Briefing note, March 9, 2023

Potential health impacts of bypassing SO2 controls at Kusile

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The health impacts of allowing three units at the Kusile power station to operate without SO2 control devices, using temporary stacks, were assessed for four different scenarios, corresponding to combinations of "low utilization", based on the recent average load factor of the three units of 33% (for the period from July 2021 to June 2022), and "high utilization", corresponding to average output of 2,000 MW. The duration of the bypass was assumed to be either 13 or 36 months.

The bypass would result in an estimated 6-fold increase in SO2 emissions from the plant, based on the ratio of the average flue gas concentrations of SO2 at Kendal, the nearest power station to Kusile, and at Kusile itself before the issues with flue gas desulfurization started. The base period used for all calculations is July 2021 to June 2022.

The total excess SO2 emissions resulting from the exemption, compared with normal operation at the same utilization, would be 87,000 to 610,000 tonnes (Table 1). At the high end, this corresponds to almost 40 years worth of emissions from normal operation of the plant.

The resulting health impacts from these excess emissions were assessed following the methodology and data in the CREA report "Health impacts of Eskom's non-compliance with minimum emissions standards"[1]. The health impacts would include a projected 200 air pollution-related deaths (95% confidence interval: 120–270) in the low utilization scenario, assuming the bypass is utilized for 13 months, and 1,400 (870–1,900) in the high utilization scenario, assuming the bypass is utilized for 36 months (Table 2).

[1] https://energyandcleanair.org/publication/health-impacts-of-eskoms-non-compliance-with-minimum-emissions-standards/

The societal costs associated with the health impacts would be a projected R3.6 bln (R2.3–5.0 bln) in the low utilization, 13 months scenario, and R25 bln (R16–35 bln) in the high utilization, 36 months scenario.

Table 1: Emissions in the different scenarios

scenario	SO2 emissions, t/year	excess SO2 emissions compared with normal operation, cumulative, t
base period	16,100	–
low utilization 13 months	96,600	87,100
high utilization 13 months	244,000	220,000
low utilization 36 months	96,600	241,000
high utilization 36 months	244,000	609,000

Table 2: Excess health impacts in the different scenarios, compared with the normal operation of the plant at the same utilization.

scenario	air pollution-related deaths			economic costs		
	central estimate	95% CI: low	95% CI: high	central estimate	95% CI: low	95% CI: high
high utilization 13 months	492	314	693	9,109	5,730	12,593
high utilization 36 months	1,362	869	1,919	25,226	15,869	34,874
low utilization 13 months	195	124	274	3,607	2,269	4,987
low utilization 36 months	540	344	760	9,989	6,284	13,810