

Vale S.A.  
Form 6-K  
April 16, 2018  
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**United States**  
**Securities and Exchange Commission**

Washington, D.C. 20549

**FORM 6-K**

**Report of Foreign Private Issuer**

**Pursuant to Rule 13a-16 or 15d-16**

**of the**

**Securities Exchange Act of 1934**

**For the month of**

**April 2018**

**Vale S.A.**

**Praia de Botafogo 186 18º andar**

**22250-145 Rio de Janeiro, RJ, Brazil**

(Address of principal executive office)

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This press release may include statements that present Vale's expectations about future events or results. All statements, when based upon expectations about the future, involve various risks and uncertainties. Vale cannot guarantee that such statements will prove correct. These risks and uncertainties include factors related to the following: (a) the countries where we operate, especially Brazil and Canada; (b) the global economy; (c) the capital markets; (d) the mining and metals prices and their dependence on global industrial production, which is cyclical by nature; and (e) global competition in the markets in which Vale operates. To obtain further information on factors that may lead to results different from those forecast by Vale, please consult the reports Vale files with the U.S. Securities and Exchange Commission (SEC), the Brazilian Comissão de Valores Mobiliários (CVM), and the French Autorité des Marchés Financiers (AMF), and in particular the factors discussed under "Forward-Looking Statements" and "Risk Factors" in Vale's annual report on Form 20-F.

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Production and sales highlights

Rio de Janeiro, April 16th, 2018 Vale S.A. (Vale) maintained a strong supply and sales discipline in 1Q18 as part of its commitment to maximize margins over volume. Our premium and flexible portfolio of products is best positioned to lead and profit from the structural flight to quality trend. In 1Q18, Vale reached another milestone towards improving Fe content and price realization in line with its strategy.

Record sales volumes for a first quarter of iron ore and pellets totaled 84.3 Mt in 1Q18, 6.4 Mt higher than in 1Q17, achieving the best first quarter ever, due to flexibility and active management of its supply chain.

Vale's sales mix improved substantially year-on-year, as a result of S11D's ramp-up and the decision to progressively reduce low grade ore production. The share of pellets, Carajás and blended ores increased to 76% in 1Q18 from 67% of total sales in 1Q17. Consequently, Vale's product sales mix leveraged the impact of rising market premiums, driving the increase in the contributions of quality and average premium to Vale's realized CFR/FOB wmt price that amounted to US\$ 5.2/t in 1Q18 vs. US\$ 2.3/t in 1Q17 and US\$ 3.9/t in 4Q17.

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**Iron ore and pellets sales composition**

Iron ore production(1) reached 82.0 Mt in 1Q18, 4.2 Mt and 11.4 Mt lower than in 1Q17 and 4Q17, respectively, mainly due to management's decision in 2Q17 to reduce production of lower grade ore, reinforcing the positioning of Vale as a premium producer and resulting in higher price realization and better margins since 1Q17. The more intense rain season also affected production in 1Q18. As a result of the premium and flexible product portfolio, average Fe content reached 64.4% in 1Q18 when compared to 63.9% in 1Q17 and 64.3% in 4Q17, by far the best among its peers.

Northern system production, which comprises Carajás and S11D, was driven by S11D successful ramp-up and achieved a record for a first quarter of iron ore production of 40.6 Mt in 1Q18, 12.9% higher than in 1Q17.

Pellet production of 12.8 Mt in 1Q18 was 0.4 Mt higher than in 1Q17 marked by the restart of Tubarão II pellet plant. The restarts of Tubarão I and São Luís pellet plants are scheduled to 2Q18 and 3Q18, respectively, leveraging on the

increase in negotiated terms for pellet premiums averaging at US\$ 60/dmt for the year, an increase of more than US\$ 10/dmt vs. 2017.

Vale reaffirms its iron ore production guidance for 2018 of around 390 Mt, as previously announced on Vale Day.

Base metals production and sales performed in line with our decision to reduce the footprint of the Canadian operations by placing non-competitive mines on care and maintenance, following

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(1) Including third party purchases, run-of-mine and feed for pelletizing plants.

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Vale's strategy to optimize margins and maintain the optionality in the scenario of higher demand for nickel class I. As a consequence, nickel production reached 58,600 t in 1Q18, with sales of 57,900 t whilst LME nickel prices in the quarter continued to improve to an average of US\$ 13,276/t, from US\$ 11,584/t in 4Q17, representing the strongest pricing quarter since 1Q15. Nickel production is expected to increase to about 65,000 t in 2Q18.

Vale has adopted a rigorous capital allocation process based on returns. Projects will only be approved if they generate high returns at the current and conservative price scenarios, not depending on future price expectations. As a result, Voisey's Bay production output has been decreased to extend its mine life while the Voisey's Bay Mine Extension project is reassessed. Thompson will fully transition to a mine-mill operation in 3Q18, when its last furnace and refinery will be shut down, while production at the Long Harbour processing plant reached the quarterly record of 8,600 t in 1Q18.

