

# **FINAL REPORT**

## **Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes**

*Prepared for*

### **Meriton**

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R001



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<sup>1</sup> <http://www.bom.gov.au/climate/dwo/200603/html/IDCJDW2061.200603.shtml>

### 1.1 General

URS Australia Pty Ltd (URS) has been engaged by Meriton to prepare a human health risk assessment (HHRA) for onsite construction workers during remediation of the site 42 Walker Street and referred to as the Allied Feeds site. The remediation process will involve potential exposure to emissions to air from a range of sources including volatile chemicals derived from excavated soil and emissions derived from the soil treatment process (stack emissions). The air emissions will result in workers potentially being exposed to a range of compounds from the emissions sources.

The remediation onsite will involve the excavation and process of contaminated soil in a staged approach. During the remediation it has been proposed that construction of the residential units be started. This assessment has been undertaken to assess the potential human health risks to workers carrying out site construction works simultaneously to the contaminated soil excavation and the soil treatment process.

### 1.2 Background

The remediation works on site will be conducted by Thiess Services Pty Ltd (Thiess) with the processing of the soil already being undertaken in accordance with the remediation action plan (URS 2005). The contaminated soil is being remediated using a Directly Heated Thermal Desorption (DTD) plant. It is proposed by Thiess that the DTD will remove organic compounds from excavated materials onsite, rendering them suitable for re-use on-site following adequate characterisation.

The emission control system associated with the DTD plant proposed by Thiess incorporates a cyclones and oxidiser unit, connected in series with a rapid cooling system, a bag house and an acid gas scrubber. Emissions from this process are released to air via a stack located on the Allied Feeds Site. There will also be a pre-treatment building (PTB) onsite for soil materials prior to DTD treatment.

Adjacent to the Allied Feeds site to the south is the former Union Carbide (Lednez) site. This site is also undergoing remediation by Thiess and also will have an Indirect Thermal Desorption (IDT) stack operating to remediate contaminated soils present on site. The Lednez site will also have a pre-treatment building onsite for the treatment of material prior to treatment by IDT.

The proposed (by Thiess) remediation activities at the Allied Feeds site follows the plan shown in Figure 1 with lots 100 to 104, with lots 104 and 103 on the western site boundary being reclaimed and filled with waste material from the former union carbide site. The remediation is set to begin in lot 100, moving to lot 101, 102 then lot 104 and 103. It is anticipated that the most heavily impacted areas will be lots 103 and 104.

Currently Thiess are operating on the Lednez site, however no remediation of soils has begun and it has been confirmed by Thiess that these activities will begin in May 2007.

Meriton are proposing to begin construction of residential apartments on lot 100 when the potential remediation of lot 104 and lot 101 (used for pre-treatment and stockpiling).

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### 1.3 Study Objectives

The objective of the study is to assess the potential health risk to Meriton construction workers whilst onsite remediation activities by Thiess are co-occurring. The risk assessment will not consider any potential health risks posed to residents onsite as it is understood that occupation of the site will not occur until remediation activities have ceased onsite.

The study will encompass the following:

- Collection of vapour and odour emissions during a simulated excavation (using Thiess excavation equipment) on the Allied feeds site.
- Review of air modelling conducted by Holmes Air Sciences that provided an estimate of maximum concentrations at ground levels and at height receptors (using data from vapour and odour assessment and theoretical data associated with the stack emissions) with both the DTD (Direct Thermal Desorption) and PTB (Pre-treatment building) operating on the Allied Feeds site and adjacent ITD (Indirect thermal desorption) and PTB (Pre-treatment building) operating on the Lednez site (adjacent to Allied feeds to the south).
- Identification of exposure parameters for onsite workers and evaluation of human health risks and odour assessment.

### 1.4 Methodology

The approach taken to the assessment of human health risks is generally in accordance with the protocols/guidelines recommended by enHealth (Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards, June 2002). These guidelines draw on and are supplemented by those provided by ANZECC and NH&MRC and detailed in the documents:

- “The Health Risk Assessment and Management of Contaminated Sites” (CSMS 1991, 1993, 1996 and 1998 and enHealth 2002b);
- ANZECC/NH&MRC (1992); and
- The NEPM (Schedule B(4), Guideline on Health Risk Assessment Methodology, 1999).

ANZECC and NH&MRC currently provide only general guidance for the completion of these tasks and, as such, the more detailed protocols and guidelines developed by the US EPA (1989 and 2001) have been used to provide supplementary guidance.

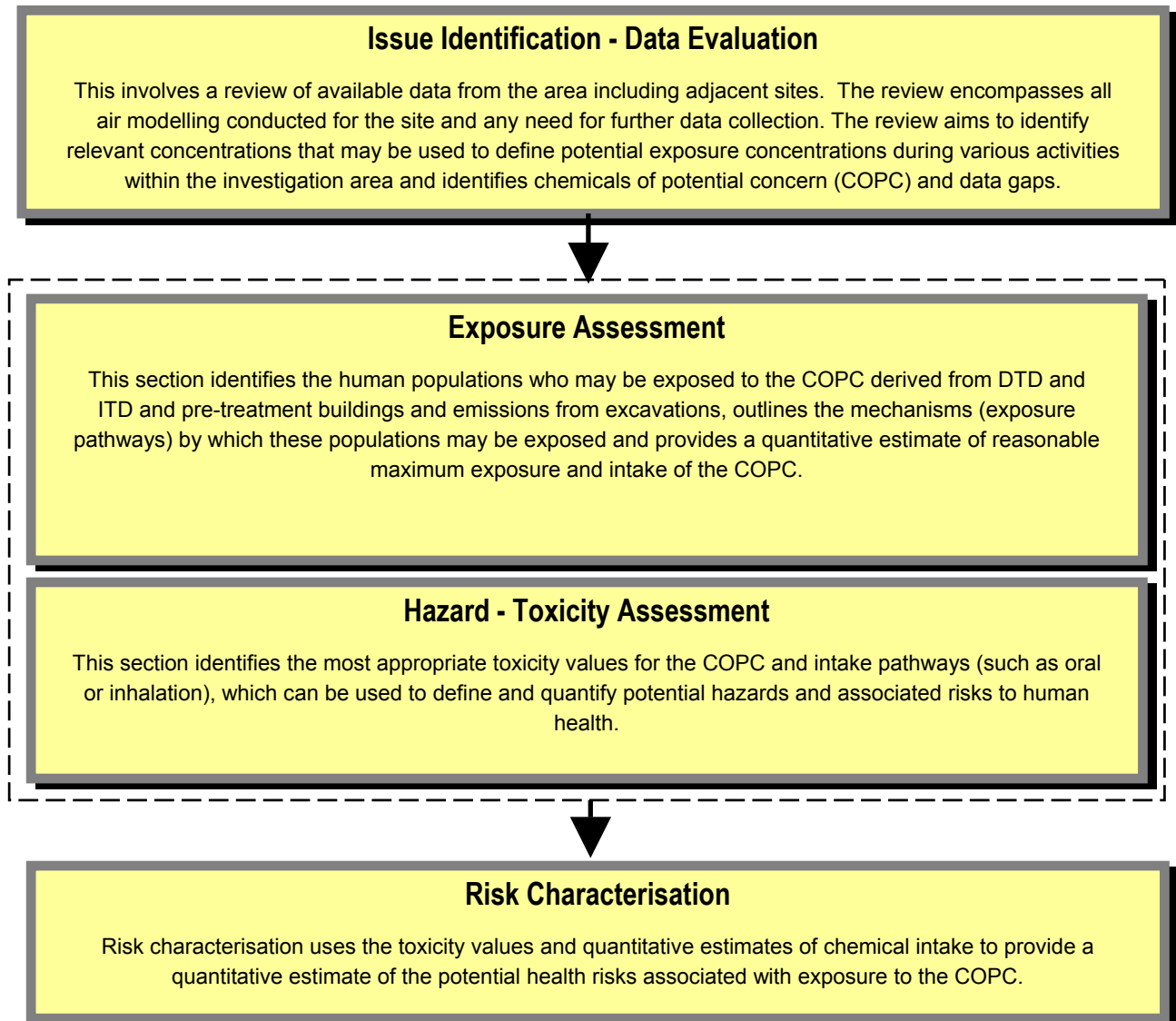
In following this approach and in accordance with these types of risk assessments, the HHRA presented is not an epidemiological study (which is a study of the distribution and causes of existing health related issues in the community), nor does this assessment provide a statistical analysis of the existing health status of the community or workforce. Rather this assessment is of potential health risks posed to onsite construction workers employed by Meriton during remediation works conducted by Thiess.

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Human health risk assessment can be divided into the following four prime tasks;

- ***Issue Identification/Data Evaluation***
- ***Exposure Assessment***
- ***Toxicity/Hazard Assessment***
- ***Risk characterisation.***

The following diagram illustrates the key tasks required in the assessment of risk to human health.



**Figure 1-1: Approach to Human Health Risk Assessment**

It is not the purpose of the HHRA to present and discuss risk management activities, rather the HHRA aims to provide technical information and assessments to enable appropriate risk management decisions to be made.

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These tasks have been undertaken and are presented within the following sections (not necessarily strictly defined within the above task structure). The overall approach has been to undertake a site specific human health risk assessment which takes into account the potential and actual distribution of key chemicals which may be emitted during excavations and operations of the DTD, ITD and pre-treatment buildings.

### 2.1 Site Description

The site is located at 42 Walker street, Rhodes, NSW. It occupies the north-western portion of the Rhodes peninsula and has an area of 5.48 hectares. It is bounded to the south by the Lednez (Former Union Carbide) Site, to the west by Homebush Bay, the north by Parramatta River and to the east by Walker Street and the main northern railway line.

The western portion of the site has been reclaimed from the littoral area of Homebush Bay and was constructed through erection of a seawall to the west of the original shoreline and progressive placement of waste materials and fill materials derived from the adjacent Lednez site and other sources. The reclaimed portion occupies 1.9 hectares of the total 5.48 hectare site area.

### 2.2 Process Description

There are a number of potential emission sources on the former Allied Feeds site during excavation and remediation activities. These processes are detailed below:

- Treatment of Contaminated Wet Materials: Spreading and mixing processes may generate odours and emission of volatile chemicals;
- Pre-Treatment of Materials for DTD: Unloading, screening, crushing, sorting and pre-treatment activities may generate odours and emissions of volatile chemicals. It should be noted that these process are expected to occur within the pre-treatment building (hence the odour and emission of volatile vapours will be minimal)
- Direct Thermal Desorption Unit (DTD): The material will go through feed handling, rotary dryer, gas treatment, treated soil handling and water treatment processes with emissions released to air (following emission control measures) via a stack.

### 2.3 Expected COPC

Based on the processes detailed above at the former Allied Feeds site, the following chemicals have been determined as contaminants of potential concern (COPC):

- Dioxins and Furans (combustion materials from DTD and ITD processes);
- Polycyclic Aromatic Hydrocarbons (from DTD and ITD processes and some volatile materials present in untreated materials, movement of materials across the site);
- Organochlorine, Organophosphorous and PCB pesticides (from DTD and ITD processes);
- Volatile Organic Chemicals (remediation activities and movement of materials across the site);
- Metals (Cr, Ni, Cu, Zn, As, Cd, Pb); and

- 
- Phenols.

