



RESEARCH ARTICLE

Article DOI: 10.58538/IJAR/2166

DOI URL: <http://dx.doi.org/10.58538/IJAR/2166>

UTILIZATION OF BAUXITE DUST FROM THE COMPAGNIE DES BAUXITES DE GUINÉE'S DRYERS FOR A SHIPMENT OF 25 MT OF BAUXITE WITH 3 % MOISTURE CONTENT

Amadou Tidia Diallo¹, Thierno Abdoulaye Barry³, Mouhamadou Massek Fall², Mamadou Lamine LO², Mame Mor Dione¹, Sitor Diouf¹, Cheik Tidiane Dione¹, Birame Ndiaye¹, Dame Cisse¹, Seydou BA¹, Mamadou Saar¹ and Momar Ndiaye¹

1. Faculté des Sciences et Techniques, Laboratoire de Chimie Physique Organique et d'Analyse Environnementale (LCPOAE)-UCAD, Dakar, Sénégal.
2. Ecole Polytechnique de Thiès Sénégal, Laboratoire Mixte de Recherche (LMR) BP: A-10.
3. Laboratoire de chimie du solide et Matériaux, Institut des Sciences chimiques de Rennes, 20 Avenue des buttes de Coësmes, 35708 France.

Manuscript Info

Manuscript History

Received: 23 August 2026

Final Accepted: 26 September 2026

Published: September 2026

Keywords:

Bauxite Dust, Environment, Dryer, Formulation, Drying

Abstract

Bauxite dust is widely used in the production of high-quality bauxite due to its high Al_2O_3 content. This bauxite residue was recovered from the dryer hoppers during the drying of bauxite at Department 42 of the Compagnie des Bauxites de Guinée. The dust and gas that have escaped from the cyclones are washed down by water jets from the scrubber, whilst the slurry is discharged into the settling ponds via two pumps into the East and West ponds. The slurry is then conveyed to the drying beds by dredging, where it is dried during the dry season and transported to the storage site. This study aims to further our understanding of the use of bauxite dust from the Compagnie des Bauxites de Guinée (CBG) in the bauxite industry, with a view to recycling bauxite residues. The initial raw samples were characterised using X-ray fluorescence spectroscopy (XRF). The quantity of bauxite to be exported is estimated at 26,042,000 tonnes, with a moisture content of 6.7 per cent. This figure varies depending on the provisional quantity. The results obtained demonstrate environmental potential for the production of high-quality alumina.

***Corresponding Author:** - Mamadou Lamine LO, Ecole Polytechnique de Thiès Sénégal, Laboratoire Mixte de Recherche (LMR) BP: A-10.

Introduction: -

Bauxite is a mineral whose main use (in over 90 per cent of cases) is the production of alumina (Al_2O_3), which is then processed into metallic aluminium. Other chemical applications of alumina include the ceramics, refractories, abrasives, cosmetics and pharmaceuticals industries, amongst others [1].

Since 1893, the Bayer process has been the most economical method and the one most widely used by refineries to produce alumina from bauxite. There are several alumina refineries around the world, a large proportion of which are located in tropical and subtropical regions (close to bauxite mines) [2].

According to surveys carried out in certain regions, the Republic of Guinea has reserves of over 40 billion tonnes of bauxite. The nature of bauxite is determined by its origin and the conditions under which it is processed. Guinean bauxite is characterised by a high alumina content and a low silica content [3].

China is currently the world's leading producer of alumina, accounting for more than half of global production (estimated at 90 Mt for 2025), followed at a considerable distance by Australia and Brazil [4].

We investigated the use of bauxite dust recovered from cyclone hoppers during the drying process. Whilst the bauxite is drying, the dust and gas that escape from the cyclone hoppers are carried through the duct into the scrubber, where they are washed out by jets of water. The slurry settles at the bottom of the cyclone separator where it is cooled, whilst the gas is discharged via the chimney. The slurry is pumped back into the settling ponds via two (2) pumps to the west and east. After the East and West lakes have settled, the overflow (water) is transferred to the central lake. This water is drawn off and pumped back into the system to supply the sprinklers. The sludge is removed by dredging and transported to the drying beds, where it will be dried during the dry season and taken to the shed. This bauxite residue contains, like gibbsite bauxite ($\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$), silica (SiO_2), anatase (TiO_2) and iron oxide (Fe_2O_3). The quantity of sludge currently available is estimated at over 2,040,240 tonnes.

The main problem facing the alumina industry is the production of huge quantities of bauxite residue (BR). These residues are classified as hazardous material in some countries. The annual volume of bauxite tailings produced is estimated at over 100 Mt, a figure that continues to change year on year [5] [6].

