

4.1.3.2.2. Investment Committee

a) Responsibilities

The Committee's assignments are the following:

- Review capital expenditures budget as part of the budgeting process:
  - Individual proposed and committed capital projects over US$10 million;
  - All other expenditure in aggregate, by business line;
  - Net cash exposure on capital expenditure;
  - Prior year capital expenditure results;
  - Evaluation on internal cost capitalized vs. the market rate for similar services;
- Review quarterly updates on capital expenditure budget, sustaining vs. growth, risked IRR/NPV and discuss all capital projects over US$10 million where there has been an unfavorable and material change in the risk/return of the project;
- Review all authorizations for expenditures over US$100 million and make recommendations to the Chief Executive Officer;
- Review all M&A projects of US$10 million and make recommendations to the Chief Executive Officer;

The Committee regularly invites other Directors who are interested in its work, to participate in its assignments. The Committee reports on its work to the Board of Directors.

b) Composition

As of December 31, 2018, the members of the Committee were the following:

- Robert F. SEMMENS, Chairman;
- Gilberte LOMBARD (Independent Director);
- Mario RUSCEV (Independent Director).

c) Activity

In 2018, the Committee met three times. The attendance rate of Committee members at these meetings was 100%.

Member of the Investment Committee	**Attendance rate to the Investment Committee meetings in 2018**
Robert F. SEMMENS	100%
Gilberte LOMBARD (Independent Director)	100%
Mario RUSCEV (Independent Director) *	100%

* *Director appointed in the course of 2018.*

At these meetings, the Committee reviewed and submitted regulations setting the threshold below which the Group's investments would be submitted to its review. The Committee accessed the major investments falling under its review. Lastly, the Committee reviewed the multi-client resources and competition and the investments' budgets for 2018 and 2019.

4.1.3.2.3. HSE/Sustainable Development Committee

a) Responsibilities

The Committee's assignments are the following:

- Support General Management in developing a strategic approach to Health, Safety, Security and Environment ("HSE") & Sustainable Development ("SD"). Determine the main axes for the improvement of HSE performance on an ongoing basis. Encourage, assist and counsel General Management in maintaining and improving HSE & SD performance;
- Monitor the performance of CGG's HSE & SD systems and programs, and at the Committee's discretion, recommend any changes to the Board;
- Review CGG HSE & SD performance at each regularly scheduled meeting. Benchmark CGG performance against its peers in the industry;
- Review the Group's high rated HSE & SD operational risks and the controls put in place to manage these risks. Review high impact incidents and near misses such as fatalities and High Potential Incidents ("HPIs");
- Review the Group's SD programs (principally environmental, social and ethical matters) and provide support and direction concerning the mid-term and long-term direction of CGG efforts in this area;
- Monitor the Group's compliance with applicable laws related to HSE & SD;
- Review the Group's crisis management preparedness. Monitor any major crisis and support the Board and General Management team as necessary in the event of such a crisis;
- Recommend to the Board and to General Management desirable policies and actions from its review and monitoring activity.

The Committee reports to the Board on its proceedings after each meeting, on all matters within its duties and responsibilities.

b) Composition

As of December 31, 2018, the members of the Committee were the following:

- Michael DALY (Independent Director), Chairman;
- Patrice GUILLAUME (Director representing the employees);
- Heidi PETERSEN (Independent Director);
- Mario RUSCEV (Independent Director).

c) Activity

In 2018, the Committee met three times. The attendance rate of Committee members was 100%.

Member of the HSE/Sustainable Development Committee	**Attendance rate to the HSE/SD Committee meetings in 2018**
Michael DALY (Independent Director)	100%
Patrice GUILLAUME (Director representing the employees)	100%
Heidi PETERSEN (Independent Director) *	100%
Mario RUSCEV (Independent Director) *	100%

* *Director appointed in the course of 2018.*

During these meetings, the Committee is systematically updated on the HSE performance of the Group and is presented with an overview of any operational Lost Time Incidents ("LTIs") and High Potential Incidents ("HPIs"). The root causes are discussed and enquiries made into follow up actions.

Periodically the Committee focuses on specific high rated risks, and reviews the controls and mitigations that are in place to manage them. In 2018, small boat operations, health, and in particular malaria, and aviation risks were reviewed.

The sustainability of CGG operations and the Company are considered by the committee. In 2018, the HSE-SD training framework; the sound emissions impact on marine wildlife; and the financial risks of climate change were discussed. On the latter the risk is deemed non-material for CGG, although is an issue for the oil and gas sector generally. CGG plans to continue seeking energy efficiencies from all its operations (see Chapter 3 — Sustainable development).

The Committee members provided their comments to the management on the draft of the Sustainable Development chapter of the 2018 Reference document, and the External auditor (Ernst & Young et Associés in 2018) presented to the Committee the results of their verification of the social, environmental and societal information captured in this document. The Committee was informed of regulatory changes in the way non-financial information will be reported from 2018 onwards. The Committee also supported the Company's Care & Protect awards and agreed the renewal of the programme and its objectives for 2019-2021.

4.1.3.2.4. Audit Committee

a) Responsibilities

Pursuant to its charter, the Audit Committee is responsible for assisting the Board of Directors and, as such for preparing its assignments.

The Audit Committee shall report regularly on its duties and responsibilities to the Board of Directors. The Committee also reports on the audit process of the financial statements, on how such process contributed to the integrity of the financial statements and the role the Committee played in such process. The Committee is required to immediately inform the Board of any difficulty encountered in the process.

In this scope, the Committee is specifically in charge of:

- Assignments relating to accounts and financial information:

  In accordance with the provisions of Article L.823-19 of the French Commercial Code, the Audit Committee is in charge of monitoring the financial reporting process and shall make any relevant recommendation in order to ensure its integrity, including:

  » Reviewing and discussing with General Management and the statutory auditors the following items:

  — the consistency and appropriateness of the accounting methods adopted for establishment of the corporate and consolidated financial statements;

  — the consolidation perimeter;

  — the draft annual and consolidated accounts, semi-annual and quarterly consolidated financial statements along with their notes, and especially off-balance sheet arrangements;

  — the quality, comprehensiveness, accuracy and sincerity of the financial statements of the Group;

  » Hearing the statutory auditors report on their review, including any comments and suggestions they may have made in the scope of their audit;

  » Examining the draft press releases related to the Group financial results and proposing any modifications deemed necessary;

  » Reviewing the "Reference document" and the annual report;

  » Raising any financial and accounting question that appears important to it.

- Assignments relating to risk management and internal control:

  In accordance with the provisions of Article L.823-19 of the French Commercial Code, the Audit Committee shall monitor the effectiveness of the Company's internal control and risk management systems, and, if need be, of internal audit systems, in relation to the preparation and treatment of accounting and financial information, without prejudicing internal audit's independence.

In connection therewith, the Committee's responsibilities include:

» Reviewing with the General Management (i) the Company's policy on risk management, (ii) the analysis made by the Company of its major risks (risk mapping) and (iii) the programs put in place to monitor them;

» Reviewing with the General Management (i) the role and responsibilities with respect to internal control; (ii) the principles and rules of internal control defined by the Company on its general internal control environment (governance, ethics, delegation of authority, information systems…) and on the key processes (treasury, purchase, closing of the accounts, fixed assets…), (iii) the internal control quality as perceived by the Company and (iv) significant deficiencies, if any, identified by the Company or reported by the external auditors (Article L.823-16 of the French Commercial Code) as well as the corrective actions put into place.

- Assignments relating to internal audit:

  » reviewing with General Management and the Group Internal Audit Director:

    — the organization and operation of the internal audit;

    — the activities and in particular the missions proposed in the scope of the internal audit plan approved by management and presented to the Committee;

    — results of internal audit reviews.

- Assignments relating to external audit:

  » reviewing with the statutory auditors their annual audit plan;

  » hearing, if necessary, the statutory auditors without General Management being present;

  » monitoring the procedure for selection of the auditors and issuing a recommendation to the Board of Directors on the statutory auditors whose appointment or renewal is to be submitted to the General Meeting. Such recommendation is to be prepared in accordance with Section 16 of Regulation (EU) n° 537/2014 (the "Regulation"); the Audit Committee is also responsible for issuing a recommendation when the renewal of the auditors is contemplated under the conditions set forth in Article L.823-3-1 of the French Commercial Code;

  » monitoring the auditors' compliance with the independence conditions defined in Article L.822-9 to L.822-16 of the French Commercial Code and take any measures necessary to the application of paragraph 3 of Section 4[1] of Regulation (EU) n°537/2014 and make sure that the conditions set forth in Section 6 of the Regulation are complied with;

  » following the way the auditors fulfill their mission and take into account the statements and conclusions issued by the *Haut conseil du commissariat aux comptes* as a result of their review pursuant to Article L.821-9 et seq. of the French Commercial Code;

  » approving the supply of non-audit services referred to in Article L.822-11-2 of the French Commercial Code, pursuant to the policy prepared by the Audit Committee and ratified by the Board of Directors;

  » discussing, possibly individually the audit work with the statutory auditors and General Management and reviewing regularly with management the auditors' fees. Within the framework of a procedure that it determines annually, the Committee has sole authority to authorize performance by the auditors and/or by the members of their network of services not directly relating to their auditing mission.

- Other assignements:

  » reviewing with management and, when appropriate, the external auditors the transactions binding directly or indirectly the Company and its Executive Officers;

  » handling, anonymously, any feedback relating to possible internal control problem or any problems of an accounting or financial nature.

Finally, the General Management of the Company must report any suspected fraud of a significant amount to the Committee so that the Committee may proceed with any investigation that it deems appropriate.

The following persons attend the Committee meetings: the Chairman of the Board of Directors, the Chief Executive Officer, the SEVP Chief Financial Officer, the relevant members of the Executive Leadership Team, the SVP Group Chief Accounting Officer, the auditors, the Group Internal Audit Director who presents an update on significant missions at least twice a year.

The Audit Committee usually meets before each meeting of the Board of Directors. For practical reasons, meetings of the Audit Committee are held in general on the eve of the Board of Directors. In order that this constraint does not prevent the proper functioning of the Committee, the Chairman of the Board and the Chief Executive Officer ensure that the members of the Committee receive the necessary documents and information sufficiently in advance in order to have sufficient time to be able to review the accounts.

(1) *When the total fees received from a public-interest entity in each of the last three consecutive financial years are more than 15% of the total fees received by the statutory auditor or the audit firm or, where applicable, by the group auditor carrying out the statutory audit, in each of those financial years, such a statutory auditor or audit firm or, as the case may be, group auditor, shall disclose that fact to the audit committee and discuss with the audit committee the threats to their independence and the safeguards applied to mitigate those threats. The audit committee shall consider whether the audit engagement should be subject to an engagement quality control review by another statutory auditor or audit firm prior to the issuance of the audit report.*

Minutes of each meeting are taken. Furthermore, the Chairman of the Committee reports on its work at every Board of Directors' meeting. This report is recorded in the minutes of the Board of Directors' meeting.

b) Composition

As December 31, 2018, the members of the Committee were the following:

- Gilberte LOMBARD (Independent Director), Chairman;
- Anne France LACLIDE (Independent Director);
- Helen LEE BOUYGUES (Independent Director).

Mrs. Gilberte LOMBARD qualifies as independent members of the Committee with specific competences in financial and accounting matters pursuant to Article L.823-19 of the French Commercial Code.

Mrs. Gilberte LOMBARD developed an extensive financial and accounting expertise through the various financial responsibilities she has held within the HSBC Group (previously Crédit Commercial de France), where she spent her career. After the privatization of Credit Commercial de France (1987), she was the Investor Relations Officer, in charge of the relation with financial analysts and institutional investors, and coordinated the information policy vis-a-vis the shareholders of the bank: major shareholders as well as individual shareholders. After Credit Commercial de France had been taken over by HSBC (2000), she was appointed as head of the financial transactions (Directeur des Opérations Financières) in charge of structuring and implementing sales, acquisitions, mergers for HSBC and managing HSBC industrial and financial portfolio. As part of her assignments, she was appointed as member of the Board and the Audit Committee of several companies of the HSBC group in France. In 1990, she was also appointed secretary of the Board and was in charge, in particular, of the relations with the main shareholders of the bank.

Thanks to her experience, Mrs. Gilberte LOMBARD is therefore very familiar with the financial and accounting specificities of our industrial sector and those linked to our international activities.

In compliance with the provisions of the AFEP-MEDEF Code, two thirds of the Committee is composed of independent Directors.

c) Activity

In 2018, the Committee met nine times with an average attendance rate of Committee members of 100%.

Members of the Audit Committee	**Attendance rate to the Audit Committee meetings in 2018**
Gilberte LOMBARD (Independent Director)	100%
Anne-France LACLIDE-DROUIN (Independent Director)	100%
Helen LEE BOUYGUES(Independent Director) *	100%

* *Director appointed in the course of 2018.*

During these meetings, the Committee reviewed draft versions of the annual consolidated financial statements for 2017 (and in particular the impairment tests, the accounting classification of the financial debt of the Group as current liabilities and the memo relating to the going concern), the statutory financial statements for 2017 and the 2018 half-year statutory financial statements and the consolidated financial statements for the first quarter, the first semester and the third quarter of 2018. It also reviewed the 2018 forecasts. The Committee also provided to the Board its recommendations concerning these financial statements. The Committee reviewed the 2017 annual report on Form 20-F and the Reference document. It reviewed in details the implementation of IFRS 15 and the specific communication procedures adopted by the seismic industry concerning the revenue recognition for multi-client prefunded surveys. The Committee also reviewed the implementation of IFRS 16.

The Committee also met with the external auditors without General Management being present. During this meeting, the auditors and the Committee had an overview of the audit work performed for the closing of the 2017 financial statements. In addition, several discussions involving the external auditors, the Chairman of the Board and certain members of the Committee were held early 2018 with respect to the financial restructuring and to the going concern.

In addition, the Committee closely monitored the Group's situation with respect to cash and cash flow forecasts which was presented at each Committee's meeting. The Board was also regularly kept informed of the Group's situation with respect to debt, mid-term refinancing and Group's hedging policy. The Committee reviewed the multi-client activity, the composition of its library and the valuation of the related surveys.

Regarding the preparation of the Financial Restructuring Plan finally submitted to the approval of the creditors' committees, the French and United States Courts, and the general meeting of shareholders, the Audit committee was kept informed on a regular basis of the progress of the discussions with the various stakeholders and the options to be decided and the outcome of the various technical negotiations. In this context, special attention of the Audit committee was brought on the financial characteristics of the first lien notes to be issued in order to refinance the existing secured debt and the second lien notes to issue new money. In addition, the Audit committee was periodically kept informed on the financial costs related to the implementation of the financial restructuring to be borne by the Company.

The 2018/2017 risk mapping, before and after mitigation has been presented to the Audit Committee. In this scope, the Committee also approved and implemented the annual review plan of the main risks of the Group and of certain specific risks that it determined. In this scope, in particular, the Committee reviewed the risk related to internal and external communication, to "trade compliance", the risk related to energy transition, the compliance processes and and the monitoring of the Ethics Committee's actions. The Committee also follows the commercial consultants network of the Group on a regular basis.

The Committee also examined the work to be performed by the statutory auditors in the scope of their audit on the 2018 financial statements and approved their fee estimates for this work. The Committee reviewed the detailed report from external auditors and analyzed with high care the key audit points identified. The audit reviews are mostly focused on significant risks which may impact the financial statements. In compliance with the Committee's procedures for its prior approval of non-audit services provided by the members of our auditors' network, the Committee reviewed such services performed in 2018 and approved them as necessary. The Committee reviewed the activities of the internal audit team, which acts according to a plan established by the Executive Leadership Team and submitted to the Committee. This plan is established in light of perceived operational and financial risks with the goal of systematically reviewing the major entities of each business line on a five-year basis. It includes a review of the risks identified in the risk mapping presented to the Committee by the Enterprise risk management department.

The Committee was also kept regularly informed on the assessment of internal control procedures pursuant to Section 404 of the Sarbanes-Oxley Act and of the results thereof. The external auditors and the internal audit presented their respective conclusions.

The Committee also follows the evolution of the Group's legal perimeter and, in particular the rationalization program for the Group's legal structures. It also reviewed the tax situation of the Group.

4.2. COMPENSATION

4.2.1. Compensation of the Board of Directors

4.2.1.1. Compensation rules of the Directors

Directors' fees

Directors' fees are divided into a fixed and variable component on the basis of one-third of the basic amount for functions and two-third for presence as described hereafter.

Allocation of the basic amount

The fixed component is calculated on the basis of one share for each Director and an additional share as a Committee member. The remuneration of any Director appointed in the course of the year is calculated on a pro-rata temporis basis.

The variable component linked to the participation in committees and Board meetings is calculated on the basis of two shares for each meeting of the Board, one share for each committees or the Joint Committees, and 1.5 share for Board or Committee Chairs (this rule will apply as well to a Chairman attending a Joint Committee meeting of all committees). A Director who participates in a Board committee's meeting as a guest does not receive any fee.

Allocation of the lump sum

AUDIT COMMITTEE

In addition to the basic amount, a lump sum is allocated to the members of the Audit Committee as follows:

- €10,000 for the Chairman of the Audit Committee;
- €5,000 for each other Audit Committee member (i.e. a global amount of €20,000 on a basis of 4 members).

TRAVEL INDEMNITY

A travel indemnity is also applicable to each Director (whatever his/her nationality), seminar as follows:

- €2,000 per intercontinental travel;
- €500 per travel in the same continent.

This travel indemnity also applies for the annual Board seminar.

The gross fixed compensation earned and paid by the Company and its subsidiaries to each Director, for fiscal year 2017 and 2018, is set forth in the table hereafter.

Rules for the compensation of the Chairman of the Board of Directors, the Chief Executive Officer and the Director representing the employees

CHAIRMAN OF THE BOARD OF DIRECTORS

The Chairman of the Board of Directors receives a fixed amount of Directors' fees approved by the Board of Directors.

CHIEF EXECUTIVE OFFICER

The Chief Executive Officer, who is also a Director of the Company, does not receive Directors' fees.

DIRECTOR REPRESENTING THE EMPLOYEES

Pursuant to article 8 of the Company's articles of association, the Director representing the employees does not receive Directors' fees.

Fixed compensation

In addition to the Directors' fees, the Chairman of the Board of Directors receives a fixed compensation which amount is determined by the Board of Directors.

Stock options and performance shares

Pursuant to applicable law, Directors, except the Chief Executive Officer, are not entitled to be allocated stock options and/or performance shares of the Company.

4.2.1.2. Compensation paid for fiscal year 2018

Aggregate compensation received for fiscal year 2018

Directors as a group received aggregate compensation of €645,753.42 in February 2019 (compared to a €680,000 envelope authorized by the General Meeting held on April 26, 2018) for services provided in their capacity as Directors during fiscal year 2018.

Chairman of the Board of Director

For 2018, Mr. Remi DORVAL received a fixed amount of Director fees determined by the Board of €18,173.63 in February 2019 for services provided in its capacity as Chairman of the Board until April 26, 2018.

For 2018, Mr. Philippe SALLE received a fixed amount of Director fees determined by the Board of €52,445.39 in February 2019 for services provided in its capacity as Chairman of the Board since April 26, 2018.

Non-Executive Directors

Amounts paid to Non-Executive Directors

Name	Amount paid to CGG's Directors for fiscal year 2017	Amount paid to CGG's Directors for fiscal year 2018
Bpifrance Participations [a]		
Attendance fees	€58,356.81	€14,415.11
Other fees	n.a.	n.a.
Loren CARROLL [b]		
Attendance fees	€59,627.09	€7 391,26
Other fees	n.a.	n.a.
Michael DALY		
Attendance fees	€58,380.44	€54,725.33
Other fees	n.a.	n.a.
Patrice GUILLAUME [c]		
Attendance fees	n.a.	n.a.
Other fees	n.a.	n.a.
Didier HOUSSIN [d]		
Attendance fees	€55,519.92	16,690.64
Other fees	n.a.	n.a.
Anne-France LACLIDE-DROUIN [e]		
Attendance fees	€8,903.86	€61,017.97
Other fees	n.a.	n.a.
Helen LEE BOUYGUES [f]		
Attendance fees	n.a.	€46,425.41
Other fees	n.a.	n.a.
Agnès LEMARCHAND [g]		
Attendance fees	€45,425.68	n.a.
Other fees	n.a.	n.a.
Colette LEWINER [h]		
Attendance fees	n.a.	€42,516.00
Other fees	n.a.	n.a.
Gilberte LOMBARD		
Attendance fees	€75,253.90	€89 378,51
Other fees	n.a.	n.a.
Hilde MYRBERG [i]		
Attendance fees	€47,463.98	€8 672,86
Other fees	n.a.	n.a.
Heidi PETERSEN [j]		
Attendance fees	n.a.	€53,597.88
Other fees	n.a.	n.a.
Mario RUSCEV [k]		
Attendance fees	n.a.	€60,641.47
Other fees	n.a.	n.a.
Robert F. SEMMENS		
Attendance fees	€71,288.20	€85,579.76
Other fees	n.a.	n.a.
Kathleen SENDALL		
Attendance fees	€79,580.11	€34,077.20
Other fees	n.a.	n.a.

Table 3 of the AMF Recommendation No. 2009-16
(a) The term of office of Bpifrance Participations ended on March 23, 2018.
(b) The term of office of Mr. Loren Carroll ended on March 8, 2018.
(c) Mr. Patrice Guillaume, as a Director representing the employees, does not receive Directors' fees.
(d) The term of office of Mr. Didier Houssin ended on March 23, 2018.
(e) Mrs. Anne-France Laclide-Drouin was appointed by the General Meeting held on October 31, 2017.
(f) Mrs. Helen Lee Bouygues was coopted on March 23, 2018 in place of Bpifrance Participations.
(g) The term of office of Mrs. Agnès Lemarchand expired at the end of the General Meeting held on October 31, 2017.
(h) Mrs. Colette Lewiner was coopted on March 8, 2018 in place of Mrs. Hilde Myrberg.
(i) The term of office of Mrs. Hilde Myrberg ended on March 8, 2018.
(j) Mrs. Heidi Petersen was coopted on March 23, 2018 in place of Mr. Didier Houssin.
(k) Mr. Mario Ruscev was coopted on March 8, 2018 in place of Mr. Jean-Georges Malcor.

4.2.2. Compensation of the Senior Executive Officers

4.2.2.1. Report on the principles and criteria for determination, allocation and distribution of the fixed, variable and exceptional elements of the total remuneration and the benefits of all kinds that may be granted to the executive officers

(submitted to the Shareholders' approval pursuant to article L225-37-2 of the French Commercial Code)

This section is established in accordance with new Article L.225-37-2 of the French Commercial Code and present the principles for f the compensation policy of the Senior Officers which will be submitted to the vote of the Ordinary General Meeting convened to approve the 2018 financial statements.

As of the date of this report, the Senior Executive Officers of the Company are Mr. Philippe SALLE as Chairman of the Board of Directors and Mrs. Sophie ZURQUIYAH as Chief Executive Officer.

For the purpose of this report and according to the recommendations of the Corporate Governance Code of Listed Corporations (the "AFEP-MEDEF Code"), the term "Senior Executive Officer" refers to the Chief Executive Officer and the Corporate Officers, and the term "Senior Non Executive Officer" refers to the "Chairman of the Board of Directors".

4.2.2.1.1. Principles of the compensation policy for Senior Officers

The compensation policy for Senior Officers is determined by the Board of Directors, upon proposal from the Appointment and Remuneration Committee. This policy is regularly reviewed and discussed by the Board of Directors.

The following principles are applicable to the compensation for Senior Executive Officers and are set up according to the provisions of the AFEP-MEDEF Code, which are the following:

- **Principle of balance**: it is ensured that there is an appropriate balance between the several remuneration components and that none of these is disproportionate.
- **Principle of comparability**: the level of compensation for Senior Executive Officers is regularly reviewed against the Company's sector and comparable compensation markets on the basis of studies carried out by external specialized firms. As a result, Group practices are compliant and competitive with regards to market practices in order to ensure the retention of key Executive Officers.
- **Principle of interest alignment and link with performance:** Generally, the Board of Directors and the Appointment and Remuneration Committee pay particular attention to ensure that the applied compensation policy for the Senior Executive Officers is linked to the performance of the Company and focused on creating long-term value (quantitative criteria) and the achievement of individual objectives (qualitative criteria). As a result, the purpose of the compensation policy is to encourage the achievement of ambitious objectives through the setting of demanding strategic performance criteria whether short, medium or long-term.

The overall compensation policy for Senior Executive Officers focuses on the variable part of their compensation at risk for the beneficiary. Therefore, the compensation structure includes a significant variable part in order to align more directly the compensation of Senior Executive Officers with the Group operational strategy and the interests of shareholders, while rewarding performance. Long term incentives also represent a significant part in order to tie the remuneration of Senior Executive Officers with the shareholders' interests.

It is indeed critical in the cyclical industry of the Group to attract, motivate and retain talent and generally to provide a high level of competitiveness in the compensation packages.

4.2.2.1.2. Components of the compensation for Chairman of the Board of Directors

The Chairman of the Board of Directors receives:

- A fixed remuneration; and/or
- Director fees.

No other form of remuneration is paid to the Chairman of the Board of Directors. In particular, no annual or multi-annual variable remuneration, no stock option is paid or allocated to him.

Finally, the Chairman of the Board of Directors is entitled to the general benefits scheme applicable to all Company employees, where applicable, and to a company car. The Chairman of the Board of Directors is not entitled to any supplementary pension scheme, non-competition benefit or contract severance indemnity.

4.2.2.1.3. Components of the compensation for Senior Executive Officers

The purpose of the compensation policy for Senior Executive Officers is to reward performance measured in the short, medium or long-term. The compensation components pertain to various and consistent objectives.

A. Fixed remuneration

Pursuant to the AFEP-MEDEF Code, the compensation for Senior Executive Officers is reviewed annually by the Appointment and Remuneration Committee. However, the amount is not modified annually but may be reviewed after a relatively long period of time (every two or three years).

Any increase of the compensation must be justified and explained.

Any significant increase decided by the Board of Directors, upon proposal from the Appointment and Remuneration Committee, must be explained and must take into account market practices.

The fixed compensation is paid monthly.

B. Annual Variable Remuneration: Global Performance Incentive Plan (GPIP)

The Company has set up a short-term annual variable remuneration within the Group that benefits all employees. This policy may vary with respect to the Group's objectives and strategy. To date, the company has set up a program called the Global Performance Incentive Plan (GPIP), which is also applicable to Senior Executive Officers.

The Board of Directors and the Appointment and Remuneration Committee pay particular attention to ensure that the compensation policy for Senior Executive Officers is tied to the performance of the Company. As a result, the cyclical business and the highly volatile market in which the Company operates are reflected in the short-term variable compensation and represent a significant part of their overall remuneration.

Pursuant to the AFEP-MEDEF Code, in order to ensure that such criteria comply with the Company's short term strategy, the criteria used for determining the annual variable compensation are reviewed annually by the Board of Directors without being necessarily amended every year.

The annual variable remuneration of Senior Executive Officers is broken down into two parts:

- The first one is based on quantitative criteria;
- The second one is based on qualitative criteria.

Quantitative criteria (financial objectives) are precisely defined by the Board of Directors pursuant to the Group budget objectives. In particular and not exclusively, they may relate to: (i) free cash flow, (ii) Group external revenues, (iii) Group EBIT, (iiii) EBITDA. The Board of Directors decides the weighting assigned to each performance criteria according to the context and their significance for the Group.

Qualitative criteria (individual objectives) are precisely defined by the Board of Directors pursuant to the annual priorities for the Group. In particular and not exclusively, they may relate to: (i) the Group governance, (ii) relations with major customers, relations with shareholders and financial community, (iii) promotion and development in the industry, (iiii) Group operational performance, (iiiii) human resources (iiiii) Corporate Social Responsibility and Sustainable Development.

The Board of Directors decides on the weighting assigned to each criterion according to the context and its significance for the Group.

The amount of the target annual short-term variable compensation (when 100 % of the quantitative and qualitative criteria are achieved) for Senior Executive Officers is expressed as a percentage of the fixed compensation.

Finally, in order to incentivize for overachievement, the short-term variable compensation scheme allows for the payment of amounts exceeding the target compensation set for:

- quantitative criteria (financial objectives); and / or
- qualitative criteria (individual objectives).

The variable part of the compensation for a given financial year is determined by the Board of Directors approving the accounts for the previous year. It shall be paid within one month following the validation of this payment by the General Meeting ruling on the accounts of the previous year.

The level of achievement for each criterion is precisely determined by the Board of Directors but is not disclosed for confidentiality reasons.

The target objectives are not disclosed for confidentiality reasons.

The indicators are set annually by the Board of Directors for Senior Executive Officers and are passed on to all Group employees in order to ensure a consistency between the amounts of variable compensation paid to Senior Executive Officers, executive managers and more broadly, Group employees.

C. Multi-annual variable remuneration

The Board of Directors has decided not to use a long-term variable compensation mechanism to be paid in cash, preferring to align Senior Executive Officers with the interests of shareholders by giving priority to equity schemes.

However, it is specified that this type of remuneration could be considered in the event of regulatory changes or circumstances that would make the use of equity schemes restraining or impossible. In this case, the principles and criteria described for share-based schemes will be used to structure such multi-annual compensation by adapting the terms and conditions in order to make them similar.

D. Long term remuneration

The Board of Directors, upon proposal from the Appointment and Remuneration Committee and with the authorization of the General Meeting, grants long-term compensation to Senior Executive Officers in the form of stock options, performance shares within the framework of section L225-197-2 of the French Commercial Code or any other scheme tied to the increase in the share price.

The purpose of this mechanism is in particular to retain Senior Executive Officers and to promote the alignment of their interest with the Group's social interest and the shareholders' interest. Such scheme are not reserved to Senior Executive Officers and may benefit employees who have contributed to performance or show a strong potential for evolution within the Group.

In principle, the grants are carried out annually during the first semester of the following fiscal year. No discount is applied on allocation date and vesting of the options is closely tied to the fulfilment of performance conditions.

The implementation of these schemes is subject to demanding performance conditions for Senior Executive officers. Thus, Mrs. Sophie ZURQUIYAH is entitled to a stock option scheme subject to the fulfilment of performance conditions for the years 2019, 2020, 2021 and 2022, with the possibility of acquiring 25% of the options granted each year.

The implementation of this scheme departs from the conditions set out in the AFEP/MEDEF Code since Mrs. Sophie ZURQUIYAH may acquire 25% of the options granted at the end of the first year.

This departure is explained by the fact that CGG does not have any other long-term compensation scheme and must, in view of the specific context encountered, have an element associating the Senior Executive Officers with the evolution of the share price from the first financial year of activity.

In accordance with the provisions of the AFEP/MEDEF Code, under exceptional circumstances, the performance conditions may be modified during the period in question. In this case, these amendments shall be made public after the meeting of the Board of Directors that approved of them. The change in performance conditions must maintain the alignment of the interests of shareholders and beneficiaries.

In the event of the departure of Senior Executive Officers before the expiry of the fixed period for the assessment of the performance conditions, the Board of Directors will decide whether to maintain all or part of the long-term compensation benefit.

E. Director Fees

Senior Executive Officers that would also be Director do not receive any Director fees.

F. Exceptional compensation

No exceptional compensation can be allocated to Senior Executive Officers by the Board of Directors unless it is expressly justified by an exceptional situation.

It is specified that these elements must be submitted to the approval of the Ordinary General Meeting called to approve the accounts for the previous financial year.

G. Supplemental pension schemes

i. Defined benefit scheme (Article 39 of the French Tax Code)

In order to enable the Group's senior executives to supplement the level of pension provided by the French mandatory schemes, a supplementary defined-benefit pension scheme under Article L. 137-11 of the Social Security Code has been set up. This scheme has been closed to new beneficiaries since July 1, 2014.

Mr. Jean-Georges MALCOR benefited from this scheme on the occasion of his retirement on September 30, 2018.

However, current and future Senior Executive Officers are not entitled to this pension scheme.

ii. Defined contribution scheme (Article 83 of the French Tax Code)

Senior Executive Officers have been entitled to the defined contribution scheme applicable to Group's Senior Executives since January 1, 2005.

The annuities served under this additional scheme are deducted from the amount of annuities to be paid under the defined benefit pension scheme described above if any.

It is capped as follows and is calculated in accordance with the French Social Security Cap (PASS):

- "Band A" — up to 100% of PASS : 0.5% for the employee contribution and 1% for the employer contribution;
- "Band B" — beyond 100% of PASS and up to 400% of PASS : 2% for the employee contribution and 3% for the employer contribution;
- "Band C" — beyond 400% of PASS and up to 800% of PASS: 3.5% for the employee contribution and 5% for the employer contribution.

The contribution is based on the gross annual compensation of a given year exclusively: base salary, annual variable compensation and benefit in kind (i.e. company car). As a matter of principle, this basis excludes any other component of the compensation.

iii. Alternative pension scheme

As the defined benefit plan is closed to new beneficiaries, the Board of Directors may decide to set up an alternative pension scheme for Senior Executive Officers.

Pursuant to the Article L. 225-42-1 of the French Commercial Code, this system would be subject to the fulfilment of demanding performance conditions defined by the Board of Directors.

H. Individual insurance covering employment termination

As the Chief Executive Officer or any other Senior Executive Officer do not benefit from an employment contract are not subject to the statutory legislation relating to individual insurance coverage for employment termination, the Board of Directors may authorize, in accordance with the procedures applicable to related party agreements and provided for in Articles L. 225-38 et seq. of the French Commercial Code, the conclusion of a specific insurance covering employment termination to their benefit.

I. Other collective benefits

i. General benefits scheme

Senior Executive Officers may be entitled to the general benefits scheme applicable to all employees of the Group.

ii. Benefits in kind

Senior Executive Officers may be entitled to a company car.

J. Severance pay

Senior Executive Officers may be entitled to a contractual indemnity in case of departure from the Group, whose terms and conditions are set by the Board of Directors upon proposal from the Appointment and Remuneration Committee and in compliance with Article L. 225-42-1 of the French Commercial Code.

The contractual termination indemnity is exclusively payable in case of revocation (in the absence of serious or gross misconduct), non-renewal of his or her term in office, or any other form of forced departure relating to a change of control. The amount of such indemnity is equal to the difference between (i) a gross amount of 200% of the reference annual compensation for the Senior Executive Officer and (ii) any sum to which the Senior Executive Officer may be entitled to as a result of his or her departure from the Group, including any sums to be paid further to the application of his or her non-competition commitment. The overall indemnity amount shall not exceed 200% of the reference annual compensation.

Pursuant to Article L. 225-42-1 of the French Commercial Code, payment of the contractual termination indemnity is subject to the fulfilment of demanding performance conditions set by the Board of Directors.

The payment terms and the assessment of performance conditions are compliant with the recommendations of the AFEP-MEDEF Code.

Finally, pursuant to said Article L.225-42-1 of the French Commercial Code, the Board of Directors shall verify prior to the payment of the contractual termination indemnity (i) that the performance conditions set by the Board of Directors are duly fulfilled and (ii) that the payment of such contractual termination indemnity complies with the AFEP-MEDEF Code applicable at the date of departure.

K. Non-compete agreement

In order to protect the Group's interests in case of departure of certain executive managers including Senior Executive Officers, the Company provides for non-compete provisions.

This agreement applies to any geophysical data acquisition, processing, interpretation services, or the provision of equipment or products designed for the acquisition, processing or interpretation of geophysical data. Such agreement applies also to the contribution of projects or activities in the same field as those in which the interested party was involved within the Group.

In return for this non-compete agreement during the period defined in the agreement, Senior Executive Officers are entitled to receiving a compensation corresponding to a percentage of their annual reference remuneration as defined in their protection letter related to payment of the contractual indemnity in case of termination of their office. The company determines these elements in compliance with the recommendations of the AFEP-MEDEF Code and provides for a stipulation authorizing the Board of Directors to waive the implementation of the clause upon the beneficiary's departure.

The recommendations of the AFEP-MEDEF Code relating to non-compete agreements were revised in June 2018 and require, in particular, for a payment in instalments of the indemnity and the absence of payment when the Senior Executive Officer claims his or her pension entitlements and, in any event, beyond the age of 65.

Insofar as Mrs. Sophie ZURQUIYAH's non-competition agreement entered into force prior to the revision of the AFEP-MEDEF Code, the Board of Directors will implement these new recommendations at the next renewal of her term in office or a new appointment.

L. Benefits for taking up a position

Benefits for taking up a position may only be granted by the Board of Directors to a new Senior Executive Officer who has come from a company outside of the Group, in accordance with the AFEP-MEDEF Code. Such indemnity, which may take different forms, is intended to compensate for the loss of benefits previously received by the Senior Executive Officer. Payment of this benefit must be duly justified.

M. Draft resolutions proposed by the Board of Directors in accordance with article L.225-37-2 of the Code of Commerce

Fifteenth resolution

(Approval of the principles and criteria of determination, distribution and allocation of the fixed, variable and exceptional elements of the global compensation structure, and of all benefits of any kind granted to the Chairman of the Board of Directors for the 2019 financial year)

Voting under the conditions of quorum and of majority required for ordinary general meetings, in accordance with article L.225-37-2 of the French Commercial Code, the General Meeting approves the principles and the criteria of determination, distribution and allocation of the fixed, variable and exceptional components of the global compensation structure and of all benefits of any kind granted to the Chairman of the Board of Directors for the 2019 financial year, as described in the Report on Corporate Governance prepared in accordance with article L.225-37 of the French Commercial Code included in the Reference Document.

Sixteenth resolution

(Approval of the principles and criteria of determination, distribution and allocation of the fixed, variable and exceptional elements of the global compensation structure, and of all benefits of any kind granted to the Chief Executive Officer for the 2019 financial year)

Voting under the conditions of quorum and of majority required for ordinary general meetings, in accordance with article L.225-37-2 of the French Commercial Code, the General Meeting approves the principles and the criteria of determination, distribution and allocation of the fixed, variable and exceptional components of the global compensation structure and of all benefits of any kind granted to the Chief Executive Officer for the 2019 financial year, as described in the Report on Corporate Governance prepared in accordance with article L.225-37 of the French Commercial Code included in the Reference Document.

4.2.2.2. Summary table

Summary table of the compensation granted to each Senior Executive Officer

	2017	2018
Remi DORVAL, Chairman of the Board of Directors until April 26, 2018		
TOTAL COMPENSATION OVER THE YEAR (see details in 4.2.2.3.1 of the present document)	**€170,310.00**	**€54,984.63**
Valuation of the multi-annual bonus plan granted over the year (*)	n.a.	n.a.
Valuation of stock-options granted over the year (see details in 4.2.2.3.2 of the present document) (*)	n.a.	n.a.
Valuation of the performance shares granted over the year (see details in 4.2.2.3.3 of the present document) (*)	n.a.	n.a.
TOTAL OF THE POTENTIAL RIGHTS TO DEFERRED COMPENSATION SUBJECT TO FUTURE RESULTS OF THE COMPANY	**n.a.**	**n.a.**
Philippe SALLE, Chairman of the Board of Directors since April 26, 2018		
TOTAL COMPENSATION OVER THE YEAR (see details in 4.2.2.3.1 of the present document)	**n.a.**	**€168,142.39**
Valuation of the multi-annual bonus plan granted over the year (*)	n.a.	n.a.
Valuation of stock-options granted over the year (see details in 4.2.2.3.2 of the present document) (*)	n.a.	n.a.
Valuation of the performance shares granted over the year (see details in 4.2.2.3.3 of the present document) (*)	n.a.	n.a.
TOTAL OF THE POTENTIAL RIGHTS TO DEFERRED COMPENSATION SUBJECT TO FUTURE RESULTS OF THE COMPANY	**n.a.**	**n.a.**
Jean-Georges MALCOR, Chief Executive Officer until April 26, 2018		
TOTAL COMPENSATION OVER THE YEAR (see details in 4.2.2.3.1 of the present document)	**€1,556,765.00**	**€2,372,231.00**
Valuation of the multi-annual bonus plan granted over the year (*)	n.a.	n.a.
Valuation of stock-options granted over the year (see details in 4.2.2.3.2 of the present document) (*)	n.a.	n.a.
Valuation of the performance shares granted over the year (see details in 4.2.2.3.3 of the present document) (*)	n.a.	n.a.
TOTAL OF THE POTENTIAL RIGHTS TO DEFERRED COMPENSATION SUBJECT TO FUTURE RESULTS OF THE COMPANY	**n.a.**	**n.a.**
Sophie ZURQUIYAH, Chief Executive Officer since April 26, 2018		
TOTAL COMPENSATION OVER THE YEAR (see details in 4.2.2.3.1 of the present document)	**n.a.**	**€1,315,097.00**
Valuation of the multi-annual bonus plan granted over the year (*)	n.a.	n.a.
Valuation of stock-options granted over the year (see details in 4.2.2.3.2 of the present document) (*)	n.a.	€491,669,00
Valuation of the performance shares granted over the year (see details in 4.2.2.3.3 of the present document) (*)	n.a.	€297,955,00
TOTAL OF THE POTENTIAL RIGHTS TO DEFERRED COMPENSATION SUBJECT TO FUTURE RESULTS OF THE COMPANY	**n.a.**	**€789,624,00**

Table 1 of the Recommendation No 2009-16 of the AMF.

(*) The Company considers that these elements are not cumulative with the other elements due for the year, and therefore the total here above mentioned does not represent the actual compensation received within the year. The final grant of these compensation components are, on one hand, submitted to fulfilment of performance conditions (therefore, there could be no allocation if the performance conditions are not met) and, on the other hand, the valuation of the multi-annual bonus plan in the form of performance units, stock-options and performance shares at the fair value as of the date of the allocation does not correspond to a compensation received by the beneficiaries in the course of the year of the allocation.

The valuation of the options pursuant to the method used to prepare the consolidated financial statements does not necessarily correspond to the actual value that the beneficiary could derive from the exercise of the options. The exercise of the options is subject to the fulfillment of certain performance conditions and supposes a subscription price lower than the stock market price (as of the date of this document, the subscription price of all plans is above the stock market price). Moreover, the gain before tax that a stock option beneficiary may derive from the option exercise depends upon the share market price on the exercise date. This gain could be nil if, during the duration of the plan, the exercise price remains above the share market price.

4.2.2.3. Compensation of the Senior Executive Officers for 2017 and 2018

(in accordance with the provisions of Article L. 225-102-1 of the French Commercial Code)

4.2.2.3.1. Fixed and variable compensation of the Chairman of the Board of Directors and the Chief Executive Officer for 2017 and 2018

A. Compensation of Mr. Remi DORVAL, Chairman of the Board of Directors until April 26, 2018

The gross fixed compensation earned by and paid by the Company and its subsidiaries to Mr. Remi DORVAL, Chairman of the Board of Directors, for fiscal years 2017 and 2018, is set forth in the table below.

For fiscal year 2017, Mr. Remi DORVAL benefited, as Chairman of the Board of Directors, of a fixed amount of Directors' fees, set at €57,200 per year, and a fixed compensation set at €115,000 per year, to which the actual amount borne by the Company with respect to his company car has been deducted. This benefit in kind (company car), for fiscal year 2017, amounted to €3,360.

For fiscal year 2018, Mr. Remi DORVAL's compensation components remained unchanged and was paid prorate temporis for his term of office. His compensation consisted of a fixed amount of Directors' fees, set at €57,200 per year, and a fixed compensation set at €115,000 per year, to which the actual amount borne by the Company with respect to his company car has been deducted. This benefit in kind (company car) amounted to €3,360 per year, and was calculated on a prorata basis for 2018.

Summary table of the compensation of Mr. Remi Dorval, Chairman of the Board of Directors until April 26, 2018

	2017		2018	
Remi DORVAL	**Amounts earned**	**Amounts paid**	**Amounts earned**	**Amounts paid**
Chairman of the Board of Directors until April 26, 2018				
Fixed compensation	€109,705.00	€109,705.00	€35,710.00	€35,710.00
Annual variable compensation	n.a.	n.a.	n.a.	n.a.
Multi-annual variable compensation	n.a.	n.a.	n.a.	n.a.
Exceptional compensation	n.a.	n.a.	n.a.	n.a.
Director's fees	€57,200.00 [a]	€57,700.00 [b] [c]	€18,178.63 [d]	€57,200.00
Benefits in kind	€3,360.00	€3,360.00	€1,096.00	€1,096.00
TOTAL	**€170,310.00**	**€170,810.00**	**€54,984.63**	**€94,006.00**

Table 2 of the AMF Recommendation No. 2009-16.

(a) Paid in March 2018 for fiscal year 2017.

(b) Including a €500.00 travel indemnity pursuant to the compensation rules of the Directors described in the paragraph 4.2.1.1 of the present document.

(c) Paid in February 2017 for fiscal year 2016.

(d) Paid in February 2019 for fiscal year 2018.

B. Compensation of Mr. Philippe SALLE, Chairman of the Board of Directors since April 26, 2018

The gross fixed compensation earned by and paid by the Company and its subsidiaries to Mr. Philippe SALLE, Chairman of the Board of Directors, for fiscal year 2018, is set forth in the table below. It is recalled that Mr. SALLE was appointed Chairman of the Board of Directors on April 26, 2018.

For fiscal year 2018, the compensation of Mr. Philippe SALLE consisted in a fixed amount of Directors' fees, set at €70,000 per year, and a fixed remuneration set at €170,000 per year.

Summary table of the compensation of Mr. Philippe SALLE, Chairman of the Board of Directors since April 26, 2018

	2018	
Philippe SALLE	**Amounts earned**	**Amounts paid**
Chairman of the Board of Directors since April 26, 2018		
Fixed compensation	€115,697.00	€115,697.00
Annual variable compensation	n.a	n.a.
Multi-annual variable compensation	n.a	n.a.
Exceptional compensation	n.a.	n.a.
Director's fees	€52,445.39 [a]	n.a.
Benefits in kind	n.a.	n.a.
TOTAL	**€168,142.39**	**€115,697.00**

Table 2 of the AMF Recommendation AMF No. 2009-16.
(a) Paid in February 2019 for fiscal year 2018.

C. Compensation of Mr. Jean-Georges MALCOR, Chief Executive Officer until April 26, 2018

The gross fixed and variable compensations paid by the Company and its subsidiaries to Mr. Jean-Georges MALCOR in fiscal years 2017 and 2018 are set forth hereinafter.

For fiscal year 2017, the Board of Directors determined the variable compensation of Mr. MALCOR during its meeting held on April 6, 2017.

The variable compensation of Mr. Jean-Georges MALCOR, as Chief Executive Officer of the Company, is based on qualitative criteria (or individual objectives), weighting for one third of the variable compensation's amount, as well as quantitative criteria (or financial objectives), weighting for two third of the variable compensation's amount. The target amount is set at 100% of Mr. MALCOR's fixed compensation. If the targets are exceeded, the allocation's criteria for the annual variable compensation's part could take into account:

- For quantitative criteria (or financial objectives): up to 133.3% of the fixed compensation; and
- For qualitative criteria (or individual objectives): up to 66.6% of the fixed compensation.

The variable compensation comprised:

- Quantitative criteria (or financial objectives) based on the achievement of budget objectives: Group free cash flow (25% weighting), Group external revenues (25% weighting), Group operating income (25% weighting), and EBITDAS minus tangible and intangible investments made in the course of the fiscal year (25% weighting);
- Qualitative criteria (or individual objectives) were focused on (i) the financial restructuring plan and, in particular, its negotiation with all stakeholders, the implementation of the legal proceedings in France and in the U.S. as well as the approval of the plan by the extraordinary shareholders' meeting — this objective included also the restructuring of our financial obligations un the Nordic credit facility; and (ii) the budgets' monitoring, our operational performance, ensuring cohesion and motivation of our employees (clients satisfaction, monitoring of the HSE/SD objectives, regular communication internally for our employees and externally for our clients and state governments).

The level of achievement for each objective was determined by the Board of Directors but is not disclosed for confidentiality reasons.

In 2017, Mr. Jean-Georges MALCOR's objectives were achieved at 145%; this global achievement rate was applied on the target amount of his variable compensation.

For fiscal year 2018, Mr. Jean-Georges MALCOR's compensation structure for its role as Chief Executive Officer, was determined by the Board of Directors in its meeting held on December 1, 2017 and following the recommendations made by the Appointment and Remuneration Committee. It was composed as follows:

- A fixed gross monthly compensation of €52,500, unchanged from his 2017 fixed compensation;
- No annual variable compensation subject to the achievement of qualitative objectives and quantitative objectives will be attributed to him;
- A gross fixed exceptional compensation of €75,000 that was conditional, upon the final completion andunder certain

conditions, of all the financial securities issuance operations allowing for the implementation of the Group's debt restructuring; and

- An additional exceptional compensation payment conditional upon the final completion, under certain conditions, of a refinancing of the debt, amount to €75,000, which could be increased to €175,000 should such refinancing occur on or prior to February 21, 2018. The refinancing did not occur on or prior to February 21, 2018, as a consequence, no compensation is due in this respect.

The Board of Directors, in its meeting dated December 1, 2017, authorized, in accordance with Article L.225-38 and, as appropriate, Article L.225-42-1 of the French Commercial Code, the conclusion of an employment contract with him in order to allow his continued collaboration with the Company as "Senior Advisor" until October 1, 2018. Under this employment contract, he earned a gross fixed monthly compensation of €52,500 between April 26, 2018 and September 30, 2018. Mr. Jean-Georges MALCOR continued to benefit from his company car (benefits in kind) until his retirement on September 30, 2018.

On the same day, the Board of Directors also confirmed that Mr. Jean-Georges MALCOR would continue to benefit from the performance units set up in June 2015 and 2016, according to unchanged performance conditions and from the stock options granted to him by the Board of Directors and remaining outstanding, also in accordance with unchanged acquisition conditions.

Mr. Jean-Georges MALCOR remains subject to the non-compete commitment authorized by the Board of Directors on December 1, 2017 in the event of the conclusion of an employment agreement. Such commitement was set for a period of 24 months in return for an indemnity equal to 16/12th of his annual reference compensation, corresponding to the amount of (i) any gross fixed compensation received within the Group during the last 12 months and (ii) the annual average of the variable compensation due for the last 3 years.

Finally, over this period, Mr. Jean-Georges MALCOR continued to benefit from the supplementary defined benefit pension scheme in effect within the Group for certain members of the Executive Committee and whose extension to Mr. Jean-Georges MALCOR was authorized by the Board of Directors during its meeting of June 30, 2010.

Summary table of the compensation of Mr. Jean-Georges MALCOR, Chief Executive officer until April 26, 2018

	2017		2018	
Jean-Georges MALCOR	**Amounts earned**	**Amounts paid**	**Amounts earned**	**Amounts paid**
Chief Executive Officer until April 26, 2018				
Fixed Compensation	€630,000.00	€630,000.00	€472,500.00	€472,500.00
Annual variable compensation	€914,885.00	€384,216.00 (a)	n.a. (b)	€914,885.00 (c)
Multi-annual variable compensation *	n.a.	n.a.	n.a.	n.a.
Exceptional compensation	n.a.	n.a.	€75,000.00 (d)	n.a.
Non-compete benefit	n.a.	n.a.	1,626,673.00 (e)	€1,626,673.00 (e)
Director fees	n.a.	n.a.	n.a.	n.a.
Benefits in kind	€11,880.00	€11,880.00	€8,910.00	€8,910.00
Contractual pension benefits	n.a.	n.a.	€167,344.00 (f)	€167,344.00 (f)
Other statutory benefits	n.a.	n.a.	€21,804.00 (g)	€21,804.00 (g)
TOTAL	**€1,556,765.00**	**€1,026,096.00**	**€2,372,231.00**	**€3,212,116.00**

Table 2 of the AMF Recommendation No. 2009-16.

(a) Paid in March 2017 for fiscal year 2016.

(b) The Board of Directors, in its meeting held on December 1, 2017 and approving the conditions relating to the end of Mr. Jean-Georges MALCOR's term as Chief Executive Officer, resolved that no annual variable compensation subject to the achievement of qualitative objectives and quantifiable objectives will be attributed to him.

(c) Paid in May 2018 for fiscal year 2017. This payment was approved by the Combined General Meeting held on April 26, 2018, pursuant to article L. 225-100 of the French Commercial Code.

(d) This exceptional compensation is due to Mr. Jean-Georges MALCOR pursuant to the decision from the Board of Directors in its meeting held on December 1, 2017 and approving the conditions relating to the end of Mr. Jean-Georges MALCOR's term as Chief Executive Officer. Payment of this compensation will be submitted for approval to the General Meeting convened to approve 2018 financial statements, in application of Article L.225-100 of the French Commercial Code.

(e) This non-compete benefit is due to Mr. Jean-Georges MALCOR pursuant to the resolutions of the Board of Directors in its meeting held on December 1, 2017 and approving the conditions relating to the end of Mr. Jean-Georges MALCOR's term of office. This benefit was paid at the departure of Mr. Jean-Georges MALCOR from the Group on September 30, 2018.

(f) Mr. Jean-Georges MALCOR liquidited his pension on September 30, 2018.

(g) Accrual of paid holiday in connection with his employment contract with CGG SA.

** No multi-annual variable compensation scheme was implemented in 2017 and 2018.*

The term of office of Mr. Jean-Georges MALCOR as Chief Executive Officer expired on April 26, 2018.

C. Compensation of Mrs. Sophie ZURQUIYAH, Chief Executive Officer since April 26, 2018

The gross fixed and variable compensations paid by the Company and its subsidiaries to Mrs. Sophie ZURQUIYAH in fiscal years 2018 are set forth hereinafter.

The variable part of the Chief Executive Officer's compensation is based on qualitative criteria (individual objectives), accounting for a third of the variable compensation, and quantitative criteria (financial objectives), accounting for two-thirds of the variable compensation. Her target amount was set at 100% of her fixed compensation. Lastly, in case of overachievement, the allocation of short-term variable incentive compensation may involve:

- Quantitative criteria (financial objectives), and/or
- Qualitative criteria (individual objectives).

For fiscal year 2018, Mrs. Sophie ZURQUIYAH's compensation structure for her role as Chief Executive Officer, was determined by the Board of Directors in its meeting held on April 26, 2018. It was composed as follows:

- Quantitative criteria (financial objectives), based on the achievement of budget objectives: Group free cash flow (25% weighting), Group external revenues (25% weighting), Group operating income (25% weighting), and EBITDA (25% weighting);
- Qualitative criteria, (or individual objectives) were focused on (i) the review of 2019-2020 Group strategy and the organization of a Capital Markets Day; (ii) the implementation of a new Group organization and the retention and rewarding of key employees; (iii) the operational performance and; (iv) the HSE.

The level of achievement for each objective was determined by the Board of Directors but is not disclosed for confidentiality reasons.

In 2018, Mrs. ZUQRUIYAH's objectives were achieved at 137%; this global achievement rate was applied on the target amount of her variable compensation.

Summary table of the compensation of Mrs. Sophie ZURQUIYAH, Chief Executive officer since April 26, 2018

	2018	
Sophie ZURQUIYAH	**Amounts earned**	**Amounts paid**
Chief Executive Officer since April 26, 2018		
Fixed compensation	€571,826.00 [a]	€571,826.00 [a]
Annual variable compensation	€727,516,00 [b]	€533,017.00 [c]
Multi-annual variable compensation *	n.a.	n.a.
Exceptional compensation	n.a.	n.a.
Directors' fees	n.a.	n.a.
Benefits in kind	€10,877.00 [d]	€3,577.00 [e]
Other statutory benefits	€4,878.00 [f]	€4,878.00 [f]
TOTAL	**€1,315,097.00**	**€1,113,298.00**

Table 2 of the AMF Recommendation No. 2009-16.

(a) This amount includes (i) the compensation paid by CGG Services (U.S.) Inc. to Mrs. Sophie ZURQUIYAH, in US dollars, pursuant to her employment agreement in force between January 1, 2018 and April 26, 2018, and (ii) the compensation paid by CGG SA to Mrs. Sophie ZURQUIYAH, in euros, pursuant to her tem of office as Chief Executive Officer from April 26, 2018.

(b) The variable compensation due for the 2018 fiscal year in respect of the term of office of Mrs. Sophie ZURQUIYAH as Chief Executive Officer will be paid in 2019, after approval of the financial statements by the Annual General Meeting. This payment will be subject to approval of such varialbe compensation by the same General Meeting in accordance with the conditions provided by article L. 225-100 of the French Commercial Code.

(c) This variable compensation earned in 2017 and paid in 2018, in US dollars, is in connection with Mrs. Sophie ZURQUIYAH's former employment contrat with CGG Services (U.S.) Inc.

(d) Includes a benefit in kind (company car) amounting to €3,577 and an individual insurance covering loss of employment with CGG Services (U.S.) Inc. (the annual suscription fee for this insurance became payable in January 2019; this benefit in kind was thus recorded in 2019 for an amount of €7,299).

(e) Mrs. Zurquiyah benefits from a company car (as benefit in kind) since May 4, 2018.

(f) Accrual of paid holiday in connection with the termination of employment with CGG Services (U.S.) Inc., paid in US dollars.

** No multi-annual variable compensation scheme was implemented in 2017 and 2018.*

For presentation purposes, all payments made in US dollars were converted into euros based on a USD/EUR average exchange rate of 0.84545 for 2018.

4.2.2.3.2. Stock options allocated to the Executive Officers

A. Stock options allocated to the Executive Officer for fiscal year 2017 and 2018

In accordance with the provisions of Article L. 225-102-1 of the French Commercial Code, stock options were allocated to the Chief Executive Officer under the plan approved by the Board of Directors in 2018. The allocation of these stock options are described in the following table.

Name of the Executive Officer	**Date of the Plan**	**Nature of stock options**	**Valuation of options pursuant to the method used for consolidated financial statements (€)**	**Maximum number of options allocated during fiscal year** [a]	**Subscription price** [b]	**Exercise period**
Sophie ZURQUIYAH *Chief Executive Officer*	06.27.2018	Options to subscribe for shares	€491,669	732 558 0.10% (*)	€2.15	From 06.28. 2018 to 06.27.2026 inclusive

Table 4 of the AMF Recommendation No. 2009-16.
(a) Subject to the performance conditions described below.
(b) The subscription price corresponds to the average of the opening share price on the last twenty trading days prior to the meeting of the Board of Directors granting the options.
(*) Proportion of the share capital represented by the allocation as of the date of the allocation.

No stock option plan had been adopted by the Company for fiscal year 2017.

The valuation of the options pursuant to the method used to prepare the consolidated financial statements does not necessarily correspond to the actual value that the beneficiary could derive from the exercise of the options. The exercise of the options is subject to the fulfillment of certain performance conditions and supposes a subscription price lower than the stock market price. Moreover, the gain before tax that a stock option beneficiary may derive from the option exercise depends upon the share market price on the exercise date. This gain could be nil if, during the duration of the plan, the exercise price remains above the share market price.

Stock options are allocated without any possible discount. The conditions of the plans applicable to the Executive Officers are those of the general plans, plus those described below.

Stock option plan dated June 27, 2018

PERFORMANCE CONDITIONS

The Board of Directors decided that the rights to the options would be acquired in four batches during the first four years of the plan (25% of the options allocated in June 2019, 25% of the options allocated in June 2020, 25% of the options allocated in June 2021, 25% of the options allocated in June 2022). The acquisition of the options would be subject to a performance condition linked to the increase of the market price of the CGG share at least by 10% on an average annual basis over the vesting period with a catch-up mechanism over the whole past period for assessing the conditions of acquisition.

OBLIGATION TO KEEP STOCK OPTIONS UNDER THE REGISTERED FORM

Pursuant to the provisions of Article L.225-185 of the French Commercial Code, the Board of Directors decided that the number of shares resulting from the exercise of stock options that the Chief Executive Officer will have to keep under the registered form until the end of his term shall account for 20% of the amount of the gain on the purchase price realized when exercising the options granted by the Board of Directors on June 27, 2018.

PROHIBITION OF THE USE OF HEDGING INSTRUMENTS

Pursuant to the provisions of Code and the recommendations of the AMF, Mrs. Sophie ZURQUIYAH has agreed not to use hedging instruments both on options and on shares resulting from the exercise of options until the end of the retention period of the shares under registered form as set by the Board pursuant to the provisions of Article L.225-185 of the French Commercial Code.

EXERCISE PERIOD

The Board of Directors reminds that the exercise of stock options by Mrs. Sophie ZURQUIYAH is subject to compliance with the rules prohibiting trading over the shares of the Company set by the Group and which apply to all permanent insiders (See 4.1.2.1.8 of the present document).

B. Stock-options exercised by Executive Officers under the current stock-options plans during fiscal year 2017 and 2018

There was no exercise of stock-options during fiscal year 2017 and 2018.

4.2.2.3.3. Performance shares allocated to Executive Officers (pursuant to Article L. 225-97-1 of the French Commercial Code)

The table below details the number of performance shares allocated to Executive Officers by the Company pursuant to the plan implemented on June 27, 2018:

Name of the Executive Officer	**Date of the Plan**	**Number of shares allocated during fiscal year**	**Valuation of the shares pursuant to the method used for consolidated financial statements (€)**	**Vesting date**	**Acquisition term** [(a)]	**Performance conditions**
Sophie ZURQUIYAH *Chief Executive Officer*	06.27.2018	157,500	€297,955	Acquisition in two batches: - 06.27.2020 -06.27.2021	Acquisition in two batches: - 06.27.2020 -06.27.2021	Free EBITDA Average Net Debt over EBITDAS ratio

Table 6 of the AMF recommendation No. 2009-16

(a) Considering the vesting in two batches, at the end of a respective period of two and three years, no minimum retaining period has been imposed by the Board of Directors.

No performance shares plans has been implemented by the Company during fiscal year 2017.

As there were no performance shares allocated since 2012, no performance share became available during the last two fiscal years.

4.2.2.3.4. Special Severance Payment

Chief Executive Officer

The Board of Directors, on April 26, 2018, in its meeting appointing Mrs. Sophie ZURQUIYAH as Chief Executive Officer for a four-year period, also approved, for the duration of her term in office, the terms and conditions of the advantages granted to Mrs. Sophie ZURQUIYAH in case of termination of her term of office. These advantages will be submitted to the General Meeting convened on May 15, 2019 for ratification.

These advantages are the following:

- Mrs. Sophie ZURQUIYAH will benefit from a contractual indemnity in case of termination under the following conditions:
  a) Dismissal, non-renewal of the term of office or in the event of a forced departure (involving a resignation), related to a change of control that has occurred in the absence of any failure situation characterized by the non-fulfilment of all the performance conditions below. It is specified that a departure occurring within the twelve months following the occurrence of change of control shall be considered as a forced departure;

  b) Dismissal in the absence of serious or gross misconduct occurring in the absence of any situation of failure characterized for the purposes of this paragraph by failure to meet the performance conditions as defined hereafter.
- In the event that these provisions where to apply during the first three years of the term of office of the Chief Executive Officer, the assessment of the achievement of the performance conditions would be made in the following manner;
  a) In case of departure from the Group during 2018 and 2019 fiscal years, the Board of Directors will determine the rate of achievement of the objectives during the period since the appointment of the Chief Executive Officer ; the rate as determined by the Board of Directors will constitute the achievement rate which will be taken into account to apply the rule described below;

  b) The payment of this Special Severance Payment would depend on the level of the average rate of achievement of the objectives relating to Mrs. Sophie ZURQUIYAH's variable annual compensation calculated over the financial years 2018, 2019, 2020, as follows:
    a) If the average rate is below 60%, no Special Severance Payment will be paid;

    b) If the average rate is 60%, the Special Severance Payment will be equal to 60% of its amount;

    c) If the average rate is higher than 60%, the Special Severance Payment will be paid on a straight-line basis from 60% to 100% of its amount.
- This Special Severance Payment will be equal to the difference between (i) a gross amount capped at 200% of the reference annual compensation including all sums irrespective of type or basis to which Mrs. Sophie ZURQUIYAH may be entitled as a consequence of the severance, and (ii) any sums to which she may be entitled further to the application of the non-competition commitment.

According to Article L. 225-42-1 of the French Commercial Code, the Board of Directors, prior to the payment of the Special Severance Payment, shall assess that, (i) the aforementioned performance conditions have been met and that (ii) the Special Severance Payment complies with the AFEP-MEDEF Code in force at the date of the concerned person's departure.

4.2.2.3.5. Non-compete agreement

Chief Executive Officer

On April 26, 2018, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by Article L.225-38 et seq. of the French Commercial Code, the signature of a non-compete agreement between the Company and Mrs. Sophie ZURQUIYAH. This agreement will be submitted for ratification to the General Meeting convened to approve the 2018 financial statements.

This agreement applies to any geophysical data acquisition, processing, interpretation services, or the provision of equipment or products designed for the acquisition, processing or interpretation of geophysical data, that may involve the contribution of the interested party to projects or activities in the same fields as those in which Mrs. Sophie ZURQUIYAH was involved within the Group.

In return for this non-compete agreement for a period of 18 months starting from the departure date of Mrs. Sophie ZURQUIYAH from the Group, she would be entitled to receiving a compensation corresponding to 100% of her annual reference remuneration as defined in her protection letter related to payment of the contractual indemnity in case of termination of her office.

Terms and conditions of this non-competition agreement, entered into force before the revision of the AFEP-MEDEF Code in June 2018, will be revised by the Board of Directors at the next renewal of Mrs. Sophie ZURQUIYAH's term in office or a new appointment, if any (See « 4.1.1. Code of Corporate Governance applied by the Company»).

4.2.2.3.6. General benefits and health plan

Chairman of the Board of Directors and Chief Executive Officer

The Board of Directors, in its meeting held on April 26, 2018, authorized, in accordance with procedures applicable to related party agreements and provided for by Article L.225-38 et seq. of the French Commercial Code, the extension of the general benefits and health plan of the Group applicable to all employees to Mr. Philippe SALLE, Chairman of the Board of Directors and to Mrs. Sophie ZURQUIYAH, Chief Executive Officer. This commitment will be submitted for ratification to the General Meeting convened to approve the 2018 financial statements.