### 2.4 Available Data

To evaluate the potential human health risks posed to Meriton construction workers, a review of investigations conducted at the Allied Feeds and adjacent Lednez sites has been undertaken. Detailed below are sources of information that have been used to determine relevant stack emission data and potential emissions that may be derived from excavations and used in the assessment.

#### **Stack Emission Data**

The following sources of data were utilised for the evaluation of potential stack emissions from Allied Feeds and Lednez sites.

1. Lednez Indirect Thermal Desorption Plant (Thiess Services Pty Ltd 2005 *Remediation of the Lednez Site and Homebush Bay - Air Quality Management Plan*, January 2005);
2. Lednez Pre Treatment Building (Parsons Brinckerhoff 2002 *Remediation of Lednez Site, Rhodes and Homebush Bay Environmental Impact Statement*, December 2002);
3. Allied Feeds Direct Thermal Desorption Plant (Thiess Services Pty Ltd 2005 *Remediation of the Former Allied Feeds Site - Air Quality Management Plan*, April 2005);
4. Allied Feeds Pre Treatment Building (presumed to be same as Lednez Pre Treatment Building<sup>2</sup>);<sup>3</sup>
5. URS Final Report, Remediation Action Plan for the Former Allied Feeds Site, 42 Walker Street, Rhodes, December 2006.

#### **Frequency of Stack Emissions**

URS has verbal confirmation from Thiess (who are conducting the remediation on both the Allied Feeds and Lednez sites) that, at time of writing this report, the:

- IDT stack (Lednez) is not yet fully constructed and is not operating. It is anticipated that this facility would be operating from May 2007-May 2008 (12 months).

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<sup>2</sup> As the Allied Feeds Pre Treatment Building has been a recent addition to the proposed works, for the purposes of calculating the emissions, it was presumed that the materials being processed and the operations at the Allied Feeds PTB were similar to the Lednez PTB.

<sup>3</sup> Email from Kerry Holmes (Holmes Air Sciences) to Steve Bowly (URS) on 23<sup>rd</sup> May 2005 suggesting that modelling from allied feeds direct PTB was similar in emission to the Lednez PTB.

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- DTD stack (Allied Feeds) is completed and currently operating. The expected duration of operation is from May 2006 until March 2007.

### ***Excavation Emission Data***

There is no data available for potential emissions from excavations at the Allied Feeds Site. To further refine these potential risks to onsite construction workers, URS undertook an emission sampling program on the Allied Feeds site in March 2006. Details of this sampling program are in Section 2.5.

### ***Odour Emission Data***

There is no data available for the evaluation of potential odours from excavations at the Allied Feeds site. To further refine the assessment of potential odours emitted during excavations, URS undertook an emission sampling program on the Allied Feeds site in March 2006, in conjunction with the emission sampling program.

## **2.5 URS Vapour Emission and Odour Assessment**

URS conducted a vapour emission and odour assessment at the former Allied Feeds site in March 2006, following a recommendation to utilise site specific data (where limited data existed from existing reports) to refine air modelling and provide a more realistic evaluation of potential health risks at the site. The objectives of the assessment were to collect relevant field data for the assessment of odour and vapour from remediation excavation located on the site utilising identified areas of contamination on the Allied Feeds site.

### **2.5.1 Sampling Locations**

The field works were conducted by URS on the 29<sup>th</sup> March 2006. The location of the odour and vapour assessment is illustrated in Figure 1. The sampling locations were selected in lot area 104 which is located in the reclaimed land area and comprises of fill material from the former Union Carbide site (Lednez site). The location chosen was based on known contamination in the area and advice by the Site Supervisor that the area sampled has previously been known to be odorous upon excavation.

### **2.5.2 Outline of Sampling**

The sampling was undertaken by two URS personnel. Thiess provided the necessary excavation equipment and operators to dig a suitable pit which allowed for the collection of odour and volatile gas samples.

The test pit was excavated to three depths (2m, 4m and 6m) with the depths estimated based on bucket depth. These depths were chosen to be equidistant from the surface and capture the emissions from various depths to the apparent maximum depth of 6m. It is at 6m that weathered bedrock begins and contaminated material has accumulated.

As the highest odours from the exposed soil are likely to be emitted during the initial few minutes after the excavation, the sampling (deviation from the US EPA guideline) occurred during this time to capture the odours from the peak emission. Samples were collected from three different depths at the same location. Each sample depth involved taking a sample immediately after dumping of the excavated soil and succeeded with another sample (at the same location), based on the US EPA guidelines. This enabled samples to capture both the peak of the odour and also to be performed in accordance with approved DEC guidelines.

### 2.5.3 Sampling Conditions

The air emissions and odour sampling was performed after 3 days of dry and warm weather. Table 2.1 present a summary of the weather conditions prior to and during the air emissions sampling as recorded at Bureau of Meteorology Homebush Weather Station.

**Table 2.1– Summary of weather conditions at Homebush between March 24, 2006 and March 29, 2006 (Bureau of Meteorology, 2006<sup>4</sup>)**

| Day | Day of week | Maximum Temperature (°C) | Rainfall (mm) |
|-----|-------------|--------------------------|---------------|
| 24  | Friday      | 22.7                     | 0             |
| 25  | Saturday    | 23.6                     | 25.4          |
| 26  | Sunday      | 26.6                     | 0.4           |
| 27  | Monday      | 28.9                     | 0             |
| 28  | Tuesday     | 26.8                     | 0             |
| 29  | Wednesday   | 24.9                     | 0             |

### 2.5.4 Surface Emissions Sampling Methodology

The emission rate of volatile chemicals from the surface of the soil was measured using an emissions flux hood operated by URS.

The methodology generally follows US EPA Guidance for Measurement of Gaseous Emission Rates from Land Surfaces Using an Emission Isolation Flux Chamber (US EPA, 1986 and Reinhart, 1992). This method is applicable to the measurement of air emission rates at the ground surface from undisturbed

<sup>4</sup> <http://www.bom.gov.au/climate/dwo/200603/html/IDCJDW2061.200603.shtml>

sites where contaminants have been released to the surface or subsurface (US EPA, 1986). The static fluxhood method is listed as the preferred testing technique for the direct measurement of volatile organic compounds (VOC) vapour emissions by the US EPA in the Air/Superfund Technical Guideline Series (US EPA, 1990) and it is also included by the NSW EPA as test method OM-8 on the list of “Approved methods for the sampling and analysis of air pollutants in New South Wales” (NSW EPA, 2001).

Figure 2-1 shows an example of the type of emissions flux hood apparatus used for the sampling.

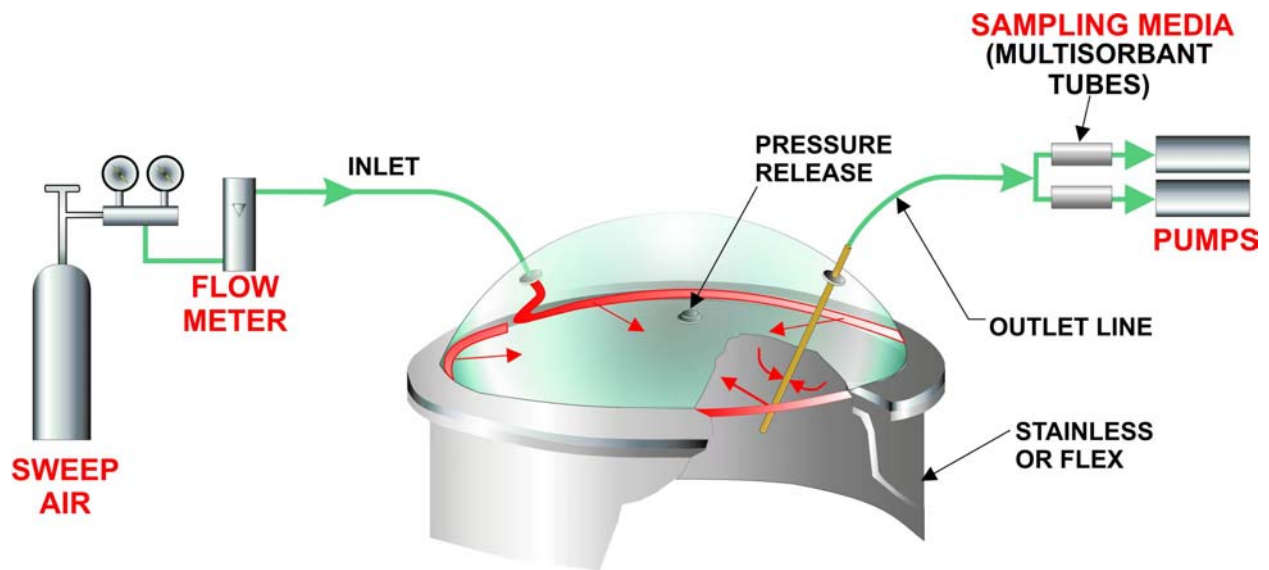


**Figure 2-1: A photograph of the isolation flux hood used in the sampling**

Before sampling occurred the fluxhood was cleaned and decontaminated as per URS standard operating procedures prior to sampling. The teflon tubing was also checked for any potential moisture which may be present as moisture has the potential to affect the accuracy of the multi-sorbent tubes. In addition, the pumps used were calibrated at the beginning and end of every sampling day and pumping rates were recorded.

At each location the flux hood was placed on the surface of the ground, the rim being approximately 1 cm below the surface of the ground. The flux hood was purged and allowed to establish equilibrium. This requires the connection of the sweep gas (ultra high pure nitrogen) to the sweep inlet of the fluxhood using flexible teflon tubing. The sweep gas was set at 5L/min and at least 4 fluxhood volumes purged. Two round of sampling were completed at each location and are discussed in detail in Section 2.7.1 and 2.7.2. During the purging period, the first round of VOC and odour samples were collected. Upon completion of the purging, the second round of sampling (at the same location) was completed.

This isolation flux hood schematic is illustrated in Figure 2-2.



**Figure 2-2: Schematic of isolation flux chamber operation**

### VOC Sampling

Soil was excavated to depths of 2.0m, 4.0m and 6.0m. At each depth, excavated material was placed adjacent to the pit and VOC samples were taken. The VOC sampling program for each “depth” follows:

- one 20 minute multi sorbent tube (primary sample);
- one 2 minute multi-sorbent tube sample (secondary sample); and
- one 2 minute charcoal tube sample (backup sample);

Upon fluxhood purged, following samples were taken:

- one 20 minute multi sorbent tube was sampled (primary sample);
- one 2 minute multi-sorbent tube sample (secondary sample); and
- one 2 minute charcoal tube sample (backup sample);

A 20 minute multi-sorbent tube was not sampled after purging at 4.0m due to an insufficient number of tubes.

All primary and secondary samples were collected using multi-sorbent (Airtox) tubes. The multi-sorbent tube samples, were sent under chain of custody to LabMark for analysis by the USEPA TO-17 method. The analysis was undertaken by heating the tube and desorbing the compounds for collection and analysis by a GC/MS. Labmark are NATA accredited for this analysis.

