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Date:
 14 November 2018

Enquiries:

Ref: 17/4/AEL/MP312/11/09

Dear Mr Mahlangu

KRIEL POWER STATION'S MONTHLY STACK EMISSIONS REPORT FOR THE MONTH OF September 2018

This serves as the monthly report required in terms of Section 7.2.1 in Kriel Power Station's Atmospheric Emission License 17/4/AEL/MP312/11/09. The emissions are for the month of September 2018. Verified emissions of particulates matter, SO₂ and NO_x (as NO₂) are also included.

Raw Materials and Products

Table 1: Quantity of Raw Materials and Products used/produced for the month of September 2018

Raw Materials and Products used	Raw Material Type	Units	Maximum Permitted Consumption/ Rate (Quantity)	Consumption/ Rate in Month of September 2018
	Coal	Tons/month	1 227 600	682 411.90
	Fuel Oil	Tons/month	5 000	4302.29
Production Rates	Product/ By-Product Name	Unit	Maximum Production Capacity Permitted (Quantity)	Production Rate in Month of September 2018
	Ash	Tons/month	not specified	522.29
	RE PM	kg/MWh	not specified	0.43

1/...

Abatement Technology

Table 2: Abatement Equipment Control Technology for September 2018

Associated Unit/Stack	Technology Type	Actual Utilisation (%)
		September 2018
Unit 1	ESP	98.3%
Unit 2	ESP	Outage
Unit 3	ESP	100%
Unit 4	ESP	100%
Unit 5	ESP	94.3%
Unit 6	ESP	90.9%

Energy Source Characteristics



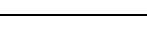
Table 3: Energy Source Material Characteristics for the month of September 2018

Characteristic	Stipulated Range (Unit)	Monthly Average Content
CV Content	18-24 (MJ/kg)	
Sulphur Content	0.6-1.2 (%)	0.98
Ash Content	27-32 (%)	25.48

Monthly Monitor Reliability

Associated Unit/Stack	PM (%)	SO _x (%)	NO _x (%)
North	100%	95.6%	95.6%
South	97.6	95.0%	95.6%

Emissions Reporting

GRAPH LEGEND	
	Final daily emissions average in mg/Nm ³ released within a particular day
	Final monthly emissions average in mg/Nm ³ released within the whole month
	Emissions limit as per the AEL

