

Consolidated information on initial & additional postponements and responses to technical clarifications: Sasol Infrachem

The information provided below underpins the information already provided and summarised elsewhere in documents pertaining to the postponement application, including the final motivation reports and associated technical appendices, the final Atmospheric Impact Report and the final Comment and Response Report.

This document contains three sections:

- Technical clarifications on aspects of the applications, linked to information contained in postponement applications;
- Reference tables consolidating information pertaining to the applications as extracted from the application documentation, along with references to the applicable emission sources in the redacted Atmospheric Emissions License and 2014 annual emissions report
- A summary table contextualising the requested alternative emissions limits for each applicable point source including extracts from the source data used to inform these limits

A. Responses to technical clarification questions

1. Can Sasol Infrachem provide additional information on the compliance roadmaps and projects and timelines?

Figure 1 below is an excerpt from Chapter 7 of the final motivation report for additional postponement (as also shown in Chapter 6 of the final motivation report for initial postponement). A summary of the roadmap detail is provided below, and referenced to the specific sections of the application where this information is provided.

Section 7.4 of the final motivation report for additional postponement provides detail on progress on implementation of the roadmap from September 2013 – November 2014.

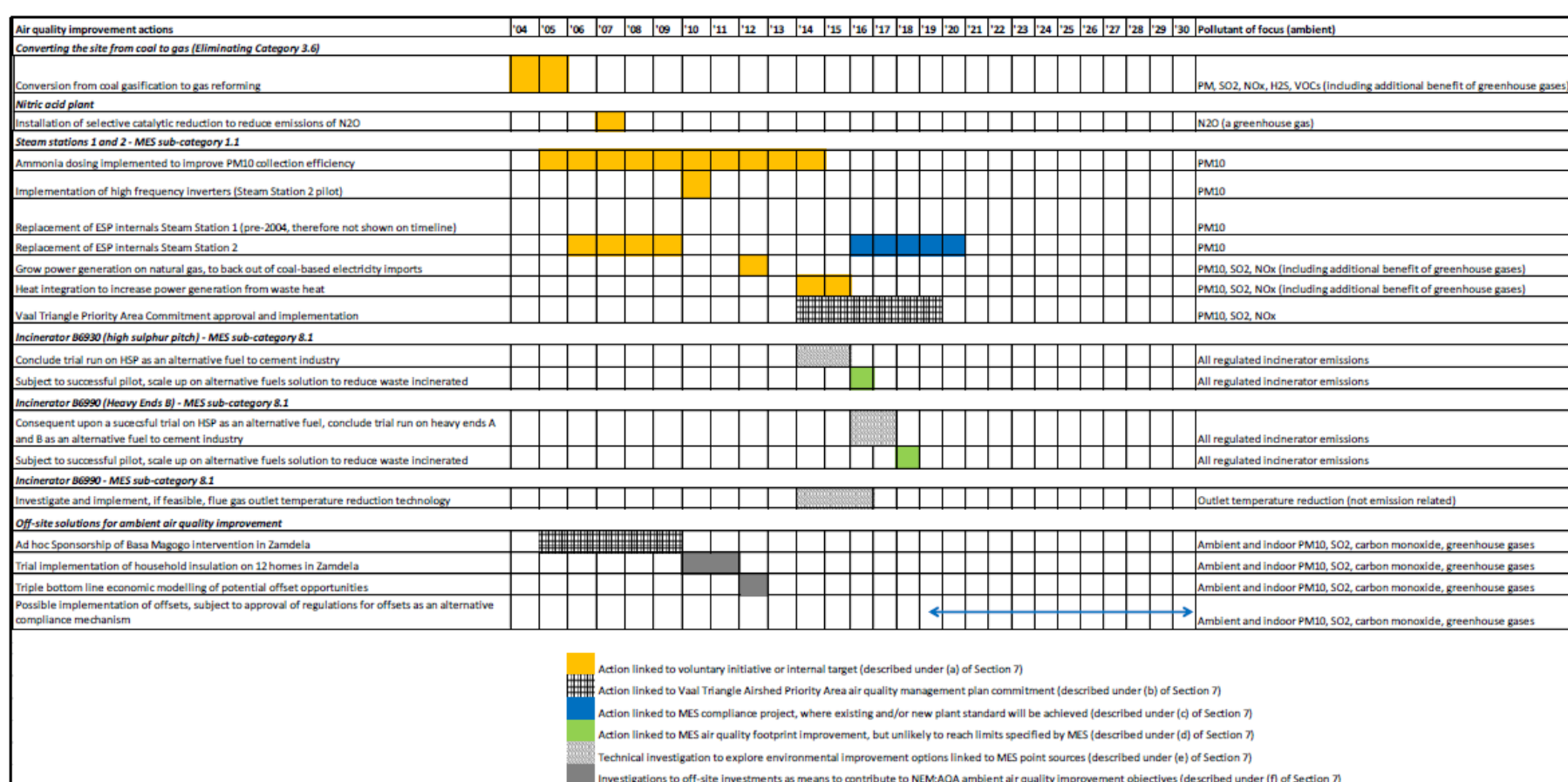


Figure 1: Sasol Infrachem's roadmap to sustainable air quality improvement, as per final motivation reports (note: this is a condensed diagram, the motivation reports contains a larger version)

1.1. Steam Station 1

As explained in Chapter 7 of the final motivation report for additional postponement, Sasol Infrachem is committed to honouring its Vaal Triangle Airshed Priority Area (VTAPA) commitments. Sasol Infrachem is required to reduce its ambient impact on NO_x, SO₂ and Particulates by 18%, 7% and 1% respectively and has committed to these reductions, which will be achieved through, amongst others, interventions at Steam Station 1. An update on Sasol Infrachem's plans to meet its VTAPA commitment was presented to the ITT and Multi Stakeholder Reference Group in November 2014, and project governance processes will be advanced on this basis, in order to achieve these commitments by the required date of July 2019. The VTAPA commitments will realise an actual improvement in ambient air quality in the area around the facility.

Furthermore, capital applications were advanced for the implementation of continuous emissions monitoring at Steam Station 1 to ensure an improved understanding of emissions.

1.2. Steam Station 2