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Only the primary multi sorbent tubes (20 minute) were analysed except for PIT1\_4.0m after purging, where a 2 minute sample (secondary sample) was analysed as a 20 minute sample was not taken after purging at 4.0m. The adopted sample naming followed the following:

- M2 = 20 minute multi-sorbent tube sample taken before purging;
- PM2 = 20 minute multi-sorbent tube sample taken after purging; and
- PM1 = 2 minute multi-sorbent tube sample taken after purging.

### ***Odour Samples***

Odour samples were collected before purging and after purging as per the method described in Section 2.5.2. Odour samples were collected into nalphan ® sampling bags contained in a drum via teflon tubing attached to the flux hood. Air was then pumped out of the sampling drum by a battery operated pump creating a vacuum inside the drum. Sample air was drawn into the bag by the pressure difference between the inside and outside of the bag. The sample was collected over approximately 5 minutes.

The odour samples were sent to The Odour Unit Pty Limited, located Sydney, to be analysed for odour concentration and odour character using dynamic olfactometry. The measurement of odours was performed in accordance with the Australian Standard, AS4323.3:2001. The odour samples are labelled PIT 1, PIT2, PIT3 and were not different pits but rather different depths for example:

- PIT 1 Sample 1 - was sampled from PIT1 at 2.0m before purging;
- PIT 1 Sample 2 - was sampled from PIT1 at 2.0m after purging;
- PIT2 Sample 1 - was sampled from PIT1 at 4.0m before purging;
- PIT2 Sample 2 - was sampled from PIT1 at 4.0m after purging;
- PIT3 Sample 1 - was sampled from PIT1 at 6.0m before purging; and
- PIT3 Sample 2 - was sampled from PIT1 at 6.0m after purging.

As a safety precaution, a charcoal tube sample was sent to Workcover for analysis, before the odour samples were analysed. The WorkCover analysis was performed within 24 hours to ensure the odour samples could be analysed within the 30 hour time period specified in the AS4323.3:2001. The results are shown in Appendix A and showed no concentration of analytes above NOHSC 8 Hour TWA guidelines.

### 2.6 Assessment of Vapour Emission

The assessment of vapour emission incorporates the mass of each analyte reported on the thermal desorption tube, flux hood dimensions, sampling time and flow rates of sampling and the sweep gas.

#### **Emission Rate Calculation**

The analysis of the multi-sorbent tube provides a measure of the total mass of each target chemical collected during the sampling time and can be used to calculate the concentration of each chemical. The concentration of the target chemicals in the sampled air is calculated using known, measured parameters and is found using Equation 1.

$$\text{Concentration In Air}(\mu\text{g} / \text{m}^3) = \frac{\text{Mass}}{\text{SFR} \bullet \text{ST}} \quad \text{..(Equation 1)}$$

where:

*Mass* = mass of chemical detected on multi-sorbent tube (μg);  
*SFR* = sample flow rate through multi-sorbent tube (m<sup>3</sup>/min);  
*ST* = sample time (min).

The emission rate of the target chemicals from the surface of the ground to the enclosed hood area is calculated using Equation 2 (USEPA, 1986). Similarly for the odour samples, surface odour emission rates (SOER) refer to the odour emission rate per unit area whilst the odour emission rate (OER) refers to the total odour emission rate from a source. Equation 2 was also used to calculate the SOER, however odour concentration replaced VOC concentration.

$$\text{Emission Rate}(\mu\text{g} / \text{min} / \text{m}^2) = \frac{C_a \bullet \text{FR}}{\text{Area}} \quad \text{..(Equation 2)}$$

where:

*C<sub>a</sub>* = concentration of target chemicals in the air flowing out of the flux hood as calculated using equation 1 (μg/m<sup>3</sup>);  
*FR* = flow rate of sweep air into the emissions flux hood (m<sup>3</sup>/min);  
*Area* = area enclosed by the flux hood (m<sup>2</sup>).

The VOC laboratory results are attached in Appendix B and odour results are provided in Appendix C.

### **3.1 Stack Emission Rates**

The dispersion modelling performed by Holmes Air Sciences, provided in Appendix G, used stack specific emission characters, however excluded individual pollutants. As stack emissions for each pollutant were required for the risk assessment, the generic dispersion modelling was used to predict the impact at receptors. This is further discussed in Appendix H. The stack emission rates were based on documented concentrations presented in reports outlined in Section 2.4 and shown in Table 3-1. URS conducted a review of this information and determined that it was suitable for the quantification of potential stack emission rates. It is understood that the stack emission data have been based on emission characteristics from Thermal Desorption plants processing similar material, however it should be noted that the emission data do not represent actual emissions from the Allied Feeds or Lednez Thermal Desorption Plants or PTBs.

**Table 3-1: Source Emission Information (Taken from Appendix H)**

| Species                                | DTD      | AFPTB    | ITD      | LPTB     |
|----------------------------------------|----------|----------|----------|----------|
|                                        | g/s      | g/s      | g/s      | g/s      |
| NOx                                    | 1.447    | -        | 0.21     | -        |
| CO                                     | 0.114    | -        | 0.012    | -        |
| PM10                                   | 0.531    | -        | 0.162    | -        |
| SO2                                    | 0.0496   | -        | 0.007    | -        |
|                                        |          |          |          |          |
| HCl                                    | -        | -        | 0.42     | -        |
|                                        |          |          |          |          |
| B(a)P (dustborne)                      | -        | 9.52E-07 | -        | 9.52E-07 |
| DDD (dustborne)                        | -        | 2.94E-05 | -        | 2.94E-05 |
| Dieldrin (dustborne)                   | -        | 4.36E-07 | -        | 4.36E-07 |
| PAH's                                  | 7.41E-08 | -        | 4.36E-07 | -        |
| PCB's (vapour)                         | 2.82E-05 | -        | -        | -        |
| PCB's (dustborne)                      | -        | 3.00E-05 | -        | 3.00E-05 |
| Dioxins/Furans(TEQ vapour)             | 2.47E-11 | 1.36E-09 | 7.27E-13 | 1.36E-09 |
| Dioxins/Furans(TEQ Dustborne)          | -        | 2.60E-09 |          | 2.60E-09 |
| Dichloromethane                        | 6.30E-06 | -        | -        | -        |
| Dibromoethane                          | 2.16E-05 | -        | -        | -        |
| Phenol                                 | -        | -        | 5.20E-07 | -        |
| 2-Chlorophenol                         | -        | 2.39E-04 | -        | 2.39E-04 |
| Benzene                                | -        | 9.79E-02 | 1.01E-05 | 9.79E-02 |
| Chlorobenzene                          | -        | 6.89E-01 | 1.46E-05 | 6.89E-01 |
| Dichlorobenzene                        | -        | -        | 1.95E-05 | -        |
| 1,2-Dichlorobenzene                    | -        | 2.67E-01 | -        | 2.67E-01 |
| 1,3-Dichlorobenzene                    | -        | 5.94E-03 | -        | 5.94E-03 |
| 1,4-Dichlorobenzene                    | -        | 6.19E-01 | -        | 6.19E-01 |
| Tetrachlorobenzene                     | -        | 1.19E-02 | -        | 1.19E-02 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | -        | 1.87E-04 | -        | 1.87E-04 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | -        | 1.06E-04 | -        | 1.06E-04 |
| Pentachlorobenzene                     | -        | 5.98E-04 | -        | 5.98E-04 |
| Hexachlorobenzene (vapour)             | -        | 1.13E-04 | -        | 1.13E-04 |
| Hexachlorobenzene (dustborne)          | -        | 4.96E-06 | -        | 4.96E-06 |
| Ethylbenzene                           | -        | 6.28E-02 | -        | 6.28E-02 |
| Napthalene (vapour)                    | -        | 2.36E-02 | -        | 2.36E-02 |
| Napthalene (dustborne)                 | -        | 3.94E-05 | -        | 3.94E-05 |
| Xylenes                                | 1.05E-05 | 2.01E-02 | -        | 2.01E-02 |
|                                        |          |          |          |          |
| Hg                                     | 6.94E-06 | -        | -        | -        |
| As                                     | 3.22E-05 | -        | -        | -        |
| Pb                                     | 1.02E-04 | -        | -        | -        |
| Tl                                     | 2.98E-06 | -        | -        | -        |
| Ba                                     | 2.41E-04 | -        | -        | -        |
| Cd                                     | 1.29E-05 | -        | -        | -        |
| Total Cr                               | 3.33E-05 | -        | -        | -        |
| Cu                                     | 2.21E-05 | -        | -        | -        |
| Ni                                     | 1.06E-05 | -        | -        | -        |
| Sb                                     | 8.26E-06 | -        | -        | -        |
| Va                                     | 1.53E-05 | -        | -        | -        |
| Zn                                     | 4.81E-04 | -        | -        | -        |

Note: - = no data available

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### **3.2 Emission Rates from Excavations**

The sampling of emissions from excavations (as presented in Section 2.5) provides a quantification of the emission to air of volatile (and some semivolatile) organic compounds (VOC). The VOC results reported by Labmark following analysis of the samples collected are presented in Appendix B.

The calculated VOC emissions rates are shown in Table 3-2 with the calculations are provided in Appendix D.

### **3.3 Odour Results**

The Odour results reported by The Odour Unit and are in Appendix C. The odour emissions rates are shown in Table 3-3 and the calculations are provided in Appendix E.

### **3.4 Quality Assurance / Quality Control**

Limited guidance is provided in the USEPA document “*Measurement of Gaseous Emission Rates from Land Surfaces Using an Emission Isolation Flux Chamber*” (USEPA 1986) for the collection and assessment of QC data. Assessment of the accuracy and precision of analytical data were achieved by the collection and/or analysis of the following QA / QC samples:

- Laboratory Blank;
- Laboratory Spike;

Data validation of the samples taken from the emissions flux hood and the analysis of the multi-sorbent tubes is presented in Appendix F. The outcome of this validation indicated that the data was within acceptable levels of precision and accuracy. Laboratory QA/QC measurements associated with the odour results are shown in Appendix C.