4.2.2.3.7. Health insurance

Chief Executive Officer

In its meeting held on April 26, 2018, the Board of Director approved, in accordance with procedures applicable to related party agreements and provided for by Article L.225-38 et seq. of the French Commercial Code, the subscription, to an international individual health insurance by CGG Services (U.S.) Inc. and to the benefit of Mrs. Sophie ZURQUIYAH due to her frequent travels outside France. The annual subscription fee paid by CGG Services (U.S.) Inc. for this insurance amounts to €12,735[1].

This agreement will be submitted for ratification to the General Meeting convened to approve the 2018 financial statements.

4.2.2.3.8. Individual insurance covering loss of employment

Chief Executive Officer

Pursuant to the procedure applicable to related-party agreements set forth by Article L.225-38 and seq. of the French Commercial Code, the Board of Directors authorized, on April 2018 26, the Company to subscribe with GSC, an individual insurance policy covering loss of employment, in favor of Mrs. Sophie ZURQUIYAH. The annual subscription fee payable by the Company amounts to €7,299.78 for 2018, calculated prorata temporis for the period between April 26, 2018 and December 31, 2018. This insurance provides for the payment of a maximum of 13.87% of her 2018 target compensation (corresponding to €174,821), for a duration of 12 months. This agreement will be submitted to the General Meeting convened to approve the 2018 financial statements, for ratification.

Mr. Jean-Georges MALCOR was the beneficiary of this guarantee under his term of office, in accordance with the decision of the Board of Directors on June 30, 2010, also ratified by the General Meeting of May 4, 2011. As of April 26, 2018, Mr. Jean-Georges MALCOR ceased to meet the conditions to benefit from this guarantee. The contribution paid to the GSC under this guarantee amounts to €10,876.64 for the year 2018.

4.2.2.3.9. Defined contribution scheme (article 83 of the French Tax Code)

Chief Executive Officer

Mrs. Sophie ZURQUIYAH benefits from the collective defined contribution scheme implemented for the management of the Group since January 1, 2005 under the same conditions as applicable to the other beneficiaries.

(1) Amount paid in US dollars and, for presentation purposes, converted into euros based on a USD/EUR average exchange rate of 0.84545 for 2018.

This additional plan is capped as followed and calculated in reference to the annual French social security cap:

- « Tranche A », up to 100 % of the annual French social security cap: 0.5% of the employee social security contribution and 1% of the employer social security contribution;
- « Tranche B », above 100% of the annual French social security cap and up to 400% of the annual French social security cap: 2% of the employee social security contribution and 3% of the employer social security contribution;
- « Tranche C », above 400% 2% of the employee social security contribution and 3% of the employer social security contribution and up to 800 of the annual French social security cap: 3.5% of the employee social security contribution and 5% of the employer social security contribution.

The contribution base is assessed on the gross annual compensation of a given year exclusively, base salary, annual variable compensation and benefit in kind (company car). By principle, this base excludes any other component of the compensation. The contribution paid by the company amounts to €8,111.94 for 2018, calculated prorata temporis for the period between April 26, 2018 and December 31, 2018, i.e. €11,920 for a full year (calculation based on the annual French social security cap for 2018).

4.2.2.3.10. Summary table as of December 31, 2018

	Employment agreement		Supplemetal retirement plan		Contractual indemnity in case of termination		Non-compete agreement	
Name of the Senior Executive Officer	Yes	No	Yes	No	Yes	No	Yes	No
Philippe SALLE *Chairman of the Board of Directors* First appointment: 2018 End of term of office: 2021		X		X		X		X
Sophie ZURQUIYAH *Chief Executive Officer* First appointment: 2018 End of term of office: 2022		X	X [(a)]		X [(b)]		X [(c)]	

Table 11 of the AMF Recommendation No, 2009-16.

(a) For details of the Supplemental retirement plan, see 4.2.2.3.9. Senior Executive Officer benefit from defined-contribution capitalised pension fund in effect for all managers of the Group. This pension scheme is partly covered by the Company. For fiscal year 2018, the expenses borne by the Company under this mechanism amounted to €8,112 for Mrs. Sophie ZURQUIYAH and €8,940 for Mr. Jean-Georges MALCOR.

(b) For details of the Contractual indemnity in case of termination, see 4.2.2.3.5.

(c) For details of the Non-compete agreement, see 4.2.2.3.6.

4.2.2.3.11. Senior Executive Officers' remuneration components paid or earned for fiscal year 2018 and submitted to the vote of shareholders

Elements of compensation paid or granted for the 2018 financial year to Mr. Remi Dorval, Chairman of the Board of Directors until April 26, 2018, submitted to the Shareholders' approval:

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
Fixed remuneration	€35,710	The Board of Directors held on April 6, 2017 resolved that Mr. Dorval would receive a fixed annual compensation of €115,000 (to which the actual amount borne by the Company with respect to his company car was to be deducted) as Chairman of the Board of Directors for 2017. For 2018, the same rule was applied and the amount of this compensation was calculated on a prorata basis until the end of his term of office, on April 26, 2018,
Annual variable remuneration	N/A	Mr. Dorval did not receive any variable remuneration.
Deferred annual variable remuneration	N/A	Mr. Dorval did not receive any deferred annual variable remuneration.
Multi-annual variable remuneration	N/A	Mr. Dorval did not receive any multi-annual variable remuneration.
Exceptional compensation	N/A	Mr. Dorval did not receive any exceptional compensation.
Value of options / performance shares granted during the fiscal year	N/A	Mr. Dorval did not benefit from any stock option or performance share plan.
Directors' fees	€18,178.63	The Board of Directors held on April 6, 2017 resolved that, as Chairman of the Board of Directors, Mr. Dorval would benefit from a fixed amount of Directors' fees, set at €57,200 on an annual basis for 2017. For 2018, the same rule was applied and the amount of these Directors' fees was calculated on a prorata temporis basis until the end of his term of office, on April 26, 2018.
Value of benefits in kind	€1,096	The Board of Directors held on April 6, 2017 resolved that, as Chairman of the Board of Directors, Mr. Dorval would benefit from a company car, set at €3,360 on an annual basis for 2017. For 2018, the same rule was applied and the amount of this benefit in kind was calculated on a prorata temporis basis until the end of his term of office, on April 26, 2018.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
Severance pay	N/A	Mr. Dorval did not benefit from any severance agreement.
Non-compete clause	N/A	Mr. Dorval did not benefit from any non-compete agreement.
General benefits plan	No amount paid to Mr. Dorval by the Company in 2018	On March 26, 2015, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, the extension to Mr. Dorval of the benefit of the Group's general benefits plan applicable to all employees. This agreement was ratified by the General Meeting held on May 29, 2015.
Supplementary pension plan	N/A	Mr. Dorval did not benefit from any supplementary pension plan.

Elements of compensation paid or granted for the 2018 financial year to Mr. Philippe Salle, Chairman of the Board of Directors since April 26, 2018, submitted to the Shareholders' approval:

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
Fixed remuneration	€115,697	The Board of Directors held on April 26, 2018 resolved that Mr. Salle would receive a fixed annual compensation of €170,000 as Chairman of the Board of Directors. For 2018, this compensation was calculated on a prorata basis as from April 26, 2018, the date on which his appointment as Chairman of the Board became effective.
Annual variable remuneration	N/A	Mr. Salle does not receive any variable remuneration.
Deferred annual variable remuneration	N/A	Mr. Salle does not receive any deferred annual variable remuneration.
Multi-annual variable remuneration	N/A	Mr. Salle does not receive any multi-annual variable remuneration.
Exceptional compensation	N/A	Mr. Salle does not receive any exceptional compensation.
Value of options / performance shares granted during the fiscal year	N/A	Mr. Salle does not benefit from any stock option or performance share plan.
Directors' fees	€52,445.39	The Board of Directors held on April 26, 2018 resolved that, as Chairman of the Board of Directors, Mr. Salle would receive a fixed amount of Directors' fees, set at €70,000 on an annual basis. For 2018, this fixed amount was calculated on a prorata temporis basis as from the date of his appointment as Chairman of the Board on April 26, 2018. Prior to this date (i.e. from the date of his appointment as Director on March 8, 2018 until the date of his appointment as Chairman, on April 26, 2018), Mr. Salle received an amount of Directors' fees calculated on the common rules to be applied to all Directors.
Value of benefits in kind	N/A	Mr. Salle does not benefit from a company car.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
Severance pay	N/A	Mr. Salle does not benefit from any severance agreement.
Non-compete clause	N/A	Mr. Salle does not benefit from any non-compete agreement.
General benefits plan	No amount paid to Mr. Salle by the Company in 2018	On April 26, 2018, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, the extension to Mr. Salle of the benefit of the Group's general benefits plan applicable to all employees. This agreement will be submitted to the General Meeting convened on May 15, 2019 for ratification.
Supplementary pension plan	N/A	Mr. Salle does not benefit from any supplementary pension plan.

Elements of compensation paid or granted for the 2018 financial year to Mr. Jean-Georges MALCOR, Chief Executive Officer until April 26, 2018, submitted to the Shareholders' approval:

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
Fixed remuneration	€472,500	The Board of Directors held on April 6, 2017 resolved that, as Chief Executive Officer, Mr. Malcor would receive a fixed annual compensation of €630,000 as Chief Executive Officer for 2017 (unchanged since 2013). For 2018, the same rule was applied and the amount of this compensation was calculated on a prorata basis until the end of his term of office, on April 26, 2018. In addition, on December 1, 2017, the Board of Directors authorized the conclusion of an employment agreement between CGG SA and Mr. Malcor, as "Senior advisor" until October 1, 2018. Therefore, Mr. Malcor received a gross monthly compensation of €52,500 between April 26, 2018 and September 30, 2018 under this employment agreement.
Annual variable remuneration	N/A	The Board of Directors held on December 1, 2017 resolved that Mr. Malcor would not receive any variable remuneration for 2018.
Deferred annual variable remuneration	N/A	Mr. Malcor did not receive any deferred annual variable remuneration.
Multi-annual variable remuneration	N/A	No multi-annual remuneration plan was implemented by the Company in 2018.
Exceptional compensation *(Payment of this exceptional compensation will be subject to approval by the General Meeting convened on May 15, 2019 in accordance with the conditions provided by article L. 225-100 of the French Commercial Code)*	€75,000	The Board of Directors held on December 1, 2017 resolved that in 2018, Mr. Malcor would receive: 1. An exceptional compensation payment of a fixed gross amount of €75,000 conditional upon the final completion, under certain conditions, of all the financial securities issuance operations allowing for the implementation of the Group's debt restructuring; and 2. An additional exceptional compensation payment, conditional upon the final completion, under certain conditions, of a refinancing of the debt, of a gross amount of €75,000 or €175,000 depending on the effective date of such refinancing.

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
		The conditions required for the exceptional compensation referred to in item1) above have been met. However, conditions required for the additional exceptional compensation under item 2) above have not been met. As a consequence, Mr. Malcor is entitled to receive an exceptional compensation for a gross amount of €75,000 for 2018, subject to approval by the General Meeting convened on May 15, 2019.
Value of options / performance shares granted during the fiscal year	Stock-options: N/A	Mr. Malcor did not receive any stock-options in 2018.
	Performance shares: N/A	Mr. Malcor did not receive any performance shares in 2018.
Directors' fees	N/A	Mr. Malcor did not receive any Directors' fees.
Value of benefits in kind	€8,910	The Board of Directors held on April 6, 2017 resolved that, as Chief Executive Officer, Mr. Malcor would benefit, for 2017, from a company car, whose reintegration may not give rise to a benefit in kind exceeding €11,880 on an annual basis. For 2018, the same rule was applied and the amount of this benefit in kind was calculated on a prorata temporis basis until his retirement on September 30, 2018.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
Severance pay	N/A	No contractual indemnity in case of termination of Mr. Malcor's office was in force in 2018.
Non-compete clause	€1,626,673	This non-compete agreement applies to any geophysical data acquisition, processing or interpretation services or the provision of equipment or products designed for the acquisition, processing or interpretation of geophysical data. Mr. Malcor has agreed that he will not contribute to projects or activities in the same field as those in which he was involved at CGG for period of 18 months starting on the date on which he leaves the Group. In consideration of this undertaking, Mr. Malcor was entitled to receive a compensation corresponding to 100% of his annual reference compensation. On June 30, 2010, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, this non-compete agreement between the Company and Mr. Malcor. This agreement was ratified by the General Meeting held on May 4, 2011. The Board of Directors held on December 1, 2017, stating on the conditions relating to the departure of Mr. Malcor, resolved that the latter would remain subject to this non-compete commitment and that the amount of the related indemnity would amount to 16/12th of his annual reference compensation in case an employment agreement be concluded, with a commitment over 24 months. As a consequence, upon his departure from the Group on September 30, 2018, Mr. Malcor received a non-compete indemnity amounting to €1,626,673.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
General benefits plan	No amount paid to Mr. Malcor by the Company in 2018	On June 30, 2010, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, the extension to Mr. Malcor of the benefit of the Group's general benefits plan applicable to all employees. This agreement was ratified by the General Meeting held on May 4, 2011.
Individual insurance covering loss of employment	No amount paid to Mr. Malcor by the Company in 2018	Pursuant to the procedure applicable to related-parties agreement set forth by section L. 225-38 and seq. of the French Commercial Code, the Board of Directors authorized, on June 30, 2010, the Company to subscribe with GSC, as from July 1, 2010, an individual insurance policy covering loss of employment, in favor of Mr. Malcor. This agreement was ratified by the General Meeting held on May 4, 2011. The annual subscription fee payable by the Company amounted to €10,876.64 for 2018. Mr. Malcor ceased to meet the conditions to benefit from this guarantee on April 26, 2018.
Supplementary pension plan	No amount paid to Mr. Malcor by the Company in 2018	Mr. Malcor benefits from the supplemental retirement plan for the members of the Executive Committee of the Group (as composed prior to February 1, 2013) and the Management Board of Sercel Holding (as composed prior to April 19, 2012). It is an additive defined benefit plan with a cap. Accruals are acquired per year of service, with a double limit: ▸ Potential rights are applied in addition to the mandatory basic and supplementary pension schemes but cannot, however, procure in aggregate for all schemes, a replacement rate exceeding 50%; ▸ Potential rights are calculated on the basis of seniority with an upper limit of 20 years. They are accrued up to: » 1.5% of the remuneration used as reference, per seniority year within the company and up to 20 years, for the portion of remuneration below 20 times the Social security upper limit; » 1% of the remuneration used as reference, per seniority year within the company and up to 20 years, for the portion of remuneration above 20 times the Social security upper limit; Further, to participate in the plan, the Beneficiaries must comply with the main following cumulative conditions: ▸ have liquidated their social security pension and all possible other rights to pensions, ▸ have at least five years of service as member of the Executive Committee of the Group (as composed prior to February 1, 2013) or of the Management Board of Sercel Holding (as composed prior to April 19, 2012) and until they were 55 years of age, and ▸ end their professional career when leaving the Company. The conditions relating to the age and length of service are assessed taking into account the service continuity within the new governance bodies of the Group. This plan was closed to new comers on July 1, 2014.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
		The benefit of this plan was extended to Mr. Malcor by the Board of Directors on June 30, 2010 pursuant to section L. 225-38 and seq. of the Commerce code. Such extension was ratified by the annual general meeting held on May 4, 2011. In addition, on June 1, 2017, upon renewal of the term of office of Mr. Malcor as Chief Executive Officer, the Board decided, in accordance with section L225-42-1, paragraph 2 of the French Commerce code to submit, starting 2017, the acquisition of annual rights under the defined benefit pension plan benefitting to Mr. Malcor to the following performance conditions: ▸ If the average rate of achievement of the objectives relating to Mr. Malcor's variable compensation calculated over the three financial years preceding the acquisition date is higher than 40% the annual rights will be acquired; ▸ If such average rate is below 40%, the annual rights will not be acquired. Pursuant to Article L. 225-42-1 of the French Commercial Code, this amendment was ratified by the annual general meeting held on October 31, 2017 under the 11th resolution. On March 23, 2018, the Board of Directors confirmed that the performance condition was met for 2017 and that the corresponding annual rights were accrued. On December 11, 2018, the Board of Directors decided that the accrued annual rights acquired were set at 1.3% and 0.98% for 2017 and 2018 respectively, i.e. below the threshold of 3% of the annual reference compensation for the calculation of the annuity under the retirement plan. The Board also unanimously acknowledged that Mr. Malcor satisfied the requirements of the supplemental retirement plan subject to performance conditions pursuant to Article L.137-11 of the French Social Security Code and, as such, shall receive his annuity under the supplemental retirement plan. As a consequence, as Mr. Malcor retired on September 30, 2018, he is entitled to receive a gross annual annuity of €180,391.14. The financing of this supplementary pension plan was subject to social contributions under the social security scheme L. 137-11 of the French Social Security Code.
Supplementary pension plan	No amount paid to Mr. Malcor by the Company in 2018	Pursuant to the procedure applicable to related-parties agreement set forth by section L. 225-38 and seq. of the French Commercial Code, the Board of Directors held on June 30, 2010 authorized the entitlement of Mr. Malcor in the defined contribution scheme applicable to Group's Senior Executives since January 1, 2005. This additive system is capped as follows and is calculated in accordance with French Social Security Cap (PASS): ▸ « Tranche A », up to 1 annual French social security cap: 0.5% of the employee social security contribution and 1% of the employer social security contribution; ▸ « Tranche B », from 1 to 4 annual French social security caps : 2% of the employee social security contribution and 3% of the employer social security contribution;

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
		▸ « Tranche C », from 4 to 8 annual French social security caps: 3.5% of the employee social security contribution and 5% of the employer social security contribution. The contribution base is assessed on the gross annual compensation of a given year exclusively, base salary, annual variable compensation and benefit in kind (company car). By principle, this base excludes any other component of the compensation. The contribution paid by the company amounts to €8,939.69 for 2018, calculated on a prorata temporis basis for the duration of his office over 2018, and corresponding to a €11,920 contribution for a full year (calculated in reference to the annual French social security cap).

Elements of compensation paid or granted for the 2018 financial year to Mrs. Sophie Zurquiyah, Chief Executive Officer since April 26, 2018, submitted to the Shareholders' approval:

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
Fixed remuneration	€571,826	The Board of Directors held on April 26, 2018 resolved that, as Chief Executive Officer, Mrs. Zurquiyah would receive a fixed annual compensation of €630,000. For 2018, the amount of this compensation was calculated on a prorata temporis basis as from April 26, 2018. In 2018, Mrs. Zurquiyah also received a compensation from CGG Services (U.S.) Inc. pursuant to her employment agreement in force with this company between January 1, 2018 and April 26, 2018.
Annual variable remuneration *(Payment of this annual variable remuneration will be subject to approval by the Annual General Meeting convened on May 15, 2019 in accordance with the conditions provided by article L. 225-100 of the French Commercial Code)*	€727,516	The annual variable remuneration of Mrs. Zurquiyah is based on the achievement of qualitative objectives (accounting for 1/3 of the variable compensation) and quantitative objectives (accounting for 2/3 of the variable compensation). The quantitative criteria are based on the achievement of Group budget objectives set by the Board of Directors. Her target amount is set at 100% of her fixed compensation. However, in case of overachievement, the allocation of the variable incentive remuneration may involve: ▸ the quantitative criteria (financial objectives), and / or ▸ the qualitative criteria (individual objectives). For 2018: ▸ The financial objectives (quantitative) were related to the Group Free Cash Flow (25% weighting), EBITDA (25% weighting), the Group external revenues (25% weighting), and the Group operating income (25% weighting). ▸ The individual objectives (qualitative) were related to (i) the Group's strategy, (ii) the Group organization (iii) the operational performance and (iv) the HSE.

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
		On March 7, 2019, based on the achievement of the hereinabove qualitative and quantitative targets and the financial 2018 results, the Board of Directors, upon the Appointment and Remuneration Committee's proposal, set this variable remuneration at €727,516. This corresponds to an overall achievement rate of 137% of her objectives; this global achievement rate was applied on the target amount of her variable compensation. Payment of this variable compensation will be subject to approval by the General Meeting convened on May 15, 2019.
Deferred annual variable remuneration	N/A	Mrs. Zurquiyah does not receive any deferred annual variable remuneration.
Multi-annual variable remuneration	N/A	No multi-annual remuneration plan was implemented in 2018.
Exceptional compensation	N/A	Mrs. Zurquiyah did not receive any exceptional compensation in 2018.
Value of options / performance shares granted during the fiscal year *(IFRS book value)*	Stock-options: €491,669 *The vesting of the options is subject to the achievement of the performance conditions and the final value will depend on the final number of vested options and the share price on the day of exercise of the options.*	On June 27, 2018, based on the 17th resolution of the general meeting held on April 26, 2018, the Board of Directors allocated 732,558 options to Mrs. Zurquiyah, i.e. 0.10% of the share capital of the Company on the day of allocation. The rights to the options will be acquired in four batches, in June 2019 (for 25% of the options allocated), in June 2020 (for 25% of the options allocated), June 2021 (for 25% of the options allocated) and June 2022 (for 25% of the options allocated) subject to a performance condition relating to an increase of CGG market price by at least 10% on an average annual basis over the vesting period with a catch-up mechanism over the whole past period for assessing the conditions of acquisition. The other conditions of the plan are disclosed in item 4.2.2.3.2 of our Reference document. Final vesting is subject to the achievement of the performance condition hereinabove.
	Performance shares: €297,955	On June 27, 2018, based on the 18th resolution of the general meeting held on April 26, 2018, the Board of Directors allocated 157,500 performance shares to Mrs. Zurquiyah, i.e. 0.02% of the share capital of the Company on the day of allocation. The performance shares will vest in two batches (June 2020 and June 2021), each representing 50% of the performance shares allocated and subject to the fulfillment of two performance conditions. The other conditions of the plan are disclosed in item 4.2.2.3.3 of our Reference document.
Directors' fees	N/A	Mrs. Zurquiyah does not receive any Directors' fees.

Remuneration components paid or granted for the fiscal year	**Amounts submitted to the vote**	**Presentation**
Value of benefits in kind	€3,577	The Board of Directors held on April 26, 2018 resolved that, as Chief Executive Officer, Mrs. Zurquiyah would benefit from a company car, whose reintegration may not give rise to a benefit in kind exceeding €11,880 on an annual basis. For 2018, the amount of this benefit in kind was calculated on a prorata temporis basis for the duration of her term of office.
	€7,299	Pursuant to the procedure applicable to related-parties agreement set forth by section L. 225-38 and seq. of the French Commercial Code, the Board of Directors authorized, on April 26, 2018 the Company to subscribe with GSC an individual insurance policy covering loss of employment, in favor of Mrs. Zurquiyah. This insurance provides for the payment of a maximum of 13.87 % of Mrs. Zurquiyah's target compensation for 2018 (corresponding to €174,821), for a duration of 12 months. The annual subscription fee for the Company amounts to €10,891 for 2018, i.e. €7,299 paid by the Company on a prorata temporis basis as from the appointment of Mrs. Zurquiyah on April 26, 2018. This agreement will be submitted for ratification to the General Meeting to be held on May 15, 2019.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
Severance pay	No amount paid to Mrs. Zurquiyah by the Company in 2018	Mrs. Zurquiyah benefits from a contractual indemnity in case of departure from the Group (the "Special Severance Payment"). The Special Severance Payment shall be paid to Mrs. Zurquiyah only in the event of: ▶ Dismissal or non-renewal of Mrs. Zurquiyah's office in the event of a forced departure (involving a resignation), relating to a "Change of Control" that has occurred in the absence of any failure situation, which failure shall, for the purposes of this paragraph, be characterized by the non-fulfillment of all the performance conditions set out hereafter; it is hereby specified that a departure occurring within the twelve months following the occurrence of Change of Control shall be considered as a Forced Departure; ▶ Dismissal in the absence of serious or gross misconduct occurring in the absence of any situation of failure characterized for the purposes of this paragraph by failure to meet the performance conditions set out hereafter. Payment of the Special Severance Payment will depend on the level of the average rate of the objectives relating to Mrs. Zurquiyah's variable compensation calculated over the three financial years preceding the date of notice: ▶ If such average rate is below 60%, no Special Severance Payment will be paid; ▶ If such average rate is 60%, the Special Severance Payment will be equal to 60% of its amount;

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
		▸ If such average rate is higher than 60%, the Special Severance Payment will be paid on a straight-line basis from 60% to 100% of its amount. This Special Severance Payment will be equal to the difference between (i) a gross amount capped at 200% of the reference annual compensation, including all sums irrespective of type or basis to which Mrs. Zurquiyah may be entitled as a consequence of the severance, and (ii) any sums to which Mrs. Zurquiyah may be entitled further to the application of the non-competition commitment. This agreement will be submitted for ratification to the General Meeting to be held on May 15, 2019.
Non-compete clause	No amount paid to Mrs. Zurquiyah by the Company in 2018	This non-compete agreement applies to any geophysical data acquisition, processing or interpretation services or the provision of equipment or products designed for the acquisition, processing or interpretation of geophysical data involving the contribution of Mrs. Zurquiyah to projects or activities in the same filed as those in which she was involved at CGG for period of 18 months starting on the date on which she leaves the Group. In consideration of this undertaking, for a period of 18 months starting on the day on which Mrs. Zurquiyah leaves the Group, she will be entitled to receive a compensation corresponding to 100% of her annual reference compensation. On April 26, 2018, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, this non-compete agreement between the Company and Mrs. Zurquiyah. This agreement will be submitted for ratification to the General Meeting to be held on May 15, 2019.
General benefits plan	No amount paid to Mrs. Zurquiyah by the Company in 2018	On April 26, 2018, the Board of Directors approved, in accordance with procedures applicable to related party agreements and provided for by section L.225-38 et seq. of the French Commercial Code, the extension to Mrs. Zurquiyah of the benefit of the Group's general benefits plan applicable to all employees. This agreement will be submitted to the General Meeting to be held on May 15, 2019 for ratification.
International individual health insurance	No amount paid to Mrs. Zurquiyah by the Company in 2018	Pursuant to the procedure applicable to related-party agreements set forth by section L.225-38 and seq. of the French Commercial Code, the Board of Directors approved on April 26, 2018 the implementation of an international individual health insurance for the benefit of Mrs. Zurquiyah. The annual subscription fee in relation thereto amounts to €12,735[1] for 2018. This agreement will be submitted for ratification to the General Meeting to be held on May 15, 2019.
Individual insurance covering loss of employment	See "Value of benefits in kind" above	See "*Value of benefits in kind*" *above*

(1) Amount paid in US dollars and, for presentation purposes, converted into euros based on a USD/EUR average exchange rate of 0.84546 for 2018.

Remuneration components paid or granted for the fiscal year that are or were submitted to a vote during a General Meeting as part of the Agreements and Commitments approvals	**Amounts submitted to the vote**	**Presentation**
Supplementary pension plan	No amount paid to Mrs. Zurquiyah by the Company in 2018	Pursuant to the procedure applicable to related-parties agreement set forth by section L. 225-38 and seq. of the French Commercial Code, the Board of Directors held on April 26, 2018 authorized the entitlement of Mrs. ZURQUIYAH in the defined contribution scheme applicable to Group's Senior Executives since January 1, 2005. This additive system is capped as follows and is calculated in accordance with French Social Security Cap (PASS): ▸ « Tranche A », up to 1 annual French social security cap: 0.5% of the employee social security contribution and 1% of the employer social security contribution; ▸ « Tranche B », from 1 to 4 annual French social security cap: 2% of the employee social security contribution and 3% of the employer social security contribution; ▸ « Tranche C », from 4 to 8 annual French social security cap: 3.5% of the employee social security contribution and 5% of the employer social security contribution. The contribution base is assessed on the gross annual compensation of a given year exclusively, base salary, annual variable compensation and benefit in kind (company car). By principle, this base excludes any other component of the compensation. The contribution paid by the company amounts to €8,111.94 for 2018, calculated on a prorata temporis basis for the duration of her office over 2018, and corresponding to a €11,920 contribution for a full year (calculated in reference to the annual French social security cap). This commitment will be submitted for ratification to the General Meeting to be held on May 15, 2019.

4.2.3. Other compensation

4.2.3.1. Stock-options

The policy on stock-options allocation to executive Officers is described in 4.2.2.1. of the present document.

Neither the Company nor any affiliated or controlled company within the meaning of Articles L. 225-180 and L. 233-16 of the French Commercial Code had implemented any stock option plans.

The table below summarizes the evolution of the stock-options plans in place as of December 31, 2018:

	2011 plan	2012 plan	2013 plan	2014 plan	2015 plan	2016 plan	2018 plan		Total
Date of the General Meeting	04/29/2008	05/04/2011	05/03/2013	05/03/2013	05/29/15	05/29/2015	04/26/2018	04/26/2018	
Date of the Board of Directors' meeting	03/24/2011	06/26/2012	06/24/2013	06/26/2014	06/25/2015	06/23/2016	06/27/2018	12/11/2018 [f]	
Number of beneficiaries	366	413	672	752	749	683	530	4	
Total number of shares that can be subscribed [3]:	1,164,363	1,410,625	1,642,574	1,655,843	1,769,890	6,658,848	6,544,389	671,171	**21,517,703**
Out of which the number can be exercised by:									
Executive Officers:									
Remi Dorval [6]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Jean-Georges Malcor [7]	133,333	200,000 [a]	200,000 [b]	200,000 [c]	220,600 [d]	882,400 [e]	N/A	N/A	**1,836,333**
Philippe Salle [8]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Sophie Zurquiyah [9]	N/A	N/A	120,000 [b]	60,000 [c]	79,500 [d]	444,000 [e]	732,558	N/A	**732,558**
Start date of options exercise	03/25/2012	06/27/2014	06/25/2015	06/27/2016	06/26/2017	06/24/18	06/28/2019	06/28/2019	
Expiration date	03/24/2019	06/26/2020	06/24/2021	06/26/2022	06/25/2023	06/23/24	06/27/2026	06/27/2026	
Subscription price (in €) [1] [2] [4]	253.30	186.62	193.27	107.66	62.92	8.52	2.15	1.39	
Exercise rules (when the plan provides for several batches of options) [5]	— Options accrue rights by third every year during the first three years; — prohibition to sell or transfer his shares before March 24, 2011 for French tax residents.	— Options accrue rights in three batches (50% after 2 years, 25% after 3 years and 25% after 4 years) — prohibition to sell or transfer his shares before June 26, 2016 for French tax residents.	— Options accrue rights in three batches (50% after 2 years, 25% after 3 years and 25% after 4 years)	— Options accrue rights in three batches (50% after 2 years, 25% after 3 years and 25% after 4 years)	— Options accrue rights in three batches (50% after 2 years, 25% after 3 years and 25% after 4 years)	— Options accrue rights in three batches (50% after 2 years, 25% after 3 years and 25% after 4 years)	— Options accrue rights in four batches (25% after 1 year, 25% after 2 years, 25% after 3 years and 25% after 4 years)	— Options accrue rights in four batches (25% after 1 year, 25% after 2 years, 25% after 3 years and 25% after 4 years)	
Number of shares subscribed as of December 31, 2018 [3]	0	0	0	0	0	0	0	0	**0**
Cumulated number of stock-options which were cancelled or lapsed as of December 31, 2018 [3]	156,441	1,001,863	543,531	432,910	163,994	169,047	472,453	0	**2,940,239**
Remaining stock-options as of December 31, 2018 [4]	96,216	48,554	70,870	79,755	95,908	326,266	6,071,936	671,171	**7,460,676**
Out of which the remaining number is held by:									
Executive officers									
Remi Dorval [6]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Jean-Georges Malcor [7]	13,415	0	0	1,195	9,223	44,002	N/A	N/A	**67,835**
Philippe Salle [8]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
Sophie Zurquiyah [9]	N/A	N/A	0	359	3,324	22,141	732,558	N/A	**758,382**

(1) Considering the adjustements done further to the capital increase of February 5, 2016, to the stock reverse split of July 20, 2016 and and the capital increase of February 21, 2018.
(2) The subscription price corresponds to the average of the opening share prices of the share on the last twenty trading days prior to the meeting of the Board of Directors granting the options.
(3) Without taking into account the various adjustments that have occurred after the implementation of the plans.
(4) Considering the adjustments done further to the capital increase of October 23, 2012 for all plans previously granted and the adjustments done further to the capital increase of February 5, 2016, to the stock reverse split of July 20, 2016 and the capital increase of February 21, 2018.
(5) In addition, certain performance conditions are applicable to the senior executive officers and the members of Executive Committee or Corporate Committee / Executive Leadership (depending in the attribution date) see 4.2.2.3.2.
(6) Executive Officer of CGG SA from June 4, 2014 to April 26, 2018.
(7) Executive Officer of CGG SA from June 30, 2010 to April 26, 2018.
(8) Executive Officer of CGG SA since April 26, 2018.
(9) Executive Officer of CGG SA from September 1, 2015 to January 4, 2017 (member of the Corporate Committee) and since April 26, 2018 (Chier Executive Officer).

(a) For the senior executive officers and members of the Corporate Committee, this plan is subject to performance conditions which have not been met for each of the three batches in 2014, 2015 and 2016.
(b) For the senior executive officers and members of the Corporate Committee, this plan is subject to performance conditions which have not been met for each of the three batches in 2015, 2016 and 2017.
(c) For the senior executive officers and members of the Corporate Committee, this plan is subject to performance conditions which have not been met in 2016 for the first batch (corresponding to 50% of the allocation) nor for the second batch in 2017 (corresponding to 25% of the allocation).
(d) For the senior executive officers and members of the Corporate Committee, this plan is subject to performance conditions which have not been met in 2017 for the first batch (corresponding to 50% of the allocation).
(e) For the senior executive officer and members of the Corporate Committee, this plan is subject to performance conditions which have not been met in 2018 for the first batch (corresponding to 50% of the allocation).
(f) Allocation subject to the terms and conditions of the stock options plan date June 27, 2018, except for the subscription price.

Individual information on stock-options allocated to Executive Officers is set forth in paragraph 4.2.2.3.3.

4.2.3.2. Performance shares

Pursuant to the 18th resolution of the Combined General Meeting held on April 26, 2018, the Board of Directors held on June 27, 2018 decided to grant performance shares as follows:

	Past allocation of performance shares (Article L225-97-1 of the French commercial code)	
	Information about performance shares	
Date of General Meeting	04/26/2018	04/26/2018 [a]
Date of Board of Director's resolution	06/27/2018	12/11/2018 [a]
Total number of performance shares allocated, of which the number allocated to:	3,108,217	132,821
Sophie ZURQUIYAH, Chief Executive Officer	157,500	n.a.
Date of acquisition of performance shares	Acquisition in two batches: — June 27, 2020 : 50% of the allocated shares — June 27 2021 : 50% des allocated shares	Acquisition in two batches: — December 11, 2020: 50% allocated shares — June 27, 2021 : 50% of the allocated shares
Date of the end of the retaining period	n.a. [b]	n.a. [b]
Performance conditions	Free EBITDA and Average Net Debt over EBITDAS ratio	Free EBITDA and Average Net Debt over EBITDAS ratio
Number of performance shares acquired on December 31, 2018	0	0
Cumulative number of performance shares cancelled or lapsed	87,915	0
Performance shares remaining at the end of the financial year	3,020,302	132,821

Table 10 of the AMF Recommendation No. 2009-16
(a) Acquisition subject to the terms and conditions of the performance shares plan of June 27, 2018, except for the first batch's acquisition date.
(b) Considering the vesting period, no holding period has been set by the Board of Directors.

No performance shares had been allocated since 2012.

4.2.4. Transaction in the Company's shares carried out by Executives or their close relatives in the course of 2018 and until the date of the present document

In accordance with provisions of Article L. 621-18-2 of the French Monetary and Financial Code and Article 223-26 of the General Regulations of the Financial Markets Authority (AMF), the summary of transactions carried out pursuant to the above-mentioned Article L. 621-18-2 are set out below.

Executive Officers, Directors and members of the Executive Leadership Team (See paragraph 4.1.2.1.8 of the present document) are forbidden from carrying out any transactions in the Company's shares, whatever the nature, including the exercise of stock options:

(i) During the 30 calendar days preceding the publication of quarterly, semi-annual or annual results (transactions in the Company's shares can be carried out the day after the date of publication of such results); and

(ii) In case such Officers, Directors or Committee members hold any information which could have any influence on the share value in case of public disclosure.

Name	**Type of transaction**	**Date**	**Number of shares/ADS**	**Unit price**	**Amount of the transaction**
Jean-Georges Malcor Chief Executive Officer and Director as of the date of these transactions	Purchase of shares with warrants	February 23, 2018	7,423	€1.56	€11,579.88
	Purchase of Preferential subscription rights	February 23, 2018	2	€1.08	€2.16
	Purchase of shares with warrants	January 30, 2018	17,316	€1.56	€27,012.96
	Purchase of Preferential subscription rights	January 30, 2018	1	€1.04	€1.04
Bpifrance Participations Director as of the date of these transactions	Sale of shares	January 30, 2018	268,370	€3.066	€878,010.42
	Sale of Shares	January 30, 2018	17,000	€3.075	€52,275.00
	Sale of Preferential subscription rights	January 30, 2018	633,546	€0.9754	€617,960.77
	Sale of shares	January 31, 2018	398,261	€2.90	€1,154,956.90
	Sale of Shares	January 31, 2018	23,924	€2.89	€69,140.36
	Sale of Preferential subscription rights	January 31, 2018	799,312	€0.7164	€572,627.12
	Sale of shares	February 1, 2018	192,417	€2.9532	€568,245.88
	Sale of Shares	February 2, 2018	615,402	€2.6707	€1,643,554.12
	Exercize of preferential subscription rights	February 2, 2018	471,808	€0	€0
	Purchase of shares with warrants	February 12, 2018	1,533,376	€1.56	€2,392,066.56
Philippe Salle Director Chairman of the Board	Purchase of shares	February 28, 2018	18,500	€1.442	€26,677.00
	Purchase of shares	March 16, 2018	7,450	€1.60	€11,920.00
	Purchase of shares	April 9, 2018	31,860	€1.6059	€52,769.874
	Purchase of shares	November 14, 2018	126,251	€1.50	€189,376.50
Michael Daly Director	Purchase of shares with warrants	February 28, 2018	507	€1.56	€790.92
	Purchase of shares	November 8, 2018	19,337	€1.83625	€35,507.56
Sophie Zurquiyah Director and CEO	Purchase of shares	April 20, 2018	1,000	€1.837	€1,837.00
	Purchase of shares	November 8, 2018	5,000	€1.78311	€8,915.55
	Purchase of shares	November 8, 2018	5,000	€1.78317	€8,915.85
	Purchase of shares	November 8, 2018	9,000	€1.784201	€16,057.80
	Purchase of shares	November 9, 2018	10,000	€1.624096	€16,240.96
	Purchase of shares	November 9, 2018	11,000	€1.579	€17,369.00

Name	Type of transaction	Date	Number of shares/ADS	Unit price	Amount of the transaction
Colette Lewiner Director	Purchase of shares	February 28, 2018	1,000	€1.45	€1,450.00
	Purchase of shares	May 24, 2018	19,000	€ 2.27	€43.130,00
Luuna AS, legal entity linked to **Heidi Petersen** Director	Purchase of shares	March 23, 2018	6,800	€1.5368	€10,450.24
	Purchase of shares	November 9, 2018	13,200	€1.5570	€20,552.40
Mario Ruscev Director	Purchase of shares	March 15, 2018	156	US$2.05	US$319.80
	Purchase of shares	November 14, 2018	20,000	US$1.78	US$35,600.00
Yuri Baidoukov SEVP Group Chief Financial Officer	Purchase of shares	November 12, 2018	25,000	€1.617355	€40,433.87
Robert Semmens Director	Purchase of shares	December 12, 2018	10,000	US$1.2649	US$12,649.00
	Purchase of shares	December 28, 2018	10,000	US$1.27	US$12,700.00
Helen Lee Bouygues Director	Purchase of shares	November 8, 2018	20,000	€1.92	€38,400

Note : Pursuant to Article 223-23 of the General Regulation of the French Market Authority, the transactions reflected in this table are those (i) carried out by the persons referred to in Article L.621-18-2 of the French Monetary and Financial Code, and (ii) if the total amount of such transactions exceeds €20,000 par calendar year.

4.2.5. Transactions entered into between the Company and its Executives and/or shareholder holding more than 10% of the voting rights

The list of transactions entered into in the course of 2018 between the Company and companies or subsidiaries having common directors or common executives is reflected in the Statutory Auditors' special report on related party commitments in paragraph 4.2.6. of the present document.

4.2.6. Special report of statutory auditors on the regulated agreements and undertakings

This is a translation into English of the statutory auditors' report on related party agreement and commitments of the Company issued in French and it is provided solely for the convenience of English speaking users.

This statutory auditors' report includes information required by European regulation and French law. This report should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France.

To the shareholders of CGG,

In our capacity as statutory auditors of your company, we hereby report on certain related party agreements and commitments.

We are required to inform you, on the basis of the information provided to us, of the terms and conditions and interest for the company of the agreements and commitments indicated to us, or that we may have identified in the performance of our engagement. We are not required to comment as to whether they are beneficial or appropriate or to ascertain if any other agreements and commitments exist. It is your responsibility, in accordance with article R225-31 of the French code of commercial law, to evaluate the benefits resulting from those agreements and commitments prior to their approval.

In addition we are required, where applicable, to inform you, in accordance with article R225-31 of the French code of commercial law, of any agreements and commitments previously approved by shareholders which were executed during the year.

We performed the procedures which we considered necessary to comply with the professional guidance applicable in France to this type of engagement. The procedures consisted of verifying that the information provided to us was consistent with the documentation from which it was extracted.

Agreements and commitments subject to the approval of the general meeting of shareholders

Agreements and commitments authorized and signed in 2018

In accordance with article L225-40 of the French code of commercial law, we were advised of the following agreements and commitments signed during the year which were previously approved by your Board of Directors.

1. Agreements and commitments involving corporate officers

1.1 Agreements and commitments involving Philippe Salle, Chairman of the Board of Directors and Sophie Zurquiyah, Chief Executive Officer from April 26, 2018

Extension of the benefit of the Group's obligatory provident and health insurance plan

At its meeting of April 26, 2018 the company's Board of Directors authorized the application to Philippe Salle and Sophie Zurquiyah of the benefit of the Group's obligatory provident and health insurance plan applicable to all Group employees.

Persons concerned:

Philippe Salle with regard to his functions as Chairman of the Board of Directors and Sophie Zurquiyah with regard to her functions as Chief Executive Officer and Board member.

Interest of the commitment for the company:

The agreement reflects the previous arrangements for the Chairman of the Board of Directors and Chief Executive Officer, and is designed to provide company executives with a minimum level of social protection.

Amounts paid during the period:

The subscriptions paid by the company for 2018 with effect from April 26 amounted to €2,425 for Philippe Salle and €2,983 for Sophie Zurquiyah.

1.2 Agreements and commitments involving Sophie Zurquiyah, Chief Executive Officer and a Board member from April 26, 2018

Person concerned:

Sophie Zurquiyah with regard to her functions as Chief Executive Officer and Board member.

a) Provision of international medical insurance cover

Terms and conditions:

At its meeting of April 26, 2018 the company's Board of Directors authorized the provision of international medical insurance cover for the Chief Executive Officer with effect from her date of appointment. The applicable contract was arranged by CGG Services (U.S.) Inc., a subsidiary indirectly subject to 100% control by CGG SA.

This statutory auditors' report includes information required by European regulation and French law. This report should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France.

Interest of the commitment for the company:

The medical cover is necessitated by the Chief Executive Officer's frequent international travel. Its cost is consistent with the market rates for such insurance.

Amount paid during the period:

The subscription paid by CGG Services (U.S.) Inc. for 2018 with effect from April 26 amounted to USD 15,063.

b) Provision of specific unemployment insurance cover

Terms and conditions:

At its meeting of April 26, 2018 the company's Board of Directors authorized the provision by GSC of specific unemployment insurance cover, on the basis of 55% of base salary for 12 months, with effect from May 1, 2018. The organization of such cover is consistent with general market practices. As the cost is borne by the company, its full amount will be treated as a benefit in kind.

Interest of the commitment for the company:

The insurance reflects the previous arrangements for the Chief Executive Officer (until April 26, 2018) and is designed to provide the executive with a minimum level of social protection.

Amount paid during the period:

The subscription paid for 2018 with effect from April 26 amounted to €7,299.

c) Provision of compensation in the event of termination of office (issuance of a protection letter)

Terms and conditions:

In accordance with the provisions of article L225-42-1 of the French code of commercial law, at its meeting of April 26, 2018, and following proposal by the Remuneration and Appointments Committee, the company's Board of Directors authorized the provision of a special termination indemnity, judged in line with market practices, payable to Sophie Zurquiyah in the following circumstances:

- In case of revocation, non-renewal or any other instance of forced departure (leading to resignation) linked to a change of control and not reflecting any situation of failure to achieve the performance criteria mentioned below. Any departure within twelve months of a change of control would be deemed to constitute a forced departure;
- In case of revocation in the absence of any gross or serious misconduct and not reflecting any situation of failure to achieve the performance criteria mentioned below.

The special termination indemnity is equal to the difference between (i) a gross amount of 200% of the applicable annual compensation of reference, including any and all amounts to which Sophie Zurquiyah may be entitled as a result of said termination, and (ii) any sums to be paid further to the application of her non-competition undertaking.

The applicable annual compensation of reference is defined as the fixed compensation received during the twelve-month period preceding the departure date, to which is added the yearly average of the variable compensation received over the thirty-six months preceding the departure date. In the event of departure within less than twelve months, the fixed compensation would be reconstituted on an annual basis. The applicable variable compensation would be calculated taking into account the annual levels of achievement determined by the Board of Directors since the start of the appointment.

The payment of the special termination indemnity is subject to the achievement of performance conditions and is namely correlated to the average achievement of the objectives underpinning the variable annual compensation of the last three fiscal years, according to the following rule:

- If the average achievement rate is inferior to 60%, no special termination indemnity will be paid;
- If the average achievement rate is equal or superior to 60%, the special termination indemnity will equal between 60% and 100% of the amount calculated on a proportional basis.

Should those provisions require application during the first three years of the Chief Executive Officer's appointment, the assessment of the achievement of the applicable performance conditions would be performed as follows:

- In the event of departure in 2018 or 2019, the Board of Directors would determine the average achievement rate on the basis of the period since the date of appointment as Chief Executive Officer, which rate would then apply as provided for above;
- In the event of departure in 2020, the Board of Directors would exceptionally determine the average achievement rate on the basis of the two fiscal years preceding the date of notice of termination.

The Board of Directors must verify, prior to payment of the special termination indemnity, (i) that the applicable performance conditions have been met; and (ii) that the special termination indemnity remains compliant with the company's code of corporate governance in force at the departure date.

Interest of the commitment for the company:

The Board of Directors has approved the protection letter providing for the special termination indemnity as presented to it and on the basis that it appears consistent with general market practices and has been agreed in the interest of the company and with a view to protecting the interests of Sophie Zurquiyah.

Amount paid during the period:

No payment was made in respect of Sophie Zurquiyah's special termination indemnity during 2018.

d) Non-competition undertaking

Terms and conditions:

At its meeting of April 26, 2018, and following proposal by the Remuneration and Appointments Committee, the company's Board of Directors authorized the conclusion of a non-competition undertaking between the company and Sophie Zurquiyah. The undertaking covers a period of eighteen months and applies to services involving the acquisition, processing or interpretation of geophysical data, or the supply of equipment or other products designed for the acquisition, processing or interpretation of geophysical data, and implying Sophie Zurquiyah's contribution to projects or other activities in the same domain as for Sophie Zurquiyah's activity within CGG. As consideration for her undertaking, Sophie Zurquiyah would receive remuneration equating with 100% of her annual compensation of reference as defined by her protection letter.

Interest of the commitment for the company:

The Board of Directors sees this undertaking as indispensable to preserving the interests of the company and of the Group given the relationships to be developed by Sophie Zurquiyah with the Group's main customers and other partners and her overall knowledge of the Group's operations and strategy. The applicable consideration reflects the duration of the undertaking.

Amount paid during the period:

No payment was made in respect of Sophie Zurquiyah's non-competition undertaking during 2018.

e) Authorization for the benefit of the Group's article 83 supplemental pension and retirement plan

Terms and conditions:

At its meeting of April 26, 2018 the company's Board of Directors authorized the application to Sophie Zurquiyah of the Group's article 83 supplemental pension and retirement plan implemented since January 1, 2005 for the benefit of members of the Group's executive bodies in France. The plan is subject to the following subscription limits:

- Social security Tranche A: 0.5% of employee contribution and 1.0% of employer's contribution;
- Social security Tranche B: 2.0% of employee contribution and 3.0% of employer's contribution;
- Social security Tranche C: 3.5% of employee contribution and 5.0% of employer's contribution.

The subscription is based on gross annual compensation limited to basic salary, annual variable compensation and company vehicle benefit in kind, to the exclusion therefore of any other element of remuneration.

The Board of Directors noted that Sophie Zurquiyah was an eligible beneficiary for the plan.

Interest of the commitment for the company:

The extension for the benefit of Sophie Zurquiyah reflects the previous arrangements for the Chief Executive Officer (until April 26, 2018) and is designed to provide the executive with a minimum level of social protection.

Amount paid during the period:

The subscription paid for 2018 with effect from April 26 amounted to €8,111.

Agreements and commitments already approved by the general meeting of shareholders

Agreements and commitments approved during previous fiscal years which continued to be executed during the latest fiscal year

In accordance with Article R225-30 of the French code of commercial law, we were informed that the following agreements and commitments, previously approved by general meetings of shareholders of previous fiscal years, continued to be executed during the year.

2. Agreements and commitments involving corporate officers

2.1 Agreements and commitments involving Jean-Georges Malcor, Chief Executive Officer until April 26, 2018 and a Board member until March 8, 2018

Person concerned:

Jean-Georges Malcor in his capacity as Chief Executive Officer until April 26, 2018 and a Board member until March 8, 2018.

It must first be recalled that Jean-Georges Malcor's appointment as Chief Executive Officer was terminated on April 26, 2018 and his appointment as Board member ended on March 8, 2018, for which reason agreements involving him are no longer within the scope of articles L225-38 and following of the French code of commercial law from that date on and are treated as such in the present report.

a) Extension of the benefit of the defined benefit supplementary pension and retirement plan (governed by article 39 of the French code of tax law) and associated performance conditions

Terms and conditions:

On May 4, 2011, after authorization by the Board of Directors on June 30, 2010, the general meeting of shareholders approved the extension of the defined benefit supplementary pension and retirement plan for the benefit of Jean-Georges Malcor, under the same conditions as applicable to the other beneficiaries.

Pursuant to article L225-42-1 of the French code of commercial law, at its meeting of June 1, 2017 the Board of Directors both renewed Jean-Georges Malcor's appointment as Chief Executive Officer and subjected his supplementary pension benefit to the same performance conditions as for his special termination indemnity. The Board of Directors noted Jean-Georges Malcor's compliance with those performance conditions in 2017 and 2018 and equally, with all the applicable criteria for his eligibility for defined benefit supplementary pension as governed by article L137-11 of the French code of social security law.

Amount paid during the period:

No payment was made in respect of this plan during 2018.

b) Extension of the benefit of the defined benefit supplementary pension and retirement plan (governed by article 83 of the French code of tax law)

Terms and conditions:

On May 4, 2011, after authorization by the Board of Directors on June 30, 2010, the general meeting of shareholders approved the extension of the defined benefit supplementary pension and retirement plan, implemented with effect from January 1, 2005, for the benefit of Jean-Georges Malcor, under the same conditions as applicable to the other beneficiaries.

Amount paid during the period:

The subscription paid for 2018 amounted to €8,939.69.

c) Non-competition commitment

Terms and conditions:

On May 4, 2011, after authorization by the Board of Directors on June 30, 2010, the general meeting of shareholders approved the subscription of a non-competition commitment by Jean-Georges Malcor. In consideration for that commitment for an eighteen-month period following the cessation of his functions, Jean-Georges Malcor would be entitled to receive compensation corresponding to 100% of his annual compensation of reference as defined in his protection letter.

On December 1, 2017 the Board of Directors defined terms and conditions for the cessation of Jean-Georges Malcor's appointment as Chief Executive Officer and decided to maintain the requirement for a non-competition commitment subject to consideration set at 16/12ths of the annual remuneration of reference in the event of signature of a contract of employment and a period of commitment of twenty-four months.

Amount paid during the period:

In 2018, the company paid Jean-Georges Malcor €1,626,673 of non-competition compensation.

d) Commitments by the company towards Jean-Georges Malcor in the event of cessation of his appointment as Chief Executive Officer before October 1, 2018

Terms and conditions:

On December 1, 2017 your Board of Directors, following a recommendation by the Remuneration and Appointments Committee, authorized your company to sign the term sheet including the terms and conditions applicable to the termination of Jean-Georges Malcor's appointment. In the event of termination of Jean-Georges Malcor's corporate appointment before October 1, 2018, your Board of Directors authorized the following commitments:

(i) The signature of a permanent contract of employment recognizing Jean-Georges Malcor's length of past service, it being noted that Jean-Georges Malcor has undertaken to take his retirement with effect from October 1, 2018 so any contract of employment would end on October 1, 2018 in the absence of the parties' express agreement to prolong the contract beyond that date;

(ii) The exercise by Jean-Georges Malcor of the functions of Senior Advisor as a member of the Executive Committee, mainly for the purpose of assisting your company's new Chief Executive Officer and advising her on matters relating to relationships with the company's shareholders or the company's operations;

(iii) Jean-Georges Malcor's continued entitlement to the benefit of the defined benefit supplementary pension and retirement plan applicable within the Group to certain members of the Executive Committee, the extension of which to Jean-Georges Malcor was authorized by the Board of Directors on June 30, 2010 and June 1, 2017 and approved by the general meeting of shareholders held on October 31, 2017;

(iv) Gross monthly compensation of €52,500 and Jean-Georges Malcor's right to reimbursement of his professional expenses in accordance with the company's practices;

(v) The subscription of non-solicitation and non-competition undertakings by Jean-Georges Malcor, for a period of twenty-four months following the termination of his contract of employment and in return for compensation set at 16/12ths of his annual compensation of reference; said non-competition undertaking replacing the undertaking subscribed by Jean-Georges Malcor in his capacity of Chief Executive Officer authorized by your Board of Directors on June 30, 2010 and approved by the general meeting of shareholders held on May 4, 2011.

The aforementioned terms and conditions were ratified by the general meeting of shareholders held on April 26, 2018.

Amount paid during the period:

For the exercise of his salaried functions, between April 26, 2018 and September 30, 2018 Jean-Georges Malcor received gross remuneration of €52,500 per month so €262,500 in total. He equally had the benefit of a company car until his retirement on September 30, 2018.

He remains subject to the non-competition commitment authorized by the Board of Directors on December 1, 2017 and described in paragraph 2.1.c of the present report.

Finally, during the period Jean-Georges Malcor retained the benefit of the supplementary pension and retirement plan described in paragraph 2.1.a and 2.1.b of the present report.

e) Extension of the benefit of the Group's obligatory provident and health insurance plan

Terms and conditions:

On May 4, 2011, after authorization by the Board of Directors on June 30, 2010, the general meeting of shareholders approved the extension of the general benefits plan with Swiss Life for the benefit of Jean-Georges Malcor, under the same conditions as applicable to the other beneficiaries.

Amount paid during the period:

The subscription paid for 2018 amounted to €1,886.

f) Individual insurance policy covering loss of employment

Terms and conditions:

On May 4, 2011, after authorization by the Board of Directors on June 30, 2010, the general meeting of shareholders approved the subscription of an individual insurance policy covering loss of employment subscribed by your company with GSC GAN for the benefit of the Chief Executive Officer.

Amount paid during the period:

The subscription paid for 2018 amounted to €10,876.

2.2 Agreements and commitments involving Rémi Dorval, Chairman of the Board of Directors until April 26, 2018

Extension of the benefit of the Group's obligatory provident and health insurance plan

Person concerned:

Rémi Dorval, in his capacity as Chairman of the Board of Directors until April 26, 2018.

It must first be recalled that Rémi Dorval's appointments as Chairman of the Board of Directors and Board member were terminated by the general meeting of shareholders held on April 26, 2018, for which reason agreements involving him are no longer within the scope of articles L225-38 and following of the French code of commercial law from that date on and are treated as such in the present report.

Terms and conditions:

On May 15, 2015 the general meeting of shareholders approved the extension of the general benefits plan with Swiss Life for the benefit of Rémi Dorval, under the same conditions as applicable to the other beneficiaries.

Amount paid during the period:

The subscription paid for 2018 amounted to €841.84.

2.3 Agreements and commitments involving shareholders

Commitments made by your company to BPI France Participations SA in the framework of its financial restructuring

With BPI France Participations SA in that company's capacity as a stockholder in CGG prior to the financial restructuring.

Terms and conditions:

On October 16, 2017 your Board of Directors made the following commitments to BPI France Participations SA:

(i) Not to divest, in any form, its major assets through December 31, 2019 unless so authorized by the Paris commercial court;

(ii) To confirm that its business plan equally provides for no divestment, in any form, of major assets held by its direct or indirect subsidiaries in France or abroad; should any such divestments be liable to result in substantial modification of the bases or objectives of the company's recovery plan, your company would be required to request the prior authorization of the Paris commercial court. It is nevertheless agreed that your company should retain sufficient flexibility to be able, if appropriate, to take an active part in the consolidation or in any other form of evolution of the seismic industry in terms of mergers and acquisitions;

(iii) Not to envisage any social or industrial restructuring in France; more specifically, and unless otherwise authorized by the Paris commercial court, not to implement any job preservation plan in France before December 31, 2019 and to maintain intact the centers of decision of the company and its French subsidiaries currently located in France, including your company's headquarters, until December 31, 2022;

(iv) Not to take any measures to counter the governance undertakings subscribed to by the creditor signatories to the lockup agreement and to take part in the discussions with the company's creditors and other parties on the new composition of your company's Board of Directors.

Amount paid during the period:

No payment was made in respect of this agreement during 2018.

Paris La-Défense and Courbevoie, April 5, 2019

The statutory auditors

ERNST & YOUNG et Autres	MAZARS
Nicolas PFEUTY	Jean-Luc BARLET

4.3. INFORMATION ON THE SHARE CAPITAL OF THE COMPANY

4.3.1. General information on the Company's share capital

4.3.1.1. Changes in the share capital and voting rights

There are no specific rules in the Company's articles of association relating to the change in the share capital or the rights attached to the securities constituting the share capital. As a consequence, these changes shall be carried out in accordance with legal requirements.

4.3.1.2. Share capital

Share capital

2018

In the framework of the implementation of the financial restructuring plan, the extraordinary general meeting held on November 13, 2017 decided, among others, to reduce the share capital of the Company in an amount of €17,485,187.71 by reducing the nominal value of each share, from €0.80 to €0.01. This share capital reduction was completed by decision of the Board of Directors on January 15, 2018.

On January 15, 2018, further to the acknowledgment of the share capital reduction by the Board of Directors, the share capital of the Company amounted to €221,331.49, divided into 22,133,148 shares, all fully paid.

As part of the implementation of its financial restructuring plan, the Company issued on February 21, 2018:

- 71,932,731 shares of the Company, each with one share purchase warrant, all of which were subscribed by holders of preferential subscription rights;
- 35,311,528 new shares resulting from the equitization of the Convertible Bonds;
- 449,197,594 new shares resulting from the equitization of the Senior Notes;
- 22,133,149 warrants allocated to the shareholders of CGG (the "Warrants #1");
- 113,585,276 warrants in favor of the subscribers of the Second Lien Notes (the "Warrants #3");
- 7,099,079 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Coordination Warrants");
- 10,648,619 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Backstop Warrants").

As a result of these transactions, our issued share capital amounted to €5,785,750 divided into 578,575,002 shares of the same class with a nominal value of €0.01 per share, all fully paid. Various changes in the share capital occurred since then, as a result of the exercise of the warrants. These changes are detailed below.

Warrants #3, Coordination Warrants and Backstop Warrants expired on August 21, 2018.

As of December 31, 2018, our issued share capital amounted to €7,099,448, divided into 709,944,816 shares of the same class with a nominal value of €0.01 per share, all fully paid.

2019

As of February 28, 2019, our issued share capital amounted to €7,099,477 divided into 709,947,758 shares of the same class with a nominal value of €0.01 per share, all fully paid.

Dilutive instruments

As of December 31, 2018 and as of the date of this document, the only dilutive instruments issued were stock options (see paragraph 4.2.3.1 of this document), performance shares (see paragraph 4.1.3.2 of this document) and warrants described below.

The number of shares that could derive from our dilutive instruments in circulation on December 31, 2018 and as of February 28, 2019, on the basis of their terms in force as of these dates, as well as the corresponding percentage of dilution are presented in the table below.

	12.31.2018	Dilution	02.28.2019	Dilution
Stock-options	7,460,076[a]	1.05%	7,431,832[a]	1.05%
Performance shares	3,153,123	0.44%	3,137,927	0.44%
Warrants#1	29,434,084	4.15%	29,433,032	4.15%
Warrants#2	47,932,690	6.75%	47,930,800	6.75%

(a) Number of shares adjusted further to the share capital increase dated February 5, 2016, to the stock reverse split dated July 20, 2016 and to the share capital increase dated February 21, 2018.

Warrants

The following table sets out some of the key characteristics of the warrants issued in the framework of the implementation of our financial restructuring on February 21, 2018:

	Warrants #1	Warrants #2	Warrants #3	Coordination Warrants	Backstop Warrants
Number of warrants issued	22,133,149	71,932,731	113,585,276	7,099,079	10,648,619
Exercise ratio	3 Warrants #1 for 4 new shares	3 Warrants #2 for 2 new shares	1 Warrant #3 for 1 new share	1 Coordination Warrant for 1 new share	1 Backstop Warrant for 1 new share
Exercise price	3.12 euros per new share	4.02 euros per new share	0.01 euro per new share	0.01 euro per new share	0.01 euro per new share
Maximum number of shares to be issued upon exercise of the warrants (subject to adjustments)	29,477,536[1]	47,955,154	113,585,276	7,099,079	10,648,619
Expiry date of the warrants	February 21, 2022	February 21, 2023	August 21, 2018	August 21, 2018	August 21, 2018

(1) The 24,996 Warrants #1 allocated to the Company in connection with the treasury shares were cancelled.
(2) Subject to extension cases.

Warrants #1: warrants allocated to the shareholders of CGG;

Warrants #2: warrants associated to new shares ("ABSA"), all of which were subscribed by holders of preferential subscription rights;

Warrants #3: warrants in favor of the subscribers of the Second Lien Notes;

Coordination Warrants: warrantsallocated to the members of the ad hoc committee of holders of Senior Notes;

Backstop Warrants: warrants allocated to the members of the ad hoc committee of holders of Senior Notes.

These warrants can be exercised pursuant to the terms and conditions described in the prospectuses n°17-551 dated October 13, 2017 and N°18-018 dated January 16, 2018.

Warrants #3, Coordination Warrants and Backstop Warrants expired on August 21, 2018.

Changes in share capital during the past three years and until February 28, 2019

Transaction	Nominal value	Number of shares created	Amount of the share premium	Amount of the capital variation	Resulting total share capital
Share capital increase dated February 28, 2018 (as a result of the exercize of warrants)	€0.01	402	€1,266,42	€4.02	€7,099,477,58
Share capital increase dated February 6, 2018 (as a result of the exercize of warrants)	€0.01	2,540	€9,584,20	€25,40	€7,099,473,56
Share capital increase dated January 9, 2018 (as a result of the exercize of warrants)	€0.01	418	€1,308,98	€4,18	€7,099,448,16
Share capital increase dated December 5, 2018 (as a result of the exercize of warrants)	€0.01	512	€1,653,52	€5,12	€7,099,443,98
Share capital increase dated November 8, 2018 (as a result of the exercize of warrants)	€0.01	1,006	€3,292,46	€10,06	€7,099,438,86
Share capital increase dated October 2, 2018 (as a result of the exercize of warrants)	€0.01	2,162	€6,873,22	€21,62	€7,099,428,80
Share capital increase dated September 4, 2018 (as a result of the exercize of warrants)	€0.01	858	€2,878,98	€8,58	€7,099,407,18
Share capital increase dated August 23, 2018 (as a result of the exercize of warrants)	€0.01	10,613,316	€0	€106,133,16	€7,099,398,60
Share capital increase dated August 2, 2018 (as a result of the exercize of warrants)	€0.01	497,637	€6,827,84	€4,976,37	€6,993,265,44
Share capital increase dated July 2, 2018 (as a result of the exercize of warrants)	€0.01	1,115,710	€4,750,46	€11,157,10	€6,988,289,07
Share capital increase dated June 1, 2018 (as a result of the exercize of warrants)	€0.01	2,372,284	€9,939,32	€23,772,84	€6,977,131,97
Share capital increase dated May 4, 2018 (as a result of the exercize of warrants)	€0.01	68,953	€2,214,32	€689,53	€6,953,409,13
Share capital increase dated April 24, 2018 (as a result of the exercize of warrants)	€0.01	9,863,863	€27,608,64	€98,638,63	€6,952,719,60
Share capital increase dated April 3, 2018 (as a result of the exercize of warrants)	€0.01	99,950,700	€142,803,78	€999,507,00	€6,854,080,97
Share capital increase dated March 9, 2018 (as a result of exercise of certain warrants by their holders)	€0.01	6,882,395	€15,064,84	€68,823,95	€5,854,573,97
Share capital increase dated February 21, 2018 (reserved to the senior noteholders)	€0.01	449,197,594	€1,397,004,517,34	€4,491,975,94	€5,785,750,02
Share capital increase dated February 21, 2018 (reserved to the convertible bondholders)	€0.01	35,311,528	€361,943,162,00	€353,115,28	€1,293,774,08
Share capital increase dated February 21, 2018 (with preferential subscription right)	€0.01	71,932,731	€111,495,733,05	€719,327,31	€940,658,80
Share capital reduction dated January 15, 2018	€0.01	—	—	€-17,485,187,17	€221,331,49
Share capital reduction dated August 11, 2016	€0.80	—	—	€-265,597,788	€17,706,519
Stock reverse split dated July 20, 2016 (1 new share for 32 former shares)	€12.80	—	—	—	€283,304,307
Share capital increase dated February 5, 2016	€0.40	531,195,576	€138,110,849,76	€212,478,230,40	€283,304,307

4.3.1.3. Share buyback program approved by the General Meeting held on April 26, 2018

At the General Meeting held on April 26, 2018, our shareholders authorized the Board of Directors to acquire up to 10% of our share capital through purchases of shares and to resell shares so acquired for the 18 months following the date of such meeting, with the following objectives:

- to support liquidity of our shares through a liquidity contract entered into with an investment service provider in compliance with the Code of Practice of the French *Autorité des Marchés Financiers*;
- to deliver shares in the scope of securities giving access, immediately or in the future, to shares by redemption, conversion, exchange, presentation of a warrant or by any other means;
- to deliver, immediately or in the future, shares in exchange in the scope of external growth within the limit of 5% of the share capital;
- to allocate shares to employees and officers of the Company or affiliated companies within the meaning of article L.225-180 of the French Commercial Code, including but not limited to options to purchase shares of the Company;
- to deliver shares for no consideration to executive officers and employees, including but not limited to the scope of articles L. 225-197-1 and seq. of the French Commercial Code; and
- to cancel the shares through a capital reduction, subject to a decision of, or an authorization by the extraordinary general meeting.