As indicated in the roadmap summary of Chapter 7 of the final motivation report for additional postponements and section 2.3 of the corresponding technical appendix, Sasol Infrachem intends to reduce PM emissions from Steam Station 2 to below the existing plant standard. In order to achieve this target and to improve on this target, renewal of the electrostatic precipitators is required. This project is currently underway and implementation will be aligned with the statutory maintenance schedule of the boilers (currently planned completion by April 2020) as indicated in Figure 1 above.

Furthermore, capital applications were advanced for the implementation of continuous emissions monitoring at Steam Station 2 to ensure an improved understanding of emissions.

1.3. Thermal oxidation plant

Pilot trials with the cement industry continue to explore the viability of diverting certain waste streams away from incinerators towards beneficial use, aligned with the waste hierarchy (refer to section 3.3 (e) of the technical appendix to the final motivation report for additional postponement). As is the case for the Steam Stations, capital applications were advanced for the implementation of continuous emissions monitoring at Thermal Oxidation to ensure an improved understanding of emissions.

2. What is the exit gas temperature achieved on incinerator B6990?

The exit gas temperature of this incinerator is approximately 570⁰C, as indicated in Table 6.4.1 of the AEL. The B6990 incinerator is captured as Point Source Code 7 in Table 6.4.1: Old HSP Incinerator.

3. Why are alternative emission limits not proposed for some emissions from incinerator B6990?

Please refer to point (g) under the table in Section C below, which explains that isokinetic sampling cannot be conducted for this incinerator due to high exit gas temperatures.

Accordingly, alternative controls are proposed to limit the emissions of PM, Metals, Hg, Cd + Tl and dioxins/furans, as described in the motivation report. For example, since the precursors that are necessary for dioxin / furan formation are not present in the feed to this incinerator, these compounds cannot form regardless of the exit gas temperature, and a feed stream analysis could be employed to verify this fact. These aspects are described in section 3.4 of the technical appendix to the final motivation report for additional postponement, pg 28, and in point (g) under the table in Section C below.

4. What are the corresponding names of the listed activities seeking postponement in the atmospheric emissions licence and the 2014 annual emission report?

The references to each point source under each listed activity category seeking postponement in the AEL and annual emission report are provided in the table in Section B below.

5. How did Sasol derive the proposed alternative emission limits?

An explanation of how the alternative emission limit was derived for each “point of compliance” is provided in the table in Section C below.