## Results & Emission Rate Calculation

## SECTION 3

**Table 3-2: Allied Feeds Surface VOC Emission Rates**

| Compound                   | Pit 1_2.0m_M2<br>( $\mu\text{g}/\text{m}^3$ ) | Pit 1_2.0m_PM2<br>( $\mu\text{g}/\text{m}^3$ ) | Pit 1_4.0m_M2<br>( $\mu\text{g}/\text{m}^3$ ) | Pit 1_4.0m_PM1<br>( $\mu\text{g}/\text{m}^3$ ) | Pit 1_6.0m_M2<br>( $\mu\text{g}/\text{m}^3$ ) | Pit 1_6.0m_PM2<br>( $\mu\text{g}/\text{m}^3$ ) |
|----------------------------|-----------------------------------------------|------------------------------------------------|-----------------------------------------------|------------------------------------------------|-----------------------------------------------|------------------------------------------------|
| trichlorofluoromethane     | 3.4E-04                                       | 3.4E-04                                        | 3.4E-04                                       | 3.4E-03                                        | 3.4E-04                                       | 3.4E-04                                        |
| 1,1-dichloroethene         | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| trans-1,2-dichloroethene   | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| tributylmethylether (TBME) | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| 1,1-dichloroethane         | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| cis-1,2-dichloroethene     | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| chloroform                 | 1.7E-04                                       | 1.7E-04                                        | 6.5E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 3.4E-04                                        |
| 1,1,1-trichloroethane      | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| 1,2-dichloroethane         | 4.1E-04                                       | 6.2E-04                                        | 6.2E-04                                       | 6.2E-03                                        | 7.2E-04                                       | 7.2E-04                                        |
| 1,1-dichloropropene        | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| carbon tetrachloride       | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| benzene                    | 8.2E-03                                       | 1.1E-02                                        | 1.5E-01                                       | 1.7E-01                                        | 1.2E-01                                       | 8.2E-02                                        |
| trichloroethene            | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| 1,2-dichloropropane        | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| dibromomethane             | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| bromodichloromethane       | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| cis-1,3-dichloropropene    | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| toluene                    | 4.1E-03                                       | 4.1E-03                                        | 7.9E-02                                       | 9.9E-02                                        | 6.5E-02                                       | 4.8E-02                                        |
| trans-1,3-dichloropropene  | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |
| 1,1,2-trichloroethane      | 1.7E-04                                       | 1.7E-04                                        | 1.7E-04                                       | 1.7E-03                                        | 1.7E-04                                       | 1.7E-04                                        |

## Results & Emission Rate Calculation

## SECTION 3

| Compound                  | Pit 1_2.0m_M2 | Pit 1_2.0m_PM2 | Pit 1_4.0m_M2 | Pit 1_4.0m_PM1 | Pit 1_6.0m_M2 | Pit 1_6.0m_PM2 |
|---------------------------|---------------|----------------|---------------|----------------|---------------|----------------|
| 1,3-dichloropropane       | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| chlorodibromomethane      | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| tetrachloroethene         | 4.1E-04       | 4.4E-04        | 5.8E-04       | 1.7E-03        | 6.2E-04       | 4.4E-04        |
| 1,2-dibromoethane         | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| chlorobenzene             | 1.8E-01       | 1.9E-01        | 3.9E-01       | 2.8E-01        | 4.3E-01       | 3.0E-01        |
| 1,1,1,2-tetrachloroethane | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| ethylbenzene              | 2.1E-03       | 1.9E-03        | 1.3E-03       | 2.7E-03        | 1.2E-03       | 9.2E-04        |
| meta- & para- xylene      | 1.2E-02       | 1.1E-02        | 1.0E-02       | 1.4E-02        | 9.2E-03       | 6.8E-03        |
| styrene                   | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| bromoform                 | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| ortho-xylene              | 4.1E-03       | 4.1E-03        | 3.8E-03       | 5.8E-03        | 3.4E-03       | 2.5E-03        |
| 1,1,2,2-tetrachloroethane | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| isopropylbenzene          | 8.9E-04       | 8.9E-04        | 6.8E-04       | 1.7E-03        | 5.8E-04       | 4.4E-04        |
| 1,2,3-trichloropropane    | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| bromobenzene              | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| n-propylbenzene           | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 2-chlorotoluene           | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 4-chlorotoluene           | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 1,3,5-trimethylbenzene    | 6.2E-03       | 6.5E-03        | 5.5E-03       | 6.8E-03        | 6.5E-03       | 4.4E-03        |
| tert-butylbenzene         | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 1,2,4-trimethylbenzene    | 1.2E-02       | 1.2E-02        | 9.2E-03       | 1.3E-02        | 1.1E-02       | 7.9E-03        |
| sec-butylbenzene          | 5.1E-04       | 5.8E-04        | 5.5E-04       | 1.7E-03        | 5.5E-04       | 3.8E-04        |

## Results & Emission Rate Calculation

## SECTION 3

| Compound                    | Pit 1_2.0m_M2 | Pit 1_2.0m_PM2 | Pit 1_4.0m_M2 | Pit 1_4.0m_PM1 | Pit 1_6.0m_M2 | Pit 1_6.0m_PM2 |
|-----------------------------|---------------|----------------|---------------|----------------|---------------|----------------|
| 1,3-dichlorobenzene         | 4.4E-03       | 4.1E-03        | 5.5E-03       | 1.1E-02        | 1.1E-02       | 6.8E-03        |
| 1,4-dichlorobenzene         | 1.5E-01       | 1.5E-01        | 1.5E-01       | 5.1E-01        | 7.7E-02       | 1.6E-01        |
| p-isopropyltoluene          | 8.2E-04       | 8.2E-04        | 6.8E-04       | 1.7E-03        | 9.6E-04       | 5.8E-04        |
| 1,2-dichlorobenzene         | 1.0E-01       | 9.6E-02        | 1.1E-01       | 2.8E-01        | 1.6E-01       | 1.2E-01        |
| n-butylbenzene              | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 1,2-dibromo-3-chloropropane | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 1,2,4-trichlorobenzene      | 1.4E-01       | 1.3E-01        | 2.0E-01       | 1.1E+00        | 2.4E-01       | 1.9E-01        |
| naphthalene                 | 2.4E-02       | 2.0E-02        | 1.9E-02       | 3.4E-02        | 2.7E-02       | 1.7E-02        |
| hexachlorobutadiene         | 1.7E-04       | 1.7E-04        | 1.7E-04       | 1.7E-03        | 1.7E-04       | 1.7E-04        |
| 1,2,3-trichlorobenzene      | 7.5E-03       | 6.2E-03        | 1.8E-02       | 5.1E-02        | 3.4E-02       | 1.8E-02        |

**Table 3-3: Surface Odour Emission Rate**

| <b>Sample Location</b>      | <b>Surface Odour Emission Rate<br/>(OU.m<sup>3</sup>/s/m<sup>2</sup>)</b> |
|-----------------------------|---------------------------------------------------------------------------|
| Pit 1 – 2.0m_Before purging | 0.48                                                                      |
| Pit 1 – 2.0m_After purging  | 0.63                                                                      |
| Pit 1 – 4.0m_Before purging | 0.77                                                                      |
| Pit 1 – 4.0m_After purging  | 0.77                                                                      |
| Pit 1 – 6.0m_Before purging | 0.67                                                                      |
| Pit 1 – 6.0m_After purging  | 0.63                                                                      |

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## **4.1 Methodology for Ground Level Concentrations of Pollutants from Excavated Material**

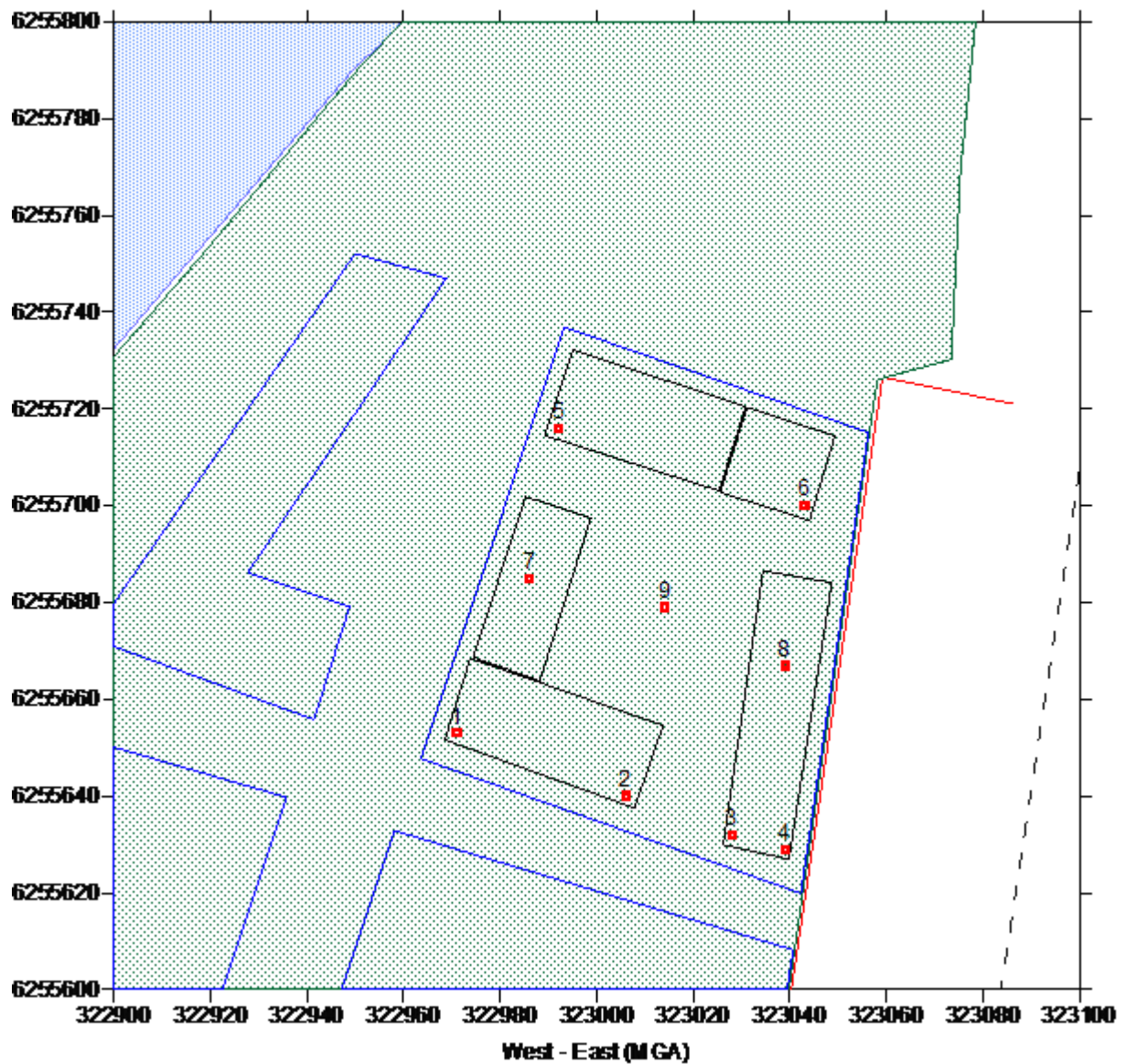
There are two primary sources of vapour concentrations that may be present at the ground surface level, namely those from excavated sources and those from stacks. The ground level concentrations were modelled from the stack emission sources such as the PTB, DTD and ITD, and those sources associated with excavations (emissions of VOCs and odours).

The results from the sampling of surface emission rates from excavated materials (presented in Section 3) were provided to Holmes Air Sciences to quantify maximum ground level concentrations from several different excavations scenarios (refer to Holmes Air Sciences report in Appendix G). The potential excavation scenarios, as advised by Thiess, involve:

1. all of Lots 104 and 101 will undergo excavation/remediation;
2. all of Lot 104 will undergo excavation/remediation;
3. all of Lot 101 will undergo excavation/remediation;
4. half the area of Lot 104 will undergo excavation/remediation; and
5. half the area of Lot 101 will undergo excavation/remediation.

The VOC and odour emission rates were modelled for the above 5 scenarios and maximum ground level concentrations were predicted at sensitive receptors on Lot 100, where construction works are expected to occur. Nine sensitive receptors were chosen for Lot 100 to represent workers at different locations at the proposed construction area. The location of these receptors are shown in Figure 4-1.