In accordance with these objectives (save for liquidity contracts), the treasury shares so acquired may be either cancelled, sold or otherwise transferred. The shares may be acquired, sold or transferred, on one or several occasions, by any means, including by individual agreement or market purchase, by an offer to buy, or in a block of shares and at any moment, but not during a take-over bid. The maximum amount of share capital that can be purchased or transferred as block of shares can be up to the total authorized amount under this program.

The General Meeting approved a maximum purchase price of €3.12 per share.

The maximum number of shares that we are entitled to hold is 10% of our share capital as at the time of the purchase, less any shares acquired under previous authorizations. Notwithstanding the above, pursuant to Article L.225-209, paragraph 6 of the French Commercial Code, the number of shares that may be acquired and retained for possible use for payment or exchange in the context of a merger, demerger or contribution may not exceed 5% of the share capital.

This authorization was granted for an 18-month period from the date of the General Meeting approving the program, i.e. until October 25, 2019.

This share buyback program was not implemented in 2018.

As of December 31, 2018, we held 24,996 of our own shares, acquired in the course of 2010.

As of the date of this report, we do not expect to request any shareholders' authorization to implement a share buyback program, in the course of the General Meeting to be convened to approve the 2018 financial statements.

4.3.1.4. Authorized capital

The tables below summarize the financial delegations granted by the General Meeting to the Board of Directors, which are currently in force.

Share capital increases

	Authorizations in force in 2018			
	Resolution number — General Meeting	**Period**	**Maximum authorized amount**	**Use of the authorization in 2018**
Issuance and granting of free warrants to the shareholders of the Company	19th — GM 11/13/2017 (*)	18 months	€325,000 upon exercise of the warrants (2)	02.21.2018 : Issuance of 22,133,149 warrants, corresponding to a maximum number of shares to be issued of 29,477,536
Issuance of new shares with warrants attached with shareholders' preferential subscription rights	20th — GM 11/13/2017 (*)	18 months	€720,000 and €480,000 upon exercise of the warrants (2)	02.21.2018 : Issuance of 71,932,731 warrants, corresponding to a maximum number of shares to be issued of 47,955,154
Issuance of new shares with removal of the shareholders' preferential subscription rights in favor of holders of OCEANE (1)	21st — GM 11/13/2017 (*)	18 months	€375,244 (2)(3)	02.21.2018 : Issuance of 35,311,528 shares

Authorizations in force in 2018

	Resolution number — General Meeting	Period	Maximum authorized amount	Use of the authorization in 2018
Issuance of new shares, with removal of the shareholders' preferential subscription rights in favor of holders of Senior Notes (1)	22nd — GM 11/13/2017 (*)	18 months	€4,967,949 (2)(3)	02.21.2018 : Issuance of 449,197,594 shares
Issuance of new notes secured by second-ranking security interests and warrants, either freestanding or attached to said notes, with removal of the shareholders' preferential subscription rights in favor of persons committed to subscribing for the Second Lien Notes, in accordance with the private placement agreement dated June 26, 2017 (1)	23rd — GM 11/13/2017 (*)	18 months	€1,238,173 upon exercise of the warrants (2)(3)	02.21.2018 : Issuance of 113,585,276 warrants, corresponding to a maximum number of shares to be issued of 113,585,276
Issuance and granting of free warrants, with removal of the shareholders' preferential subscription right in favor of funds and/or entities advised and/or managed by Alden Global Capital LLC, Attestor Capital LLP, Aurelius Capital Management LP, Boussard & Gavaudan Asset Management LP, Contrarian Capital Management LLC, et Third Point LLC	24th — GM 11/13/2017 (*)	18 months	€77,386 upon exercise of the warrants (2)(3)(4)	02.21.2018 : Issuance of 7,099,079 warrants, corresponding to a maximum number of shares to be issued of 7,099,079
Issuance and granting of free warrants, with removal of the shareholders' preferential subscription rights in favor of persons backstopping the subscription of the new notes secured with second-ranking security interests (1)	25th — GM 11/13/2017 (*)	18 months	€116,079 upon exercise of the warrants (2)(3)	02.21.2018 : Issuance of 10,648,619 warrants, corresponding to a maximum number of shares to be issued of 10,648,619
Increase of capital, reserving the subscription of the shares to be issued to members of a Company Savings Plan ("*Plan d'Epargne Entreprise*")	19th — GM 04/26/2018 (**)	26 months	€115,800 (5)	None
	26th — GM 11/13/2017 (*)(**)	26 months	€115,800 (2)(6)	None

(1) Category of persons under article L.225-138 of the French Commercial Code.
(2) Deducted from the ceiling of €8,415,631 set forth in the 27th resolution of the General Meeting held on November 13, 2017.
(3) Deducted from the ceiling of €6,890,631 set forth in the 27th resolution of the General Meeting held on November 13, 2017.
(4) The updates of the Reference document on October 13, 2017 and on January 16, 2018 contained a material mistake regarding the maximum authorized amount pursuant to the 24th resolution submitted to the General Meeting held on November 13, 2017. This material mistake is corrected in this table.
(5) Within the limit of the aggregate ceilling of €355,000 mentioned in the 20th resolution of the General Meeting held on April 26, 2018.
(6) The updates of the Reference document on October 13, 2017 and on January 16, 2018 contained a material mistake regarding the maximum authorized amount pursuant to the 26th resolution submitted to the General Meeting held on November 13, 2017. This material mistake is corrected in this table.
(*) Further to the completion of our Financial restructuring on February 21, 2018, the General Meeting held on April 26, 2018 decided, through its 14th resolution, to terminate this delegation, for its non-used portion, with immediate effect.
(**) Cancels and replaces, for the non-used portion, the resolutions voted in this respect during the previous General Meetings.

Stock-options and performance shares

	Authorizations in force in 2018			
	Resolution number — General Meeting	Period	Maximum authorized amount	Use of the authorization in 2018
Stock-options	17th — GM 04/26/2018: Allocation to the employees and senior executive officers	26 months	Maximum number of 15,746,813 stock-options over the period of the authorization	06/27/2018: allocation of 6,544,141 stock-options and 12/11/2018: allocation of 671,171 stock-options
Performance shares	18th — GM 04/26/2018: Allocation to the employees and senior executive officers	26 months	Maximum number of 6,928,598 performance shares stock-options over the period of the	06/27/2018: allocation of 3,108,217 performance shares and 12/11/2018: allocation of 132,821 performance shares

Share buy-back program

	Authorizations in force in 2018			
	Resolution number — General Meeting	Period	Maximum authorized amount	Use of the authorization in 2018
Share repurchase	7th — GM 04/26/2018	18 months	10% of the share capital Maximum amount: €3.12 per share	None

Capital reduction

	Authorizations in force in 2018			
	Resolution number — General Meeting	Period	Maximum authorized amount	Use of the authorization in 2018
Share cancellation	15th — GM 04/26/2018	18 months	10% of the share capital	None
Reduction of the nominal value	19th — GM 11/13/2017	n.a.	€17,485,187.71	01/15/2018 : Share capital reduction amounting to €17,485,187.71

4.3.1.5. Securities not giving access to the share capital

First lien notes due 2023

As part of the financial restructuring, on February 21, 2018, CGG Holding (U.S.) Inc. issued US$663.6 million in principal amount of first lien notes due 2023, bearing floating rate interest at LIBOR (with a floor of 1%) plus 6.5% per annum in cash, and 2.05% per annum PIK interest, in exchange for the remaining claims under Credit Facilities, reduced by the cash payment of US$150 million. See "1.2 — History and significant events in the development of the Company's activities — Financial restructuring process — Description of the Safeguard Plan" for more details..

On May 6, 2018, these notes were redeemed after the new first lien senior secured notes with maturity 2023 were issued by CGG Holding (U.S.) Inc. (an indirect fully owned subsidiary of CGG SA), for a total nominal amount of US$300 million bearing interest at 9.00 % plus €280 million bearing interest at 7.875%. In connection with the issuance of the first lien notes, CGG Holding (U.S.) Inc. as Issuer, the Company and certain of its subsidiaries as Guarantors and The Bank of New York Mellon, London Branch as Trustee, among others, executed an indenture dated May 6, 2018

Second lien notes due 2024

As part of the financial restructuring, on February 21, 2018, the Company issued US$355.1 million and €80.4 million in principal amounts of second lien notes due 2024, bearing interest at a rate including a variable component indexed on the LIBOR (for the tranche denominated in US dollars) and EURIBOR (for the tranche denominated in euros), in each case, with a floor of 1%, plus a margin of 4.0% per annum, and PIK interest of 8.5% per annum. In connection with the issuance of the second lien notes, CGG SA as Issuer, certain of its subsidiaries as Guarantors, and The Bank of New York Mellon, London Branch as Trustee, among others, executed an indenture dated February 21, 2018. The net proceeds from the issuance of the new money portion of the second lien notes were used as set forth in "1.2 — History and significant events in the development of the Company's activities — Financial restructuring process — Description of the Safeguard Plan".

4.3.1.6. General meetings

Convening (articles 14.2 and 14.3 of our articles of association)

The General Meeting is convened and takes decision under the conditions set forth by law. The General Meeting meets at the head office or at any other place as may be indicated in the notice of convening.

Conditions to attend and vote at General Meetings (article 14.6 of our articles of association)

Subject to the provisions of article L. 225-104 and seq. of the French Commercial code, the conditions for shareholders to attend the General Meetings of the Company are described in articles 14, 15 and 16 of our articles of association.

The General Meeting is composed of all the shareholders, either personally or represented by another person, whatever the number of shares they hold.

Any shareholder shall have the right to attend the general meetings and to vote on the resolutions, either personally or by agent, regardless of the number of shares held, on simple justification of his/her identity, provided that, (i) in the case of a registered shareholder or financial intermediary referred to in Article L. 228-1 of the Commercial code, the registered shareholder or financial intermediary referred to in Article L. 228-1 of the Commercial code is registered in the securities accounts of the Company on the second business day prior to the date of the General Meeting at 12 a.m., Paris time, or, (ii) in the case of a holder of shares in bearer form, within the same period, a certificate delivered by an authorized financial intermediary, evidencing the recording of the shares in the book up to the date of the General Meeting, was sent to the place indicated in the convening notice.

4.3.2. Main shareholders

4.3.2.1. Current structure of the share capital and of voting rights

4.3.2.1.1. Share capital as of December 31, 2018

As of December 31, 2018, we had 687 shareholders in registered form.

On March 9, 2012, Bpifrance Participations (formerly named Fonds Stratégique d'investissment) and IFP Energies Nouvelles announced that they had entered into a shareholders' agreement relating to their shareholding in order to implement a common approach on the matters relating to the Company. They announced on February 5, 2018, that they terminated this agreement.

On December 31, 2018, our Directors and the members of our Corporate Committee held 380,371 shares and 20,337 ADS, representing 402,538 voting rights, i.e. 0.0564% of the share capital and 0.0567% of the voting rights.

On December 31, 2018, the number of shares held by the employees of the Group, through the Group Employee Savings Plan instituted in 1997, amounted to 273 shares corresponding to 0.00004% of the share capital and 0.0001% of the voting rights of CGG.

On December 31, 2018, the Company held 24,996 of its own shares, acquired pursuant to the authorizations granted by the shareholders as described in paragraph 4.3.1.3 of this document.

The table below sets forth certain information with respect to entities known to us or ascertained from public filings to beneficially own a significant percentage of our voting securities as of December 31, 2018:

	Number of shares	% capital	Number of theoretical voting rights	% theoretical voting rights	Number of voting rights to be exercized during General Meetings	% voting rights to be exercized during General Meetings
Contrarian Capital Management LLC (a)	65,633,491	9.24%	65,633,491	9.24%	65,633,491	9.24%
Morgan Stanley (b)	37,162,490	5.23%	37,162,490	5.23%	37,162,490	5.23%
Thunderbird Partners LLP (c)	35,832,554	5.05%	35,832,554	5.05%	35,832,554	5.05%
River and Mercantile Asset Management LLP (d)	35,539,430	5.01%	35,539,430	5.01%	35,539,430	5.01%
CGG Actionnariat	273	0.00004%	546	0.0001%	546	0.0001%
Public	535,751,582	75.4638%	535,805,656	75.4657%	535,805,656	75.4683%
Treasury stock (e)	24,996	0.0035%	24,996	0.0035%	0	0.00%
TOTAL NUMBER OF SHARES OUTSTANDING AND VOTING RIGHTS	**709,944,816**	**100%**	**709,999,163**	**100%**	**709,974,167**	**100%**

a) *Calculated on the basis of the number of shares held by Contrarian Capital Management LLC as indicated in the notice of threshold crossing dated August 12, 2018.*
b) *Calculated on the basis of the number of shares held by Morgan Stanley as indicated in the notice of threshold crossing dated October 19, 2018.*
c) *Calculated on the basis of the number of shares held by Thunderbird Partners LLP as indicated in the notice of threshold crossing dated November 27, 2018.*
d) *Calculated on the basis of the number of shares held by River and Mercantile Asset Management LLP as indicated in the notice of threshold crossing dated December 11, 2018.*
e) *Shares held by the Company are deprived of voting rights for all General Meetings.The corresponding voting rights are reflected to provide theoretical voting rights only.*

To our knowledge, on December 31, 2018, there was no other shareholder holding, on an individual basis or pursuant to any agreement with another shareholder, more than 5% of the share capital or of the voting rights.

« Titres au porteur identifiable » (article 7.1 of our articles of association)

We may avail ourselves of the legal procedure known as *titres au porteur identifiables*, according to which we are entitled to request Euroclear France to disclose the name, nationality, address and the number of shares held by holders of those securities of ours which have, or which may in the future acquire, voting rights.

Double voting rights

As from May 22 1997, a double voting right is allocated to all registered and fully paid-up shares registered in the name of the same holder for at least two years.

In the event of an increase in capital by incorporation of reserves, profits or paid in capital, this double voting right is granted to registered shares allocated free to a shareholder as soon as they are issued, at the rate of the former shares for which he benefits from this right.

The double voting right ceases ipso jure for any share having been subject to a conversion to bearer form or a transfer of ownership subject to exceptions provided for by law.

In accordance with article L.225-99, paragraph 2, of the French Commercial Code, the Extraordinary General Meeting cannot withdraw the double voting rights without a prior authorization granted by a special meeting of the holders of these double voting rights.

Threshold crossings to be notified to the Company (article 7.2 of our articles of association)

Any shareholder who directly or indirectly (as per the provisions of article L.233-7 of the French Commercial Code) acquires ownership or control of shares representing 1% or any multiple thereof of our share capital or voting rights, or whose shareholding falls below any such limit, must inform us within five trading days of the crossing of the relevant threshold, of the number of shares then owned by such shareholder.

Failure to comply with these notification requirements may result, at the request, recorded in the minutes of the General Meeting, of one or several shareholders holding at least 1% of the capital, in the shares in excess of the relevant threshold being deprived of voting rights for all Shareholder Meetings until the end of a two-year period following the date on which the owner thereof has complied with such notification requirements.

Threshold crossings notified to the Company in the course of 2018 and until February 28, 2019

Date of the notification	**Above/Below**	**Threshold crossed**
By Caisse des dépôts (indirectly, through Bpifrance Participations)		
February 5, 2018	Below	10% of the voting rights
	Below	5% of the share capital and voting rights
By both IFP Énergies Nouvelles — Bpifrance Participations		
February 5, 2018	Below	10% of the voting rights
	Below	5% of the share capital and voting rights
By EPIC Bpifrance (through Bpifrance Participations)		
February 6, 2018	Below	10% of the voting rights
	Below	5% of the share capital and voting rights
By Slate Path Capital LP		
June 22, 2018	Above	5% of the share capital and voting rights
September 19, 2018	Below	5% of the share capital and voting rights
By DNCA Finance		
May 29, 2018	Below	5% of the share capital and voting rights
By Norges Bank Investment Management		
November 27, 2018	Above	5% of the share capital and voting rights
December 3, 2018	Below	5% of the share capital and voting rights
February 15, 2019	Above	5% of the share capital and voting rights
February 18, 2019	Below	5% of the share capital and voting rights
February 20, 2019	Above	5% of the share capital and voting rights
February 26, 2019	Below	5% of the share capital and voting rights
By BlackRock Inc		
June 1, 2018	Above	5% of the share capital and voting rights
June 4, 2018	Below	5% of the share capital and voting rights
June 25, 2018	Above	5% of the share capital and voting rights
July 6, 2018	Below	5% of the share capital and voting rights
July 20, 2018	Above	5% of the share capital and voting rights
July 23, 2018	Below	5% of the share capital and voting rights
August 1, 2018	Above	5% of the share capital and voting rights
August 2, 2018	Below	5% of the share capital and voting rights
August 14, 2018	Above	5% of the share capital and voting rights
August 16, 2018	Below	5% of the share capital and voting rights
August 22, 2018	Above	5% of the share capital and voting rights
August 28, 2018	Below	5% of the share capital and voting rights
September 14, 2018	Above	5% of the share capital and voting rights
October 24, 2018	Below	5% of the share capital and voting rights
November 7, 2018	Above	5% of the share capital and voting rights
November 8, 2018	Below	5% of the share capital and voting rights
By Attestor Capital LLP		
February 23, 2018	Above	5% of the share capital and voting rights
June 21, 2018	Below	5% of the share capital and voting rights
By Alden Global Capital LLC		
February 27, 2018	Above	5% of the share capital and voting rights
September 14, 2018	Below	5% of the share capital and voting rights

Date of the notification	**Above/Below**	**Threshold crossed**
By Aurelius Capital Management LP		
February 27, 2018	Above	5% of the share capital and voting rights
March 1, 2018	Below	5% of the share capital and voting rights
By Boussard & Gavaudan Partners Limited		
February 27, 2018	Above	5% of the share capital and voting rights
May 30, 2018	Below	5% of the share capital and voting rights
By Contrarian Capital Management LLC		
February 27, 2018	Above	5% of the share capital and voting rights
By Third Point LLC		
February 27, 2018	Above	5% of the share capital and voting rights
March 2, 2018	Below	5% of the share capital and voting rights
By Thunderbird Partners LLP		
March 26, 2018	Above	5% of the share capital and voting rights
November 2, 2018	Below	5% of the share capital and voting rights
November 27, 2018	Above	5% of the share capital and voting rights
By Morgan Stanley and its affiliates		
March 15, 2018	Above	5% of the share capital
March 20, 2018	Below	5% of the share capital and voting rights
March 21, 2018	Above	5% of the share capital and voting rights
June 27, 2018	Below	5% of the share capital and voting rights
June 28, 2018	Above	5% of the share capital and voting rights
July 2, 2018	Below	5% of the share capital and voting rights
	Above	5% of the share capital and voting rights
July 5, 2018	Below	5% of the share capital and voting rights
July 9, 2018	Above	5% of the share capital and voting rights
July 10, 2018	Below	5% of the share capital and voting rights
July 13, 2018	Above	5% of the share capital and voting rights
July 19, 2018	Below	5% of the share capital and voting rights
July 20, 2018	Above	5% of the share capital and voting rights
August 30, 2018	Below	5% of the share capital and voting rights
August 31, 2018	Above	5% of the share capital and voting rights
September 13, 2018	Below	5% of the share capital and voting rights
September 17, 2018	Above	5% of the share capital and voting rights
September 26, 2018	Below	5% of the share capital and voting rights
October 3, 2018	Above	5% of the share capital and voting rights
October 4, 2018	Below	5% of the share capital and voting rights
	Above	5% of the share capital and voting rights
October 5, 2018	Below	5% of the share capital and voting rights
October 9, 2018	Above	5% of the share capital and voting rights
October 18, 2018	Below	5% of the share capital and voting rights
October 19, 2018	Above	5% of the share capital and voting rights
February 13, 2019	Below	5% of the share capital and voting rights
February 26, 2019	Above	5% of the share capital and voting rights
By Goldman Sachs Group		
May 3, 2018	Above	5% of the share capital and voting rights
By River and Mercantile Asset Management LLP		
December 11, 2018	Above	5% of the share capital and voting rights

Legal entity or natural person which/who may control the Company

As of the date of this report, no natural person nor any legal entity has control over the Company. As of the date of this report, there is no specific measure in place to prevent a potential attempt to take over the Company. The only existing control over the interest owned by each of our shareholders in our share capital is the notification imposed by our articles of association when crossing the threshold of 1% of the share capital or the voting rights.

Items likely to have an influence in the event of a take-over bid

Pursuant to article L.225-100-3 of the French Commercial Code, you will find below the elements which are likely to have an influence in case of a take-over bid.

CAPITAL STRUCTURE OF THE COMPANY:

Notice of crossing of a statutory threshold:

Pursuant to article 7.2 of the by-laws of the Company, any shareholder holding directly or indirectly a portion amounting to 1% of the stock capital or of the voting rights or a multiple of this percentage, within the meaning of article L. 233-7 of the French Commercial Code, shall give notice to the Company of the number of shares or voting rights he holds, within five trading days from the date on which one of these thresholds was exceeded.

In the event of failure to comply with this notification requirement, and upon request of one or several shareholders holding at least 1 percent of the capital, such request being recorded in the minutes of the General Meeting, those shares in excess of the fraction that should have been declared shall be deprived of their voting rights from the date of said General Meeting and for any other subsequent General Meeting to be held until the expiry of a two-year period following the date on which the required notification of the passing of the threshold will have been regularized.

Similarly, any shareholder whose shareholding is reduced below one of these thresholds shall give notice thereof to the Company within the same five-day period.

Double voting right:

As from May 22 1997, a double voting right has been allocated to all registered and fully paid-up shares registered in the name of the same holder for at least two years.

STATUTORY RESTRICTIONS CONCERNING THE EXERCISE OF VOTING RIGHTS AND SHARE TRANSFERS OR CLAUSES OF AGREEMENTS WHICH THE COMPANY IS AWARE OF, IN COMPLIANCE WITH ARTICLE L.233-11 OF THE FRENCH COMMERCIAL CODE:

There is no statutory restriction to the exercise of voting right and share transfers. The Company is not aware of any agreement in compliance with article L.233-11 of the French Commercial Code.

DIRECT OR INDIRECT SHAREHOLDING IN THE SHARE CAPITAL OF THE COMPANY NOTIFIED PURSUANT TO SECTIONS L.233-7 AND L.233-12 OF THE FRENCH COMMERCIAL CODE:

See paragraph 4.3.2.1.2. of this document.

LIST OF HOLDERS OF ANY SECURITY WITH SPECIAL CONTROL RIGHTS AND RELATED DESCRIPTION:

There is no holder of securities with special rights.

CONTROL MECHANISM INCLUDED IN A POTENTIAL SYSTEM OF EMPLOYEES SHARE OWNERSHIP, WHEN CONTROL RIGHTS ARE NOT EXERCISED BY THEM:

Not applicable

AGREEMENTS BETWEEN SHAREHOLDERS WHICH THE COMPANY IS AWARE OF AND WHICH ARE LIKELY TO RESTRICT SHARE TRANSFERS AND THE EXERCISE OF VOTING RIGHTS:

As of December 31, 2018, no agreements between shareholders were notified to the Company.

RULES APPLICABLE TO THE APPOINTMENT AND REPLACEMENT OF MEMBERS OF THE BOARD OF DIRECTORS AS WELL AS THE MODIFICATION OF BYLAWS:

The rules applicable to the appointment and replacement of Board of Directors' members are described in article 14 of the by-laws. The rules applicable to the modification of by-laws are described in article L.225-96 of the French Commercial Code.

None of these rules is likely to have an influence in case of a take-over bid.

POWERS OF THE BOARD OF DIRECTORS, IN PARTICULAR THE ISSUANCE OR RE-PURCHASE OF SHARES:

The Board of Directors does not have any specific power likely to have an influence in case of a take-over bid. The delegations of competence currently in force cannot be used by the Board of Directors in case of a take-over bid.

AGREEMENTS ENTERED INTO BY THE COMPANY AND MODIFIED OR TERMINATED IN THE EVENT OF CHANGE OF CONTROL OVER THE COMPANY:

The indentures governing our outstanding senior notes and certain of our credit facilities provide for an early redemption of the loans, at the option of the lenders, in the event of a change of control, pursuant to the terms specified in each agreement.

AGREEMENTS PROVIDING FOR SEVERANCE PAYMENTS TO EMPLOYEES WHO RESIGN OR WHO ARE DISMISSED WITHOUT CAUSE OR EMPLOYEES WHOSE EMPLOYMENT IS TERMINATED IN THE EVENT OF A TAKE-OVER BID:

In addition to the agreements referred to paragraph 4.2.2.3.4. of this document, with respect to the Company's Executive Officers, we inform you that certain executives of the Group benefit from a protection letter providing for the payment of a severance payment in the event of dismissal or change of control. The amount of such severance payment depends upon the positions and classifications of each concerned persons.

4.3.2.1.2. Evolution of the share capital over the past three years — Share capital as of February 28, 2019

The table below sets forth certain information with respect to entities known to us or ascertained from public filings to beneficially own a significant percentage of our voting securities as of February 28, 2019 and December 31, 2018, 2017 and 2016:

	February 28, 2019		December 31, 2018		December 31, 2017		December 31, 2016	
	% of shares	% of voting rights [a]	% of shares	% of voting rights [a]	% of shares	% of voting rights [a]	% of shares	% of voting rights [a]
Contrarian Capital Management LLC [c]	9.24	9.24	9.24	9.24	—	—	—	—
Morgan Stanley [d]	6.85	6.85	5.23	5.23	—	—	—	—
Norges Bank [e]	5.12	5.12	—	—				
Thunderbird Partners LLP [f]	5.05	5.05	5.05	5.05	—	—	—	—
River and Mercantile Asset Management LLP [g]	5.01	5.01	5.01	5.01	—	—	—	—
DNCA Finance	—	—	—	—	7.94	7.79	8.27	8.04
Bpifrance Participations	—	—	—	—	9.35	10.9	9.35	10.8
IFP Energies Nouvelles	—	—	—	—	0.49	0.48	1.27	2.11
AMS Energie	—	—	—	—	—	—	8.3	8.074
Treasury stock [b]	0.0035	0.0035	0.0035	0.0035	0.11	0.11	0.11	0.11
FCPE CGG Actionnariat	0.00004	0.0001	0.00004	0.0001	0.0012	0.0024	0.0012	0.0024
Public	68.72646	68.7264	75.46646	75.4664	82.1088	80.7176	72.6988	70.8636
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
TOTAL NUMBER OF SHARES OUTSTANDING AND VOTING RIGHTS	**709,947,758**	**710,004,203**	**709,944,816**	**709,999,163**	**22 133 149**	**22 558 848**	**22 133 149**	**22 764 784**

a) *Theoretical voting rights.*
b) *Shares held by the Company are deprived of voting rights for all General Meetings.The corresponding voting rights are reflected to provide theoretical voting rights only.*
c) *Calculated on the basis of the number of shares owned by Contrarian Capital Management LLC as indicated in the notice of threshold crossing dated August 12, 2018.*
d) *Calculated on the basis of the number of shares owned by Morgan Stanley as indicated in the notice of threshold crossing dated February 18, 2019.*
e) *Calculated on the basis of the number of shares owned by Norges Bank as indicated in the notice of threshold crossing dated February 28, 2019.*
f) *Calculated on the basis of the number of shares owned by Thunderbird Partners LLP as indicated in the notice of threshold crossing dated November 27, 2018.*
g) *Calculated on the basis of the number of shares owned by River and Mercantile Asset Management LLP as indicated in the notice of threshold crossing dated December 11, 2018.*

4.3.2.2. Stock market information

4.3.2.2.1. Places where CGG securities are listed

The trading market for our ordinary shares is Euronext Paris S.A. Paris (Compartment C) — SRD Long Only. Our ordinary shares will entitle their holders to all rights attached to them on January 1, 2018.

In addition, as part of the implementation of the Group financial restructuring plan:

- our senior first lien secured notes due 2023 and our senior second lien secured notes due 2024, are listed on the Euro MTF market of the Luxembourg Stock Exchange; and,
- the Warrants #1 and Warrants #2 are listed on Euronext Paris.

On September 21, 2018, the Company filed a Form 25 with the Stock and Exchange Commission ("SEC") to effect the delisting of its American depositary Shares ("ADSs") from the New York Stock Exchange. A Form 15F was filed with the SEC on October 2, 2018 to terminate its SEC reporting obligations and the registration of its ADSs. The termination of the registration of its ADSs became effective 90 days after the date of filing of the Form 15F with the SEC, i.e. on January 2, 2019. Following delisting of the ADSs from the New York Stock Exchange, CGG maintains its American Depositary Receipt program at "level one". This enables investors to retain their ADSs and facilitates trading on the U.S. over-the-counter market. The depositary of CGG's ADR program remains The Bank of New York Mellon.

4.3.2.2.2. Other market places

Since the delisting of our shares from the New York Stock Exchange, our shares are not listed on any other market place than Euronext Paris (Compartment C).

4.3.2.2.1. Shares and ADS price

	EURONEXT PARIS				NEW YORK STOCK EXCHANGE			
	Share price		Volumes		ADS price		Volumes	
	Highest (in euros)	Lowest (in euros)	Shares	Amount (in million euros)	Highest (in US dollars)	Lowest (in US dollars)	ADS	Amount (in million US dollars)
2019								
February	1.72	1.43	87,179,236	140.67	1.98	1.66	n.a.	n.a.
January	1.71	1.08	131,122,049	189.22	1.98	1.33	n.a.	n.a.
2018								
December	1.48	1.00	146,300,057	172.65	1.68	1.11	n.a.	n.a.
November	2.24	1.28	207,657,658	326.60	2.47	1.46	n.a.	n.a.
October	2.49	1.86	92,566,376	202.62	2.86	2.17	n.a.	n.a.
September [d]	2.50	2.15	87,821,129	207.84	2.99	2.53	n.a.	n.a.
August	2.60	2.24	117,978,131	285.52	2.99	2.53	412,860	1.15
July	2.42	2.04	97,258,431	215.96	2.78	2.35	556,213	1.40
June	2.29	2.00	84,731,599	181.12	2.73	2.33	594,933	1.49
May	2.48	1.81	192,724,767	422.99	3.15	2.34	1,641,927	4.47
April	2.04	1.53	121,262,621	217.58	2.45	1.95	1,186,232	2.53
March	1.69	1.30	144,225,221	224.88	4.82	1.88	2,371,263	5.50
February	3.01	1.41	58,492,698	103.05	7.15	3.27	1,161,137	5.41
January	4.10[a]	1.52[a]	28,723,569	117.03	6.66	4.45	305,037	1.75
2017								
December	4.35	3.68	6,983,891	27.44	7.50	4.08	185,652	0.90
November	4.89	3.52	11,261,325	45.66	5.12	4.13	37,628	0.17
October	5.09	3.57	16,661,650	73.30	5.66	4.30	92,798	0.47
September	5.60	4.24	22,149,680	110.48	6.44	5.20	275,593	1.62
August	6.27	2.83	43,912,034	211.38	7.14	3.26	356,614	2.03
July	4.43	3.72	4,527,851	18.19	4.77	4.36	53,397	0.24
June	6.32	3.95	10,859,380	55.40	7.67	4.37[c]	377,237	2.19
May	6.72	4.88	6,704,600	36.60	7.23	5.55	59,174	0.36
April	6.95	6.17	3,924,182	25.60	7.27	6.64	32,545	0.22
March	9.10	6.11	16,640,720	114.80	9.65	6.57	111,276	0.79
February	9.98	8.35	7,241,228	66.12	10.51	8.83	72,125	0.69
January	15.24	9.27	14,124,580	162.58	15.60	10.06	98,671	1.18
2016								
December	15.43	13.03	9,953,088	141.38	16.25	14.01	154,379	2.30
November	24.24	11.10	16,102,328	239.48	26.50	11.91	234,812	3.67
October	27.88	23.14	7,888,042	203.36	29.70	25.95	31,824	0.89
September	24.68	20.40	6,614,124	147.93	26.88	22.89	41,955	1.03
August	23.85	17.71	6,469,735	139.76	26.53	19.86	64,055	1.54
July [b]	23.36	19.52	68,288,987	91.19	25.21	21.76	862,954	1.73
June	0.86	0.56	218,446,930	150.26	0.94	0.66	1,610,567	1.23
May	0.82	0.59	199,742,891	136.62	1.00	0.73	931,703	0.77
April	0.87	0.59	191,112,316	139.61	1.00	0.73	1,351,570	1.18
March	0.89	0.56	394,500,821	279.10	1.00	0.70	1,963,466	1.73
February	0.75	0.43	310,794,292	168.10	1.23	0.59	2,220,063	1.65
January	1.32	0.71	108,543,921	110.28	2.95	0.95	1,231,182	1.89

(a) Restated further to the operations linked to the financial restructuring held in February 2018.

(b) On July 20, 2016, the Company carried out a reverse stock split. The figures presented for the third quarter of 2016 are adjusted pursuant to this transaction.

(c) On June 14, 2017, the trading of our ADSs was suspended pending the announcement of the opening of safeguard proceedings and no trading took place during the day. The theoretical closing price of our ADSs was US$3.73 per ADS as of June 14, 2017.

(d) The listing of our shares on the New York Stock Exchange was terminated on October 2, 2018.

5 OPERATING AND FINANCIAL REVIEW AND PROSPECTS

5

OPERATING AND FINANCIAL REVIEW AND PROSPECTS

5.1. OPERATING AND FINANCIAL REVIEW

Group organization

Strategic Plan, changed segment presentation and discontinued operations

Since September 30, 2015, we have organized our activities in four segments for financial reporting: (i) Contractual Data Acquisition, (ii) Geology, Geophysics & Reservoir ("GGR"), (iii) Equipment and (iv) Non-Operated Resources.

In November 2018, at our "Capital Markets Day", we announced a new strategy for our group that includes the transition to an asset-light model by reducing CGG's exposure to the data acquisition business, which has been impacted over the years by structural industry overcapacity, lack of differentiation, commodity pricing and a heavy fixed cost base. The objectives are to focus on cash generation, optimization of our capital structure and reduction of our cost of capital. We plan to carry out the following strategic changes in compliance with the undertakings and requirements in the CGG safeguard plan and other applicable legal requirements:

- In Marine:
  - Adjust to a three-vessel fleet in 2019; and
  - Find a strategic partnership to cost efficiently operate the vessels with the objective to not operate any vessels by 2021.
- In Land: exit the market after a wind-down period.
- In Multi-Physics: divest the business.
- Divest equity stakes in Argas and Seabed Geosolutions BV ("SBGS") joint ventures.
- Implement the appropriate reductions to general & administrative expenses and support costs to adapt to our new size and footprint.

As a result of these strategic announcements and actions undertaken afterwards, our Contractual Data Acquisition segment and part of our Non-Operated Resources segment are now presented as discontinued operations and assets held for sale in accordance with IFRS 5. This presentation applies for the first time as of and for the year ended December 31, 2018, and we have applied it retroactively as of and for the years ended December 31, 2016 and 2017. The discussion in this section is based on the new presentation.

The costs of implementation of our strategic plan as described above (referred to as the "CGG 2021 Plan") are reported in the related Contractual Data Acquisition business lines.

Description of our segments

Financial information by segment is reported in accordance with our internal reporting system and provides internal segment information that is used by the chief operating decision maker to manage and measure performance. A summary of our segments is set out below.

CONTINUING OPERATIONS:

- **GGR**

This operating segment comprises the Geoscience business lines (processing and imaging of geophysical data, reservoir characterization, geophysical consulting and software services, geological data library and data management solutions) and the Multi-client Data business line (development and management of seismic surveys that we undertake and license to a number of clients on a non-exclusive basis). Both activities regularly combine their offerings, generating overall synergies between their respective activities.

- **Equipment**

This operating segment comprises our manufacturing and sales activities for seismic equipment used for data acquisition, both on land and marine. The Equipment segment carries out its activities through our subsidiary Sercel.

DISCONTINUED OPERATIONS:

- **Contractual Data Acquisition**

This operating segment comprises the following business lines:

  - Marine: offshore seismic data acquisition undertaken by us on behalf of a specific client; and
  - Land and Multi-Physics: other seismic data acquisition undertaken by us on behalf of a specific client.

- **NOR**

As discussed further below under the heading "Factors affecting our results of operations — Fixed costs, fleet reduction and Transformation Plan", we started implementing our Transformation Plan in the first quarter of 2014 to address the cyclical trough in the seismic market, and as market conditions deteriorated further we implemented additional steps, ultimately downsizing our marine fleet to five vessels. As a result, some of our owned vessels were not operated for a certain period of time. In April 2017, with the new ownership set up of our fleet, the non-operated vessels and their related costs (cold-stacking costs notably) were transferred to Global Seismic Shipping AS ("GSS"), in which we own a 50% stakes accounted for under the equity method. The costs of the non-operated acquisition resources as well as the costs of the Transformation Plan linked to the downsizing of our Contractual Data Acquisition businesses are reported in the discontinued operations portion of this segment. The capital employed includes mainly the 50% share in GSS moved to assets held for sale, and the remaining provisions related to the Transformation Plan.

For more information, please refer to note 2 to our consolidated financial statements.

Factors affecting our results of operations

Geophysical market environment

Overall demand for geophysical services and equipment is dependent on spending by oil and gas companies for exploration, development and production and field management activities. We believe the level of spending of such companies depends on their assessment of their ability to efficiently supply the oil and gas market in the future and the current balance of hydrocarbon supply and demand. The geophysical market has historically been extremely volatile.

We believe many factors contribute to the volatility of this market, such as the geopolitical uncertainties that can harm the confidence and visibility that are essential to our clients' long-term decision-making processes and the expected balance in the mid- to long-term between supply and demand for hydrocarbons. Lower or volatile hydrocarbon prices tend then to limit the demand for seismic services and products. Since 2015, oil and gas companies have reduced their exploration and production spending due to falling oil prices, affecting demand for our products and services as reflected in our results.

Increasing oil and gas prices in 2018 and rebalancing of our clients' assets portfolio have improved their profitability and cash flow providing them with more financial flexibility. Even if the exploration and production spending remains tightly controlled, as we enter 2019, we anticipate the market will continue its gradual recovery and expect growth of our activities in 2019 in line with the market trend.

For more information about the market environment, please refer to paragraphs 1.3 "Business Overview" and 2.1 "Risks Factors".

Fixed costs, fleet reduction and Transformation Plan

We have high fixed costs and seismic data acquisition activities that require substantial capital expenditures and long-term contractual commitments. As a result, downtime or decreased productivity due to reduced demand, weather interruptions, equipment failures, permit delays or other circumstances that affect our ability to generate revenue could result in significant operating losses. In particular, we operate certain of our marine acquisition vessels under long-term bareboat charters, which generate significant fixed costs that cannot easily be reduced before the expiration of the charters. As discussed below, we have taken steps to reduce our costs in the past, and our current strategy calls for the transition to an asset-light model with reduced exposure to the data acquisition business.

In order to lower our high fixed cost base in light of the difficult market environment, the Group took drastic measures to reduce the operated seismic fleet, as part of the Transformation Plan, from 18 vessels in 2014 to five 3D high-end vessels by the end of 2016, with a large percentage of the remaining vessels dedicated to multi-client programs.

In early 2017, we implemented additional measures to further reduce our maritime exposure and improve the fleet's competitiveness. In January 2017 and March 2017, we reduced the cash burden of various charter agreements in respect of cold-stacked seismic vessels and an active seismic vessel through payments settled on a non-cash basis.

In April 2017, we implemented the new ownership set up for our seismic fleet, allowing us to access high-end capacity at a fair market price while externalizing the cold-stacking costs. We transferred the non-operated vessels and their related costs to GSS. The transaction also allowed us to amend our charter agreements in respect of the X-bow vessels we operate. The removal of GSS from our consolidated perimeter resulted in a reduction of our gross debt of US$182.5 million (corresponding to the principal amount of loans under the Nordic credit facility outstanding as of March 31, 2017).

In 2018 and 2017, we operated five 3D high-end vessels for a total annual charter cost of US$54 million and US$59 million, respectively, compared to US$77 million in 2016, mainly as a result of the improved contractual conditions described above.

Because structural marine overcapacity continued putting pressure on prices down to very low level, we plan, as announced in November 2018, to further downsize the fleet to three vessels in 2019 and to find a strategic partnership with the objective to not operate any vessels by 2021. Our goal is to give our Multi-client business line the flexibility to select the providers of acquisition services best suited for its project requirements and enable the delivery of a full suite of products, from wells and geology to 2D/3D seismic and integrated data packages, that will greatly improve exploration efficiency.

Set out below are the changes to the fleet during the last three years.

During the year 2016:

- The *CGG Alizé*, the *Geo Celtic* and the *Pacific Finder* halted operations;
- The *Viking Vision* was returned to its owner; and
- The *Geowave Voyager* was used as a source vessel and a crew boat throughout the year.

During the year 2017:

- The *Pacific Finder* was returned to its owner;
- The *Geo Caspian* halted operations as a seismic vessel at the expiration of the charter agreement; and

- The *Geo Coral* was re-introduced on April 1, 2017, in replacement of the *Geo Caspian*, as per the plan to keep the fleet at five seismic vessels.

During the year 2018:

- The *Endeavour* halted operations as a seismic vessel at the expiration of the charter agreement;
- The *Geo Caribbean* restarted operations in April 2018, in replacement of the *Endeavour*, as per the plan to keep the fleet at five seismic vessels;
- The *Geowave Voyager* was sold in November; and
- The *Oceanic Champion* halted operations in November, before being returned to its owner at the beginning of 2019 as a first step in the new strategy to decrease the fleet to three seismic vessels.

For more information on marine acquisition activity, please refer to paragraph 1.3.3.1 "Marine Data Acquisition Business Line" and note 2 to our consolidated financial statements.

Financial restructuring process and first lien refinancing

On February 21, 2018, the Group finalized the implementation of its financial restructuring plan. This plan comprised, in particular, (i) the equitization of nearly all of the unsecured senior debt, (ii) the extension of the maturities of the secured senior debt and (iii) the provision of additional liquidity to meet various business scenarios.

On April 24, 2018, CGG Holding (U.S.) Inc. issued US$300 million in aggregate principal amount of 9.000% first lien senior secured notes due 2023 and €280 million in aggregate principal amount of 7.875% first lien senior secured notes due 2023 (together, the "New First Lien Notes").

CGG Holding (U.S.) Inc. used the net proceeds from the issuance, together with cash on hand, to redeem the first lien notes issued in connection with the financial restructuring (the "Refinanced First Lien Notes") in full on May 9, 2018 in accordance with their terms.

For more information on the financial restructuring process, please refer to paragraph 1.2 "History and significant events in the development of the company's activities" and note 2 to our consolidated financial statements.

Write-off, impairment and restructuring costs

We have had in the past and may have in the future impairment losses as events or changes in circumstances occur that reduce the fair value of an asset below its book value. We may also have write-offs and non-recurring charges or restructuring costs.

In Continuing Operations, write-offs, impairments and restructuring costs related to our Transformation Plan were respectively of US$116 million and US$106 million in 2016 and 2017. In 2018, such costs amounted to US$288 million, comprising:

- US$240 million of impairment (mainly linked to the US Gulf of Mexico Stagseis data library for US$197 million);
- US$30 million of valuation allowance of Sercel inventory; and
- US$18 million of costs relating to the Transformation Plan and the financial restructuring.

In Discontinued Operations, write-offs, impairments and restructuring costs net of gains on sales of assets related to our Transformation Plan were respectively of US$68 million and US$80 million in 2016 and 2017. In 2018, the costs relating to the completion of our Transformation Plan amounted to US$27 million (mainly redundancy packages). As part of the CGG 2021 Plan, we recognized US$402 million of restructuring costs at operating income level in 2018, including:

- US$139 million of write-offs and impairment of assets;
- US$126 million of provisions for onerous contract related to the reduction of our operating fleet from 5 to 3 vessels; and
- US$137 million of additional provisions, mainly related to redundancy costs.

We have also been involved in a number of business combinations in the past, leading to the recognition of large amounts of goodwill on our balance sheet. Goodwill on our balance sheet totaled US$1,229 million as of December 31, 2018, US$1,234 million as of December 31, 2017 and US$1,223 million as of December 31, 2016. Goodwill is allocated to CGUs as described in note 11 to our consolidated financial statements. At each balance sheet date, if we expect that a CGU's recoverable amount will fall below the amount of capital employed recorded on the balance sheet, we may write down some value on given assets and/or the goodwill in part or in whole.

For more information, please refer to notes 5, 11 and 22 to our consolidated financial statements.

Foreign exchange fluctuations

As a company that derives a substantial amount of its revenues from international sales, which are often denominated or linked to the US dollar but with costs that are to a certain extent denominated in euros, our results of operations are affected by fluctuations in currency exchange rates.

Changes between the US dollar and euro or other currencies may adversely affect our business by negatively impacting our results of operations and earnings.

The exchange rates as of December 31, 2016, 2017 and 2018 were US$1.0541, US$1.1993 and US$1.1450, respectively, per euro, and the average exchange rates for the years 2016, 2017 and 2018 were, US$1.1057, US$1.1227 and US$1.1828, respectively, per euro.

For more information on the impact of currency fluctuations on our results of operations, please refer to paragraph 2.1 "Risk Factors".

Critical accounting policies

The following operating and financial review and prospects should be read in conjunction with our consolidated annual financial statements and the notes thereto included in this annual report, which have been prepared in accordance with

International Financial Reporting Standards (IFRS) and its interpretations as issued by the International Accounting Standards Board (IASB) and as adopted by the European Union as at December 31, 2018.

Our significant accounting policies, which we have applied consistently, are fully described in note 1 to our consolidated financial statements, including a discussion of certain of our accounting policies that are particularly important to the portrayal of our financial position and results of operations such as those relating to:

- Revenue recognition (including the application of "IFRS 15 — Revenue from Contracts with Customers");
- Multi-client surveys (and impairment, amortization and classification thereof);
- Capitalization of expenditures on our research activities; and
- Impairment losses (including impairment losses on goodwill).

The Group decided not to early adopt those Standards, Amendments and Interpretations that the European Union adopted but that were not effective as of December 31, 2018, namely:

- IFRS 16 — Leases;
- Amendments to IFRS 9 — Prepayment features with negative compensation and modifications of financial liabilities;
- IFRIC 23 — Uncertainty over income tax treatments; and
- Amendments to IAS 28 — Long-term interests in associates and joint ventures.

For more information on significant accounting policies, please refer to note 1 to our consolidated financial statements.

IFRS 15 application

CGG implemented IFRS 15 on January 1, 2018 with a modified retrospective application. The only change compared to Group historical practices was related to multi-client prefunding revenues. These prefunding revenues are recorded at delivery of the final data while they were historically recorded based on percentage of completion. For internal reporting purposes, CGG continues using historical method with prefunding revenues recorded based on percentage of completion.

CGG, as other seismic players, presents then a dual approach in the Group's results including:

(i) one set of figures (the "as reported" figures) with prefunding revenue recognized in full only upon delivery of the final data and

(ii) a second set of figures (the "Segment" figures) produced in accordance with the Group's historical method for multi-client prefunding revenues, corresponding to both the figures we use for internal management reporting purposes and the rules relating to the transition reporting periods that require figures being also published under the former method throughout 2018.

Please refer to note 1.3 "New standards impacts — IFRS 15 Revenue from Contracts with Customers, applied starting January 1, 2018" and note 19 "Revenue" to our consolidated financial statements for more information.

Changes in estimate for multi-client surveys amortization

Since the majority of the multi-client surveys sales are done during the prefunding phase plus the subsequent four years and in order to harmonize reporting practices with other multi-client players, we decided from October 1, 2018 to adopt a four-year straight-line post-delivery amortization in accordance with the industry standard. Amortization was previously based on sales forecast method (80% of the sales in most cases).

The introduction of the four-year straight-line post-delivery amortization led to recognizing US$146 million of amortization on after sales from October 1, 2018 to December 31, 2018 (US$57 million from surveys more than four years old and US$89 million from other surveys). The amortization of after-sales would have been US$39 million without this change in estimate. The negative impact of this change in estimate is thus US$106 million.

The prefunding cost of sales, recognized concurrently with the revenue upon delivery of the survey, is calculated from October 1, 2018 as the difference between the total capitalized cost of a survey upon delivery and the fair value based upon discounted future expected sales. The net book value of the survey upon delivery thus equals the net present value of future expected sales. Prefunding cost of sales was previously 80% of the prefunding sales recognized upon delivery.

Two surveys were delivered between October 1, 2018 and December 31, 2018. The previous estimate based on 80% of the prefunding sales was US$12 million higher than the prefunding cost of sales derived on discounted future expected sales. The positive impact of this change in estimate was US$12 million.

The total negative impact of multi-client changes in estimate is US$94 million (US$106 million from after-sales less the US$12 million from prefunding, represented as a net increase in amortization).

Please refer to note 1.4 "Changes in estimate for multi-client surveys amortization" to our consolidated financial statements for more information.

5.1.1. Acquisitions and divestitures

During the periods under review, the most significant change to our perimeter has been the new ownership set up of our marine fleet, as described above.

For more information regarding other acquisitions and divestitures, please refer to note 2 to our consolidated financial statements.

5.1.2. Year ended December 31, 2018 compared to year ended December 31, 2017

Unless otherwise specified, comparisons made in this section are between the twelve months ended December 31, 2018 and the twelve months ended December 31, 2017. References to 2018 correspond to the twelve months ended December 31, 2018 and references to 2017 correspond to the twelve months ended December 31, 2017.

Operating Revenues

The following table sets forth our operating revenues by division for each of the periods stated:

	2018				Increase/(Decrease)	
(In millions of US dollars)	Segment figures	IFRS 15 adjustment	As reported	2017	Segment figures	As reported
Geoscience	396.0	—	396.0	350.6	13%	13%
Multi-client data	517.4	(33.9)	483.5	469.0	10%	3%
GGR Revenues	**913.4**	**(33.9)**	**879.5**	**819.6**	**11%**	**7%**
Equipment Revenues	**350.8**	**—**	**350.8**	**241.2**	**45%**	**45%**
Eliminated revenues and others	(36.8)	—	(36.8)	(25.7)	—	—
Total operating revenues	**1,227.4**	**(33.9)**	**1,193.5**	**1,035.1**	**19%**	**15%**

Our consolidated operating revenues as reported, following the implementation of IFRS 15, increased 15% to US$1,194 million in 2018 from US$1,035 million in 2017.

The respective contributions from the Group's businesses to our segment operating revenues were 74% from GGR and 26% from Equipment in 2018.

GGR

In 2018, GGR revenues as reported increased 7% compared to 2017.

GEOSCIENCE

Operating revenues from our Geoscience business lines (previously known as Subsurface Imaging & Reservoir) increased 13% from US$351 million in 2017 to US$396 million in 2018, driven by a generally strengthening market. Geoscience's technical leadership and large market share in the growing ocean bottom nodes processing business fueled some of the growth.

MULTI-CLIENT DATA

Multi-client Data revenues as reported increased 3% in 2018 compared to 2017. Excluding IFRS 15 adjustments of US$(34) million, Multi-client Data segment revenues were up 10% at US$517 million in 2018.

Prefunding revenues as reported decreased 32% to US$182 million in 2018 due to reduced multi-client capital expenditures. Excluding IFRS 15 adjustment, prefunding segment revenues decreased 20% to US$216 million in 2018 from US$269 million in 2017, following capital expenditures contraction to US$223 million in 2018. The cash prefunding rate was 97%, above the 70% target, but below the 107% reached in 2017.

After-sales revenues were strong in active basins at US$302 million in 2018, up 51% compared to US$200 million in 2017. In 2018, our offshore multi-client after-sales were the highest in the North Sea and Brazil.

Equipment

Total revenues for our Equipment segment (including internal and external sales) increased 45% to US$351 million in 2018, reflecting continuous signs of a stronger market in land equipment.

Internal sales represented 10% of total revenues in 2018 compared to 11% in 2017. External revenues for our Equipment segment increased 46% to US$314 million in 2018 from US$215 million in 2017.

Land equipment sales represented 61% of total revenues in 2018, compared to 49% in 2017, with significant deliveries in India and the Middle-East, while Russia picked up from a very low level in 2017.

Marine equipment sales represented 26% of total revenues in 2018 compared to 38% in 2017. The demand for replacement is still constrained by low capital expenditures from our customers.

The demand for downhole gauges, representing 10% of equipment revenues in 2018 and in 2017, also strengthened with deliveries in the US lower 48.

Non-oilfield related sales represented 3% of total revenues in 2018 and in 2017. In early 2019, we signed a strategic partnership agreement with Apave for the delivery of a structural health monitoring solution ("SHM").

Operating expenses

Cost of operations as reported, including depreciation and amortization, increased 10% to US$931 million in 2018 compared to US$850 million in 2017, impacted by US$94 million of additional straight-line amortization in the multi-client business.

As a percentage of operating revenues as reported, cost of operations as reported decreased to 78% in 2018 from 82% in 2017. Excluding IFRS 15 adjustments, segment cost of operations, as a percentage of the segment operating revenues, decreased to 76% in 2018 from 82% in 2017.

The amortization expenses of our seismic library as reported (excluding impairments) corresponded to 67% of the multi-client data revenues as reported in 2018 compared to 63% in 2017 and, excluding IFRS 15 adjustments, the segment amortization expenses of our seismic library corresponded to 63% of the multi-client data segment revenues in 2018. In line with industry standards, we applied prospectively a four-year straight-line amortization in our multi-client business starting October 1, 2018. The total impact was an additional charge of US$94 million in the last quarter of 2018, including US$57 million for the full amortization of surveys older than four years. *Please refer to note 1.4 "Changes in estimate for multi-client surveys amortization" to our consolidated financial statements for more information.*

Gross profit as reported increased to US$264 million in 2018 from US$186 million in 2017, representing 22% and 18% of operating revenues, respectively, as a result of the factors discussed above. Segment gross profit was a profit of US$298 million in 2018, representing 24% of segment operating revenues.

Research and development expenditures increased to US$31 million in 2018 compared to US$18 million in 2017, representing 3% and 2% of operating revenues as reported respectively. They also represented 2% of segment operating revenues in 2018. The increase in research and development expenditures in 2018 compared to 2017 is mainly due to a write-down of research tax credit in the United States in 2018.

Marketing and selling expenses decreased 2% to US$46 million in 2018 from US$47 million in 2017. They represented 4% of operating revenues as reported and of segment operating revenues in 2018, compared to 5% in 2017.

General and administrative expenses increased 9% to US$81 million in 2018 from US$74 million in 2017. The positive effect of our Transformation Plan was more than offset by one-off costs incurred in 2018 and the unfavorable exchange rate impact of our euro cost base (US$1.18 per euro for year 2018 compared to US$1.12 per euro for the year 2017). General and administrative expenses represented 7% of operating revenues as reported in both periods. Excluding IFRS 15 adjustments, they represented 7% of segment operating revenues in 2018.

Other expenses were US$286 million in 2018, including mainly (i) US$240 million of impairment of intangible assets principally related to our offshore multi-client library (including US$197 million for our US Gulf of Mexico Stagseis data library) (ii) US$30 million of valuation allowance for Sercel inventory and (iii) US$18 million of other restructuring costs relating to our Transformation Plan and financial restructuring (mostly fees relating to the financial restructuring completed in early 2018).

Other expenses amounted to US$106 million in 2017, including mainly US$106 million of restructuring costs related to our Transformation Plan (not including the acceleration of historical issuing fees amortization linked to our financial restructuring for US$23 million) of which (i) US$94 million relating to financial restructuring fees and (ii) US$12 million related to other restructuring costs, being mainly redundancy and facilities exit costs net of reversal of provisions.

For more information on our financial restructuring, see note 2 to our consolidated annual financial statements.

Operating income

Operating income as reported amounted to a loss of US$180 million in 2018 as a result of the factors described above, compared to a loss of US$58 million in 2017. Excluding IFRS 15 adjustments, the impact of the Transformation Plan and the financial restructuring and impairments and provisions, segment operating income amounted to a gain of US$142 million in 2018 compared to a gain of US$48 million in 2017.

Segment operating income from our GGR segment was a gain of US$176 million in 2018 compared to a gain of US$131 million in 2017 mainly driven up by very favorable mix of fully amortized surveys while Geoscience businesses delivered a strong performance, with increased activity across all businesses.

Segment operating income from our Equipment segment was back to positive with a gain of US$12 million in 2018 compared to a loss of US$36 million in 2017, mainly due to strong land equipment sales and continued growth in downhole gauges, and despite a continuous weak marine equipment market.

Equity in income of affiliates

Net income from investments accounted for under the equity method was a loss of US$1 million in 2018 mainly due to Petroleum Edge Limited. Net income from investments accounted for under the equity method was null in 2017.

Financial income and expenses

Net cost of financial debt decreased 40% to US$127 million in 2018 from US$211 million in 2017 as a result of the reduction in our debt following our financial restructuring and the subsequent first lien notes refinancing.

Other financial income and expenses amounted to an income of US$820 million in 2018, compared to an income of US$22 million in 2017, mainly coming (i) for US$771 million from the strong positive impact of our financial restructuring (ii) for US$74 million in one-off income mainly linked to the positive foreign exchange effect, associated with the shift of Euro/US$ balance sheet exposure following the financial restructuring and the subsequent first lien refinancing (our Euro/US$ balance sheet position is now balanced), partly offset by (iii) the first lien refinancing costs for US$21 million.

Income taxes

Income taxes as reported amounted to an expense of US$7 million in 2018 compared to an expense of US$19 million in 2017.

Net income from continuing operations

Net income as reported from continuing operations amounted to US$504 million in 2018 compared to a loss of US$267 million in 2017 as a result of the factors discussed above.

Excluding IFRS 15 adjustments, the impact of the Transformation Plan and the financial restructuring and impairments and provisions, segment net income from continuing operations amounted to a gain of US$78 million in 2018 compared to a loss of US$134 million in 2017.

Net income from discontinued operations

Operating revenues for Contractual Data Acquisition decreased 21% to US$226 million in 2018 from US$285 million in 2017.

Operating revenues of Marine Contractual Data Acquisition decreased 38% to US$115 million in 2018 from US$186 million in 2017, mainly as a consequence of the different type of contract mix in 2018, compared to 2017 when we executed large contracts with a high-end multi-source vessels setup.

Operating revenues of Land and Multi-Physics Acquisition increased 16% to US$119 million in 2018 from a very low level of US$102 million in 2017, while both operated in a very competitive market environment marked by slow decision processes by our clients. Multi-Physics benefited from the mining market recovery.

Cost of operations of discontinued operations, including depreciation and amortization, decreased 21% from US$390 million in 2017 to US$308 million in 2018 due to the Marine mix of contracts. As a percentage of operating revenues, cost of operations remained stable at (136)% in 2018 compared to (137)% in 2017.

Gross profit was a loss of US$82 million in 2018 compared to a loss of US$105 million in 2017, representing (36)% of operating revenues in 2018 compared to (37)% in 2017.

Other expenses amounted to US$425 million in 2018, including mainly (i) US$402 million of impairments and provisions related to our “CGG 2021 Plan” (ii) US$27 million of net restructuring costs related to our Transformation Plan and (iii) US$4 million of net gain on sales of assets. The US$402 million impairments and provisions related to our “CGG 2021 Plan” principally comprised (i) US$139 million of impairment of fixed assets (ii) US$126 million of provision for onerous contracts related to the reduction of our operating fleet from 5 to 3 vessels and (iii) US$137 million related to additional provisions, being mainly redundancy costs.

Other expenses amounted to US$73 million in 2017, including mainly (i) US$51 million loss relating to our new ownership set up for our seismic fleet (ii) US$12 million relating to the renegotiation of a charter agreement and (iii) US$10 million relating to other restructuring costs, being mainly redundancy and facilities exit costs net of reversal of provisions.

Operating loss amounted to US$539 million in 2018, compared to US$206 million in 2017 as a result of the factors described above.

Joint ventures negatively contributed by US$4 million in 2018 (mainly GSS), compared to a negative contribution of US$20 million in 2017 from joint ventures GSS and PTSC CGGV Geophysical Survey Limited (“PTSC”) in Vietnam, impacted by adverse market conditions in the marine acquisition market.

Net loss from discontinued operations amounted to US$600 million in 2018 compared to a loss of US$248 million in 2017 as a result of factors described above.

Net income

Net loss as reported was US$96 million in 2018 compared to a loss of US$514 million in 2017 as a result of the factors discussed above.

Net income attributable to the shareholders of CGG S.A. was US$(102) million (€(86) million) in 2018 compared to net loss of US$515 million (€459 million) in 2017.

Statutory financial statements of CGG S.A.

Operating revenues of CGG S.A. in 2018 were €28 million compared to €26 million in 2017.

Operating loss in 2018 amounted to €16 million compared to a loss of €32 million in 2017.

Financial loss in 2018 amounted to €152 million compared to a loss of €969 million in 2017. In 2018, it mainly included (i) a provision allowance for investments in affiliates of €474 million compared to €1,104 million in 2017, (ii) interests expenses of €69 million compared to €130 million in 2017; partly offset by (iii) dividends received from affiliates, interests income on loans to affiliates and foreign exchange impact.

Extraordinary income and expense amounted to €(103) million in 2018, including financial restructuring costs of € 41 million and a €64 million of grants provided by the company to its subsidiary CGG International SA. Extraordinary income and expense in 2017 amounted to an expense of €2 million, mainly as a result of financial restructuring costs of €67 million offset by a reversal of provisions for risks for affiliates of €67 million.

Net income tax was nil in 2018 compared to a €57 million profit in 2017 resulting from the reversal of the provision for the use of subsidiaries' deficits (following the reduction of the corporate tax rate in France).

Net income was a loss of €271 million in 2018 compared to a net loss of €945 million in 2017, resulting from the above factors.

The shareholders' equity as of December 31, 2018 amounted to €1.8 billion compared to €0.3 billion as of December 31, 2017 after a capital increase amounting to €1.8 billion and a net loss for the period of €271 million.

No dividends have been distributed in the last three fiscal years.

5.1.3. Year ended December 31, 2017 compared to year ended December 31, 2016

Unless otherwise specified, comparisons made in this section are between the twelve months ended December 31, 2017 and the twelve months ended December 31, 2016. References to 2017 correspond to the twelve months ended December 31, 2017 and references to 2016 correspond to the twelve months ended December 31, 2016.

Operating revenues

The following table sets forth our operating revenues by division for each of the periods stated:

(In millions of US$)	2017	2016	Increase/(Decrease)
Geoscience	350.6	400.7	(13)%
Multi-client data	469.0	383.3	22%
GGR Revenues	**819.6**	**784.0**	**5%**
Equipment Revenues	**241.2**	**255.0**	**(5)%**
Eliminated and others	(25.7)	(75.7)	—
Total operating revenues	**1,035.1**	**963.3**	**7%**

Our consolidated operating revenues as reported increased 7% to US$1,035 million in 2017 from US$963 million in 2016 due in particular to strong multi-client sales.

The respective contributions from the Group's businesses to our segment operating revenues in 2017 were 79% from GGR and 21% from Equipment, and were respectively 81% and 19% in 2016.

Prefunding revenues decreased 1% to US$269 million in 2017 from US$272 million in 2016, with the cash prefunding rate at 107% in 2017 compared to 92% in 2016.

After-sales increased 80% to US$200 million in 2017 from US$111 million in 2016 mainly as a result of demand for our well-positioned multi-client data libraries in the strategic basins.

GGR

Operating revenues from our GGR segment in 2017 increased 5% to US$820 million from US$784 million in 2016, mainly due to strong multi-client sales.

GEOSCIENCE

Operating revenues from our Geoscience business lines (previously known as Subsurface Imaging & Reservoir) decreased 13% to US$351 million in 2017 from US$401 million in 2016. Subsurface Imaging delivered a resilient performance and maintained its market share, while the Reservoir businesses were more impacted by clients' spending cuts.