B. Table of consolidated information for Sasol Infrachem as extracted from initial and additional postponement applications, including references to AEL and 2014 annual emissions report

Applicant	Listed activities seeking postponement		Description of activity	Applicable MES, and requested alternative emissions limits and arrangements	Technical detail on application	Assessment of impacts on postponements for ambient air quality:					References to AEL and 2014 annual emissions report		Other relevant references in application	
						Atmospheric Impact Report								
Located in initial or additional postponement application	MES Category	Name of process plant	Section and page reference to applicable motivation report	Section and page reference to applicable motivation report	Section and page reference to technical appendix to applicable motivation report	Pollutant	Point source parameters - AIR Table 4.1 pg 23	Emission rates Baseline emissions: AIR Table 4.2 pg 24-25 (baseline) and Appendix C2-4 pg 134-137 (maximum release rates) Compliance scenarios: Table 5.15 & 5.16 pg 75-77	Start up, shut down and upset conditions	Impacts: sensitive receptors & isopleths – AIR Section 5.1	Reference to point source information in AEL	Reference to point source information in annual emission reports	The columns to the left describe the impact of each listed activity on ambient air. The cumulative impact of all listed activities for criteria pollutants are described in the following Sections of the AIR: Section 5.1.8.1.1 and Fig 5-31 pg 80-81 (SO ₂); Section 5.1.8.1.2 and Fig 5-40 pg 86 (NO _x); Section 5.1.8.1.3 pg 91-92 and Fig 5-49 (PM); Section 5.1.8.2 pg 96-102 (non-criteria pollutants associated with incineration)	
Additional postponement	1.1	Steam station 1 (particulate matter; SO ₂ ; NO _x) (note: this point source does not seek a postponement on 2015 existing plant standards for SO ₂ , but information is included in respect of 2020 new plant standards)	Section 2.3.1, pg 5 (additional postponement)	applicable MES and the alternative emissions limits or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Table 2, pg 17-18 (additional postponement)	Chapter 1, pg 1-10 (additional postpone-ment)	SO ₂	Point source no. 1, 2 & 3	Table 4.2 - Point source no. 1, 2 & 3. Table 5.21/5.22 – Steam stations stacks 1, 2 & 3. Appendix C2-4 – Boiler 4, Boiler 5 & 6, Boiler 7 & 8.	Annexure 6 of Comment & Response Report	Section 5.1.8.1.1 pg 80-83 and Fig 5-32, 5-33, 5-34	The information is captured in Table 6.4.1 of the AEL. Steam Station 1 has three stacks, captured as Point Source Codes 3,4 and 5 in Table 6.4.1.	Not reported as it is not required as a license condition for FY14. Will be reported for FY15		Section 5.1.8.1.1 and Fig 5-31 pg 80-81 (SO ₂); Section 5.1.8.1.2 and Fig 5-40 pg 86 (NO _x); Section 5.1.8.1.3 pg 91-92 and Fig 5-49 (PM); Section 5.1.8.2 pg 96-102 (non-criteria pollutants associated with incineration)
						NO _x				Section 5.1.8.1.2 pg 86-88 and Fig 5-41, 5-42, 5-43		Not reported as it is not required as a license condition for FY14. Will be reported for FY15		
						PM				Section 5.1.8.1.3 pg 91-93, Fig 5-50, 5-51, 5-52		Page 11 of Compliance report Sec 4.1, Table 4.1.1. (Steam Station 1 has three stacks, captured as SS1 boiler 4, boiler 5 & 6, boiler 7 & 8)		
Additional postponement	1.1	Steam station 2 (particulate matter; SO ₂ ; NO _x) (note: this point source does not seek a postponement on 2015 existing plant standards for SO ₂ or PM, but information is included in respect of 2020 new plant standards)	Section 2.3.1, pg 5 (additional postponement)	applicable MES and the alternative emissions limits or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Table 2, pg 17-18 (additional postponement)	Chapter 2, pg 11-20 (additional postpone-ment)	SO ₂	Point source no. 4	Table 4.2 - Point source no. 4. Table 5.21/5.22 – Steam stations stacks 1, 2 & 3. Appendix C2-4 – SS2 Boiler 1-7.	Annexure 6 of Comment & Response Report	Section 5.1.8.1.1 pg 80 & pg 83-85 and Fig 5-35, 5-36, 5-37	The information is captured in Table 6.4.1 of the AEL. Steam Station 1 has a single stack, captured as Point Source Code 6 in Table 6.4.1: SS2 Boiler 1 to 7.	Not reported as it is not required as a license condition for FY14. Will be reported for FY15	In addition, the cumulative impact of Sasol Infrachem and Natref’s criteria pollutant emissions (SO ₂ , NO _x , PM) is included in Appendix L of the AIR, with further information provided in Annexure 5 of the Comments & Responses Report	
						NO _x				Section 5.1.8.1.2 pg 86 & pg 88-89 and Fig 5-44, 5-45, 5-46		Not reported as it is not required as a license condition for FY14. Will be reported for FY15		
						PM				Section 5.1.8.1.3 pg 91 & pg 94-95 and Fig 5-53, 5-54, 5-55		Page 11 of Compliance report Sec 4.1, Table 4.1.1. (SS2 boiler 1-7)		
Additional postponement	8.1	Thermal oxidation plant: Incinerator B6930	Section 2.3.2, pg 5-6 (additional	applicable MES and the alternative emissions limits	Chapter 3, pg 21-33 (additional	SO ₂	Point source no. B6930	Table 4.2 - Point source no. B6930. Table 5.21/5.22	Annexure 6 of Comment &	Section 5.1.8.1.1 pg 80 & pg 85 Fig 5-38, 5-	The information is captured in Table 6.4.1 of the AEL. The	Page 11 and 12 of the compliance report Sec 4.1, Table 4.1.1. The source is referred to as Thermal		

