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Date: 12 September 2018

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Dear Mr. Hlanyane

## MAJUBA POWER STATION'S MONTHLY EMISSIONS REPORT FOR THE MONTH OF AUGUST 2018

This serves as the monthly report required in terms of Majuba Power Station's Atmospheric Emission License (MPS/0014/2014/F01) under section 7 routine reporting and record keeping. The emissions are for the month of August 2018. Verified emissions of particulates are included. SO<sub>2</sub> and NO<sub>x</sub> (as NO<sub>2</sub>) emissions are included for all units.

### Raw Materials and Products

**Table 1. Quantity of Raw Materials and Products used/produced for the month of August 2018**

Raw Materials and Products used	Raw Material Type	Unit	Maximum Permitted Consumption/ Rate (Quantity)	Consumption/ Rate in Month of August 2018
	Coal	Tons/month	1.800.000	1098114
	Fuel Oil	Tons/month	6000	4575.18
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of August 2018
	Energy	GWh	4110	2103.15
	Ash	Tons/month	Not stated in the license	330532.31

### Abatement Technology

**Table 2. Abatement Equipment Control Technology for the month of August 2018**

Associated Unit	Technology Type	*Minimum Control Efficiency (%)	Actual Utilisation (%) for the month of August 2018
Unit 1	Fabric Filter Plant	100	99.96
Unit 2	Fabric Filter Plant	100	99.93
Unit 3	Fabric Filter Plant	100	99.81
Unit 4	Fabric Filter Plant	100	99.80
Unit 5	Fabric Filter Plant	100	99.86
Unit 6	Fabric Filter Plant	100	99.94

\*Calculated from the assumption of 90% fly ash to 10% bottom ash and percentage ash as measured in coal

Generation Division (Operating Unit Coal 2)

Majuba Power Station

Between Amersfoort and Volksrust

Private Bag x9001 Volksrust 2470 SA

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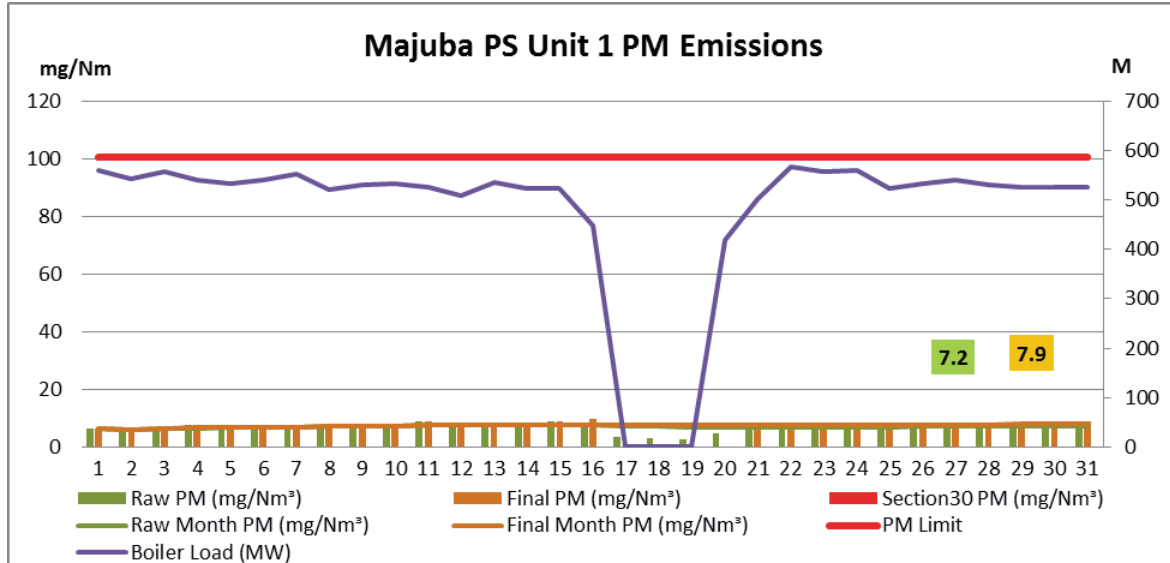
Eskom Holdings SOC Ltd Reg No 2002/015527/30

## Energy Source Characteristics

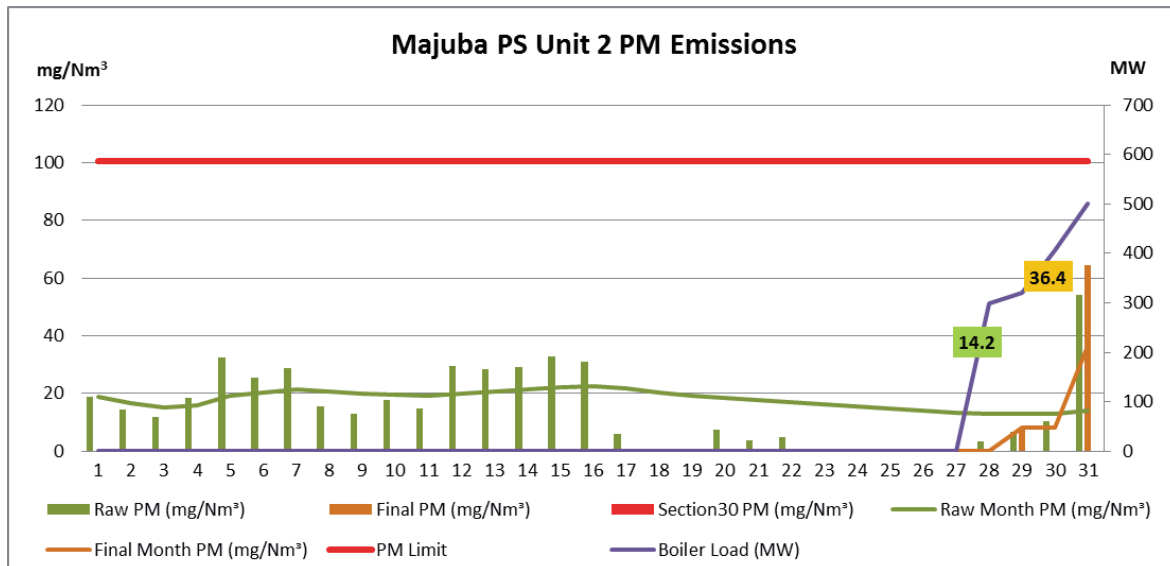
**Table 3. Energy Source Material Characteristics for the month of August 2018**