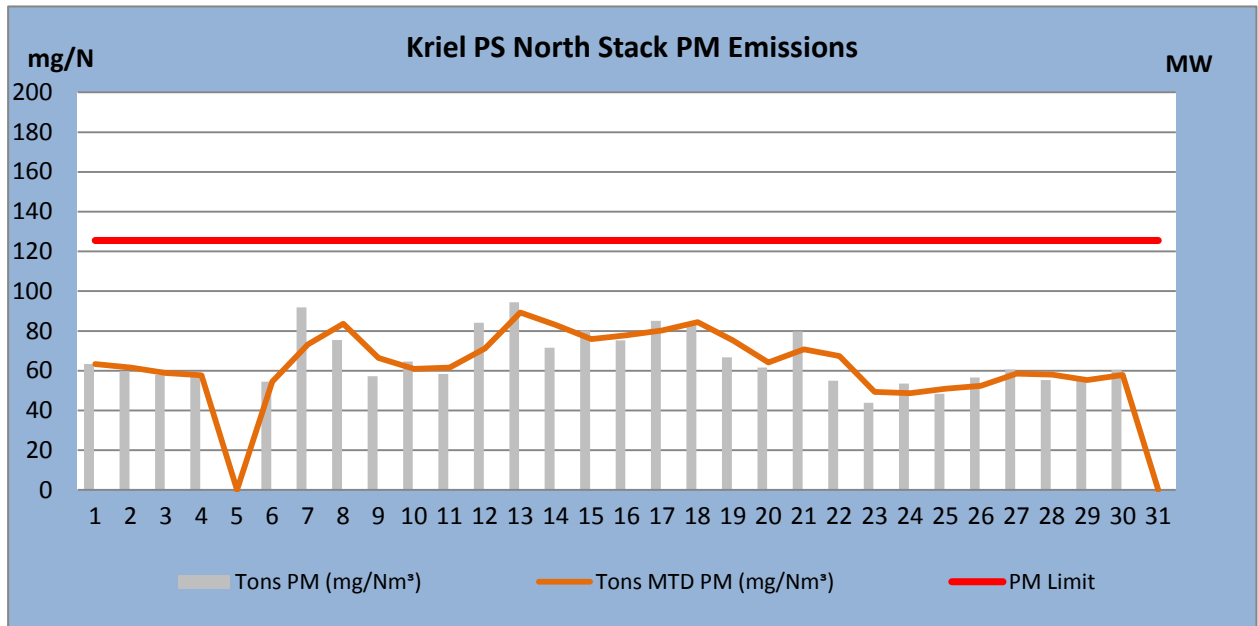


Figure 1: PM emissions (daily averages) for the month of September 2018 against emission limit for the North Stack

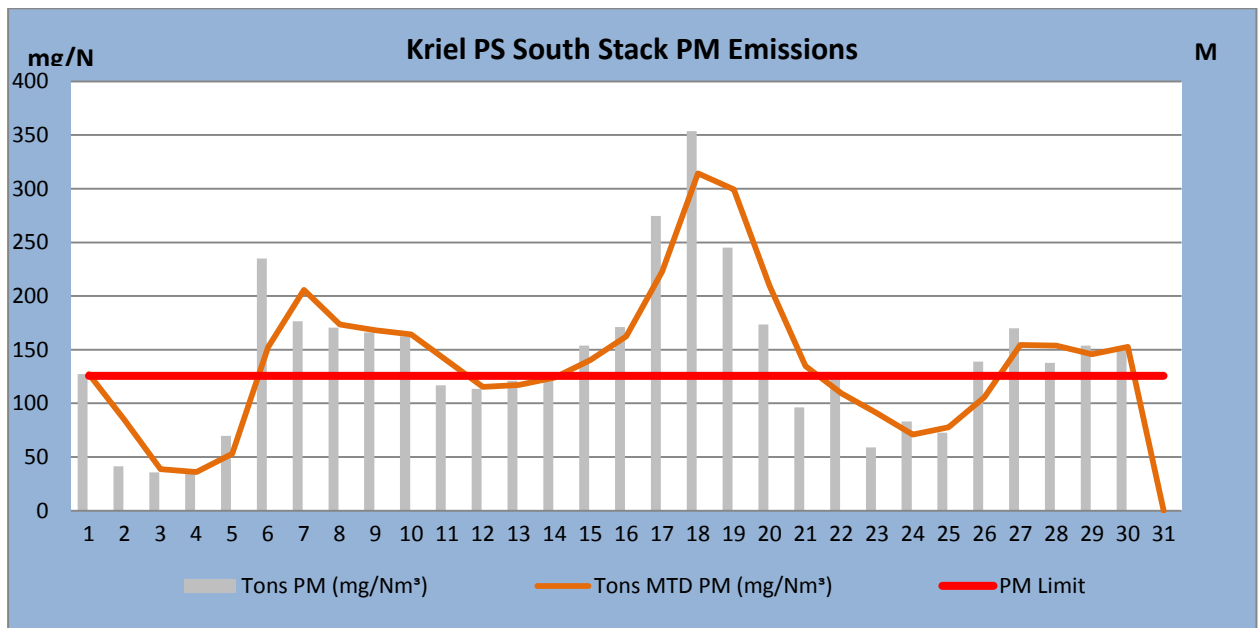


Figure 2: PM emissions (daily averages) for the month of September 2018 against emission limit for the South Stack