		a.k.a. "High Sulphur Pitch incinerator"	postponement)	or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Table 2, pg 17-18	postpone-ment)			– B6930. Appendix C2-4 – Thermal oxidation (30 furnace).	Response Report	39	B6930 incinerator is captured as Point Source Code 8 in Table 6.4.1: New HSP Incinerator	Oxidation (9630 furnace). This should be corrected to reflect B6930: New HSP incinerator. As indicated in the compliance report, re-measurements taken during August 2014 and results to be reported to licensing authority when available.
		Emissions limits for: PM SO ₂ NOx Total Organic Compounds		(additional postponement)		NOx				Section 5.1.8.1.2 pg 86 & pg 90 and Fig 5-47, 5-48		As above
						PM				Section 5.1.8.1.3 pg 91 & pg 95-96 and Fig 5-56, 5-57		As above
						Non-criteria pollutants				Section 5.1.8.2 pg 96-102		Not reported as it is not required as a license condition for FY14. Will be reported for FY15
Additional postponement	8.1	Thermal oxidation plant: Incinerator B6993 a.k.a. "Spent caustic incinerator"	Section 2.3.2, pg 5-6 (additional postponement)	applicable MES and the alternative emissions limits or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Table 2, pg 17-18 (additional postponement)	Chapter 3, pg 21-33 (additional postpone-ment)	SO ₂	Point source no. B6993	Table 4.2 - Point source no. B6993. Table 5.21/5.22 – B6993. Appendix C2-4 – Thermal oxidation (93 furnace).	Annexure 6 of Comment & Response Report	Section 5.1.8.1.1 pg 80 & pg 85 Fig 5-38, 5-39	The information is captured in Table 6.4.1 of the AEL. The B6993 incinerator is captured as Point Source Code 9 in Table 6.4.1: Caustic Incinerator	Not reported as it is not required as a license condition for FY14. Will be reported for FY15
						NOx				Section 5.1.8.1.2 pg 86 & pg 90 and Fig 5-47, 5-48		Not reported as it is not required as a license condition for FY14. Will be reported for FY15
						PM				Section 5.1.8.1.3 pg 91 & pg 95-96 and Fig 5-56, 5-57		Page 11 and 12 of the compliance report Sec 4.1, Table 4.1.1. The source is referred to as Thermal Oxidation (Caustic Incinerator). This should be corrected to reflect B6993: Caustic Incinerator
						Non-criteria pollutants				Section 5.1.8.2 pg 96-102		Not reported as it is not required as a license condition for FY14. Will be reported for FY15
Additional postponement	8.1	Thermal oxidation plant: Incinerator B6990 a.k.a. "Heavy Ends B incinerator"	Section 2.3.2, pg 5-6 (additional postponement)	applicable MES and the alternative emissions limits or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Table 2, pg 17-18 (additional postponement)	Chapter 3, pg 21-33 (additional postpone-ment)	SO ₂	Point source no. B6990	Table 4.2 - Point source no. B6990. Table 5.21/5.22 – B6990. Appendix C2-4 – Thermal oxidation (90 furnace).	Annexure 6 of Comment & Response Report	Section 5.1.8.1.1 pg 80 & pg 85 Fig 5-38, 5-39	The information is captured in Table 6.4.1 of the AEL. The B6990 incinerator is captured as Point Source Code 7 in Table 6.4.1: Old HSP Incinerator	Page 11 and 12 of the compliance report Sec 4.1, Table 4.1.1. The source is referred to as Thermal Oxidation (9690 furnace). This should be corrected to reflect B6990: Old HSP incinerator
						NOx				Section 5.1.8.1.2 pg 86 & pg 90 and Fig 5-47, 5-48		As above
						PM				Section 5.1.8.1.3 pg 91 & pg 95-96 and Fig 5-56, 5-57		Not reported as the AEL notes (pg 25; sec 7.2) that this point cannot be measured due to high stack temperature
						Non-criteria pollutants				Section 5.1.8.2 pg 96-102		Not reported as it is not required as a license condition for FY14. Components that can be measured will be reported for