Characteristic	Stipulated Range (Unit)	Monthly Average Content
CV Content	Not stipulated	19.39
Sulphur Content	0.6 to >0.94%	0.7
Ash Content	28 to >30%	30.1

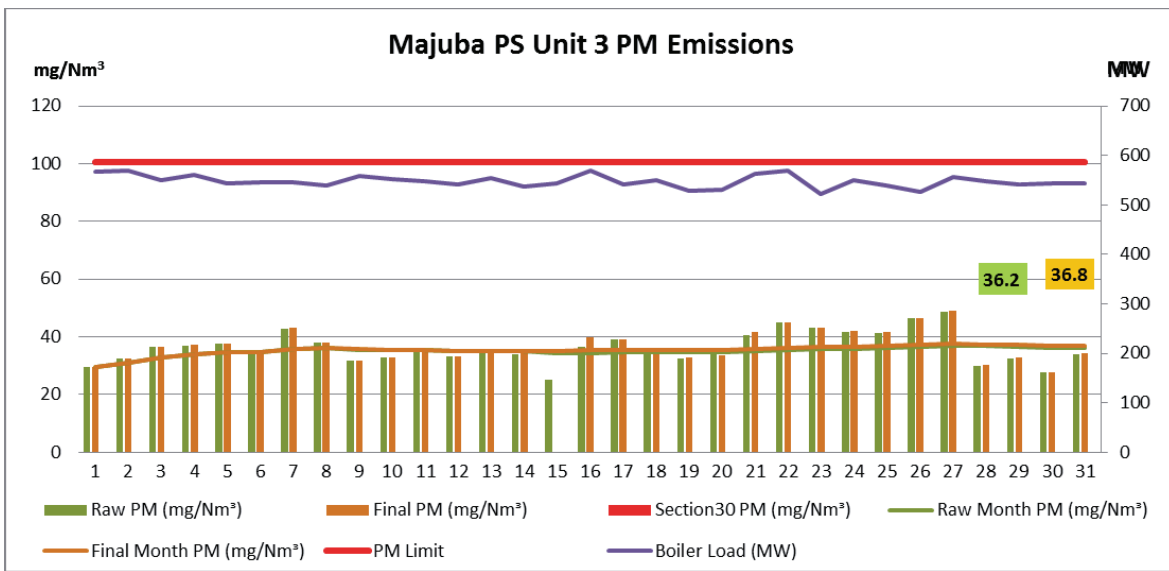
## Emissions Reporting



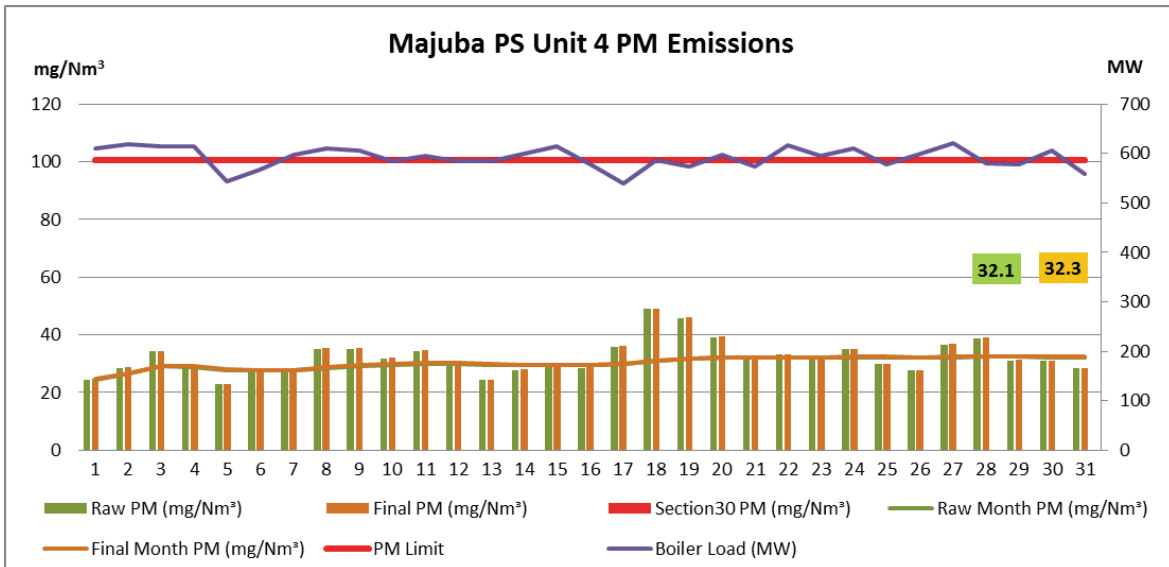
**Figure 1. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 1**



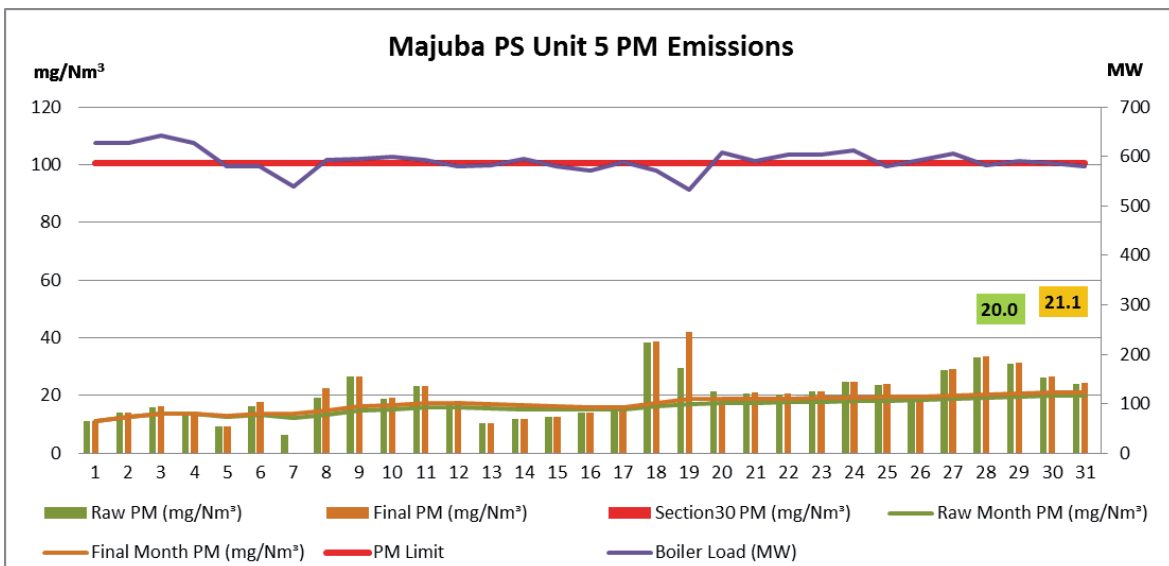
**Figure 2. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 2**