The modelling was undertaken initially on the basis of a 1 g/s/m<sup>2</sup> emission rate (associated with an area source representing excavations) for the above excavation scenarios. This modelling was used to provide estimates of maximum ground level concentrations at each receptor and has been used to identify the most conservative exposure scenario and receptor location. That is the receptor location where the highest ground level concentrations occur.



**Figure 4-1: Location of sensitive receptors on Lot 100 (From Figure 2, Appendix G)**

## Impact at Receptors

## SECTION 4

### 4.2 VOC Modelling from Excavated Material

The maximum predicted 1 hour average ground level concentrations for a 1 g/s/m<sup>2</sup> emission rate of VOCs at the nine workplace receptors (receptors on Lot 100) are presented in Table 4-1 (refer to Appendix G).

**Table 4-1 – Predicted maximum 1-hour average concentrations for Scenario 1 using maximum emission rates (milligrams per cubic metre)**

| Receptor               | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Chloroform             | 1.77E-01 | 2.12E-01 | 2.45E-01 | 2.56E-01 | 1.01E-01 | 1.16E-01 | 1.25E-01 | 1.55E-01 | 1.36E-01 |
| 1,2-dichloroethane     | 6.76E-04 | 8.10E-04 | 9.38E-04 | 9.79E-04 | 3.88E-04 | 4.44E-04 | 4.78E-04 | 5.92E-04 | 5.18E-04 |
| Benzene                | 6.44E-03 | 7.72E-03 | 8.95E-03 | 9.34E-03 | 3.70E-03 | 4.24E-03 | 4.56E-03 | 5.64E-03 | 4.94E-03 |
| Toluene                | 1.03E-01 | 1.23E-01 | 1.43E-01 | 1.49E-01 | 5.91E-02 | 6.77E-02 | 7.28E-02 | 9.01E-02 | 7.89E-02 |
| Tetrachloroethane      | 1.77E-03 | 2.12E-03 | 2.45E-03 | 2.56E-03 | 1.01E-03 | 1.16E-03 | 1.25E-03 | 1.55E-03 | 1.36E-03 |
| Chlorobenzene          | 4.47E-01 | 5.36E-01 | 6.21E-01 | 6.48E-01 | 2.56E-01 | 2.94E-01 | 3.16E-01 | 3.91E-01 | 3.43E-01 |
| Ethylbenzene           | 2.81E-03 | 3.36E-03 | 3.90E-03 | 4.07E-03 | 1.61E-03 | 1.85E-03 | 1.99E-03 | 2.46E-03 | 2.15E-03 |
| meta- & para- xylene   | 1.46E-02 | 1.74E-02 | 2.02E-02 | 2.11E-02 | 8.35E-03 | 9.57E-03 | 1.03E-02 | 1.27E-02 | 1.12E-02 |
| ortho-xylene           | 6.03E-03 | 7.23E-03 | 8.37E-03 | 8.74E-03 | 3.46E-03 | 3.96E-03 | 4.26E-03 | 5.28E-03 | 4.62E-03 |
| Isopropylbenzene       | 1.77E-03 | 2.12E-03 | 2.45E-03 | 2.56E-03 | 1.01E-03 | 1.16E-03 | 1.25E-03 | 1.55E-03 | 1.36E-03 |
| 1,3,5-trimethylbenzene | 7.07E-03 | 8.47E-03 | 9.82E-03 | 1.02E-02 | 4.06E-03 | 4.65E-03 | 5.00E-03 | 6.19E-03 | 5.42E-03 |
| 1,2,4-trimethylbenzene | 1.35E-02 | 1.62E-02 | 1.88E-02 | 1.96E-02 | 7.75E-03 | 8.89E-03 | 9.56E-03 | 1.18E-02 | 1.04E-02 |
| sec-butylbenzene       | 6.03E-04 | 7.23E-04 | 8.37E-04 | 8.74E-04 | 3.46E-04 | 3.96E-04 | 4.26E-04 | 5.28E-04 | 4.62E-04 |
| 1,3-dichlorobenzene    | 1.14E-02 | 1.37E-02 | 1.59E-02 | 1.66E-02 | 6.56E-03 | 7.52E-03 | 8.09E-03 | 1.00E-02 | 8.77E-03 |
| 1,4-dichlorobenzene    | 5.30E-01 | 6.35E-01 | 7.36E-01 | 7.68E-01 | 3.04E-01 | 3.49E-01 | 3.75E-01 | 4.64E-01 | 4.07E-01 |
| p-isopropyltoluene     | 9.98E-04 | 1.20E-03 | 1.39E-03 | 1.45E-03 | 5.73E-04 | 6.56E-04 | 7.06E-04 | 8.74E-04 | 7.65E-04 |
| 1,2-dichlorobenzene    | 2.91E-01 | 3.49E-01 | 4.04E-01 | 4.22E-01 | 1.67E-01 | 1.91E-01 | 2.06E-01 | 2.55E-01 | 2.23E-01 |

## Impact at Receptors

## SECTION 4

**Table 4-1 – Predicted maximum 1-hour average concentrations for Scenario 1 using maximum emission rates (milligrams per cubic metre)**

| Receptor               | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1,2,4-trichlorobenzene | 1.14E+00 | 1.37E+00 | 1.59E+00 | 1.66E+00 | 6.56E-01 | 7.52E-01 | 8.09E-01 | 1.00E+00 | 8.77E-01 |
| Napthalene             | 3.53E-02 | 4.24E-02 | 4.91E-02 | 5.12E-02 | 2.03E-02 | 2.32E-02 | 2.50E-02 | 3.09E-02 | 2.71E-02 |
| 1,2,3-trichlorobenzene | 5.30E-02 | 6.35E-02 | 7.36E-02 | 7.68E-02 | 3.04E-02 | 3.49E-02 | 3.75E-02 | 4.64E-02 | 4.07E-02 |

### 4.3 Odour Modelling Results

The same modelling scenarios described in Section 4.1 were used to predict the odour concentrations at the nine workplace receptors. The maximum predicted 1 hour average ground level odour concentrations at sensitive receptors (receptors on Lot 100) are shown in Table 4-2 (refer to Appendix G).

| <b>Table 4-2 – Predicted maximum 1-hour average ground level odour concentrations at sensitive receptors (From Table 2, Appendix H)</b> |                   |                   |                   |                   |                   |
|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| <b>Receptor</b>                                                                                                                         | <b>Scenario 1</b> | <b>Scenario 2</b> | <b>Scenario 3</b> | <b>Scenario 4</b> | <b>Scenario 5</b> |
| 1                                                                                                                                       | 112               | 62.1              | 99.7              | 62.1              | 53.3              |
| 2                                                                                                                                       | 134               | 63.5              | 134               | 63.5              | 52.7              |
| 3                                                                                                                                       | 155               | 62.4              | 135               | 62.3              | 57.4              |
| 4                                                                                                                                       | 162               | 59.8              | 134               | 59.6              | 58.8              |
| 5                                                                                                                                       | 64.1              | 33.6              | 57.9              | 33.5              | 26.3              |
| 6                                                                                                                                       | 73.5              | 33.3              | 63.3              | 33.0              | 26.3              |
| 7                                                                                                                                       | 79.0              | 44.2              | 76.2              | 44.2              | 34.0              |
| 8                                                                                                                                       | 97.9              | 43.4              | 84.1              | 43.2              | 34.5              |
| 9                                                                                                                                       | 85.7              | 43.1              | 82.2              | 43.1              | 32.6              |

### 4.4 Methodology for Estimation of Concentrations from Stacks

There were two components to estimating concentrations at receptors from the stacks. The first and most important component was the prediction of pollutant concentrations from the stack sources. The stack emission modelling was used to develop pollutant impacts at each of the receptors. The second component was to add the VOC emissions from the excavated material to the VOC concentrations predicted at the receptors from the stacks, at both ground level and 10m. This is further discussed below and in more detail in Appendix H.

The dispersion modelling was undertaken to predict concentration in air at the nine workplace receptors (refer to Figure 4.1 for receptor locations) associated with emissions from the various process stacks from the Allied Feeds and Lednez sites. The stack modelling was conducted by Holmes Air Science and is reported in Appendix G.

The modelling was run to estimate the maximum 1 hour and annual average concentrations at ground level, as well as heights of 10m, 20m, 30m and 40m, representing the various heights of proposed buildings to be located on Lot 100. The modelling did not estimate specific pollutants from the stacks, rather used a generic emission rate. The ground level concentrations of specific pollutants were calculated by using the ratio of predicted pollutants emitted from the stack to predicted ground level concentrations. The ratio was then assigned to specific pollutants being emitted from the stacks. Concentrations for each of the pollutants from the stack were then calculated for each specific receptor.

The highest concentrations are generally found in the *plume centreline* and the highest concentrations from the stack emissions modelling were found at the 40m receptor height. Given the stack heights range between 16 and 30m, the effective stack height would be greater than this height due to plume rise. Consequently the effective stack height would be the approximate height of the *plume centreline* close to the stack. Thus, the findings of the modelling are consistent with expected results for the location of the highest concentrations.

In addition, the receptors closest to the source will have higher concentrations compared with receptors further away. Consequently, Receptors 1-4 (as shown in Figure 4-1) would be considered to have the highest concentration and were the receptors chosen to be investigated.

Once the maximum concentrations of specific stack derived VOCs had been calculated at each receptor, the maximum corresponding VOC concentrations, which were derived from the excavated material, were added. The results for the stack and area (excavated material) sources were added for the 0m and 10m scenarios only. It was considered that the VOC emissions from the area sources were unlikely to occur above 20m in height. This produced a conservative cumulative VOC concentration at each receptor. For the scenarios above 10m, only stack emissions were included.

A schematic of the emission sources relative to the receptors is shown in Figure 4-2.