												FY15 including HCl, HF, NH ₃ , TOCs. Due to high flue gas temperatures (refer point h below), PM, metals and dioxin/furan cannot be measured.	
Initial postponement	8.1	Thermal oxidation plant: Incinerator B6990 a.k.a. "Heavy Ends B incinerator" Special arrangement (a)(vi) (initial postponement)	Section 2.3.1, pg 5 (initial postponement)	applicable MES and the alternative emissions limits or alternative special arrangements which Sasol proposes to prevail during the period of postponement: Section 3.2 pg 6 & Section 4.3 pg 9-10 (initial postponement)	The initial postponement application relates to one requirement, hence technical details are included in the motivation report. Chapter 4, pg 8-10 (initial postponement)	n/a (exit gas temperature requirement)			Annexure 6 of Comment & Response Report	As above	The exit gas temperature of this incinerator is provided in Table 6.4.1 of the AEL. The B6990 incinerator is captured as Point Source Code 7 in Table 6.4.1: Old HSP Incinerator	Not reported as it is not required as a license condition for FY14.	

C. Summary table contextualising alternative emissions limits requested for each applicable point source

Located in initial or additional postponement application	Applicable Sasol Activities	MES Category	Substance(s)	Emission limits or special arrangements		Alternative emission limit requested during 1 st postponement period	Method used for recent independent emission measurement campaign, or other method used to determine requested alternative emission limits	Measurement range informing the limit value	Description of how the proposed alternative emission limit value was derived	
				New plant standards	Existing plant standards					
Additional postponement	Steam Station 1	Category 1: Sub-category 1.1	Particulate matter	50	100	165	Continuous Online Monitoring	70 – 161 mg/Nm ³ (January 2009 to June 2012 monthly averages of daily measurements for the Steam Station not corrected for oxygen)	The maximum average for the combined steam station rounded up to the nearest 5 mg/Nm ³ , i.e. 165 mg/Nm ³ was taken as the limit value. Also refer to note (a) below table.	
			Sulphur dioxide	500	3500	n/a (compliant with existing plant standard). Refer to note (b) below regarding new plant standards.				
			Oxides of nitrogen	750	1100	1 450	Monthly internal measurements based on USEPA Method 7 (Testo unit)	1 163 – 1 313 mg/Nm ³ as NO ₂ (January 2009 to June 2012, monthly measurements)	Steam Station 1 consists of three stacks. During the course of normal operations, it is possible that only one boiler at a time is online in a stack. Hence the highest measured concentration was used, to which one standard deviation was added rounded up to the nearest 50 mg/Nm ³ , i.e. 1 313+133 = 1 446 rounded up to 1 450 mg/Nm ³ . Also refer to note (c) below table.	
Additional postponement	Steam Station 2	Category 1: Sub-category 1.1	Particulate matter	50	100	n/a (compliant with existing plant standard). Refer to note (d) below regarding new plant standards.				
			Sulphur dioxide	500	3500	n/a (compliant with existing plant standard). Refer to note (b) below regarding new plant standards.				
			Oxides of nitrogen	750	1100	1 250	Monthly internal measurements based on USEPA Method 7 (Testo unit)	633 – 1458 mg/Nm ³ as NO ₂ (January 2009 to June 2012, monthly measurements)	Due to all the Steam Station 2 boilers emitting into one stack, the average of the combined boilers was taken as 1 088 mg/Nm ³ , to which a standard deviation of 148 mg/Nm ³ was added, and rounded up to nearest 50 mg/Nm ³ , i.e. 1 250 mg/Nm ³ . Also refer to note (e) below table.	
Additional postponement	Thermal Oxidation plant: B6930 a.k.a. “High Sulphur Pitch incinerator”	Category 8: Sub-category 8.1	Particulate matter	10	25	50	US EPA method 5 April 2011	50 – based on current licence limit	Refer to note (f) below table.	
			Carbon Monoxide	50	75	n/a (compliant with existing and new plant standard)				
			Sulphur dioxide	50	50	1 800	USEPA Method 6C and 7E	1 800 – based on current licence limit		
			Oxides of nitrogen	200	200	750	USEPA Method 6C and 7E	750 – based on current licence limit		
			Hydrogen chloride	10	10	n/a (compliant with existing and new plant standard)				
			Hydrogen fluoride	1	1	n/a (compliant with existing and new plant standard)				
			Sum of Lead, arsenic, antimony, chromium.	0.5	0.5	1	USEPA Method 29	0.29 mg/Nm ³ + a margin	Measurements stemming from two 2011	