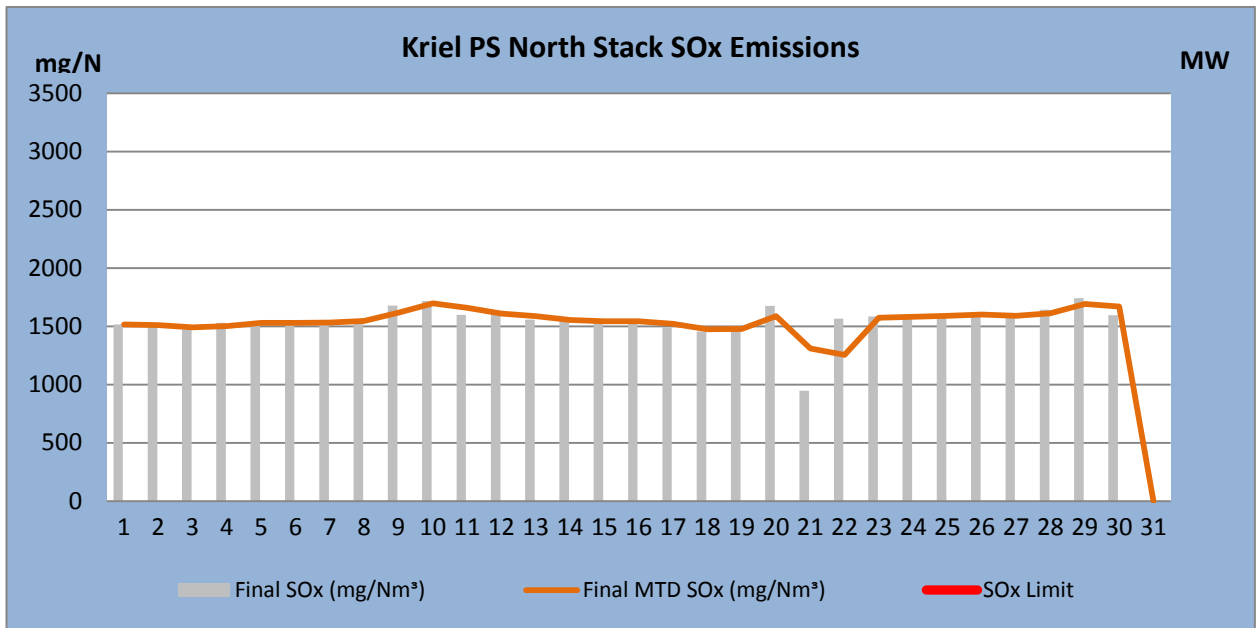
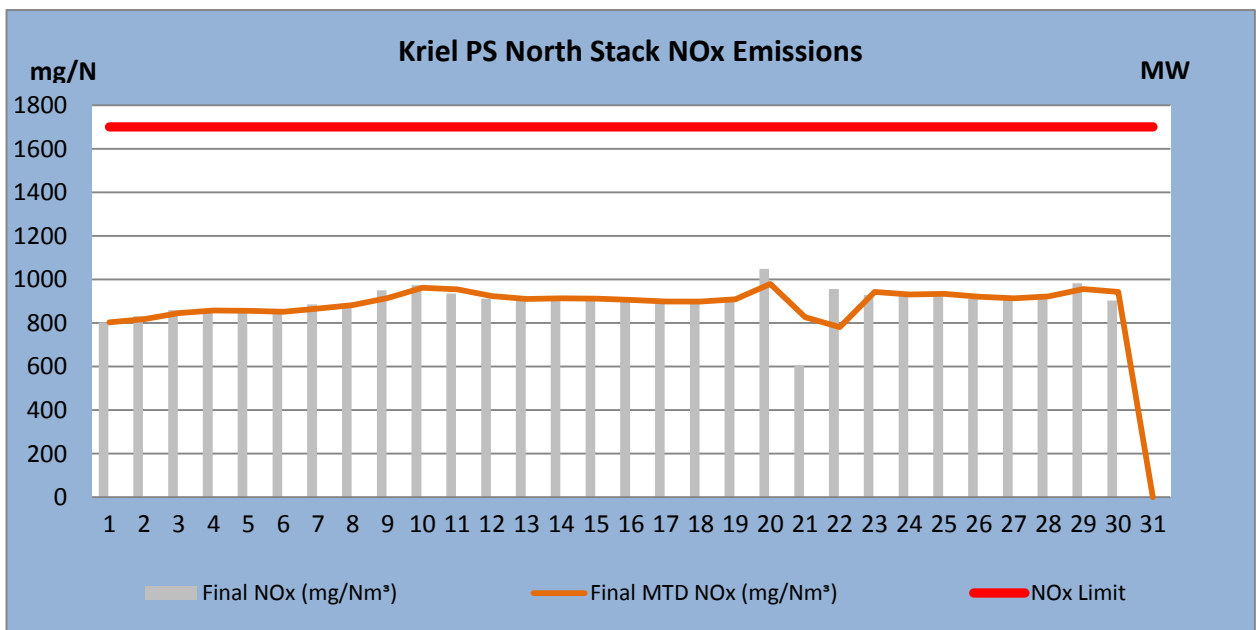