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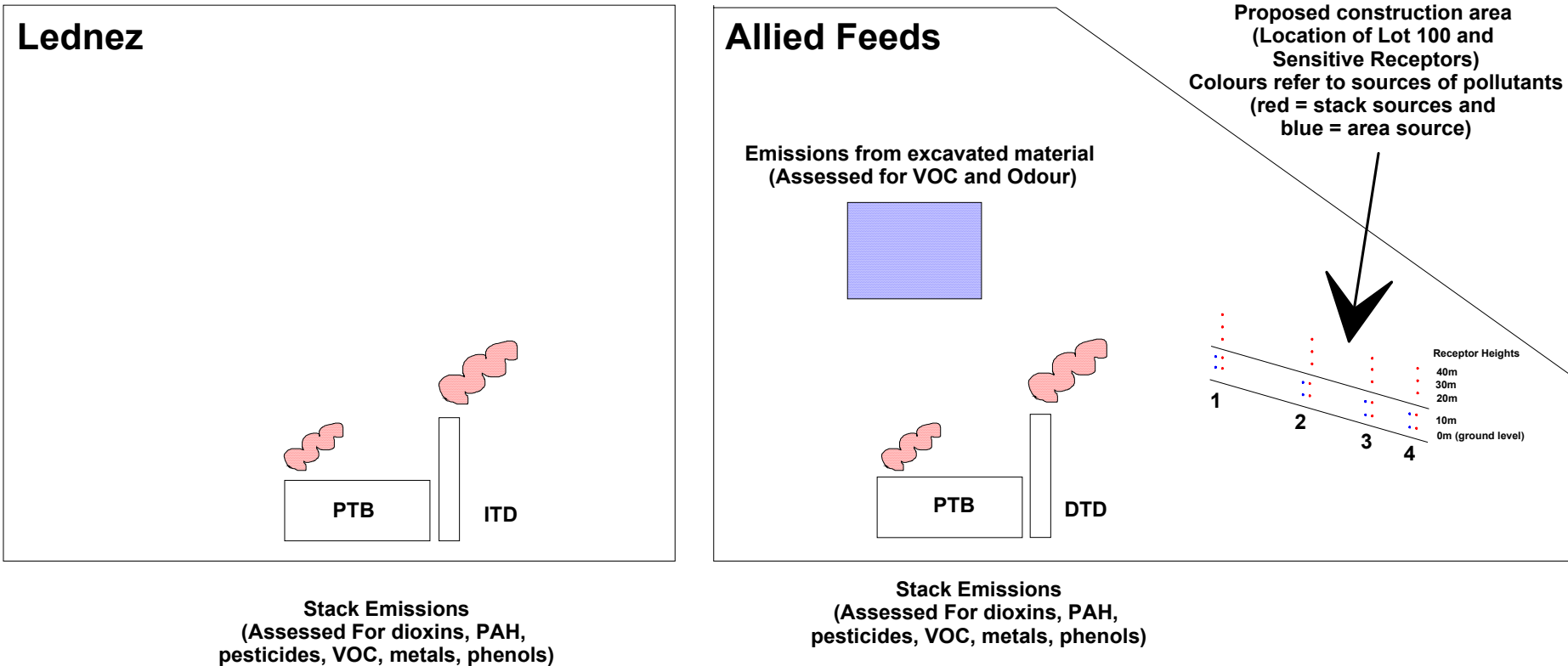
### 4.5 Modelling Limitations

It should be noted that background concentrations of various pollutants were excluded from the modelling. Due to the range of contaminated site excavation activities and construction activities on site and on adjacent sites, the background concentration of urban would not necessarily be considered representative of the site, consequently background concentrations were excluded.

## Impact at Receptors

## SECTION 4

### Parramatta River



**Figure 4-2: Schematic showing emission sources and receptor locations**

### 5.1 General

This section presents an assessment of potential exposure by workers to chemicals derived from the remediation activities on the Allied Feeds Site (and adjacent Lednez site) and, where required, provides an assessment of potential risks to human health.

### 5.2 Exposure Assessment

This section identifies the human populations (receptors) who may be exposed to the COPC, outlines the mechanisms (pathways) by which these populations may be exposed and provides a quantitative estimate of exposure and chemical intake.

The exposure assessment is undertaken to be representative of a particular population and does not calculate the exposure for a given individual. Populations are grouped so as to reflect common activities undertaken by that group (such as workers or children) or by the location of the population in relation to the contaminant distribution. For this reason it is important that the exposure assessment be undertaken in such a way that the most sensitive individuals within the potentially exposed population are adequately protected. The exposure assessment has been structured in the following way:

- Identification of the population that may be exposed to the COPC;
- Identification of the activities by which exposure may take place for each population;
- Identification of parameters which define activity (such as time spent swimming or wading) and physiological exposure parameters (such as body weight and inhalation rate); and
- Identification of the chemical concentration at the point of exposure. This may include the identification and use of models to estimate chemical concentrations for receptors and exposure pathways that cannot be measured directly.

#### 5.2.1 Receptor Populations

At and surrounding the Meriton site there are a number of receptor populations identified, however the risk assessment presented here only concerns the onsite Meriton construction workers.

The Meriton construction workers will undertake a number of activities at the former Allied Feeds site, including utilities installation, and development and construction both at the ground surface and at height of the proposed residential development. It is anticipated that these works will coincide with the remediation activities of Thiess on the site. This risk assessment will only consider potential health risks posed by the remediation activities co-occurring on the site, it will not consider potential human health risks associated with the construction of the proposed development.

The potential health risks posed to Thiess workers will not be considered as part of this assessment.

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Therefore the following receptors will be considered for further assessment:

- Onsite Meriton construction workers; and
- Visitors to the site.

### 5.2.2 Potential Exposure Pathways

Detailed below is a summary of the identified and incomplete exposure pathways for the Meriton construction workers on the former Allied Feeds site.

#### ***Key Exposure Pathways***

The identified exposure pathways posed to Meriton construction workers are as follows:

- Inhalation of volatile chemicals from excavation and remediation works (Thiess); and
- Inhalation of volatiles and particulates from the DTD and ITD stacks (which are used for remediation of soils).

#### ***Other Exposure Pathways***

Listed below are pathways which are considered incomplete and warrant no further assessment for the Meriton construction workers.

- Direct contact and incidental ingestion of contaminated materials (soil/groundwater) on site. It is considered unlikely that Meriton construction workers will have direct contact with unremediated areas of the site. It has therefore been assumed for the purposes of the assessment of potential health risks that this is an incomplete pathway.
- Ingestion of potentially contaminated groundwater and surface water surrounding the site. The standing water level at the site lies between 3 and 5 mAHD (LB03 and LB04 installed by GHD Longmac in 2004 (URS 2005)) that contact during construction activities is unlikely. It is also considered that contact with surface water surrounding the western boundary of the site is also an incomplete pathway.

### 5.3 Assessment of Potential Exposure by Workers

Potential inhalation exposures by construction workers have been evaluated using Workplace Exposure Standards for Atmospheric Contaminants in the Occupational Environment (TWA) (NOHSC:1003 (1995), available from NOHSC website) in accordance with NEPM guidance (1999).

These standards are applicable to long term exposure to a substance over an 8 hour day, 5 day working week over the entire working life. The exposure standards do not represent 'no-effect' levels which

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guarantee protection to every worker. The standards are not fine dividing lines between satisfactory and unsatisfactory working conditions, but they assess the quality of the work environment and indicate where appropriate control measures are required. The exposure standards listed in this publication only consider absorption via inhalation and are valid only on the condition that significant skin absorption cannot occur.

The evaluation of modelled total concentrations at ground surface, 10, 20, 30 and 40 m above the ground have been compared to the TWA values in Appendix I.

TWA values were sourced from Australia (NOHSC, available in 2006). Where no data was available from the NOHSC, data was obtained from other bodies such as NIOSH, ACGIH and the International Labor Organisation International Health and Safety Information Centre occupational exposure database. There are a number of chemicals as noted in tables in Appendix I where there was no TWA value. Where appropriate a surrogate chemical which had a similar composition and toxicity was selected. In most instances these surrogate compounds are a conservative assessment for the identified chemicals with no reference guideline. However chemicals such as sec-butyl benzene has no appropriate surrogate compound and has not been assessed further.

The modelled data presented and compared to the Workplace Exposure Standards is considered to be the worst case scenario with all of lots 104 and 101 being open and undergoing excavation and for all stack sources to be co-currently operating. The modelled data was converted (Appendix H) to an 8 hour average to compare directly with the established TWA values which are based on an eight hour exposure time.

The comparison of total modelled concentrations against the TWA guidelines (presented in Appendix I) indicates that there were no exceedences of the adopted TWAs at the Meriton site for all the chemicals quantified. The concentrations modelled are approximately at a minimum 30 times lower than the adopted TWA value. The only exception is relevant to the assessment of inhalation exposure of benzo(a)pyrene and polycyclic aromatic hydrocarbons (PAHs).

There are no TWA values established for benzo(a)pyrene and PAHs. Benzo(a)pyrene is considered to be one of the most toxic PAHs and assessment of potential exposure to PAHs in air has been undertaken on the basis of benzo(a)pyrene being an indicator chemical for PAHs, consistent with the approach adopted by the NEPC (2004). For benzo(a)pyrene the recommendation by the NOHSC is that exposures should be carefully controlled and as low as possible as it is classified as an A2 carcinogen.

### 5.4 Assessment of Potential Exposure to Benzo(a)Pyrene

#### 5.4.1 Approach

As no relevant workplace exposure limit is available or relevant for the assessment of exposures to benzo(a)pyrene, and exposures are to be kept as low as possible, the assessment of potential exposures to benzo(a)pyrene in the workplace has been undertaken on the basis of a risk. Benzo(a)pyrene is classified as a genotoxic carcinogen (refer to toxicity summary presented in Appendix J) and as such risk is evaluated on the basis of non-threshold effects.

Non-threshold carcinogenic effects assume that for some chemicals classified as carcinogenic, there is no threshold below which there will be no expected toxic effects. Hence, assessment of these chemicals is based on the use of a slope factor, which assumes that any exposure to the chemicals will result in an increased incremental risk or probability of developing cancer.

The potential for unacceptable non-threshold carcinogenic risks associated with exposure to COPC have been evaluated using US EPA methodology.

Non-threshold carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential non-threshold carcinogen. The numerical estimate of excess lifetime cancer risk is calculated as follows:

$$\text{Carcinogenic Risk} = \text{Daily Chemical Intake} \bullet \text{Cancer Slope Factor}$$

The total non-threshold carcinogenic risk is the sum of the risk for each chemical for each pathway.

Australian guidance related to the significance of non-threshold cancer risk estimates is currently not available. However, current USEPA policy states that: “Where the cumulative site risk to an individual based on reasonable maximum exposure for both current and future land use is less than  $10^{-4}$ , action is generally not warranted unless there are adverse environmental impacts” (USEPA, 1991). If risks are found to be greater than the  $10^{-4}$  probability, then the USEPA recommends that a preliminary remediation goal of  $10^{-6}$  cancer risk be developed as the point of departure (ibid). URS understands that risks of less than  $10^{-5}$  per lifetime is generally accepted as indicating conditions that might warrant specific management or remedial action.

#### Acceptable Risk

The adopted acceptable non-threshold risk is defined as a risk of less than  $1 \times 10^{-5}$  incremental lifetime risk of cancer. This value has been adopted in this assessment with respect to the consideration of exposure to benzo(a)pyrene in air by construction workers to identify if there is the potential for elevated exposure.

### 5.4.2 Toxicity of Benzo(a)Pyrene

With respect to inhalation exposures to benzo(a)pyrene a slope factor of  $305 \text{ (mg/kg/day)}^{-1}$  available from the World Health Organisation (WHO, 2000) has been adopted. This value has been adopted following guidance from enHealth (2002), with details on the toxicity and basis for the identification of relevant toxicity values presented in Appendix J.

### 5.4.3 Calculation of Chemical Intake

When calculating chemical intake or exposure, the risk assessment process focuses on exposure occurring over a prolonged period that is, chronic exposure that occurs over years and possibly a lifetime. Whilst an activity may occur infrequently (i.e. several days a year), it may occur over a long period (i.e. years or decades) and therefore have the potential to increase long term or chronic intake of the chemical. Activities that occur on a once-off basis only have limited potential to make a significant contribution to long term chemical intake. It could be argued that a visitor (not a regular user of the area) to the site who may be there for inspection purposes represents an infrequent activity, undertaken by a few individuals and unlikely to take place over a long time and therefore have limited potential to contribute to the long term intake of the chemicals identified at the site.

It has been assumed that the assessment of potential exposures to visitors on the site will not be assessed as the onsite construction workers will provide a conservative assessment of potential health risks.