Located in initial or additional postponement application	Applicable Sasol Activities	MES Category	Substance(s)	Emission limits or special arrangements		Alternative emission limit requested during 1 st postponement period	Method used for recent independent emission measurement campaign, or other method used to determine requested alternative emission limits	Measurement range informing the limit value	Description of how the proposed alternative emission limit value was derived
				New plant standards	Existing plant standards				
			cobalt, copper, manganese, nickel, vanadium				Used in 2011 measurement campaigns	for uncertainty in available measurements and limestone metal content	measurement campaigns were used to inform proposed alternative emission limits. A total measured metal content of 0.29 mg/Nm ³ from the second campaign was used, which falls within the 0.5 mg/Nm ³ of the proposed limit. However a higher number, namely 1 mg/Nm ³ is proposed based on the uncertainty of the variance of metals present in the limestone and analytical error.
			Mercury	0.05	0.05	n/a (compliant with existing and new plant standard)			
			Cadmium + Thallium	0.05	0.05	n/a (compliant with existing and new plant standard)			
			Total Organic Compounds	10	10	50	Method 18 Used in 2011 measurement campaign	46	The TOC value was informed by the concentration measured during a 2011 sampling campaign, including a 10% uncertainty factor, i.e. 50 mg/Nm ³ to allow for uncertainty in the measurements since only one measurement was available at that time
			Ammonia	10	10	n/a (compliant with existing and new plant standard)			
			Dioxins and furans	0.1	0.1	n/a (compliant with existing and new plant standard)			
			n/a	Exit gas temperatures must be maintained below 200°C		n/a (compliant with existing and new plant standard)			
Additional postponement & initial postponement (exit gas temperature)	Thermal Oxidation plant: Incinerator B6990 a.k.a. "Heavy Ends B incinerator"	Category 8: Sub-category 8.1	Particulate matter	10	25	Opacity Measurements	n/a	n/a	Refer to note (g) below table.
			Carbon Monoxide	50	75	n/a (compliant with existing and new plant standard)			
			Sulphur dioxide	50	50	n/a (compliant with existing and new plant standard)			
			Oxides of nitrogen	200	200	360	USEPA Method 6C and 7E	360 - based on current licence limit	Refer to note (f) below table.
			Hydrogen chloride	10	10	n/a (compliant with existing and new plant standard)			
			Hydrogen fluoride	1	1	1.5	USEPA Method 26A Used in 2011 measurement campaign	0.33 – 0.98 (not corrected for oxygen)	Two of the three samples taken during a sampling campaign in 2011 were below the detection limit, with the third sample being at 0.98 mg/Nm ³ . If the higher sample is corrected for oxygen, the value elevates to 2.2 mg/Nm ³ . No halogens are fed to the incinerator and therefore as a buffer the limit value was proposed as the average between the oxygen corrected minimum and maximum concentration,