Figure 3. SO₂ emissions (daily averages) for the month of September 2018 against emission limit for the North Stack. SO_x permitted maximum release rate is 3 500mg/Nm³



4. NO₂ emissions (daily averages) for the month of September 2018 against emission limit for the North Stack. NO_x permitted maximum release rate is 1 600mg/Nm³

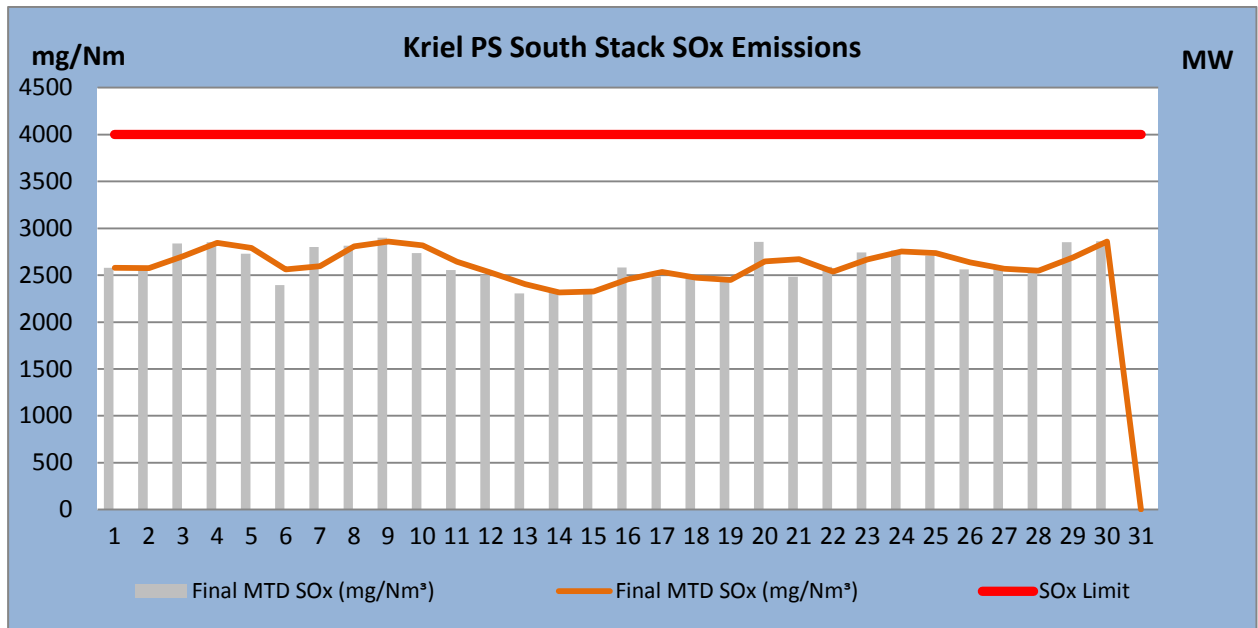


Figure 5. SO₂ emissions (daily averages) for the month of September 2018 against emission limit for the South Stack. SO_x permitted maximum release rate is 3 500mg/Nm³