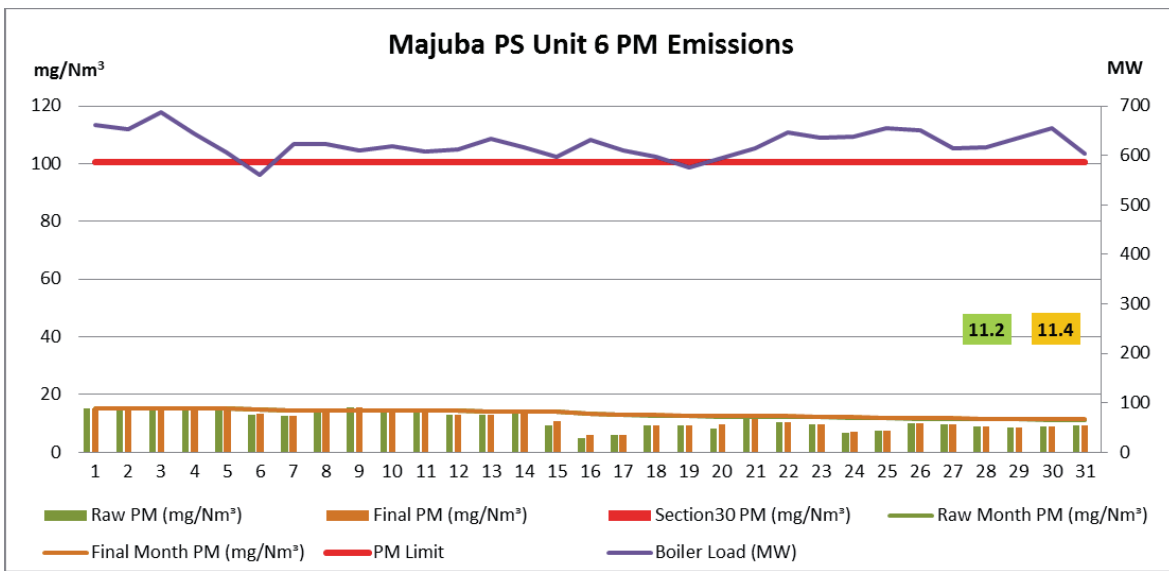
**Figure 3. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 3**



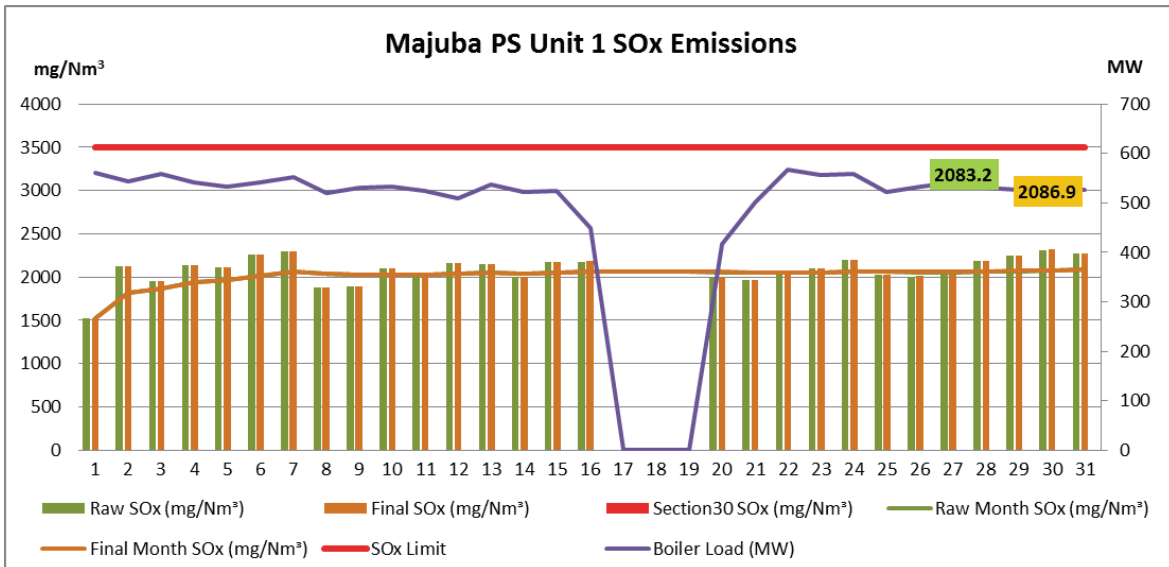
**Figure 4. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 4**