Copper production reached 93,300 t in 1Q18, with sales of 87,700 t. In the quarter, LME copper price averaged US\$ 6,961/t, an increase of 2% from the US\$ 6,808/t registered in 4Q17, being the strongest pricing quarter since 4Q14. Copper production should achieve about 100,000 t in 2Q18.

Cobalt is one of the key metals, along with nickel, required to produce the highest energy density batteries for use in electric vehicles. Vale is an important cobalt producer, with about 6% of market share and about 15% of market share when excluding the DRC (Democratic Republic of Congo). Vale's cobalt production totaled 1,327 t in 1Q18, 68 t higher than 1Q17, capturing the good momentum of the market with LME cobalt prices increasing to the all-time record of US\$ 81,845/t in 1Q18 vs. US\$ 64,516/t in 4Q17.

The contained volume of gold as a byproduct in the nickel and copper concentrates reached 113,000 oz in 1Q18 7.6% higher than in 1Q17.

**Production summary**

| 000 metric tons    | 1Q18   | 4Q17   | 1Q17   | 1Q18/4Q17 | % change | 1Q18/1Q17 |
|--------------------|--------|--------|--------|-----------|----------|-----------|
| Iron ore(1)        | 81,953 | 93,361 | 86,198 | -12.2%    |          | -4.9%     |
| Pellets            | 12,780 | 12,898 | 12,422 | -0.9%     |          | 2.9%      |
| Manganese Ore      | 434    | 553    | 544    | -21.5%    |          | -20.2%    |
| Coal               | 2,432  | 2,576  | 2,434  | -5.6%     |          | -0.1%     |
| Nickel             | 58.6   | 78.0   | 71.4   | -24.9%    |          | -17.9%    |
| Copper(2)          | 93.3   | 113.5  | 107.5  | -17.8%    |          | -13.2%    |
| Cobalt             | 1.327  | 1.650  | 1.259  | -19.6%    |          | 5.4%      |
| Gold (000 oz troy) | 113    | 139    | 105    | -18.7%    |          | 7.6%      |

(1) Including third party purchases, run-of-mine and feed for pelletizing plants.

(2) Excluding Lubambe's attributable production.



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| <b>000 metric tons</b> | <b>1Q18</b> | <b>4Q17</b> | <b>1Q17</b> | <b>1Q18/4Q17</b> | <b>% change</b> | <b>1Q18/1Q17</b> |
|------------------------|-------------|-------------|-------------|------------------|-----------------|------------------|
| Iron ore(1)            | 71,221      | 79,958      | 65,318      | -10.9%           |                 | 9.0%             |
| Pellets                | 13,125      | 13,579      | 12,582      | -3.3%            |                 | 4.3%             |
| Manganese Ore          | 338         | 740         | 196         | -54.3%           |                 | 72.4%            |
| Coal                   | 2,497       | 2,943       | 2,568       | -15.2%           |                 | -2.8%            |
| Nickel                 | 57.9        | 79.8        | 72.1        | -27.4%           |                 | -19.7%           |
| Copper                 | 87.7        | 110.5       | 100.3       | -20.6%           |                 | -12.6%           |

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(1) Including third party purchases and run -of-mine.

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Iron ore

| 000 metric tons                   | 1Q18          | 4Q17          | 1Q17          | 1Q18/4Q17     | % change | 1Q18/1Q17     |
|-----------------------------------|---------------|---------------|---------------|---------------|----------|---------------|
| <b>Northern System</b>            | <b>40,601</b> | <b>46,683</b> | <b>35,974</b> | <b>-13.0%</b> |          | <b>12.9%</b>  |
| Carajás                           | 28,920        | 38,955        | 32,838        | -25.8%        |          | -11.9%        |
| S11D                              | 11,680        | 7,728         | 3,136         | 51.1%         |          | 272.4%        |
| <b>Southeastern System</b>        | <b>22,213</b> | <b>26,038</b> | <b>28,165</b> | <b>-14.7%</b> |          | <b>-21.1%</b> |
| Itabira                           | 9,040         | 10,333        | 8,821         | -12.5%        |          | 2.5%          |
| Minas Centrais                    | 7,755         | 8,456         | 10,337        | -8.3%         |          | -25.0%        |
| Mariana                           | 5,419         | 7,249         | 9,007         | -25.2%        |          | -39.8%        |
| <b>Southern System</b>            | <b>18,530</b> | <b>19,998</b> | <b>21,504</b> | <b>-7.3%</b>  |          | <b>-13.8%</b> |
| Paraopeba                         | 6,132         | 6,362         | 6,104         | -3.6%         |          | 0.5%          |
| Vargem Grande                     | 4,686         | 5,033         | 6,466         | -6.9%         |          | -27.5%        |
| Minas Itabirito                   | 7,712         | 8,604         | 8,934         | -10.4%        |          | -13.7%        |
| <b>Midwestern System</b>          | <b>609</b>    | <b>643</b>    | <b>555</b>    | <b>-5.3%</b>  |          | <b>9.7%</b>   |
| Corumbá                           | 609           | 643           | 555           | -5.3%         |          | 9.7%          |
| <b>IRON ORE(1) PRODUCTION</b>     | <b>81,953</b> | <b>93,361</b> | <b>86,198</b> | <b>-12.2%</b> |          | <b>-4.9%</b>  |
| <b>IRON ORE(2) SALES</b>          | <b>71,221</b> | <b>79,958</b> | <b>65,318</b> | <b>-10.9%</b> |          | <b>9.0%</b>   |
| <b>IRON ORE AND PELLETS SALES</b> | <b>84,346</b> | <b>93,537</b> | <b>77,900</b> | <b>-9.8%</b>  |          | <b>8.3%</b>   |