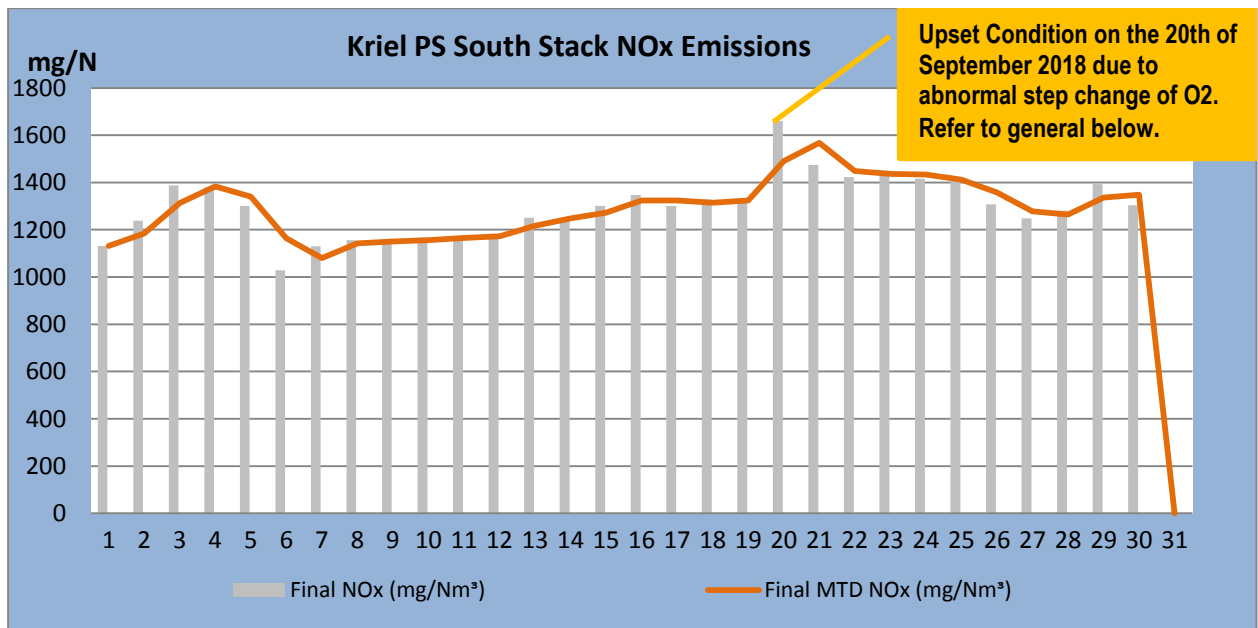


Figure 6. NO₂ emissions (daily averages) for the month of September 2018 against emission limit for the South Stack. NO_x permitted maximum release rate is 1 600mg/Nm³

Table 4: Monthly tonnages for the month September 2018

Unit	PM (tons)	SO ₂ (tons)	NO ₂ (tons)	CO ₂ (tons)
1	59.9	1 498.4	874.6	
2	0.0	0.0	0.0	
3	54.4	1 247.3	722.9	
4	162.0	3 300.7	1 679.8	
5	151.2	2 635.2	1 310.0	
6	94.7	1 922.4	901.8	
SUM	522.3	10 604.0	5 489.1	

Unit	Operating Days (DD:HH:MM)			
	Normal operation	In grace period	Under S 30	Unit off load
1	26:00:55	00:00:00	00:00:00	03:23:05
2	00:00:00	00:00:00	00:00:00	30:00:00
3	18:11:25	00:00:00	00:00:00	11:12:35
4	25:11:30	00:00:00	00:00:00	04:12:30
5	26:08:45	00:00:00	00:00:00	03:15:15
6	16:13:35	00:00:00	00:00:00	13:10:25

Light up information

Table 6: PM Start-up information for the month of September 2018

North Stack	Event 1		Event 2		Event 3	
Unit No.	Unit 1		Unit 1		Unit 3	
Fires in	9:15 AM	03/09/2018	10:45 PM	05/09/2018	3:25 AM	05/09/2018
Synchronisation with Grid	4:20 PM	03/09/2018	5:55 AM	06/09/2018	8:40 AM	05/09/2018
Emissions below limit from Sync (Date and Time)						
Fires in to synchronization	00:07:05		00:07:10		00:05:15	
Synchronization to < limit (Duration)	did not go above limit		did not go above limit		did not go above limit	

South Stack	Event 1		Event 2		Event 3	
Unit No.	Unit 5		Unit 6		Unit 6	
Fires in	10:15 AM	04/09/2018	8:00 PM	29/04/2018	4:00 PM	24/09/2018
Synchronisation with Grid	5:15 PM	04/09/2018	3:00 AM	30/04/2018	2:15 AM	25/09/2018
Emissions below limit from Sync						
Fires in to synchronization	00:07:00		00:07:00		00:10:15	
Synchronization to < limit	did not go above limit		did not go above limit		did not go above limit	

Table 7. Point Source emissions released during start-up (fires-in) for the month of September 2018 in mg/Nm³