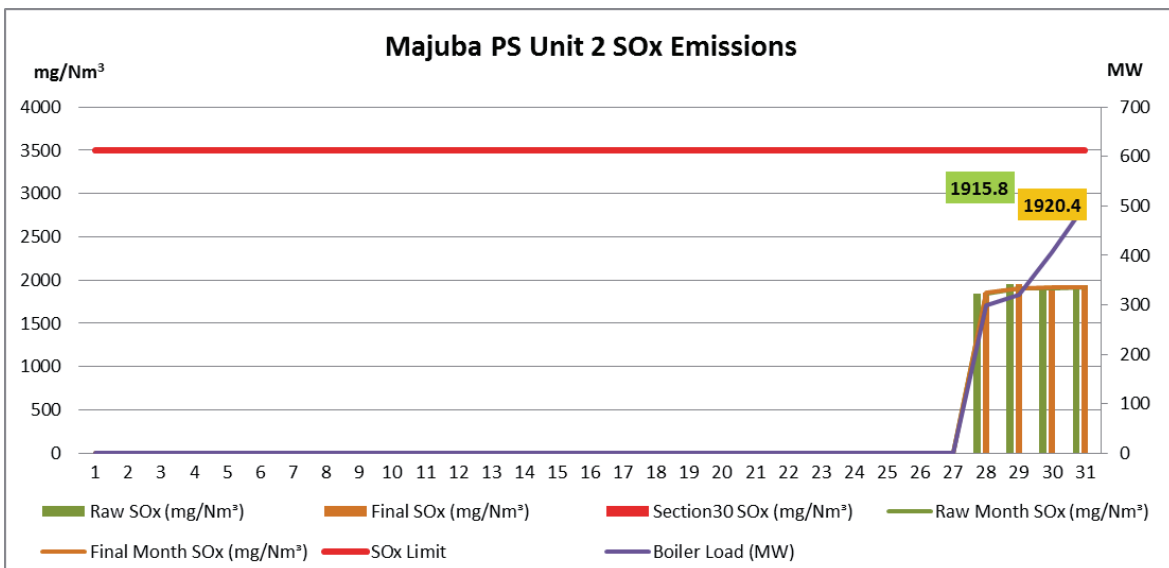
**Figure 5. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 5**



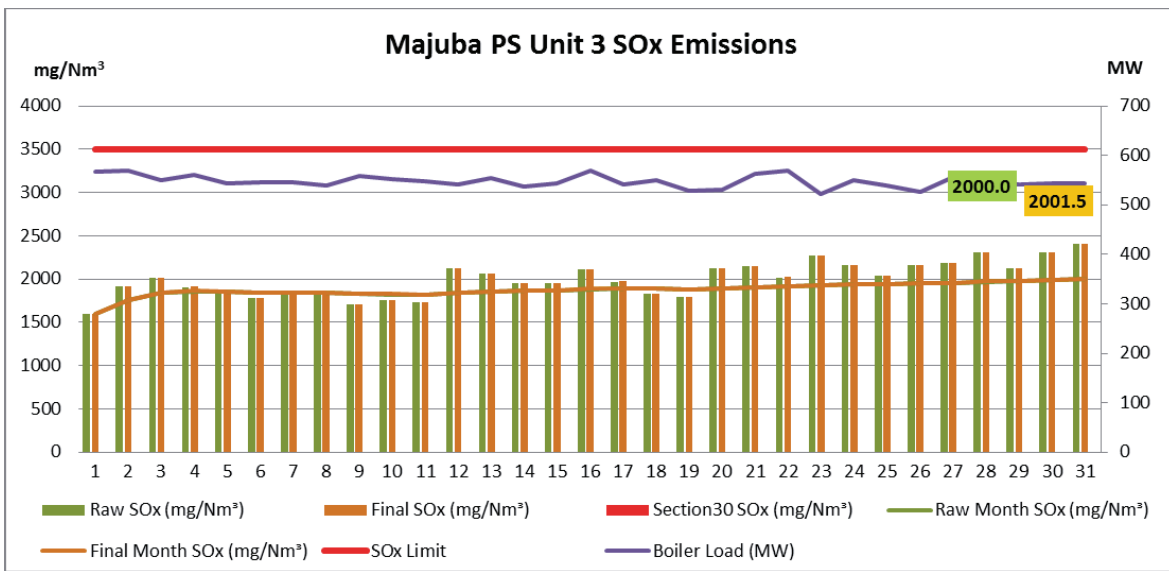
**Figure 6. Particulate Matter emissions (daily averages) for the month of August 2018 against emission limit for Unit 6**



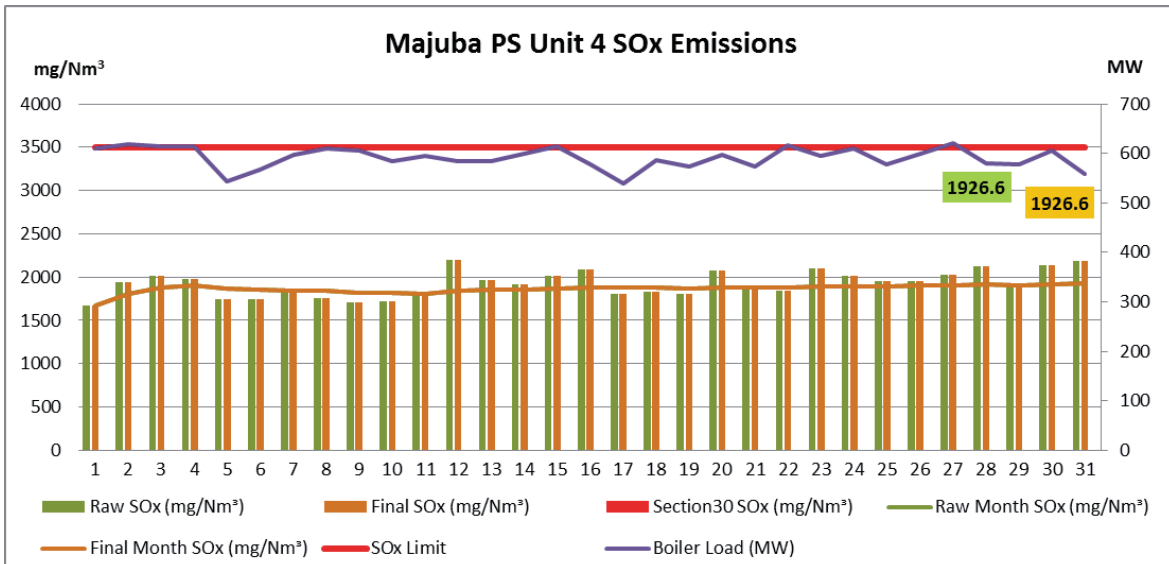
**Figure 7. SOx emissions (daily averages) for the month of August 2018 against emission limit for Unit 1**