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(1) Including third party purchases, run-of-mine and feed for pelletizing plants.

(2) Including third party purchases and run-of-mine.

**Production and sales overview**

Vale's iron ore production achieved 82.0 Mt in 1Q18, mainly due to the Vale's decision to progressively reduce lower grade ore production from the Southern and Southeastern Systems, which resulted in 4.9% reduction when compared to 1Q17. Additionally, a more intense rain season in

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1Q18, also contributed with this impact. Compared to 4Q17, production was 12.2% lower due to this amplified weather-related seasonality in Brazil.

Nevertheless, sales volumes of iron ore and pellets totaled 84.3 Mt in 1Q18, 6.4 Mt higher than in 1Q17, achieving a record for a first quarter, as a result of the flexibility and active management of its supply chain, optimizing price realization and margins, thus resulting in a higher sales/production ratio. In the coming quarters, the sales/production ratio will reflect the ongoing offshore blending activities, completing the build-up of offshore stocks.

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Vale's sales mix improved substantially year-on-year, as a result of S11D's ramp-up and the decision to progressively reduce low grade ore production. The share of pellets, Carajás and blended ores increased to 76% in 1Q18 from 67% of total sales in 1Q17. Consequently, Vale's product mix leveraged the impact of rising market premiums, driving the increase in the contributions of quality and average premium to Vale's realized CFR/FOB wmt price that amounted to US\$ 5.2/t in 1Q18 vs. US\$ 2.3/t in 1Q17 and US\$ 3.9/t in 4Q17.

The Northern System achieved a production record for a first quarter of 40.6 Mt in 1Q18, 12.9% higher than in 1Q17, due to the S11D ramp-up.

Average Fe content was 64.4% in 1Q18, higher than the 64.3% in 4Q17 and the 63.9% in 1Q17, due to the S11D ramp-up and the reduction in lower grade ore production aligned with the ongoing strategy to maximize margins.

Vale reaffirms its production guidance for 2018 of around 390 Mt, as previously announced on Vale Day.

**Northern System**

The Northern System, which comprises Carajás and S11D, achieved a production record for a first quarter of 40.6 Mt in 1Q18, 6.1 Mt lower than in 4Q17 due to a heavier than usual weather-seasonality in 1Q18. Production increased 4.6 Mt in comparison to 1Q17, due to the S11D ramp-up, which positive contribution was partially offset by the negative impact of heavier rain in Feb18 vs. Feb17 (the rainfall index reached 556 mm in Feb18 vs. 472 mm in Feb17, an increase of 18%).

**Southeastern System**

The Southeastern System, which encompasses the Itabira, Minas Centrais and Mariana mining hubs, produced 22.2 Mt in 1Q18, 3.8 Mt lower than in 4Q17 mainly due to a heavier than usual weather-related seasonality. Production was 6.0 Mt lower than in 1Q17 due to Vale's actions to reduce supply of lower grade ore, as well as a more intense rainy season in 1Q18 (the rainfall index reached 1,001 mm in 1Q18 vs. 489 mm in 1Q17, an increase of 105%).

Aligned with the positioning of being a premium and flexible producer, Timbopeba plant resumed its operation at the end of 1Q18, with future production contributing to further improve the quality of Southeastern System's products.

**Southern System**

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The Southern System, which encompasses the Paraopeba, Vargem Grande and Minas Itabirito mining hubs, produced 18.5 Mt in 1Q18, 1.5 Mt lower than in 4Q17 due to a heavier than usual weather-related seasonality. Production was 3.0 Mt lower than in 1Q17 mainly due to Vale s

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actions to reduce supply of lower grade ore, as well as a more intense rainy season in 1Q18 (the rainfall index reached 730 mm in 1Q18 vs. 413 mm in 1Q17, an increase of 77%).

**Midwestern System**

The Midwestern System produced 0.6 Mt in 1Q18, in line with 4Q17 and 1Q17.