These residues take the form of ‘fugitive’ dust and sludge produced in settling ponds – resulting from the removal of dust by water jets in the scrubber during the drying of bauxite – and red mud produced by the Bayer process.

This study focuses on the dust generated by the mechanical processing (crushing and drying) of bauxite at the CBG plant in Kamsar.

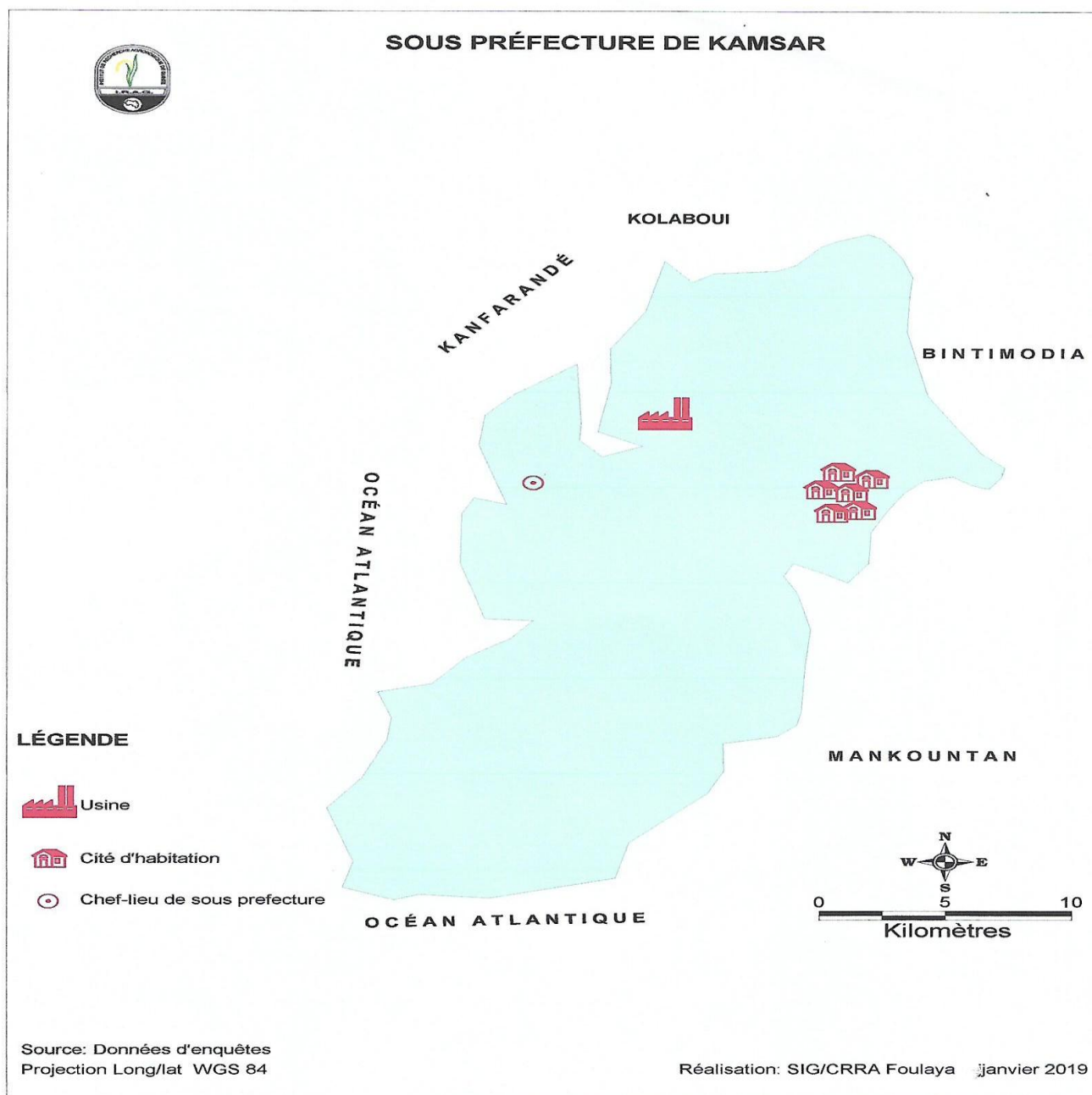
This involves the processing of bauxite dust in dryers for shipment of 25MT per year at 3 per cent moisture content.

Materials and Methods:-

Sampling site

The bauxite dust covered by this study was collected at the Compagnie des Bauxites de Guinée (CBG) plant, from the cyclone hoppers in bauxite drying department 42. This is situated between the bauxite crushing and dispatch departments. The geographical coordinates of the bauxite dust sampling site are 10.64438° N and 14.61173° E, and it is situated at an altitude of 42 m (Figure 1).

Figure 1:- Bauxite dust sampling site.



