Field Operations Directorate
East and South East Region

SUMMARY SHEET OF SG INSPECTOR'S REPORT FOD SPECIALIST GROUP: OCCUPATIONAL HYGIENE

Client ID	Site ID	Service order number	Report Date
1006743		SVC4146011	06/11/2009

Company Name:
LONDON CITY AIRPORT

Site Address:
CITY AVIATION HOUSE, ROYAL DOCKS, LONDON, E16 2PB

Persons Seen	Position:
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Subject of Report:
INVESTIGATION INTO THE INDOOR AIR QUALITY AT THE TERMINAL BUILDING OF LONDON CITY AIRPORT

This report summarises the conclusions from air sampling undertaken by the various parties and the outcome of discussions at a meeting held at the airport.

1. Background

A formal complaint by GMB was made to HSE's Chief Executive alleging that an employee working in the terminal building was suffering from ill-health associated with exposure to contaminants originating from aircraft fuel and products of combustion.

London City Airport Safety Department had already undertaken an internal investigation into the extent and nature of contaminants in the indoor environment. This included 3 air quality surveys by Green Air Monitoring (May 2008, May 2009 and July 2009). These surveys measured a variety of parameters including temperature, humidity, carbon monoxide, carbon dioxide, volatile organic compounds and microbiological activity. GMB also

commissioned an air quality assessment by LJC Associates, which was carried out in June 2008. All the above documents were reviewed as part of the investigation into the complaint. Further air sampling was carried out by the Health & Safety Laboratory on 26 June 2009. A meeting was held at City Aviation House on 27 October 2009 to discuss the findings and conclusions from all the available evidence. HSL's report is entitled *"Measurement of VOCs and thermal comfort parameters at the Terminal Building, City Airport London"* and has been uploaded onto the COIN database.

Aircraft fuel (Jet A1 fuel) is classified as harmful and details are provided in a report entitled *"Quantified Risk Assessment of Aircraft Fuelling Operations"* prepared by WS Atkins Safety & Reliability. Jet A1 is similar in nature to white spirit, its main health hazards relating to skin irritation (caused by de-fatting) and inhalation of mists, which can lead to a chronic inflammatory condition of the lungs with chronic exposure. The fuel does not contain any substances that are known to be respiratory sensitisers. When any hydrocarbon fuel is burnt, a range of incomplete products of combustion form including oxides of carbon, nitrogen and various species of VOCs. VOCs detected from the sampling surveys include alkanes of low chain length, ethanol, acetone, benzene, toluene and xylene. Some of these substances are known irritants, but none are classified as respiratory sensitisers. Some of these originate from burnt/partially burnt fuel and others are naturally found in the urban environment. Of particular interest in relation to potential health effects is the levels of benzene given that this substance is a carcinogen.

2. Comments on evidence from air sampling

The measurements from the various surveys generally agree that exposure to all the above substances is of a very low order, with some variation depending on the time of day. The maximum level of benzene found was in the region of $1/10^{th}$ of the WEL (1 ppm 8-hr TWA), but most of the results found were much lower than this, being measured in parts per billion. There is no evidence of any significant exposure to VOCs within the terminal building.

Carbon dioxide and carbon monoxide levels were all below the respective WELs of 5000 and 30 ppm 8-hr TWA. These substances are typically used as indicators of the standard of ventilation as this should be capable of diluting out CO_2 and CO generated by respiration and air pollution.

Overall, relative humidity levels as indicated by all the surveys were towards the lower end of the comfort zone (40 -70%), but none were excessively high or low. Temperature levels were similarly not excessive, although some were over 25°C, but this is to be expected in the warmer months of summer.

Having reviewed all this data I conclude that there is no significant risk of exposure to aircraft fuel as this is done on the airport apron and any vapour emissions would be greatly diluted out. I also conclude that exposures to the various chemical species found does not present a risk to health at the levels detected. It is likely that the nature of the site is such that a distinct odour is detected given that many of the substances identified have very low odour thresholds. However, this should not be equated with adverse health effects. It is possible that certain individuals are more affected than others by this odour and this could lead to feelings of nausea or headache. Low humidity may have a similar effect and is often associated with upper respiratory tract irritation such as dry eyes and throat. The best way to deal with this is to ensure a good throughput of clean air into the building to dilute contaminants arising from both air and people traffic.

3. Discussion and conclusions

At the meeting, concern was expressed that the sampling was not representative of actual levels because some employees believe that there are peak times where traffic is highest, which were not measured. This is reported to be between 06:00 and 09:00. However, it is doubtful whether this is a real effect because a review of take-offs and landings show that traffic is fairly constant throughout the day. Also, CO_2 and CO levels from the Green Air Monitoring report (May 09) appeared to peak after this time indicating that aircraft traffic does not have a major influence on air quality within the building.

It is likely that whilst no individual exposure limits are exceeded, air quality could be improved throughout the terminal building in my opinion and there are a number of areas that could be explored to achieve this. For example, there is an issue surrounding the shutters, which stop external air entering the building via the baggage handing plant. This seems to be a combination of poor maintenance and lack of adherence to procedure. The air handling system itself has not been assessed to

identify any potential failures or whether it is adequate for the building's needs. In particular, means of improving humidity levels should be investigated. Consideration should also be given as to whether it would be feasible to install airlocks to minimise the ingress of outside air into the building. Further air sampling may be useful, but given that the 4 major surveys do not indicate any potential risk to health (above that posed by any urban environment), ensuring a good standard of general ventilation would be the best use of resources.

The discussion revealed that a contributory factor is the lack of clear lines of communication in relation to health and safety issues and not all interested parties had representation at the relevant forums. This is not a straightforward matter because of the number of concerns on site and the various different relationships. All parties were urged to find a solution that enables everyone to be included at an appropriate level so that issues such as air quality and any important instructions are properly discussed and communicated. This would have the added benefit of improving relations with employees and demonstrating that their concerns are taken seriously.

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