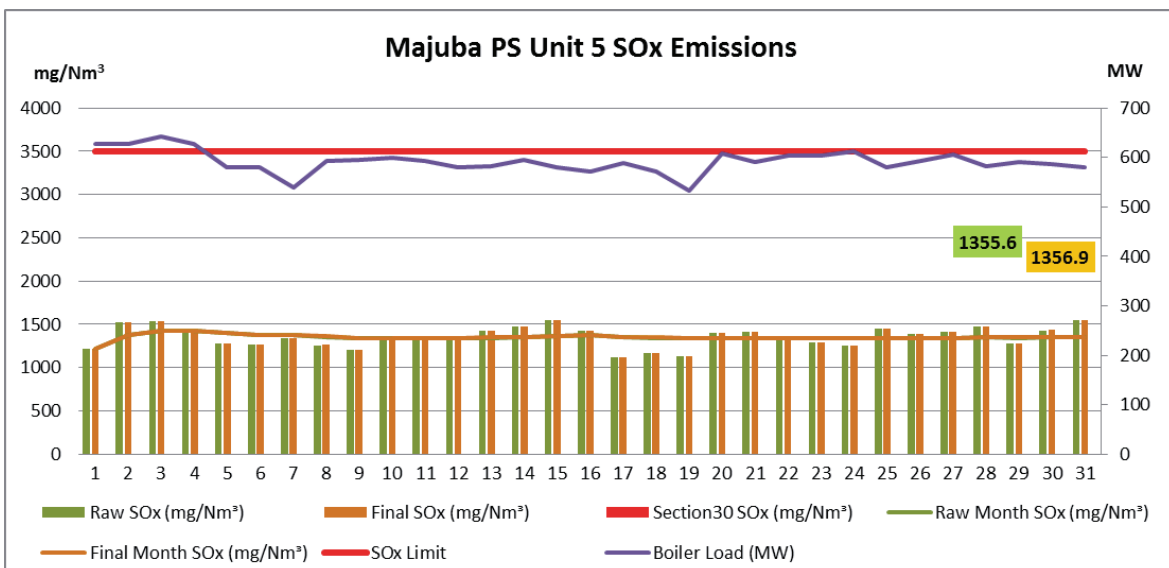
**Figure 8. Sox emissions (daily averages) for the month of August 2018 against emission limit for Unit 2**



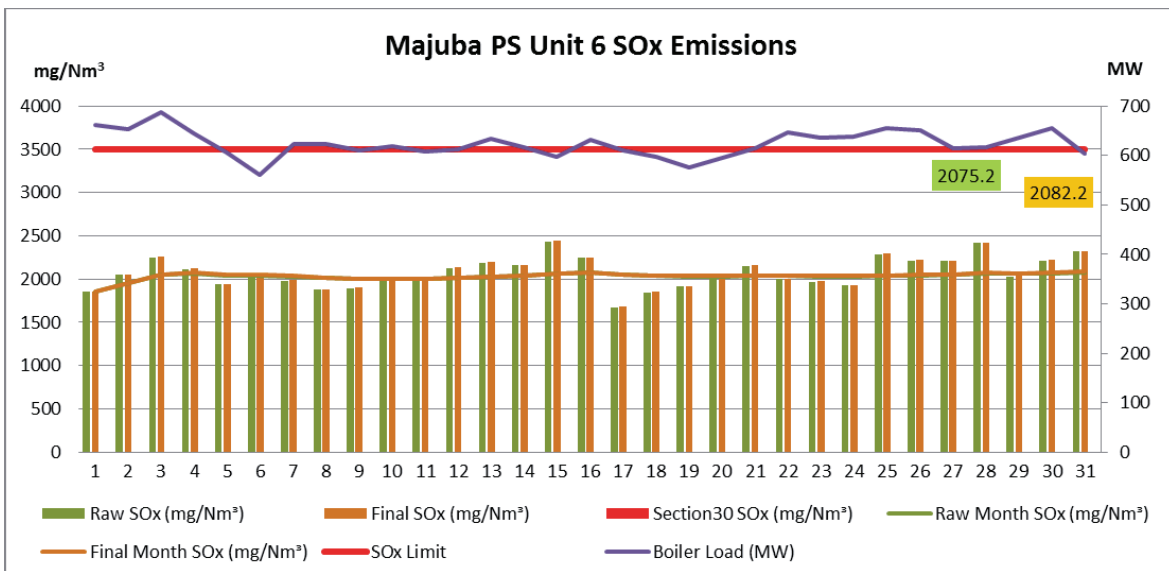
**Figure 9. Sox emissions (daily averages) for the month of August 2018 against emission limit for Unit 3**



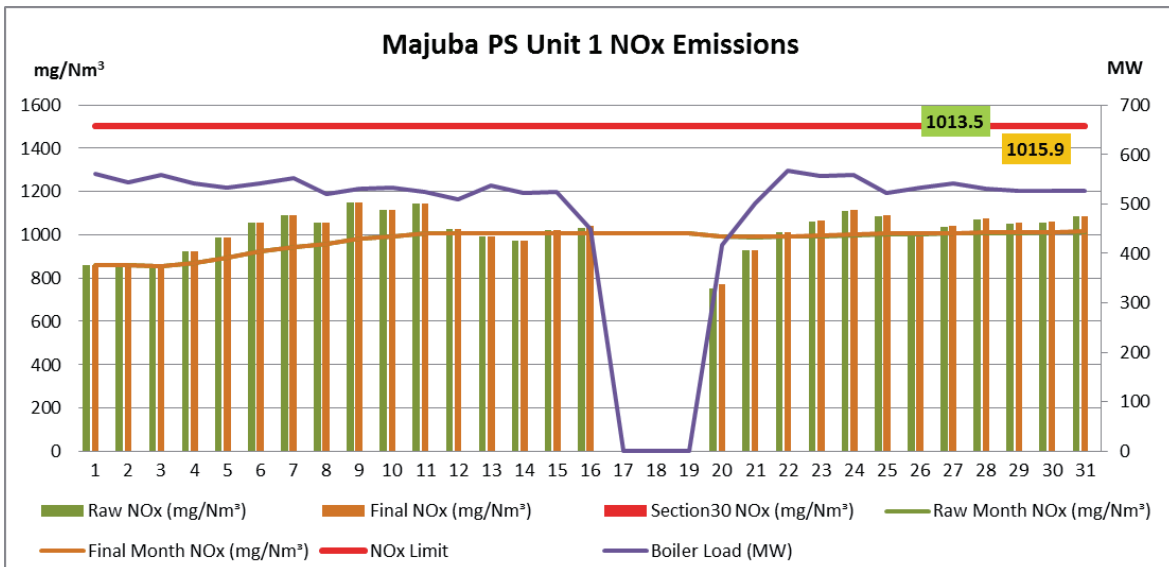
**Figure 10. Sox emissions (daily averages) for the month of August 2018 against emission limit for Unit 4**