Sampling

This is an essential step which involves taking a representative sample of bauxite dust, possessing all the physico-chemical characteristics required for analysis. After the bauxite is mined at Sangaredi, it is transported to the Compagnie des Bauxites de Guinée to be crushed, dried and stored. Ten samples of bauxite dust were taken from the cyclone hoppers in the drying department and placed in plastic bags. Similarly, ten samples of bauxite slurry were taken from East Lake. These were then transported to the Compagnie des Bauxites de Guinée (CBG) laboratory to be analysed in order to determine their chemical composition.

Préparation des échantillons

After collection, the bauxite slurry samples were placed in an oven at 105°C for 8 hours. The dust samples were also dried in an oven at 190°C for 30 minutes. Finally, all the samples were ground to 100 mesh, and then sent to the XRF spectrometer to determine their chemical composition.

Figure 2: Bauxite slurry drying beds



Figure 3 : Bauxite storage site



Calculation of the ratio of dust and sludge added to bauxite intended for export

The quantity of bauxite to be exported in 2020 will be 25.000.000 tonnes at 3 % moisture content. These 25.000.000 tonnes at 3 % commercial moisture content correspond to 26.041.666 tonnes at 6.7 % moisture content in the dryers.

$$K = \frac{100-6,7}{100-3} = 0,96 \text{ si } K = t(3\%)/t(6,7\%) \cdot t(6,7\%) = t(3\%)/K = 25\,000\,000/0,96 = 26\,041\,666,666 \approx \mathbf{26\,042\,000\,t}$$

Taking 2017 as an example, the quantity of bauxite exported was 14,976,165 tonnes at 6.7 per cent, whilst the quantity of raw bauxite added was 4.766.784 tonnes. The proportion of raw bauxite was 31.8 per cent. Therefore, taking 31.8 per cent as the basis, the 26.042.000 tonnes will contain a total of 8.281.356 tonnes of raw bauxite.

The dried bauxite would amount to: 26.042.000 t – 8.281.356 t = 17.760.644 t at 6.7 per cent moisture content, which corresponds to 68.2 per cent. In previous years, from 2014 to 2017, tests showed 0.4 per cent slurry in the cyclone separators. These tests enabled us to determine a figure of 71.042.57 tonnes.

The amount of dust that passes through the cyclones is 1 per cent of the dried bauxite. In this case, this would amount to **177.606.44 t**.

The bauxite sent to Conveyor 9, excluding dust and slurry, is:

$$\text{Quantity of bauxite} - \text{Quantity of slurry} = 17\,760\,644\,t - 71.042\,t = 17.689.602\,t$$

The quantity of bauxite = 17.689.602 t (fully dried).

Recovery of sludge and dust

The amount of dust is equal to **177606,44 t** à 6.7% moisture

The amount of sludge is **71042 t** à 6.7% d'humidité

Given that these humidity levels are equal à 6.7%, let's bring them back to 3%

$$K = 100-3/100-6.7 = 1,035 \Rightarrow K = 1,035$$

The amount of sludge to 3% = 68639,61 t

The amount of dust at 3% = 171600,42 t

The total quantity to 3% = Amount of sludge + Amount of dust

The total quantity = **240 240,03 t**

The price per tonne is currently 28 dollars.

The expected benefit from recycling dust and sludge is **6 726 720,84 \$ US**

Results and Discussion:-

Chemical analysis

Results of the chemical analysis of bauxite slurry from the East.

The results of the chemical analysis of the bauxite slurry from Lac Est are set out in Table 1.

It is clear from this table that the bauxite slurry in Lake East is characterised by the following composition:

- The average chemical composition of the sample studied showed a predominance of alumina Al_2O_3 (47.02 %), a high content of Fe_2O_3 (18.56%), a relatively low average content of silica SiO_2 (7.62 %), a low average content of rutile or anatase TiO_2 (3.72 %), and a high average loss on ignition (LOI) (22.44 %). This is a typical composition for lateritic bauxite [7] [8].
- Sample No. 4 has a high alumina (Al_2O_3) content (49.40 %), indicating that the material is richer in gibbsite. Sample No. 10 has a higher ferric oxide content, which gives the material its red colour. The TiO_2 content varies between 3.46 % and 3.79 %, indicating the presence of rutile or anatase. The SiO_2 content, which varies between

6.61 % and 9.45 %, is high, which affects the quality of the bauxite slurry to be added to the bauxite intended for shipment by vessel. The $\text{Al}_2\text{O}_3/\text{Fe}_2\text{O}_3$ ratio falls within the range of 2.2–13.1, indicating that these bauxite slurries are of economic interest [5] [9].

Table 1:- Results of the analysis of bauxite slurry from Lake Est.