MULTI-CLIENT DATA

Multi-client revenues increased 22% in 2017 compared to 2016. Our sustained offshore multi-client sales were boosted by Brazilian licensing rounds, as well as sales in the North Sea and the Mexican part of the Gulf of Mexico.

Equipment

Total revenues for our Equipment segment (including internal and external sales) decreased 5% to US$241 million in 2017 from US$255 million in 2016, reflecting very low volumes driven by the weakness of the seismic acquisition market.

Internal sales represented 11% of the total revenues in 2017 compared to 30% in 2016. External revenues increased 20% to US$215 million in 2017 from US$179 million in 2016, mainly due to land equipment sales, driven notably by the 508XT deliveries in the fourth quarter.

Land equipment sales represented 49% of total revenues in 2017 and in 2016.

In 2017, we generated US$116 million in revenues in the fourth quarter, representing 48% of equipment total revenues of the year. This sharp increase can be explained by staggered deliveries from the third quarter to the fourth quarter and the usual seasonal pattern at year-end driving a strong activity pick-up in the fourth quarter.

Operating expenses

Cost of operations, including depreciation and amortization, were stable in 2017 at US$850 million compared to US$858 million in 2016 despite increased activity, mainly due to the sharp reduction in our cost base as a consequence of the completion of our Transformation Plan. The multi-client amortization costs corresponded to 63% of multi-client revenues in 2017 compared to 84% in 2016. As a percentage of operating revenues, cost of operations were 82% in 2017 compared to 89 % in 2016.

Gross profit increased to US$186 million in 2017 from US$107 million in 2016, representing 18% of operating revenues in 2017 compared to 11% in 2016.

Research and development expenditures, net of government grants received, increased 7% to US$18 million in 2017 from US$17 million in 2016, principally as a result of a U.S. tax credit catch-up for research and development in the earlier period. Research and development expenditures represented 2% of operating revenues for 2017 and 2016.

Marketing and selling expenses decreased 7% to US$47 million in 2017 from US$50 million in 2016 mainly due to the completion of our Transformation Plan.

General and administrative decreased 3% to US$74 million in 2017, from US$76 million in 2016 as a consequence of the completion of the Transformation Plan. As a percentage of operating revenues, general and administrative expenses represented respectively 7% and 8% of operating revenues for 2017 and 2016.

Other expenses amounted to US$106 million in 2017, including mainly US$106 million of restructuring costs related to our Transformation Plan (not including the acceleration of historical issuing fees amortization linked to our financial restructuring for US$23 million) of which (i) US$94 million related to financial restructuring fees and (ii) US$12 million relating to other restructuring costs, being mainly redundancy and facilities exit costs net of reversal of provisions.

Other expenses amounted to US$111 million in 2016, including mainly (i) US$97 million impairment of multi-client surveys mainly related to our U.S. offshore library, (ii) US$19 million of restructuring costs net of reversal of provisions and (iii) US$5 million of net gain on sales of assets.

For more information about restructuring costs relating to the Transformation Plan, please refer to note 22 to our consolidated financial statements.

Operating income

Operating loss as reported amounted to US$58 million in 2017 as a result of the factors described above, compared to a loss of US$147 million in 2016. Excluding the impact of the Transformation Plan and of the financial restructuring segment operating income amounted to US$48 million in 2017 compared to operating loss of US$30 million in 2016.

Segment operating income from our GGR segment amounted to US$131 million in 2017, compared to US$81 million in 2016, demonstrating the overall resilience of the GGR segment, boosted by a favorable revenue mix in multi-client sales with an amortization rate corresponding to 63% of multi-client sales in 2017 compared to 84% in 2016.

Segment operating income from our Equipment segment was a loss of US$36 million in 2017 from a loss of US$42 million in 2016, hampered by very low volumes, despite efficient cost management and manufacturing flexibility.

Equity in income of affiliates

Net income from investments accounted for under the equity method was null in 2017 compared to a loss of US$2 million in 2016 from our two joint ventures Reservoir Evaluation Services LLP and Petroleum Edge Limited.

Financial income and expenses

Cost of net financial debt increased 21% to US$211 million in 2017 from US$174 million in 2016. This increase was mainly due to the acceleration of historical issuing fees amortization for US$23 million, as most of our debt was settled during February 2018 through conversion into equity or new debt instruments under our financial restructuring.

Other financial income amounted to US$22 million in 2017 compared to an income of US$6 million in 2016. This increase was mainly due to foreign exchange gains. *See note 24 to our consolidated financial statements for more information.*

Income taxes

Income taxes amounted to an expense of US$19 million in 2017, including US$7 million deemed taxation through withholding tax and US$11 million in current income tax mainly in Canada and Brazil.

Income taxes amounted to an income of US$19 million in 2016.

For more information, please refer to note 25 to our consolidated financial statements.

Net income from continuing operations

Net income from continuing operations amounted to US$(267) million in 2017 compared to US$(298) million in 2016 as a result of the factors discussed above.

Net income from discontinued operations

Operating revenues for Contractual Data Acquisition increased 23% to US$285 million in 2017 from US$232 million in 2016.

Despite very weak pricing conditions, operating revenues of Marine Contractual Data Acquisition increased 40% to US$186 million in 2017 from US$133 million in 2016, mainly due to the execution of two large contracts using high-end multi-source vessel set-up and the strong operational performance of the fleet, with a high production rate at 97% in 2017 compared to 94% in 2016.

Operating revenues of Land and Multi-Physics Acquisition decreased 2% to US$102 million in 2017 from US$105 million in 2016, mainly as a consequence of the weak market, a delayed contract in Algeria and the early termination of a contract in Angola for Land Acquisition.

Cost of operations, including depreciation and amortization, was stable in 2017 at US$390 million compared to US$393 million in 2016 despite increased activity, mainly due to the sharp reduction in our cost base as a consequence of the completion of our Transformation Plan. As a percentage of operating revenues, cost of operations was (137)% in 2017 compared to (169)% in 2016. Gross profit increased to a loss of US$105 million in 2017 from a loss of US$161 million in 2016, representing (37)% of operating revenues in 2017 compared to (69)% in 2016.

Other expenses amounted to US$73 million in 2017, including mainly (i) US$51 million loss relating to our new ownership set up for our seismic fleet (ii) US$12 million relating to the renegotiation of a charter agreement and (iii) US$10 million relating to other restructuring costs, being mainly redundancy and facilities exit costs net of reversal of provisions. Other expenses amounted to US$72 million in 2016, including mainly (i) US$35 million restructuring costs being mainly vessel chart costs and redundancies, net of reversal of provisions and (ii) US$31 million of impairment of vessels related to our Transformation Plan.

Operating income amounted to a loss of US$206 million in 2017, compared to a loss of US$250 million in 2016 with the positive impact of the lower cost base of Marine Contractual Data Acquisition being partially offset by a non-recurring research and development tax credit in 2016.

Our joint ventures GSS and PTSC in Vietnam negatively contributed by US$20 million in 2017, impacted by adverse market conditions in the marine acquisition market, compared to a negative contribution of US$6 million in 2016 mainly from Seabed JV suffering from low volumes in a weak market.

Net loss from discontinued operations amounted to US$248 million in 2017, from a loss of US$278 million in 2016, as a result of the factors described above.

Net income

Net loss amounted to US$514 million in 2017 compared to a net loss of US$577 million in 2016 as a result of the factors discussed above. Earnings per share were US$(11.18) in 2017 compared to US$(13.26) in 2016.

Net loss attributable to the shareholders of CGG S.A. was US$515 million (€459 million) in 2017 compared to a net loss of US$573 million (€519 million) in 2016.

Statutory financial statements of CGG S.A.

Operating revenues of CGG S.A. in 2017 were €26 million compared to €49 million in 2016.

Operating loss in 2017 amounted to €32 million compared to a loss of €43 million in 2016.

Financial loss in 2017 amounted to €969 million compared to a loss of €827 million in 2016. The decrease was mainly due to dividends received in 2017 of €142 million, compared to €421 million in 2016. In 2017, we accounted for a provision allowance for investments in affiliates for €1,104 million, compared to €1,197 million in 2016.

Extraordinary income and expense in 2017 amounted to €(2) million, mainly as a result of extraordinary costs relating to the financial restructuring for €67 million and reversal of provisions for risks of affiliates for €67 million. Extraordinary income and expense amounted to €30 million in 2016 mainly due to a €25 million reversal of provisions for risks of affiliates.

Net income in 2017, after a tax income of €57 million due to the French tax group effect, was a loss of €945 million compared to a net loss of €841 million in 2016, after a tax expense of €1 million. The 2017 tax income resulted from the reversal of the provision for the use of subsidiaries' deficits, following the inclusion of the planned reduction of the corporate tax rate in France.

The shareholders' equity as of December 31, 2017 amounted to €0.3 billion compared to €1.2 billion as of December 31, 2016.

No dividends have been distributed in the last three fiscal years.

5.1.4. Comments on the financial situation of the Company and the Group

Liquidity and capital resources

Our principal financing needs are the funding of ongoing operations and capital expenditures, investments in our multi-client data library, the funding of restructuring measures relating to the "CGG 2021 plan" and of our debt services obligations. We do not have any major debt repayment scheduled before the 2023, maturity date of our first lien notes. We intend to fund our capital requirements through cash generated by operations and liquidity on hand. In the past we have obtained financing through bank borrowings, capital increases and issuances of debt and equity-linked securities.

Our ability to make scheduled payments of principal, or to pay the interest or additional amounts, if any, or to refinance our indebtedness, or to fund planned capital expenditures will depend on our future performance, which, to a certain extent, is subject to general economic, financial, competitive, legislative, regulatory and other factors that are beyond our control.

Cash flows

Operating activities

The following table presents a summary of the net cash related to operating activities for each of the periods stated:

	Year ended December 31, 2018			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
Net cash before changes in working capital	543.4	(75.4)	(33.9)	434.1
Change in working capital	(113.2)	10.5	33.9	(68.8)
Net cash provided by operating activities	430.2	(64.9)	—	365.3

	Year ended December 31, 2017			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
Net cash before changes in working capital	443.6	(71.9)	—	371.7
Change in working capital	(6.1)	20.0	—	13.9
Net cash provided by operating activities	437.5	(51.9)	—	385.6

	Year ended December 31, 2016			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
Net cash before changes in working capital	253.2	(44.3)	—	208.9
Change in working capital	116.4	—	—	116.4
Net cash provided by operating activities	396.6	(44.3)	—	325.3

Before changes in working capital, net cash provided by operating activities in 2018 was US$434 million compared to US$372 million in 2017 and US$209 million in 2016. Changes in working capital had a negative impact on cash from operating activities of US$69 million in 2018, mainly coming from an increase in receivables as a result of revenue growth. The impact of changes in working capital was positive for US$14 million and US$116 million in 2016 and 2017, respectively.

Net cash provided by operating activities was US$365 million in 2018 compared to US$386 million in 2017 and US$325 million in 2016.

Investing activities

The following table presents the main items linked to investing activities for each of the periods stated:

	Year ended December 31,		
(In millions of US$)	2018	2017	2016
Net cash used in investing activities	**300.8**	**301.0**	**376.6**
Of which			
Industrial capital expenditures	*44.9*	*35.4*	*39.8*
Capitalized development costs	*33.1*	*31.8*	*34.0*
Multi-client data	*222.8*	*251.0*	*295.1*

Our industrial capital expenditures include Sercel lease pool and asset suppliers' variance.

After three years of tight cash spending discipline, we increased our industrial capital expenditures in 2018 compared to 2017, while we remained stable in developments costs.

The decrease in multi-client data was principally due to lower capital expenditures in offshore multi-client projects. We invested in multi-client data primarily in Latin America, Mozambique and Scandinavia during 2018. In 2017, we invested primarily offshore in Brazil, Mozambique and in the North Sea, while in 2016 we invested primarily in Brazil, in Western Africa and in the Norwegian North Sea.

As of December 31, 2018, the net book value of our multi-client data library as reported was US$633 million compared to US$950 million as of December 31, 2017. Excluding IFRS 15 adjustments, the segment net book value of our multi-client data library was US$519 million as of December 31, 2018, compared to US$831 million as of December 31, 2017. This decrease was mainly due to the year-end impairments of US$226 million (of which US$197 million related to the Stagseis survey) and the change in estimate triggering an additional amortization charge of US$94 million. *Please refer to note 1.4 "Changes in estimate for multi-client surveys amortization" to our consolidated financial statements.*

Financing activities

Our net cash provided by financing activities in 2018 was US$191 million compared to net cash used of US$117 million in 2017, and net cash provided of US$176 million in 2016.

On February 21, 2018, the Group finalized the implementation of its financial restructuring plan. This plan comprised, in particular, (i) the equitization of nearly all of the unsecured senior debt, (ii) the extension of the maturities of the secured senior debt and (iii) the provision of additional liquidity to meet various business scenarios.

On April 24, 2018, CGG Holding (U.S.) Inc. issued US$300 million in aggregate principal amount of 9.000% first lien senior secured notes due 2023 and €280 million in aggregate principal amount of 7.875% first lien senior secured notes due 2023 (together, the "New First Lien Notes").

CGG Holding (U.S.) Inc. used the net proceeds from the issuance, together with cash on hand, to redeem the first lien notes issued in connection with the financial restructuring (the "Refinanced First Lien Notes") in full on May 9, 2018 in accordance with their terms.

In 2017, we repaid in full the US$8 million outstanding principal amount of our 7.75% senior notes due 2017. We also repaid US$8 million of the principal amount under our Nordic credit facility, leading to a total outstanding amount of US$182.5 million under this facility before it was transferred to GSS in April 2017 as part of the of new ownership set up for our seismic fleet.

For more information, please refer to note 2 to our consolidated financial statements.

In 2016, we repaid a net amount of US$31 million from our French revolving facility, leading to an amount outstanding as of December 31, 2016 under this facility of US$294 million. We also drew a net amount of US$35 million from our US revolving facility, leading to an amount outstanding as of December 31, 2016 under this facility of US$165 million.

As of December 31, 2016, the outstanding amount of our Nordic credit facility stood at US$190 million compared to US$220 million as of December 31, 2015 after repayment of US$30 million in 2016.

On February 12, 2016, we fully repaid the outstanding US$6.1 million of our US$45 million Secured Term Loan Facility.

In 2016, we also received net proceeds of €337 million from a capital increase that was used to fund our Transformation Plan.

As of December 31, 2018, our material financing arrangements consisted of the following (with euro amounts converted into US$):

- US$621 million New First Lien Notes due 2023; and
- US$481 million second lien senior secured notes due 2024 (including accumulated payment-in-kind ("PIK")).

For more information on our refinancing terms and arrangement, please refer to note 13 to our interim consolidated financial statements.

Net cash flow from discontinued operations

The following table presents a summary of the cash-flow of the discontinued operations for each of the periods stated:

	Year ended December 31,		
(In millions of US dollars)	**2018**	**2017**	**2016**
Net cash-flow provided by operating activities	(113.6)	(187.7)	(106.6)
Net cash-flow used in investing activities	(5.7)	(2.2)	(4.6)
Net cash-flow provided by (used in) financing activities	—	—	—
Net cash flow incurred by discontinued operations	**(119.3)**	**(189.9)**	**(111.2)**

Financial debt

Gross financial debt was US$1,167 million as of December 31, 2018, US$2,955 million as of December 31, 2017, and US$2,850 million as of December 31, 2016. Net financial debt was US$733 million as of December 31, 2018, US$2,640 million as of December 31, 2017, US$2,312 million as of December 31, 2016.

The ratio of net debt to equity for the years ended December 31, 2018, 2017 and 2016 was 45%, 540%, and 206%, respectively.

The amount of our financial debt was materially reduced by our financial restructuring, which was completed on February 21, 2018. Following the effectiveness of the restructuring, our gross financial debt totaled US$1.2 billion. *For more information, please refer to paragraph 1.2 "History and significant events in the development of the company's activities" and note 2 to our consolidated financial statements.*

"Gross financial debt" is the amount of bank overdrafts, plus current portion of financial debt, plus financial debt, and "net financial debt" is gross financial debt less cash and cash equivalents. Net financial debt is presented as additional information because we understand that certain investors believe that netting cash against debt provides a clearer picture of our financial liability exposure. However, other companies may present net financial debt differently than we do. Net financial debt is not a measure of financial performance under IFRS and should not be considered as an alternative to any other measures of performance derived in accordance with IFRS.

The following table presents a reconciliation of net financial debt to financing items of the balance sheet at December 31, 2018, 2017 and 2016 (according to IFRS):

	Year ended December 31,		
(In millions of US dollars)	**2018**	**2017**	**2016**
Bank overdrafts	0.0	0.2	1.6
Current portion of financial debt	17.8	2,902.8	2,782.1
Financial debt	1,148.9	52.3	66.7
Gross financial debt	**1,166.7**	**2,955.3**	**2,850.4**
Less cash and cash equivalents	(434.1)	(315.4)	(538.8)
Net financial debt	**732.6**	**2,639.9**	**2,311.6**

EBIT and EBITDAS

EBIT is defined as operating income plus our share of income in companies accounted for under the equity method. As a complement to operating income, EBIT may be used by management as a performance indicator for segments because it captures the contribution to our results of the significant businesses that we manage through our joint ventures.

EBITDAS is defined as earnings before interest, tax, income from equity affiliates, depreciation, amortization net of amortization expense capitalized to multi-client, and share-based compensation cost. Share-based compensation includes both stock options and shares issued under our share allocation plans. EBITDAS is presented as additional information because we understand that it is one measure used by certain investors to determine our operating cash flow and historical ability to meet debt service and capital expenditure requirements.

However, other companies may present EBIT and EBITDAS differently than we do. EBIT and EBITDAS are not a measure of financial performance under IFRS and should not be considered as an alternative to cash flow from operating activities or as a measure of liquidity or an alternative to net income as indicators of our operating performance or any other measures of performance derived in accordance with IFRS.

The following table presents a reconciliation of EBITDAS and EBIT to net income for the periods indicated:

	Year ended December 31, 2018			
(In millions of US dollars)	**Segment Figures**	**Transformation Plan, provisions and impairments**	**IFRS 15 adjustments**	**As reported**
EBITDAS	**556.0**	**(47.9)**	**(33.9)**	**474.2**
Depreciation and amortization	(104.0)	(13.9)	—	(117.9)
Multi-client surveys depreciation and amortization	(326.0)	(226.0)	(0.3)	(552.3)
Depreciation and amortization capitalized to multi-client surveys	18.8	—	—	18.8
Stock based compensation expenses	(2.5)	—	—	(2.5)
Operating income	**142.3**	**(287.8)**	**(34.2)**	**(179.7)**
Share of (income) loss in companies accounted for under equity method	(1.2)	—	—	(1.2)
EBIT	**141.1**	**(287.8)**	**(34.2)**	**(180.9)**
Cost of financial debt, net	(126.1)	(1.3)	—	(127.4)
Other financial income (loss)	66.7	753.2	—	819.9
Total income taxes	(3.3)	—	(4.1)	(7.4)
Net income from continuing operations	**78.4**	**464.1**	**(38.3)**	**504.2**

(In millions of US dollars)	Year ended December 31, 2017 — Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
EBITDAS	**434.0**	**(106.2)**	**—**	**327.8**
Depreciation and amortization	(117.5)	—	—	(117.5)
Multi-client surveys depreciation and amortization	(297.7)	—	—	(297.7)
Depreciation and amortization capitalized to multi-client surveys	30.0	—	—	30.0
Stock based compensation expenses	(0.5)	—	—	(0.5)
Operating income	**48.3**	**(106.2)**	**—**	**(57.9)**
Share of (income) loss in companies accounted for under equity method	(0.4)	—	—	(0.4)
EBIT	**47.9**	**(106.2)**	**—**	**(58.3)**
Cost of financial debt, net	(186.5)	(24.5)	—	(211.0)
Other financial income (loss)	23.2	(1.7)	—	21.5
Total income taxes	(18.7)	—	—	(18.7)
Net income from continuing operations	**(134.1)**	**(132.4)**	**—**	**(266.5)**

(In millions of US dollars)	Year ended December 31, 2016 — Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
EBITDAS	**386.0**	**(19.0)**	**—**	**367.0**
Depreciation and amortization	(136.5)	(0.5)	—	(137.0)
Multi-client surveys depreciation and amortization	(320.4)	(96.8)	—	(417.2)
Depreciation and amortization capitalized to multi-client surveys	42.3	—	—	42.3
Stock based compensation expenses	(1.7)	—	—	(1.7)
Operating income	**(30.3)**	**(116.3)**	**—**	**(146.6)**
Share of (income) loss in companies accounted for under equity method	(2.2)	—	—	(2.2)
EBIT	**(32.5)**	**(116.3)**	**—**	**(148.8)**
Cost of financial debt, net	(174.2)	—	—	(174.2)
Other financial income (loss)	6.0	—	—	6.0
Total income taxes	(23.2)	41.9	—	18.7
Net income from continuing operations	**(223.9)**	**(74.4)**	**—**	**(298.3)**

For 2018, EBITDAS as reported represented 40% of operating revenues as reported compared to 32% for 2017 and 38% in 2016.

In 2018, EBITDAS as reported included US$18 million of restructuring expenses relating to our Transformation Plan, US$106 in 2017 and US$19 million in 2016.

The following table presents EBITDAS by segment for the periods indicated:

	Year ended December 31, 2018			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
GGR	557.8	—	(33.9)	523.9
Equipment	42.1	(30.1)	—	12.0
Non-Operated Resources	—	(17.8)	—	(17.8)
Eliminations and other	(43.9)	—	—	(43.9)
EBITDAS	**556.0**	**(47.9)**	**(33.9)**	**474.2**

	Year ended December 31, 2017			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
GGR	486.0	—	—	486.0
Equipment	(6.1)	—	—	(6.1)
Non-Operated Resources	—	(106.2)	—	(106.2)
Eliminations and other	(45.9)	—	—	(45.9)
EBITDAS	**434.0**	**(106.2)**	**—**	**327.8**

	Year ended December 31, 2016			
(In millions of US dollars)	Segment Figures	Transformation Plan, provisions and impairments	IFRS 15 adjustments	As reported
GGR	460.4	—	—	460.4
Equipment	(6.4)	—	—	(6.4)
Non-Operated Resources	—	(19.0)	—	(19.0)
Eliminations and other	(68.0)	—	—	(68.0)
EBITDAS	**386.0**	**(19.0)**	**—**	**367.0**

Free cash flow

We define "free cash flow" as cash flow from operations including "Proceeds from disposals of tangible and intangible assets" minus (i) the net of "Total net capital expenditures"; "Investments in multi-client surveys" set out in our consolidated statement of cash flows under "Investing", and (ii) "Financial expenses paid" set out in our consolidated statement of cash flows under "Financing".

Free cash flow as reported amounted to outflows of US$4 million in 2018 compared to outflows of US$7 million in 2017 and outflows of US$174 million in 2016. Before restructuring charges relating to the Transformation Plan, free cash flow amounted to inflows of US$60 million in 2018, compared to inflows of US$45 million in 2017 and outflows of US$129 million in 2016.

Contractual obligations

The following table presents payments in future periods relating to contractual obligations as of December 31, 2018:

	Payments due by period				
(in millions of US dollars)	Less than 1 year	2-3 years	4-5 years	After 5 years	Total
Long-term debt obligations:					
— Repayments: fixed rates	0.4	0.6	621.2	4.7	627.0
— Repayments: variables rates [(a)]	—	—	—	740.9	740.9
— Bonds and facilities interests	83.3	175.2	161.5	11.5	431.5
Total long-term debt obligations	**83.7**	**175.8**	**782.7**	**757.1**	**1,799.3**
Finance leases:					
— Finance lease obligations: fixed rates	7.4	14.9	3.8	—	26.1
— Finance lease obligations: variables rates [(a)]	—	—	—	—	—
Total finance lease obligations	**7.4**	**14.9**	**11.8**	**—**	**26.1**
Bareboat agreements	**40.7**	**85.1**	**91.3**	**148.3**	**365.4**
Other operating lease agreements	**43.4**	**53.9**	**43.7**	**31.7**	**172.7**
Total contractual obligations [(b)]	**175.2**	**329.7**	**921.5**	**937.1**	**2,363.5**

(a) Payments are based on the variable rates applicable as of December 31, 2018.
(b) Payments in foreign currencies are converted in US$ at December 31, 2018 exchange rates.

The amount of our financial debt was materially reduced by our financial restructuring, which was completed on February 21, 2018.

For more information, please refer to paragraph 1.2 "History and significant events in the development of the company's activities" and note 2 to our consolidated financial statements.

Off-balance sheet arrangements

We have not entered into any other off-balance sheet arrangements that have or are reasonably likely to have a current or future material effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Please refer to note 8 to our consolidated financial statements for further details on current off-balance sheet obligations.

Currency fluctuations

We face foreign exchange risks because a large percentage of our revenues and cash receipts are denominated in US dollars, while a significant portion of our operating expenses and income taxes accrue in euro and other currencies. Movements between the US dollar and euro or other currencies may adversely affect our operating results. Approximately 72% of total Group turnover was denominated in US dollars in 2018, compared to approximately 75% in 2017 and 2016.

As of December 31, 2018, we estimate our annual recurring expenses in euros at Group level to be approximately €300 million and as a result, an unfavorable variation of US$0.10 in the average yearly exchange rate between the US dollar and the euro would reduce our profit before tax and our shareholders' equity by approximately US$30 million.

Please refer to paragraph 2.1 "Risk Factors" for further details on the effect of fluctuations in the exchange rate of US dollar against euro upon our results of operations.

Interest rates

Following our financial restructuring effective February 21, 2018, the total amount of our first lien notes and second lien notes are subject to variable interest rates that are reset at each interest period (every three months). As a result, our interest expenses vary in line with movements in short term interest rates.

For more information about our variable interest rate exposure, please refer to paragraph 2.1 "Risk Factors" and note 14 to our consolidated financial statements.

Income taxes

We conduct the majority of our activities outside of France and pay taxes on income earned or deemed profits in each foreign country pursuant to local tax rules and regulations.

We have significant tax losses carried forward that are available to offset future taxation on income earned in certain OECD countries. Deferred tax assets are recognized only when their recovery is considered as probable or when there are existing taxable temporary differences, of an appropriate type, that reverse in an appropriate period. When tax laws limit the extent to which unused tax losses can be recovered against future taxable profits in each year, the amount of deferred tax assets recognized from unused tax losses as a result of suitable existing taxable temporary differences is restricted as specified by the tax law. When financial forecast are revised downward, we consider the depreciation of our deferred tax assets recognized on prior period.

5.2. INFORMATION ON THE UTILIZATION OF FINANCIAL INSTRUMENTS

In 2018 and 2017, our turnover was mainly denominated in US dollars, representing respectively 72% and 75% of our total turnover and to a significantly lesser extent in Brazilian reais, Euro, Chinese yuan, British pounds, Norwegian kroner, Australian dollars and Canadian dollars.

Most of our expenses in 2018 were paid in US dollars, Euro, British pounds, Norwegian kroner and Renminbi-Yuan.

We aim to match our foreign currency revenues and expenses in order to balance, to the extent possible, our net position of receivables and payables denominated in foreign currencies, in particular currencies that are not readily available or are difficult to convert. Nevertheless, over past years, the Group did not succeed in totally balancing its foreign currency revenues and expenses, especially for euros, due to personnel costs payable in euros in France and in certain European countries.

In addition, our general policy is, when possible, to hedge major currency exposures related to forecasted excess currency originating from operational contracts at the time such contracts are entered in the backlog. This strategy to reduce foreign exchange risks led us to mitigate, without eliminating the positive or negative impact of the foreign exchange rate variation on the operating income of the Group.

On the contrary, we do not enter into forward foreign currency exchange contracts to hedge recurring fixed expenses in any currency, especially euros.

As we are a US$ company, we maintain our financing primarily in US dollars. As of December 31, 2018 and 2017, our total outstanding debt denominated in US dollars was US$683 million and US$1,757 million, respectively, representing 59% and 62% of our total financial debt outstanding at such dates.

As of December 31, 2018, contracts were outstanding for the US dollar equivalent of US$34.2 million (of which US$15.8 million were applied), of which US$13.6 million against Brazilian reals and US$20.6 million against Euros.

As of December 31, 2017, we did not have significant forward exchange contracts outstanding.

5.3. PROSPECTS

Market environment

Since 2014, our industry has been facing oil price unstability from stable US$100 for about 3 years ending in the middle of 2014, followed by a drastic drop to the US$30 bottom in early 2016, and then, the relatively steady increases back up to the US$60-$70 current environment. While oil price is ultimately driving our client's spending and prospects, the planning price used internally by our clients is even more important. We anticipate the 2019 budget planning price to be around US$60.

Between 2014 and 2017, oil prices fluctuated below the US$50 price threshold, resulting in 50% cut of exploration and production capex by the oil and gas companies and hence a massive workforce reductions by the service companies. At CGG, the headcount were reduced by more than half over the period, from 11,060 employees end of 2013 to approximately 5,100 end of 2018.

In addition to the cost cutting and in order to secure work, the service company responded with heavy discounting, particularly in products and services perceived as commodities. In data acquisition services, pricing fall to well below cash break-even levels. Geoscience and Equipment managed to defend their pricing power thanks to their high differentiation added-value.

Eventually, oil companies have to find oil. When the pressure to find oil is on, CGG is very well positioned to take advantage of the recovery. Our global coverage of frontier areas with our geologic and 2-D seismic libraries, and our 3-D coverage of the Gulf of Mexico, Brazil, the North Sea and Norway is unparalleled.

A strategy based on cash generating businesses and technology differentiation

On November 7, 2018, CGG announced an evolved set of strategic objectives to ensure the future growth and sustainability of the company. This strategy is based on three clear objectives:

1. Ensure profitability through the cycles. To do this, CGG intends to move to an asset light business model, limiting its exposure to the commotized data acquisition businesses. The following strategic adjustments will be implemented:
   - For Marine: reducing CGG's fleet to three vessels in 2019, and search for a strategic partnership to take over and operate all vessels by 2021.
   - For Land: wind down and exit the business in 2019.
   - For Multi-Physics : divest of this business.
2. Further strengthen the remaining CGG businesses as the market recovers.
   - The Geoscience business maintained both its leading market share and margins through the downturn, based on clear differentiation that clients recognize and value. The CGG strategy going forward is to strengthen its leadership position and profitability as the market recovers.
   - The Multi-Client ("MC") business also performed well through the cycle and since 2017 has profited from the gradual strengthening offshore exploration market. Combined with the strength of CGG's Geoscience capabilities, MC will continue to deliver a full suite of products including 2D and 3D seismic data as wella s petrophysical information from its wells log library and geologic data and studies of various types.
   - The Equipment business has shown its operational flexibility to react strongly to industry downturns, while maintaining investments and resources necessary to introduce new and differentiated technologies and capture the rebound, which now appears to be in its early stages. Looking forward, Equipment should benefit from its very large installed base in Land where demand is strengthening. It should also see the Marine market start to rebound, as a significant number of streamers are at their end-of-life and need replacement. Gauges and downhole tools sales are strong, driven by the US land unconventional market.
3. The third part of CGG's strategy is to grow the business profitably and organically. CGG will develop new areas of profitable growth in a capital-efficient way. Areas of focus include expansion into adjacent markets, leveraging increased reservoir development activity, equipment diversification and rapid advance of geoscience and digital technologies. In equipment, CGG will expand diversification through structural health monitoring solutions.

Improving imaging and developing integrated solutions for reservoir simulation

To anticipate the exponential increase in data acquired (Big Data), considerable research and development efforts will be necessary in respect of seismic data processing, data storage and management, and new parallel computer architectures which should enable such data to be processed in a reasonable time frame and in an energy efficient manner. The Group believes that, by continually improving its seismic data processing software, it will remain among the leading suppliers of high-end land and marine seismic services. Its research and development work will therefore continue to focus on improving imaging in complex zones to help exploration and production as a technology for characterizing and monitoring reservoirs. The Group will also continue to develop lithological prediction (identification of rocky layers surrounding the accumulation of hydrocarbons) and reservoir characterization and content applications, in particular 3D prestack depth imaging, subsalt depth imaging, broadband depth imaging, multi-component acquisition imaging and differential imaging unique to 4D surveys.

Sercel's innovative solutions

In terms of equipment, Sercel is maintaining a high level of research and development which is justified by the high technological content of seismic equipment which includes numerous cutting-edge technologies, such as wireless transmission, high- and low-frequency transmission or miniaturized electronic technologies, and also optical or acoustic technologies.

Sercel launched several new products the past few years, including:

- The Nomad 65 Neo and Nomad 90 Neo vibrators that allow the generation of a wider range of seismic wave frequencies and are therefore the ideal source for broadband seismic land surveys;
- GeoWave II, the first digital multi-level downhole array tool specifically designed to withstand high temperatures (up to 400°F/205°C) and high pressures (up to 25,000 psi/ 1,725 bars), and which allows for up to 120 levels to be deployed on a standard wireline;
- QuietSea, a passive acoustic monitoring system for detecting the presence of marine mammals during marine seismic surveys;
- GeoTag, the acoustic positioning solution of choice for seabed seismic acquisition, allowing the accurate positioning of all types of cable (OBC) or autonomous systems, on seabeds or in transition zones, for seismic surveys in depths up to 500 metres.

Commercial and Industrial outlook

The Group's seismic activity is strongly correlated to the exploration and production budget. More generally, the oil and gas companies will likely remain cautious at the beginning of 2019 after the strong drop of the oil price in December 2018, and will likely remain focused on quick returns, i.e. — producing more out of existing fields, developing unconventional and conventional resources on land and leveraging existing infrastructure. All this is expected to result in lower activity volumes and also less willingness to take risks in the areas of frontier exploration (arctic, deep water offshore…).

In general terms, CGG will continue to develop and promote high-end solutions: upstream with its equipment offering and also in subsurface-imaging.

Geology, Geophysics & Reservoir: developing an integrated geoscience activity and capitalizing on our multi-client library

The Subsurface Imaging market is following the global trend of reduced exploration and production spending by clients, despite imaging being a small part of their budget. Overall, the Subsurface Imaging and Reservoir activity saw its turnover increase by 13% in 2018 and we anticipate the same growth in 2019.

Multi-client revenues increased by 10% in 2018 driven by a very high after-sales rebound in very mature basins. For 2019, multi-client cash investments are expected around US$280 million with a pre-funding rate of over 70%, spurred by the undiminished appetite of oil companies for good quality multi-client seismic data in zones that they know well (Brazil, the North Sea, etc.) enabling them to capitalize on their existing infrastructures and reduce the marginal investment cost. Moreover, CGG should benefit from interest in new prospective areas, such as Mozambique.

Many customers are focusing their exploration and production budgets on increasing production from current installations, and GGR benefits with services and imaging projects, given our leading ocean bottom nodes processing capability, as well as large multi-client projects over mature areas. In addition, the oil companies, wanting to obtain the best possible images to maximize their exploration efforts, are asking for more reprocessing of previous data in order to benefit, at a lower cost, from developments of new imaging algorithms. In 2019, we expect that GGR growth will be driven by a modest recovery in Imaging and a sustained demand for Multi-client data sets.

Equipment: capitalize on a strong client base and benefit from the start of the volume increase

In 2019, Sercel's revenue should improve compared to 2018 with a rebound of land activity especially in the Middle East, resulting in demand for new equipment from the geophysical contractors. Moreover, Sercel should benefit from the 508XT advanced technology compared to aging systems. Geographical pockets of new opportunities are emerging in India and Algeria, beyond our traditional markets (Russia, China and Middle East).

The marine market should remain low due to the financing difficulties Sercel's clients are facing. Marine contractors continue to face a difficult market, restricting their ability to invest in new equipment. However, their current fleets are aging and their excess of equipment generated by the stacking of vessels is shrinking.

In the medium-term, the land equipment market should be spurred by the need for better imaging of conventional onshore reservoirs that are currently being operated intensively (with the increase in volumes produced aiming to offset the drop in oil prices as best as possible) in order to better control their depletion.

Overall, the geophysics market is characterized by ever increasing demand for new technologies, both in land and marine, to achieve high-resolution imaging. The Group predicts that this trend will continue in the coming years. Because of its strong reputation and past success, Sercel should be able to maintain its leading position in the seismic equipment market, capitalizing on its installed base, the implementation of new technologies in its full product range, especially in the node business.

Contractual Data Acquisition: organizing the exit

On November 7, 2018, CGG announced its decision to exit the data acquisition market. Starting the 4th quarter of 2018, the data acquisition business was reported as discontinued operations. See item 1.2 "History and significant events in the development of the Company's activities" of this document.

Financial outlook

CGG enjoys a leading technology position in Geoscience and Equipment as a result of our sustained investments in Research & Development during the downturn. Thus, we anticipate our solid pipeline of new products and innovative solutions to generate returns in 2019 and beyond.

As we enter 2019, we expect the Group to grow in line with the market. We remain focused on generating cash and are on track to deliver our 2021 plan.

In 2019, CGG expects to deliver the following objectives:

- the Revenue is expected to increase by a high single digit and in line with increase in exploration and production spending;
- the segment EBITDAs margin is expected at c. 45% depending on the revenue mix;
- the segment Operating Income is expected in the range of US$75-125 million including multi-client amortization of US$(365)-(385) million.
- the Total capex is expected in the range of US$330-365 million with multi-client cash capex at US$250-275 million, with a cash prefunding rate above 70%, and Industrial and Research & Development capex at US$80-90 million.
- CGG is anticipating lower cash use than in previous years thanks to a segment Free cash flow in the range of US$175-200 million.

We have included above certain targets and projections regarding our financial outlook. We cannot guarantee that they can or will be met and investors are advised not to place undue reliance on these targets and projections. These targets and projections are based on assumptions and are subject to known and unknown risks, uncertainties and other factors that could cause our actual results to materially differ from those expressed in, or suggested by, these targets and projections. The ultimate achievability of these targets and projections is also subject to numerous risks and uncertainties including, but not limited to, the risks and uncertainties described in "2.1 — Risk Factors".

Neither our independent auditors nor any other independent accountants compiled, examined or performed any procedures with respect to these targets and projections, nor have they expressed any opinion or any other form of assurance on these targets and projections or their achievability.

These targets and projections, while presented with numerical specificity, necessarily reflect numerous estimates and assumptions made by us with respect to industry performance, general business, economic, regulatory, market and financial conditions, and other future events, as well as matters specific to our businesses, all of which are difficult or impossible to predict and many of which are beyond our control. These targets and projections reflect subjective judgments in many respects and, thus, are susceptible to multiple interpretations and periodic revisions based on actual experience and business, economic, regulatory, financial and other developments.

These targets and projections constitute forward-looking information and are subject to risks and uncertainties that could cause actual results to differ materially from these targets and projections, including, but not limited to, our performance, industry performance, general business and economic conditions, competition, adverse changes in applicable laws, regulations or rules, and the various risks and uncertainties set forth herein that could materially adversely affect our future results. We cannot give any assurance that these targets and projections will be realized or that actual results will not vary significantly from these targets and projections. See "Forward-Looking Statements" at the beginning of this document.

6

INFORMATION ON THE COMPANY

6 INFORMATION ON THE COMPANY

6.1. INFORMATION ON THE COMPANY

6.1.1. Registered name

Registered name: CGG

6.1.2. Place and number of registration

As of the date of this document, the Company is registered with the Paris Commercial court registry under registation number "969202241 RCS Paris".

APE : 7010 Z Code.

6.1.3. Date of registration and duration of the Company (article 5 of the articles of association)

The Company was incorporated in on March 27, 1931 for a 99-year duration, i.e. until March 26, 2030 — unless ealier dissolution or extension approved by the General Meeting.

6.1.4. Place of registration — legal form — applicable law — country of origin — address and phone number of the registered address

As of the date of this report, the registered address of the Company is located at Tour Maine-Montparnasse, 33, avenue du Maine, 75015 Paris, France (telephone: +33 (0)1 64 47 45 00).

Nevertheless, on December 11, 2018 and in accordance with article 4 of the articles of association, the Board of Directors approved the change of registered address of the Company to 27 avenue Carnot, 91300, Massy, France, effective as from May 31, 2019. This decision will be submitted to the General Meeting convened to approve the 2018 financial statements for ratification.

The Company is a French *société anonyme* (article 1 of the articles of association). The Company is governed by the French Commercial Code and, more generally, by French laws and regulations.

6.1.5. Corporate object (article 2 of the articles of association)

The corporate object of the Company is as follows:

- Development and operation in any form and under any conditions whatsoever, of all and any business relating to the geophysical survey of the soil and subsoil in any all countries, on behalf of third parties or on its own behalf.
- Direct or indirect participation in any business, firm or Company whose object would be likely to promote the corporate object.
- And, generally, any business, industrial, mining, financial, personal or real property operations relating directly or indirectly to the above object without limitation or reserve.

6.1.6. Fiscal year (article 18 of the articles of association)

The Company's fiscal year starts on January first and ends on December thirty-first.

6.1.7. Distribution of earlings (article 19 of the articles of association)

Out of the earnings of the fiscal year, reduced if necessary by previous losses, at least five percent shall be first appropriated to form the reserve fund required by law, until said reserve fund has reached one tenth of the stock capital.

The balance, increased by retained earnings, if any, forms the distributable earnings.

Any amounts that the General Meeting would decide, either on proposal by the Board or by its own decision, to allocate to one or more general or special reserve funds or to carry forward, shall be withdrawn from said earnings.

The balance shall be distributed among the shareholders as a dividend.

The terms and conditions for the payment of dividends are determined by the General Meeting or, failing such, by the Board of Directors.

The General Meeting deciding on the financial statements is entitled to give each shareholder, for the dividend or part of the dividend to be distributed or for any advance payments on a dividend, the choice between payment of the dividend in cash or in stock.

6.1.8. Dividends

The Company did not distribute any dividends over the past five years.

Priority being given to debt reduction and financing of the growth and development of the Company, the Board of Directors does not, at this stage, consider proposing to distribute dividends to the General Meeting.

6.2. MATERIAL CONTRACTS

Please refer to paragraph 4.3.1.5 "Securities not giving access to the share capital" of the present document for more details.

6.3. RELATED PARTY TRANSACTIONS

See Note 28 to our 2018 consolidated financial statements

7 2018 FINANCIAL STATEMENTS — FINANCIAL INFORMATION CONCERNING THE ASSETS, FINANCIAL POSITION AND RESULTS

7.1. 2016-2017-2018 CGG CONSOLIDATED FINANCIAL STATEMENTS

Consolidated statements of financial position

		December 31,		
(In millions of US$)	Notes	2018	2017	2016
ASSETS				
Cash and cash equivalents	29	434.1	315.4	538.8
Trade accounts and notes receivable, net [(2)]	1, 3, 19	520.2	522.6	434.8
Inventories and work-in-progress, net	4	204.8	239.3	266.3
Income tax assets		72.1	61.6	112.2
Other current assets, net	4	99.1	117.0	105.8
Assets held for sale, net [(4)]	5	195.5	14.6	18.6
Total current assets		**1,525.8**	**1,270.5**	**1,476.5**
Deferred tax assets	1, 19, 25	22.6	21.9	26.0
Investments and other financial assets, net	7	31.1	62.6	51.9
Investments in companies under equity method	8	0.1	192.7	190.5
Property, plant and equipment, net	9	189.2	330.3	708.6
Intangible assets, net [(2)] [(3)]	1, 10, 19	898.9	1,152.2	1,184.7
Goodwill, net	11	1,229.0	1,234.0	1,223.3
Total non-current assets		**2,370.9**	**2,993.7**	**3,385.0**
TOTAL ASSETS		**3,896.7**	**4,264.2**	**4,861.5**
LIABILITIES AND EQUITY				
Bank overdrafts	13	—	0.2	1.6
Current portion of financial debt [(1)]	2, 13	17.8	2,902.8	2,782.1
Trade accounts and notes payable		126.4	169.9	157.4
Accrued payroll costs		135.8	153.6	138.9
Income taxes payable		49.6	38.7	31.6
Advance billings to customers		35.7	25.9	24.4
Provisions — current portion	16	172.4	58.3	110.7
Current liabilities associated with funded receivables	3	—	9.8	—
Other current liabilities [(2)]	1, 12, 19	250.9	123.1	140.2
Liabilities directly associated with the assets classified as held for sale [(4)]	5	131.7	—	—
Total current liabilities		**920.3**	**3,482.3**	**3,386.9**
Deferred tax liabilities	1, 19, 25	44.4	62.0	67.6
Provisions — non-current portion	16	95.9	121.6	162.1
Financial debt [(1)]	2, 13	1,148.9	52.3	66.7
Other non-current liabilities	17	13.1	17.9	21.4
Total non-current liabilities		**1,302.3**	**253.8**	**317.8**
Common stock: 829,153,000 shares authorized and 709,944,816 shares with a €0.01 nominal value issued and outstanding at December 31, 2018	15	8.7	20.3	20.3
Additional paid-in capital [(1)]		3,184.6	1,850.0	1,850.0
Retained earnings [(1)]	1	(1,457.8)	(1,354.6)	(845.7)
Other Reserves		(27.9)	37.6	171.1
Treasury shares		(20.1)	(20.1)	(20.1)
Cumulative income and expense recognized directly in equity		(0.9)	(0.8)	(0.8)
Cumulative translation adjustment		(55.1)	(43.3)	(54.1)
Equity attributable to owners of CGG S.A.		**1,631.5**	**489.1**	**1,120.7**
Non-controlling interests		42.6	39.0	36.1
Total equity [(1)] [(2)]		**1,674.1**	**528.1**	**1,156.8**
TOTAL LIABILITIES AND EQUITY		**3,896.7**	**4,264.2**	**4,861.5**

(1) See note 2 for more information regarding the impact of our financial restructuring completed on February 21, 2018.
(2) See note 1.3 for more information regarding the impact of application of "IFRS 15 — revenues from contracts with customers".
(3) See note 1.4 for more information regarding the impact of changes in estimates on multi-client amortization.
(4) See note 5 for more information regarding the impact of IFRS 5 "Assets held for sale and discontinued operations" as of December 31, 2018.

The accompanying notes are an integral part of the consolidated financial statements

Consolidated statements of operations

(In millions of US$, except per share data)	Notes	2018	2017 (restated*)	2016 (restated*)
Operating revenues (5)	5, 19, 20	1,193.5	1,035.1	963.3
Other income from ordinary activities	19, 20	1.4	0.8	1.4
Total income from ordinary activities		**1,194.9**	**1,035.9**	**964.7**
Cost of operations (6)		(931.0)	(849.7)	(857.5)
Gross profit		**263.9**	**186.2**	**107.2**
Research and development expenses — net	21	(30.5)	(17.9)	(16.7)
Marketing and selling expenses		(45.9)	(46.6)	(50.1)
General and administrative expenses		(81.1)	(74.1)	(76.3)
Other revenues (expenses) — net	5, 22	(286.1)	(105.5)	(110.7)
Operating income	**5, 20**	**(179.7)**	**(57.9)**	**(146.6)**
Expenses related to financial debt		(129.7)	(214.0)	(176.9)
Income provided by cash and cash equivalents		2.3	3.0	2.7
Cost of financial debt, net	**23**	**(127.4)**	**(211.0)**	**(174.2)**
Other financial income (loss) (4)	2, 5, 24	819.9	21.5	6.0
Income (loss) before income taxes and share of income (loss) in companies accounted for under equity method		**512.8**	**(247.4)**	**(314.8)**
Income taxes	5, 25	(7.4)	(18.7)	18.7
Share of income (loss) in companies accounted for under equity method	5	(1.2)	(0.4)	(2.2)
Net income (loss) from continuing operations		**504.2**	**(266.5)**	**(298.3)**
Net income (loss) from discontinued operations (7)	5	(600.0)	(247.6)	(278.3)
Net income (loss) (5)		**(95.8)**	**(514.1)**	**(576.6)**
Attributable to:				
Owners of CGG S.A.	$	(101.6)	(514.9)	(573.4)
Owners of CGG S.A. (1)	€	(85.9)	(458.6)	(518.6)
Non-controlling interests	$	5.8	0.8	(3.2)
Weighted average number of shares outstanding (2)	30	608,438,241	46,038,287	43,255,753
Dilutive potential shares from stock options	30	(3)	(3)	(3)
Dilutive potential shares from performance share plans	30	(3)	(3)	(3)
Dilutive potential shares from warrants	30	(3)	—	—
Dilutive weighted average number of shares outstanding adjusted when dilutive (2)	30	608,438,241	46,038,287	43,255,753
Net income (loss) per share *(see note 30 for more detail on EPS for continuing and discontinued operations)*				
— Basic	$	(0.17)	(11.18)	(13.26)
— Basic (1)	€	(0.14)	(9.96)	(11.99)
— Diluted	$	(0.17)	(11.18)	(13.26)
— Diluted (1)	€	(0.14)	(9.96)	(11.99)

* *In accordance with IFRS 5 "Non-current Assets Held for Sale and Discontinued Operations", the profit and loss accounts related to the discontinued operations have been presented in the separate line item "Net income (loss) from discontinued operations" at December 31, 2018, 2017 and 2016.*

(1) *Converted at the average exchange rate of US$1.1828, US$1.1227 and US$1.1057 per € for 2018, 2017 and 2016 respectively.*

(2) *As a result of the February 21, 2018 CGG S.A. capital increase via an offering of preferential subscription rights to existing shareholders, the calculation of basic and diluted earnings per share for 2017 and 2016 has been adjusted retrospectively. Number of ordinary shares outstanding has been adjusted to reflect the proportionate change in the number of shares.*

(3) *As our net result was a loss, stock options, performance shares plans and warrants had an anti-dilutive effect; as a consequence, potential shares linked to those instruments were not taken into account in the dilutive weighted average number of shares or in the calculation of diluted loss per share.*

(4) *See note 2 for more information regarding the impact of our financial restructuring on February 21, 2018.*

(5) *See note 1.3 for more information regarding the impact of application of "IFRS 15 — revenues from contracts with customers".*

(6) *See note 1.4 for more information regarding the impact of changes in estimates on multi-client amortization*

(7) *See note 5 for more information regarding the impact of IFRS 5 "Assets held for sale and discontinued operations"*

The accompanying notes are an integral part of the consolidated financial statements

Consolidated statements of comprehensive income (loss)

	Year		
(In millions of US$)	**2018***	**2017***	**2016***
Net income (loss) from statements of operations	**(95.8)**	**(514.1)**	**(576.6)**
Other comprehensive income to be reclassified in profit (loss) in subsequent period:			
Net gain (loss) on cash flow hedges	(0.1)	—	(0.2)
Exchange differences on translation of foreign operations	(14.0)	12.9	(17.7)
Net other comprehensive income to be reclassified in profit (loss) in subsequent period (1)	**(14.1)**	**12.9**	**(17.9)**
Other comprehensive income not to be classified in profit (loss) in subsequent period:			
Net gain (loss) on actuarial changes on pension plan	6.8	5.2	(6.6)
Net other comprehensive income not to be reclassified in profit (loss) in subsequent period (2)	**6.8**	**5.2**	**(6.6)**
Total other comprehensive income (loss) for the period, net of taxes (1)+(2)	**(7.3)**	**18.1**	**(24.5)**
Total comprehensive income (loss) for the period	**(103.1)**	**(496.0)**	**(601.1)**
Attributable to:			
Owners of CGG	*(106.7)*	*(498.9)*	*(595.4)*
Non-controlling interests	*3.6*	*2.9*	*(5.7)*

* *Including other comprehensive income related to the discontinued operations.*

The accompanying notes are an integral part of the consolidated financial statements

Consolidated statements of changes in equity

Amounts in millions of US$, except share data	**Number of Shares issued [(a)]**	**Share capital**	**Additional paid-in capital**	**Retained earnings**	**Other reserves**	**Treasury shares**	**Income and expense recognized directly in equity**	**Cumulative Translation Adjustment**	**Equity attributable to owners of CGG S.A.**	**Non-controlling interests**	**Total equity**
Balance at January 1, 2016	**5,533,287**	**92.8**	**1,410.0**	**(268.5)**	**138.0**	**(20.6)**	**(0.6)**	**(38.9)**	**1,312.2**	**46.2**	**1,358.4**
Net gain (loss) on actuarial changes on pension plan (1)				(6.6)					(6.6)		(6.6)
Net gain (loss) on cash flow hedges (2)							(0.2)		(0.2)		(0.2)
Exchange differences on foreign currency translation (3)								(15.2)	(15.2)	(2.5)	(17.7)
Other comprehensive income *(1)+(2)+(3)*				**(6.6)**			**(0.2)**	**(15.2)**	**(22.0)**	**(2.5)**	**(24.5)**
Net income (4)				(573.4)					(573.4)	(3.2)	(576.6)
Comprehensive income *(1)+(2)+(3)+(4)*				**(580.0)**			**(0.2)**	**(15.2)**	**(595.4)**	**(5.7)**	**(601.1)**
Capital increase	16,599,862	231.6	135.9			0.5			368.0		368.0
Share capital reduction *(see note15)*		(304.1)	304.1						—		—
Dividends									—	(4.4)	(4.4)
Cost of share-based payment				2.6					2.6		2.6
Exchange differences on foreign currency translation generated by the parent company					33.1				33.1		33.1
Changes in consolidation scope and other				0.2					0.2		0.2
Balance at December 31, 2016	**22,133,149**	**20.3**	**1,850.0**	**(845.7)**	**171.1**	**(20.1)**	**(0.8)**	**(54.1)**	**1,120.7**	**36.1**	**1,156.8**

(a) Number of shares as of January 1, 2016 and capital increase have been restated to reflect the 32-for-one stock split on July 20, 2016.

Amounts in millions of US$, except share data	**Number of Shares issued**	**Share capital**	**Additional paid-in capital**	**Retained earnings**	**Other reserves**	**Treasury shares**	**Income and expense recognized directly in equity**	**Cumulative Translation Adjustment**	**Equity attributable to owners of CGG S.A.**	**Non-controlling interests**	**Total equity**
Balance at January 1, 2017	**22,133,149**	**20.3**	**1,850.0**	**(845.7)**	**171.1**	**(20.1)**	**(0.8)**	**(54.1)**	**1,120.7**	**36.1**	**1,156.8**
Net gain (loss) on actuarial changes on pension plan (1)				5.2					5.2		5.2
Net gain (loss) on cash flow hedges (2)									—		—
Exchange differences on foreign currency translation (3)								10.8	10.8	2.1	12.9
Other comprehensive income*(1)+(2)+(3)*				**5.2**				**10.8**	**16.0**	**2.1**	**18.1**
Net income (4)				(514.9)					(514.9)	0.8	(514.1)
Comprehensive income *(1)+(2)+(3)+(4)*				**(509.7)**				**10.8**	**(498.9)**	**2.9**	**(496.0)**
Cost of share-based payment				1.0					1.0		1.0
Exchange differences on foreign currency translation generated by the parent company					(133.5)				(133.5)		(133.5)
Changes in consolidation scope and other				(0.2)					(0.2)		(0.2)
Balance at December 31, 2017	**22,133,149**	**20.3**	**1,850.0**	**(1,354.6)**	**37.6**	**(20.1)**	**(0.8)**	**(43.3)**	**489.1**	**39.0**	**528.1**

Amounts in millions of US$, except share data	Number of Shares issued	Share capital	Additional paid-in capital	Retained earnings	Other reserves	Treasury shares	Income and expense recognized directly in equity	Cumulative translation adjustment	Equity attributable to owners of CGG S.A.	Non-controlling interests	Total equity
Balance at December 31, 2017	**22,133,149**	**20.3**	**1,850.0**	**(1,354.6)**	**37.6**	**(20.1)**	**(0.8)**	**(43.3)**	**489.1**	**39.0**	**528.1**
IFRS 15 First Time Application [a]				(11.6)					(11.6)		(11.6)
Balance at January 1, 2018	**22,133,149**	**20.3**	**1,850.0**	**(1,366.2)**	**37.6**	**(20.1)**	**(0.8)**	**(43.3)**	**477.5**	**39.0**	**516.5**
Net gain (loss) on actuarial changes on pension plan (1)				6.8					6.8		6.8
Net gain (loss) on cash flow hedges (2)							(0.1)		(0.1)		(0.1)
Exchange differences on foreign currency translation (3)								(11.8)	(11.8)	(2.2)	(14.0)
Other comprehensive income (1)+(2)+(3)				**6.8**	**—**	**—**	**(0.1)**	**(11.8)**	**(5.1)**	**(2.2)**	**(7.3)**
Net income (4)				(101.6)					(101.6)	5.8	(95.8)
Comprehensive income (1)+(2)+(3)+(4)				**(94.8)**	**—**	**—**	**(0.1)**	**(11.8)**	**(106.7)**	**3.6**	**(103.1)**
Share capital reduction		(20.0)	20.0						—		—
Capital increase [b]	71,932,731	0.9	126.5						127.4		127.4
Debt equitization [b]	484,509,122	5.9	1,187.8						1,193.7		1,193.7
Exercise of warrants [b]	131,369,814	1.6	0.3						1.9		1.9
Cost of share-based payment				2.9					2.9		2.9
Exchange differences on foreign currency translation generated by the parent company				—	(65.5)				(65.5)		(65.5)
Changes in consolidation scope and other				0.3					0.3	—	0.3
Balance at December 31, 2018	**709,944,816**	**8.7**	**3,184.6**	**(1,457.8)**	**(27.9)**	**(20.1)**	**(0.9)**	**(55.1)**	**1,631.5**	**42.6**	**1,674.1**

(a) Refer to note 1 and 19 for more information regarding the impact of “IFRS 15 – revenues from contracts with customers”.
(b) Refer to note 2 for information regarding the impact of our financial restructuring completed on February 21, 2018.

The accompanying notes are an integral part of the consolidated financial statements

Consolidated statements of cash flows

(In millions of US$)	Notes	Year 2018	2017 (restated*)	2016 (restated*)
OPERATING				
Net income (loss)	1, 19	(95.8)	(514.1)	(576.6)
Less : Net income (loss) from discontinued operations	5	600.0	247.6	278.3
Net income (loss) from continuing operations		**504.2**	**(266.5)**	**(298.3)**
Depreciation and amortization	1, 19, 29	117.9	117.5	137.0
Multi-client surveys depreciation and amortization	10, 29	552.3	297.7	417.2
Depreciation and amortization capitalized in multi-client surveys	10	(18.8)	(30.0)	(42.3)
Variance on provisions		(18.2)	26.9	(25.3)
Stock based compensation expenses		2.5	0.5	1.7
Net (gain) loss on disposal of fixed and financial assets		(1.5)	(4.2)	4.9
Equity (income) loss of investees		1.2	0.4	2.2
Dividends received from investments in companies under equity method		—	—	—
Other non-cash items		(823.3)	(48.8)	0.3
Net cash flow including net cost of financial debt and income tax		**316.3**	**93.5**	**197.4**
Less net cost of financial debt		127.4	211.0	174.2
Less income tax expense	1, 19	7.4	18.7	(18.7)
Net cash flow excluding net cost of financial debt and income tax		**451.1**	**323.2**	**352.9**
Income tax paid	29	(17.0)	48.5	(7.6)
Net cash flow before changes in working capital		**434.1**	**371.7**	**345.3**
Change in working capital		(68.8)	13.9	116.4
— change in trade accounts and notes receivable	1, 19	(75.5)	(77.5)	230.7
— change in inventories and work-in-progress		33.3	55.0	57.0
— change in other current assets		4.3	(40.7)	(42.7)
— change in trade accounts and notes payable		(4.9)	27.7	(52.0)
— change in other current liabilities		(26.0)	49.4	(77.6)
Impact of changes in exchange rate on financial items		—	—	1.0
Net cash flow provided by operating activities		**365.3**	**385.6**	**461.7**
INVESTING				
Total capital expenditures (including variation of fixed assets suppliers, excluding multi-client surveys)	9	(78.0)	(67.2)	(73.8)
Investments in multi-client surveys, net cash	10	(222.8)	(251.0)	(295.1)
Proceeds from disposals of tangible and intangible assets		4.4	10.5	11.8
Total net proceeds from financial assets	29	—	4.5	—
Acquisition of investments, net of cash & cash equivalents acquired	29	—	—	—
Variation in loans granted	29	(0.4)	(1.5)	(1.2)
Variation in subsidies for capital expenditures		(0.2)	(0.5)	(0.6)
Variation in other non-current financial assets		(3.8)	4.2	(17.7)
Net cash flow used in investing activities		**(300.8)**	**(301.0)**	**(376.6)**

		Year		
(In millions of US$)	Notes	2018	2017 (restated*)	2016 (restated*)
FINANCING				
Repayment of long-term debt		(195.9)	(26.9)	(496.1)
Total issuance of long-term debt		336.5	2.3	458.1
Lease repayments		(5.7)	(5.7)	(8.7)
Change in short-term loans		(0.2)	(1.4)	0.9
Financial expenses paid		(73.2)	(85.0)	(141.8)
Net proceeds from capital increase:				
— from shareholders	29	129.3	—	367.5
— from non-controlling interests of integrated companies		—	—	—
Dividends paid and share capital reimbursements:				
— to shareholders		—	—	—
— to non-controlling interests of integrated companies		—	—	(4.4)
Acquisition/disposal from treasury shares		—	—	0.5
Net cash flow provided by (used in) financing activities		**190.8**	**(116.7)**	**176.0**
Effect of exchange rates on cash		(17.3)	6.1	3.6
Impact of changes in consolidation scope		—	(7.5)	—
Net cash flows incurred by Discontinued Operations (1)	5	(119.3)	(189.9)	(111.2)
Net increase (decrease) in cash and cash equivalents		**118.7**	**(223.4)**	**153.5**
Cash and cash equivalents at beginning of year	29	315.4	538.8	385.3
Cash and cash equivalents at end of period	**29**	**434.1**	**315.4**	**538.8**

* *In accordance with IFRS 5 "Non-current Assets Held for Sale and Discontinued Operations", financial information was restated to present comparative amounts for each period presented.*

(1) *See note 5 for more information regarding the impact of IFRS 5 "Assets held for sale and discontinued operations"*

The accompanying notes are an integral part of the consolidated financial statements

Notes to consolidated financial statements

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

CGG S.A. ("the Company"), along with its subsidiaries (together, the "Group") is a global participant in the geophysical and geological services industry, providing a wide range of data acquisition, processing and interpretation services as well as related imaging and interpretation software to clients in the oil and gas exploration and production business. It is also a global manufacturer of geophysical equipment.

Given that the Company is listed on a European Stock Exchange and pursuant to European Regulation n(o)1606/2002 dated July 19, 2002, the accompanying consolidated financial statements have been prepared in accordance with International Financial Reporting Standards ("IFRS") and its interpretations as issued by the International Accounting Standards Board (IASB) and as adopted by the European Union as at December 31, 2018.

The consolidated financial statements were authorized for issue by the Board of Directors on March 7, 2019 and will be submitted to the General Meeting convened on May 15, 2019 for approval.

1.1-Critical Accounting Policies

Our accounting policies, which we have applied consistently, are described below. However, the accounting policies related to the accounts impacted by the judgments and estimates described below are particularly important to reflect our financial position and results of operations. As we must exercise significant judgment when we apply these policies, their application is subject to an inherent degree of uncertainty.

Those accounting policies are consistent with those used to prepare our consolidated financial statements as of December 31, 2017, except for the first adoption of the following Standards, Amendments, and Interpretations:

- IFRS 9 — Financial instruments
- IFRS 15 — Revenue from Contracts with Customers
- Amendments to IFRS 15 — Revenue from Contracts with Customers
- Annual Improvements (2014-2016)
- Amendments to IFRS 2 — Share-based payment
- IFRIC 22 — Foreign Currency Transactions and Advance Consideration

The impacts of the application of IFRS 15 (Revenue from Contracts with Customers) and IFRS 9 (Financial instruments) are detailed below. The adoption of the other Standards, Amendments, and Interpretations listed above had no significant impact on the consolidated financial statements.

The Group decided not to early adopt those Standards, Amendments and Interpretations that the European Union adopted but that were not effective as of December 31, 2018, namely:

- IFRS 16 — Leases
- Amendments to IFRS 9 — Prepayment features with negative compensation and modifications of financial liabilities
- IFRIC 23 — Uncertainty over income tax treatments
- Amendments to IAS 28 — Long-term interests in associates and joint ventures

A preliminary analysis of the impact of the application of IFRS 16 (Leases) and IFRIC 23 (Uncertainty over income tax treatments) is described below.

At the date of issuance of these consolidated financial statements, the following Standards, Amendments, and Interpretations were issued but not yet adopted by the European Union and were thus not effective:

- Annual Improvements (2015-2017)
- Amendments to IAS 19 — Employee Benefits
- Amendments to the Conceptual Framework in IFRS Standards
- Amendment to IFRS 3 Business Combinations
- Amendments to IAS 1 and IAS 8: Definition of Material

We are currently reviewing these Standards, Amendments, and Interpretations to measure their potential impact on our consolidated financial statements.