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## Pellets

| 000 metric tons            | 1Q18          | 4Q17          | 1Q17          | 1Q18/4Q17    | % change | 1Q18/1Q17    |
|----------------------------|---------------|---------------|---------------|--------------|----------|--------------|
| <b>Southeastern System</b> | <b>7,872</b>  | <b>7,890</b>  | <b>7,514</b>  | <b>-0.2%</b> |          | <b>4.8%</b>  |
| Tubarão 2                  | 536           |               |               | n.m.         |          | n.m.         |
| Itabrasco (Tubarão 3)      | 1,102         | 1,157         | 1,130         | -4.8%        |          | -2.5%        |
| Hispanobras (Tubarão 4)    | 1,109         | 1,160         | 1,128         | -4.4%        |          | -1.7%        |
| Nibrasco (Tubarão 5 and 6) | 2,295         | 2,372         | 2,401         | -3.2%        |          | -4.4%        |
| Kobrasco (Tubarão 7)       | 1,082         | 1,311         | 1,171         | -17.5%       |          | -7.6%        |
| Tubarão 8                  | 1,747         | 1,890         | 1,683         | -7.5%        |          | 3.8%         |
| <b>Southern System</b>     | <b>2,705</b>  | <b>2,605</b>  | <b>2,545</b>  | <b>3.8%</b>  |          | <b>6.3%</b>  |
| Fábrica                    | 979           | 989           | 919           | -1.0%        |          | 6.5%         |
| Vargem Grande              | 1,725         | 1,616         | 1,626         | 6.7%         |          | 6.1%         |
| <b>Oman</b>                | <b>2,204</b>  | <b>2,403</b>  | <b>2,364</b>  | <b>-8.3%</b> |          | <b>-6.8%</b> |
| <b>PELLETS PRODUCTION</b>  | <b>12,780</b> | <b>12,898</b> | <b>12,422</b> | <b>-0.9%</b> |          | <b>2.9%</b>  |
| <b>PELLETS SALES</b>       | <b>13,125</b> | <b>13,579</b> | <b>12,582</b> | <b>-3.3%</b> |          | <b>4.3%</b>  |

**Production overview**

Vale's pellet production totaled 12.8 Mt, in line with 4Q17 due to postponements of some scheduled maintenance stoppages from 4Q17 to 1Q18, which were in its turn offset by the successful restart of Tubarão II pellet plant, since January 2018. Pellet production was 2.9% higher than in 1Q17, mainly due to the restart of Tubarão II pellet plant, leveraging on the increase in negotiated terms for pellet premiums averaging at US\$ 60/dmt for the year, an increase of more than US\$ 10/dmt vs. 2017.

The start-ups of Tubarão I and São Luís pellet plants are envisioned for 2Q18 and 3Q18, respectively.

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Vale reaffirms its production guidance for 2018 of around 55 Mt, as previously announced on Vale Day.

### **Southeastern system**

Production at the Tubarão pellet plants Tubarão 2, 3, 4, 5, 6, 7 and 8 totaled 7.9 Mt in 1Q18, in line with 4Q17 and 0.4 Mt higher than in 1Q17 mainly due to the restart of Tubarão II pellet plant.

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**Southern system**

The Fábrica pellet plant achieved a production level of 1.0 Mt in 1Q18, in line with 4Q17 and 0.1 Mt higher than in 1Q17 due to higher productivity of the plant.

The Vargem Grande pellet plant reached 1.7 Mt of production in 1Q18, 0.1 Mt higher than in 4Q17 and 1Q17 due to higher productivity of the plant and higher availability of feed.

**Oman operations**

The Oman pellet plant reached 2.2 Mt of production in 1Q18, 0.2 Mt lower than in 4Q17 and 1Q17, due to scheduled maintenance stoppage postponed from 4Q17 to 1Q18, as well as some corrective maintenance.

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## Manganese ore and ferroalloys

| 000 metric tons                 | 1Q18       | 4Q17       | 1Q17       | 1Q18/4Q17     | 1Q18/1Q17     |
|---------------------------------|------------|------------|------------|---------------|---------------|
| <b>MANGANESE ORE PRODUCTION</b> | <b>434</b> | <b>553</b> | <b>544</b> | <b>-21.5%</b> | <b>-20.2%</b> |
| Azul                            | 234        | 352        | 367        | -33.5%        | -36.2%        |
| Urucum                          | 171        | 178        | 163        | -3.9%         | 4.9%          |
| Morro da Mina                   | 29         | 23         | 14         | 26.1%         | 107.1%        |
| <b>MANGANESE ORE SALES</b>      | <b>338</b> | <b>740</b> | <b>196</b> | <b>-54.3%</b> | <b>72.4%</b>  |
| <b>FERROALLOYS PRODUCTION</b>   | <b>45</b>  | <b>35</b>  | <b>36</b>  | <b>28.6%</b>  | <b>25.0%</b>  |
| <b>FERROALLOYS SALES</b>        | <b>34</b>  | <b>34</b>  | <b>30</b>  |               | <b>13.3%</b>  |

**Production and sales overview**

Manganese ore production totaled 434,000 t in 1Q18, decreasing 21.5% and 20.2% when compared to 4Q17 and 1Q17, respectively.