Date	ID	Poll	Description	PF	SiO ₂	TiO ₂	Fe ₂ O ₃	Al ₂ O ₃
24/08/2018	180824001	Lac Est	Ouest N°1	23,12	6,61	3,79	20,20	45,70
24/08/2018	180824001	Lac Est	Ouest N°2	22,56	6,95	3,76	20,10	46,00
24/08/2018	180824001	Lac Est	Nord Ouest N°3	22,57	7,29	3,82	19,30	46,30
24/08/2018	180824001	Lac Est	Nord Centre N°4	22,13	7,58	3,68	16,60	49,40
24/08/2018	180824001	Lac Est	Nord Est N°5	22,34	8,85	3,61	18,90	45,60
24/08/2018	180824001	Lac Est	Nord Est N°6	22,21	7,89	3,71	16,50	49,10
24/08/2018	180824001	Lac Est	Nord Est N°7	22,34	7,46	3,64	18,10	47,90
24/08/2018	180824001	Lac Est	Ouest Centre N°8	22,00	9,45	3,46	18,40	46,10
24/08/2018	180824001	Lac Est	Ouest Est N°9	22,54	6,88	3,98	18,10	47,80
24/08/2018	180824001	Lac Est	Sud centre N°10	22,59	7,30	3,77	19,40	46,30
Average				22,44	7,62	3,72	18,56	47,02

Results of the chemical analysis of dust from the dryers

Le résultat d’analyse de la composition chimique de la poussière est présenté dans le tableau 2
The results in Table 2 show a predominance of alumina Al_2O_3 (46.51 %), a high content of ferric oxide (Fe_2O_3) (21.01%), a low silica (SiO_2) content (2.50 %), a low rutile (TiO_2) content (3.60 %) and a high loss on ignition (LOI) (23.65 %). These results correspond to the typical characteristics of tropical bauxites [10].

An alumina (Al_2O_3) content ranging from 45.80 % to 47.10 %, which shows that the bauxite dust has a chemical composition identical to that of high-quality bauxite. The $\text{Al}_2\text{O}_3/\text{SiO}_2$ ratio is 18.60, indicating that the bauxite is of good quality. A silica content ranging from 2.17 % to 3.11 % is low, indicating that this dust is of the lateritic bauxite type. The TiO_2 (rutile) content ranges from 3.45 % to 3.75 %, which indicates the presence of anatase or silica in the bauxite dust. The loss on ignition is high, ranging from 22.83 % to 24.4 %; this indicates the loss of weight of the sample during drying [11] [12] [13].

Tableau 2:- Résultats d’analyse de la poussière aux sècheurs de la bauxite.

Date	ID	Poll	Description	PF	SiO ₂	TiO ₂	Fe ₂ O ₃	Al ₂ O ₃
15/09/2018	180915008	Four2	cycloneN°1	22,83	2,79	3,57	23,10	47,10
15/09/2018	180915009	Four1	cyclone N°2	23,85	2,28	3,43	24,00	45,80
15/09/2018	180915010	Four1	cyclone N°3	23,75	2,17	3,63	23,00	46,90
15/09/2018	180915011	Four2	cyclone N°4	24,24	2,26	3,75	22,60	46,60
15/09/2018	180915012	Four2	cyclone N°5	23,74	2,34	3,55	23,10	46,60
15/09/2018	180915013	Four3	cyclone N°6	23,63	2,38	3,68	22,90	46,70
15/09/2018	180915014	Four2	cyclone N°7	24,06	2,62	3,68	22,50	46,50
15/09/2018	180915015	Four3	cyclone N°8	22,97	3,16	3,73	23,40	46,00
15/09/2018	180915016	Four2	cyclone N°9	23,73	2,88	3,49	22,90	46,40
15/09/2018	180915017	Four2	cyclone N°10	23,70	3,11	3,45	22,60	46,50
Moyenne				23,65	2,50	3,60	21,01	46,51

Bauxite blending and simulation

The 2018 bauxite mix and simulation (slurry, raw bauxite, SMG bauxite) based on the SMG mining plan by quarter for 2018 are set out in Table 3.

The average alumina (Al_2O_3) content (47.03 %) is higher in the sludge than that of ferric oxide (Fe_2O_3), silica (SiO_2) and rutile (TiO_2). The alumina content falls within the range specified in the Sangarédi mining plan (Forecast). The average ferric oxide (Fe_2O_3) content is higher (18.56%) than that specified in the Forecast. The average silica (SiO_2) content (7.63 %) is higher than that in the mining plan for all quarters. These results show that adding a known quantity of bauxite slurry has no significant impact on the quality of the bauxite to be shipped [14].

The quantity of dried bauxite is almost double that of raw bauxite; the quantity of dried bauxite is more than two hundred times that of bauxite slurry. June, July, August and September are the rainy season [15].