Located in initial or additional postponement application	Applicable Sasol Activities	MES Category	Substance(s)	Emission limits or special arrangements		Alternative emission limit requested during 1 st postponement period	Method used for recent independent emission measurement campaign, or other method used to determine requested alternative emission limits	Measurement range informing the limit value	Description of how the proposed alternative emission limit value was derived
				New plant standards	Existing plant standards				
									which results in the 1.5 mg/Nm ³ proposed.
			Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	Opacity Measurements	n/a	n/a	Refer to note (g) below table.
			Mercury	0.05	0.05	Feed Analysis	n/a	n/a	Refer to note (g) below table.
			Cadmium + Thallium	0.05	0.05	Opacity Measurements	n/a	n/a	Refer to note (g) below table.
			Total Organic Compounds	10	10	25	Method 18 Used in 2011 measurement campaign	22	Based on one of the most accurate and representative measurement campaigns in 2011, where a value of 22 mg/Nm ³ was measured, and including a 10% uncertainty factor
			Ammonia	10	10	n/a (compliant with existing and new plant standard)			
			Dioxins and furans	0.1	0.1	Feed stream analysis (prohibition of chlorinated compounds fed to incinerator)	n/a	n/a	Refer to note (g) below table.
Additional postponement	B6993 (Sasol Infrachem)	Category 8: Sub-category 8.1	n/a	Exit gas temperatures must be maintained below 200°C		Proposed to operate at current exit gas temperatures, and to conduct feed stream analysis (prohibition of chlorinated compounds fed to incinerator)	USEPA methods Used in 2011 measurement campaign	Historical measurement indicates temperatures ranging between 500 - 1 000 °C.	Sasol proposes to operate at current exit gas temperatures, on the basis that no temperature will result in the formation of high concentrations of dioxins and furans if chlorinated compounds are prohibited.
			Particulate matter	10	25	180	USEPA Method 5 and 5D	180 - based on current licence limit	Refer to note (f) below table.
			Carbon Monoxide	50	75	1050	USEPA Method 3 Used in two 2011 measurement campaigns	26 - 886	Based on two sampling campaigns in 2011, there is a substantial variation in concentrations. Therefore a 15% uncertainty factor was added to the highest concentration and rounded up to the nearest 50 mg/Nm ³ .
			Sulphur dioxide	50	50	n/a (compliant with existing and new plant standard)			
			Oxides of nitrogen	200	200	420	USEPA Method 6C and 7E Used in two 2011 measurement campaigns	193 - 382	Based on the range of values detected in two sampling campaigns in 2011, a 10% uncertainty value was added to the highest concentration
			Hydrogen chloride	10	10	15	USEPA Method 26A Used in two 2011 measurement campaigns	6.03 – 26.9	The higher of the two concentrations is assumed to be an analytical error, however based on the uncertainty the higher concentration introduced, the average of the two

Located in initial or additional postponement application	Applicable Sasol Activities	MES Category	Substance(s)	Emission limits or special arrangements		Alternative emission limit requested during 1 st postponement period	Method used for recent independent emission measurement campaign, or other method used to determine requested alternative emission limits	Measurement range informing the limit value	Description of how the proposed alternative emission limit value was derived
				New plant standards	Existing plant standards				
									concentrations is proposed. In this instance the higher concentration value was not taken together with a standard deviation, since the higher HCl value did not make sense, as no chlorinated components are being fed to the incinerator. Notwithstanding, it did introduce uncertainty which was the reason for the proposed limit averaging between the two values.
			Hydrogen fluoride	1	1	1.2	USEPA Method 26A Used in two 2011 measurement campaigns	0.39 – 2.07	As with the hydrogen chloride, the higher of the two concentrations measured does not seem accurate since no halogenated components being fed into the incinerator. However, based on the uncertainty it introduced, the average of the two values is proposed as the alternative emissions limit.
			Sum of Lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium	0.5	0.5	22	USEPA Method 29 Used in 2011 measurement campaign	19.9	As described above for the B6930 oven, the first 2011 measurement campaign had an analytical error resulting in elevated metal emission concentrations therefore those results cannot be reliably used in establishing a limit value. Therefore the second 2011 metal results together with an uncertainty factor of 1.15 provided the metal concentration requested as the alternative emission limit.
			Mercury	0.05	0.05	n/a (compliant with existing and new plant standard)			
			Cadmium + Thallium	0.05	0.05	n/a (compliant with existing and new plant standard)			
			Total Organic Compounds	10	10	n/a (compliant with existing and new plant standard)			
			Ammonia	10	10	n/a (compliant with existing and new plant standard)			
			Dioxins and furans	0.1	0.1	n/a (compliant with existing and new plant standard)			
			n/a	Exit gas temperatures must be maintained below 200°C		n/a (compliant with existing and new plant standard)			