Sales volumes reached 338,000 t in 1Q18, 72.4% higher than in 1Q17 due to better river barge sailing conditions of Urucum ore in 1Q18 and to the management decision to increase the offshore inventories in 1Q17 in order to achieve higher price realization in the following quarters of 2017.

Ferroalloy production reached 45,000 t in 1Q18, increasing 28.6% and 25.0% when compared to 4Q17 and 1Q17, respectively.

Sales volumes totaled 34,000 t, in line with 4Q17 and 13.3% higher than in 1Q17.

**Manganese ore**

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Production at the Azul manganese mine totaled 234,000 t in 1Q18, 33.5% and 36.2% lower than in 4Q17 and 1Q17, respectively, mainly due to lower grades in the run-of-mine, resulting in lower product recovery.

Production at the Urucum mine totaled 171,000 t in 1Q18, in line with 4Q17, and 4.9% higher than in 1Q17 due to higher availability of run-of-mine, consequently increasing productivity.

Production at the Morro da Mina mine totaled 29,000 t in 1Q18, 26.1% higher than in 4Q17, mainly due to the maintenance stoppage in 4Q17, and 107.1% higher than in 1Q17 due to the 40 days stoppage in 1Q17 to clean the bottom of the pit.

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**Ferroalloy production**

Ferroalloy production in 1Q18 totaled 45,000 t, 28.6% and 25.0% higher than in 4Q17 and 1Q17, respectively, due to the resumption of one furnace in Ouro Preto in September 2017 and maintenance stoppage in Simões Filho in 1Q17 and 4Q17.

Production of 1Q18 was composed of 23,000 t of ferrosilicon manganese alloys (FeSiMn), 18,000 t of high-carbon manganese alloys (FeMnHC) and 4,000 t of medium-carbon manganese alloys (FeMnMC).

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Nickel

**Finished production by source**

| 000 metric tons            | 1Q18        | 4Q17        | 1Q17        | 1Q18/4Q17     | % change<br>1Q18/1Q17 |
|----------------------------|-------------|-------------|-------------|---------------|-----------------------|
| Canada                     | 28.8        | 37.9        | 36.1        | -24.0%        | -20.2%                |
| Sudbury                    | 14.0        | 17.7        | 17.9        | -20.9%        | -21.8%                |
| Thompson                   | 5.2         | 7.0         | 4.8         | -25.7%        | 8.3%                  |
| Voisey's Bay               | 9.6         | 13.2        | 13.5        | -27.3%        | -28.9%                |
| Indonesia                  | 13.8        | 19.0        | 16.3        | -27.4%        | -15.3%                |
| New Caledonia(1)           | 7.3         | 10.9        | 10.2        | -33.0%        | -28.4%                |
| Brazil                     | 5.7         | 6.0         | 6.1         | -5.0%         | -6.6%                 |
| Feed from third parties(2) | 3.0         | 4.2         | 2.7         | -28.6%        | 11.1%                 |
| <b>NICKEL PRODUCTION</b>   | <b>58.6</b> | <b>78.0</b> | <b>71.4</b> | <b>-24.9%</b> | <b>-17.9%</b>         |
| <b>NICKEL SALES</b>        | <b>57.9</b> | <b>79.8</b> | <b>72.1</b> | <b>-27.4%</b> | <b>-19.7%</b>         |

(1) Production at VNC reached 9,300 t in 1Q18, while production of finished nickel from VNC totaled 7,300 t in 1Q18, the differences are due to the required time for processing into finished nickel.

(2) External feed purchased from third parties and processed into finished nickel in the Canadian and Asian operations.

**Production and sales overview**

Production of finished nickel reached 58,600 t in 1Q18 mainly reflecting Vale's rigorous capital allocation process based on returns, that resulted in decreased Voisey's Bay production output to extend its mine life while the Voisey's Bay Mine Extension project is reassessed, as well as, Vale's decision to adjust its nickel supply by placing non-competitive mines, such as Stobie in Sudbury and Birchtree in Manitoba, on care and maintenance. Finished nickel production in 1Q18 was also impacted by (i) lower production of finished nickel from PTVI as a result of a planned maintenance shutdown in the Matsusaka refinery in Japan; (ii) unscheduled maintenance works at Sudbury's Coleman Mine; and (iii) timing issues with finished production from New Caledonian source material being shipped and consumed at downstream refineries, which resulted in 17.9% reduction when compared to 1Q17, with VNC finished production being expected to recover over the next quarters, given that the production rate at the site is going well. Nickel production is expected to increase to about 65,000 t in 2Q18.

Sales volumes of nickel were 57,900 t in 1Q18, reflecting lower production volumes in 1Q18 as well as finished inventories build-up of 700 t to replenish inventory levels.