1.2-Key items and where to find them

	Statement of operations	Statement of financial position	Statement of cash flows
Financial restructuring completed on February 21, 2018	US$758.7 million positive impact in 2018 other financial income *See note 2, 24*	US$2,081.7 million impact on equity US$1,750 million reduction of gross debt as of February 21, 2018. *See note 2, 13*	US$260.4 million of net proceeds *See note 2*
Application of IFRS 15	US$(33.9) million on 2018 revenues and US$(38.3) million on 2018 net income *See note 1.3*	US$(11.6) million on opening equity and US$(46.4) million on December 31, 2018 equity Increase of US$114.7 million of multiclient library as of December 31, 2018 Increase of US$138.5 million of deferred revenues as of December 31, 2018 *See note 1.3*	No impact on net cash flow. Impacts on various lines disclosed. *See note 1.3*
Direct consequences of 7th of November 2018 Capital Market Day strategy announcement (CGG 2021). Change in profile and impacts.	Loss of discontinued operations of US$(600.0) million in 2018, including a US$(422.8) million impact of CGG 2021 plan *See note 5*	US$195.5 million presented as Assets held for sale as of December 31, 2018. US$ (131.7) million in liabilities directly associated with assets held for sale as of December 31, 2018. *See note 5*	Net cash flows incurred of US$(119.3) million, presented as discontinued operations in 2018 *See note 5*
Indirect consequences of 7th of November 2018 Capital Market Day strategy announcement.	Sercel inventory valuation allowance of US$(30) million *See note 4, 6, 20, 22*	Sercel inventory carrying amount is reduced by US$(30) million *See note 4, 6*	No impact on net cash flow. Impacts on various lines disclosed.
Segment figures of the new profile (continuing operations) See note 2 – Capital Market Day announcement	2018 Revenues of new profile is US$1,227.4 million 2018 Operating Income of new profile is US$142.3 million 2018 EBITDAS of new profile is US$556.0 million 2018 non-recurring charges of new profile is US$(287.8) million, including US$(226.0) million of multi-client impairment (see below) and US$(30.0) million of valuation allowance for Sercel inventory (see above) *See note 20*	GGR capital employed as of December 31, 2018 is US$2.0 billion Equipment capital employed as of December 31, 2018 is US$0.5 billion *See note 20*	2018 EBITDAS of new profile is US$556.0 million 2018 capital expenditures of new profile is US$(300.8) million *See note 20*
Changes in multi-client amortization accounting estimate with prospective application starting October 1st, 2018	Additional amortization of US$(94) million incurred in Q4'18 compared to previous estimate of amortization *See note 1.4, 10*	The NBV of the multi-client library presented is reduced by US$(94) million compared to the NBV calculated with previous amortization estimate *See note 1.4, 10*	No impact on cash flows statement. Impacts on various lines disclosed.
Multi-client surveys impairment	Impairment of US$(226) million incurred in 2018, including StagSeis survey fully impaired for US$197.0 million. *See note 10, 22*	The NBV of the multi-client library presented is reduced by US$(226) million due to the impairment. *See note 10*	No impact on cash flows statement. Impacts on various lines disclosed.

1.3-New standards impacts

IFRS 15 — Revenue from Contracts with Customers, applied starting January 1, 2018

CGG implemented IFRS 15 on January 1, 2018 with a modified retrospective application. The only change compared to Group historical practices is related to multi-client prefunding revenues. These prefunding revenues are recorded at delivery of the final data while they were historically recorded based on percentage of completion. For internal reporting purposes, CGG continues using historical method with prefunding revenues recorded based on percentage of completion.

CGG, as other seismic players, presents then a dual approach in the Group's results including:

(i) one set of figures (the "as reported" figures) with multi-client prefunding revenue recognized in full only upon delivery of the final data and

(ii) a second set of figures (the "Segment" figures) produced in accordance with the Group's historical method for multi-client prefunding revenues, corresponding to both the figures we use for internal management reporting purposes and the rules relating to the transition reporting periods that require figures being also published under the former method throughout 2018.

Opening consolidated statement of financial position

The cumulative effects on our consolidated statement of financial position due to the changes related to the adoption of IFRS 15 are disclosed in the table below:

In millions of US$	Balance as of December 31, 2017	Balance as of January 1, 2018	Adjustments due to IFRS 15
Assets			
Trade accounts and notes receivable, net	522.6	509.2	(13.4)
Deferred tax assets	21.9	39.0	17.1
Intangible assets, net	1,152.2	1,271.2	119.0
Liabilities			
Other current liabilities	123.1	251.9	128.8
Deferred tax liabilities	62.0	67.5	5.5
Total Equity	**528.1**	**516.5**	**(11.6)**

The adjustments all relate to multi-client prefunding revenues. During the years ended December 31, 2016 and 2017, US$142.2 million of revenues were recognized over time on surveys that were not completed as of December 31, 2017. US$13.4 million of these revenues were unbilled and recorded in the "Trade accounts and notes receivable, net" balance. To adjust for the application of IFRS 15, the US$128.8 million already invoiced and recognized as revenues should be considered deferred revenues and adjusted in the "other current liabilities" balance accordingly. The corresponding depreciation amounted to US$119.0 million and impacted the "intangible assets, net" balance. The net negative impact on equity as of January 1, 2018 amounted to US$(11.6) million.

Consolidated statement of operations as of December 31, 2018

The impacts of the adoption of IFRS 15 in our consolidated statement of operations are disclosed in the table below:

	As of December 31, 2018		
In millions of US$	As reported	Balances without adoption of IFRS 15	Adjustments due to IFRS 15
Operating revenues	1,193.5	1,227.4	(33.9)
Costs of operations	(931.0)	(930.7)	(0.3)
Operating income	**(179.7)**	**(145.5)**	**(34.2)**
Income taxes	(7.4)	(3.3)	(4.1)
Net income (loss) from continuing operations	**504.2**	**542.5**	**(38.3)**
Net income (loss)	**(95.8)**	**(57.5)**	**(38.3)**

Consolidated statement of financial position as of December 31, 2018

The impacts of the adoption of IFRS 15 in our consolidated statement of financial position are disclosed in the table below:

	As of December 31, 2018		
In millions of US$	**As reported**	**Balances without adoption of IFRS 15**	**Adjustments due to IFRS 15**
Assets			
Trade accounts and notes receivable, net	520.2	548.4	(28.2)
Deferred tax assets	22.6	17.5	5.1
Intangible assets, net	898.9	784.2	114.7
Liabilities			
Other current liabilities	250.9	112.4	138.5
Deferred tax liabilities	44.4	44.9	(0.5)
Total Equity	**1,674.1**	**1,720.5**	**(46.4)**

Consolidated statement of cash flows as of December 31, 2018

The impacts of the adoption of IFRS 15 in our consolidated statement of cash flow are disclosed in the table below:

	As of December 31, 2018		
In millions of US$	**As reported**	**Balances without adoption of IFRS 15**	**Adjustments due to IFRS 15**
Net income (loss)	(95.8)	(57.5)	(38.3)
Net income (loss) from continuing operations	504.2	542.5	(38.3)
Multi-client surveys depreciation and amortization	552.3	552.0	0.3
Less income tax expense	7.4	3.3	4.1
Change in trade accounts and notes receivable	(75.5)	(109.5)	33.9

IFRS 9 — Financial instruments, applied starting January 1, 2018

IFRS 9, issued on July 24, 2014, replaced IAS 39 — Financial Instruments: Recognition and Measurement on January 1, 2018. The application of IFRS 9 had no material impact on the Group's consolidated financial statements.

Impairment of financial assets and contract assets

IFRS 9 introduced a new forward-looking "expected loss" impairment model which replaced the existing "incurred loss" impairment model. The Group assessed the actual credit losses experienced over the past several years. Since our customers are generally large national or international oil and gas companies, our credit losses were insignificant over those years. Thus the outcome of the IFRS 9's "expected loss" impairment model does not differ materially from the IAS 39 impairment model.

IFRS 16 — Leases, applicable as at January 1, 2019 (figures provided below are rounded to the nearest US$10 million)

IFRS 16 was issued in January 2016 and is endorsed by the EU. It will supersede IAS 17 Leases and a number of lease-related interpretations and will result in almost all leases being recognized on the consolidated statement of financial position, as the distinction between operating and finance leases is removed for lessees. Under the new standard, both a right-of-use asset (the right to use the leased item) and a financial liability corresponding to the minimum lease payments are recognized. The only exemptions are for short-term leases and leases of low-value asset and the Group decided to use them both. The accounting for lessors will not change significantly for the Group.

As at December 31, 2018, the Group has identified non-cancellable operating lease commitments of approximately US$500 million (undiscounted) which are relevant for IFRS 16 adoption. The commitments related to lease assets consist mainly of vessels (c. 61%), offices (c. 34%) and Subsurface Imaging servers (4%). It is worth noting that the right-of-use asset and the debt related to vessels leases with our GSS JV will be respectively classified as "Assets held for sale" and "Liabilities directly associated with the assets classified as held for sale" according to IFRS 5. The discounted lease liability will be approximately US$210 million for the vessels leases (or approximately US$300 million undiscounted).

As a result, the Group expects to recognize right-of-use assets of approximately US$150 million (after adjustment related to provisions for onerous leases) from the identified operating lease commitments and a discounted lease liability of approximately US$160 million on January 1, 2019. In addition, the existing finance lease assets (US$67 million) and liabilities (US$50 million) determined in accordance with IAS 17 as at December 31, 2018 will be reclassified and added to the right-of-use assets and lease liabilities on operating leases determined in accordance with IFRS 16 on January 1, 2019.

The Group will apply the modified retrospective approach starting January 1, 2019. Therefore, the cumulative effect of adopting IFRS 16 will be recognized as an adjustment to the opening balance of retained earnings on January 1, 2019, with no restatement of comparative information. The Group has elected to apply the standard to contracts that were previously identified as leases applying IAS 17 and IFRIC 4. The Group has elected to use the exemptions on lease contracts for which the lease terms ends within 12 months as of the date of initial application. The Group will rely on its assessment of whether leases are onerous applying IAS 37 Provisions, Contingent Liabilities and Contingent Assets and accordingly adjust its right-of-use asset.

If the lease portfolio and other parameters remain similar during the year 2019 compared to the status as of January 1, 2019, then the impact of IFRS 16 on the net income from continuing operations in 2019 is not expected to be material as the increase in depreciation and financial expense will be largely offset by the decrease in operating lease expense. Similarly, in 2019 operating cash flows from continuing operations are expected to increase and financing cash flows from continuing operations decrease by approximately US$50 million as repayment of the principal portion of the lease liabilities will be classified as cash flows from financing activities, while previously the operating lease payments were classified as cash flows from operating activities.

Impacts linked to deferred tax impacts are not included in the above figures.

IFRIC 23 — Uncertainty over income tax treatments, applicable as from January 1, 2019 (figures provided below are rounded to the nearest US$10 million)

IFRIC 23 supplements IAS 12 “Income Taxes” by specifying arrangements for measuring and recognizing uncertainty relating to income tax. This interpretation is mandatory for accounting periods beginning on or after 1 January 2019. The Group does not expect the implementation of IFRIC 23 to have a material impact on opening equity at 1 January 2019.

The amount of provisions to be reclassified as tax liabilities will be approximately US$10 million.

1.4-Changes in estimate for multi-client surveys amortization

Since the majority of the multi-client surveys sales are done during the prefunding phase plus the subsequent four years and in order to harmonize reporting practices with other European multi-client players, the Group decided from October 1, 2018 to adopt a four-year straight-line post-delivery amortization in accordance with the industry standard. Amortization was previously based on sales forecast method (80% of sales in most cases).

The introduction of the four-year straight-line post-delivery amortization led to recognizing US$146 million of amortization on after sales from October 1, 2018 to December 31, 2018 (US$57 million from surveys more than four years old and US$89 million from other surveys). The amortization of after sales would have been US$39 million without this change in estimate. The negative impact of this change in estimate is thus US$106 million.

The prefunding cost of sales, recognized concurrently with the revenue upon delivery of the survey, is calculated from October 1, 2018 as the difference between the total capitalized cost of a survey upon delivery and the fair value based upon discounted future expected sales. The net book value of the survey upon delivery thus equals the net present value of future expected sales. Prefunding cost of sales was previously 80% of the prefunding sales recognized upon delivery.

Two surveys were delivered between October 1, 2018 and December 31, 2018. The previous estimate based on 80% of the prefunding sales is US$12 million higher than the prefunding cost of sales derived on discounted future expected sales. The positive impact of this change in estimate is US$12 million.

The total negative impact of multi-client changes in estimate is US$94 million (US$106 million from after sales less the US$12 million from prefunding, represented as a net increase in amortization).

To summarize the Group accounting practices for multi-client accounting:

For IFRS purposes:

- Prefunding revenue is recognized upon delivery of the final product to the pre-funder(s).
- The prefunding cost of sales is recognized upon delivery and is calculated as the difference between the total capitalized cost of a survey upon delivery and the fair value based upon discounted future expected sales. The survey net book value upon delivery equals the discounted future expected sales.
- The net book value upon delivery is then amortized on a 4 year straight-line basis, in accordance with the industry standard.
- After sale revenues are recognized upon delivery of the final product to the client.

For segment reporting (non-IFRS) purposes:

- Prefunding revenue continues to be recognized over time on a percentage of completion basis
- Prefunding cost of sales is also recognized over time with revenue and is calculated using the sales forecast method (the amortization is 80% of the prefunding sales)
- Upon delivery, the cost of sales from the sales forecast method is adjusted to equal the cost of sales from the IFRS method.
- The net book value upon delivery is amortized on a 4 year straight-line basis, in accordance with the industry standard. The net book value upon delivery and subsequent amortization are the same in IFRS and segments figures.

- After sale revenues are recognized upon delivery of the final product to the client.

1.5-Use of judgment and estimates

The preparation of consolidated financial statements in accordance with IFRS requires management to make estimates, assumptions and judgments that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ materially from those estimates due to the change in economic conditions, changes in laws and regulations, changes in strategy and the inherent imprecision associated with the use of estimates.

Key judgments and estimates used in the financial statements are summarized in the following table:

Note	**Judgments and estimates**	**Key assumptions**
Note 2	Fair value of assets and liabilities acquired through purchase accounting	Pattern used to determine the fair value of assets and liabilities
Note 2	Fair value of the shares issued	Fair value of the shares at the date of restructuring
Note 3	Recoverability of client receivables	Assessment of clients' credit default risk
Note 5	Classification of disposal groups as held for sale Valuation of disposal groups classified as held for sale	Likelihood of disposal within twelve months Assessment of disposal groups at fair value less cost to sell Final terms of disposals are in line with currently contemplated terms
Notes 7 and 8	Valuation of investments	Financial assets fair value Equity method companies fair value
Note 10	Amortization and impairment of multi-client surveys	Expected sales for each survey
Note 10	Depreciation and amortization of tangible and intangible assets	Assets useful lives
Note 11	Recoverable value of goodwill and intangible assets	Expected geophysical market trends and timing of recovery Discount rate (WACC)
Note 16	Post-employment benefits	Discount rate Participation rate to post employment benefit plans Inflation rate
Note 16	Provisions for restructuring and onerous contracts	Assessment of future costs related to restructuring plans and onerous contracts
Note 16	Provisions for risks, claims and litigations	Assessment of risks considering court rulings and attorney's positions
Note 20	Revenue recognition	Contract completion rates Assessment of fair value of contracts identifiable parts
Note 21	Development costs	Assessment of future benefits of each project
Note 25	Deferred tax assets	Hypothesis supporting the achievement of future taxable benefits

1.6-Accounting policies

1. Basis of consolidation

Our consolidated financial statements include CGG S.A. and all its subsidiaries.

Subsidiaries are fully consolidated from the date of acquisition, being the date on which we obtain control, and continue to be consolidated until the date when such control ceases. Control is achieved when we are exposed or have rights to variable returns from our involvement with the investee and have the ability to affect those returns through our power over the investee. When we have less than a majority of the voting or similar rights of an investee, we consider all relevant facts and circumstances in assessing whether we have power over the investee, including contractual arrangements with the other holders or potential voting rights.

The financial statements of the subsidiaries are prepared for the same reporting period as the parent company, using consistent accounting policies. All intra-group balances, transactions, unrealized gains and losses resulting from intra-group transactions and dividends are eliminated in full.

Losses within a subsidiary are attributed to the non-controlling interest even if that results in a deficit balance. A change in the ownership interest of a subsidiary, without a loss of control, is accounted for as an equity transaction. If we lose control over a subsidiary, we:

- derecognize the assets (including goodwill) and liabilities of the subsidiary,
- derecognize the carrying amount of any non-controlling interest,
- derecognize the cumulative translation differences, recorded in equity,
- recognize the fair value of the consideration received,
- recognize the fair value of any investment retained,
- recognize any surplus or deficit in profit or loss, and
- reclassify the parent's share of components previously recognized in other comprehensive income to profit or loss or retained earnings, as appropriate.

We use the equity method for investments classified as joint venture. A joint venture is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the arrangement. Joint control is the contractually agreed sharing of control of an arrangement, which exists only when decisions about the relevant activities require the unanimous consent of the parties sharing control.

2. Foreign currency

Effective January 1, 2012, we changed the presentation currency of our consolidated financial statements from the euro to the US dollar to better reflect the profile of our revenues, costs and cash flows, which are primarily generated in US dollars, and hence, to better present the financial performance of the Group.

The functional currency is the currency in which they primarily conduct their business. The functional currency of most of our subsidiaries is the US dollar. Goodwill attributable to subsidiaries is accounted for in the functional currency of the applicable entities.

For the subsidiaries with a functional currency different than US dollar, the financial statements are translated to US dollars using the following method:

- year-end exchange rates are applied to the statement of financial position items,
- average annual exchange rates are applied to statement of financial operations items.
- adjustments resulting from this process are recorded in a separate component of shareholders' equity.

With respect to affiliates accounted for using the equity method, the effects of exchange rates changes on the net assets of the affiliates are recorded in a separate component of shareholders' equity.

Transactions denominated in currencies other than the functional currency of a given entity are recorded at the exchange rate prevailing on the date of the transaction. Monetary assets and liabilities denominated in foreign currencies other than the functional currency are revalued at year-end exchange rates and any resulting unrealized exchange gains and losses are included in income. Unrealized exchange gains and losses arising from monetary assets and liabilities for which settlement in neither planned nor likely to occur in the foreseeable future are recorded in a separate component of shareholder's equity.

3. Business combinations

Business combinations are accounted for using the acquisition method. The cost of an acquisition is measured as the aggregate of the consideration transferred, measured at acquisition date fair value and the amount of any non-controlling interest in the acquiree. For each business combination, we measure the non-controlling interest in the acquiree either at fair value or at the proportionate share in the recognized amounts of the acquiree's identifiable net assets. Acquisition costs incurred are expensed and included in administrative expenses.

If the business combination is achieved in stages, the acquisition date fair value of the acquirer's previously held equity interest in the acquiree is remeasured to fair value at the acquisition date through profit or loss. Any contingent consideration to be transferred by us will be recognized at fair value at the acquisition date. Subsequent changes to the fair value of the contingent consideration which is deemed to be a financial instrument will be recognized in accordance with IFRS 9 in profit or loss. If the contingent consideration is classified as equity, it should not be remeasured until it is finally settled within equity. Goodwill is initially measured at cost being the excess of the aggregate of the consideration transferred measured at fair value and the amount recognized for non-controlling interest over the net identifiable assets acquired and liabilities assumed.

If this consideration is lower than the fair value of the net assets of the subsidiary acquired, the difference is recognized in profit or loss.

After initial recognition, goodwill is measured at cost less any accumulated impairment losses. For the purpose of impairment testing, goodwill acquired in a business combination is, from the acquisition date, allocated to each of the Group's cash-generating units that are expected to benefit from the combination, irrespective of whether other assets or liabilities of the acquiree are assigned to those units.

Where goodwill forms part of a cash-generating unit and part of the operation within that unit is disposed of, the goodwill associated with the operation disposed of is included in the carrying amount of the operation when determining the gain or loss on disposal of the operation. Goodwill disposed of in this circumstance is measured based on the relative values of the operation disposed of and the portion of the cash-generating unit retained.

4. Operating revenues (classified as discontinued operations)

Revenues from contracts with customers are recognized using the five-step model of the IFRS 15 standard. The following provides a description of the main nature of our performances obligations broken down by business line, the timing of their satisfaction, and detail on the transaction prices and their allocations, if applicable.

Acquisition

Marine exclusive contracts

Under our marine exclusive contracts, we acquire seismic data for a specific customer. We recognize these revenues over time. The measure of revenue recognized is based on the data acquired and delivered to the customer.

Either the total price of the contract, for turnkey and lump sum contracts, or the unitary prices, for day-rate contracts or contracts based on square kilometers are specified in the contract. With respect to contracts for both the acquisition and processing of data, the allocation is based on the stand alone selling price of each service with revenue recognized according to respective percentages of completion.

In most cases, invoicing is carried out on a monthly basis, based on the amount of data acquired and delivered to the customer, as evidenced by a customer acceptance. As the acceptance is often obtained a few days after the balance sheet date, the counterpart of the revenue during the month is recorded as unbilled revenue, i.e. as a contract asset.

When the costs are expected to be recovered, i.e. when the contract margin is positive, the costs related to the transit of the vessel toward the survey area are recognized as an asset to fulfil the contract. They are then expensed over the duration of the survey.

Land exclusive and Multi Physics contracts

Under our land exclusive and multi physics contracts, we acquire seismic data for a specific customer. We recognize these revenues over time. For Land turnkey contracts, the measure of revenue recognized is based on direct cash costs. For land day rate and multi physics contracts, the measure of revenue recognized is based on monthly reports of data acquired or services rendered.

Either the total price of the contract, for turnkey and lump sum contracts, or the unitary prices, for day-rate or contracts on square kilometers, are specified in the contract. With respect to contracts for both the acquisition and processing of data, the allocation is based on the stand alone selling price of each service with revenue recognized according to respective percentages of completion.

In most cases, invoicing is carried out on a monthly basis, based on the amount of data acquired and delivered to the customer, evidenced by a customer acceptance. As the acceptance is often obtained after the balance sheet date, the counterpart of the revenue during the month is recorded as unbilled revenue, i.e. as a contract asset.

When the costs are expected to be recovered, i.e. when the contract margin is positive, the costs related to the mobilization of a Land crew are recognized as an asset to fulfill the contract. They are then expensed over the duration of the survey.

GGR

Geoscience (previously known as Subsurface Imaging & Reservoir) contracts

Under our Geoscience contracts, we process seismic data for a specific customer. These contracts may encompass one or several performance obligations. For each performance obligation, we recognize the revenues over time as the services are rendered. The measure of revenue recognized is based on the time spent over the total time expected to satisfy the performance obligation. The balance of revenue recognized that has not yet been invoiced to the clients is recorded as an unbilled revenue, i.e. as a contract asset.

We also recognize revenue related to the sale of software upon delivery of the software and of the access code/key as the case may be, to the client. We recognize revenue related to the maintenance of the software over time during the specific contractual period. In case of a contract providing for both the sale and maintenance of software, the price allocation is based on the stand alone selling price of each component and the revenue for the software is recognized upon delivery, while the maintenance revenue is recognized over time. In most cases, only one invoice is issued for such contracts upon license delivery and the amount corresponding to the maintenance is recorded as deferred revenues, i.e. as a contract liability, at invoicing.

We also provide geological consulting services or training for specific customers. We recognize the revenues over time as the services are rendered.

We provide licenses to use geological data to several clients. We recognize the revenue upon delivery of the data to the client.

In addition, we provide licenses to access dynamic geological databases for a specific duration. We recognize the revenue related to such licenses over the duration of the contract. In most cases, only one invoice is issued for such contracts at the beginning of the year and the total amount is recorded as deferred revenues, i.e. as a contract liability, at invoicing.

Multi-client after sales contracts and prefunding contracts

Pursuant to our multi-client after sales contracts, we provide non-exclusive licenses to use seismic processed data to several clients. We recognize the revenue upon delivery of the data to the client. In certain cases, significant after sales agreements contain multiple deliverable elements, and the associated revenues are allocated to the various elements based on specific objective evidence of the stand-alone sale price for such elements, regardless of any separate allocations stated within the contract for each element. In these cases, one invoice is issued upon delivery of the data for the total contractual amount.

In certain circumstances, revenue can also be recognized relating to a performance obligation that has already been fulfilled in the past. This happens when one client is already in possession of the license for certain data and either (i) the client is taken-over by a competitor who does not yet have the license for such data (and thus is required to pay a transfer fee) or (ii) the client involves another partner, not already having access to the licensed data, for the exploration of the block (farm-in, uplift). Such revenue is recognized when there is an agreement on the fee and, in the case of transfer fee, when the buyer notifies us that they will not return the data to the Group.

Please refer to note 1.3 and 1.4 for changes on prefunding contracts revenue recognition linked to "IFRS 15 — Revenue from Contracts with Customers".

Equipment

We recognize revenues on equipment sales upon delivery to the customer, i.e. when control is transferred. When such contracts require a partial or total advance payment, such payments are recorded as advance billings to customers, i.e. as a contract liability.

We recognize the sale of software upon delivery of the software to the client. We recognize the maintenance of the software over time during the specific contractual period. In case of a contract providing for both the sale and maintenance of software, the price allocation is based on the stand alone selling price of the software and the revenue for the software is recognized upon delivery, while the maintenance revenue is recognized over time. In most cases, we issue only one invoice, issued upon license delivery, and the amount corresponding to the maintenance is recorded as deferred revenues, i.e. as a contract liability, at invoicing.

5. Cost of net financial debt

Cost of net financial debt includes expenses related to financial debt, composed of bonds, the debt component of convertible bonds, bank loans, capital-lease obligations and other financial borrowings, net of income provided by cash and cash equivalents.

Borrowing costs that relate to assets that take a substantial period of time to get ready for use or sale are capitalized as part of the acquisition cost of such assets.

6. Income taxes and deferred taxes

Income taxes includes all tax based on taxable profit.

Deferred taxes are recognized on all temporary differences between the carrying value and the tax value of assets and liabilities, as well as on carry-forward losses, using the balance sheet liability method. Deferred tax assets are recognized only when their recovery is considered as probable or when there are existing taxable temporary differences, of an appropriate type, that reverse in an appropriate period. When tax laws limit the extent to which unused tax losses can be recovered against future taxable profits in each year, the amount of deferred tax assets recognised from unused tax losses as a result of suitable existing taxable temporary differences is restricted as specified by the tax law.

Deferred tax liabilities are recognized on intangible assets identified and recognized as part of business combinations (technological assets, customer relationships).

Deferred tax assets and deferred tax liabilities are not discounted.

7. Intangible and tangible assets

In accordance with IAS 16 "Property, Plant and equipment" and IAS 38 "Intangible assets" only items for which cost can be reliably measured and for which the future economic benefits are likely to flow to us are recorded in our consolidated financial statements.

Property, plant and equipment

Property, plant and equipment are valued at historical cost less accumulated depreciation and impairment losses. Depreciation is generally calculated over the following useful lives:

- equipment and tools: 3 to 10 years
- vehicles: 3 to 5 years
- aircrafts: 5 to 10 years
- seismic vessels: 12 to 30 years
- buildings for industrial use: 20 years
- buildings for administrative and commercial use: 20 to 40 years

Depreciation expense is determined using the straight-line method.

We include residual value, if significant, when calculating the depreciable amount. We segregate tangible assets into their separate components if there is a significant difference in their expected useful lives, and depreciate them accordingly.

Lease agreements

Assets under a finance lease agreement or a long-term lease agreement that transfers substantially all the risks and rewards incidental to ownership to the Group are accounted for as fixed assets at the commencement of the lease term, at amounts equal to the fair value of the leased property or, if lower, the present value of the minimum lease payments, each determined at the inception of the lease. Minimum lease payments are apportioned between the finance charge and the reduction of the outstanding liability and the finance charge is allocated to each period during the lease term so as to produce a constant periodic rate of interest on the remaining balance of the liability. Assets under finance lease are depreciated over the shorter of its useful life and the lease term, if there is no reasonable certainty that the Group will obtain ownership by the end of the lease term. Depreciation is determined on the same basis as owned-assets and is included in depreciation expense.

Rent payments under operating leases are recognized as operating expenses on a straight-line basis over the lease term.

Goodwill

Goodwill is determined according to IFRS 3 Revised — Business Combinations. Goodwill is not amortized but subject to an impairment test at least once a year at the statement of financial position dates or when a triggering event occurs.

Multi-client surveys

Multi-client surveys consist of seismic surveys to be licensed to customers on a non-exclusive basis. All costs directly incurred in acquiring, processing and otherwise completing seismic surveys are capitalized into the multi-client surveys (including transit costs when applicable). The carrying amount of our multi-client library is stated on our statement of financial position at the aggregate of those costs less accumulated amortization. Whenever there is an indication that a survey may be impaired, an impairment test is performed. A systematic impairment test of all delivered surveys is performed at least at delivery date and for the yearly closing.

Before October 1, 2018, each survey was amortized in a manner that reflected the pattern of consumption of its economic benefits during both prefunding and after-sale periods. An amortization rate of 80% corresponding to the ratio of capitalized costs to total expected sales over the accounting life of the survey was applied to each normative sale, unless specific indications led to application of a different rate. If that was the case, the amortization rate was adjusted to reflect the commercial effects of price elements.

The Group decided from October 1, 2018 to adopt a four-year straight-line post-delivery amortization in accordance with the industry standard. Please refer to note 1.4.

Development costs

Expenditures on research activities undertaken with the prospect of gaining new scientific or technological knowledge and understanding are recognized in the income statement as expenses as incurred and are presented as “Research and development expenses — net”. Expenditures on development activities, whereby research findings are applied to a plan or design for the production of new or substantially improved products and processes, are capitalized if:

- the project is clearly defined, and costs are separately identified and reliably measured,
- the product or process is technically and commercially feasible,
- we have sufficient resources to complete development, and
- the intangible asset is likely to generate future economic benefits, either because it is useful to us or through an existing market for the intangible asset itself or for its products.

The expenditures capitalized include the cost of materials, direct labor and an appropriate proportion of overhead. Other development expenditures are recognized in the income statement as expenses as incurred and are presented as “Research and development expenses — net”.

Capitalized development expenditures are stated at cost less accumulated amortization and impairment losses.

Capitalized development costs are amortized over 5 years.

Research and development expenses in our income statement represent the net cost of development costs that are not capitalized, of research costs, offset by government grants acquired for research and development.

Other intangible assets

Other intangible assets consist primarily of customer relationships, technology and trade name acquired in business combinations. Customer relationships are generally amortized over periods ranging from 10 to 20 years and acquired technology are generally amortized over periods ranging from 5 to 10 years.

Impairment

The carrying values of our assets (excluding inventories, contract assets and assets arising from costs to obtain or fulfil a contract that are recognised in accordance with IFRS 15, non-current assets classified as held for sale in accordance with IFRS 5, deferred tax assets, assets arising from employee benefits and financial assets) are reviewed at each statement of financial position date or if any indication exists that an asset may be impaired, in compliance with IAS 36 “Impairment of assets”. Factors we consider important that could trigger an impairment review include the following:

- significant underperformance relative to expected operating results based upon historical and/or projected data,
- significant changes in the manner of our use of the tested assets or the strategy for our overall business, and
- significant negative industry or economic trends.

The recoverable amount of tangible and intangible assets is the greater of their net fair value less costs of disposal and value in use.

Goodwill, assets that have an indefinite useful life and intangible assets are allocated to cash generating units or groups of cash generating units. We estimate the recoverable amount of these cash generating units at each statement of financial position closing date and whenever any indication exists that the cash generating unit may be impaired.

We determine the value in use by estimating future cash flows expected from the assets or from the cash generating units, discounted to their present value using the sector weighted average cost of capital (WACC) estimated on a yearly basis by the Group. When the recoverable value retained is a fair value less cost of disposal, the fair value is determined by reference to an active market.

We recognize an impairment loss whenever the carrying amount of an asset exceeds its recoverable amount. For an asset that does not generate largely independent cash inflows, the recoverable amount is determined for the cash-generating unit to which the asset belongs.

Impairment losses are recognized in the statement of operations. Impairment losses recognized in respect of a group of non-independent assets allocated to a cash-generating unit are allocated first to reduce the carrying amount of any goodwill allocated to cash-generating units (group of units) and then, to reduce the carrying amount of the other assets in the unit (group of units) on a pro rata basis provided that the carrying amount of an individual asset is not reduced below its value in use or fair value less costs of disposal.

A previously recognized impairment loss is reversed only if there has been a change in the assumptions used to determine the asset's recoverable amount since the last impairment loss was recognized. The reversal is limited so that the carrying amount of the asset does not exceed its recoverable amount, nor exceed the carrying amount that would have been determined, net of depreciation or amortization, had no impairment loss been recognized for the asset in prior years. Such reversal is recognized in the income statement unless the asset is carried at a revalued amount, in which case the reversal is treated as a revaluation increase.

Impairment losses recognized on goodwill cannot be reversed.

Discontinued operations and non-current assets held for sale

Assets classified as assets held for sale correspond to non-current assets for which the net book value will be recovered by a sale rather than by their use in operations. Assets held for sale are valued at the lower of historical cost and fair value less cost to sell.

Non-current assets and disposal groups comprising assets and liabilities that are expected to be recovered primarily through sale rather than through continuing use are classified as held for sale.

Non-current assets classified as held for sale and the assets of a disposal group classified as held for sale are presented separately from the other assets in the consolidated statement of financial position. The liabilities of a disposal group classified as held for sale are presented separately from other liabilities in the consolidated statement of financial position. The prior periods are not restated.

A discontinued operation is a component of an entity that has either been disposed of or is classified as held for sale, and represents a separate major line of business or geographical area of operations; and is a part of a single coordinated plan to dispose of a separate major line of business or geographical area of operations; or is a subsidiary acquired exclusively with a view to sell.

Any gain or loss from disposal, together with the results of these operations until the date of disposal, is reported separately as discontinued operations in the consolidated statements of cash flows and consolidated statements of operations presented. The prior periods are restated accordingly.

Further information on discontinued operations and non-current assets held for sale can be found in note 5.

8. Investments in companies under equity method

Under the equity method, the investments in our associates or joint ventures are carried in the statement of financial position at cost plus post acquisition changes in our share of net assets of the associates or joint ventures. Goodwill relating to the associates is included in the carrying amount of the investment and is neither amortized nor individually tested for impairment.

After application of the equity method, we determine whether it is necessary to recognize an additional impairment loss on our investment in the associates. We determine at each reporting date whether there is any objective evidence that the investments in our associates are impaired. If this is the case we calculate the amount of impairment as the difference between the recoverable amount of the associates and their carrying value and usually recognize the amount in the 'share of profit of an associate' in the statement of operations.

Upon loss of significant influence over the associate, we measure and recognize any retaining investment at its fair value. Any difference between the carrying amount of the associate upon loss of significant influence and the fair value of the retaining investment and proceeds from disposal is recognized in profit or loss.

From the date when an investment ceases to be an associate or a joint venture and becomes a financial asset we discontinue the use of the equity method. The retained interests are measured at fair value. We recognize in profit or loss any difference between (i) the fair value of any retained interest and any proceeds from disposing of a part interest in the associate or joint venture; and (ii) the carrying amount of the investment at the date the equity method was discontinued.

9. Investments and other financial assets

Investments and other financial assets include investments in non-consolidated entities, loans and non-current receivables.

In accordance with IFRS 9 "Financial instruments", we measure Investments and other financial assets at fair value through profit and loss. The fair value for listed securities is their market price at the statement of financial position date. If a reliable fair value cannot be established, securities are valued at historical cost.

- Derecognition

We derecognize a financial asset (or, where applicable, a part of a financial asset or part of a group of similar financial assets) when:

- The rights to receive cash flows from the asset have expired, or
- We have transferred the rights to receive cash flows from the asset or have assumed an obligation to pay the received cash flows in full without material delay to a third party under a 'pass-through' arrangement; and either (a) we have transferred substantially all the risks and rewards of the asset, or (b) we have neither transferred nor retained substantially all the risks and rewards of the asset, but have transferred control of the asset.

When we have transferred the rights to receive cash flows from an asset, we evaluate if and to what extent we have retained the control of this asset. When we have neither transferred nor retained substantially all of the risks and rewards of the asset, nor transferred control of the asset, the asset is recognized to the extent of our continuing involvement in the asset. In that case, we also recognize an associated liability. The transferred asset and the associated liability are measured on a basis that reflects the rights and obligations that we have retained.

Continuing involvement that takes the form of a guarantee over the transferred asset is measured at the lower of the original carrying amount of the asset and the maximum amount of consideration that we could be required to repay.

10. Treasury shares

We value treasury shares at their cost, as a reduction of shareholders' equity. Proceeds from the sale of treasury shares are included in shareholders' equity and have no impact on the statement of operations.

11. Inventories

We value inventories at the lower of cost (including direct production costs where applicable) and net realizable value.

We calculate the cost of inventories on a weighted average price basis for our Equipment segment and on a first-in first-out basis for Contractual Data Acquisition segment.

The additions and deductions in valuation allowances for inventories and work-in-progress are presented in the consolidated statements of operations as "Cost of sales".

12. Trade accounts and Notes receivable

In the Contractual Data Acquisition and Geology, Geophysics & Reservoir ("GGR") segments, customers are generally large national or international oil and gas companies, which management believes reduces potential credit risk.

In the Equipment segment, a significant portion of sales is paid by irrevocable letters of credit.

The Group maintains an allowance for doubtful accounts based upon factors surrounding the credit risk of specific customers, historical trends and other information. Credit losses have not been material for the periods presented and have consistently been within management's expectations.

Recoverable costs and accrued profit not billed comprise amounts of revenue recognized under the percentage of completion method on contracts for which billings had not been presented to the contract owners. Such unbilled accounts receivable are generally billed over the 30 or 60 days after services has been delivered.

13. Provisions

We record a provision when the Group has a present obligation (legal or constructive) as a result of a past event for which it is probable that an outflow of resources embodying economic benefits (that can be reliably determined) will be required to settle the obligation.

- Onerous contracts

We record a provision for onerous contracts equal to the excess of the unavoidable costs of meeting the obligations under the contract over the economic benefits expected to be received under it, as estimated by the Group.

- Pension, post-employment benefits and other post-employment benefits

We record obligations for contributions to defined contribution pension plans as an expense in the income statement as incurred. We do not record any provision for such plans as we have no further obligation.

Our net obligation in respect of defined benefit pension plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in return for their service in the current and prior periods. We perform the calculation by using the projected unit credit method.

- That benefit is discounted to determine its present value, and the fair value of any plan assets is deducted.
- Net interest is calculated by applying the discount rate to the net defined benefit liability or asset. Interest is recorded in the profit and loss.
- Unvested past services costs are recognized immediately if the benefits have vested immediately following the introduction of, or changes to, a pension plan.
- We record actuarial gains and losses on defined benefits plans directly in equity.

14. Financial debt

Financial debt is accounted for:

- As of the date of issuance, at the fair value of the consideration received, less issuance fees and/or issuance premium;
- Subsequently, at amortized cost, corresponding to the fair value at which it is initially recognized, less repayments at the nominal amount and increased or decreased for the amortization of all differences between this original fair value recognized and the amount at maturity; differences between the initial fair value recognized and the amount at maturity are amortized using the effective interest rate method.

15. Convertible debt

- The Company recognizes separately the components of convertible debt as respectively (i) a financial liability and (ii) an option to the holder of the instrument to convert it into an equity instrument of the Company.
- The Company first determines the carrying amount of the liability component by measuring the fair value of a similar liability (including any embedded non-equity derivative features) that does not have an associated equity component.
- The carrying amount of the equity instrument represented by the option to convert the instrument into ordinary shares is then determined by deducting the fair value of the financial liability from the fair value of the compound financial instrument as a whole. The carrying amount is presented net of associated deferred taxes.
- The sum of the carrying amounts assigned to the liability and equity components on initial recognition is always equal to the fair value that would be ascribed to the instrument as a whole.

16. Derivative financial instruments

We use over-the-counter derivative financial instruments to hedge our exposure to foreign exchange fluctuations from operational, financing and investment activities denominated in a currency different from the functional currency. In accordance with our treasury policy, we do not hold or issue derivative financial instruments for trading purposes. However, derivatives that do not qualify for hedge accounting are accounted for as trading instruments in "Other financial income (loss)".

Over-the-counter derivatives are entered into in the frame master agreements that provide a right of set-off in the event of default, insolvency or bankruptcy of one of the parties to the agreement (those netting agreements do not fulfill IAS 32 criteria to offset the fair value of derivatives on the balance sheet).

Exchange gains or losses on foreign currency financial instruments that represent the efficient portion of an economic hedge of a net investment in a foreign subsidiary are reported as translation adjustments in shareholder's equity under the line item "Cumulative translation adjustments", the inefficient portion being recognized in the statement of operations. The cumulative value of foreign exchange gains and losses recognized directly in equity will be transferred to statement of operations when the net investment is sold.

Derivative financial instruments are stated at fair value. The gain or loss on reassessment to fair value is recognized immediately in the statement of operations. However, where derivatives qualify for cash flow hedge accounting, we account for changes in the fair value of the effective portion of the hedging instruments in shareholder's equity. The ineffective portion is recorded in "Other financial income (loss)". Amounts recorded in other comprehensive income are reclassified into the statement of operations when the hedged risks impact the statement of operations.

When derivatives do not qualify for cash flow hedge accounting, we account for changes in the fair value into the statement of operations in "Other financial income (loss)".

17. Cash flow statement

The cash flows of the period are presented in the cash flow statement within three activities: operating, investing and financing activities:

- Operating activities

Operating activities are the principal revenue-producing activities of the entity and other activities that are not investing or financing activities.

- Investing activities

Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents. When a subsidiary is acquired, a separate item, corresponding to the consideration paid net of cash and cash equivalents held by the subsidiary at the date of acquisition, provides the cash impact of the acquisition.

Investments in multi-client surveys are presented net of depreciation and amortization capitalized in multi-client surveys, in order to reflect actual cash outflows. Depreciation and amortization capitalized in multi-client surveys are also restated in operating activities.

- Financing activities

Financing activities are activities that result in changes in the size and composition of the contributed equity and borrowings of the entity.

They include the cash impact of financial expenses.

- Cash and cash equivalents

Cash and cash equivalents in the consolidated statement of financial position comprise cash at banks and on hand and short-term deposits with a maturity of three months or less that are readily convertible to known amounts of cash.

18. Share-based payments, including stock options

Employees (including senior executives) of the Group receive remuneration in the form of share-based payments. These rights can be settled either in equity (equity-settled transactions) or in cash (cash-settled transactions).

- Equity-settled transactions

We include stock options granted to employees in the financial statements using the following principles: the stock option's fair value is determined on the grant date and is recognized in personnel costs, with a corresponding increase in equity, on a straight-line basis over the period between the grant date and the end of the vesting period. We calculate stock option fair value using the Black-Scholes mathematical model.

- Cash-settled transactions

The cost of cash-settled transactions is measured initially at the grant date using a binomial model. A provision is recognized over the period until the vesting date. This liability is re-measured to fair value at each reporting date up to and including the settlement date, which changes in fair value recognized in the statement of operations.

19. Grants

Government grants, including non-monetary grants at fair value, are not recognized until there is reasonable assurance that the entity will comply with the conditions of the grant and that the grants will be received.

Government grants are recognized as income over the periods necessary to match them with the related costs which they are intended to compensate. They are presented as a reduction of the corresponding expenses in the item "Research and development expenses, net" in the statement of operations.

Refundable grants are presented in the statement of financial position as "Other non-current liabilities".

20. Earnings per share

Basic earnings per share amounts are calculated by dividing net income for the year attributable to ordinary equity holders of the Company by the weighted average number of ordinary shares outstanding during the year.

Diluted earnings per share amounts are calculated by dividing the net income attributable to ordinary equity holders of the Company, by the weighted average number of ordinary shares outstanding during the year plus the weighted average number of ordinary shares that would be issued on the conversion of convertible bonds, the exercise of stock options and shares from performance share plans.

In both basic and diluted, the net income attributable to ordinary equity holders of the Company is adjusted for the after-tax amounts of preference dividends, differences arising on the settlement of preferences shares, and other similar effects of preference shares classified as equity.

NOTE 2 SIGNIFICANT EVENTS, ACQUISITIONS AND DIVESTITURES

— During 2018

Financial restructuring process

In the extraordinary general meeting of shareholders held on November 13, 2017, the shareholders decided to reduce the Company's share capital by a total amount of €17,485,188, by reducing the nominal value of each share from €0.80 to €0.01. The completion of such share capital reduction was acknowledged by the Board of Directors on January 15, 2018, with the Board's approval of a reduction of the share capital from €17,706,519 to €221,331 by reducing the nominal value of the Company's shares from €0.80 to €0.01. The amount of €17,485,188, corresponding to the share capital reduction, was allocated in full to the "additional paid in capital" account.

On February 21, 2018, CGG successfully completed a rights issue with preferential subscription rights for an amount of €112,215,060.36 (including the share premium), through the issuance of 71,932,731 shares of the Company (the "New Shares") each with one warrant attached (the "Warrants #2" and together with the New Shares, the "ABSA") at a subscription price of €1.56 per ABSA (i.e. €0.01 nominal value and €1.55 share premium).

At the end of the subscription period, on February 2, 2018, the total demand, which amounted to €132.5 million, was €20.3 million higher than the target amount (amounting to a subscription rate of 118.06%). The number of ABSA subscribed on a non-reducible basis (à titre irréductible) was 65,283,036 and represented 90.76 % of the ABSA to be issued. Additionally, 19,639,466 ABSA were subscribed on a reducible basis and such subscription has therefore been only partially satisfied, up to 6,649,695 ABSA.

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which meets the Company's objectives of strengthening its balance sheet and providing financial flexibility to continue investing in the future. This plan comprised (i) the equitization of nearly all of the unsecured senior debt, (ii) the extension of the maturities of the secured senior debt and (iii) the provision of additional liquidity to meet various business scenarios.

As part of the implementation of its financial restructuring plan, the following securities were issued on February 21, 2018:

- US$663.6 million in principal amount of first lien senior secured notes due 2023, bearing floating rate interest at Libor (floor of 1%) + 6.5% in cash, and 2.05% paid-in-kind (PIK) issued by CGG Holding (U.S.) Inc. in exchange for the balance of the Secured Loans (taking into account an upfront paydown of US$150 million of the Secured Loans). The first lien senior secured notes due 2023 were refinanced with the New First Lien Notes on April 24, 2018;
- US$355.1 million and €80.4 million in principal amount of second lien senior secured notes due 2024, bearing floating rate interest at Libor/Euribor (floor of 1%) depending on the currency + 4% in cash, and 8.5% paid-in-kind (PIK) issued by CGG S.A.. This issuance comprised US$275 million and €80.4 million as new money and US$80.2 million in exchange for part of the accrued interest claims under the Group's existing senior notes (the "Senior Notes") (with the US$ new money notes and accrued interest notes being fungible);
- 71,932,731 shares of the Company (the "New Shares") each with one share purchase warrant (the "Warrants #2" and together with the New Shares, the "ABSA"), all of which were subscribed by holders of preferential subscription rights. The final gross proceeds amounted to €112 million;
- 35,311,528 new shares (the "Creditor Shares 1") resulting from the equitization of the Convertible Bonds;
- 449,197,594 new shares (the "Creditor Shares 2") resulting from the equitization of the Senior Notes;
- 22,133,149 warrants allocated to the shareholders of CGG (the "Warrants #1");
- 113,585,276 warrants in favor of the subscribers to the Second Lien Notes (the "Warrants #3");
- 7,099,079 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Coordination Warrants");
- 10,648,619 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Backstop Warrants").

Following the issuance of New Shares, Creditor Shares 1 and Creditor Shares 2, the Company's share capital as of February 21, 2018 amounted to €5,785,750.02, divided into 578,575,002 shares with a nominal value of €0.01 per share.

	Warrants#1	Warrants#2	Warrants#3	Coordination Warrants	Backstop Warrants
Number of warrants issued	22,133,149	71,932,731	113,585,276	7,099,079	10,648,619
Exercise ratio	3 Warrants #1 for 4 new shares	3 Warrants #2 for 2 new shares	1 Warrant #3 for 1 new share	1 Coordination Warrant for 1 new share	1 Backstop Warrant for 1 new share
Exercise price	3.12 euros per new share	4.02 euros per new share	0.01 euro per new share	0.01 euro per new share	0.01 euro per new share
Maximum number of shares to be issued upon exercise of the warrants (subject to adjustments)	29,477,536	47,955,154	113,585,276	7,099,079	10,648,619
Expiry date of the warrants	February 21, 2022	February 21, 2023	August 21, 2018	August 21, 2018	August 21, 2018

Please refer to note 15 for more information regarding the exercise of Warrants between February 21, 2018 and December 31, 2018.

Prior to the equitization of the unsecured senior debt, the Senior Notes and the Convertible Bonds were delisted from the Euro MTF market of the Luxembourg Stock Exchange and Euronext Paris, respectively.

CGG's financial restructuring plan was finalized on February 21, 2018.

Following its financial restructuring, and with the settlement and delivery of all securities and instruments contemplated thereby, CGG benefits from a healthier balance sheet with notably:

- net proceeds from the completion of the financial restructuring on February 21, 2018 of US$308 million (or US$260 million after payment of financial restructuring fees) converted at the February 21, 2018 exchange rate of US$1.2312 per €1.00,

	Part denominated in Euros	Part denominated in US$	Total
	In millions of Euro	*In millions of US$*	*In millions of US$*
Rights issue with preferential subscription rights net proceeds	103.5	—	127.4
Second lien senior secured notes due 2024 net proceeds	72.1	247.8	336.5
First lien senior secured notes due 2023 repayment	—	(150.0)	(150.0)
Convertible Bonds interests payment	(4.5)	—	(5.5)
Net proceeds from financial restructuring	**171.1**	**97.8**	**308.4**
Financial restructuring fees payment	(20.3)	(22.9)	(48.0)
Net proceeds	**150.8**	**74.9**	**260.4**

- In the twelve months ended December 31, 2018, the financial restructuring, the settlement and delivery of all securities and instruments contemplated thereby, and the expenses linked to the equitized unsecured senior debt, resulted in a US$759 million gain in our consolidated statement of operations. In addition, the equity increased by US$1,323 million through the issuance of new shares (as a result of the equitization of the unsecured debt, the rights issue and the future exercise of Warrants #3, Coordination Warrants and Backstop Warrants), to reach a total equity increase of US$2,082 million.

The table below details the impacts of the financial restructuring:

	Statements of Operations	Other retained earnings	Total
			In millions of US$
Unsecured debt equitization	1,062.1	930.6	1,992.7
Rights issue with preferential subscription rights	—	127.4	127.4
Future exercise of Warrants #3, Coordination Warrants and Backstop Warrants	(250.6)	250.6	—
Second lien backstop & commitment fees	(37.4)	—	(37.4)
Rollover Fees (1)	—	—	—
Consulting Fees	(12.5)	—	(12.5)
Deferred tax impact	—	12.6	12.6
Others	(2.9)	1.8	(1.1)
Total	**758.7**	**1,323.0**	**2,081.7**

(1) Pursuant to the indenture governing the first lien senior secured notes issued on February 21, 2018 in connection with the financial restructuring, a 3% rollover fee (US$19.9 million) would have applied if the notes were not refinanced within three months following the financial restructuring. However, given the refinancing of such notes on April 24, 2018 as described below no such rollover fee were due.

The conversion into shares of the unsecured debt impacts the equity up to the debt carrying value. Under IFRS (IFRIC 19), the impact on the Statements of Operations (in other financial income) is the difference between the carrying value of the debt converted and the fair value of the shares issued. Considering the share price evolution on February 21 and 22, 2018, the Group concluded that €1.56 per share was a reasonable fair value estimation.

The issuance of Warrants #3, Coordination Warrants and Backstop Warrants negatively impacted the other financial income (loss) line item in the Statement of Operations, according to IFRS 2, without any impact on the equity. Given the strike price of €0.01 and the very short maturity of six months, the Black & Sholes fair value is equivalent to 1.56-0.01 = €1.55 per warrant. An equity impact will be recognized when the warrants are exercised, equal to the cash consideration received (which will be marginal given the €0.01 strike price).

All the fees have been expensed (in other financial income for the second lien backstop and commitment fees and in other revenues and expenses for the consulting fees) without any portion capitalized.

The deferred tax liabilities linked to the equity portion of the convertible bonds have been reversed through equity, without any impact on the Statements of Operations.

First lien senior secured notes due 2023 refinancing

Because the terms of the first lien senior secured notes due 2023 issued on February 21, 2018 by CGG Holding (U.S.) Inc., a wholly-owned indirect subsidiary of CGG S.A., as part of the restructuring plan (the “Refinanced First Lien Notes”) provided a window to refinance them at par until May 21, 2018, we commenced an offering of new first lien senior secured notes in April 2018 to refinance the Refinanced First Lien Notes.

On April 24, 2018, CGG Holding (U.S.) Inc. issued US$300 million in aggregate principal amount of 9.000% first lien senior secured notes due 2023 and €280 million in aggregate principal amount of 7.875% first lien senior secured notes due 2023 (together, the “New First Lien Notes”).

These New First Lien Notes represented at issuance a total principal amount of US$645 million (using an exchange rate of $1.2323 per €1.00) at a weighted average coupon of 8.40%. The refinancing of the Refinanced First Lien Notes during the par window allowed the CGG group to save the 3% rollover fee (representing US$19.9 million), reduces the Group’s interest cost compared to the Refinanced First Lien Notes (which bore cash interest at a rate equal to three-month LIBOR plus 6.50% per annum and interest paid-in-kind at 2.05% per annum) and provides a shorter non-call period (April 2020 under the New First Lien Notes versus February 2021 under the Refinanced First Lien Notes).

CGG Holding (U.S.) Inc. used the net proceeds from the issuance, together with cash on hand, to redeem the Refinanced First Lien Notes in full on May 9, 2018 in accordance with their terms.

The New First Lien Notes and the second lien senior secured notes due 2024 share the same security package encompassing notably the US Multi- Client Library, the shares of the main Sercel operating entities (Sercel SAS and Sercel Inc.), the shares of significant GGR operating entities, and certain intercompany loans.

Renewing of the governance

On April 26, 2018, CGG’s Board of Directors elected Philippe Salle as Chairman of the Board of Directors. Sophie Zurquiyah took up her position of CEO of the Group and was appointed as a director by the general meeting of shareholders on the same day. Since the beginning of the year, CGG’s Board of Directors has completed the process of renewing its governance with the cooptation of six new Directors.

The members of the Board of Directors are:

Name	Position
Mr. Philippe Salle [a]	Independent director and Chairman of the Board
Mrs. Sophie Zurquiyah [a]	Director and Chief Executive Officer
Mr. Mario Ruscev [a]	Independent director
Mr. Robert F. Semmens	Director
Mrs. Anne-France Laclide-Drouin	Independent director
Mrs. Gilberte Lombard	Independent director
Mrs. Colette Lewiner [a]	Independent director
Mrs. Helen Lee Bouygues [a]	Independent director
Mrs. Heidi Petersen [a]	Independent director
Mr. Michael Daly	Independent director
Mr. Patrice Guillaume [b]	Director representing the employees

(a) appointed in 2018
(b) Director representing employees pursuant to section L.225-27-1 of the French commercial code

Geowave Voyager

SeaBird Exploration Plc announced on July 11, 2018 that it was in an exclusive process to acquire our seismic vessel Geowave Voyager and certain seismic equipment for cash consideration of US$17 million. The transfer of ownership of the Vessel and closing of the transaction was effective in November 2018.

Convertible bondholders' appeal

On July 17, 2018, certain holders of CGG's convertible bonds filed a recourse before the French Supreme Court (*Cour de cassation*) against the ruling rendered on May 17, 2018 by the Appeals Court of Paris rejecting a claim by a group of Convertible Bondholders against the ruling of the Commercial Court of Paris sanctioning the safeguard plan on December 1, 2017.

NYSE delisting and SEC deregistration

On September 11, 2018 CGG announced that the Board of Directors has unanimously approved the voluntary delisting of its American Depositary Shares ("ADSs") from the New York Stock Exchange ("NYSE") and its voluntary deregistration with the United States Securities and Exchange Commission ("SEC"). CGG believes that the costs associated with continuing the listing and registration of its ADSs exceed the benefits received by CGG, as the primary market for CGG shares is Euronext Paris.

Accordingly, CGG filed a Form 25 with the SEC on September 21, 2018 to effect the delisting with the NYSE and filed a Form 15F with the SEC on October 1, 2018 to terminate its SEC reporting obligations and the registration of its ADSs under the Securities Exchange Act of 1934, as amended.

The termination of the registration of its ADSs is now effective as 90 days have elapsed since the date of filing of the Form 15F with the SEC. However, as a result of the filing of a Form 15F, CGG's obligation to file certain reports, including its obligation to file annual reports on Form 20-F and to furnish reports on Form 6-K with the SEC is immediately suspended.

Following delisting of the ADSs from the NYSE, CGG intends to maintain its American Depositary Receipt program at "level one". This will enable investors to retain their ADSs and facilitate trading on the U.S. over-the-counter market.

Capital Market Day announcements

Following the 'CGG 2021' strategic plan announced on November 7, 2018 and actions undertaken afterwards, Contractual Data Acquisition is accounted under IFRS 5 as discontinued operations and therefore its contributions to statements of operations and statements of cash flows are aggregated in a single line item in both statements, respectively "Net income (loss) from discontinued operations" and "Net cash flows incurred by Discontinued Operations" for all periods presented.

The Group "continuing operations" namely GGR (Geoscience and Multi-Client) & Equipment represent the new profile of the group going forward.

Implementation of the CGG 2021 strategic plan must comply with the undertakings and requirements in the CGG safeguard plan and other applicable local legal requirements.

Please refer to note 5 and 20 for more information on the impact of the Capital Market Day announcements and the new organization of the Group.

During 2017

a — Proactive management of maritime liabilities

On January 20, 2017, CGG entered into agreements to substantially reduce the cash burden of the charter agreements in respect of three cold-stacked seismic vessels. As part of the agreements to settle those amounts on a non-cash basis, CGG issued US$58.6 million of its 2021 Notes bearing a 6.5% interest to the relevant charter counterparties. On March 13, 2017, CGG entered into an agreement to substantially reduce the cash burden of the charter agreement in respect of the "Oceanic Champion", an active seismic vessel. As part of the agreements to settle those amounts on a non-cash basis, CGG issued US$12.1 million of its 2021 Notes bearing a 6.5% interest to the relevant charter counterparties. The consequences of these agreements are reflected in note 22 — "Other revenues and expenses" of this document.

b — New ownership set up for our seismic fleet

In April 2017, we entered into agreements with Eidesvik, the lenders under our Nordic credit facility and the lenders under the credit facilities of Eidesvik Seismic Vessels AS ("ESV") and Oceanic Seismic Vessels AS ("OSV") for the implementation of a new ownership set up for our seismic fleet.

Under the new arrangements, Global Seismic Shipping AS ("GSS"), a company organized under the laws of Norway and 50% owned by CGG (through our subsidiary, Exploration Investment Resources II AS) and Eidesvik, holds (i) Geo Vessels AS, our former wholly-owned subsidiary, which owns the five previously cold-stacked vessels (Geo Coral (re-rigged in March 2017), Geo Caribbean, Geo Celtic, CGG Alize and Oceanic Challenger), and (ii) ESV and OSV (in which we previously held 49% stakes), which respectively own the Oceanic Vega and Oceanic Sirius. Global Seismic Shipping AS is accounted for using the equity method.

The following table summarizes the consideration received and the carrying value of the assets and liabilities contributed:

(in millions of US$)	
Consideration received	
Fair value of our shares in Global Seismic Shipping AS	71.9
Total consideration received [(a)]	**71.9**
Carrying value of the contributed assets and liabilities	
Cash and cash equivalents	7.5
Investments in companies under equity method [(1)]	48.3
Property, plant and equipment, net	301.0
Finance lease net	(3.1)
Current portion of financial debt [(2)]	(182.5)
Provisions — current portion	(4.8)
Provisions — non-current portion	(13.4)
Other Current Liabilities	(30.0)
Liabilities linked to charter agreements	(72.1)
Total carrying value of the contributed assets and liabilities [(b)]	**50.9**
Net gain realized [(c)= (a) – (b)]	**21.0**
Reduction of the cash burden of the charter agreement [(d)]	(72.1)
Net impact of the transaction in operating income [(3) (e) = (c) + (d)]	**(51.1)**
Other financial income (loss)	(15.0)
Cost of financial debt, net	(3.3)
Net impact of the transaction in financial income (loss) [(4) (f)]	**(18.3)**
Net impact of the transaction in the Net Income [(e) + (f)]	**(69.4)**

(1) This relates to the 49% equity in income that we held in ESV and OSV, accounted for under the equity method as of March 31, 2017.

(2) This relates to the Nordic credit facility.

(3) The net impact of the transaction in operating income is a loss of US$51.1 million broken-down as follows:

— a gain of US$21.0 million arising from our contribution to GSS is recorded in the line item "Gains (losses) on sales of assets" in our statement of operations (see note 22 — "Other revenues and expenses"),

— a loss of US$72.1 million linked to the renegotiation and extension of the charter agreement in respect of the operated seismic vessels "Vega" and "Sirius" to reduce the cash burden. This loss corresponds to the compensation granted to ESV and OSV following the renegotiation of the charter agreements. It is recorded in the line item "Other revenues (expenses) net" in our statement of operations (see note 22 — "Other revenues and expenses").

(4) The net impact of the transaction in financial income is a loss of US$18.3 million broken-down as follows:

— a loss of US$15.0 million recorded in the line item "Other financial income (loss)" in our statement of operations,

— a loss of US$3.3 million recorded in the line item "Cost of financial debt, net" in our statement of operations.

c — Financial restructuring process

On February 6 2017, CGG solicited consents from the holders of each series of Senior Notes and the creditors under the Term Loan B to permit the appointment of a 'mandataire ad hoc' without such action constituting an Event of Default. CGG had previously received consents from the creditors under its French and US RCFs for the appointment.

On February 20, 2017, CGG announced the receipt of the requisite majority consent from holders of its Term Loan B, 2020 Notes, 2021 Notes and 2022 Notes and the extension of the consent solicitation in respect of its 2017 Notes.

On February 23, 2017, CGG announced execution of supplemental indentures in respect of its 2020 Notes, 2021 Notes and 2022 Notes to allow for appointment of a 'mandataire ad hoc' and its intention to discharge and satisfy the indenture in respect of its 2017 Notes. The payment to the indenture trustee, in trust for the bondholders, of the aggregate outstanding principal (US$8.3 million) and interest on the 2017 Notes was done on Friday, February 24, 2017. Following this operation, the amount of unsecured debt (Senior Notes and Convertibles) reached US$1,884 million.

On February 27, 2017, a 'mandataire ad hoc' was appointed to better organize and facilitate discussions with and between all stakeholders for the financial restructuring of the Group.

On March 3, 2017, CGG entered into a financial restructuring process with the aim of significantly reducing debt levels and related cash interest costs to align them with its cash flows. In order to facilitate such restructuring discussions held under the aegis of a mandataire ad hoc, CGG executed non-disclosure agreements ("NDAs") and initiated discussions with stakeholders.

Pursuant to the NDAs, CGG was required to publicly disclose, by May 12, 2017, the status at that date of the negotiations regarding the financial restructuring and certain previously confidential information, including selected financial targets and additional information on its business segments.

On June 2, 2017, CGG announced an agreement in principle on a financial restructuring plan that met the Company's objectives with its main creditors and DNCA, a creditor and shareholder.

On June 14, 2017, CGG announced that following agreement with key financial creditors, it has begun legal processes to implement balance sheet restructuring and create sustainable capital structure with the opening of a safeguard proceeding in France and Chapter 11 and Chapter 15 filings in the U.S.

As part of this process, the French Court which opened the safeguard proceedings appointed the former mandataire ad hoc, as judicial administrator of CGG S.A.

Prior to the legal proceedings in the U.S. and France, CGG and certain of its financial creditors entered into a lock-up agreement on June 13, 2017, pursuant to which the relevant parties committed to take all actions reasonably necessary and appropriate to support, implement and consummate the restructuring. The terms of the lock-up agreement are relatively customary and include a requirement for creditors to vote in favor of the safeguard and Chapter 11 plan (subject to receiving appropriate disclosure materials), to provide various waivers, to enter into the required documentation to effect the restructuring and not to sell their debt holdings unless the transferee enters into the lock-up agreement or is already a signatory (and is therefore bound by such terms). The lock-up agreement as of that date had been signed by (i) an ad hoc committee of secured lenders, who hold collectively approximately 53.8% of the aggregate principal amount of the Group's Secured Debt, (ii) an ad hoc committee of senior noteholders, who collectively hold approximately 52.4% of the aggregate principal amount of the Company's Senior Notes, and (iii) DNCA, which holds 5.5% of the aggregate principal amount of the Company's Senior Notes and approximately 20.7% of the aggregate principal amount of its convertible bonds. In addition, the Company entered into a restructuring support agreement with DNCA (in its capacity as shareholder) in connection with its holding of 7.9% of the Company's share capital, pursuant to which DNCA committed to take all reasonably, necessary and appropriate actions as a shareholder to support, implement and consummate the restructuring, including voting in favor of the relevant shareholder resolutions and not selling its shares in the Company during the restructuring process. In October 2017, following certain commitments made by us which are described in detail in the press release dated October 17, 2017, long-standing shareholder Bpifrance Participations (which represented approximately 9.35% of the share capital and 10.9% of the voting rights) undertook to vote in favor of the resolutions required to implement the financial restructuring.

Results of the private placement agreement: on July 13, 2017, CGG announced that as of July 7, 2017 (the end of the placement period) eligible holders representing 86.08% of the aggregate principal amount of the Senior Notes had committed to subscribe to the new secured lien senior notes with Warrants of US$375 million pursuant to the terms of a private placement agreement, and had acceded to the lock-up agreement. The issuance of the new secured lien senior notes with Warrants has been backstopped by members of the ad hoc committee of the holders of the Senior Notes holding, as of the date of the private placement agreement, 52.4% of the aggregate principal amount of the Senior Notes, who have also committed to subscribe for their pro rata shares of the new secured lien senior notes with warrants.

Approval of the draft safeguard plan by creditors' committees in France: on July 28, 2017, lenders' committee unanimously approved the draft safeguard plan, and the bondholder general meeting approved it with a majority of 93.5% of the creditors who cast a vote.

Acceptance by creditors entitled to vote on Chapter 11 plan: late September, all creditor classes entitled to vote on the Chapter 11 plan proposed in the Chapter 11 cases commenced on June 14, 2017 in the US Bankruptcy Court for the Southern District of New York by CGG's 14 main foreign, direct and indirect subsidiaries, each a borrower or guarantor in respect of the Group's funded financial indebtedness, voted to overwhelmingly accept the plan.