The calculation of daily chemical intake requires the estimation of relevant exposure parameters that describe physical and behavioural variables relevant to the exposure evaluated as well as chemical concentrations that are considered relevant to the exposure evaluated.

The assessment presented has addressed potential worst-case exposure to benzo(a)pyrene and exposure has been calculated for a **Reasonable Maximum Exposure (RME)** scenario estimated by using intake variables and chemical concentrations that define the highest exposure that is reasonably likely to occur in the area assessed. The RME is likely to provide a conservative or overestimate of total exposure and therefore health risk. This approach follows ANZECC/NHMRC guidance (1992) supplemented by USEPA guidance (USEPA, 1989).

The assessment of daily chemical intake associated with inhalation exposures has been undertaken using the following equation:

$$\text{Daily Chemical Intake}_V = C_a \cdot \frac{\text{InhR} \cdot \text{ET} \cdot \text{FI} \cdot \text{EF} \cdot \text{ED}}{\text{BW} \cdot \text{AT}} \quad (\text{mg/kg/day})$$

where:

$C_a$  = Concentration of chemical in air (as relevant for each pathway assessed) ( $\text{mg/m}^3$ )

$\text{InhR}$  = Inhalation rate (dependant on age and activity) ( $\text{m}^3/\text{hr}$ )

$\text{ET}$  = Exposure time (dependant on activity) ( $\text{hr/day}$ )

$\text{FI}$  = Fraction inhaled from contaminated source assumed to be 1 or 100% (unitless)

$\text{EF}$  = Exposure frequency (days/year)

ED = Exposure duration (years)  
 BW = Body weight (dependant on age) (kg)  
 AT = Averaging time for threshold and non-threshold exposures (days)

Assessment of inhalation exposures using the above equation assumes that the benzo(a)pyrene present in air is associated with a fine particulate similar to a vapour. This provides a conservative assessment of potential intake of chemicals present in particulate form as typically particulates range in size and not all penetrates sufficiently far into the lungs to be absorbed. Hence consideration of a fine particulate, assuming it is similar to a vapour, is expected to overestimate actual chemical intake.

### Adopted Exposure Parameters

For the assessment of potential health risks posed to onsite workers from exposure to benzo(a)pyrene, the following exposure parameters and been adopted.

**Table 5-1: Adopted Exposure Parameters**

#### Inhalation of Chemicals (Fine Particulates)

| General Data/ Equations                        |                    | Exposure Parameters (RME)                  |                                                           |
|------------------------------------------------|--------------------|--------------------------------------------|-----------------------------------------------------------|
|                                                |                    | Inhalation Outdoors by Construction Worker |                                                           |
| <b>Exposure Parameters</b>                     |                    |                                            |                                                           |
| Exposure Frequency (EF)                        | days/year          | 312                                        | Exposure for 6 days per week                              |
| Exposure Duration (ED)                         | years              | 5                                          | Assume workers are on the site for 5 years (conservative) |
| Body Weight (BW)                               | kg                 | 70                                         | USEPA 1989 and CSMS 1996                                  |
| Averaging Time - NonThreshold (ATc)            | days               | 25550                                      | USEPA 1989 and CSMS 1996                                  |
| Averaging Time - Threshold (ATn)               | days               | 1825                                       | USEPA 1989 and CSMS 1996                                  |
| Inhalation Rate (InhR)                         | m <sup>3</sup> /hr | 2.20                                       | Inhalation rate indoors for adults as per enHealth 2002   |
| Exposure Time (ET)                             | hr/day             | 10                                         | Time spent outdoors                                       |
| Fraction Inhaled from Contaminated Source (FI) | -                  | 1                                          | Assume inhalation from worst-case emissions all day       |

### Concentration of Benzo(a)Pyrene in Air

The highest modelled stack emission of benzo(a)pyrene has been adopted for this assessment, which is considered to provide a reasonable maximum. The primary sources were found to be the Allied Feeds DTD Stack and Allied Feeds PTB, as shown in Appendix H. This has been found to be at 40m at Receptor 4, (Appendix G) and is  $3.9 \times 10^{-7}$  mg/m<sup>3</sup>.

### Calculated Daily Chemical Intake

Based in the above exposure parameters and the worst-case concentration of benzo(a)pyrene in air, the daily intake of benzo(a)pyrene has been calculated (using the above equation) as  $7.5 \times 10^{-9}$  mg/kg/day.

---

### 5.4.4 Calculation of Carcinogenic Risk

The non-threshold carcinogenic risk associated with exposure to benzo(a)pyrene by construction workers on the site has been calculated using the following:

$$\text{Carcinogenic Risk} = \text{Daily Chemical Intake} \bullet \text{Cancer Slope Factor for Benzo(a)pyrene}$$

The calculated non-threshold risk is  $2.3 \times 10^{-6}$  which is lower than the target risk value of  $1 \times 10^{-5}$  adopted as indicative of acceptable risks to human health. On this basis risks to workers are considered low and acceptable.

The modelling presented here is conservative as the concentrations of benzo(a)pyrene adopted are from the stack emissions only. There was no benzo(a)pyrene detected in the excavation assessment as it is not considered to be a volatile chemical. The stack emissions modelling is based on the assumption that both the DTD and IDT stacks will be operating co-currently. Whilst verbal confirmation with Thiess has confirmed that this is likely not to be the case that both stacks will be operating at the same time, the decision was made to model both stacks operating at the same time based on a reasonable maximum exposure.

### 6.1 General

An odour is defined as the property of a substance that gives it its characteristic scent or smell. Odours are very subjective, with responses varying greatly from individual to individual. Whether an odour is perceived as being pleasant or unpleasant is often based on personal opinion.

The sensory perception of odour has four major dimensions: concentration, intensity, character, and hedonic tone.

- **Odour concentration:** this is otherwise known as the odour threshold. It is the concentration of a compound necessary for detection by 50% of the population.
- **Odour intensity:** this refers to the perceived strength of the odour sensation. Intensity, for most chemicals, increases exponentially with the concentration of the compound.
- **Odour character:** this is what the substance smells like. A commonly used list of descriptors includes “fishy, hay, nutty, creosote, turpentine, rancid, sewer, and ammonia”.
- **Hedonic tone:** this is the judgement of the relative pleasantness or unpleasantness of the odour. It is this aspect that primarily dictates whether an odour nuisance occurs.

Obviously, there are many odours, or situations, when a smell does not cause a nuisance. It is the subjective judgement of the hedonic tone that enables the decision to be made as to whether an odour is a nuisance or not. Odours from contaminated sites are generally considered to be unpleasant, and masking agents may change slightly change the character, but the concentration, intensity and hedonic tone may remain the same.

### 6.2 Odour Policy in New South Wales

The DEC (formerly NSW EPA) provides odour criteria in NSW EPA (2001) *Draft Policy: Assessment and Management of Odour from Stationary Source in NSW*. The criteria is shown in the following tables and ranges from 2 OU to 7 OU (99.0%, nose response time) and corresponds to an affected population of >2000 (2 OU criteria) to 2 (7 OU criteria).

NSW EPA (2001, p12) further states that “*Experience gained through odour assessments for proposed and existing facilities in NSW indicates that an odour performance criterion of 7 OU/m<sup>3</sup> is likely to represent the level below which ‘offensive’ odours should not occur...*”. This is the basis of the 7 OU limit listed in the attached table.

**Table 6.1 Odour Performance Criteria (from Table 3.1, NSW EPA 2001)**

| <b>Population of affected community</b> | <b>Odour performance criteria<br/>(odour units/m<sup>3</sup>)</b> |
|-----------------------------------------|-------------------------------------------------------------------|
| Urban areas ( $\geq 2000$ )             | 2.0                                                               |
| 500 - 2000                              | 3.0                                                               |
| 125-500                                 | 4.0                                                               |
| 30-125                                  | 5.0                                                               |
| 10-30                                   | 6.0                                                               |
| Single residence ( $\leq 2$ )           | 7.0                                                               |

### 6.3 Assessment of Exposure to Odours By Workers

The maximum odour concentrations predicted at the nine sensitive workplace receptors from the excavated material ranged from 26 OU to 162 OU. As it is generally understood that odour characters become recognised upwards of 3-4 OU, it would appear that the workers at the sensitive receptors would commonly be experiencing strong odours from the excavated sites.

It should be noted that the odour modelling did not include odour emissions from the stack sources. The stack emissions are likely to have a high odour concentration and during adverse weather conditions, odorous stack emissions may combine with excavated material odours to produce higher odour concentrations at the receptors than what was modelled.

Whilst the NSW odour policy is generally aimed at sensitive receptors off site, rather than “site employees”, on site workers may find working in this odorous environment a nuisance and unpleasant for long durations.

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The assessment of potential health risks posed to Meriton onsite construction workers during remediation activities has considered exposure to stack emissions on and offsite, exposure to the emission of volatile chemicals from excavations and an aesthetic evaluation of exposure to odours from excavations onsite. The evaluation has adopted a conservative approach with the entire lots 104 and lot 101 undergoing excavation with both stack emission sources (from the Allied Feeds Site and Lednez Site) operating concurrently with potential concentrations within the Meriton workplace estimated using air dispersion modelling.

The maximum concentrations of chemicals estimated within the workplace derived from stack emissions and excavations are lower than recommended workplace exposure inhalation standards (or equivalent). On this basis risks to workers associated with exposure to all chemicals, except benzo(a)pyrene and PAHs (where no occupational exposure limit is relevant) are considered low and acceptable.

The potential health risks posed to onsite construction workers to benzo(a)pyrene and PAH emissions from stacks both on and off site are less than the adopted target risk levels. Risks to workers are therefore considered to be low and acceptable.

The maximum odour concentrations predicted within the workplace at the Meriton site ranged from 26 OU to 162 OU. Based on these high odour concentrations estimated, it would appear that the workers at the sensitive receptors would commonly be experiencing strong odours from the excavated sites. This suggests that excavated areas should be minimised and atmospheric conditions be closely monitored to minimise nuisance to on site workers.

The stack emissions whilst not examined for odour impact in this assessment are likely to have a high odour concentration and during adverse weather conditions, odorous stack emissions may add to excavated material odours to produce higher odour concentrations at the receptors than what was modelled.

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EnHealth Environmental Health Risk Assessments, *Guidelines for assessing Human Health Risks from Environmental Hazards*, 2002.

National Environmental Protection (Air Toxics) Measure, *Impact Statement for the National Environment Protection (Air Toxics) Measure*, May 2003, National Environment Protection Council.

NSW EPA (2001) *Draft Policy: Assessment and Management of Odour from Stationary Source in NSW*.

Parsons Brinckerhoff 2002 *Remediation of Lednez Site, Rhodes and Homebush Bay Environmental Impact Statement*, December 2002

Thiess Services Pty Ltd 2005 *Remediation of the Former Allied Feeds Site - Air Quality Management Plan*, April 2005

Thiess Services Pty Ltd 2005 *Remediation of the Lednez Site and Homebush Bay - Air Quality Management Plan*, January 2005

URS, 2005 Final Remediation Action Plan for the Former Allied Feeds Site, 42 Walker Street, Rhodes

World Health Organisation Regional Office for Europe, Copenhagen, *Air Quality Guidelines for Europe*, Second Edition, WHO Regional Publications, European Series, No 91, 2000

World Health Organisation, WHO 2000, *Guidelines for Air Quality*, WHO Geneva 2000.