Tableau 3:- 2018 Bauxite Blend and simulation (slurry, raw bauxite, SMG bauxite) next the plan minier SMG per quarter 2018.

Sludge composition					Bauxite Blend 2018				Simulation			Mining plan SMG per quarter 2018					
					Boue		Brute		Dryers	boue, brute et bauxite SMG							
N°	Site	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	Mois	Tonnage		Tonnage		Tonnage	SiO ₂	Fe ₂ O ₃	Al ₂ O ₃	SiO2	Fe2O3	Al2O3	Trimestre
1	Lac Est	6,61	20,2	45,7	janv-18	10148		690 113		1 474 134	1,99	19,36	50,00	1,97	19,36	50,02	T1
2	Lac Est	6,95	20,1	46,0	févr-18	10148		690 113		1 474 134	1,99	19,36	50,00				
3	Lac Est	7,29	19,3	46,3	mars-18	10148		690 113		1 474 134	1,99	19,36	50,00				
4	Lac Est	7,58	16,6	49,4	avr-18	10149		690 113		1 474 134	2,00	19,47	50,02	1,98	19,48	50,02	T2
5	Lac Est	8,85	18,9	45,6	mai-18	10149		690 113		1 474 134	2,01	19,48	50,00				
6	Lac Est	7,89	16,5	49,1	juin-18	0		690 113		1 474 134	1,98	19,48	50,02				
7	Lac Est	7,46	18,1	47,9	juil-18	0		690 113		1 474 134	2,06	18,36	49,94	2,06	18,36	49,94	T3
8	Lac Est	9,45	18,4	46,1	août-18	0		690 113		1 474 134	2,06	18,36	49,94				
9	Lac Est	6,88	18,1	47,8	sept-18	0		690 113		1 474 134	2,06	18,36	49,94				
10	Lac Est	7,3	19,4	46,3	oct-18	0		690 113		1 474 134	2,11	18,21	49,94	2,09	18,20	49,95	T4
11	Lac Est	7,63	18,56	47,03	nov-18	10150		690 113		1 474 134	2,11	18,20	49,94				
12	Lac Est	7,63	18,56	47,03	déc-18	10150		690 113		1 474 134	2,11	18,20	49,94				
Average					Total	71 042		8 281 356		17 689 602				±0,3	±0,4	±1,5	