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**Canadian operations**

Production from the Sudbury mines reached 14,000 t in 1Q18, 20.9% lower than in 4Q17 and 21.8% lower than in 1Q17. Sudbury source production decreased when compared to 1Q17 due to Vale's deliberate decision to place non-competitive mines on care and maintenance, which resulted in the cessation of mining activities at Stobie mine since 2Q17 as the company pursues its margin over volume strategy. When compared to 4Q17, the decrease was mainly due to the impact of structural challenges in the ventilating shaft at Coleman Mine, resulting in an unscheduled maintenance shutdown, with expected return to production by April 2018.

Production from the Thompson mines reached 5,200 t in 1Q18, 25.7% lower than in 4Q17 and 8.3% higher than in 1Q17. Production was lower than in 4Q17 due to some unscheduled maintenance shutdowns at the smelter and severe winter conditions, as well as mechanical and electrical limitations. The increase compared to 1Q17 occurred despite operating without Birchtree mine since the end of 3Q17, following Vale's strategy to optimize margins in the nickel business, as in 1Q17 Thompson experienced smelter operational issues. Thompson will fully transition to a mine-mill operation in 3Q18, when its last furnace and refinery will be shut down.

Production from the Voisey's Bay source reached 9,600 t in 1Q18, 27.3% lower than in 4Q17 and 28.9% lower than in 1Q17. The overall decrease was a deliberate decision to decrease production output in the mine in order to extend its mine life while Vale reassesses the economics of Voisey's Bay Mine Extension project. Additionally, production decreased in relation to 4Q17 also due to the total inventory drawdown of Voisey's Bay source concentrate that was being processed in Thompson and Sudbury refineries, and the decrease compared to 1Q17 was also due to the higher consumption rates of Voisey's Bay concentrate at Sudbury in 1Q17 while the Sudbury smelter operated with two furnaces.

Production at the Long Harbour processing plant reached the quarterly record of 8,600 t in 1Q18, 2.3% higher than 4Q17 and 109.8% higher than in 1Q17. The nickel concentrate being produced at Voisey's Bay is currently processed solely at Long Harbour. The refinery continues its successful ramp-up with trials of plating grade nickel for customers.

**Indonesian operation (PTVI)**

PTVI nickel in matte production reached 17,100 t in 1Q18, 11.2% lower than in 4Q17 and in line with 1Q17 production. The decrease compared to 4Q17 was mainly due to a scheduled partial maintenance shutdown. Production was in line with 1Q17 production as a similar scheduled maintenance shutdown was conducted in the period.

Production of finished nickel from PTVI reached 13,800 t in 1Q18, 27.4% lower than in 4Q17 and 15.3% lower than in 1Q17, mainly due to the negative impact of the scheduled annual maintenance shutdown at the Matsusaka refinery in Japan as well as the timing differences



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between mining and refining PTVI source feed that is being shipped to the Clydach refinery in Wales. PTVI source material is shipped to Clydach to maximize production of higher value carbonyl products following Vale's margin optimization strategy for the nickel business.

**New Caledonia operation (VNC)**

Production of NiO and NHC at VNC site (prior to shipping to Dalian in China for refining) was 9,300 t in 1Q18. Site production was 12.3% lower than in 4Q17 and 7.3% higher than in 1Q17. The decrease compared to 4Q17 was mainly due to power outages, lime production delays and lower feed grades. NiO represented 84%, and NHC 16%, of VNC's 1Q18 site production.

Production of finished products from VNC reached 7,300 t in 1Q18, 33.0% lower than 4Q17 and 28.4% lower than 1Q17, mainly due to restocking of supply chain inventories at the refinery in Dalian. VNC finished production is expected to recover over the next quarters, given that the production rate at the site is going well.

**Brazilian operation (Onça Puma)**

Production from the Onça Puma operation reached 5,700 t in 1Q18, 5.0% and 6.6% lower than in 4Q17 and in 1Q17, respectively. The decrease when compared to 4Q17 and 1Q17 was mainly due to lower ore grades.

