

REPORT ON AN AIRBORNE CONTAMINANT SURVEY  
CONDUCTED AT THE ANATOMY BUILDING

TITLE PAGE

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STATEMENT

I, [redacted] declare on behalf of [redacted] (Pty) Ltd, as an approved inspection authority, that the results and findings of this report are a true reflection of the conditions that were encountered at the time when the work was performed. All recommendations and suggestions are made in good faith and [redacted] (Pty) Ltd would make reasonable effort to ensure that such recommendations are viable and practicable. However, the viability and practicability of implementation of such recommendations still remains the responsibility of the client.

## **1.0 PURPOSE**

To reflect the results of airborne contaminant monitoring in order to establish if construction vehicle exhaust fumes released at a building site adjacent to the Anatomy Building pose a health risk to its occupants.

## **2.0 INTRODUCTION**

This survey was conducted by [REDACTED] (Pty) Ltd at the request of Mr H. Smith after university employees at the Anatomy Building complained about headaches and fatigue, allegedly as a result of exhaust fumes generated by construction vehicles inside the Auditorium. Subsequently, consultants from [REDACTED] (Pty) Ltd performed carbon monoxide, sulphur dioxide and nitrous fume monitoring at some work areas inside the Anatomy Building on 18 June 2001.

## **3.0 HEALTH HAZARDS ASSOCIATED WITH EXHAUST FUMES**

Inhalation of carbon monoxide (exhaust fumes) poses an acute as well as chronic health hazard. Acute exposure may be life threatening due to the asphyxiation danger that develops when high levels of exhaust fumes accumulate in inadequately ventilated places. The immediate danger of asphyxiation is increased when fumes are generated in confined spaces. Chronic exposure to lower concentrations increases the body's workload on the heart and cardiovascular system. Carbon monoxide combines with haemoglobin and this reduces the blood's ability to supply oxygen to the tissues, particularly the brain and heart. Exposed individuals are therefore more susceptible to occupational exposures and research has shown a higher incidence of cardiovascular problems amongst those occupations where workers are exposed to exhaust fumes on a day to day basis.

## **4.0 OCCUPATIONAL HEALTH STANDARDS AND EXPOSURE LIMITS**

Regulation 5 (1) of the Environmental Regulations for Workplaces requires that workplaces be ventilated in such a way that the air breathed by employees does not endanger their safety and that concentrations of airborne contaminants do not exceed prescribed limits.

The results of exhaust fume sampling (carbon monoxide, nitrogen oxides, sulphur dioxide) in this study were evaluated against the occupational exposure limits (OEL's) of the Hazardous Chemical Substances, Occupational Health and Safety Act No. 85 of 1993. The relevant OEL's are shown in Table I.

## **5.0 SURVEY METHODOLOGY**

Vehicle exhaust gases at the Workshop were measured with a Dräger precision colorimetric gas detector system fitted with colorimetric tubes specific for the gas under investigation.

## **6.0 RESULTS**

The results of exhaust gas monitoring are reflected in Table I.



**TABLE I:**  
**CARBON MONOXIDE, NITROGEN OXIDES AND SULPHUR DIOXIDE CONCENTRATIONS**  
**AT SOME WORK AREAS. ANATOMY BUILDING, UNIVERSITY OF CAPE TOWN.**  
**18 JUNE 2001.**

Work Area	Substance Monitored	Concentration (ppm)	OEL - STEL (ppm)
<b>08h00 - 09h00</b>			
Photographic Laboratory (Room 1108)	Carbon Monoxide	< 2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
Tea Room / Kitchen (Room 1104)	Carbon Monoxide	2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
Cytogenetics Laboratory (Room 1127)	Carbon Monoxide	2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	0.5	5

Work Area	Substance Monitored	Concentration (ppm)	OEL - STEL (ppm)
2 <sup>nd</sup> Floor Passage	Carbon Monoxide	< 2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
<b>09h00 - 10h00</b>			
Photographic Laboratory (Room 1108)	Carbon Monoxide	< 2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
Tea Room / Kitchen (Room 1104)	Carbon Monoxide	2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
Cytogenetics Laboratory (Room 1127)	Carbon Monoxide	2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5
2 <sup>nd</sup> Floor Passage	Carbon Monoxide	< 2	300
	Nitrogen Oxides	< 0.5	5
	Sulphur Dioxide	< 0.5	5

ppm : parts per million  
 STEL : Short Term Exposure Limit

## 7.0 DISCUSSION OF RESULTS

Exhaust fume sampling was conducted at three different work areas and a 2<sup>nd</sup> floor passage during demolition activities inside the Auditorium. Measurements were performed during the morning at 08h00 and repeated at 09h00 in order to establish if an accumulation of exhaust fumes occurs as the day progresses.

Exhaust fume concentrations at the *Photographic Laboratory* and *2<sup>nd</sup> Floor Passage* were well below statutory limits during both sampling sessions and consequently pose an insignificant health risk. See Table I.

Exposure levels at the *Tea Room/Kitchen* and *Cytogenetics Laboratory* were similar to those found in the passage. Carbon monoxide was the only substance that occurred at a slightly elevated concentration, i.e. 2 ppm, possibly due to contaminated air being drawn into the building by its central air-conditioning system. Carbon monoxide exposure levels of this magnitude are unlikely to cause adverse health effects in the long (chronic) as well as short (acute) term.

## 8.0 CONCLUSION

From the results of this survey, it may be concluded that construction vehicle exhaust fumes generated at the Auditorium pose a negligible exposure risk to occupants of the Anatomy Building.