Total 26 042 000 à 6,7% moisture

Contents

Boue 0,27%

Brute 31,80%

Dryers 67,93%

Somme 100%

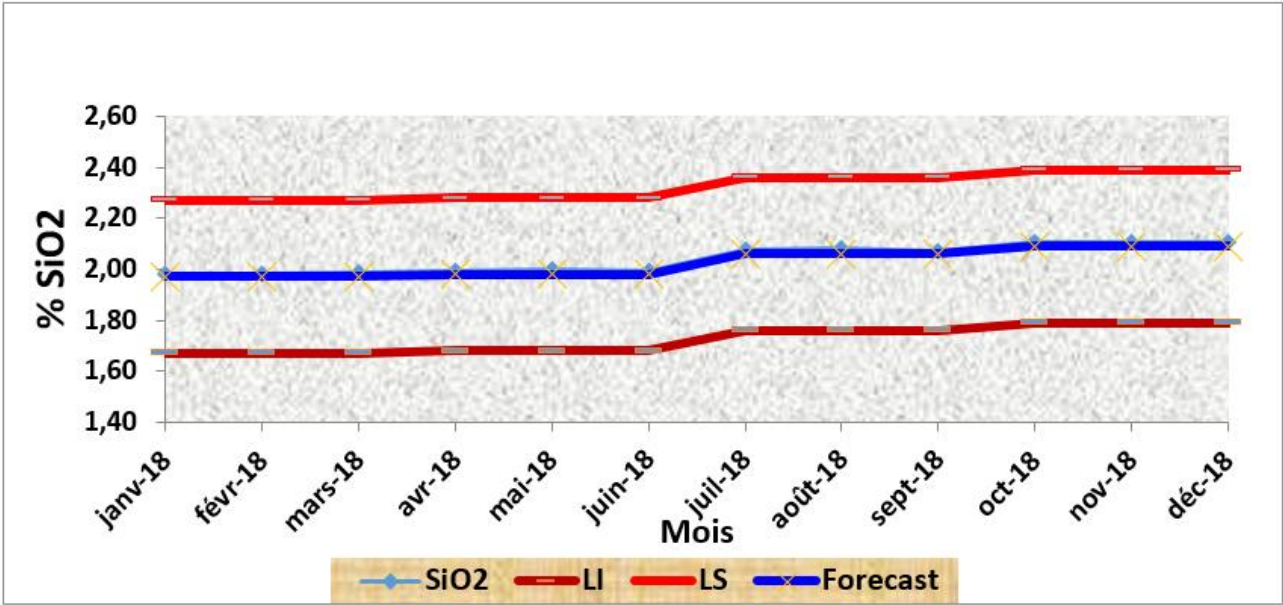


Figure 4: Simulation of silica (SiO_2) (a mixture of slurry, raw bauxite and dried bauxite)
The simulation results for silica (SiO_2) – a mixture of slurry, raw bauxite and dried bauxite – are shown in Figure 4. The silica curves from the simulation and the mining plan overlap, indicating that their compositional results are almost identical. Both curves lie between the upper limit and lower limit curves of the mining plan [14]. The four curves remain constant from January to June. They rise from June to December, indicating a slight increase in the silica content derived from the simulation, that of the mining plan, and those corresponding to the upper and lower limits of the mining plan [15]. The high silica content in the slurry will have no impact, provided the quantity of slurry to be added to the bauxite intended for export is known.

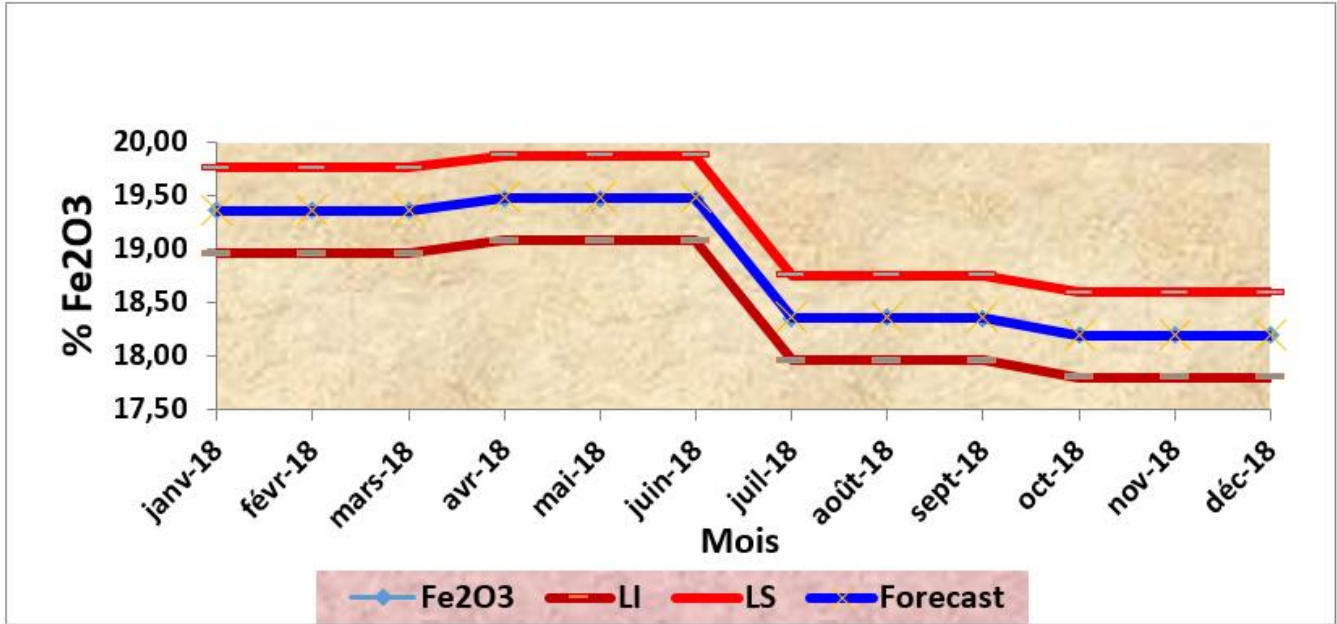


Figure 5:- Simulation of Fe_2O_3 (a mixture of slurry, raw bauxite and dried bauxite).

The simulation results for ferric oxide (Fe_2O_3): a mixture of slurry, raw bauxite and dried bauxite are shown in Figure 5.

The curve for ferric oxide (Fe_2O_3) and that for the mining plan are superimposed, indicating that their grades are very similar. The four curves representing ferric oxide – the mining plan, the lower limit and the upper limit of the forecast – remain constant from January to July. This shows that the ferric oxide simulation had no significant impact on the quality of the bauxite intended for export [17].

The four curves decline from June to July and then remain constant from July to December. This depends on the mining plan and the geological nature of the ore. The impurity ferric oxide does not adversely affect the alumina during the conversion of bauxite into alumina [18].