Notes:

- a) Isokinetic measurements included in the Compliance Report dated 29 August 2014 indicate that the PM concentrations measured exceed both the existing and new plant standards. The alternative emission limit was determined using historic emissions data, taking into consideration normal process variations, as described in the table above.
- b) Third party measurement results indicate compliance with existing plant standards but concentrations exceed new plant standards, based on various measurements conducted. The sulphur content of the coal to the factory varies due to geological conditions at the mine supplying the coal to the boilers. The geological conditions, and consequently the sulphur content, vary depending on the area currently being mined or planned to be mined. Variations in feed and process conditions within a 5 year period are taken into consideration, as far as practically possible, in determining a feasible limit to apply during a period of postponement. Sasol's predictions for maximum SO₂ emission concentrations beyond 2020, informed by views on the average sulphur content of the coal, and allowing for process variations, is 2000 mg/Nm³.
- c) Third party measurement results indicate widely varying NO₂ concentrations and various measurements indicate concentrations above the existing and new plant standards. Even though more recent measurements than the period reported in the table above indicate that the proposed alternative emission limit of 1450 mg/Nm³ is exceeded, the limit is regarded as an achievable target based on the previous measurements, allowing for process condition variations and burner conditions.
- d) Isokinetic measurements indicate that the PM concentrations exceed the new plant standard. Even though more recent isokinetic result also indicated values higher than the existing plant standard, with process improvements and electrostatic precipitator renewals, 100 mg/Nm³ is seen as a sustainably achievable emission limit. The Improvement roadmap described under Section A above refers to more detail.
- e) Third party measurement results indicate widely varying NO₂ concentrations and various measurements indicate concentrations above the existing and new plant standards. Even though more recent measurements than the period reported in the table above indicate that the proposed alternative emission limit of 1250 mg/Nm³ is exceeded, the limit is regarded as an achievable target based on the previous measurements, allowing for process condition variations and burner conditions.
- f) In determining feasible emission limits for the incinerators, previous measurement data conducted by third parties were reviewed. Outliers in the data were removed to ensure a realistic view of current emissions. The data sets indicate that there is variability in the measurement values, likely due to changes in incinerator process conditions, feed conditions, feed concentrations and so forth. The highest measured value (excluding outliers) was therefore used in most cases to determine the alternative emission limit, adjusted for acceptable variation in measurement and sampling. Where limits are already included in licence conditions, the alternative emissions limits proposed are aligned with these if a lower limit value could not be proposed.
- g) Due to the high exit temperature of the B6990 incinerator, PM, Metals, Hg, Cd + Tl and dioxin/furan concentrations cannot be measured. It is therefore not presently possible to provide alternative emission limits for these components. Sasol Infrachem has therefore proposed alternative means to control emissions and thereby assess compliance that are measurable: For PM emissions it is proposed that opacity measurements be used to assess the visibility and hence compliance of the exit plume. Opacity measurement is a well-known method for assessing the amount of dust (PM) in the flue gas. The metals, with the exclusion of mercury, will predominantly leave the stack as particulates and hence will be monitored by the opacity monitor. Therefore, with a low opacity, the metal concentration can be assumed to be in the lower range. For Hg, periodic feed stream analysis is proposed. This will ensure that Hg emissions are controlled. Similarly, a periodic feed stream analysis is proposed for the control of dioxins and furans. For dioxin and furan formation, certain precursors, most notably chlorinated compounds, are required. A feed stream analysis would ensure that no precursors to dioxin and furan formation are fed to the incinerator.