Specifically, 97.14% of holders who cast ballots in respect of the Secured Loans, and 97.96% of holders who cast ballots in respect of the Senior Notes, voted in favor of the plan.

On October 13, 2017, we made available to the public a prospectus (in the French language) in connection with certain issuances provided for under the draft safeguard plan and the

Chapter 11 plan in the context of the financial restructuring plan of CGG (AMF visa n°17-551). The prospectus comprised the CGG 2016 reference document (document de référence), filed with the French Financial Markets Authority (the "AMF") on May 1, 2017, the update of the Company's Reference Document filed with the AMF on October 13, the securities note (including a summary of the prospectus) dated October 13, 2017, and a summary of the prospectus.

On October 16, 2017, the relevant U.S. Bankruptcy court confirmed the Chapter 11 plan.

On October 17, 2017, a Securities Note Supplement was made available. It describes the undertaking of Bpifrance Participations to vote in favor of the resolutions required to implement the financial restructuring plan, as well as the related undertakings made by the Company and certain of its creditors in the context of the safeguard proceedings.

On October 31, 2017, a quorum of 22.48% of the share capital was present at the general meeting of shareholders, which allowed a vote on the ordinary part of the agenda, i.e. mainly approval of the 2016 consolidated annual financial statements. However, such representation was not sufficient to allow the general meeting to vote on the resolutions required to implement the financial restructuring plan. The required quorum for the extraordinary part of the general meeting on first notice is 25% of the share capital, and 20% on second notice.

On November 13, 2017, the extraordinary general meeting of shareholders, convened on second notice, approved all the resolutions required to implement the financial restructuring plan.

On December 1, 2017, the Commercial Court of Paris approved the safeguard plan of CGG, after finding the claims filed by certain holders of CGG's convertible bonds against this draft plan inadmissible.

On December 21, 2017, by an order in CGG's Chapter 15 Case, the US Bankruptcy Court recognized the ruling of the Commercial Court of Paris dated December 1, 2017 approving its safeguard plan.

Undertakings of the Company and certain of its creditors in the framework of the safeguard proceedings

(i) Undertakings of the Company

Bpifrance Participations (which held, as of December 31, 2017, 9.35% of the share capital and 10.90% of the voting rights of the Company) voted in favor of the resolutions required to implement the Financial Restructuring Plan at the general meeting of shareholders held on November 13, 2017 on second convening, in light of the undertakings made by the Company, upon authorization from its board of directors, in a letter dated October 16, 2017 sent to the supervising judge of the Paris Commercial Court (*juge commissaire*) and the judicial administrator (*administrateur judiciaire*). Pursuant to such letter, the Company:

- undertook to refrain from any form of disposal of its significant assets until December 31, 2019, pursuant to article L. 626-14 of the French Commercial Code, as such disposals are not provided for by its three-year business plan (the "Business Plan"); consequently, should such disposals appear necessary due to the evolution of market conditions that would impede implementation of the Business Plan, the Company would have to request the prior authorization of the Commercial Court of Paris;
- confirmed that the Business Plan does not provide for any form of disposal of significant assets held in France or abroad, including by its direct or indirect subsidiaries; should the disposal of such significant assets be foreseen and likely to result in a substantial change to the means or goals of the draft Safeguard Plan, the Company would have to request the prior authorization from the Commercial Court of Paris, pursuant to article L.626-26 of the French Commercial Code; the Company will keep the necessary flexibility to take an active part, as the case may be, in the potential consolidation or other form of evolution that may occur in the seismic acquisition market;
- confirmed that pursuant to the draft Safeguard Plan and in light of the underlying market assumptions of its Business Plan, no social or industrial restructuring is contemplated in France, and that the Transformation Plan, which implementation was completed by the end of 2016, had already led to the reduction of the Group's workforce by half compared to the end of 2013; more precisely, unless otherwise authorized by the Commercial Court of Paris, the Company undertook to refrain from any redundancy plan in France until December 31, 2019 and to maintain, and to do what is necessary for the French law subsidiaries it controls within the meaning of article L.233-3 of the French Commercial Code to maintain the decision centers currently located in France, including the Company's registered office, until December 31, 2022; and
- undertook (i) not to take any measure to oppose the governance undertakings made by the Signatory Creditors (as defined below), it being specified however, that the Company assumes no responsibility, and the Safeguard Plan will not be at risk of being terminated pursuant to articles L.626-25 and L.626-27 of the French Commercial Code in the event one or more third parties separate from the Signatory Creditors were to hold a sufficient number of voting rights to impose a composition of the board of directors of the Company that would differ from the one provided for under these undertakings, and (ii) to have Bpifrance Participations participate in the discussions that will take place notably with the Signatory Creditors with respect to the new composition of the Company's board of directors, in accordance with the provisions of the lock-up agreement referred to above.

The trustees in charge of overseeing the implementation of the plan (*commissaires à l'exécution du plan*), appointed by the Commercial Court of Paris, will issue a yearly report on the compliance with the undertakings that the Company makes under the Safeguard Plan and this letter, which have been acknowledged by the Commercial Court of Paris in its judgment approving the Safeguard Plan; any breach may potentially lead to the termination of the Safeguard Plan, in accordance with applicable laws and regulations. In accordance with article L. 626-26 of the French Code de commerce, any substantial change in the goals or the means of the Safeguard Plan can only be decided by the Court, further to a report by the *commissaires à l'exécution du plan*.

(ii) Undertakings of certain Senior Notes holders creditors

Each of (i) Attestor Capital LLP, (ii) Boussard & Gavaudan Asset Management LP, and (iii) DNCA Finance, Oralie Patrimoine and DNCA Invest SICAV (each, a "Signatory Creditor") agreed to give the following undertakings on October 16, 2017, upon a request from the *Direction Générale des Entreprises*, which have been acknowledged by the Commercial Court of Paris in its judgment approving the Safeguard Plan on December 1, 2017:

- to have Bpifrance Participations involved in the discussions that will be notably held with each of the Signatory Creditors regarding the Company's board of directors' new composition, in accordance with the provisions of the lock-up agreement referred to above;
- to vote, during the first ordinary shareholders' meeting of the Company that will occur after the closing of the financial restructuring, in favor of the designation as director of candidates which will have been agreed between the Company's current board of directors and the relevant Signatory Creditor in the context of the above referred process;
- neither the relevant Signatory Creditor nor its affiliates or related persons will be represented on the Company's board of directors unless such Signatory Creditor or the funds, entities or accounts managed or advised directly or indirectly by it or its affiliates (i) hold together 10% or more of the Company's share capital or (ii) demonstrate the existence of fiduciary duties (including the duties of the relevant funds' management companies to manage the money entrusted to them by investors in the best interest of such investors);
- to vote in favor of any draft resolutions and, if necessary and subject to holding a sufficient shareholding in compliance with article L. 225-105 of the French Commercial Code, to submit any draft resolutions to the shareholders' meeting in order to maintain the Company's board of directors composed of 60% of independent directors and that such composition of the board continues to reflect, in accordance with the current situation, the diversity of geographical origins of the members of the board of directors, while complying with the Company's registered office location;
- to vote in favor of any draft resolutions and, if necessary and subject to holding a sufficient shareholding in compliance with article L. 225-105 of the French Commercial Code, to submit any draft resolutions to the shareholders' meeting in order to ensure that the Company's articles of association provide that any chief executive officer (*directeur général*) succeeding, as the case may be, the current chief executive officer (*directeur général*), will have his main place of residence located in France.

The abovementioned undertakings of each of the Signatory Creditors became effective when all the transactions for the implementation of the Safeguard Plan were completed (with the exception of the first undertaking, which took effect as from countersignature of the letter by the Signatory Creditors). The undertakings will remain valid until December 31, 2019, subject to the corresponding Signatory Creditor remaining a shareholder of the Company, it being specified that no undertaking to keep shares of the Company has been entered into.

The trustees in charge of overseeing the implementation of the plan (*commissaires à l'exécution du plan*) appointed by the Commercial Court of Paris, will issue a yearly report on the compliance with the undertakings that the Signatory Creditors make under the abovementioned letters; any breach potentially leading to the termination of the Safeguard Plan, in accordance with applicable laws and regulations.

Each of the Signatory Creditors also declared that it does not act in concert with any other Signatory Creditor, with Bpifrance Participations, or with any other third party.

During 2016

Initiation of the financial restructuring process

In November 2016 CGG announced that it would take steps to evaluate its short- and long-term alternatives to address its capital structure constraints.

Issued shares

CGG increased its share capital through the distribution of preferential subscription rights to existing shareholders launched on January 13, 2016. The final gross proceeds amounted to €350,589,080.16, corresponding to the issuance of 531,195,576 new shares. The net proceeds of the issuance amounted to €337 million (or US$367.5 million) and were used to reinforce the shareholders' equity of CGG and improve its liquidity as it finances its Transformation Plan.

The transaction was fully underwritten (excluding the Bpifrance Participations and IFP Energies Nouvelles subscription commitments) by a syndicate of banks. The fees and costs related to this transaction amounted to €13 million (US$14 million).

The listing of the new shares on the regulated market of Euronext Paris (Segment B) on the same line as the existing shares (FR0000120164) took place on February 5, 2016. As from that date, the share capital of CGG was composed of 708,260,768 shares with a nominal value of €0.40 each, for a total nominal share capital of €283,304,307.20.

Reverse stock split

The Company carried out on July 20, 2016 the reverse stock split that the Combined General Shareholders' Meeting approved on May 27, 2016. All shareholders received one new share (with all rights pertaining to shares), in exchange for 32 former shares. The first share price on July 20 was calculated on the basis of the last share price traded on July 19 (€0.69) multiplied by 32.

The listing of the new shares on the regulated market of Euronext Paris (Segment B) on a new line (FR0013181864) took place on July 20, 2016. As from that date, the share capital of CGG was composed of 22,133,149 shares with a nominal value of €12.80 each, for a total nominal share capital of €283,304,307.20.

Change of nominal value of ordinary shares

The Company carried out on August 11, 2016 the change of nominal value of ordinary shares that the Combined General Shareholders' Meeting approved on May 27, 2016. The Company's share capital was reduced by €265,597,788 (or US$304.1 million at historical exchange rate) to bring it down from €283,304,307.20 to €17,706,519 (or US$20.3 million) by reducing the nominal value of the Company's shares after realization of the reverse split from €12.80 to €0.80.

The amount of €265,597,788, corresponding to the share capital reduction, was allocated in full to the "additional paid in capital" account.

Sale of the Multi-Physics Business Line

CGG announced on April 29, 2016, that it had entered into a binding agreement with NEOS for the sale of the Multi-Physics Business Line. On December 12, 2016, the transaction between NEOS and CGG did not proceed and the agreement for this sale was terminated.

Gardline CGG Pte Ltd

On March 24, 2016, CGG sold its 49% stake in Gardline CGG Pte Ltd., which was accounted for using the equity method in our financial statements.

NOTE 3 TRADE ACCOUNTS AND NOTES RECEIVABLE

Analysis of trade accounts and notes receivables by maturity is as follows:

(In millions of US$)	December 31, 2018	2017	2016
Trade accounts and notes receivable gross — current portion	425.5	391.9	330.9
Less: allowance for doubtful accounts — current portion	(33.4)	(33.1)	(37.1)
Trade accounts and notes receivable net — current portion	**392.1**	**358.8**	**293.8**
Trade accounts and notes receivable gross — non-current portion	—	3.1	6.9
Less: allowance for doubtful accounts — non-current portion	—	—	—
Trade accounts and notes receivable net — non-current portion	**—**	**3.1**	**6.9**
Recoverable costs and accrued profit, not billed	128.1	160.7	134.1
Total accounts and notes receivables (1)	**520.2**	**522.6**	**434.8**

(1) The amount does not include US$14.3 million of trade accounts and notes receivable, net, reclassified as assets held for sale as of December 31, 2018.

Allowances for doubtful accounts only relate to overdue receivables as of December 31, 2018.

As of December 31, 2018 the ageing analysis of net trade accounts and notes receivable is as follows:

(In millions of US$)	Not past due	30 days	30 - 60 days	60 - 90 days	90 - 120 days	> 120 days	Total
2018	275.8	46.8	10.4	5.6	5.3	48.2	**392.1**
2017	248.8	32.9	23.5	10.2	4.1	42.4	**361.9**
2016	189.1	33.6	17.5	3.1	6.5	50.9	**300.7**

Litigation

On March 18, 2013, CGG Services SAS, a fully owned subsidiary of CGG S.A., initiated arbitration proceedings against ONGC, an Indian company, to recover certain unpaid amounts under three commercial contracts entered into by ONGC and CGG Services SAS on one hand, and ONGC and Wavefield Inseis AS on the other hand, between 2008 and 2010. The Arbitration Tribunal issued an award in favor of CGG on July 26, 2017. ONGC appealed on October 27, 2017. We believe that the on-going procedure will allow us to recover at a minimum the amount of the receivables that are recorded on our balance sheet as unpaid receivables as of December 31, 2018.

Factoring agreements

There were no factoring agreements as of December 31, 2016 and 2018.

In 2017, we entered into an agreement with a financial institution to obtain advance payments for a marine acquisition and processing project with a client. The collection right of the invoices to be issued was transferred to the financial institution, based on monthly client's acceptance of the work in progress. Nonetheless the terms of this agreement did not allow for de-recognition of the funded work in progress (which is thus recorded in "Trade accounts and notes receivable"). The debt corresponding to the cash received were accounted for in "Current liabilities associated with funded receivables" in the consolidated statement of financial position. As of December 31, 2017, an amount of US$9.8 million was accounted for in "Current liabilities associated with funded receivables" in the consolidated statement of financial position in respect of the above agreement.

In 2017, we also entered into a factoring agreement with the same financial institution. We transferred US$76.0 million of notes receivable as part of this agreement. The risks retained by the Group were mainly the risk of payment delay up to 60 days and the risk of commercial litigation. These risks were historically low with the transferred client. As a consequence, the Group retained an amount of US$7.6 million to the extent of its continuing involvement. Related costs recorded in operating income were not significant.

NOTE 4 INVENTORIES, WORK IN PROGRESS AND OTHER CURRENT ASSETS

(In millions of US$)	December 31, 2018 Cost	Valuation Allowance	Net	December 31, 2017 Cost	Valuation Allowance	Net	December 31, 2016 Cost	Valuation Allowance	Net
Consumables and spares parts	15.8	(0.4)	15.4	12.7	(0.6)	12.1	12.0	(0.9)	11.1
Raw materials and sub-assemblies	71.6	(20.3)	51.3	68.6	(20.6)	48.0	67.0	(17.2)	49.8
Work in progress	127.4	(40.1)	87.3	117.4	(33.3)	84.1	138.4	(28.5)	109.9
Finished goods	91.3	(40.5)	50.8	115.8	(20.7)	95.1	110.0	(14.5)	95.5
Inventories and work in progress (1)	**306.1**	**(101.3)**	**204.8**	**314.5**	**(75.2)**	**239.3**	**327.4**	**(61.1)**	**266.3**

Variation of inventories and work in progress

Variation of the period *(In millions of US$)*	December 31, 2018	2017	2016
Balance at beginning of period	**239.3**	**266.3**	**329.3**
Variations	(0.9)	(47.7)	(52.6)
Movements in valuation allowance (1)	(29.0)	(6.8)	(7.6)
Change in exchange rates	(9.3)	27.5	(6.8)
Change in consolidation scope	—	—	—
Others	4.7	—	4.0
Balance at end of period	**204.8**	**239.3**	**266.3**

(1) Following the 7th of November, 2018 Capital Market Day announcements, the Equipment division revised its perspectives of sales of its inventories as external outputs could not fully replace expected internal outputs. The revision of perspectives led to a provision of US30 million of its inventories (mainly Land equipment).

Other current assets

(In millions of US$)	December 31, 2018	2017	2016
Personnel and other tax assets	43.3	46.5	31.8
Fair value of financial instruments	—	—	—
Restricted cash	12.4	12.1	4.0
Other miscellaneous receivables	12.3	22.7	42.7
Supplier prepayments	15.6	19.6	12.0
Prepaid expenses	15.5	16.1	15.3
Other current assets (1)	**99.1**	**117.0**	**105.8**

(1) The amount does not include US$2.9 million of Other current assets, reclassified as assets held for sale as of December 31, 2018.

NOTE 5 ASSETS HELD FOR SALE AND DISCONTINUED OPERATIONS

Assets held for sale

On November 7, 2018, CGG presented its CGG 2021 strategic roadmap during the Capital Market Day. This strategic roadmap contains a transition to an asset-light model by reducing CGG's exposure to the data acquisition business, which has been impacted over the years by structural industry overcapacity, lack of differentiation, commodity pricing and a heavy fixed cost base. *See note 2.*

Disaggregation of assets:

In millions of US$	December 31, 2018 Gross	December 31, 2018 Impairment loss recognized on the remeasurement to fair value less costs to sell	December 31, 2018 Net	December 31, 2017	December 31, 2016
Intangible assets, net	9.1	(9.1)	—	—	—
Property, plant and equipment, net	104.5	(57.8)	46.7	14.6	18.6
Investments in companies formerly under equity method	181.6	(50.0)	131.6	—	—
Investments and other financial assets, net	—	—	—	—	—
Trade accounts and notes receivable, net	14.3	—	14.3	—	—
Other current assets, net	2.9	—	2.9	—	—
Assets held for sale, net	**312.4**	**(116.9)**	**195.5**	**14.6**	**18.6**

Disaggregation of liabilities:

In millions of US$	December 31, 2018
Trade accounts and notes payable	(4.1)
Accrued payroll costs	(0.2)
Other non-current liabilities	(1.1)
Provisions for onerous contracts (1)	(126.3)
Liabilities directly associated with the assets classified as held for sale	**(131.7)**

(1) related to the reduction of our operating fleet from 5 to 3 vessels.

Net income (loss) from discontinued operations:

(In millions of US$)	December 31, 2018	December 31, 2017	December 31, 2016
Operating revenues	225.9	284.9	232.2
Operating expenses (1)	(339.8)	(417.1)	(409.9)
Other revenues (expenses) — net	(425.3)	(73.4)	(72.2)
Operating income	**(539.2)**	**(205.6)**	**(249.9)**
Other financial income (loss)	(31.6)	(17.3)	(17.4)
Income taxes	(25.0)	(5.0)	(5.0)
Share of income (loss) in companies accounted for under equity method	(4.2)	(19.7)	(6.0)
Net income (loss) from discontinued operations	**(600.0)**	**(247.6)**	**(278.3)**

(1) Includes Cost of operations, Research and development expenses, net, Marketing and selling expenses, and General and administrative expenses

As part of the CGG 2021 plan, we recognized US$(422.8) million of restructuring costs for the period ended December 31, 2018. These restructuring costs include:

(i) US$139.1 million impairment of which US$116.9 million of impairment loss recognized on the remeasurement to fair value less cost to sell, US$16.0 million of vessels related equipment's and US$6.1 million of equity investment impairment;

(ii) US$126.3 million of provision for onerous contracts related to the reduction of our operating fleet from 5 to 3 vessels;

(iii) US$113.9 million additional provisions relating to the reduction of 712 positions worldwide and across the Group;

(iv) US$22.8 million of other costs related to our CGG 2021 plan;

(v) US$17.2 million of fair value decrease of our Global Seismic Shipping AS vendor loan; and

(vi) US$3.5 million of provisions for tax contingencies.

For the period ended December 31, 2017, we recognized US$101.1 million of restructuring costs and a revenue of US$27.7 million of which US$21 million arising from our contribution to the Global Seismic Shipping AS.

For the period ended December 31, 2016, we recognized US$35.3 million of restructuring costs and US$32.2 million of impairment mainly related to our vessels.

Net cash flows incurred by discontinued operations are as follows:

	December 31,		
(In millions of US$)	2018	2017	2016
Net cash flow provided by operating activities	(113.6)	(187.7)	(106.6)
Net cash flow used in investing activities	(5.7)	(2.2)	(4.6)
Net cash flow provided by (used in) financing activities	—	—	—
Net cash flows incurred by discontinued operations	**(119.3)**	**(189.9)**	**(111.2)**

NOTE 6 ASSET VALUATION ALLOWANCE

	December 31, 2018					
(In millions of US$)	Balance at beginning of year	Additions	Deductions	Unused Deductions	Others [(a)]	Balance at end of period
Trade accounts and notes receivable	33.1	9.1	(8.6)	—	(0.2)	33.1
Inventories and work-in-progress [(1)]	75.2	30.7	(1.7)	—	(2.9)	101.4
Tax assets	8.2	—	(3.2)	—	(0.1)	4.9
Other current assets	3.8	—	(0.8)	—	—	3.0
Total assets valuation allowance	**120.3**	**39.8**	**(14.3)**	**—**	**(3.2)**	**142.7**

(a) Includes the effects of exchange rate changes and changes in the scope of consolidation.

(1) Following the 7th of November, 2018 Capital Market Day announcements, the Equipment division revised its perspectives of sales of its inventories as external outputs could not fully replace expected internal outputs. The revision of perspectives led to a provision of US30 million of its inventories (mainly Land equipment).

	December 31, 2017					
(In millions of US$)	Balance at beginning of year	Additions	Deductions	Unused Deductions	Others [(a)]	Balance at end of period
Trade accounts and notes receivable	37.1	5.9	(11.3)	—	1.4	33.1
Inventories and work-in-progress	61.1	7.4	(0.6)	—	7.3	75.2
Tax assets	6.5	1.6	—	—	0.1	8.2
Other current assets	3.6	0.2	—	—	—	3.8
Total assets valuation allowance	**108.3**	**15.1**	**(11.9)**	**—**	**8.8**	**120.3**

(a) Includes the effects of exchange rate changes and changes in the scope of consolidation.

(In millions of US$)	December 31, 2016					
	Balance at beginning of year	Additions	Deductions	Unused Deductions	Others [(a)]	Balance at end of period
Trade accounts and notes receivable	42.3	12.3	(17.2)	—	(0.3)	37.1
Inventories and work-in-progress	55.4	9.0	(1.4)	—	(1.9)	61.1
Tax assets	6.9	0.5	(0.1)	—	(0.8)	6.5
Other current assets	7.5	0.3	(4.2)	—	—	3.6
Total assets valuation allowance	**112.1**	**22.1**	**(22.9)**	**—**	**(3.0)**	**108.3**

(a) Includes the effects of exchange rate changes and changes in the scope of consolidation.

NOTE 7 INVESTMENTS AND OTHER FINANCIAL ASSETS

(In millions of US$)	December 31, 2018	2017	2016
Non-consolidated investments	1.8	3.8	8.8
Loans and advances	10.2	38.4	18.2
Deposits and other	19.1	20.4	24.9
Total	**31.1**	**62.6**	**51.9**

In 2018, the Group has pledged US$18.1 million of its other financial assets in order to fulfil some collateral requirements.

Loans and advances included a loan granted by CGG Services (Norway) AS to Global Seismic Shipping AS for a net discounted amount of US$17.2 million as of December 31, 2018. It was fully impaired as of December 31, 2018 following CGG strategic roadmap presentation during the Capital Market Day.

Non-consolidated investments

(In millions of US$)	Country	2018 % of interests	December 31, 2018	2017	2016
Geokinetics Inc.	USA	16.0%	—	1.7	6.0
Other investments in non-consolidated companies			1.8	2.1	2.8
Total non-consolidated investments			**1.8**	**3.8**	**8.8**

On December 31, 2018, the fair value of our financial stake in Geokinetics Inc was set to nil.

No restriction or commitment exists between CGG and the non-consolidated investments.

NOTE 8 INVESTMENTS IN COMPANIES UNDER EQUITY METHOD

(In millions of US$)	Country / Head office	2018 % of interests	December 31, 2018	2017	2016
Marine acquisition					
CGG Eidesvik Ship Management AS	Norway/Bergen	49.0%	0.2	0.2	0.2
Eidesvik Seismic Vessels AS [1]	Norway/Bomlo	—	—	—	21.0
Global Seismic Shipping AS [1] [3]	Norway/Bomlo	50.0%	—	63.5	—
Oceanic Seismic Vessels AS [1]	Norway/Bomlo	—	—	—	27.0
PT Elnusa-CGGVeritas Seismic	Indonesia/Jakarta	49.0%	0.3	0.2	0.4
PTSC CGGV Geophysical Survey Limited [2]	Vietnam/Vung Tau City	49.0%	—	—	9.6
Land and Multi-Physics acquisition					
Argas [3]	Saudi Arabia/Al-Khobar	49.0%	—	68.3	64.5
Seabed Geosolutions BV [3]	The Netherlands/Amsterdam	40.0%	—	60.1	67.5
Veri-Illuq Geophysical Ltd.	Canada/Calgary	49.0%	—	(0.1)	(0.1)
Yamoria Geophysical Ltd.	Canada/Calgary	49.0%	—	(0.3)	(0.3)
GGR					
Petroleum Edge Limited	UK/London	50.0%	(3.4)	(2.3)	(1.1)
Reservoir Evaluation Services LLP [4]	Kazakhstan/Almaty	49.0%	3.0	3.1	1.8
Investments in companies under the equity method [3]			**0.1**	**192.7**	**190.5**

(1) On April, 2017, CGG entered into agreements with Eidesvik, the lenders under our Nordic credit facility and the lenders under the credit facilities of "ESV" and "OSV" for the implementation of a new ownership set up for our seismic fleet, through the creation of Global Seismic Shipping AS ("GSS") company. This new company, "GSS", holds 100% stake in "ESV" and "OSV" (see note 2).

(2) Our investment in PTSC was fully depreciated in 2017, following the decision to liquidate the JV.

(3) Following the presentation on November 7, 2018, of CGG strategic roadmap during the Capital Market Day, the investments in Global Seismic Shipping AS, Argas and Seabed Geosolutions BV were reclassified as Asset held for sale.

(4) On February 23, 2017, CGG acquired an additional 13% stake in Reservoir Evaluation Services LLP.

The variation of "Investments in companies under equity method" is as follows:

(In millions of US$)	December 31, 2018	2017	2016
Balance at beginning of period	**192.7**	**190.5**	**200.7**
Change in consolidation scope	0.4	23.6	(8.6)
Investments made during the year	—	0.7	19.0
Equity in income	(5.4)	(20.1)	(8.2)
Impairment	(6.1)	—	—
Dividends received during the period, reduction in share capital	—	(2.0)	(13.0)
Investments reclassified as *Assets held for sale*	(181.6)	—	—
Change in exchange rate and other	0.1	—	0.6
Balance at end of period	**0.1**	**192.7**	**190.5**

The changes in consolidation scope in 2017 corresponded for US$23.6 million to the implementation of the new ownership set up for our seismic fleet (see note 2 — New ownership set up for our seismic fleet). The changes in consolidation scope in 2016 corresponded for US$(8.6) million to the disposal of the shares we held in Gardline CGG PTE Ltd..

The investments in 2016 corresponded for US$19.0 million to our participation in Seabed Geosolutions BV capital increase through the conversion of part of the existing debt.

For transactions with investments in companies under the equity method, please see note 28 — Related party transactions.

NOTE 9 PROPERTY, PLANT AND EQUIPMENT

	December 31,						
	2018			2017			2016
(In millions of US$)	Gross	Accumulated depreciation	Net	Gross	Accumulated depreciation	Net	Net
Land	14.7	—	14.7	15.2	—	15.2	17.4
Buildings	234.0	(130.1)	103.9	244.0	(129.6)	114.4	108.3
Machinery & equipment	245.2	(195.3)	49.9	874.1	(741.6)	132.5	232.0
Vehicles & vessels	3.1	(2.9)	0.2	167.7	(124.7)	43.0	317.7
Other tangible assets	101.0	(84.8)	16.2	108.0	(92.5)	15.5	20.6
Assets under constructions	4.3	—	4.3	9.7	—	9.7	12.6
Total Property, plant and equipment	**602.3**	**(413.1)**	**189.2**	**1,418.7**	**(1,088.4)**	**330.3**	**708.6**

Variation of the period

	December 31,		
(In millions of US$)	2018	2017	2016
Balance at beginning of period	**330.3**	**708.6**	**885.2**
Acquisitions	63.0	45.4	57.2
Depreciation	(65.9)	(116.1)	(221.6)
Disposals	(4.6)	(18.7)	(4.4)
Change in exchange rates	(6.0)	15.6	(4.5)
Change in consolidation scope	—	(301.0)	—
Impairment of assets	(16.0)	—	—
Reclassification of tangible assets as "Assets held for sale"	(104.5)	(3.5)	(0.5)
Other	(7.1)	—	(2.8)
Balance at end of period	**189.2**	**330.3**	**708.6**

In 2018, the *Reclassification of tangible assets as "Assets held for sale"* line item includes reclassification of assets related to the Contractual Data Acquisition segment (see note 5 — non-current assets held for sale and discontinued operations). The *Impairment of assets* line item includes impairment loss recognized following our Capital Market Day announcement. In 2017, the "Change in consolidation scope" line item is related to the implementation of a new ownership set up for our seismic fleet (see note 2 — New ownership set up for our seismic fleet).

Disposals of assets mainly relate to marine seismic equipment scrapped or damaged.

Reconciliation of acquisitions with the consolidated statements of cash flows

	December 31,		
(In millions of US$)	2018	2017	2016
Acquisitions of tangible assets, excluding finance lease	63.0	45.4	57.2
Development costs capitalized (see notes 10 and 21)	33.1	34.1	34.0
Additions in other intangible assets, excluding non-exclusive surveys (see note 10)	3.0	4.7	9.0
Variance of fixed assets suppliers	4.4	(3.0)	4.3
Reclassification of flows as discontinued operations	(25.5)	(14.0)	(30.7)
Total purchases of tangible and intangible assets according to cash flow statement	**78.0**	**67.2**	**73.8**

Land, buildings and geophysical equipment recorded under finance leases

(In millions of US$)	December 31, 2018 Gross	2018 Accumulated depreciation	2018 Net	2017 Gross	2017 Accumulated depreciation	2017 Net	2016 Net
Geophysical equipment and vessels under finance leases	—	—	—	5.6	(5.1)	0.5	5.4
Land and buildings under finance leases	92.4	(25.6)	66.8	92.5	(21.9)	70.6	64.4
Total Property, plant and equipment under finance leases	**92.4**	**(25.6)**	**66.8**	**98.1**	**(27.0)**	**71.1**	**69.8**

NOTE 10 INTANGIBLE ASSETS

(In millions of US$)	December 31, 2018 Gross	2018 Accumulated depreciation	2018 Net	2017 Gross	2017 Accumulated depreciation	2017 Net	2016 Net
Multi-client surveys Marine	4,845.8	(4,279.1)	566.7	4,677.7	(3,936.8)	740.9	739.2
Multi-client surveys Land	751.2	(684.6)	66.6	716.5	(626.1)	90.4	108.7
Development costs capitalized	445.3	(266.3)	179.0	432.5	(228.5)	204.0	201.5
Software	107.2	(92.1)	15.1	113.2	(88.9)	24.3	30.7
Research — Technology	73.9	(73.9)	0.0	75.2	(75.1)	0.1	1.0
Customer relationships	232.1	(173.8)	58.3	232.3	(165.3)	67.0	75.3
Trade names	44.0	(31.9)	12.1	44.2	(31.6)	12.6	12.5
Other intangible assets	97.9	(96.8)	1.1	103.4	(90.5)	12.9	15.8
Total intangible assets	**6,597.4**	**(5,698.5)**	**898.9**	**6,395.0**	**(5,242.8)**	**1,152.2**	**1,184.7**

Variation of the period

(In millions of US$)	December 31, 2018	2017	2016
Balance at beginning of period	**1,152.2**	**1,184.7**	**1,286.7**
IFRS 15 First time application [(1)]	119.0	—	—
Increase in multi-client surveys	241.6	281.0	337.4
Development costs capitalized	33.1	34.1	34.0
Other acquisitions	3.1	4.7	9.0
Depreciation on multi-client surveys	(552.3)	(297.7)	(417.2)
Other depreciation	(78.0)	(65.1)	(64.4)
Disposals	(0.3)	—	(0.1)
Change in exchange rates	(10.6)	10.5	(2.6)
Reclassification of intangible assets as “Assets held for sale”	(9.1)	—	—
Other	0.3	—	1.9
Balance at end of period	**898.9**	**1,152.2**	**1,184.7**

(1) Refer to note 1 for more information regarding the impact of “IFRS 15 – revenues from contracts with customers”.

In 2018 the “Depreciation on multi-client surveys” line item includes:

(i) US$(226) million of impairment of multi-client surveys, including StagSeis survey fully impaired for US$(197.0) million

(ii) US$(94) million impact of the multi-client changes in estimate, see note 1.4 for more information.

In 2016, it included US$96.8 million of impairment of multi-client surveys.

Reconciliation of acquisitions with the consolidated statements of cash flows and capital expenditures in note 20

	December 31,		
(In millions of US$)	**2018**	**2017**	**2016**
Increase in multi-client surveys	241.6	281.0	337.4
Multi-client depreciations & amortizations capitalized	(18.8)	(30.0)	(42.3)
Investment in multi-client surveys according to cash flow statement	**222.8**	**251.0**	**295.1**

NOTE 11 GOODWILL

Analysis of goodwill is as follows:

Variation of the period	December 31,		
(In millions of US$)	**2018**	**2017**	**2016**
Balance at beginning of period	**1,234.0**	**1,223.3**	**1,228.7**
Additions	—	—	—
Impairment	—	—	—
Change in exchange rates	(5.0)	10.7	(5.4)
Balance at end of period	**1,229.0**	**1,234.0**	**1,223.3**

Impairment review

Group management undertakes at least an annual impairment test covering goodwill, intangible assets and indefinite lived assets allocated to the cash generating units to consider whether impairment is required.

The recoverable value retained by the Group corresponds to the value in use of the assets, cash generating units or group of cash generating units, defined as the discounted expected cash flows. In certain occasions, the recoverable value retained is the fair value less costs of disposal, in which case defined by reference to an active market.

There are nine cash generating units. A cash generating unit is a homogeneous group of assets that generates cash inflows that are largely independent of the cash inflows from other groups of assets.

The following table provides the split of the total Group Goodwill per segment:

	December 31,		
(In millions of US$)	**2018**	**2017**	**2016**
Contractual Data Acquisition	—	—	—
Non-Operated Resources	—	—	—
CGU Multi-client	*284*	*284*	*284*
CGUs in Subsurface Imaging and Reservoir	*771*	*771*	*770*
GGR	**1,055**	**1,055**	**1,054**
Equipment	**174**	**179**	**169**
Total	**1,229**	**1,234**	**1,223**

Key assumptions used in the determination of recoverable value

In determining the asset recoverability through value in use, management makes estimates, judgments and assumptions on uncertain matters. For each cash generating unit tested for goodwill impairment, the value in use is determined based on economic assumptions and forecasted operating conditions as follows:

- expected cash flows estimated in the 2019 budget and 2020-2021 outlook as presented to the Board of Directors on November 6, 2018 and December 11, 2018,
- use of normative cash flows beyond Year 3, the discounted normative cash flows weigh more than 80% of the total value in use,
- long-term growth rate at 2.0% for all the CGUs,
- discount rates which we consider reflect the respective sector weighted average cost of capital (WACC):
  - 10.0% for the Equipment segment (unchanged compared to 2017) corresponding to a pre-tax rate of 12.8%;

» 10.0% for the cash generating units within the GGR segment (compared to 9.5% in 2017) corresponding to a pre-tax rate from 12.4% up to 13.1%.

Our WACCs are calculated with the standard Capital Asset Pricing Model (CAPM) methodology. We requested an external valuation firm to perform an independent assessment in 2018. Pre-tax WACCs are calculated by iteration: the pre-tax WACC is the discount rate leading to the same net present value calculated with post-tax WACC with tax expenses excluded from cash flows projections.

In 2018

GGR:

Increasing oil and gas prices have significantly improved the profitability and cash flow within GGR's customer base, which should lead to an improved market for GGR. However, most large clients are publicly stating that they will maintain tight spending discipline and will structure their companies to prosper at commodity prices lower than today's prices.

Many customers are focusing their exploration and production budgets on increasing production from current installations, and GGR benefits from services and imaging projects, given our leading ocean bottom nodes processing capability, as well as large multi-client projects over mature areas. Our clients also invest heavily in their land operations in the United States where our contributions are more modest, but GGR has established, and is continuing to invest in, a significant data library position in the popular onshore unconventional plays in the United States.

Our top line strategy for the GGR activities in 2019 continues to be:

- Maintain our investment in new multi-client surveys, at an acceptable level of pre-funding;
- Continue to invest in research and development and people to maintain our lead in high-end imaging and advance our software offering;
- Expand our reservoir and geological operations through increased multi-client / subscription product investment and the geographic expansion of certain technologies; and
- Gain more value from integrated offerings.

The capital employed of the Multi-client cash generating unit amounts to US$876 million as of December 31, 2018, including US$284 million of goodwill.

The capital employed of the Subsurface Imaging and Reservoir cash generating units amounted to US$1,151 million as of December 31, 2018, including US$771 million of goodwill.

Equipment:

In 2019, we expect that Sercel's revenue should improve compared to 2018 with a rebound of land activity worldwide due to the need for new equipment after years of under investment and the resumption of some high-channel count megacrews projects operating in the Middle East. Sercel should also benefit from the sales of the 508XT advanced technology compared to aging systems. Geographically, pockets of new opportunities are emerging in India and Algeria, beyond our traditional markets (Russia, China and Middle East).

The marine market should stabilize but at a low level. Marine contractors continue to face a difficult market, restricting their ability to invest in new equipment. However, their current fleets are aging and their excess of equipment generated by the stacking of vessels is shrinking.

In this market environment, and notably considering its important installed base, Sercel estimates that, for 2019, it should maintain its leading position in the seismic equipment market by capitalizing on growth opportunities resulting from the strength of its current product range, the application of new technologies in all of its products as well as from its diversified geographical presence.

The capital employed of the Equipment cash generating unit amounted to US$534 million as of December 31, 2018, including US$174 million of goodwill.

No impairment of goodwill recognized in 2018.

In 2017

The capital employed of the Multi-client cash generating unit amounts to US$1,096 million as of December 31, 2017, including US$284 million of goodwill.

The capital employed of the Subsurface Imaging and Reservoir cash generating units amounted to US$1,114 million as of December 31, 2017, including US$771 million of goodwill.

The capital employed of the Equipment cash generating unit amounted to US$604 million as of December 31, 2017, including US$179 million of goodwill.

No impairment of goodwill recognized in 2017.

In 2016

The capital employed by the Multi-client cash generating unit amounted to US$1,165 million as of December 31, 2016, including US$284 million of goodwill.

The capital employed of the Sub Surface Imaging and Reservoir cash generating units amounted to US$1,147 million as of December 31, 2016 including US$770 million goodwill.

The capital employed by the Equipment cash generating unit amounted to US$617 million as of December 31, 2016 including US$169 million of goodwill.

No impairment of goodwill recognized in 2016.

Sensitivity to changes in assumptions

Changing the assumptions selected by Group management, in particular the discount rate and the normative cash flows (based on EBITDAS — see definition in note 20) could significantly affect the evaluation of the value in use of our cash generating units and, hence, the Group's impairment test result. The profile of the business cycle could affect, to a lesser extent compared to the two previous assumptions, the evaluation of the value in use of our cash generating units. The cash flow generated during 2020 (chosen as middle of the three years sequence) is an important assumption.

The following changes to the assumptions used in the impairment test lead to the following:

(In millions of US$)	Goodwill	Excess of the expected future Discounted cash flows over the carrying value of assets including goodwill	Sensitivity on 2020 cash flows		Sensitivity on normative cash flows		Sensitivity on discount rate (after tax)	
			Decrease by 10%	Increase by 10%	Decrease by 10%	Increase by 10%	Decrease by 0.25bps	Increase by 0.25bps
CGU Multi- client	284	627	(13)	+13	(113)	+113	+46	(43)
CGUs in Subsurface Imaging and Reservoir	771	411	(9)	+9	(128)	+128	+52	(49)
Equipment segment	174	373	(3)	+3	(81)	+81	+32	(30)
Total	**1,229**							

NOTE 12 OTHER CURRENT LIABILITIES

(In millions of US$)	December 31, 2018	2017	2016
Value added tax and other taxes payable	45.3	48.5	25.6
Deferred revenue [1]	199.9	58.0	72.0
Fair value of financial instruments (see note 14)	0.3	—	—
Other liabilities	5.4	16.6	42.6
Other current liabilities	**250.9**	**123.1**	**140.2**

(1) The increase in deferred revenue is directly linked to the application of IFRS 15 since January 1, 2018. See notes 1.3 and 19 for more details.

NOTE 13 FINANCIAL DEBT

Gross financial debt as of December 31, 2018 was US$1,166.7 million compared to US$2,955.3 million as of December 31, 2017. Refer to note 2 — "Significant events" for information on the impact on financial debt of the financial restructuring completed on February 21, 2018.

Our gross debt as of December 2018 breaks down as follows:

	December 31,						
	2018			2017			2016
(In millions of US$)	Current	Non-current	Total	Current	Non-current	Total	Total
High yield bonds	—	—	—	1,573.9	—	1,573.9	1,430.1
Convertible bonds	—	—	—	396.0	—	396.0	332.9
Term loans	—	—	—	337.4	—	337.4	332.8
Credit facilities	—	—	—	470.5	—	470.5	548.9
New First lien senior secured notes due 2023	—	620.6	620.6				
Second lien senior secured notes due 2024 (including PIK) [a]	—	480.7	480.7				
Bank loans and other loans	0.4	3.0	3.4	4.6	—	4.6	94.2
Finance lease debt	5.4	44.6	50.0	5.8	52.3	58.1	75.6
Sub-total	**5.8**	**1,148.9**	**1,154.7**	**2,788.2**	**52.3**	**2,840.5**	**2,814.5**
Accrued interests	12.0	—	12.0	114.6	—	114.6	34.3
Financial debt	**17.8**	**1,148.9**	**1,166.7**	**2,902.8**	**52.3**	**2,955.1**	**2,848.8**
Bank overdrafts	—	—	—	0.2	—	0.2	1.6
Total [b]	**17.8**	**1,148.9**	**1,166.7**	**2,903.0**	**52.3**	**2,955.3**	**2,850.4**

(a) PIK: payment-in-kind interest.
(b) After completion of the financial restructuring, the financial debt decreases from US$2,955 million as of December 31, 2017 down to US$1,205 million as of February 21, 2018, out of which US$10 million are current and US$1,195 million are non-current. See note 2

Changes in liabilities arising from financing activities

(In millions of US$)	December 31, 2018	December 31, 2017
Balance at beginning of period	**2,955.1**	**2,848.8**
Decrease in long term debts	*(195.9)*	*(26.9)*
Increase in long term debts	*336.5*	*2.3*
Reimbursement on leasing	*(5.7)*	*(5.7)*
Financial interests paid	*(73.2)*	*(85.0)*
Cash flows	61.7	(115.3)
Cost of financial debt, net	127.4	211.0
Unsecured debt equitization (see note 2)	(1,992.7)	—
Commitment fees on 1st lien and 2nd lien (see note 2)	57.9	—
Nordic credit facility (see note 2 — New ownership set up for our seismic fleet)	—	(182.5)
Liabilities linked to charter agreements (see note 2 — management of maritime liabilities)	—	70.7
Change in exchange rates	(34.3)	133.2
Other	(8.4)	(10.8)
Balance at end of period	**1,166.7**	**2,955.1**

Financial debt by financing sources

	Issuing date	Maturity	Nominal amount Dec 31, 2018	Net balance Dec 31, 2018	Interest rate
			(In millions of currency)	*(In millions of US$)*	
New First lien secured notes due 2023	2018	2023	€ 280.0	320.6	7.875%
New First lien secured notes due 2023	2018	2023	US$300.0	300.0	9.0%
Sub-total New First lien				**620.6**	
Second lien secured notes due 2024	2018	2024	€ 80.4	92.0	Euribor 3M + 4% in cash,+ 8.5% PIK
Second lien secured notes due 2024	2018	2024	US$355.1	355.1	Libor 3M + 4% in cash,+ 8.5% PIK
PIK Second lien secured notes due 2024 [1]	—	—	—	33.6	Same as principal amount
Sub-total Second lien				**480.7**	
Other bank loans	—	—	—	0.4	—
Other loans	—	—	—	3.0	—
Sub-total bank loans and other loans				**3.4**	
Real estate finance lease	2010	2022	€ 75.1	50.0	—
Other finance lease	—	—	—	0.0	—
Sub-total Finance lease debt				**50.0**	
Total financial debt, excluding accrued interests and bank overdrafts				**1,154.7**	

(1) PIK: payment-in-kind interest

Financial debt by currency

	December 31,		
(In millions of US$)	**2018**	**2017**	**2016**
US dollar	682.8	1,756.7	1,879.3
Euro	471.9	1,083.8	935.2
Total financial debt, excluding accrued interests and bank overdrafts	**1,154.7**	**2,840.5**	**2,814.5**

Financial debt by interest rate

	December 31,		
(In millions of US$)	**2018**	**2017**	**2016**
Variable rates (average effective rate December 31, 2018: 14.37%, 2017: 6.76%, 2016: 5.13%)	480.7	807.9	820.9
Fixed rates (average effective rate December 31, 2018: 8.08%, 2017: 5.42%, 2016: 5.43%)	674.0	2,032.6	1,993.6
Total financial debt, excluding accrued interests and bank overdrafts	**1,154.7**	**2,840.5**	**2,814.5**

Variable interest rates are generally based on inter-bank offered rates of the related currency.

First lien senior secured notes due 2023

On February 21, 2018, CGG Holding (U.S.) Inc. issued US$663.6 million in principal amount of first lien senior secured notes due 2023, bearing floating rate interest at

Libor (floor of 1%) + 6.5% in cash, and 2.05% PIK in exchange for the balance of the Secured Loans taking into account an upfront paydown of US$150 million.

New First lien secured notes due 2023

The outstanding value at December 31, 2018, is US$620.6 million.

Because the terms of the first lien senior secured notes due 2023 issued on February 21, 2018 by CGG Holding (U.S.) Inc., a wholly-owned indirect subsidiary of CGG S.A., as part of the restructuring plan (the "Refinanced First Lien Notes") provided a window to refinance them at par until May 21, 2018, we commenced an offering of new first lien senior secured notes in April 2018 to refinance the Refinanced First Lien Notes.

On April 24, 2018, CGG Holding (U.S.) Inc. issued US$300 million in aggregate principal amount of 9.000% first lien senior secured notes due 2023 and €280 million in aggregate principal amount of 7.875% first lien senior secured notes due 2023 (together, the "New First Lien Notes").

These New First Lien Notes represented at issuance a total principal amount of US$645 million (using an exchange rate of $1.2323 per €1.00) at a weighted average coupon of 8.40%. The refinancing of the Refinanced First Lien Notes during the par window allowed the CGG group to save the 3% rollover fee (representing US$19.9 million), reduces the Group's interest cost compared to the Refinanced First Lien Notes (which bore cash interest at a rate equal to three-month LIBOR plus 6.50% per annum and interest paid-in-kind at 2.05% per annum) and provides a shorter non-call period (April 2020 under the New First Lien Notes versus February 2021 under the Refinanced First Lien Notes).

CGG Holding (U.S.) Inc. used the net proceeds from the issuance, together with cash on hand, to redeem the Refinanced First Lien Notes in full on May 9, 2018 in accordance with their terms.

The New First Lien Notes and the second lien senior secured notes due 2024 share the same security package encompassing notably the US Multi- Client Library, the shares of the main Sercel operating entities (Sercel SAS and Sercel Inc.), the shares of significant GGR operating entities, and certain intercompany loans.

Second lien senior secured notes due 2024

The outstanding value at December 31, 2018, is US$480.7 million.

On February 21, 2018, CGG S.A. issued US$355.1 million and €80.4 million in principal amount of second lien senior secured notes due 2024 (US$480.7 million as of December 31, 2018, including the paid-in-kind (PIK) from February 21, 2018 to December 31, 2018 and converted at the December 31, 2018 exchange rate of US$1.1450 per €1.00), bearing floating rate interest at Libor /Euribor (floor of 1%) depending on the currency + 4% in cash, and 8.5% PIK. This issuance comprises US$275 million and €80.4 million as new money and US$80.2 million in exchange for part of the accrued interest claims under the Senior Notes (with the US$ new money notes and accrued interest notes being fungible).

The New First Lien Notes due 2023 and the second lien senior secured notes due 2024 share the same security package encompassing notably the US Multi- Client Library, the shares of the main Sercel operating entities (Sercel SAS and Sercel Inc.), the shares of significant GGR operating entities, and certain intercompany loans.

Term loans

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which comprises the extension of the maturities of the secured senior debt (see *First lien notes due 2023* above).

On November 19, 2015, CGG S.A. announced that its subsidiary, CGG Holding (U.S.) Inc. ("CGG US"), launched an Exchange Offer in relation to CGG S.A.'s 7.75% Senior Notes due 2017, 6.50% Senior Notes due 2021 and 6.875% Senior Notes due 2022 (the Notes). CGG US offered senior secured term loans (Term Loans) in exchange for any and all of the 7.75% Senior Notes due 2017 and a combined total of up to US$135 million of the 6.5% Senior Notes due 2021 and/or 6.875% Senior Notes due 2022 if accompanied by the concurrent tender of an equal or greater corresponding amount of the 7.75% Senior Notes due 2017. US$135 million of the 7.75% Senior Notes due 2017 was outstanding as of September 30, 2015.

On December 18, 2015, CGG announced that:

- US$126.7 million out of US$135 million outstanding 2017 notes were replaced by a secured term loan due 2019.
- US$45.1 million out of US$650 million outstanding 2021 notes were replaced by a secured term loan due 2019.
- US$80.4 million out of US$500 million outstanding 2022 notes were replaced by a secured term loan due 2019.
- In addition of the Exchange Offer the €84.4 million Fugro loan was also replaced by a secured term loan due 2019 amounting to US$90 million.

The Term Loans would mature on May 15, 2019 and bear an interest, at the option of the Company, of adjusted LIBOR plus 5.50% per annum or adjusted base rate plus 4.50% per annum. Adjusted LIBOR had a floor of 1.00% and adjusted base rate shall not be less than 2.00%.

The term loans were secured indebtedness ranking pari passu with the existing US and French Revolving Credit Facilities sharing the same security package encompassing notably the fleet streamers, the US Multi-Client Library, the shares of the main Sercel operating entities (Sercel SAS and Sercel Inc), the shares of significant GGR operating entities, and some intercompany loans.

High Yield bonds

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which comprises the equitization of all of the High Yield Bonds.

CGG S.A. issued several bonds in US dollar and euros, with maturities 2017 (fully redeemed), 2020, 2021 and 2022.

These notes were listed on the Luxembourg Stock Exchange; and were guaranteed on a senior basis by certain of our subsidiaries.

Those bonds included certain restrictive covenants, including limitations on additional indebtedness subscriptions, pledges arrangements, sales and lease-back transactions, issuance and sale of equity instruments and dividends payments by certain subsidiaries of the Group.

High yield bonds (US$500 million, 6.875% Senior Notes, maturity 2022)

As part of the restructuring plan, this debt was equitized on February 21, 2018

On May 1, 2014, we issued US$500 million principal amount of our 6.875% Senior Notes due 2022.

The Senior Notes were issued at a price of 100% of their principal amount. We used the net proceeds from the notes to redeem the entire US$225 million outstanding principal amount of our 9.50% Senior Notes due 2016 and to repay US$265 million in principal amount of our 7.75% Senior Notes due 2017.

High Yield bonds (US$71 million, 6.50% Senior Notes, maturity 2021)

As part of the restructuring plan, this debt was equitized on February 21, 2018

On January 20, 2017, CGG entered into agreements to substantially reduce the cash burden of the charter agreements in respect of three cold-stacked seismic vessels. As part of the agreements to settle those amounts on a non-cash basis, CGG issued US$58.6 million of its 2021 Notes bearing a 6.5% interest to the relevant charter counterparties. On March 13, 2017, CGG entered into an agreement to substantially reduce the cash burden of the charter agreement in respect of the “Oceanic Champion”, an active seismic vessel. As part of the agreements to settle those amounts on a non-cash basis, CGG issued US$12.1 million of its 2021 Notes bearing a 6.5% interest to the relevant charter counterparties.

High Yield bonds (US$650 million, 6.50% Senior Notes, maturity 2021)

As part of the restructuring plan, this debt was equitized on February 21, 2018

On May 31, 2011, we issued US$650 million principal amount of 6.50% Senior Notes due June 1, 2021.

The Senior Notes were issued at a price of 96.45% of their principal amount, resulting in a yield of 7%. We used the net proceeds of the issuance to redeem the remainder of our US$530 million 7.50% Senior Notes due May 2015 and to repay in full the US$508 million outstanding under our term loan B facility.

High yield bonds (€400 million, 5.875% Senior Notes, maturity 2020)

As part of the restructuring plan, this debt was equitized on February 21, 2018

On April 23, 2014, we issued €400 million (or US$546.3 million, converted at historical closing exchange rate of US$1.3658) principal amount of our 5.875% Senior Notes due 2020.

The Senior Notes were issued at a price of 100% of their principal amount. We used the net proceeds from the notes to fully repurchase our 1.75% convertible bonds due 2016 amounting to €360 million. The remaining net proceeds were used to reimburse the €28.1 million installment of the vendor loan granted by Fugro due in 2015.

Convertible bonds

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which comprises the equitization of all of the High Yield Bonds.

Convertible bonds (€325 million, 1.75% Senior Notes, maturity 2020)

As part of the restructuring plan, this debt was equitized on February 21, 2018

Following the reverse split and the change of nominal value of ordinary shares that occurred in 2017 (see note 15) the conversion ratio was 0.044 CGG share per one bond.

In May 2015, CGG initiated a simplified public exchange offer for its outstanding 11,200,995 bonds convertible into and/or exchangeable for new or existing share of the Company (convertible bonds) due 2019, with the intention to issue new convertible bonds due 2020 at a ratio of five 2020 convertible bonds for two 2019 convertible bonds tendered into the offer.

On June 26, 2015, holders exchanged 90.3% of the principal amount of the existing 2019 convertible bonds (or 10,114,014 bonds). In consideration, CGG issued 25,285,035 convertible bonds maturing on January 1, 2020 for a total nominal amount of €325.1 million (or US$363.7 million converted at the historical closing exchange rate of US$1.1189).

The 2020 convertible bonds’ nominal value was set at €12.86 per bond (versus €32.14 for the 2019 convertible bonds). The new bonds bear interest at a rate of 1.75% payable semi-annually in arrears on January 1 and July 1 of each year (versus 1.25% for the 2019 convertible bonds). The bonds entitle the holders to receive new and/or existing CGG shares at the ratio of one share per one bond, subject to adjustments. Under certain conditions, the bonds may be redeemed prior to maturity at our option.

As of June 30, 2015, as a result of this transaction, we derecognized the financial liability and equity components related to the 2019 convertible bonds that were exchanged and we recognized the 2020 convertible bonds at their fair value. The impact of the transaction on the net income of the period was not significant. The impact on equity amounted to

US$8.5 million, net of taxes. The financial liability component was assessed using a 6.63% interest rate and amounted to €265.4 million (or US$296.9 million).

Convertible bonds (previously €360 million, now €35 million, 1.25% Senior Notes, maturity 2019)

As part of the restructuring plan, this debt was equitized on February 21, 2018

Following the reverse split and the change of nominal value of ordinary shares that occurred in 2017 the conversion ratio was 0.044 CGG share per one bond.

As a result of the simplified public exchange offer (see *Convertible bonds —€360 million, 1.25% Senior Notes, maturity 2020* above), the outstanding amount of the financial liability that corresponds to the 2019 convertible bonds that were not exchanged amounted to €30.3 million (or US$34 million) in the consolidated statement of financial position as of December 31, 2015.

On November 20, 2012, we issued 11,200,995 bonds convertible into and/or exchangeable for new or existing shares of our company to be redeemed on January 1, 2019 for a total nominal amount of €360 million. We used the net proceeds of the issuance to finance a portion of the €1.2 billion acquisition price for Fugro Geoscience.

The bonds' nominal value was set at €32.14 per bond, representing an issue premium of 40% of the CGG's reference share price on the regulated market of NYSE Euronext in Paris. The bonds bear interest at a rate of 1.25% payable semi-annually in arrears on January 1 and July 1 of each year. The bonds entitled the holders to receive new and/or existing CGG shares at the ratio of one share per one bond, subject to adjustments. Under certain conditions, the bonds could have be redeemed prior to maturity at our option.

As of November 20, 2012, the financial liability component was US$359 million (€277 million) and the equity component was US$98 million (€75 million), net of issuing fees. The fair value of the financial liability was assessed using a 5.47% interest rate.

Credit facilities

US$165 million Revolving Credit Agreement (US revolving facility)

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which comprises the extension of the maturities of the secured senior debt (see *First lien notes due 2023* below).

On July 15, 2013, we entered into a new US revolving credit facility of up to US$165 million with a five-year maturity.

US$325 million Revolving Credit Agreement (French revolving facility)

On February 21, 2018, CGG finalized the implementation of its financial restructuring plan, which comprises the extension of the maturities of the secured senior debt (see *First lien notes due 2023* below).

On July 24, 2014, we extended the maturity of our French revolving credit facility.

On July 31, 2013, we entered into a new French revolving credit facility of up to US$325 million with a three-year maturity with two extension options of one year each.

Nordic revolving facility

See bank loans below

Bank loans

US$250 million Nordic credit facility

The "Fleet ownership changes" transaction led to a reduction of the gross debt of the Group in 2017 of US$182.5 million, corresponding to the principal amount of loans under the Nordic credit facility outstanding as of March 31, 2017.

On December 16, 2014, we completed the amendment and extension of our Nordic credit facility. The credit amount was increased from US$175 million to US$250 million and the maturity extended from May 2018 to December 2019. The new amount is split into a US$100 million authorized revolving facility and a US$150 million term loan. We entered into an interest rate swap to fix the annual rate at 4.3%.

On July 1, 2013, we entered into a five-year US$200 million financing secured by vessel assets, split into two tranches of US$100 million each, the proceeds of which were used in part to reimburse the 2013 tranche of the vendor loan granted by Fugro. We entered into an interest rate swap to fix the annual effective rate at 4.4%.

US$25 million streamer financing

We finished to reimbursed the streamer financing in 2018

On September 29, 2014, the US$25 million streamer financing line was reduced to US$12.5 million and further reduced to US$6.3 million on December 18, 2014, in line with the reduction of the capital expenditures and the fleet.

On December 19, 2013, we signed a loan agreement for a maximum amount of US$25 million with multiple drawings. This loan is dedicated to finance the acquisition of marine equipment to be delivered in up to twelve monthly lots over a period of one year. On December 30, 2014, we entered into an interest rate swap to fix the annual rate at 3.6%. This loan is to be reimbursed over five years after the deadline for drawing.

NOTE 14 FINANCIAL INSTRUMENTS

Because we operate internationally, we are exposed to general risks linked to operating abroad. Our major market risk exposures are changing interest rates and currency fluctuations. We do not enter into or trade financial instruments including derivative financial instruments for speculative purposes. Please also refer to chapter 2 of our annual report for qualitative information.

Foreign currency risk management

As a company that derives a substantial amount of its revenue from sales internationally, we are subject to risks relating to fluctuations in currency exchange rates. Our revenues and expenses are mainly denominated in US dollars and euros, and to a significantly lesser extent, in Canadian dollars, Brazilian reals, Australian dollars, Norwegian kroner, British pounds and Chinese yuan.

Foreign currency sensitivity analysis

Fluctuations in the exchange rate of other currencies, particularly the euro, against the U.S. dollar, have had in the past and will have in the future a significant effect upon our results of operations. We attempt to reduce the risks associated with such exchange rate fluctuations through our hedging policy. We cannot assure you that fluctuations in the values of the currencies in which we operate will not materially adversely affect our future results of operations.

As of December 31, 2018, we estimate our annual fixed needs in euros to be approximately €300 million and as a result, an unfavorable variation of US$0.10 in the average yearly exchange rate between the US dollar and the euro would reduce our operating income and our shareholders' equity by approximately US$30 million.

The following table shows our exchange rate exposure as of December 31, 2018:

	As of December 31, 2018					
(Converted in millions of US$)	Assets (a)	Liabilities (b)	Currency commitments (c)	Net position before hedging (d) = (a) – (b) ± (c)	Forward contracts applied (e)	Net position after hedging (f) = (d) + (e)
US$ (1)	463.6	(865.3)	—	(401.7)	(2.2)	(403.9)
EUR (2)	69.4	(458.6)	—	(389.2)	—	(389.2)
US$ (3)	53.5	(109.1)	—	(55.6)	13.6	(42.0)
BRL (4)	11.1	—	—	11.1	—	11.1

(5) US$-denominated assets and liabilities in the entities whose functional currency is the euro.
(6) Euro-denominated assets and liabilities in the entities whose functional currency is the US$.
(7) US$-denominated assets and liabilities in the entities whose functional currency is the Brazilian real.
(8) BRL-denominated assets and liabilities in the entities whose functional currency is the US$.

"Gross financial debt" is the amount of bank overdrafts, plus current portion of financial debt, plus financial debt, and "net financial debt" is gross financial debt less cash and cash equivalents. Net financial debt is presented as additional information because we understand that certain investors believe that netting cash against debt provides a clearer picture of our financial liability exposure. However, other companies may present net financial debt differently than we do. Net financial debt is not a measure of financial performance under IFRS and should not be considered as an alternative to any other measures of performance derived in accordance with IFRS.

Our financial debt is partly denominated in euro and converted in US dollars at the closing exchange rate. As of December 31, 2018, our US$ 733 million of net financial debt included a part of debt denominated in euro of €254 million based on the closing exchange rate of US$1.1450.

From one year end closing to another, a variation of US$0.10 in the closing exchange rate between the US dollar and the euro would impact our net debt by approximately US$25 million.

Foreign forward exchange contracts

Forward exchange transactions are aimed at hedging future cash flows against rate fluctuation in relation with awarded commercial contracts. Usually these foreign forward exchange contracts maturity is less than one year.

We do not enter into forward foreign currency exchange contracts for trading purpose.

As of December 31, 2018, contracts were outstanding for the US dollar equivalent of US$34.2 million (of which US$15.8 million were applied), of which US$13.6 million against Brazilian reals and US$20.6 million against Euros.

Effects of forward exchange contracts on financial statements are as follows:

(In millions of US$)	December 31, 2018	2017	2016
Carrying value of forward exchange contracts (see notes 4 and 12)	(0.3)	—	—
Gains (losses) recognized in profit and loss (see note 22)	(0.8)	—	0.2
Gains (losses) recognized directly in equity	(0.1)	—	(0.2)

Interest rate risk management

We are subject to interest rate risk on our floating rate debt and when we refinance any of our debt. As of December 31, 2018, we had US$481 million of debt, under our second lien notes, bearing variable interest, and an increase of one percentage point in the applicable three-month interest rate would have had a negative impact on our net results before taxes of US$4.8 million. Our second lien notes are subjects to paid-in-kind (PIK) interests at a fixed rate of 8.5%. As a result, the principal amount increases each period and as such, the variable component of interest is paid on an increasing amount each period. Changes in the monetary policies of the US Federal Reserve and the European Central Bank, developments in financial markets and changes in our perceived credit quality may increase our financing costs and consequently adversely impact our ability to refinance our indebtedness, which could have a negative impact on our business, liquidity, results of operations and financial condition.

Interest rate sensitivity analysis

The following table shows our variable interest rate exposure by maturity as of December 31, 2018.

	Financial assets (*) (a)		Financial liabilities (*) (b)		Net position before hedging (c) = (a) - (b)		Off-balance sheet position (d)		Net position after hedging (e) = (c) + (d)	
12.31.2018 In millions US$	Fix rate	Variable rate	Fix rate	Variable rate	Fix rate	Variable rate	Fix rate	Variable rate	Fix rate	Variable rate
Overnight to 1 year	24	102	6	—	18	102	—	—	18	102
1 to 2 years	—	—	12	—	(12)	—	—	—	(12)	—
3 to 5 years	—	—	654	—	(654)	—	—	—	(654)	—
More than 5 years	—	—	3	480	(3)	(480)	—	—	(3)	(480)
Total	**24**	**102**	**675**	**480**	**(651)**	**(378)**	**—**	**—**	**(651)**	**(378)**

(*) Excluding bank overdrafts and accrued interest.

Our sources of liquidity include credit facilities and debt securities which are or may be subject to variable interest rates. As a result, our interest expenses could increase if short-term interests' rates increase. The sensitivity analysis is based on a net liability exposure of US$378 million. Our variable interest rate indebtedness carried an average interest rate of 6.5% in 2018. Each 100 basis points increase would increase our interest expenses by US$3.8 million per year and each 100 basis point decrease in this rate would decrease our interest expenses by US$3.8 million per year.

The following table shows our variable interest rate exposure over our financial assets and liabilities as of December 31, 2018:

	December 31, 2018	
(In millions of US$)	Impact on result before tax	Impact on shareholders' equity before tax
Impact of an interest rate increase of 100 basis points	(3.8)	(3.8)
Impact of an interest rate decrease of 100 basis points	3.8	3.8

Credit risk management

We seek to minimize our counter-party risk by entering into hedging contracts only with well rated commercial banks or financial institutions and by distributing the transactions among the selected institutions. Although our credit risk is the replacement cost at the then-estimated fair value of the instrument, we believe that the risk of incurring losses is remote and those losses, if any, would not be material.