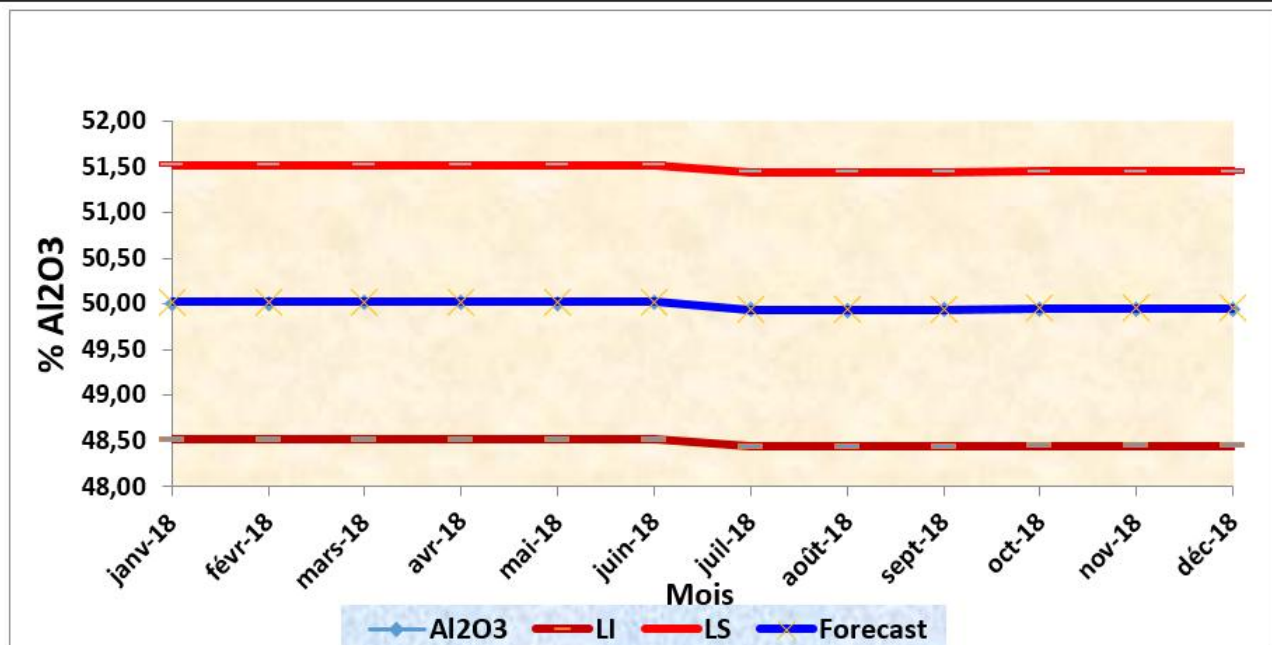


Figure 6:- Simulation of Al_2O_3 (a mixture of slurry, raw bauxite and dried bauxite).

The simulation results for alumina (Al_2O_3) – a mixture of slurry, raw bauxite and dried bauxite – are shown in Figure 6.

The alumina curve and the forecast curve remain aligned. The four curves representing alumina, the mining plan, the upper limit and the lower limit remain constant and parallel from January to December [20].

There is a significant gap between the two curves representing alumina, the mining plan, and the upper and lower limits of the forecast. The alumina oxide grade meets the standards set out in the mining plan. This indicates that there is greater scope for adding bauxite slurry due to the gap between the two combined curves and those representing the upper and lower limits of the forecast. [20] [21].

Conclusion:-

An analysis of the chemical composition of bauxite dust from the Compagnie des Bauxites de Guinée has made it possible to assess its potential for use as an additive to bauxite intended for export. The bauxite dust has an average alumina (Al_2O_3) content of 46.51 % and an average silica (SiO_2) content of 2.50 %, which are slightly lower than those of the Plan Miner, respectively. The bauxite slurry also has an average alumina (Al_2O_3) content of 47.03 % and an average silica (SiO_2) content of 7.63 %, which are slightly lower than the minimum requirements, respectively. The simulation of the quantity of bauxite slurry to be added to the bauxite for dispatch yielded the following results: 71,042 tonnes of bauxite slurry, 8,281,356 tonnes of raw bauxite, 17,689,602 tonnes of dried bauxite. The total quantity of bauxite to be shipped is 26,042,000 tonnes. The addition of slurry to the bauxite shipping process depends on the tonnage of raw and dried bauxite, the major element content and the contractual specifications of the mining plan.

This method of sludge recovery and recycling is of paramount importance for environmental protection and brings added value to the Compagnie des Bauxites de Guinée.