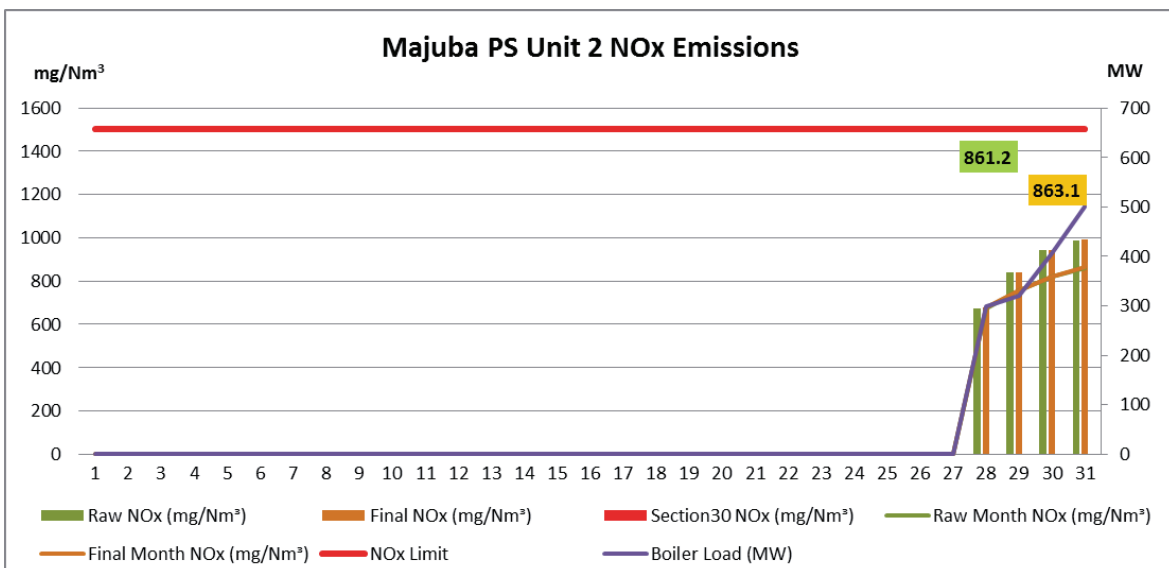
**Figure 11. Sox emissions (daily averages) for the month of August 2018 against emission limit for Unit 5**



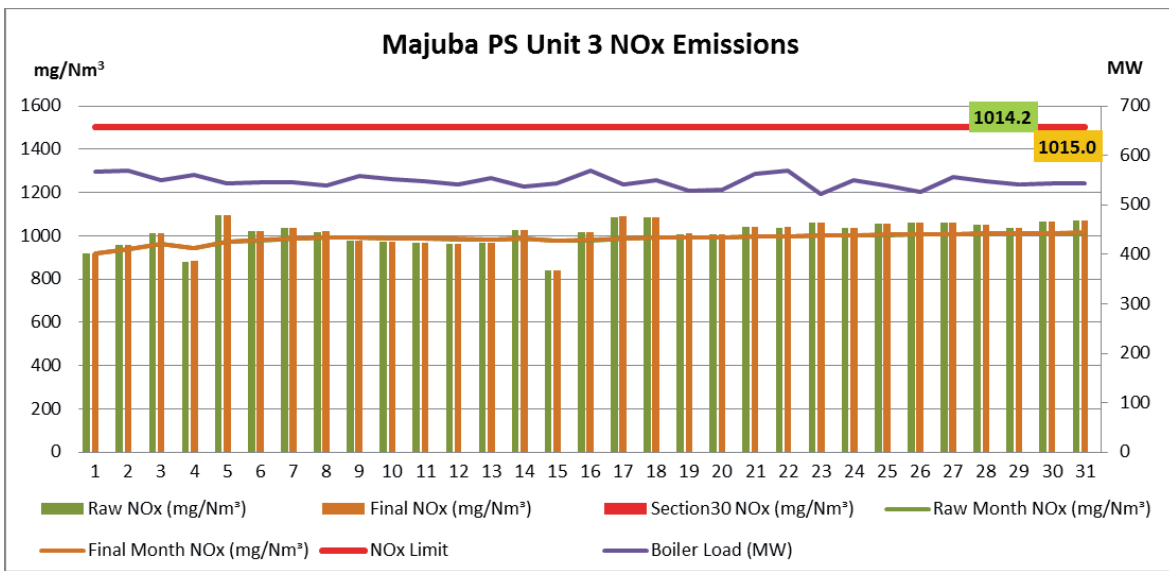
**Figure 12. Sox emissions (daily averages) for the month of August 2018 against emission limit for Unit 6**