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Copper

**Finished production by source**

| 000 metric tons          | 1Q18        | 4Q17         | 1Q17         | 1Q18/4Q17     | % change | 1Q18/1Q17     |
|--------------------------|-------------|--------------|--------------|---------------|----------|---------------|
| <b>BRAZIL</b>            | <b>66.1</b> | <b>75.6</b>  | <b>67.5</b>  | <b>-12.6%</b> |          | <b>-2.1%</b>  |
| Sossego                  | 22.5        | 22.6         | 24.9         | -0.4%         |          | -9.6%         |
| Salobo                   | 43.7        | 53.0         | 42.6         | -17.5%        |          | 2.6%          |
| <b>CANADA</b>            | <b>27.2</b> | <b>37.9</b>  | <b>40.0</b>  | <b>-28.2%</b> |          | <b>-32.0%</b> |
| Sudbury                  | 15.1        | 25.4         | 26.5         | -40.6%        |          | -43.0%        |
| Thompson                 | 0.2         | 0.7          | 0.3          | -71.4%        |          | -33.3%        |
| Voisey's Bay             | 8.4         | 9.2          | 9.1          | -8.7%         |          | -7.7%         |
| Feed from third parties  | 3.5         | 2.6          | 4.1          | 34.6%         |          | -14.6%        |
| <b>COPPER PRODUCTION</b> | <b>93.3</b> | <b>113.5</b> | <b>107.5</b> | <b>-17.8%</b> |          | <b>-13.2%</b> |
| <b>COPPER SALES</b>      | <b>87.7</b> | <b>110.5</b> | <b>100.3</b> | <b>-20.6%</b> |          | <b>-12.6%</b> |

**Production and sales overview**

Copper production reached 93,300 t in 1Q18, being 17.8% and 13.2% lower than in 4Q17 and 1Q17, respectively. The decrease was mainly due to: (i) lower production in Sudbury, a result of Vale's decision to place non-competitive mines on care and maintenance as well as the unscheduled maintenance shutdown at Coleman mine; and (ii) lower grades in Salobo, following the usual variability in base metals mining operations. Copper production should achieve about 100,000 t in 2Q18.

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Sales volumes of copper reached 87,700 t in 1Q18, 20.6% lower than in 4Q17 mainly due to lower production in 1Q18(2).

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(2) Vale mainly sells copper concentrates with sales volumes 3.5% lower compared to production volumes due losses in the smelting process.

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**Brazilian operations**

Production of copper in concentrate at Sossego totaled 22,500 t in 1Q18, in line with 4Q17 and 9.6% lower than in 1Q17. The decrease when compared to 1Q17 was due to lower ore grades being processed at the mill.

Production of copper in concentrate at Salobo reached 43,700 t in 1Q18, 17.5% lower than in 4Q17 and 2.6% higher than in 1Q17. The decrease when compared to 4Q17 was due to lower ore grade, which follows the usual variability in base metals mining operations, as well as some impacts of the rainy season on regular maintenance work. We expect the ore grades to improve in the next quarters. The increase compared to 1Q17 was due to strong plant performance and higher ore grades.

**Canadian operations**

Production of copper from the Sudbury mines reached 15,100 t in 1Q18, 40.6% and 43.0% lower than in 4Q17 and 1Q17, respectively, mainly due to: (i) Vale's decision to place non-competitive mines on care and maintenance, which resulted in the cessation of mining activities in Stobie mine; and (ii) the unscheduled maintenance shutdown at Coleman mine. The mine has been in a maintenance shutdown since November 2017 with return to production expected for April 2018. Additionally, in 1Q18, the Sudbury mines operated without the Stobie mine due to its shutdown in 2Q17 as Vale focuses on margins over volume in the nickel business.

Production of copper from Voisey's Bay reached 8,400 t in 1Q18, 8.7% and 7.7% lower than in 4Q17 and 1Q17, respectively, mainly due to the decision to decrease production output and, consequently, increase its mine life, while its mine extension project is reassessed.

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Cobalt

**Finished production by source**

|                             | 1Q18         | 4Q17         | 1Q17         | 1Q18/4Q17     | % change | 1Q18/1Q17   |
|-----------------------------|--------------|--------------|--------------|---------------|----------|-------------|
| <b>COBALT (metric tons)</b> | <b>1,327</b> | <b>1,650</b> | <b>1,259</b> | <b>-19.6%</b> |          | <b>5.4%</b> |
| Sudbury                     | 123          | 225          | 215          | -45.3%        |          | -42.8%      |
| Thompson(1)                 | 81           | -219         | 138          | n.a.          |          | -41.3%      |
| Voisey's Bay(1)             | 495          | 799          | 211          | -38.0%        |          | 134.6%      |
| VNC                         | 589          | 716          | 678          | -17.7%        |          | -13.1%      |
| Others                      | 39           | 130          | 17           | -70.0%        |          | 129.4%      |

(1) Cobalt by-product has been reclassified between Thompson and Voisey's Bay operations. The reconciliation of previous period volumes attributed a negative amount to Thompson and higher volumes to Voisey's Bay in 4Q17.

**Production and sales overview**

Cobalt production totaled 1,327 t in 1Q18, 19.6% lower and 5.4% higher than in 4Q17 and 1Q17, respectively. The decrease when compared to 4Q17 was mainly due to temporary lower production from Sudbury and New Caledonia. Vale's strategy to optimize margins includes focus on higher quality cobalt products, which led to the shift from cobalt cake to cobalt rounds production at Long Harbour to enhance our product mix with superior margins.

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Cobalt production from Sudbury was 123 t in 1Q18, 45.3% lower than 4Q17 and 42.8% lower than 1Q17. Sudbury cobalt production was adversely impacted by the unscheduled maintenance shutdown at Coleman.