Our receivables and investments do not represent a significant concentration of credit risk due to the wide variety of customers and markets in which we sell our services and products and our presence in many geographic areas. Specific procedures have been put in place to monitor customers' payments and reduce risks. In 2018, the Group's two most significant customers accounted for 7.1% and 6.3% of the Group's consolidated revenues compared with 11.0% and 8.3% in 2017 and 8.4% and 7.3% in 2016.

Liquidity risk management

See "Chapter 2.1.1.4: Key Information — Risks related to our indebtedness" for a discussion on our indebtedness and our covenants.

Financial instruments by categories in the Statement of financial position

The impact and the breakdown of the Group's financial instruments in the statement of financial position as of December 31, 2018 are as follows:

	December 31, 2018						
(In millions of US$)	Fair value hierarchy (1)	Carrying Amount	Fair Value	Fair value in income statement	Loans, receivables	Debts at amortized cost	Derivatives
Non-consolidated investments (2)	Level 3	1.8	1.8	1.8	—	—	—
Financial and non-current assets	Level 3	29.3	29.3	—	29.3	—	—
Notes receivable	Level 3	520.2	520.2	—	520.2	—	—
Financial instruments	Level 2	—	—	—	—	—	—
Cash equivalents	Level 2	80.9	80.9	80.9	—	—	—
Cash	Level 2	353.2	353.2	353.2	—	—	—
Total assets		**985.4**	**985.4**	**435.9**	**549.5**	**—**	**—**
Financial debts (see note 13)	Level 2	1,154.7	1,212.8	—	—	1,212.8	—
Bank overdraft facilities	Level 2	0.0	0.0	0.0	—	—	—
Notes payable	Level 3	126.4	126.4	—	126.4	—	—
Financial instruments	Level 2	0.3	0.3		—	—	0.3
Total liabilities		**1,281.4**	**1,339.5**	**0.0**	**126.4**	**1,212.8**	**0.3**

(1) Level 1 — Quoted (unadjusted) market prices in active markets for identical assets or liabilities
Level 2 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observable
Level 3 — Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable
(2) Due to the new IFRS 9 standard, non-consolidated investments, which were classified in "Available-for-sale assets" for US$3.8 million in December 31, 2018, are now in the category "Fair value in income statement".

There was no change of fair value hierarchy in 2018 compared to previous years.

Due to their short maturities, the fair value of cash, cash equivalents, trade receivables and trade payables is considered as being equivalent to carrying value.

As of December 31, 2018:

- The **New First lien notes due 2023** in US dollars currency were traded at a price reflecting a discount of 99.9% of their nominal value;
- The **New First lien notes due 2023** in Euro currency were traded at a price reflecting a discount of 101.0% of their nominal value;
- The **Second lien senior secured notes due 2024** were traded at a price reflecting a discount of 111.5% of their nominal value;

NOTE 15 COMMON STOCK AND STOCK OPTION PLANS

The Company's share capital at December 31, 2018 consisted of 709,944,816 shares, each with a nominal value of €0.01 and 22,133,149 as of December 31, 2017 with a nominal value of €0.80 and 22,133,149 as of December 31, 2016 with a nominal value of €0.80.

Rights and privileges related to ordinary shares

Ordinary shares give right to dividend. Ordinary shares registered held for more than two years give a double voting right.

Dividends may be distributed from the statutory retained earnings, subject to the requirements of French law and the Company's articles of incorporation.

Retained earnings available for distribution amounted to €1,757.8 million (US$2,012.6 million) at December 31, 2018. We did not pay any dividend during the years ended December 31, 2018, 2017 and 2016.

Common stock and Warrants 2018

Common stock operations for 2018 were:

- a reduction of the nominal value of each share from €0.80 to €0.01 (refer to note 2 — "Significant events" for more information),
- the issuance on February 21, 2018 of (refer to note 2 – "Significant events" for more information):
  - 71,932,731 shares of the Company (the "New Shares") each with one share purchase warrant (the "Warrants #2" and together with the New Shares, the "ABSA"), all of which were subscribed by holders of preferential subscription rights. The final gross proceeds amounted to €112 million;
  - 35,311,528 new shares (the "Creditor Shares 1") resulting from the equitization of the Convertible Bonds;
  - 449,197,594 new shares (the "Creditor Shares 2") resulting from the equitization of the Senior Notes;
  - 22,133,149 warrants allocated to the shareholders of CGG (the "Warrants #1");
  - 113,585,276 warrants in favor of the subscribers to the Second Lien Notes (the "Warrants #3");
  - 7,099,079 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Coordination Warrants");
  - 10,648,619 warrants allocated to the members of the ad hoc committee of holders of Senior Notes (the "Backstop Warrants").

Following the issuance of New Shares, Creditor Shares 1 and Creditor Shares 2, the Company's share capital as of February 21, 2018 amounted to €5,785,750.02, divided into 578,575,002 shares with a nominal value of €0.01 per share.

The exercise of warrants between February 21, 2018 and December 31, 2018 is as follows:

	Warrants #1	Warrants #2	Warrants #3	Coordination Warrants	Backstop Warrants
Number of warrants issued	22,133,149	71,932,731	113,585,276	7,099,079	10,648,619
Number of warrants exercised or lapsed	32,590	33,696	113,585,276	7,099,079	10,648,619
Number of warrants remaining	22,100,559	71,899,035	0	0	0
Exercise ratio	3 Warrants #1 for 4 new shares	3 Warrants #2 for 2 new shares	1 Warrant #3 for 1 new share	1 Coordination Warrant for 1 new share	1 Backstop Warrant for 1 new share
Exercise price	3.12 euros per new share	4.02 euros per new share	0.01 euro per new share	0.01 euro per new share	0.01 euro per new share
Maximum number of shares to be issued upon exercise of the warrants (subject to adjustments)	29,477,536	47,955,154	113,585,276	7,099,079	10,648,619
Number of shares issued	43,452	22,464	113,556,200	7,099,079	10,648,619
Number of shares to be issued	29,434,084	47,932,690	0	0	0
Expiry date of the warrants	February 21, 2022	February 21, 2023	August 21, 2018	August 21, 2018	August 21, 2018

Issued shares 2016

CGG increased its share capital through the distribution of preferential subscription rights to existing shareholders launched on January 13, 2016. The final gross proceeds amounted to €350,589,080.16, corresponding to the issuance of 531,195,576 new shares. The net proceeds of the issuance amounted to €337 million (or US$367.5 million) and were used to reinforce the shareholders' equity of CGG and improve its liquidity as it finances its Transformation Plan.

The transaction was fully underwritten (excluding the Bpifrance Participations and IFP Energies Nouvelles subscription commitments) by a syndicate of banks. The fees and costs related to this transaction amounted to €13 million (US$14 million).

The listing of the new shares on the regulated market of Euronext Paris (Segment B) on the same line as the existing shares (FR0000120164) took place on February 5, 2016. As from that date, the share capital of CGG was composed of 708,260,768 shares with a nominal value of €0.40 each, for a total nominal share capital of €283,304,307.20.

For information on our February 21, 2018 capital increase, please refer to note 2.

Reverse stock split 2016

The Company carried out on July 20, 2016 the reverse stock split that the Combined General Shareholders' Meeting approved on May 27, 2016. All shareholders received one new share (with all rights pertaining to shares), in exchange for 32 former shares. The first share price on July 20, 2016 was calculated on the basis of the last share price traded on July 19, 2016 (€0.69) multiplied by 32.

The listing of the new shares on the regulated market of Euronext Paris (Segment B) on a new line (FR0013181864) took place on July 20, 2016. As from that date, the share capital of CGG was composed of 22,133,149 shares with a nominal value of €12.80 each, for a total nominal share capital of €283,304,307.20.

Change of nominal value of ordinary shares 2016

The Company carried out on August 11, 2016 the change of nominal value of ordinary shares that the Combined General Shareholders' Meeting approved on May 27, 2016. The Company's share capital was reduced by €265,597,788 (or US$304.1 million at historical exchange rate) to bring it down from €283,304,307.20 to €17,706,519 (or US$20.3 million) by reducing the nominal value of the Company's shares after realization of the reverse split from €12.80 to €0.80.

The amount of €265,597,788, corresponding to the share capital reduction, was allocated in full to the "additional paid in capital" account.

Stock options

Pursuant to various resolutions adopted by the Board of Directors, the Group has granted options to purchase Ordinary Shares to certain employees, Executive Officers and Directors of the Group.

On March 24, 2011, the Board of Directors allocated:

- 964,363 stock options to 364 beneficiaries pursuant to a shareholders' resolution. The exercise price of the stock options is €25.48. The stock options expire on March 24, 2019. Rights to these options vest by one-third during each of the first three years of the plan;
- 66,667 stock options to the Chairman and 133,333 stock options to the Chief Executive Officer. Their exercise price is €25.48. Rights to these options vest by one-third during each of the first three years of the plan. Such vesting is subject to performance conditions based on the fulfillment of one of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index; or
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chairman and of the Chief Executive Officer.

The exercise price of each option is the average market value of the share during the 20-day period ending the day before the date the option is allocated.

On June 26, 2012, the Board of Directors allocated:

- 590,625 stock options to certain employees. Their exercise price is €18.77. The options vest in three batches, in June 2014 (for 50% of the options allocated), June 2015 (for 25% of the options allocated) and June 2016 (for 25% of the options allocated). The options have an eight-year duration.
- 420,000 stock options to the Executive Committee. Their exercise price is €18.77. The options vest in three batches, in June 2014 (for 50% of the options allocated), June 2015 (for 25% of the options allocated) and June 2016 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Executive Committee members;
  - A share price performance objective relative to the share price increase over the vesting period.
- 200,000 stock options to the Chief Executive Officer and 100,000 to each of the Corporate Officers. Their exercise price is €18.77. The options vest in three batches, in June 2014 (for 50% of the options allocated), June 2015 (for 25% of the options allocated) and June 2016 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chief Executive Officer and Corporate Officers;
  - A share price performance objective relative to the share price increase over the vesting period.

The exercise price of each option is the average market value of the share during the 20-day period ending the day before the date the option is allocated.

On June 24, 2013, the Board of Directors allocated:

- 1,062,574 stock options to certain employees. Their exercise price is €18.47. The options vest in three batches, in June 2015 (for 50% of the options allocated), June 2016 (for 25% of the options allocated) and June 2017 (for 25% of the options allocated). The options have an eight-year duration.
- 200,000 stock options to the Chief Executive Officer and 100,000 to each of the Corporate Officers. Their exercise price is €18.47. The options vest in three batches, in June 2015 (for 50% of the options allocated), June 2016 (for 25% of the options allocated) and June 2017 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chief Executive Officer and Corporate Officers;
  - A share price performance objective relative to the share price increase over the vesting period.
- 180,000 stock options to the other Corporate Committee members. Their exercise price is €18.47. The options vest in three batches, in June 2015 (for 50% of the options allocated), June 2016 (for 25% of the options allocated) and June 2017 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Corporate Committee members;
  - A share price performance objective relative to the share price increase over the vesting period.

The exercise price of each option is the average market value of the share during the twenty-day period ending the day before the date the option is allocated.

On June 26, 2014, the Board of Directors allocated:

- 1,135,843 stock options to certain employees. Their exercise price is €10.29. The options vest in three batches, in June 2016 (for 50% of the options allocated), June 2017 (for 25% of the options allocated) and June 2018 (for 25% of the options allocated). The options have an eight-year duration.
- 200,000 stock options to the Chief Executive Officer and 100,000 to each of the Corporate Officers. Their exercise price is €10.29. The options vest in three batches, in June 2016 (for 50% of the options allocated), June 2017 (for 25% of the options allocated) and June 2018 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chief Executive Officer and Corporate Officers;
  - A share price performance objective relative to the share price increase over the vesting period.
- 120,000 stock options to the other Corporate Committee members. Their exercise price is €10.29. The options vest in three batches, in June 2016 (for 50% of the options allocated), June 2017 (for 25% of the options allocated) and June 2018 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - A share price performance objective relative to the share price considering the SBF 120 index;
  - A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Corporate Committee members;
  - A share price performance objective relative to the share price increase over the vesting period.

The exercise price of each option is the average market value of the share during the 20-day period ending the day before the date the option is allocated.

On June 25, 2015, the Board of Directors allocated:

- 1,168,290 options to certain employees. Their exercise price is €6.01. The options vest in three batches, in June 2017 (for 50% of the options allocated), June 2018 (for 25% of the options allocated) and June 2019 (for 25% of the options allocated). The options have an eight-year duration.
- 220,600 options to the Chief Executive Officer and 111,000 to each of the Corporate Officers. Their exercise price is €6.01. The options vest in three batches, in

June 2017 (for 50% of the options allocated), June 2018 (for 25% of the options allocated) and June 2019 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:

- » A share price performance objective relative to the share price considering the SBF 120 index;
- » A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
- » A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chief Executive Officer and Corporate Officers;
- » A share price performance objective relative to the share price increase over the vesting period.

- 159,000 options to the other Corporate Committee members. Their exercise price is €6.01. The options vest in three batches, in June 2017 (for 50% of the options allocated), June 2018 (for 25% of the options allocated) and June 2019 (for 25% of the options allocated). Such vesting is subject to performance conditions. The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - » A share price performance objective relative to the share price considering the SBF 120 index;
  - » A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - » A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Corporate Committee members;
  - » A share price performance objective relative to the share price increase over the vesting period.

The exercise price of each option is the average market value of the share during the twenty-day period ending the day before the date the option is allocated.

On June 23, 2016, the Board of Directors allocated:

- 4,126,368 options to certain employees. Their exercise price is €0.68. The options vest in three batches, in June 2018 (for 50% of the options allocated), June 2019 (for 25% of the options allocated) and June 2020 (for 25% of the options allocated). The options have an eight-year duration.
- 882,400 options to the Chief Executive Officer and 444,000 to each of the Corporate Officers. Their exercise price is €0.68. The options vest in three batches, in June 2018 (for 50% of the options allocated), June 2019 (for 25% of the options allocated) and June 2020 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - » A share price performance objective relative to the share price considering the SBF 120 index;
  - » A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - » A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Chief Executive Officer and Corporate Officers;
  - » A share price performance objective relative to the share price increase over the vesting period.
- 318,080 options to the other Corporate Committee members. Their exercise price is €0.68. The options vest in three batches, in June 2018 (for 50% of the options allocated), June 2019 (for 25% of the options allocated) and June 2020 (for 25% of the options allocated). The options have an eight-year duration. Such vesting is subject to performance conditions based on the fulfillment of the following objectives:
  - » A share price performance objective relative to the share price considering the SBF 120 index;
  - » A share price performance objective relative to the ADS price considering the PHLX Oil Service Sector[SM] (OSX[SM]) index;
  - » A financial indicator in the form of an EBITDAS objective expressed in US dollars and related to the target for the annual variable part of compensation of the Corporate Committee members;
  - » A share price performance objective relative to the share price increase over the vesting period.

The exercise price of each option is the average market value of the share during the twenty-day period ending the day before the date the option is allocated.

On June 27, 2018, the Board of Directors allocated:

- 732,558 options to the Chief Executive Officer. Their exercise price is €2.15. The options vest in four batches, in June 2019 (for 25% of the options allocated), June 2020 (for 25% of the options allocated), June 2021 (for 25% of the options allocated) and June 2022 (for 25% of the options allocated). Such vesting is subject to performance condition related to CGG share price. The options have an eight-year duration.
- 1,141,088 options to the Executive Leadership members. Their exercise price is €2.15. The options vest in four batches, in June 2019 (for 25% of the options allocated), June 2020 (for 25% of the options allocated), June 2021 (for 25% of the options allocated) and June 2022 (for 25% of the options allocated). Such vesting is subject to performance conditions related to CGG share price. The options have an eight-year duration.

- 4,670,743 options to certain employees. Their exercise price is €2.15. The options vest in four batches, in June 2019 (for 25% of the options allocated), June 2020 (for 25% of the options allocated), June 2021 (for 25% of the options allocated) and June 2022 (for 25% of the options allocated). The options have an eight-year duration.

The exercise price of each option is the average market value of the share during the twenty-day period ending the day before the date the option is allocated.

On December 11, 2018, the Board of Directors allocated:

- 671,171 options to the Executive Leadership members. Their exercise price is €1.39. The options vest in four batches, in June 2019 (for 25% of the options allocated), June 2020 (for 25% of the options allocated), June 2021 (for 25% of the options allocated) and June 2022 (for 25% of the options allocated). Such vesting is subject to performance conditions related to CGG share price. The options have a seven-year and 7 months duration.

Information related to options outstanding at December 31, 2018 is summarized below:

Date of Board of Directors' Resolution	**Options granted**	**Options granted after capital operations[a]**	**Options outstanding at Dec. 31, 2018 [b] [c] [d] [e]**	**Exercise price per share (€) [b] [c] [d] [e]**	**Expiration date**	**Remaining duration**
March 24, 2011	1,164,363	117,094	96,216	253.30	March 24, 2019	2.7 months
June 26, 2012	1,410,625	141,860	48,554	186.62	June 26, 2020	17.9 months
June 24, 2013	1,642,574	156,871	70,870	193.27	June 24, 2021	29.8 months
June 26, 2014	1,655,843	158,139	79,755	107.66	June 26, 2022	41.9 months
June 25, 2015	1,769,890	169,031	95,908	62.92	June 25, 2023	53.8 months
June 23, 2016	6,658,848	531,281	326,266	8.52	June 23, 2024	65.8 months
June 28, 2018	6,544,389	6,544,389	6,071,936	2.15	June 28, 2026	90 months
Dec 11, 2018	671,171	671,171	671,171	1.39	June 28, 2026	90 months
Total	**21,517,703**	**8,489,836**	**7,460,676**			

(a) Options granted adjusted following 2012, 2016 and 2018 capital increases and 2016 reverse split

(b) Following the capital increase in October 2012, the stock options were adjusted as follows:

Date of stock options	**Adjustment of number of options as of October 23, 2012**	**Exercise price before adjustment per share (€)**	**Adjusted exercise price per share (€)**
March 24, 2011	1,150,636	25.48	24.21
June 26, 2012	1,483,424	18.77	17.84

(c) Following the capital increase in February 2016, the stock options were adjusted as follows:

Date of stock options	**Adjustment of number of options as of February 29, 2016**	**Exercise price before adjustment per share (€)**	**Adjusted exercise price per share (€)**
March 24, 2011	1,287,848	24.21	20.21
June 26, 2012	1,061,569	17.84	14.89
June 24, 2013	1,495,770	18.47	15.42
June 26, 2014	1,782,127	10.29	8.59
June 25, 2015	1,998,861	6.01	5.02

(d) Following the reverse split in July 2016, the stock options were adjusted as follows:

Date of stock options	**Adjustment of number of options as of July 20, 2016**	**Exercise price before adjustment per share (€)**	**Adjusted exercise price per share (€)**
March 24, 2011	40,167	20.21	646.72
June 26, 2012	20,766	14.89	476.48
June 24, 2013	43,238	15.42	493.44
June 26, 2014	49,660	8.59	274.88
June 25, 2015	63,013	5.02	160.64
June 23, 2016	208,089	0.68	21.76

(e) Following the capital increase in February 2018, the stock options were adjusted as follows:

Date of stock options	**Adjustment of number of options as of February 21, 2018**	**Exercise price before adjustment per share (€)**	**Adjusted exercise price per share (€)**
March 24, 2011	98,064	646.72	253.30
June 26, 2012	50,436	476.48	186.62
June 24, 2013	78,892	493.44	193.27
June 26, 2014	105,711	274.88	107.66
June 25, 2015	122,189	160.64	62.92
June 23, 2016	471,856	21.76	8.52

A summary of the Company's stock option activity, and related information for the years ended December 31, 2018 follows:

	2018		**2017**		**2016**	
(weighted average exercise price in €)	**Number of options**	**Weighted average exercise price**	**Number of options**	**Weighted average exercise price**	**Number of options**	**Weighted average exercise price**
Outstanding-beginning of year	**424,383**	**239.72**	**510,837**	**235.86**	**10,043,037**	**16.14**
Granted	7,215,560	2.08	—	—	6,658,848	0.68
Adjustments followings the reverse split	—	—	—	—	(16,004,834)	235.79
Adjustments followings the capital increase	567,078	199.14	—	—	1,976,021	13.48
Exercised	—	—	—	—	—	—
Forfeited	(746,345)	30.73	(86,454)	216.91	(2,162,235)	274.26
Outstanding-end of year	**7,460,676**	**10.52**	**424,383**	**239.72**	**510,837**	**235.86**
Exercisable-end of year	530,459	116.19	205,418	443.16	209,618	450.25

The average price of CGG share was €1.94 in 2018, €2.76 in 2017, and €9.77 in 2016 after adjustment following the reverse stock split and the capital increase in 2018.

Performance units

Allocation plan dated June 23, 2016

On June 23, 2016, the Board of Directors implemented a performance units plan for a maximum amount of 2,566,880 performance units out of which 108,960 were allocated to the Chief Executive Officer, 49,600 were allocated to each of the Corporate Officers, 39,680 were allocated to the other Corporate Committee members and 2,269,440 were allocated to certain employees.

The performance units vest upon the expiry of a three-year period from the vesting date subject to a presence condition in the Group at the time of vesting and achievement of certain performance conditions. These performance conditions are based on the achievement of Group objectives related to the return on capital employed and statement of financial position structure along with achievement of the segments' financial objectives aligned with the Group strategic orientations over a three-year period.

The number of vested 2016 performance units is determined upon achievement of the Group objectives up to 60% of the global allocation. The balance will be acquired based on the achievement of the segments' objectives.

The valuation of each vested 2016 performance unit shall be equal to the average closing prices of the CGG share on Euronext over the five trading days prior to the vesting date. The vested performance units will be paid half in cash and half in existing CGG shares.

Allocation plan dated June 27, 2018

On June 27, 2018, the Board of Directors allocated 157,500 performance shares to the Chief Executive Officer, 242,841 performance shares to the Executive Leadership members, and 2,708,180 performance shares to certain employees.

The performance shares vest in two batches, in June 2020 (for 50% of the shares allocated) and June 2021 (for 50% of the shares allocated). The end of the acquisition period for the first batch of these performance shares is set at the latest of the two following dates: June 27, 2020 or the date of the Annual Shareholders' Meeting convened to approve the financial statements for fiscal year 2019, provided that the Board of Directors decides that the performance conditions set forth in the plan regulation have been fulfilled. The end of the acquisition period for the second batch of these performance shares is set at the latest of the two following dates: June 27, 2021 or the date of the Annual Shareholders' Meeting convened to approve the financial statements for fiscal year 2020, provided that the Board of Directors decides that the performance conditions set forth in the plan regulation have been fulfilled.

Allocation plan dated December 11, 2018

On December 11, 2018, the Board of Directors allocated 132,821 performance shares to the Executive Leadership members.

The performance shares vest in two batches, in June 2020 (for 50% of the shares allocated) and June 2021 (for 50% of the shares allocated). The end of the acquisition period for the first batch of these performance shares is set at the latest of the two following dates: June 27, 2020 or the date of the Annual Shareholders' Meeting convened to approve the financial statements for fiscal year 2019, provided that the Board of Directors decides that the performance conditions set forth in the plan regulation have been fulfilled. The end of the acquisition period for the second batch of these performance shares is set at the latest of the two following dates: June 27, 2021 or the date of the Annual Shareholders' Meeting convened to approve the financial statements for fiscal year 2020, provided that the Board of Directors decides that the performance conditions set forth in the plan regulation have been fulfilled.

Compensation cost on stock options, performance shares and units

The following table lists the assumptions used to value the 2016 and 2018 options plans, the 2016 and 2018 performance units allocation plan according to IFRS 2. The Group uses the Black & Scholes model.

	Options granted	Volatility (1)	Risk-free rate	Exercise price per share (€)	Estimated Maturity (years)	Fair value per share at the grant date (€)	Dividends yields
2016 stock options plan	6,658,848	47%	-0.31%	0.68	4	0.23	0.0%
June 2018 stock options plan	6,544,389	56%	0 %	2.15	2.5	0.63	0.0%
December 2018 stock options plan	671,171	56%	0 %	1.39	2.5	0.57	0.0%

	Performance shares granted	Achievement of performance Conditions (2)	Fair value per share at the grant date (€) (3)	Dividends yields
2016 performance units allocation plan	2,566,880	0%	0.67	0.0%
June 2018 performance units allocation plan	3,108,521	100%	2.15	0.0%
December 2018 performance units allocation plan	132,821	100%	1.39	0.0%

(1) Corresponds to the average of restated historical volatility and implied volatility.
(2) Estimated.
(3) Corresponds to CGG share price at the date of allocation

According to IFRS 2, fair value of stock options and performance shares and units granted since November 7, 2002 must be recognized as an expense over the life of the plan. Detail of this expense is as follows:

	Year					
	IFRS 2 total expense			Of which for the executive managers of the Group		
(In millions of US$)	2018	2017 (restated)	2016 (restated)	2018	2017 (restated)	2016 (restated)
2012 stock options plan	—	—	0.2	—	—	0.1
2013 stock options plan	—	0.1	0.2	—	—	—
2014 stock options plan	0.1	0.2	0.9	—	—	0.1
2015 stock options plan	0.1	0.3	0.8	—	0.1	0.2
2016 stock options plan	0.2	0.3	0.2	0.1	0.1	—
2018 stock options plans	0.9	—	—	0.3	—	—
2014 performance units plan — paid in shares	—	—	(0.4)	—	—	(0.1)
2015 performance units plan — paid in shares	—	(0.3)	0.1	—	(0.1)	—
2016 performance units plan — paid in shares	(0.2)	—	0.1	—	—	—
2018 performance units plans — paid in shares	1.4	—	—	0.2	—	—
Recognized expense from equity-settled share based payment transactions	**2.5**	**0.6**	**2.1**	**0.6**	**0.1**	**0.3**

NOTE 16 PROVISIONS

	December 31, 2018						
(In millions of US$)	Balance at beginning of year	Additions	Deductions (used)	Deductions (unused)	Unwinding of the discount	Others [a]	Balance at end of period
Provisions for restructuring costs	32.6	138.7	(44.6)	(2.0)	—	(0.8)	123.9
Provisions for onerous contracts	16.2	25.1	(16.6)	(0.5)	0.1	6.8	31.1
Provisions for litigations	0.9	0.1	(0.1)	—	—	—	0.9
Provisions for tax contingencies	—	3.5	—	—	—	—	3.5
Other provisions related to contracts	8.2	6.7	(1.1)	(0.5)	—	(0.3)	13.0
Provisions for demobilization costs	0.4	—	(0.4)	—	—	—	—
Total current provisions	**58.3**	**174.1**	**(62.8)**	**(3.0)**	**0.1**	**5.7**	**172.4**
Provisions for cash-settled share-based payment arrangements (see note 15)	0.1	0.2	—	—	—	—	0.3
Retirement indemnity provisions	62.7	4.5	(11.8)	(8.0)	—	(11.2)	36.2
Provisions for tax contingencies	8.3	1.8	(0.7)	—	—	(0.2)	9.2
Provisions for onerous contracts	18.2	2.4	—	(0.5)	0.1	(7.5)	12.7
Customers Guarantee provisions	1.8	2.6	(1.7)	—	—	(0.2)	2.5
Provisions for customs and other contingencies	30.5	13.2	(3.7)	—	—	(5.0)	35.0
Total non-current provisions	**121.6**	**24.7**	**(17.9)**	**(8.5)**	**0.1**	**(24.1)**	**95.9**
Total provisions	**179.9**	**198.8**	**(80.7)**	**(11.5)**	**0.2**	**(18.4)**	**268.3**

(a) Includes the effects of exchange rates changes, variations in scope (see note 2), reclassification, and gain (loss) on actuarial changes.

Provision for restructuring costs

In 2018, we recognized provisions for restructuring costs as part of our Group transformation plan. They mainly included redundancy costs and facilities exit costs (see note 5 and note 22).

In 2017, the provisions for restructuring costs mainly included professional fees linked to the US Chapter 11 and French Safeguard procedures (see note 22).

Provision for onerous contract (short term and long term)

In 2018, we recognized additional provisions for onerous contracts following Group decision to redeliver Champion vessel. A specific provision of US$(126.3) million linked to the reduction of our operating fleet from 5 to 3 vessels is booked in "Liabilities directly associated with the assets classified as held for sale" (see note 5).

In 2017, we used and recognized additional provisions for onerous contracts (see note 22).

Retirement indemnity provisions

The Group main defined benefit pension plans are in France and in the UK.

In addition, a supplemental pension and retirement plan was implemented in December 2004 for the members of the Group's Management Committee and members of the Management Board of Sercel Holding. A contribution amounting to US$5.7 million was paid in 2018. No contribution was paid in 2016 and 2017.

The Group records retirement indemnity provisions based on the following actuarial assumptions:

- historical staff turnover and standard mortality schedule;
- age of retirement between 60 and 66 years old in France;
- actuarial rate and average rate of increase in future compensation;
- taxes on supplemental pension and retirement plan;

As of December 31, 2018, the net liability for these plans amounted to US$36.2 million.

The status of the retirement indemnity plans is as follows:

	December 31,		
(In millions of US$)	2018	2017	2016
Amount recognized in the statement of financial position			
Present value of the obligation [a]	109.2	152.4	138.9
Fair value of plan assets	(73.0)	(89.7)	(79.4)
Deficit (surplus) of funded plans	**36.2**	**62.7**	**59.5**
Net liability (asset) recognized in the statement of financial position	**36.2**	**62.7**	**59.5**
Amounts recognized in the income statement			
Service cost	3.0	3.1	4.4
Interest cost (income)	1.7	1.1	1.3
Effects of curtailments/settlements	(11.1)	—	(5.7)
Payroll tax	—	—	—
Net periodic expense (profit)	**(6.4)**	**4.2**	—
Movements in the net liability recognized in the statement of financial position			
Net liability at January 1	62.7	59.5	57.9
Expense as above	(6.4)	4.2	—
Actuarial (gains)/losses recognized in other comprehensive income [b]	(8.8)	(6.0)	9.2
Contributions paid	(7.8)	(0.3)	(1.4)
Benefits paid by the Company	(1.1)	(1.8)	(1.5)
Consolidation scope entries and changes in exchange rates	(2.4)	7.1	(4.7)
Other	—	—	—
Net liability at December 31	**36.2**	**62.7**	**59.5**
Change in benefit obligation			
Benefit obligation at January 1	**152.4**	**138.9**	**139.1**
Payroll tax adjustment	—	—	—
Current service cost	3.0	3.1	4.4
Contributions paid	—	—	0.3
Interest cost	3.6	3.3	4.0
Past service cost	—	—	—
Benefits paid from plan	(11.4)	(5.7)	(2.8)
Actuarial (gains)/losses recognized in other comprehensive income	(11.8)	(2.2)	19.2
Effects of curtailments/settlements	(11.1)	—	(5.7)
Consolidation scope entries and changes in exchange rates	(15.5)	15.0	(19.6)
Other	—	—	—
Benefit obligation at December 31	**109.2**	**152.4**	**138.9**
Change in plan assets			
Fair value of plan assets at January 1	**89.7**	**79.4**	**81.2**
Interest income	1.9	2.2	2.7
Contributions paid	7.8	0.3	1.7
Benefits paid from plan	(10.3)	(3.9)	(1.3)
Actuarial gains/(losses) recognized in other comprehensive income	(3.0)	3.8	10.0
Effects of curtailments/settlements	—	—	—
Consolidation scope entries and changes in exchange rate	(13.1)	7.9	(14.9)
Other	—	—	—

(In millions of US$)	December 31, 2018	2017	2016
Fair value of plan assets at December 31 [(c)]	**73.0**	**89.7**	**79.4**
Key assumptions used in estimating the Group's retirement obligations are:			
Discount rate [(d)]	1.75%	1.50%	1.50%
Average rate of increase in future compensation [(e)]	2.49%	2.42%	2.41%

(a) In 2018 the obligation amounts to US$109.3 million of which US$23.1 million for defined benefit plans not covered (US$33.2 million in 2017 and US$29.3 million in 2016). The average duration of the defined benefit plan obligation at the end of the reporting period is 16.8 in 2018, 17.6 years in 2017 and 19.0 years in 2016.

(b) Other comprehensive income

Cumulative actuarial losses recognized in other comprehensive income amount to US$15.1 million as of December 31, 2018.

Changes in the defined benefit obligation and fair value of plan assets are, as follows:

(In millions of US$)	December 31, 2018	2017	2016
Amount recognized in the other comprehensive income			
Experience adjustment	(4.5)	3.2	(2.4)
Actuarial changes arising from changes in demographic assumptions	(0.4)	(2.2)	0.8
Actuarial changes arising from changes in financial assumptions	(6.9)	(3.2)	20.8
Return on plan assets (excluding amounts included in net interest expense)	3.0	(3.8)	(10.0)
Sub-total included in the other comprehensive income	**(8.8)**	**(6.0)**	**9.2**

(c) Plan assets

The major categories of plan assets as a percentage of the fair value of total plan assets are as follows:

	December 31, 2018	2017	2016
Equity securities	42%	51%	49%
Debt securities	23%	18%	18%
Real estate	8%	7%	7%
Other	27%	24%	26%

(d) Discount rate

The discount rate for entities belonging to the "euro zone" is 1.75%. The discount rate is determined by reference to the yield on private investment grade bonds (AA), using the Iboxx index.

The discount rate used for the United Kingdom is 3.30%.

An increase of 0.25bps of the discount rate would decrease the defined benefit plan ("DBO") by US$3.9 million, and a decrease of the discount rate of 0.25bps would increase the DBO by US$4.3 million.

A variation of 0.25bps of the discount rate would have no significant impacts on Service Cost and on Interest Cost (calculated impact is within US$0.1 million).

(e) Increase in future compensation

An increase of 0.25bps of the average rate would increase the future compensation by US$0.8 million, and a decrease of the average rate of 0.25bps would decrease the future compensation by US$0.8 million.

A variation of 0.25bps of the average rate would have no significant impacts on Service Cost and on Interest Cost (calculated impact is within US$0.1 million).

NOTE 17 OTHER NON-CURRENT LIABILITIES

Detail of other non-current liabilities is as follows:

(In millions of US$)	December 31, 2018	2017	2016
Research and development subsidies	0.3	0.6	0.9
Profit sharing scheme	4.7	8.7	12.7
Other non-current liabilities	8.1	8.6	7.8
Other non-current liabilities	**13.1**	**17.9**	**21.4**

NOTE 18 CONTRACTUAL OBLIGATIONS, COMMITMENTS AND CONTINGENCIES

Status on contractual obligations

(In millions of US$)	December 31, 2018	2017	2016
Long-term debt obligations [1]	1,799.3	2,953.1	3,284.8
Finance lease obligations	26,1	35.6	39.4
Bareboat agreements [2]	365.4	460.2	533.9
Operating leases obligations	172.7	190.9	234.7
Total obligations	**2,363.5**	**3,639.8**	**4,092.8**

(1) Refer to note 2 — "Significant events" for information on the impact on financial debt of the financial restructuring completed on February 21, 2018.

(2) As of December 31, 2018, the aggregate amount of our off balance sheet commitment for bareboat charters for our fleet is US$365.4 million, out of which US$358.4 million corresponded to the vessels operated through our Global Seismic Shipping AS JV, and US$7.0 million corresponded to vessels that we have already coldstacked.
These amounts are disclosed without considering provisions for onerous contracts or reclassification in assets held for sale and discontinued operations.

The following table presents payments in future periods relating to contractual obligations as of December 31, 2018:

(In millions of US$)	Payments due by period: Less than 1 year	2-3 years	4-5 years	After 5 years	Total
Long-term debt obligations:					
— Repayments: fixed rates	0.4	0.6	621.2	4.7	626.9
— Repayments: variables rates [a]	—	—	—	740.9	740.9
— Bonds and facilities interests	83.3	175.2	161.5	11.5	431.5
Total Long-term debt obligations	**83.7**	**175.8**	**782.7**	**757.1**	**1,799.3**
Finance leases:					
— Finance lease Obligations: fixed rates	7.4	14.9	3.8	—	26.1
— Finance lease Obligations: variables rates [a]	—	—	—	—	—
Total Finance lease obligations	**7.4**	**14.9**	**3.8**	**—**	**26.1**
Bareboat agreements	**40.7**	**85.1**	**91.3**	**148.3**	**365.4**
Other operating lease agreements	**43.4**	**53.9**	**43.7**	**31.7**	**172.7**
Total Contractual Obligations [b]	**175.2**	**329.7**	**921.5**	**937.1**	**2,363.5**

(a) Payments are based on the variable rates applicable as of December 31, 2018.
(b) Payments in foreign currencies are converted in US$ at December 31, 2018 exchange rates.

Contractual obligations — finance leases

The Group leases a building under a finance lease agreement that expires in 2022.

The following table presents reconciliation between finance lease obligations and finance lease debts as of December 31, 2018:

(In millions of US$)	Less than 1 year	1-5 years	After 5 years	Total
Finance lease Obligations	**7.4**	**18.7**	**—**	**26.1**
Discounting	(2.0)	(4.2)	—	(6.2)
Headquarters purchase option	—	30.1	—	30.1
Finance lease debt (see note 13)	**5.4**	**44.6**	**—**	**50.0**

Contractual obligations — operating leases

Operating lease agreements relate primarily to bareboat charter agreements for seismic vessels, offices and computer equipment.

Guarantees

	December 31,		
(In millions of US$)	2018	2017	2016
Operations			
Guarantees issued in favor of clients (guarantees issued by the Company to mainly support bids made at the subsidiaries level)	352.6	403.1	534.4
Other guarantees and commitments issued (guarantees issued by the Company on behalf of subsidiaries and affiliated companies in favor of customs or other governmental administrations)	13.2	111.8	203.1
Financing			
Guarantees issued in favor of banks (mainly to support credit facilities)	29.5	22.3	—
Total	**395.3**	**537.2**	**737.5**

The maturity of the guarantees and commitments is as follows:

	Due date				
(In millions of US$)	Less than 1 year	2-3 years	4-5 years	After 5 years	Total
Operations					
Guarantees issued in favor of clients	224.7	71.1	51.6	5.2	352.6
Other guarantees and commitments issued	8.8	1.4	0.6	2.4	13.2
Financing					
Guarantees issued in favor of banks	20.0	—	—	9.5	29.5
Total	**253.5**	**72.5**	**52.2**	**17.1**	**395.3**

Others

The Group has no off-balance sheet obligations under IFRS that are not described above.

Legal proceedings, claims and other contingencies

From time to time we are involved in legal proceedings arising in the normal course of our business. We do not expect that any of these proceedings, either individually or in the aggregate, will result in a material adverse effect on our consolidated financial statements.

NOTE 19 REVENUE

Disaggregation of revenues

The following table disaggregates our operating revenues by major sources for the period ended December 31, 2018:

	December 31, 2018		
In millions of US$	GGR	Equipment	Consolidated Total
Multi-client prefunding	*215.6*	—	*215.6*
Multi-client after sales	*301.8*	—	*301.8*
Total Multi-client	517.4	—	517.4
Geoscience	396.0	—	396.0
Equipment, Land equipment	—	*214.6*	*214.6*
Equipment, Marine equipment	—	*91.6*	*91.6*
Equipment, Downhole Gauges	—	*35.1*	*35.1*
Equipment, Non-Oilfield related	—	*9.5*	*9.5*
Total equipment	—	350.8	350.8
Internal revenues [1]	—	(36.8)	(36.8)
Total operating revenues before IFRS 15 impact	**913.4**	**314.0**	**1,227.4**
IFRS 15 impact on prefunding	(33.9)	—	(33.9)
Total Group operating revenues as reported	**879.5**	**314.0**	**1,193.5**

(1) Sale of equipment to the Contractual Data Acquisition segment which is classified as discontinued operations

Analysis by geographic area — *Analysis of operating revenues by location of customers*

(In millions of US$)	2018		2017 (restated)		2016 (restated)	
North America	244.2	20.5%	311.9	30.1%	302.6	31.4%
Central and South Americas	267.7	22.4%	215.1	20.8%	135.0	14.0%
Europe, Africa and Middle East	446.5	37.4%	362.2	35.0%	386.2	40.1%
Asia Pacific	235.1	19.7%	145.9	14.1%	139.5	14.5%
Total operating revenues	**1,193.5**	**100%**	**1,035.1**	**100%**	**963.3**	**100%**

Analysis of operating revenues by category

(In millions of US$)	2018		2017 (restated)		2016 (restated)	
Services rendered and royalties	587.5	49.2%	623.4	60.2%	672.3	69.8%
Sales of goods	292.7	24.5%	201.7	19.5%	171.5	17.8%
After-sales on multi-client surveys	301.8	25.3%	200.3	19.4%	111.1	11.5%
Leases	11.5	1.0%	9.7	0.9%	8.4	0.9%
Total operating revenues	**1,193.5**	**100%**	**1,035.1**	**100%**	**963.3**	**100%**

In 2018, the Group's two most significant customers accounted for 7.1% and 6.3% of the Group consolidated revenues compared with 11.0% and 8.3% in 2017 and 8.4% and 7.3% in 2016.

Contracts balances

The contracts balances, including the impact of IFRS 15 are presented below:

In millions of US$	Balance as of December 31, 2018	Balance as of January 1, 2018
Receivables	**392.1**	**361.9**
Unbilled revenues	128.1	147.3
Total contracts assets	**128.1**	**147.3**
Advance billing	(14.1)	(7.4)
Deferred revenues	(194.8)	(178.5)
Contracts liabilities	**(208.9)**	**(185.9)**

The level of deferred revenues is a direct consequence of the impact of IFRS 15 as described in note 1.3. Compared to the view excluding IFRS 15 (see below), the prefunding revenues not recognized before delivery of the final data increase the deferred revenues balance (and decrease the unbilled revenues to a lesser extent).

Excluding IFRS 15 impact, the contracts balances would have been the following:

In millions of US$	Balance as of December 31, 2018	Balance as of December 31, 2017
Receivables	**392.1**	**361.9**
Unbilled revenues	156.3	160.7
Total contracts assets	**156.3**	**160.7**
Advance billing	(14.1)	(7.4)
Deferred revenues	(56.4)	(49.7)
Contracts liabilities	**(70.5)**	**(57.1)**

The revenues generated during the period ended December 31, 2018 from contract liabilities balances as of January 1, 2018 amount to US$140.7 million.

The revenues generated during the period ended December 31, 2018 from performance obligations satisfied (or partially satisfied) prior to January 1, 2018 amount to US$81.1 million.

Backlog — Transaction price allocated to remaining performance obligations

The aggregate amount of the transaction price allocated to the performance obligations that are unsatisfied or partially unsatisfied (i.e. the contractual backlog) as of December 31, 2018 equaled US$575.5 million for continuing operations. Out of this amount, the Group expects to recognize US$491.8 million in 2019 and US$83.7 million in 2020 and beyond for continuing operations. These amounts include multi-client prefunding revenues recognized at delivery. If the revenues from prefunding were recognized over time according to the historical method (excluding IFRS 15 adjustments), the aggregate amount would have been US$408.8 million, out of which US$325.6 million would have been expected in 2019 and US$83.2 million would have been expected in 2020 for continuing operations.

Assets recognized from costs to obtain or fulfill a contract

In millions of US$	Balance as of December 31, 2018	Balance as of December 31, 2017
Assets from costs to obtain a contract	—	—
Assets from costs to fulfill a contract	—	0.9
Total	**—**	**0.9**

The Group has no cost falling into the definition of a cost to obtain a contract.

The costs to fulfill a contract can be the costs of a seismic vessel transit towards a survey area or the mobilization costs of a land crew, provided these costs are expected to be recovered (i.e. contracts with positive margin).

NOTE 20 ANALYSIS BY OPERATING SEGMENT

Group organization

Strategic Plan, changed segment presentation and discontinued operations

Until the last quarter of 2018, we organized our activities in four segments for financial reporting: (i) Contractual Data Acquisition, (ii) Geology, Geophysics & Reservoir ("GGR"), (iii) Equipment and (iv) Non-Operated Resources.

In November 2018, we announced a new strategy for our group that includes the transition to an asset-light model by reducing CGG's exposure to the data acquisition business, which has been impacted over the years by structural industry overcapacity, lack of differentiation, commodity pricing and a heavy fixed cost base. We plan to carry out the following strategic changes in compliance with the undertakings and requirements in the CGG safeguard plan and other applicable local requirements:

- In Marine:
  - Adjust to a three-vessel fleet in 2019; and
  - Find in 2019 a strategic partnership to cost efficiently operate the vessels.
- In Land: exit the market in 2019.
- In Multi-Physics: activity for sale and monetize in 2019.
- Monetize equity stakes in Argas and SBGS joint ventures in 2019.
- Implement the appropriate adjustments to general & administrative expenses and support costs to adapt to our new size and footprint. We will seek to focus on cash generation, optimize our capital structure and reduce our cost of capital.

As a result of these strategic announcements and actions undertaken afterwards, our Contractual Data Acquisition segment and part of our Non-Operated Resources segment are now presented as discontinued operations and assets held for sale in accordance with IFRS 5. This presentation applies for the first time as of and for the year ended December 31, 2018, and we have applied it retroactively as of and for the years ended December 31, 2016 and 2017. The discussion in this section is based on the new presentation, as applied retroactively to prior periods.

The costs of implementation of the progressive exit of Acquisition businesses in 2019 as described above, referred to as the "CGG 2021 Plan" are reported in the related Contractual Data Acquisition business lines.

Description of our segments

Financial information by segment is reported in accordance with our internal reporting system and provides internal segment information that is used by the chief operating decision maker to manage and measure performance. A summary of our segments is set out below.

CONTINUING OPERATIONS:

- GGR

This operating segment comprises the Geoscience business lines (processing and imaging of geophysical data, reservoir characterization, geophysical consulting and software services, geological data library and data management solutions) and the multi-client business line (development and management of seismic surveys that we undertake and license to a number of clients on a non-exclusive basis. Both activities regularly combine their offerings, generating overall synergies between their respective activities. The GGR segment includes the costs, industrial capital expenditures and capital employed related to the vessels dedicated to multi-client surveys.

- Equipment

This operating segment comprises our manufacturing and sales activities for seismic equipment used for data acquisition, both on land and marine. The Equipment segment carries out its activities through our subsidiary Sercel.

DISCONTINUED OPERATIONS:

- Contractual Data Acquisition. This operating segment comprises the following business lines:
  - Marine: offshore seismic data acquisition undertaken by us on behalf of a specific client; and
  - Land and Multi-Physics: other seismic data acquisition undertaken by us on behalf of a specific client.
- NOR: As discussed further in the chapter 5.1 under the heading "Factors affecting our results of operations — Fixed costs, fleet reduction and Transformation Plan", we started implementing our Transformation Plan in the first quarter of 2014 to address the cyclical trough in the seismic market, and as market conditions deteriorated further we implemented additional steps, ultimately downsizing our marine fleet to five vessels. As a result, part of our owned vessels was not operated for a certain period of time. In April 2017, with the new ownership set up of our fleet, the non-operated vessels and their related costs (cold-stacking costs notably) were transferred to Global Seismic Shipping AS ("GSS"), in which we own a 50% stakes but which we do not consolidate. The costs of the non-operated Acquisition resources as well as the costs of the Transformation Plan linked to the downsizing of our Contractual Data Acquisition businesses are reported in the Discontinued Operations portion of this segment. The capital employed includes mainly the 50% share of CGG in Global Seismic Shipping (GSS) moved to Assets held for Sale, and the provisions related to the Transformation Plan.

As a complement to Operating Income, EBIT may be used by management as a performance indicator for segments because it captures the contribution to our results of the significant businesses that are managed through our joint ventures. We define EBIT as Operating Income plus our share of income in companies accounted for under the equity method.

We define EBITDAs as earnings before interest, tax, income from equity affiliates, depreciation, amortization net of amortization expense capitalized to multi-client, and share-based compensation cost. Share-based compensation includes both stock options and shares issued under our share allocation plans. EBITDAs is presented as additional information because we understand that it is one measure used by certain investors to determine our operating cash flow and historical ability to meet debt service and capital expenditure requirements.

Inter-segment transactions are made at arm's length prices. They relate primarily to geophysical equipment sales made by the Equipment segment. These inter-segment revenues and the related earnings are eliminated in consolidation in the tables that follow under the column "Eliminations and other".

Operating Income and EBIT may include non-recurring items, which are disclosed in the reportable segment if material. General corporate expenses, which include Group management, financing, and legal activities, have been included in the column "Eliminations and other" in the tables that follow. The Group does not disclose financial expenses or financial revenues by segment because they are managed at the Group level.

Identifiable assets are those used in the operations of each segment. Unallocated and corporate assets consist of "investments and other financial assets" and "cash and cash equivalents" of our consolidated statement of financial position. The group does not track its assets based on country of origin.

Capital employed is defined as "total assets" excluding "cash and cash equivalents" less (i) "current liabilities" excluding "bank overdrafts" and "current portion of financial debt" and (ii) "non-current liabilities" excluding "financial debt".

The following tables also present operating revenues, Operating Income and EBIT by segment, and operating revenues by geographic area (by location of customers).

Analysis by segment

	2018						
In millions of US$, except for assets and capital employed in billions of US$	**GGR**	**Equipment**	**Eliminations and other**	**Segment figures**	**IFRS 15 adjustments**	**Non-recurring charges**	**Consolidated Total / IFRS figures**
Revenues from unaffiliated customers	913.4	314.0	—	1,227.4	(33.9)	—	1,193.5
Inter-segment revenues [(1)]	—	36.8	(36.8)	—	—	—	—
Operating revenues	**913.4**	**350.8**	**(36.8)**	**1,227.4**	**(33.9)**	**—**	**1,193.5**
Depreciation and amortization (excluding multi-client surveys)	(73.6)	(30.1)	(0.3)	(104.0)	—	(13.9)	(117.9)
Depreciation and amortization of multi-client surveys	(326.0)	—	—	(326.0)	(0.3)	(226.0)	(552.3)
Operating income [(2)]	**175.8**	**11.7**	**(45.2)**	**142.3**	**(34.2)**	**(287.8)**	**(179.7)**
EBITDAS	**557.8**	**42.1**	**(43.9)**	**556.0**	**(33.9)**	**(47.9)**	**474.2**
Share of income in companies accounted for under equity method	(1.2)	—	—	(1.2)		—	(1.2)
Earnings Before Interest and Tax [(2)]	**174.6**	**11.7**	**(45.2)**	**141.1**	**(34.2)**	**(287.8)**	**(180.9)**
Capital expenditures (excluding multi-client surveys) [(3)]	54.4	24.8	(1.2)	78.0	—	—	78.0
Investments in multi-client surveys, net cash	222.8	—	—	222.8	—	—	222.8
Capital employed [(4)]	**2.0**	**0.5**	**(0.1)**	**2.4**	**—**	**—**	**2.4**
Total identifiable assets [(4)]	**2.3**	**0.6**	**0.5**	**3.4**	**—**	**—**	**3.4**

(1) Sale of equipment to the Contractual Data Acquisition segment which is classified as discontinued operations

(2) For the year ended December 31, 2018, "non-recurring charges" included US$(226.0) million impairment of multi-client surveys (of which US$ 197 million on StagSeis survey), US$(30.1) million inventory write-off in Equipment division, and US$(13.9) million relating to other tangible and intangible assets impairment

For the year ended December 31, 2018, "eliminations and other" included US$(39.1) million of general corporate expenses and US$(5.0) million of intra-group margin.

(3) Capital expenditures included capitalized development costs of US$(33.1) million for the year ended December 31, 2018. "Eliminations and other" corresponded to the variance of suppliers of assets for the year ended December 31, 2018.

(4) Capital employed and identifiable assets related to discontinued operations are included under the column "Eliminations and other".

In millions of US$, except for assets and capital employed in billions of US$	2017 (Restated)						
	GGR	**Equipment**	**Eliminations and other**	**Segment figures**	**IFRS 15 adjustments**	**Non-recurring charges**	**Consolidated Total / IFRS figures**
Revenues from unaffiliated customers	819.6	215.5	—	1,035.1	—	—	1,035.1
Inter-segment revenues [1]	—	25.7	(25.7)	—	—	—	—
Operating revenues	**819.6**	**241.2**	**(25.7)**	**1,035.1**	**—**	**—**	**1,035.1**
Depreciation and amortization (excluding multi-client surveys)	(87.5)	(29.8)	(0.2)	(117.5)	—	—	(117.5)
Depreciation and amortization of multi-client surveys	(297.7)	—	—	(297.7)	—	—	(297.7)
Operating income [2]	**130.7**	**(35.9)**	**(46.5)**	**48.3**	**—**	**(106.2)**	**(57.9)**
EBITDAS	**486.0**	**(6.1)**	**(45.9)**	**434.0**	**—**	**(106.2)**	**327.8**
Share of income in companies accounted for under equity method	(0.4)	—	—	(0.4)	—	—	(0.4)
Earnings Before Interest and Tax [2]	**130.3**	**(35.9)**	**(46.5)**	**47.9**	**—**	**(106.2)**	**(58.3)**
Capital expenditures (excluding multi-client surveys) [3]	45.0	22.2	—	67.2	—	—	67.2
Investments in multi-client surveys, net cash	251.0	—	—	251.0	—	—	251.0
Capital employed [4]	**2.2**	**0.6**	**0.4**	**3.2**	**—**	**—**	**3.2**
Total identifiable assets [4]	**2.6**	**0.7**	**0.6**	**3.9**	**—**	**—**	**3.9**

(1) Sale of equipment to the Contractual Data Acquisition segment which is classified as discontinued operations and to the GGR segment

(2) For the year ended December 31, 2017, "non-recurring charges" included US$(93.7) million of professional fees mainly linked to the US Chapter 11 and French Safeguard procedures (see note 2 — Financial restructuring process); and US$(12.5) million of other costs related to our Transformation Plan.

For the year ended December 31, 2017, "eliminations and other" included US$(37.8) million of general corporate expenses and US$(8.7) million of intra-group margin.

(3) Capital expenditures included capitalized development costs of US$(31.8) million for the year ended December 31, 2017. "Eliminations and other" corresponded to the variance of suppliers of assets for the year ended December 31, 2017.

(4) Capital employed and identifiable assets related to discontinued operations are included under the column "Eliminations and other".

In millions of US$, except for assets and capital employed in billions of US$	2016 (Restated)						
	GGR	Equipment	Eliminations and other	Segment figures	IFRS 15 adjustments	Non-recurring charges	Consolidated Total / IFRS figures
Revenues from unaffiliated customers	784.0	179.3	—	963.3	—	—	963.3
Inter-segment revenues [1]	—	75.7	(75.7)	—	—	—	—
Operating revenues	**784.0**	**255.0**	**(75.7)**	**963.3**	**—**	**—**	**963.3**
Depreciation and amortization (excluding multi-client surveys)	(100.6)	(35.5)	(0.4)	(136.5)	—	(0.5)	(137.0)
Depreciation and amortization of multi-client surveys	(320.4)	—	—	(320.4)	—	(96.8)	(417.2)
Operating income [2]	**81.4**	**(41.9)**	**(69.8)**	**(30.3)**	**—**	**(116.3)**	**(146.6)**
EBITDAS	**460.4**	**(6.4)**	**(68.0)**	**386.0**	**—**	**(19.0)**	**367.0**
Share of income in companies accounted for under equity method	(2.2)	—	—	(2.2)	—	—	(2.2)
Earnings Before Interest and Tax [2]	**79.2**	**(41.9)**	**(69.8)**	**(32.5)**	**—**	**(116.3)**	**(148.8)**
Capital expenditures (excluding multi-client surveys) [3]	60.1	12.4	1.3	73.8	—	—	73.8
Investments in multi-client surveys, net cash	295.1	—	—	295.1	—	—	295.1
Capital employed [4]	**2.3**	**0.6**	**0.6**	**3.5**	**—**	**—**	**3.5**
Total identifiable assets [4]	**2.5**	**0.7**	**1.1**	**4.3**	**—**	**—**	**4.3**

(1) Sale of equipment to the Contractual Data Acquisition segment which is classified as discontinued operations and to the GGR segment

(2) For the year ended December 31, 2016, the "non-recurring charges" included US$(96.8) million impairment of multi-client surveys and US$(0.5) million relating to tangible assets impairment, and US$(19.0) million of other costs related to our Transformation Plan.

For the year ended December 31, 2016, "eliminations and other" included US$(33.2) million of general corporate expenses and US$(36.6) million of intra-group margin.

(3) Capital expenditures included capitalized development costs of US$(34.0) million for the year ended December 31, 2016. "Eliminations and other" corresponded to the variance of suppliers of assets for the year ended December 31, 2016.

(4) Capital employed and identifiable assets related to discontinued operations are included under the column "Eliminations and other".

NOTE 21 RESEARCH AND DEVELOPMENT EXPENSES

Analysis of research and development expenses is as follows:

(In millions of US$)	December 31,		
	2018	2017 (restated)	2016 (restated)
Research and development costs	(71.3)	(69.2)	(80.8)
Development costs capitalized	33.1	31.8	34.0
Research and development expensed	**(38.2)**	**(37.4)**	**(46.8)**
Government grants recognized in income	7.7	19.5	30.1
Research and development costs — net	**(30.5)**	**(17.9)**	**(16.7)**

Research and development expenditures related primarily to:

- for the GGR segment, projects concerning data processing services and;
- for the Equipment segment, projects concerning seismic data recording equipment.

The decrease in Government grants recognized in income in 2018 compared to 2017 is mainly due to a US R&D tax credit reversal in 2018.

NOTE 22 OTHER REVENUES AND EXPENSES

	December 31,		
(In millions of US$)	2018	2017 (restated)	2016 (restated)
Impairment of assets	(239.9)	—	(97.3)
Restructuring costs	(79.4)	(195.1)	(132.0)
Change in restructuring reserves	61.6	88.9	113.0
Other restructuring expenses	(30.1)	—	—
Impairment and restructuring expenses — net	**(287.8)**	**(106.2)**	**(116.3)**
Other revenues (expenses)	1.0	(3.5)	0.5
Exchange gains (losses) on hedging contracts	(0.8)	—	0.2
Gains (losses) on sales of assets	1.5	4.2	4.9
Other revenues (expenses) — net	**(286.1)**	**(105.5)**	**(110.7)**

Year ended December 31, 2018

Impairment of assets

In 2018, we recognized a US$(226.0) million impairment of multi-client surveys (of which US$ 197 million on StagSeis survey) due to specific market conditions.

Restructuring costs and change in restructuring reserves

As part of the Group Transformation Plan, we recognized US$(17.8) million of restructuring costs. These restructuring costs include:

(vii) US$15.1 million of professional fees mainly linked to the US Chapter 11 and French Safeguard procedures (see note 2 — “Financial restructuring process”),

(viii) US$2.7 million of other costs related to our Transformation Plan.

Other restructuring expenses

In 2018, we recognized a US$(30.1) million of inventory valuation allowance at Sercel.

Year ended December 31, 2017

Restructuring costs and change in restructuring reserves

As part of the Group Transformation Plan, we recognized US$(106.2) million of restructuring costs. These restructuring costs include:

(i) US$93.7 million of professional fees mainly linked to the US Chapter 11 and French Safeguard procedures (see note 2 — Financial restructuring process); and

(ii) US$12.5 million of other costs related to our Transformation Plan.

Year ended December 31, 2016

Restructuring costs and change in restructuring reserves

As part of the Group Transformation Plan, we expensed US$132.0 million in 2016, partially offset by the use of the corresponding provisions.

Impairment of assets

In 2016, we recognized a US$(96.8) million impairment of multi-client surveys due to specific market conditions.

NOTE 23 COST OF FINANCIAL DEBT

	December 31,		
(In millions of US$)	2018	2017	2016
Current interest expenses related to financial debt	(129.7)	(181.0)	(168.6)
Amortization of deferred expenditures on financial debts	—	(33.0)	(8.3)
Income provided by cash and cash equivalents	2.3	3.0	2.7
Cost of financial debt, net	**(127.4)**	**(211.0)**	**(174.2)**

Following the approval of the draft safeguard plan by creditors' committees in France on July 28, 2017 and the approval of Chapter 11 plan by creditors entitled to vote in the US late September, 2017, most of our current debt was settled on February 21, 2018 through conversion into equity or new debt instruments under our financial restructuring plan. As a result, we have accelerated the amortization of the debt issuing fees in 2017.

NOTE 24 OTHER FINANCIAL INCOME (LOSS)

	December 31,		
(In millions of US$)	**2018**	**2017 (restated)**	**2016 (restated)**
Exchange gains (losses) net	32.0	28.1	12.6
Other financial income (expenses)	787.9	(6.6)	(6.6)
Other financial income (loss)	**819.9**	**21.5**	**6.0**

In 2018, the Other Financial Income mainly comes (i) for US$771 million from the strong positive impact of our financial restructuring (ii) for US$74 million in one-off income mainly linked to the positive foreign exchange effect, associated with the shift of Euro/US$ balance sheet exposure following the financial restructuring and the subsequent first lien refinancing (our Euro/US$ balance sheet position is now balanced), partly offset by (iii) the first lien refinancing costs for US$21 million

NOTE 25 INCOME TAXES

Income tax benefit (expense)

The Company and its subsidiaries compute income taxes in accordance with the applicable tax rules and regulations of the numerous tax authorities where the Group operates. The tax regimes and income tax rates legislated by these taxing authorities vary substantially. In foreign countries, income taxes are often accrued based on deemed profits calculated as a percentage of sales as defined by local government tax authorities.

	December 31,		
(In millions of US$)	**2018**	**2017 (restated)**	**2016 (restated)**
France			
Current income tax expense	—	—	—
Adjustments on income tax recognized in the period for prior periods	0.0	0.1	0.2
Deferred taxes on temporary differences for the period	3.3	(0.2)	(5.5)
Deferred taxes recognized in the period for prior periods	0.5	(3.4)	0.1
Total France	**3.8**	**(3.5)**	**(5.2)**
Foreign countries			
Current income tax expense, including withholding taxes	(19.0)	(19.7)	(16.3)
Adjustments on income tax recognized in the period for prior periods (3)	1.4	1.4	9.9
Deferred taxes on temporary differences for the period	14.0	49.5	43.0
Deferred taxes recognized in the period for prior periods (1) (2)	(7.6)	(46.4)	(12.7)
Total Foreign countries	**(11.2)**	**(15.2)**	**23.9**
Total income tax benefit (expense)	**(7.4)**	**(18.7)**	**18.7**

(1) In 2018, included valuation allowances on deferred tax assets of US$8.3 million in Mexico.
(2) In 2017, included valuation allowances on deferred tax assets of US$45.5 million in several countries, notably in US (US$32.0 million) based on their probable recovery regarding existing taxable items. In 2016, included valuation allowances on deferred tax assets amounting to US$7.5 million.
(3) In 2016, was mainly impacted by changes in estimates, use of tax credits and carry-back in North America.

Income tax reconciliation

The reconciliation between income tax expense in the income statement and the theoretical tax expense is detailed below:

(In millions of US$)	2018	2017 (restated)	2016 (restated)
Net income from continuing operations (loss)	**504.2**	**(266.5)**	**(298.3)**
Income taxes	**(7.4)**	**(18.7)**	**18.7**
Net Income from continuing operations (loss) before taxes	**511.6**	**(247.8)**	**(317.0)**
Equity investment companies income	(1.2)	(0.4)	(2.2)
Theoretical tax basis	**512.8**	**(247.4)**	**(314.8)**
Enacted tax rate in France	34.43%	34.43%	34.43%
Theoretical taxes	**(176.6)**	**85.2**	**108.4**
Differences on tax:			
Differences in tax rates between France and foreign countries (6)	(44.5)	0.3	23.9
Change in local tax rates enacted by US and French tax laws (4)	—	43.3	—
Non-deductible part of dividends	—	(0.6)	(1.8)
Adjustments on the tax expense recognized in the period for prior periods (2)	1.4	1.6	10.1
Adjustments on the deferred tax expense recognized in the period for prior periods	1.2	(4.3)	(5.1)
Valuation allowance on deferred tax assets previously recognized on losses on foreign entities (1)	(8.3)	(45.5)	(7.5)
Other permanent differences (including withholding taxes) (5)	239.5	(17.0)	(2.0)
Deferred tax unrecognized on losses of the period (3)	(30.0)	(84.5)	(109.9)
Unrecognized deferred tax on losses of prior periods	9.9	2.8	2.6
Income taxes	**(7.4)**	**(18.7)**	**18.7**

(1) (2) See comments on income tax benefit (expense) above.
(3) Corresponds notably to the French, and US tax groups according to short and medium term uncertainties and revised tax planning.
(4) The US corporate income tax rate used for tax calculations decreased from 35% in 2016 to 21% in 2017, which had a favorable tax impact of US$37 million in 2017. In France, the corporate income tax rate will reduce over a five-year period from 34.43% to 25%, which had a favorable impact on deferred taxes calculation in 2017 of US$6.3 million.
(5) Correspond notably, in 2018, to the permanent differences relatives to the debt equitization (see note 2)
(6) Correspond notably, in 2018, to the difference in tax rates between France and US for US$37 million

Deferred tax assets and liabilities

	December 31,		
(In millions of US$)	2018	2017	2016
Total deferred tax assets	**22.6**	**21.9**	**26.0**
Total deferred tax liabilities	**(44.4)**	**(62.0)**	**(67.6)**
Total deferred taxes, net	**(21.8)**	**(40.1)**	**(41.6)**

Net deferred tax assets (liabilities) per nature

(In millions of US$)	December 31, 2018	2017	2016
Non-deductible provisions (including pensions and profit sharing)	33.3	24.4	28.9
Tangible assets	19.5	28.4	46.9
Effect of currency translation adjustment not recognized in income statement	(10.5)	(2.5)	(42.5)
Multi-client surveys (including deferred revenues)	(57.1)	(147.6)	(152.8)
Assets reassessed in purchase accounting of acquisitions	(29.5)	(32.4)	(49.0)
Development costs capitalized	(18.8)	(23.6)	(26.9)
Other deferred revenues	(1.6)	(19.4)	2.0
Convertible bonds and other financial instruments	—	(12.3)	1.6
R&D credits	32.0	44.2	39.4
Other	(30.6)	10.5	4.5
Total deferred tax assets net of deferred tax (liabilities) related to timing differences	**(63.3)**	**(130.3)**	**(147.9)**
Tax losses carried forward	41.5	90.2	106.3
Total deferred tax assets net of deferred tax (liabilities)	**(21.8)**	**(40.1)**	**(41.6)**

Deferred tax assets (liabilities) per tax group as of December 31, 2018

(In millions of US$)	France	Foreign countries	Total
Net deferred tax assets (liabilities) related to timing differences	(32.8)	(30.5)	(63.3)
Deferred tax assets on losses carried forward [2]	5.7	35.8	41.5
Total	**(27.1)**	**5.3**	**(21.8)**

(1) The deferred taxes recognized on losses carried forward are recoverable without expiration date
(2) See note 1.6-6 to the consolidated statements for rules of recognition of deferred tax assets

Net operating loss carried forward not recognized as of December 31, 2018

(In millions of US$)	France	Foreign countries	Total
Losses scheduled to expire in 2019	—	1.3	1.3
Losses scheduled to expire in 2020 and thereafter	—	195.3	195.3
Losses available indefinitely	1,893.0	242.3	2,135.3
Total	**1,893.0**	**438.9**	**2,331.9**

Tax audit and litigation

US

The tax audit regarding CGG Holding (U.S.) Inc. for the 2007 fiscal year and extended to 2016 is still ongoing at December 31, 2018 due to the Governmental shutdown.