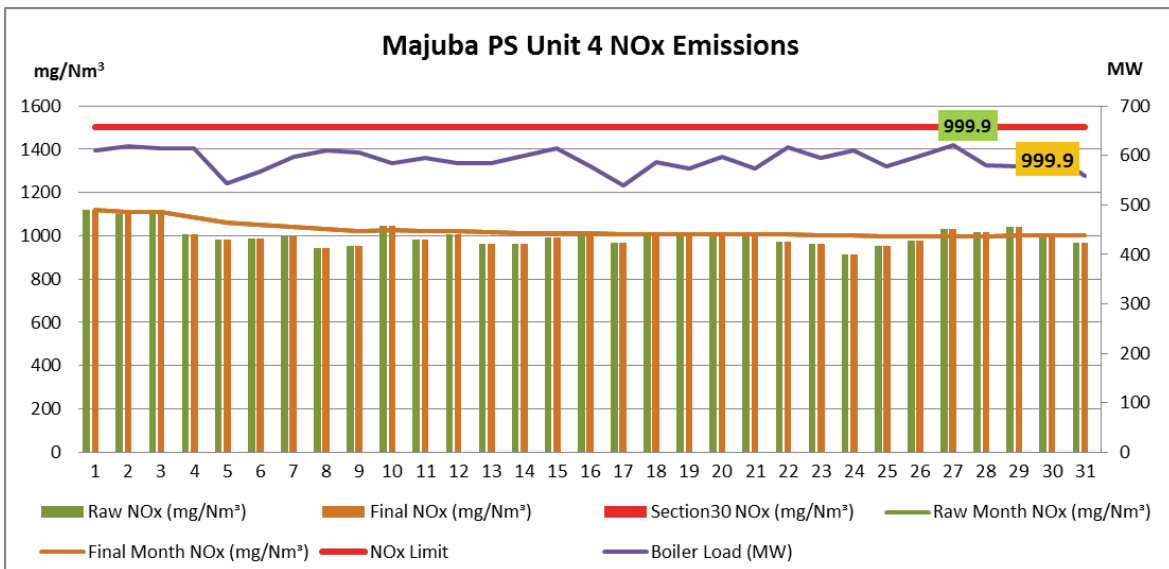
**Figure 13. Nox emissions (daily averages) for the month of August 2018 against emission limit for Unit 1**



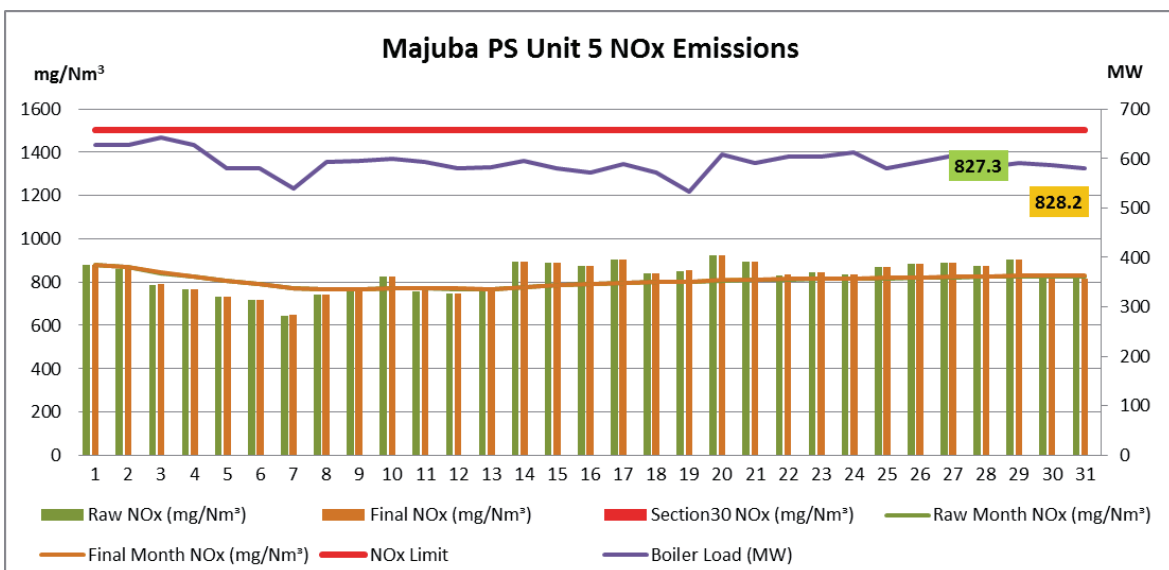
**Figure 14. Nox emissions (daily averages) for the month of August 2018 against emission limit for Unit 2**



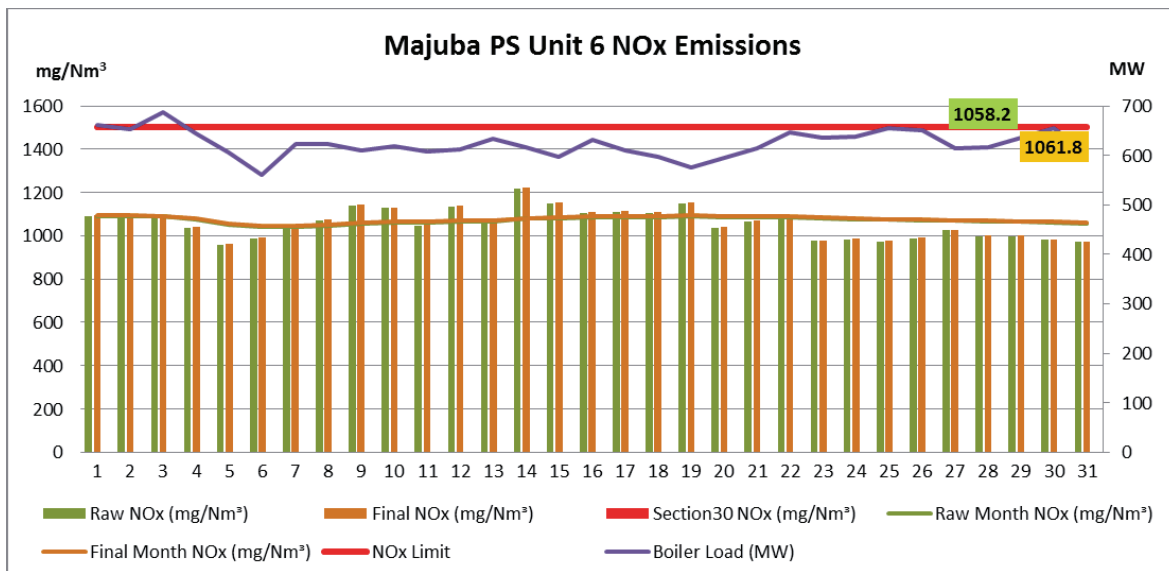
**Figure 15. Nox emissions (daily averages) for the month of August 2018 against emission limit for Unit 3**