Production from Voisey's Bay was 495 t in 1Q18, 38.0% lower than 4Q17 and 134.6% higher than 1Q17. The increase when compared to 4Q17 was mainly due to a spot reconciliation of previous period volumes that attributed a negative amount to Thompson and higher volumes to Voisey's Bay (254 t) in 4Q17. Cobalt production in Long Harbour (cobalt rounds) was 373 t in 1Q18, 7% lower than in 4Q17 and 227% higher than in 1Q17, when Long Harbour produced cobalt cake. The shift from cobalt cake to cobalt rounds follows Vale's strategy of focusing on margin and premium products, enabled by the successful ramp-up of the Long Harbour refinery. The decrease when compared to 4Q17 was mainly due to lower cobalt in the Voisey's Bay concentrate that was used to feed the Long Harbour refinery.

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Production from VNC reached 589 t in 1Q18, 17.7% and 13.1% lower than in 4Q17 and 1Q17, respectively, mainly due to lower feed grades as well as power outages and lime production delays.

Production from other sources was 39 t in 1Q18, 70.0% lower than 4Q17 and 129.4% higher than 1Q17. Other source production varies according to the cobalt content of external feeds that are consumed in the processes.

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Nickel and copper by-products

**Finished production by source**

|                                      | 1Q18       | 4Q17       | 1Q17       | 1Q18/4Q17     | % change | 1Q18/1Q17     |
|--------------------------------------|------------|------------|------------|---------------|----------|---------------|
| <b>PLATINUM (000 oz troy)</b>        | <b>31</b>  | <b>37</b>  | <b>36</b>  | <b>-16.2%</b> |          | <b>-13.9%</b> |
| <b>PALLADIUM (000 oz troy)</b>       | <b>73</b>  | <b>31</b>  | <b>61</b>  | <b>135.5%</b> |          | <b>19.7%</b>  |
| <b>GOLD BY-PRODUCT (000 oz troy)</b> | <b>113</b> | <b>139</b> | <b>105</b> | <b>-18.7%</b> |          | <b>7.6%</b>   |

**Platinum and palladium**

Platinum production in 1Q18 was 31,000 oz and palladium production was 73,000 oz, 16.2% lower and 135.5% higher than in 4Q17, respectively.

**Gold as a by-product of nickel and copper concentrates**

The contained volume of gold as a by-product in the nickel and copper concentrates reached 113,000 oz in 1Q18, 18.7% lower than in 4Q17 and 7.6% higher than in 1Q17.



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## Coal

| 000 metric tons        | 1Q18         | 4Q17         | 1Q17         | 1Q18/4Q17     | % change | 1Q18/1Q17    |
|------------------------|--------------|--------------|--------------|---------------|----------|--------------|
| <b>COAL PRODUCTION</b> | <b>2,432</b> | <b>2,576</b> | <b>2,434</b> | <b>-5.6%</b>  |          | <b>-0,1%</b> |
| Metallurgical coal     | 1,401        | 1,419        | 1,632        | -1.3%         |          | -14.2%       |
| Thermal coal           | 1,031        | 1,157        | 802          | -10.9%        |          | 28.6%        |
| <b>COAL SALES</b>      | <b>2,497</b> | <b>2,943</b> | <b>2,568</b> | <b>-15.2%</b> |          | <b>-2.8%</b> |
| Metallurgical coal     | 1,432        | 1,715        | 1,537        | -16.5%        |          | -6.8%        |
| Thermal coal           | 1,065        | 1,228        | 1,031        | -13.3%        |          | 3.3%         |

**Production and sales overview**

Vale keeps working towards the conclusion of the Moatize mine ramp-up and maintain its guidance to achieve 18 Mt in 2019. Production totaled 2.4 Mt in 1Q18, 5.6% lower than in 4Q17 and in line with 1Q17, as severe weather conditions during March resulted in power plant outages and in five flooded production pits, with the situation normalized during the latter half of the month. Additionally, production in 1Q18 was impacted by the mobilization of the workforce to resume operations to normal levels following the labor action in December 2017. Production of metallurgical coal was 1.4 Mt, 1.3% lower than 4Q17 and 14.2% lower than 1Q17. Thermal coal production was 1.0 Mt, 10.9% lower than 4Q17 and 28.6% higher than 1Q17.

Production in 2Q18 is expected to increase considerably when compared to 1Q18 with the expansion of mining areas. Despite the expected improvement in 2Q18, the abovementioned events in 1Q18 led to a review in the production guidance for 2018, which is now estimated at around 15 Mt.

Sales of metallurgical and thermal coal totaled 2.5 Mt in 1Q18.

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**Signatures**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

|                      |     |  |
|----------------------|-----|--|
|                      |     | Vale S.A.<br>(Registrant)                              |
| Date: April 16, 2018 | By: | /s/ André Figueiredo<br>Director of Investor Relations |