Brazil

Municipality of Rio de Janeiro has claimed to Veritas do Brazil Ltda that services taxes (ISS) are payable for 2001 to 2008 which has been duly disputed.

Further to the favorable decision of the judicial court received by Veritas do Brasil Ltda in 2014, the administrative procedure covering 2001 to May 2003 has been officially terminated in March 2015 and the tax assessment cancelled in January 2016. In March 2016, the Municipality filed a Rescission Action in order to have the favorable decision cancelled; the Group filed the response to the action in June 2016. In December 2016, Public attorney's office agreed that there are no grounds to re-discuss the merit of the case, but understood that the action shall be ruled. In February 2017, CGG filed a petition to object the ruling. CGG is waiting for Municipality and public attorney's office response. The Group considers that there is no proper ground for this action.

For years September 2003-2008 (taxes at stake: US$11 million), the administrative procedure is still ongoing and should result in the same cancellation considering that the reassessment is based on the same arguments than those cancelled by the judicial court.

No provision is recognized as the Group considers that these contingencies should resolve in its favor.

Following a 2012 audit on year 2009, CGG do Brazil Participacoes Ltda was reassessed US$6.1 million of withholding tax and US$4 million of CIDE (Contribution for Intervening in Economic Domain) on charter contracts. The reassessment was disputed. In 2014, the company received and appealed against an unfavorable decision from the Administrative Court. In July 2017, CIDE case was ruled against CGG and the company decided to enter into an amnesty program (PERT). The litigation has been dropped and parties agreed on a final settlement of approximately US$2.7 million fully settled in January 2018. In August 2018, the decision from the Administrative Court on WHT reassessment has been confirmed. In October 2018, CGG filed a motion to clarify the decision. No provision is recognized.

In 2016, a new audit was conducted for fiscal year 2013. CGG do Brazil Participacoes Ltda received tax reassessments on December 20, 2017 for amounts of US$15 million for withholding tax and US$10 million for CIDE. The company appealed in January 2018 against the reassessments. In August 2018, both WHT and CIDE on charter were ruled favorably to CGG. Tax authorities appealed against the decision. No provision is recognized.

Peru

The Peru tax authorities were claiming additional withholding taxes on technical services for 2012 and 2013 for CGG Land (U.S.) Inc Sucursal del Peru for an amount of US$15 million. The company disputed the reassessment and the litigation was at the Fiscal Tribunal stage. A final resolution in favor of CGG was notified in May 2017. A nullity action has been launched against this resolution by the Tax Authorities. In February 2019, the nullity action has been denied by the judge. No provision is recognized for this litigation.

NOTE 26 PERSONNEL

The analysis of personnel (including discontinued operations) is as follows:

	Year ended December 31,		
	2018	**2017**	**2016**
Personnel employed under French contracts	1,253	1,306	1,393
Personnel employed under local contracts	3,846	3,960	4,373
Total	**5,099**	**5,266**	**5,766**
Including field staff of:	*418*	*498*	*547*

The total cost of personnel employed was US$559 million in 2018 (or US$452 million excluding acquisition), US$561 million in 2017 (or US$446 million excluding acquisition), and US$654 million in 2016(or US$495 million excluding acquisition),

NOTE 27 KEY MANAGEMENT PERSONNEL COMPENSATION

Until June 2017, the Corporate Committee (C-Com) was chaired by the Chief Executive Officer and was composed of the CEO, three Senior Executive Vice Presidents — the Chief Financial Officer and the two Group Chief Operating Officers — and the Human Resources Executive Vice President.

The table below present

- for 2017 and 2016, the Director fees and C-Com members' remuneration:
- for 2018, the Director fees and the CEO remuneration

	Year ended December 31,		
(in US$)	**2018**	**2017**	**2016**
Short-term employee benefit paid [(a)]	4,490,770	3,622,362	3,923,272
Directors' fees	763,753	692,714	646,042
Long-term employee benefit — pension [(b)]	—	26,641	28,444
Long-term employee benefit — supplemental pension [(c)]	429,986	828,603	778,027
Share-based payments [(d)]	279,920	129,918	443,575

(a) Excludes social contributions.
(b) Cost of services rendered and interest cost.
(c) Cost of services rendered and interest cost on the supplemental pension implemented by the end of 2004.
(d) Expense in the income statement related to the stock options and performance shares plans.

Special Severance Payment — Chief Executive Officer

The Board of Directors, on April 26, 2018, in its meeting appointing Ms. Sophie ZURQUIYAH as Chief Executive Officer for a three-year period, also approved, for the duration of her term in office, the terms and conditions of the advantages granted to Ms. Sophie ZURQUIYAH in case of termination of her term of office. These advantages will be submitted to the General Meeting convened on May 15, 2019 for ratification.

These advantages are the following:

- Ms. Sophie ZURQUIYAH will benefit from a contractual indemnity in case of termination under the following conditions:
  a) Dismissal, non-renewal of the term of office or in the event of a forced departure (involving a resignation), related to a change of control that has occurred in the absence of any failure situation characterized by the non-fulfilment of all the performance conditions below. It is specified that a departure occurring within the twelve months following the occurrence of change of control shall be considered as a forced departure;

  b) Dismissal in the absence of serious or gross misconduct occurring in the absence of any situation of failure characterized for the purposes of this paragraph by failure to meet the performance conditions as defined hereafter.
- In the event that these provisions where to apply during the first three years of the term of office of the Chief Executive Officer, the assessment of the achievement of the performance conditions would be made in the following manner;
  a) In case of departure from the Group during 2018 and 2019 fiscal years, the Board of Directors will determine the rate of achievement of the objectives during the period since the appointment of the Chief Executive Officer ; the rate as determined by the Board of Directors will constitute the achievement rate which will be taken into account to apply the rule described below;

  b) The payment of this Special Severance Payment would depend on the level of the average rate of achievement of the objectives relating to Ms. Sophie ZURQUIYAH's variable annual compensation calculated over the financial years 2018, 2019, 2020, as follows:
     a. (a) If the average rate is below 60%, no Special Severance Payment will be paid;
     b. (b) If the average rate is 60%, the Special Severance Payment will be equal to 60% of its amount;
     c. (c) If the average rate is higher than 60%, the Special Severance Payment will be paid on a straight-line basis from 60% to 100% of its amount.
- This Special Severance Payment will be equal to the difference between (i) a gross amount capped at 200% of the reference annual compensation including all sums irrespective of type or basis to which Ms. Sophie ZURQUIYAH may be entitled as a consequence of the severance, and (ii) any sums to which she may be entitled further to the application of the non-competition commitment.

According to Article L. 225-42-1 of the French Commercial Code, the Board of Directors, prior to the payment of the Special Severance Payment, shall assess that, (i) the aforementioned performance conditions have been met and that (ii) the Special Severance Payment complies with the AFEP-MEDEF Code in force at the date of the concerned person's departure.

NOTE 28 RELATED PARTY TRANSACTIONS

The following table presents the transactions with our joint-ventures and associates. The vast majority of them belong to the acquisition segment which is classified as discontinued operation in our consolidated statements of operations.

	December 31,						
	2018			2017			2016
(In millions of US$)	Joint Ventures [a]	Associates [b]	Total	Joint Ventures [a]	Associates [b]	Total	Total
Sales of geophysical equipment	—	14.5	14.5	2.6	31.0	33.6	5.2
Equipment rentals and services rendered	4.5	10.9	15.4	13.0	8.4	21.4	28.0
Operating Revenue	**4.5**	**25.4**	**29.9**	**15.6**	**39.4**	**55.0**	**33.2**
Charter expenses	(31.7)	—	(31.7)	(23.6)	—	(23.6)	(28.3)
Ship management expenses	(32.4)	—	(32.4)	(24.4)	—	(24.4)	(36.2)
Costs of services rendered	(6.1)	(0.5)	(6.6)	(2.5)	(1.5)	(4.0)	(7.7)
Cost of operations	**(70.2)**	**(0.5)**	**(70.7)**	**(50.5)**	**(1.5)**	**(52.0)**	**(72.2)**
Other financial income (loss)	**(35.0)**	**—**	**(35.0)**	**0.1**	**—**	**0.1**	**0.2**
Trade accounts and notes receivable, including agency arrangements	15.9	14.9	30.8	18.1	18.7	36.8	36.3
Financial assets (see note 7)	2.9	—	2.9	32.9	—	32.9	14.9
Receivables	**18.8**	**14.9**	**33.7**	**51.0**	**18.7**	**69.7**	**51.2**
Trade accounts and notes payable, including agency arrangements	6.0	3.9	9.9	13.1	5.5	18.6	59.5
Financial liabilities — Finance lease debt	—	—	—	—	—	—	15.0
Payables	**6.0**	**3.9**	**9.9**	**13.1**	**5.5**	**18.6**	**74.5**
Future leases commitments	358.2	—	358.2	397.0	—	397.0	203.5
Future ship management costs	94.6	—	94.6	169.3	—	169.3	66.7
Contractual Obligations	**452.8**	**—**	**452.8**	**566.3**	**—**	**566.3**	**270.2**

(a) Mainly correspond to investments in companies accounted for using the equity method in our Marine acquisition Segment (see note 8);
(b) Mainly correspond to investments in companies accounted for using the equity method in our Land and Multi-Physics acquisition Segment (see note 8);

No credit facility or loan was granted to the Company by shareholders during the last three years.

NOTE 29 SUPPLEMENTARY CASH FLOW INFORMATION

Operating activities

In 2018 and 2016, depreciation and amortization, together with multi-client surveys depreciation, included respectively US$239.9 million, US$97.3 million of assets impairment as described in note 22.

In 2018, other non-cash items are mainly related to the financial restructuring plan as described in note 2.

In 2017, the income tax paid was an income of US$43.5 million mainly resulting from the French R&D tax credit refund.

Investing activities

In 2018, 2017 and 2016, proceeds from disposals of tangible and intangible assets related to the sales of some of our assets.

In 2017, proceeds from disposal of financial assets related to the sale of our remaining 9.17% financial stake in Tronic's microsystems SA.

In 2018, 2017 and 2016, variation in other financial assets mainly related to long term deposits made to fulfil some collateral.

Financing activities

In 2018, total issuance of long-term debts related to the second lien senior secured notes due 2024 issued in by CGG SA for US$355.1 million and €80.4 million in principal amount. This issuance comprises US$275 million and €80.4 million as new money and US$80.2 million in exchange for part of the accrued interest claims under the Senior Notes (with the US$ new money notes and accrued interest notes being fungible) (see note 13).

In 2018, CGG Holding (U.S.) Inc. issued US$663.6 million in principal amount of first lien senior secured notes due 2023, in exchange for the balance of the Secured Loans taking into account an upfront paydown of US$150 million.

In 2016, we received net proceeds €337 million from our capital increase (or US$367.5 million).

Cash and cash equivalents

	Year ended December 31,		
(In millions of US$)	**2018**	**2017 (restated)**	**2016 (restated)**
Cash	353.2	229.6	415.1
Cash equivalents (mainly short-term deposits)	80.9	85.8	123.7
Total cash and cash equivalents	**434.1**	**315.4**	**538.8**

In 2018, Cash and Cash equivalents included trapped cash amounting to US$93 million. Trapped cash means any cash and cash equivalent held by a subsidiary that operates in a country where exchange controls or other legal restrictions apply when the balances are not available for general use by the Group (cash in subsidiaries not available at Group level).

The cash equivalents do not include in 2018 US$30.5 million of cash pledged to fulfill some collateral requirements. The cash pledged for more than one year is recorded for US$18.1 million in other financial assets (see note 7) and the cash pledged for less than one year is recorded for US$12.4 million in restricted cash (see note 4).

NOTE 30 EARNINGS PER SHARE

	Year		
(In millions of US$, excepted per share data)	**2018**	**2017**	**2016**
Net income attributable to shareholders (a)	(101.6)	(514.9)	(573.4)
Effect of dilution			
Ordinary shares outstanding at the beginning of the year (b) [1]	46,038,287	46,038,287	12,647,881
Weighted average number of ordinary shares outstanding during the year [c]	562,399,954	—	30,607,872
Weighted average number of ordinary shares outstanding ((d) =(b) +(c))	**608,438,241**	**46,038,287**	**43,255,753**
Total dilutive potential shares from stock options	—	—	—
Total dilutive potential shares from performance shares allocation	—	—	—
Total dilutive potential shares from Convertible bonds	—	—	—
Total dilutive potential shares from warrants	9,155,112	—	—
Dilutive weighted average number of shares outstanding adjusted when dilutive (e)	**617,593,353**	**46,038,287**	**43,255,753**
Earnings per share			
Basic (a) / (d)	**(0.17)**	**(11.18)**	**(13.26)**
Diluted (a) / (e) [2]	**(0.17)**	**(11.18)**	**(13.26)**
Net income attributable to shareholders from continuing operations (a2)	498.4	(267.3)	(295.1)
Earnings per share Basic	0.82	(5.81)	(6.82)
Earnings per share Diluted [2]	0.81	(5.81)	(6.82)
Net income attributable to shareholders from discontinued operations (a3)	(600.0)	(247.6)	(278.3)
Earnings per share Basic	(0.99)	(5.38)	(6.43)
Earnings per share Diluted [2]	(0.99)	(5.38)	(6.43)

(1) As a result of the February 21, 2018 CGG S.A. capital increase via an offering of preferential subscription rights to existing shareholders, the calculation of basic and diluted earnings per share for 2017 and 2016 has been adjusted retrospectively. Number of ordinary shares outstanding has been adjusted to reflect the proportionate change in the number of shares.

(2) When our net result is a loss, stock options, performance shares plans and warrants had an anti-dilutive effect and shouldn't be taken into account in the calculation of diluted loss per share. As a result the formula for the diluted loss per share is (a) / (d) [or (a2) / (d) for continuing operations and (a3) / (d) for discontinued operations].

NOTE 31 SUBSEQUENT EVENTS

None

NOTE 32 LIST OF PRINCIPAL CONSOLIDATED SUBSIDIARIES AS OF DECEMBER 31, 2018

Subsidiaries are fully consolidated from the date of their acquisition, being the date on which the Group obtains the control.

Dormant subsidiaries of the Group have not been included in the list below.

Percentage of interest generally corresponds to percentage of control in the company.

Siren Number [a]	Companies Names	Country of incorporation	% of interest
403 256 944	CGG Services SAS	France	100.0
410 072 110	CGG Explo SARL	France	100.0
413 926 320	Geomar SAS	France	100.0
	CGG Holding BV	Netherlands	100.0
	CGG Marine BV	Netherlands	100.0
	CGG Services (NL) BV	Netherlands	100.0
	CGG International SA	Switzerland	100.0
	CGG Data Services SA	Switzerland	100.0
	CGG Services (Norway) AS	Norway	100.0
	CGG Services (UK) Limited	United Kingdom	100.0
	CGG do Brasil Participaçoes Ltda	Brazil	100.0
	Veritas do Brasil Ltda	Brazil	100.0
	LASA Prospeccoes SA	Brazil	100.0
	CGG Mexico, SA de CV	Mexico	100.0
	Geoinnovation Corporativa S. de RL de CV	Mexico	100.0
	Vitzel SA de CV	Mexico	100.0
	CGG Holding (U.S.) Inc.	Delaware, United States of America	100.0
	CGG Services (U.S.) Inc.	Delaware, United States of America	100.0
	CGG Land (U.S.) Inc.	Delaware, United States of America	100.0
	CGG Canada Services Ltd	Canada	100.0
	CGG Services (Canada) Inc.	Canada	100.0
	CGG Services (Australia) Pty Ltd	Australia	100.0
	CGG Aviation (Australia) Pty Ltd	Australia	100.0
	CGGVeritas Services (B) Sdn Bhd	Brunei	100.0
	PT CGG Services Indonesia [1]	Indonesia	95.0
	CGG Services India Private Ltd	India	100.0
	CGG Technology Services (Beijing) Co. Ltd	China	100.0
	CGG Services (Singapore) Pte Ltd	Singapore	100.0
	CGG Services (Malaysia) Sdn Bhd	Malaysia	100.0
	CGG Vostok	Russia	100.0

Siren Number [a]	Companies Names	Country of incorporation	% of interest
866 800 154	Sercel Holding SAS	France	100.0
378 040 497	Sercel SAS	France	100.0
	Sercel-GRC	Oklahoma, United States of America	100.0
	Sercel Inc.	Oklahoma, United States of America	100.0
	Hebei Sercel-Junfeng Geophysical Prospecting Equipment Co. Ltd [1]	China	51.0
	Sercel Singapore Pte Ltd	Singapore	100.0
	De Regt Marine Cables BV	Netherlands	100.0

(a) Siren number is an individual identification number for company registration purposes under French law.
(1) % of control for these subsidiaries amount to 100%.

Non-controlling interests

The Group does not fully consolidate any significant entity in which it holds less than a majority of voting rights.

Subsidiaries with non-controlling interests do not contribute materially to the activities of the Group, the consolidated net income, cash flows, liabilities or assets as of December 31, 2018. Hebei Sercel-Junfeng Geophysical Prospecting Equipment Co. Ltd, a subsidiary of Sercel SAS based in China, is the major entity with non-controlling interests.

NOTE 33 Audit Fees

Annual audit fees for 2018, 2017, and 2016 are as follows:

	December 31,					
	2018		2017		2016	
(in thousands of US$)	EY	Mazars	EY	Mazars	EY	Mazars
Audit Fees	3,236	1,165	3,095	1,196	2,642	1,170
Audit-Related Fees	33	—	492	241	252	51
Tax Fees	106	—	94	—	23	14
All Other Fees	—	—	—	—	25	—
Total	**3,375**	**1,165**	**3,681**	**1,437**	**2,942**	**1,235**

Audit related fees are linked to sustainability audits.

7.2 REPORT OF THE STATUTORY AUDITORS ON THE 2018 CONSOLIDATED FINANCIAL STATEMENTS

This is a translation into English of the statutory auditors' report on the consolidated financial statements of the Company issued in French and it is provided solely for the convenience of English speaking users.

This statutory auditors' report includes information required by European regulation and French law, such as information about the appointment of the statutory auditors or verification of the management report and other documents provided to shareholders.

This report should be read in conjunction with, and construed in accordance with, French law and professional auditing standards applicable in France.

To the shareholders of CGG,

Opinion

In compliance with the engagement entrusted to us by your annual general meeting, we have audited the accompanying consolidated financial statements of CGG for the year ended December 31, 2018.

In our opinion, the consolidated financial statements give a true and fair view of the assets and liabilities and of the financial position of the Group as of December 31, 2018 and of the results of its operations for the year then ended in accordance with International Financial Reporting Standards as adopted by the European Union.

The audit opinion expressed above is consistent with our report to the Audit Committee.

Basis for opinion

Audit framework

We conducted our audit in accordance with professional standards applicable in France. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.
Our responsibilities under those standards are further described in the *Statutory auditors' responsibilities for the audit of the consolidated financial statements* section of our report.

Independence

We conducted our audit engagement in compliance with the independence rules applicable to us for the period from January 1, 2018 to the date of our report and specifically we did not provide any prohibited non-audit services referred to in article 5, paragraph 1 of Regulation (EU) No 537/2014 or in the French code of ethics (*code de déontologie*) for statutory auditors.

Emphasis of matter

Without qualifying our opinion expressed above, we draw your attention to the effects of the changes in accounting policies arising by application of IFRS 15, *Revenue from Contracts with Customers*, set out in note 1.3 to the consolidated financial statements.

Justification of assessments - key audit matters

In accordance with the requirements of Articles L823-9 and R823-7 of the French code of commercial law relating to the justification of our assessments, we inform you of the key audit matters relating to risks of material misstatement that, in our professional judgment, were of most significance in our audit of the consolidated financial statements of the current period, as well as to how we addressed those risks.

These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on specific items of the consolidated financial statements.

Financial restructuring

Key audit point

On February 21, 2018 CGG finalized the implementation of its financial restructuring plan.

As presented in note 2 to the consolidated financial statements, the financial restructuring has involved: (i) converting almost all the Company's unsecured debt (an amount of USD 1,992.7 million) into share capital, (ii) extending the repayment maturities for the Group's secured debt and (iii) injecting additional cash. Details of the financial instruments issued are provided in note 2. The impacts of the financial restructuring on the consolidated financial statements are summarized in note 1.2 and detailed in note 2.

The various components of the financial restructuring involved the recognition of complex transactions requiring the exercise of significant judgment on the part of management with particular regard to determining the fair value of the Company's shares at the date of the financial restructuring and to the treatment in the consolidated statement of income of the expenses associated with the second tier secured bonds maturing in 2024. We therefore considered the financial restructuring as a key audit point.

Our response

We included professionals with particular competency in the recording of transactions involving financial instruments in our audit team in order in particular to assess the compliance with IFRSs, and in particular with IFRS 9, of the bases of recognition of all the capital transactions and transactions relating to the subscription of new borrowings engaged in during the period. In particular, our work included:

- Examination of the consistency of the fair value measurement of the shares issued in exchange for debt surrendered with regard to the listed share price at the time of performance of the transactions;
- Assessment of the coherency of the accounting treatment designed to capture the full amount of the costs associated with the issue of second rank secured bonds maturing in 2024 in the consolidated income statement, with particular regard for the overall structure of the restructuring plan.

We also assessed the appropriateness of the additional disclosures on the financial restructuring presented in the consolidated financial statements.

2021 strategic plan

Key audit point

As presented in note 2 to the consolidated financial statements, CGG announced its 2021 strategic plan on November 7, 2018. The plan involves the Group in evolving towards a business model with limited capital requirements by reducing its exposure to acquisitions. The strategic adjustments included in the 2021 strategic plan are detailed in note 2 and consist notably in disengaging CGG from various acquisition components and in adjusting its support functions in consequence.

The direct and indirect consequences of the 2021 strategic plan for the consolidated financial statements as of December 31, 2018 are summarized in note 1.2. In terms of presentation:

- Assets held for sale and the associated liabilities are presented as two distinct line items in the consolidated statement of financial position as of December 31, 2018;
- The result for discontinued operations is presented as a distinct line item in the consolidated statement of income for all the periods presented;
- The net cash flow for discontinued operations is presented as a distinct line item in the consolidated statement of cash flows for all the periods presented.

In addition to the presentation impact just described, the 2021 strategic plan has involved the recognition in 2018 of a consolidated loss of USD 422.8 million for discontinued operations and of a consolidated loss of USD 30 million for continuing operations. The consolidated loss of USD 422.8 million notably includes:

- USD 139.1 million of net impairment less revaluation of groups of assets at fair value less costs to sell;
- USD 126.3 million of provisions for loss-making leases associated with the reduction of the Group's fleet;
- USD 113.9 million of provisions reflecting the suppression of 712 jobs within the Group.

The assessment of the applicability of the criteria for classification as assets held for sale or discontinued operations requires the exercise of management judgment with regard in particular to the scope of the applicable assets and associated liabilities and to the probability of sale within twelve months. Estimation of the fair value less costs to sell of the applicable non-current assets and groups of assets held for sale, and associated liabilities, equally requires the exercise of management judgment with regard to the choice of elements to be considered and assumptions to be retained. In addition, both the satisfaction of the applicable classification criteria and the estimated fair values for the purposes of the consolidated financial statements as of December 31, 2018 reflect the assumption that the ultimate terms and conditions of sale will equate with those currently envisaged.

Finally, the determination of the provisions associated with the Group's restructuring plan equally requires the exercise of management judgment and involves a significant degree of estimation.
We therefore considered the accounting implications of the 2021 strategic plan as a key audit point.

Our response

We examined the application of IFRS 5 based on the information available as of December 31, 2018 with particular regard to:

- Examination of the scope of inclusion of assets and associated liabilities as assets or groups of assets held for sale and associated liabilities;
- Examination of the criteria applied by management for justifying the classification of assets and liabilities as assets held for sale and associated liabilities, and for recognizing discontinued operations;
- Examination of the income and expenses included in the net result for discontinued operations;
- Examination of the assumptions and overall approach retained by management for the purposes of estimating the fair value less costs to sell of each group of assets held for sale.

We assessed the existence, completeness and measurement of the provisions recognized as of December 31, 2018 for the 2021 strategic plan, including in particular the provisions for employee benefits accounted for in accordance with IAS 19 and for loss-making contracts for fleet vessels accounted for in accordance with IAS 37.

We examined the presentation in the consolidated financial statements (in accordance with the requirements of IFRS 5) of the groups of assets held for sale, the net result for discontinued operations and the net cash flow generated by discontinued operations.

Measurement of consolidated goodwill

Key audit point

As of December 31, 2018 consolidated goodwill amounted to USD 1,229 million or 32% of the consolidated statement of financial position, breaking down as follows by cash-generating unit (or group of cash-generating units):

- Imaging and Reservoir: USD 771 million,
- Multi-customers: USD 284 million,
- Equipment: USD 174 million.

Management verifies, at least annually at the year-end, that the carrying amount of goodwill is not higher than its recoverable amount and presents no risk of impairment. The bases of the impairment testing performed and the applicable assumptions are described in note 11.

The determination of the recoverable amount of goodwill is very largely based on management judgment with particular regard to:

- The future cash flows expected from the cash-generating units assessed;
- The discount rates applied to the future cash flows;
- The long-term growth rate retained for the cash flow projection.

We therefore considered the measurement of consolidated goodwill as a key audit point.

Our response

We assessed the compliance of the methodology applied by Group management with the applicable accounting standards, concentrating our procedures on those assumptions for which the sensitivity for recoverable value might have a material impact on the result of the impairment testing performed. Our procedures thus mainly consisted in:

- Assessing the consistency of the estimated future cash flows with the main underlying operating assumptions;
- Assessing the existence of any external information liable to contradict management's assumptions;
- Examining the assumptions retained for the purpose of estimating normative cash flows beyond the third year;
- Performing retrospective analysis of the cash flow estimates.

Our audit team included valuation specialists for the purpose in particular of assessing the discount rates and long-term growth rate retained by management.

Library valuation and multi-customer revenue recognition

Key audit point

The Group's multi-customer library includes seismic surveys for which non-exclusive licenses for use are granted to customers. All the costs of acquisition, processing and finalization of the surveys are recognized as intangible assets. The accounting treatment of the intangible assets, and of the associated revenue, changed considerably in 2018 by reason of the application of IFRS 15 and of changes in estimation affecting the amortization of the surveys.

As described in note 1.3, CGG has applied IFRS 15 since January 1, 2018 using the limited retrospective method. With effect from that date, revenue for pre-financing is recognized on delivery of the final data processed and no longer on a percentage of completion basis. The adoption of IFRS 15 has generated a negative net equity impact of USD 11.6 million as of January 1, 2018, and an additional negative net impact of USD 38.3 million in the consolidated income statement for 2018, in comparison with the application of the historical method.

As of December 31, 2018 the carrying amount of the multi-customer library amounts to USD 633 million, or 16% of consolidated assets, compared with USD 831 million as of December 31, 2017.

Until September 30, 2018 an 80% amortization charge, equating with the ratio of costs capitalized in comparison with the total sales expected during the accounting life of the survey, was applied to any habitual sale of a survey in the absence of specific factors leading to use of a different rate. With effect from October 1, 2018 the Group has adopted straight-line amortization over 4 years following delivery. Additionally, since October 1, 2018 the cost of sales associated with any pre-financing is calculated on the basis of the difference between the capitalized cost of the survey on delivery and its fair value based on the discounted amount of expected future sales. Before October 1, the cost of sales for pre-financing equated with 80% of the amount of the pre-financing. The prospective impacts of the changes in estimation of the amortization of multi-customer surveys, taking effect on October 1, 2018, are described in note 1.4.

In addition to the issue of amortization, management verifies, at least annually and more frequently in the event of any indication of impairment, that the carrying amount of multi-customer surveys does not exceed their recoverable amount. The assessment of the recoverable amount of multi-customer surveys is very largely based on management judgment with particular regard to the forecasting of future sales.

In that respect, and as indicated in note 10, USD 226 million of impairment losses were recognized at the end of 2018, including USD 197 of integral impairment of the StagSeis survey.

Given the elements described above, we considered measurement of the multi-customer library and multi-customer revenue recognition as a key audit point.

Our response

We examined the calculation of the impact of first-time application of IFRS 15 on consolidated equity as of January 1, 2018. In particular, we assessed the completeness of the surveys taken into account (i.e. those in progress at January 1, 2018) and the completeness of the associated revenue and cumulative amortization recognized. We also examined the impact of IFRS 15 on the consolidated statement of income for 2018. In particular, we tested a sample of the pre-financing contracts signed in 2018 and, for pre-financing revenue for 2018, we tested on a sample basis for the effective delivery of data in 2018.

We assessed the coherency of management's justification for the changes in estimation relating to the amortization of multi-customer surveys, and recalculated the prospective impact of the changes.

We assessed forecasted future sales by comparison with management's revenue forecasts for the purpose of impairment testing of the previous year, with the revenue effectively generated and with surveys' attractiveness for potential customers. In particular, we assessed the consistency of the revenue forecasts with the dynamics applicable to each oilfield. When management judged that impairment should be recognized, in particular for the StagSeis survey, we questioned management as to the reasons for the impairment loss and assessed its consistency with our understanding of the market.

Finally we assessed the appropriateness of the information provided as to the impacts of the first-time application of IFRS 15 to multi-customer revenue recognition and the impacts of the changes in estimation of survey amortization.

Specific Verifications

We have also performed, in accordance with professional standards applicable in France, the specific verifications required by laws and regulations of the Group information given in the management report of the Board of Directors.

We have no matters to report as to its fair presentation and consistency with the consolidated financial statements.

We attest that the consolidated declaration of extra-financial performance required by Article L225-102-1 of the French code of commercial law is included in the Group's management report, it being specified that, in accordance with article L823-10 of the Code, we have verified neither the fair presentation nor the consistency with the consolidated financial statements of the information contained therein. This information should be reported on by an independent third party.

Report on other legal and regulatory requirements

Appointment of the statutory auditors

We were appointed as statutory auditors of CGG by the annual general meeting held on May 15, 2003 for Mazars and on June 29, 1977 for ERNST & YOUNG et Autres.

As of December 31, 2018 Mazars was in the 16th year of total uninterrupted engagement, and ERNST & YOUNG et Autres in the 42nd year of total uninterrupted engagement, which are the 16th year and 38th year respectively since securities of the Company were admitted to trading on a regulated market.

Responsibilities of management and those charged with governance for the consolidated financial statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with International Financial Reporting Standards as adopted by the European Union and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless it is intended to liquidate the Company or to cease operations.

The Audit Committee is responsible for monitoring the financial reporting process and the effectiveness of internal control and risk management systems and where applicable, internal audit, regarding the accounting and financial reporting procedures.

The consolidated financial statements were approved by the Board of Directors.

Statutory auditors' responsibilities for the audit of the consolidated financial statements

Objective and audit approach

Our role is to issue a report on the consolidated financial statements. Our objective is to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with professional standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the consolidated financial statements.

As specified in Article L823-10-1 of the French code of commercial law, our statutory audit does not include assurance on the viability of the Company or the quality of management of the affairs of the Company.

As part of an audit conducted in accordance with professional standards applicable in France, the statutory auditor exercises professional judgment throughout the audit and furthermore:

- Identifies and assesses the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, designs and performs audit procedures responsive to those risks, and obtains audit evidence considered to be sufficient and appropriate to provide a basis for the audit opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control;
- Obtains an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the internal control;
- Evaluates the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management in the consolidated financial statements;
- Assesses the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether any material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. This assessment is based on the audit evidence obtained up to the date of the audit report. However, future events or conditions may cause the Company to cease to continue as a going concern. If the statutory auditor concludes that a material uncertainty exists, there is a requirement to draw attention in the audit report to the related disclosures in the consolidated financial statements or, if such disclosures are not provided or are inadequate, to modify the opinion expressed therein;
- Evaluates the overall presentation of the consolidated financial statements and assesses whether they represent the underlying transactions and events in a manner that achieves fair presentation;
- Obtains sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. The statutory auditor is responsible for the direction, supervision and performance of the audit of the consolidated financial statements and for the opinion expressed on the consolidated financial statements.

Report to the Audit Committee

We submit a report to the Audit Committee which includes in particular a description of the scope of the audit and the audit program implemented, as well as the results of our audit. We also report, if any, significant deficiencies in internal control regarding the accounting and financial reporting procedures that we have identified.

Our report to the Audit Committee includes the risks of material misstatement that, in our professional judgment, were of most significance in the audit of the consolidated financial statements of the current period and which are therefore the key audit matters that we are required to describe in this report.

We also provide the Audit Committee with the declaration provided for in article 6 of Regulation (EU) N° 537/2014, confirming our independence within the meaning of the rules applicable in France such as they are set in particular by articles L822-10 to L822-14 of the French code of commercial law and in the French code of ethics (*code de déontologie*) for statutory auditors. Where appropriate, we discuss with the Audit Committee the risks that may reasonably be thought to bear on our independence, and the related safeguards.

Paris-La Défense and Courbevoie, April 5, 2019

The Statutory Auditors

ERNST & YOUNG et Autres	MAZARS
NICOLAS PFEUTY	JEAN-LUC BARLET

7.3 2018-2017 STATUTORY FINANCIAL STATEMENTS — CGG SA

7.3.1. 2018-2017 statutory financial statements — CGG SA

This section is in French only

7.3.2. Information on terms of payment

As of December 31, 2018, the parent company's trade payables totaled € 7.9 million, which can be broken down as follows:

Article D. 441 I.-1°: Invoices received and not

paid as of the end of the financial year although the due date has passed

	0 days	1 to 30 days	31 to 60 days	61 to 90 days	91 days or more	Total (1 day or more)
(A) Late payment periods (see note below)						
Total number of invoices concerned	58					82
Total amount of invoices concerned, in millions of euros (incl. VAT)	6.7	-	-	-	1.2	1.2
Percentage of the total amount of invoices concerned	84.8%	-	-	-	15.2%	15.2%
(B) Invoices excluded from (A) that relate to unrecorded liabilities						
Number of excluded invoices	30					
Total amount of excluded invoices, in millions of euros (incl. VAT)	3.1					
(C) Reference payment terms used (contractual or statutory - article L. 441-6 or article L. 443-1 of the French Commercial Code [Code du commerce])						
Payment terms used to calculate late payments	☐ Contractual payment terms ☒ Statutory payment terms					

As of December 31, 2018, the parent company's trade receivables totaled € 5.0 million, which can be broken down as follows:

Article D. 441 I.-1°: Invoices received and not

paid as of the end of the financial year although the due date has passed

	0 days	1 to 30 days	31 to 60 days	61 to 90 days	91 days or more	Total (1 day or more)
(A) Late payment periods (see note below)						
Total number of invoices concerned	16					3
Total amount of invoices concerned, in millions of euros (incl. VAT)	4.9	-	-	-	0.1	0.1
Percentage of the total amount of invoices concerned	98%	-	-	-	2%	2%
(B) Invoices excluded from (A) that relate to unrecorded liabilities						
Number of excluded invoices	None					
Total amount of excluded invoices, in millions of euros (incl. VAT)	None					
(C) Reference payment terms used (contractual or statutory - article L. 441-6 or article L. 443-1 of the French Commercial Code [Code du commerce])						
Payment terms used to calculate late payments	☐ Contractual payment terms ■ Statutory payment terms					

7.4 FINANCIAL RESULTS OF CGG SA (GROUP HOLDING COMPANY) OVER THE PAST 5 YEARS (ARTICLES R. 225-83 ET R. 225-102 OF THE FRENCH COMMERCIAL CODE)

In Euros	2014	2015	2016	2017	2018
I. Financial position at year-end					
a) Capital stock	70,826,077	70,826,077	17,706,519	17,706,519	7,099,448
b) Number of shares outstanding	177,065,192	177,065,192	22,133,149	22,133,149	709,944,816
c) Maximal number of shares resulting from convertible bonds (see note below)	11,200,995	26,372,016	1,160,368	1,160,364	—
d) Total Equity	1,122,589,689	1,728,884,020	1,224,949,893	280,022,548	1,790,163,681
II. Earnings					
a) Sales net of sales tax	92 140 684	73,984,308	49,107,467	26,467,304	27,549,575
b) Earnings before taxes, employee profit sharing, depreciation and reserves	143 398 567	2,005,006,600	424,222,896	9,019,980	52,664,150
c) Employee profit sharing	—	—	—	—	—
d) Income taxes	57,118,390	(106,127,156)	1,319,915	(57,430,849)	250,482
e) Income after taxes, employee profit sharing, depreciation and reserves	(1,269,581,222)	606,294,331	(841,019,498)	(944,927,344)	(271,326,175)
f) Dividends	—	—	—	—	—
III. Earnings per share					
a) Earnings after taxes and profit sharing but before depreciation and reserves	0.49	11.92	19.11	3,00	0,07
b) Earnings after taxes, depreciation and reserves	(7.17)	3.42	(38.00)	(42,69)	(0,38)
c) Net dividend per share	—	—	—	—	—
IV. Personnel					
a) Average number of employees	39	37	34	32	27
b) Total payroll	6,862,431	6,486,844	6,664,549	8,923,393	8,229,076
c) Employee benefits (social security, etc.)	4,729,717	2,797,478	2,301,997	3,423,145	2,731,349

Note on convertible bonds: On February 21, 2018, CGG finalized the implementation of its financial restructuring plan. All bonds have been converted into shares.

7.5 REPORT OF THE STATUTORY AUDITORS ON THE 2018 FINANCIAL STATEMENTS — CGG SA

This section is in French only.

8 ADDITIONAL INFORMATION

8

ADDITIONAL INFORMATION

8.1. PERSONS RESPONSIBLE FOR THE PRESENT REFERENCE DOCUMENT

8.1.1. Name and function of persons responsible

Ms. Sophie ZURQUIYAH, Chief Executive Officer.

Mr. Yuri BAIDOUKOV, Chief Financial Officer.

8.1.2. Statement of the persons responsible

« We hereby testify that, based on all reasonable care taken in this respect, the information contained in this Reference document is, to our knowledge, consistent with the facts and does not omit anything likely to affect its significance.

We declare that, to the best of our knowledge, the financial statements have been prepared in accordance with applicable accounting standards and give a true and fair view of the assets and liabilities, financial position and results of the Company and all the companies included in the consolidation, and that the management report included in chapter 1, 2, 3, 4, 5, 6 and 7 of the present document presents a true and fair view of changes in the business, the results and financial position of the Company and all the companies included in the consolidation together with a description of the main risks and uncertainties the companies face.

We have obtained an end-of assignment letter (letter de fin de travaux) from the statutory auditors, in which they mention that they have performed, the verification of the consistency of the information pertaining to the financial position and statements contained in the present Reference document, and that they have read this Reference document in its entirety ».

Paris, on April 5, 2019

Ms. Sophie ZURQUIYAH	Mr. Yuri BAIDOUKOV
Chief Executive Officer	**Chief Financial Officer**

8.2. AUDITORS AS OF DECEMBER 31, 2018

Statutory auditors

Ernst & Young et autres

Member of the *Compagnie nationale des Commissaires aux Comptes de Versailles*

Tour First, 1, place des Saisons, TSA 14444, 92037 Paris — La Défense Cedex

Represented by Mr. Nicolas PFEUTY

Date of the last renewal : May 3, 2013

Duration : until the end of the Ordinary General Meeting convened to approve the 2018 financial statements

Mazars

Member of the *Compagnie nationale des Commissaires aux Comptes de Versailles*

Tour Exaltis, 61, rue Henri-Régnault, 92400 Courbevoie

Represented by Mr. Jean-Luc Barlet.

Date of the last renewal : May 3, 2013

Duration : until the end of the Ordinary General Meeting convened to approve the 2018 financial statements

Alternate auditors

Société Auditex

Tour First, 1, place des Saisons, TSA 14444, 92037 Paris — La Défense Cedex

Date of the last renewal : May 3, 2013

Duration : until the end of the Ordinary General Meeting convened to approve the 2018 financial statements

Mr. Hervé Hélias

Tour Exaltis, 61 rue Henri Regnault, 92400 Coubevoie

Date of the appointment : May 29, 2015

Duration : until the end of the Ordinary General Meeting convened to approve the 2018 financial statements

8.3. PUBLICLY AVAILABLE DOCUMENTS

Location of legal and financial documents regarding the Company

The articles of association, reports, mail and other documents of the Company, as well as its historical financial data and those of its subsidiaries for the last two years prior to the disclosure of this document, may be consulted directly at the Company's registered office.

8.4. CONCORDANCE TABLES

8.4.1. Concordance table for the reference document

The table below lists the information required by regulation (CE) No. 809/2004 of the Commission implementing Directive 2003/71/CE of the European Parliament and of the Council (« Prospectus Directive ») and makes it possible to identify the corresponding sections in the present Reference document. Information that are not applicable are indicated as « n.a. ».

European Regulation (a)		Section(s) of the Reference Document
1	**Persons responsibles**	8.1 Persons responsible for the present Reference document
	1.1 Name and positions of the persons responsible	8.1.1 Name and function of persons responsible
	1.2 Declaration by the persons responsible	8.1.2 Statement of the persons responsible
2	**Statutory Auditors**	8.2 Auditors as of December 31, 2018
	2.1 Name and addresses	8.2 Auditors as of December 31, 2018
	2.2 Change in auditors, where applicable	n.a.
3	**Selected financial information**	1.1 Selected financial data
		5.1 Operating and Financial Review
		5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017
	3.1 Information for each financial year for the period covered	5.1 Operating and Financial Review 5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017
		5.1.3 Year ended December 31, 2017 compared to year ended December 31, 2016
	3.2 Interim financial information	n.a.
4	**Risk factors**	2.1.1.1 Risks related to our Financial Restructuring
		2.1.1.2 Risks related to our Business
		2.1.1.3 Risks related to our Industry
		2.1.1.4 Risks related to our Indebtdness
		2.1.1.5 Risks related to Taxation
5	**Information about the issuer**	Item 6 — Information on the Company
		5.1 Operating and financial review
		5.1.4 Comments on the financial situation of the Company and the Group
	5.1 History and development of the issuer	1.2 History and significant events in the development of the Company's activities
	5.1.1 Legal and commercial name of the issuer	6.1.1 Registered name
	5.1.2 Registration	6.1.2 Place and number of registration
	5.1.3 Incorporation	6.1.3 Date of registration and duration of the Company (article 5 of the articles of association)
	5.1.4 Domicile — Legal form	6.1.4 Place of registration — legal form — applicable law — country of origin — address and phone number of the registered address
	5.1.5 Important events	1.2 History and significant events in the development of the Company's activities

(a) *European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.*

	European Regulation [a]	Section(s) of the Reference Document
	5.2 Investments	1.5 Research & Development («R&D »)
	5.2.1 Past principal investments	1.5 Research & Development («R&D »)
	5.2.2 Principal investments in progress	1.5 Research & Development («R&D »)
		5.1 Operating and Financial Review
		5.1.4 Comments on the financial situation of the Company and the Group
	5.2.3 Future principal investments	1.5 Research & Development («R&D »)
6	**Business overview**	1.3 Business Overview
	6.1 Principal activities	1.3 Business Overview
		1.3.1 Geology, Geophysics & Reservoir ("GGR")
		1.3.2 Equipment
		1.3.3 Contractual Data Acquisition
	6.1.1 Nature of the issuer's operations	1.3.1 Geology, Geophysics & Reservoir ("GGR")
		1.3.2 Equipment
		1.3.3 Contractual Data Acquisition
	6.1.2 New products	1.3.1 Geology, Geophysics & Reservoir ("GGR")
		1.3.2 Equipment
		1.3.3 Contractual Data Acquisition
	6.2 Principal markets	1.3.1 Geology, Geophysics & Reservoir ("GGR")
		1.3.2 Equipment
		1.3.3 Contractual Data Acquisition
	6.3 Exceptional factors	1.2 History and significant events in the development of the Company's activities: Financial restructuring process
	6.4 Extent to which the issuer is dependent on patents or licenses, industrial contracts or manufacturing processes	2.1.1.3.9 We depend on proprietary technology and are exposed to risks associated with the misappropriation or infringement of that technology
	6.5 Competitive position	1.3.1 Geology, Geophysics & Reservoir ("GGR")
		1.3.2 Equipment
		1.3.3 Contractual Data Acquisition
7	**Organizational structure**	1.7 Organization Chart — Intragroup transactions
	7.1 Description of the Group	1.7.1 Organization Chart
	7.2 List of significant subsidiaries	1.7.1 Organization Chart
		Note 32 of consolidated financial statements — List of principal consolidated subsidiaries as of December 31, 2018
8	**Property, plant and equipment**	1.4 List of the Group's locations
		Item 3 – Sustainable Development
	8.1 Material tangible fixed assets	1.4 List of the Group's locations
	8.2 Environmental issues	Item 3 — Sustainable Development
		2.1.1.2.8 We are exposed to financial risks related to the effects of climate change and we take measures to reduce them, by implementing a low-carbon strategy in every component of our activities
9	**Operating and financial results**	5.1 Operating and financial review
	9.1 Financial condition	1.1 Selected financial data
		5.1 Operating and financial review
		5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017
		5.1.4 Comments on the financial situation of the Company and the Group
		7.1 2016-2017-2018 CGG Consolidated financial statements

(a) European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.

European Regulation [(a)]		Section(s) of the Reference Document
	9.2 Operating results	1.1 Selected financial data 5.1 Operating and financial review 5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017 5.1.3 Year ended December 31, 2017 compared to year ended December 31, 2016 7.1 2016-2017-2018 CGG Consolidated financial statements
	9.2.1 Significant factors materially affecting the issuer's income from operations	n.a.
	9.2.2 Disclosure of material changes in net sales or revenues	Item 5 — Operating and financial review and Prospects Item 7 — 2018 Financial Statements — Financial information concerning the assets, financial position and results
	9.2.3 Strategy or factors that have materially affected, or could materially affect, directly or indirectly, the issuer's operations	1.2 History and significant events in the development of the Company's activities — History and significant events in the developmenet of the Contractual Data Acquisition segment
10	**Capital resources**	1.1 Selected financial data 7.1 2016-2017-2018 CGG Consolidated financial statements
	10.1 Issuer's capital ressources	7.1 2016-2017-2018 CGG Consolidated financial statements 5.1 Operating and financial review 5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017 5.1.3 Year ended December 31, 2017 compared to year ended December 31, 2016
	10.2 Sources and amounts of the issuer's cash flows	1.1 Selected financial data 7.1 2016-2017-2018 CGG Consolidated financial statements 5.1 Operating and financial review 5.1.4 Comments on the financial situation of the Company and the Group
	10.3 Information on the borrowing requirements and funding structure	5.1 Operating and financial review 5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017 5.1.3 Year ended December 31, 2017 compared to year ended December 31, 2016 5.1.4 Comments on the financial situation of the Company and the Group 2.1.1.4 Risks related to our Indebtedness
	10.4 Restrictions on the use of capital resources	2.1.1.4 Risks related to our Indebtedness
	10.5 Anticipated sources of funds	n.a.
11	**Research and Development**	1.5 Research & Development (« R&D ») Note 21 of consolidated financial statements — Research and Development expenses
12	**Trend information**	5.3 Prospects
	12.1 Most significant recent trends	5.3 Prospects
	12.2 Events that are reasonably likely to have a material effect on the issuer's prospects	5.3 Prospects

(a) European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.

European Regulation [a]		Section(s) of the Reference Document
13	**Profit forecasts or estimates**	n.a.
	13.1 Statement setting out the principal assumptions upon which the issuer has based its forecast or estimate	n.a.
	13.2 Report prepared by independent accountants or auditors	n.a.
	13.3 Preparation of the forecasts or estimates	n.a.
	13.4 Statement on the correctness of a forecast included in the prospectus	n.a.
14	**Administrative, management and supervisory bodies and senior management**	Item 4 — Report on Corporate Governance
		4.1.2 Board of Directors and Management
	14.1 Composition	4.1.2.1.1 Composition of the Board of Directors as of the date of this document
		4.1.2.2 General Management
	14.2 Conflicts of interests	4.1.2.3 Conflicts of interests
15	**Compensation and benefits**	Item 4 — Report on Corporate Governance
		4.2 Compensation
		Note 27 of Consolidated financial statements — Key management personnel compensation
	15.1 Compensation paid and benefits in kind	4.2.1 Compensation of the Board of Directors
		4.2.2 Compensation of the Senior Executive Officers
	15.2 Amounts set aside or accrued to provide pension, retirement or similar benefits	4.2.1 Compensation of the Board of Directors
		4.2.2 Compensation of the Senior Executive Officers
		Note 16 of Consolidated financial statements — Provisions
16	**Board practices**	Item 4 — Report on Corporate Governance
		4.1.3 Board of Directors — Committees
	16.1 Date of expiration of the current terms of office	4.1.2.1.1 Composition of the Board of Directors as of the date of this document
		4.1.2.2.3 Chief Executive Officer
	16.2 Members of the administrative or management bodies' service contracts with the issuer or any of its subsidiaries	4.1.2.1.1 Composition of the Board of Directors as of the date of this document
		4.2.5 Transactions entered into between the Company and its Executives and/or shareholder holding more than 10% of the voting rights
	16.3 Information about Audit and Remuneration Committee	4.1.3.2 Board Committees
	16.4 Statement of compliance with the corporate governance regime in force	4.1.1 Code of Corporate Governance applied by the Company
17	**Employees**	Item 3 — Sustainable Development
		Note 26 of Consolidated financial statements — Personnel
	17.1 Number and breakdown of employees	1.4 List of the Group's locations
		Item 3 — Sustainable Development
		3.3.3.1 Situation and developments in 2018
	17.2 Shareholdings and stock-options	Item 3 — Sustainable Development
		3.3.3.3. Indicators regarding attracting and retaining employees
		Item 4 — Report on Corporate Governance

(a) European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.

	European Regulation [a]	Section(s) of the Reference Document
		4.2.2.3.2 Stock options allocated to the Executive Officers
		4.2.2.3.3 Performance shares allocated to Executive Officers (pursuant to Article L. 225-97-1 of the French Commercial Code)
		4.2.3. Other compensation
	17.3 Arrangements for involving the employees in the capital of the issuer	4.2.3 Other compensation
18	**Major Shareholders**	4.3.2. Main shareholders
		4.3.2.1 Current structure of the share capital and of voting rights
	18.1 Identification of the main shareholders	4.3.2.1.1 Share capital as of December 31, 2018
		4.3.2.1.2 Evolution of the share capital over the past three years — Share capital as of February 28, 2019
	18.2 Breakdown of voting rights	4.3.2.1.1 Share capital as of December 31, 2018
	18.3 Controlling shareholder	4.3.2.1.1 Share capital as of December 31, 2018
	18.4 Arrangements which may result in a change in control of the issuer	4.3.2.1 Current structure of the share capital and of voting rights
		4.3.2.1.1 Share capital as of December 31, 2018
19	**Related party transactions**	4.2.5 Transactions entered into between the Company and its Executives and/or shareholder holding more than 10% of the voting rights
		6.3 Related party transactions
		Note 28 of Consolidated financial statements — Related party transactions
20	**Financial Information concerning the issuer's assets and liabilities, financial position and profits and losses**	Item 7 — 2018 Financial Statements — Financial information concerning the assets, financial position and results
	20.1 Historical financial information	1.1 Selected financial data
		7.1 2016-2017-2018 CGG Consolidated financial statements
	20.2 Pro forma financial information	Item 5 — Operating and financial review and Prospects
	20.3 Financial statements	1.1 Selected financial data
		7.1 2016-2017-2018 CGG Consolidated financial statements
	20.4 Auditing of historical annual financial information	7.1 2016-2017-2018 CGG Consolidated financial statements
		7.2 Report of the Statutory Auditors on the 2018 Consolidated financial statements
	20.4.1 Statement indicating that the historical financial information has been audited	8.2 Statutory Auditors
		7.1 2016-2017-2018 CGG Consolidated financial statements
	20.4.2 Indication of other information which has been audited	8.2 Statutory Auditors
		7.1 2016-2017-2018 CGG Consolidated financial statements
		7.2 Report of the Statutory Auditors on the 2018 Consolidated Financial Statements
		4.2.6 Special report of Statutory Auditors on the regulated agreements and undertakings

(a) European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.

	European Regulation [a]	Section(s) of the Reference Document
	20.4.3 Source of the data when financial data in the reference document is not extracted from the issuer's audited financial statements	8.2 Statutory Auditors
	20.5 Date of latest financial information	7.1 2016-2017-2018 CGG Consolidated financial statements
	20.5.1 The last year of audited financial information may not be older than : a) 18 months from the date of the Reference Document, if the issuer has included audited interim financial statements in it; b) 15 months from the date of the Reference Document, if the issuer has included non-audited interim financial statements in it	
	20.6 Interim and other financial information	7.1 2016-2017-2018 CGG Consolidated financial statements
	20.6.1 Quarterly or half-yearly financial information	
	20.6.2 Interim financial information	
	20.7 Dividend policy	6.1.8 Dividends
	20.7.1 Amount of dividends	
	20.8 Legal and arbitration proceedings	2.3 Litigation
	20.9 Significant change in the issuer's financial or trading position	1.2 History and significant events in the development of the Company's activities
		1.3 Business overview
		1.3.3 Contractual Data Acquisition
		5.1 Operating and financial review
		5.3 Prospects
21	**Additional Information**	4.3.1 General information on the Company's share capital
	21.1 Share capital	4.3.1 General information on the Company's share capital
		4.3.1.2 Share capital
	21.1.1 Amount of issued capital	4.3.1.2 Share capital
		Note 15 of Consolidated financial statements — Common stock and stock option plans
	21.1.2 Shares not representing capital	4.3.1.5 Securities not giving access to the share capital
	21.1.3 Shares held by or on behalf of the issuer itself	4.3.2.1.1 Share capital as of December 31, 2018
		4.3.2.1.2 Evolution of the share capital over the past three years — Share capital as of February 28, 2019
	21.1.4 Convertible securities, exchangeable securities or securities with warrants	4.2.3 Other compensation 4.3.1.2 Share capital — Dilutive instruments
	21.1.5 Information about and terms of any acquisition rigts and/or obligations over authorized but unissued capital or an undertaking to increase the capital	4.3.1.4 Authorized capital
	21.1.6 Information about any capital of any member of the group which is under option or agreed conditionally to be put under option	n.a.
	21.1.7 History of share capital	4.3.2.1.2 Evolution of the share capital over the past three years – Share capital as of February 28, 2019
		4.3.1.2 Share capital
	21.2 Memorandum and articles of association	6.1.5 Corporate object (article 2 of the articles of association)
	21.2.1 Description of issuer's objects and purposes	6.1.5 Corporate object (article 2 of the articles of association)
	21.2.2 Provisions of the issuer's articles of association, statutes, charter or bylaws with respect to administrative, management and supervisory bodies	4.1.3.1 Preparation and organization of the works of the Board of Directors

(a) *European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.*

European Regulation [a]		Section(s) of the Reference Document
	21.2.3 Description of the rights, preferential rights and restrictions attached to shares	4.3.2.1.1 Share capital as of December 31, 2018
	21.2.4 Description of the actions required to change the rights of holders of the shares	4.3.1.1 Changes in the share capital and voting rights
	21.2.5 Description of the conditions governing the manner in which Annual General Meetings and Extraordinary General Meetings of Shareholders are called	4.3.1.6 General meetings
	21.2.6 Description of any provision that would have an effect of delaying, deferring or preventing a change in control of the issuer	4.3.2.1.1 Share capital as of December 31, 2018
	21.2.7 Description of the conditions governing the ownership threshold above which shareholder ownership must be disclosed	4.3.2.1.1 Share capital as of December 31, 2018
	21.2.8 Description of the conditions governing changes in the capital, where such conditions are more stringent than is required by law	4.3.2.1.1 Share capital as of December 31, 2018
22	**Material contracts**	6.2 Material contracts See Note 28 to our 2018 Consolidated financial statements — contractual obligations, off-balance sheet commitments and exposure
23	**Third party information, statements by experts and declarations of any interest**	n.a.
	23.1 Statement or report attributed to a person acting as an expert	n.a.
	23.2 Information sources from third parties	n.a.
24	**Publicly available documents**	8.3 Publicly available documents
25	**Information on participating interests**	1.7 Organization Chart — Intragroup transactions 5.1 Operating and Financial Review

8.4.2. Management report concordance table

The table below lists the references to sections of the Reference Document corresponding to the information contained in the Management Report provided for by Articles L. 233-26 et R. 225-102 of the French Commercial Code.

Headings from the French Commercial Code	Section(s) of the Reference Document
Group situation and activity	1.3 Business overview
Objective and comprehensive analysis of changes in business, results and the financial situation of the Company and the Group	5.1 Operating and financial review
Key financial and non-financial performance indicators relating to the Company and the Group's specific activity	1.1 Selected financial data Item 3 — Sustainable Development
Company and Group foreseeable trends and outlook	1.3 Business Overview 1.3.1 Geology, Geophysics & Reservoir ("GGR") 1.3.2 Equipment 1.3.3 Contractual Data Acquisition 5.3 Prospects
Significant events occurring between the fiscal year closing date and the Management Report preparation date	1.6 Post-closing events
Research and Development activities	1.5 Research & Development («R&D »)
Amount of dividends paid out in respect of the three previous fiscal years	5.1.2 Year ended December 31, 2018 compared to year ended December 31, 2017

(a) *European legislation includes the European Parliament and Council Directive 2003/71/CE of 4 November 2003 on the prospectus to be published when securities are offered to the public or admitted to trading and the Council amending Directive 809/2004 of 29 April 2004 implementing the Directive.*

Headings from the French Commercial Code	Section(s) of the Reference Document
Information on suppliers and customers payment terms	7.3.1 2018-2017 Statutory financial statements — CGG SA: Note 11 — Suppliers debts 7.3.2 Information on terms of payment
Description of the main risks and uncertainties faced by the Company and the Group	2.1 Risk factors Item 3 — Sustainable Development
Indication of the use of financial instruments by the Company and the Group	5.2 Information on the utilization of financial instruments
Exposure to price risk, credit risk, liquidity and cash-flow risks	2.1 Risk Factors
Description and management of the environmental and climatic risks ; Sustainable development	Item 3 — Sustainable Development
List of all terms of office and functions held in any company by each Executive Officer during the fiscal year	4.1.2 Board of Directors and Management
General management organization	4.1.2.2.1 General Management organization
Remuneration and benefits of all kinds paid during the fiscal year to each Executive Officer by the Company	4.2.2 Compensation of the Senior Executive Officers
Information on Company's shares trading by executive Officers and related persons	4.2.5 Transactions entered into between the Company and its Executives and/or shareholder holding more than 10% of the voting rights
Stock options and free share grants to Executive Officers	4.2.2.3.2 Stock options allocated to the Executive Officers 4.2.2.3.3 Performance shares allocated to Executive Officers (pursuant to Article L. 225-97-1 of the French Commercial Code) 4.2.3 Other compensation
Breakdown of share capital	4.3.2.1 Current structure of the share capital and of voting rights
Acquisition and disposal by the Company of treasury shares	4.3.2.1.1 Share capital as of December 31, 2018
Share buyback programs	4.3.1.3 Share buybak program approved by the General Meeting held on April 26, 2018
Employee share ownership	4.3.2.1.1 Share capital as of December 31, 2018
Modifications to accounts presentation method	5.1 Operating and financial review
Table of Company results over the past five fiscal years	7.4 Financial results of CGG SA (Group Holding Company) over the past five years (Articles R.225-83 and R.225-102 of the French Commercial Code)
Summary table of delegations of authority currently in force granted by the Shareholders' Meeting relating to an increase in capital	4.3.1.4 Authorized capital
Information that may have an impact in the event of a takeover bid	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid

8.4.3. Concordance table for the annual financial report

The table below lists the references to sections of the Reference Document corresponding to the information which constitutes the Annual Financial Report that must be published by listed companies in accordance with Articles L. 451-1-2 of the French Monetary and Financial Code and Article 222-3 of General regulations of the French *Autorité des marchés financiers*.

Headings from the French Monetary and Financial code	Section(s) of the Reference Document
Annual financial statements	7.3. 2018-2017 Statutory financial statements — CGG SA (in French only) 7.4. Financial results of CGG SA (Group Holding Company) over the past five years (Article R.225-83 and R.225-102 of the French Commercial Code)
Statutory Auditors' Report on the Company's annual financial statements	7.5. Report of the Statutory Auditors on the 2018 financial statements — CGG SA (in French only)

Headings from the French Monetary and Financial code	Section(s) of the Reference Document
Consolidated financial statements	7.1. 2016-2017-2018 CGG Consolidated financial statements
Statutory Auditors' Report on the Company's the Consolidated financial statements	7.2. Report of the Statutory Auditors on the 2018 Consolidated financial statements
Management Report	See Concordance tables in section 8.4.2. of the present Reference document
Report on Corporate Governance	See Concordance tables in section 8.4.2. of the present Reference document
Statement of the persons assuming responsibility for the annual financial report	8.1.2. Statement of the persons responsible
Auditors' fees	Note 33 of Consolidated financial statements – Audit fees

8.4.4. Concordance table for the Report on Corporate Governance

The table below lists the references to sections of the Reference document corresponding to the information which constitutes the Report on Corporate Governance in accordance with Articles L. 225-37 et seq. of the French Commercial Code.

Headings from the French Commercial Code	Section(s) of the Reference Document
Remuneration and benefits of all kinds paid during the fiscal year to each Executive Officer by the Company and Controlled Entities	4.2 Compensation
Commitments of any kind made by the Company for the benefit of its Executive Officers	4.2.2.3 Compensation of the Senior Executive Officers for 2017 and 2018
List of all terms of office and functions held in any company by each Executive Officer during the fiscal year	4.1.2.2.3 Chief Executive Officer
Agreements between and Executive Officer or a major shareholder and a subsidiary	n.a.
Summary table of delegations of authority currently in force granted by the Sahreholders' Meeting relating to an increase in capital	4.3.1.4 Authorized capital
General management organization	4.1.2.2.1 General Management organization
Composition, preparation and organization of the work of the Board of Directors	4.1.2.1.1 Composition of the Board of Directors as of the date of this document 4.1.3.1 Preparation and organization of the works of the Board of Directors
Application of the principale of equal reprentation of women and men in the composition of the Board	4.1.2.1.5 Update on the Company's application of the principle of balanced representation on the Board of Directors
Limits on Chief Executive Officer's powers	4.1.2.2.2 Limitations of authority of the Chief Executive Officer
Reference to a Code of corporate governance and application of the principle comply or explain	4.1.1 Code of Corporate Governance applied by the Company
Specific conditions governing shareholders' attendance at the Annual General Meeting	4.3.1.6 General meetings
Share ownership and capital	4.3.1 General Information on the Company's share capital 4.3.2 Main shareholders
Restrictions on the exercise on voting rights and transfers of shares provided for in Company articles or agreements brought to the notice of the Company pursuant to article L. 233-11 of the French Commercial Code	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Direct or indirect participating interests in the Company's share capital, of which it is aware pursuant to Articles L 233-7 and L 233-12 of the French Commercial Code	4.3.2.1.1 Share capital as of December 31, 2018: Threshold crossing to be notified to the Company

Headings from the French Commercial Code	Section(s) of the Reference Document
Owners of any securities conferring special rights of control and description of these securities	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Control procedure provided in the event of potential employee shareholdings with control rights not exercised by the latter	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Agreements between shareholders of which the Company is aware and which may give rise to restrictions on share transfers	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Rules governing the appointment and replacement of board members and the amendment of the articles of association	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Powers of the Board of Directors and in particular -concerning the issuance or buyback of shares	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Agreements entered into by the Company that would change or terminate if there were a change in control of the Company, with the exception of those agreements whose disclosure would seriously harm its interests (except in the event of a legal obligation to disclose)	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid
Agreements between the issuer and its Board members or employees providing for compensation if the Board members resign or are made redundant without valid reason or if the employment of the employees ceases because of a takeover bid	4.3.2.1.1 Share capital as of December 31, 2018: Items likely to have an influence in the event of a take-over bid

CGG

A French *société anonyme* with a share capital of €7,099,479
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This reference document, prepared in accordance with article 212-13 of the
Autorité des marchés financiers General Regulations,
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It may be used in support of a financial transaction only if supplemented
by a prospectus which received approval from the *Autorité des marchés financiers*.