North Stack Emission Average from Fires-in to Synchronisation (Date and Time)							
Unit	Fires-In		Synchronisation		PM	SO ₂	NO _x
Unit 1	03/09/2018	9:15 AM	03/09/2018	4:20 PM	285.3	1201.0	632.3
Unit 1	05/09/2018	10:45 PM	06/09/2018	5:55 AM	251.5	1227.0	671.6
Unit 3	05/09/2018	3:25 AM	05/09/2018	8:40 AM	129.0	167.1	6.6

South Stack Emission Average from Fires-in to Synchronisation (Date and Time)							
Unit	Fires-In		Synchronisation		PM	SO ₂	NO _x
Unit 5	04/09/2018	10:15 AM	04/09/2018	5:15 PM	442.7	2333.4	870.2
Unit 6	04/09/2018	1:45 AM	04/09/2018	8:15 AM	361.0	2020.5	823.1
Unit 6	24/09/2018	4:00 PM	25/09/2018	2:15 AM	319.7	2094.7	1109.6

Table 8. Point Source emissions released during Shut-down (SD) for the month of September 2018 in mg/Nm³

North Stack Emission Average Breaker Open (BO) to Draft Group Shut Down (SD) (Date & Time)						
Unit	Breaker Open	DG SD	PM	SO ₂	NO _x	
Unit 2	03/05/2018	1:35 PM	143.4	164.5	21.7	
Unit 3	25/05/2018	9:30 PM	138.8	1486.1	790.7	

South Stack Emission Average Breaker Open (BO) to Draft Group Shut Down (SD) (Date & Time)							
Unit	Breaker Open	DG SD	PM	SO ₂	NO _x		
Unit 4	11/05/2018	12:10 AM	11/05/2018	12:10 PM	187.6	1112.8	511.7
Unit 6	17/05/2018	11:45 PM	18/05/2018	12:35 PM	197.1	-0.9	501.8

Complaints Register

Table 9: Complaints for the month of September 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
There was no complaint related to air quality received during the month of September 2018					

General

The particulate matter emissions for both North were within the limit, however on the South Stack were above the limited during the month of September. Hereunder is the sequence of events related to the incident:

- On the 24th of September 2018 (at around 16:00pm), a cold light up of unit 6 was initiated;
- On the 25th of September 2018 (at around 02:00am), unit 6 was then synchronized with the national grid;
- On the 26th of September 2018, it was noted that unit 6’s SO₃ plant was not effectively converting SO₂ into SO₃ as the catalytic bed differential temperatures were still negative ; the SO₃ plant issue was immediately investigated and eventually it was noted that the plant had tripped on low sulphur and it was eventually resolved on the 27th of September 2018 by unblocking the steam trapping to allow the condensate to accumulate at the drain station ;
- On the 28th of September 2018 (at around 02:00 am), the 72 hours from synchronization was exceeded and the emissions on the south stack were still above the limit due to ineffectiveness of the abatement equipment.
- On the 28th of September 2018, unit 5’s right hand side draught group tripped due to FD fan vibration and therefore forcing the SO₃ plant to be out of service as the unit had to be placed on oil burner support; consequently, SO₃ injection was interrupted resulting in ESP field to underperform and trapping efficiency was below 60 %.
- On the 28th of September 2018 (at around 21:00 pm), Control and Instrumentation Department (CID) and Howden maintenance teams managed to resolve the issue of draught group trip by changing the damaged vibration probe and also restored the functionality of the SO₃ plant; and
- On the 1st of October 2018, the particulate matter emissions on the south stack were noted trending downwards.

The monthly gaseous emissions (NOx & SOx) were also within the limit on the North Stack; however, on the South Stack the NOx limit was exceeded on the 20th of September 2018 when Unit 4 and 5 were slowly increasing the boiler load on peak from 370MW to 460MW. During the increase of boiler load there was an increase in air flow demand for Combustion resulting to rare and abnormal (upset condition) increase of oxygen from 9% to 13%; consequently, NOx emissions on the South Stack exceeded the daily limit. The incident persisted for less than 48 hours hence it was not reported as section 30 incident. A detailed investigation regarding this matter shall be undertaken and the summary of findings thereof shall be included in the annual report.

NB: The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission reports sent to your office.