**Figure 16. Nox emissions (daily averages) for the month of August 2018 against emission limit for Unit 4**



**Figure 17. Nox emissions (daily averages) for the month of August 2018 against emission limit for Unit 5**



**Figure 18. Nox emissions (daily averages) for the month August 2018 against emission limit for Unit 6**

**Table 4: Monthly tonnages for the month of August 2018**

Unit	PM (tons)	SO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)	CO <sub>2</sub> (tons)
1	14.5	4 048	1 975	379 154
2	1.8	325	152	32 150
3	71.2	4 154	2 111	371 689
4	80.7	4 808	2 497	488 697
5	53.4	3 740	2 291	488 955
6	26.1	4 920	2 507	501 895
<b>Sum</b>	<b>247.8</b>	<b>21 994</b>	<b>11 531</b>	<b>2 262 540</b>

**Table 5: Average monthly concentrations (mg/Nm<sup>3</sup>) for the month of August 2018**

Unit	PM (Mg/Nm <sup>3</sup> )	SO <sub>2</sub> (Mg/Nm <sup>3</sup> )	NO <sub>2</sub> (Mg/Nm <sup>3</sup> )	CO <sub>2</sub> (Mg/Nm <sup>3</sup> )
1	7.91	2087	1016	195148
2	36.44	1920	863	190669
3	36.81	2001	1015	179318
4	32.34	1927	1000	195805
5	21.12	1357	828	177636
6	11.39	2082	1062	212527

**Table 6: Each unit and respective days operating under normal operation, days in grace period, and section 30 days respectively**

Unit	Operating Days (DD:HH:MM)			
	Normal operation	In grace period	Under S30	Unit off load
1	27:07:25	00:00:00	00:00:00	03:16:35
2	02:15:20	00:00:00	00:00:00	28:08:40
3	30:13:00	00:00:00	00:00:00	00:11:00
4	31:00:00	00:00:00	00:00:00	00:00:00
5	30:03:00	00:00:00	00:00:00	00:21:00
6	30:19:50	00:00:00	00:00:00	00:04:10

\*Grace period referring to 48 hours after a start-up as per AEL



## CO2 and CO Relationship

Calculation: CO2% + O2% = 19.5-21.5%

**Table 7: CO2 and O2 deviations of the Month of August 2018**

	Final Average CO <sub>2</sub> (%)						Final Average O <sub>2</sub> (%)						Final Average CO <sub>2</sub> + O <sub>2</sub> (%)					
	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6	U1	U2	U3	U4	U5	U6
01-Aug							9.98	9.96	9.63		9.76	8.85						
02-Aug							9.84	9.23	8.98		8.71	8.22						
03-Aug							8.81	9.08	8.67	10.2	7.69	9.54						
04-Aug							8.61	8.83	8.49	9.7	7.93							
05-Aug							9.17	9.26	8.5	10.6	9.02							
06-Aug							9.31	8.98	9.09	9.15	8.7	6.83						
07-Aug							8.73	9.36		10.6	7.86	7.84						
08-Aug							9.15	9.79		10.8	7.71	7.97						
09-Aug							8.22	9.06	8.71	10.9	9.5	7.87						
10-Aug							8.35	8.75	8.02	10.3								
11-Aug							8.2	9.89	8.22	9.91								
12-Aug							8.28	9.73	8.13	9.78								
13-Aug							9.61	9	8.37	9.99	8.79							
14-Aug							8.65	9.91	9.18	10.6	9.85	8.84						
15-Aug							9.54	9.84	9.61	11.1	11.6	8.5						
16-Aug							9.05	10.1	8.59	10.2	9.22	8.38						
17-Aug							8.83	10.8	8.64	10.1	9.06	8.13						
18-Aug							8.88	9.73	8.52	10.3	9.27	8.36						
19-Aug							9.2	9.75	8.86	10.4	9.02	8.24						
20-Aug							9.2	9.57	8.65	9.89	8.43	8.06						
21-Aug							8.74	9.57	7.92	9.37	7.11	6.96						
22-Aug								10	7.93		8.34	7.88						
23-Aug								8.91	8.3		8.35	8.07						
24-Aug								9.25	8.36		8.59							
25-Aug							10.3	9.05	8.41		8.92							
26-Aug							10.1	9.56	9.54		8.8							
27-Aug							9.43	10.2	9.19		7.99							
28-Aug							9.87	10.8	9.52		9.7	9.56						
29-Aug							9.58	9.73	8.83		8.45	9.4						
30-Aug							9.54	9.31	8.94		8.9	8.29						
31-Aug							9.15	9.57	8.71	10.2	8.79	8.29						

\*Blank spaces indicate that the unit was offline during that period

### Comments on the performance and availability of each unit

#### UNIT 1

The unit base loaded for most of the days during the month and off for three days. No fabric filter bags were replaced during the month.

#### UNIT 2

The unit was on outage for most of the days of the month and it was brought back on load on the 27<sup>th</sup>. All filter bags have changed as part of the total re-bag (re-bag 5).

#### UNIT 3

The unit base loaded for all of the days during the month. Forty-one fabric filter bags were replaced during the month.

#### UNIT 4

The unit base loaded for all of the days during the month. Seven fabric filter bags were replaced during the month.

#### UNIT 5

The unit base loaded for all of the days during the month. No fabric filter bags were replaced during the month.

#### UNIT 6

The unit base loaded for all of the days during the month. No filter bags were replaced during the month.

### Emergency Generation

**Table 8: Emergency Generation for the month of August 2018**

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Emergency Generation hours declared by national Control	0	0	0	0	0	0
Emergency Hours declared including hours after stand down	0	0	0	0	0	0
Hours over the Limit during Emergency Generation	0	0	0	0	0	0

### Complaints Register

**Table 9: Complaints for the month of August 2018**

Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
Fugitive dust	Agitation and entrainment of fugitive dust due to strong winds	Fugitive dust measured in accordance with the requirements of the National Dustfall Regulations and reported to the Licensing officer.	n/a	Application of binding polymer chemical to exposed area of ash dump.	22 October for Stacker 1 back stack and front Stack. 5 December for Stacker 2 Front stack side slopes

**General**

Additional information demonstrating compliance with the emission license conditions is supplied in the annual emission reports sent to your office.

Report compiled by

26/09/2018

Date

**ENVIRONMENTAL MANAGER: (MAJUBA)**

Report verified by:

Date 26/09/2018

**BOILER ENGINEERING MANAGER: (MAJUBA)**

Hoping the above will meet your satisfaction.

Yours sincerely

Date 30/09/2018

**SENIOR ENGINEERING MANAGER (acting): (MAJUBA)**