Bibliographie:-

1. Mamadou Yaya Diallo et al (2021). Physicochemical characterisation of bauxite from Débélé, Guinea, for potential use as an industrial mineral. DOI : <https://doi.org/10.4236/msce.2021.93002>. Pages :15
2. Brenda O.S (2013). 'Physico-chemical characterisation of Venezuelan bauxite tailings: assessment of options for their environmental recovery'. University of Lille 1, Faculty of Earth Sciences. PhD thesis. 92 pp..
3. Mamdov et al (2011). Book. Stages in the formation of the unique Sangaredi bauxite group, Fouta Jallon-Mandingue Province, West Africa. 666(6): 404–412. DOI: 10.3103/S0145875211060081. <https://link.springer.com/10.3103/SO...>
4. D. Dodoo-Arhin et al (2013). Fabrication and characterisation of composite bricks made from clay and red bauxite slurry from Ghana for construction applications. Published in the American Journal of Materials Science. 3(5): 110–119; DOI: 10.5923/j.materials.20130305.02.
5. D.njoya et al (2017). Chemical and mineralogical characterisation of selected bauxite occurrences in Fouban (Western Cameroon). <https://dx.doi.org/10.4314/ijbcs.v11i1.35>. Pages : 9
6. Verma et al. (2017). Utilisation des résidus de bauxite. Waste Management Research. Volume : 35(1). 999-1012. <http://journals.sagepub.com/doi/10...> DOI :10.1177/0734242x17720290
7. Brenda O.S (2013). 'Physico-chemical characterisation of Venezuelan bauxite tailings: assessment of options for their environmental recovery'. University of Lille 1, Faculty of Earth Sciences. PhD thesis. 92 pp..
8. Ibrahima Sory Cissé et al (2010). Determination of the phase of bauxite using the bomb digestion method at the Kamsar ISO 9002 laboratory (Guinea). 2010.
9. Mamadou Yaya Baldé (2022). Physicochemical characterisation of aluminosilicates (clays and bauxite) from Kindia, Guinea: application in the formulation of hydraulic mortars and ceramic compositions. Doctoral thesis defended at the University of Yaoundé 1. Department of Inorganic Chemistry. 78 pp.

10. Thiago Fernandes de Aquino et al (2012). Mineralogical and physico-chemical characterisation of a bauxite ore from Lages, Santa Catarina, Brazil, for the manufacture of refractories. 137–148. DOI: 10.1080/08827508.2010.531069.
11. Mamadou Yaya Diallo et al. (2021). Physicochemical characterisation of bauxite from Débelé, Guinea, for potential uses as an industrial mineral. DOI : <https://doi.org/10.4236/msce.2021.93002>. Pages :15
12. Gordana Ostojic et al (2014). Chemical and mineralogical characterisation of bauxites from different deposits. University of Sarajevo, pp. 85–87. DOI: 10.7251/COMEN14010840.
13. Verma et al. (2017). Utilisation des résidus de bauxite. Waste Management Research. Volume : 35(1). 999-1012. <http://journals.sagepub.com/doi/10...> DOI :10.1177/0734242x17720290.
14. Feret et al. (2024). Analyse quantitative des phases des bauxites de Bidikoum (Guinée). Clays and Clay Minerals. 45(3) : 418-427. DOI : 10.1346/CCMN.1997.0450311. <http://link.springer.com/10.1346/C>
15. Andrey Panov et al (2012). Guidelines for the large-scale utilisation of bauxite residues. UCRUSAL Centre for Engineering and Technology (VAMT), Saint Petersburg. Russian Federation. Pages: 93–98. DOI :[10.1007/978-3-319-48179-1_17](https://doi.org/10.1007/978-3-319-48179-1_17)
16. Abdourahmane D. Barry et al (2021). Mineralogical and geochemical characteristics of the Sangaredi bauxite deposit, Boké region, Republic of Guinea. DOI: 10.18280/eesrj. 8(1). Pages 1–17
17. Lima et al (2017). Red mud application in construction industry. <i>review benefits and possibilities </i>. IOP Conf.Sci.Ser : Mater.Sci.Eng. Volume : 012033. <https://iopscience.iop.org/article/10.1088/1757-899x/251/1/012033> DOI : 10.1088/1757-899x/251/1/012033
18. Sanoh Ousmane et al (2022). Assessment and forecasting of Guinea’s bauxite resources using the elasticity method. Journal article published in the journal *School of Resources and Safety Engineering in China*. 10(20): 2–52. DOI : 10.4236/jss.2022.104029
19. Verghese, K. I. (1978). Production of Vaudreuil alumina for electrolysis and chemical processes at Alcan. Avida, Quebec. 30 août 1978. 3-47.
20. Mamdov et al (2011). Book. Stages in the formation of the unique bauxite group at Sanga-Redi, Fouta Jallon-Mandingue Province, West Africa. 666(6): 404–412. DOI : 10.3103/S0145875211060081. <https://link.springer.com/10.3103/SO...>
21. Thierno Mamadou Diallo. (2006). Proposal for an aluminium hydrate calcination plant at the Diandian bauxite plant (Boké). UGANC. 10–17.