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URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Meriton Pty Limited and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 8<sup>th</sup> February 2006..

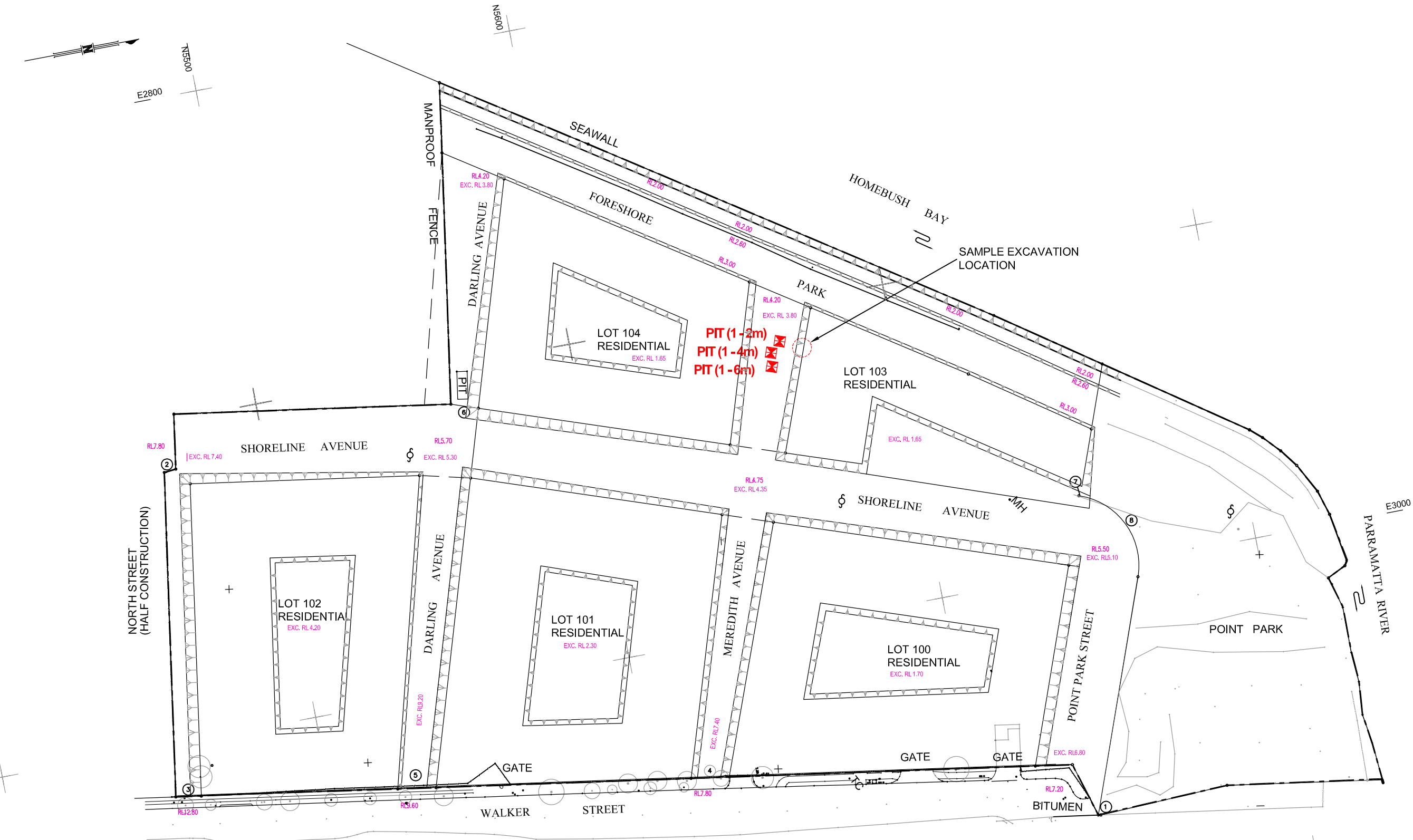
The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between February and June 2006 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

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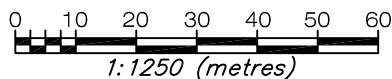
## Figure

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# LEGEND

- RL 3.00 FINISHED LEVELS
- PIT (1-2m) FLUXHOOD AIR SAMPLING STOCKPILE APPROXIMATELY 1m², SHOWING DEPTH OF EXCAVATION SAMPLED
- SITE BOUNDARY



Source: MERITON APARTMENTS PTY LTD (DWG No. 500)

|                                     |                                                                                                                             |                                   |                                        |              |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------|--------------|
| Client<br>MERITON<br><br><b>URS</b> | Project<br>HUMAN HEALTH RISK ASSESSMENT FOR<br>ONSITE CONSTRUCTION WORKERS,<br>FORMER ALLIED FEED SITE,<br>RHODES PENINSULA |                                   | Title<br>SOIL GAS SAMPLE LOCATION PLAN |              |
|                                     | Drawn: HC<br>Job No.: 43217483                                                                                              | Approved: KM<br>File No.: 001.dwg | Date: 01/06/2006<br>Figure: 1          | Rev. A<br>A3 |

# **Appendix A: Proposed Allied Feeds Remediation Plan**

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**CHEMICAL ANALYSIS BRANCH**

Steve Bowly  
URS (AUSTRALIA)  
Level 3  
116 Miller Street  
NORTH SYDNEY NSW 2060

Lab. Reference: 2006-0769

**SAMPLE ORIGIN:** URS

**DATE OF INVESTIGATION:** 29/3/06

**DATE RECEIVED:** 29/03/06

**ANALYSIS REQUIRED:** Volatile Organic Compounds

**RESULTS OF ANALYSIS**

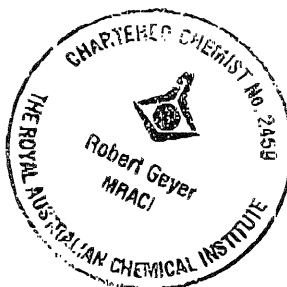
Samples are analysed as received

See attached sheet(s) for sample description and test results.

The results of this report have been approved by the NATA signatory whose signature appears below.

For all administrative or account details please contact Sue Northover or Jeanine Wells.

Robert Geyer  
Manager  
Dated: 31/03/06



Greg O'Donnell  
Technical Supervisor  
Dated: 31/03/06

61 2 99806849



## CHEMICAL ANALYSIS BRANCH



## Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

Client : Steve Bowly - URS

Date Reported : 30-Mar-06

Date Sampled : 29-Mar-06

Sample ID : PIT 1 D 6M (1685239723)

Reference Number: 2006-0769

| No                                                                    | Compounds                 | CAS No    | Front<br>µg/section | Back | No                                                                                        | Compounds                      | CAS No              | Front<br>µg/section | Back |
|-----------------------------------------------------------------------|---------------------------|-----------|---------------------|------|-------------------------------------------------------------------------------------------|--------------------------------|---------------------|---------------------|------|
| <b>Aliphatic hydrocarbons (DL = 5µg/compound/section)</b>             |                           |           |                     |      | <b>Aromatic hydrocarbons (DL = 5µg/compound/section)</b>                                  |                                |                     |                     |      |
| 1                                                                     | 2-Methylbutane            | 78-78-4   | ND                  | ND   | 39                                                                                        | Benzene                        | 71-43-2             | ND                  | ND   |
| 2                                                                     | n-Pentane                 | 109-66-7  | ND                  | ND   | 40                                                                                        | Ethylbenzene                   | 100-41-4            | ND                  | ND   |
| 3                                                                     | 2-Methylpentane           | 107-83-1  | ND                  | ND   | 41                                                                                        | Isopropylbenzene               | 98-82-8             | ND                  | ND   |
| 4                                                                     | 3-Methylpentane           | 96-14-6   | ND                  | ND   | 42                                                                                        | 1,2,4-Trimethylbenzene         | 526-73-8            | ND                  | ND   |
| 5                                                                     | Cyclopentane              | 287-92-1  | ND                  | ND   | 43                                                                                        | 1,2,4-Trimethylbenzene         | 95-63-6             | ND                  | ND   |
| 6                                                                     | Methylcyclopentane        | 96-37-7   | ND                  | ND   | 44                                                                                        | 1,3,5-Trimethylbenzene         | 108-67-8            | ND                  | ND   |
| 7                                                                     | 2,3-Dimethylpentane       | 565-59-0  | ND                  | ND   | 45                                                                                        | Styrene                        | 100-42-5            | ND                  | ND   |
| 8                                                                     | n-Hexane                  | 110-54-1  | ND                  | ND   | 46                                                                                        | Toluene                        | 108-88-3            | ND                  | ND   |
| 9                                                                     | 3-Methylhexane            | 589-34-1  | ND                  | ND   | 47                                                                                        | p-Xylene &/or m-Xylene         | 106-42-3 & 106-36-5 | ND                  | ND   |
| 10                                                                    | Cyclohexane               | 110-82-7  | ND                  | ND   | 48                                                                                        | o-Xylene                       | 95-47-6             | ND                  | ND   |
| 11                                                                    | Methylcyclohexane         | 108-87-3  | ND                  | ND   | <b>Ketones (DL #49, #54, &amp; #55 = 5µg/section; #51, #52, &amp; #53 = 25µg/section)</b> |                                |                     |                     |      |
| 12                                                                    | 2,2,4-Trimethylpentane    | 540-84-1  | ND                  | ND   | 49                                                                                        | Acetone                        | 67-64-1             | ND                  | ND   |
| 13                                                                    | n-Heptane                 | 142-82-7  | ND                  | ND   | 50                                                                                        | Acetoin                        | 513-86-0            | ND                  | ND   |
| 14                                                                    | n-Octane                  | 111-65-9  | ND                  | ND   | 51                                                                                        | Diacetone alcohol              | 123-42-2            | ND                  | ND   |
| 15                                                                    | n-Nonane                  | 111-84-3  | ND                  | ND   | 52                                                                                        | Cyclohexanone                  | 108-94-1            | ND                  | ND   |
| 16                                                                    | n-Decane                  | 124-18-1  | ND                  | ND   | 53                                                                                        | Isophorone                     | 78-59-1             | ND                  | ND   |
| 17                                                                    | n-Undecane                | 1120-21-4 | ND                  | ND   | 54                                                                                        | Methyl ethyl ketone (MEK)      | 78-93-3             | ND                  | ND   |
| 18                                                                    | n-Dodecane                | 112-40-3  | ND                  | ND   | 55                                                                                        | Methyl isobutyl ketone (MIBK)  | 108-10-1            | ND                  | ND   |
| 19                                                                    | n-Tridecane               | 629-50-3  | ND                  | ND   | <b>Alcohols (DL = 25µg/compound/section)</b>                                              |                                |                     |                     |      |
| 20                                                                    | n-Tetradecane             | 629-59-1  | ND                  | ND   | 56                                                                                        | Ethyl alcohol                  | 64-17-5             | ND                  | ND   |
| 21                                                                    | α-Pinene                  | 80-56-8   | ND                  | ND   | 57                                                                                        | n-Butyl alcohol                | 71-36-3             | ND                  | ND   |
| 22                                                                    | β-Pinene                  | 127-91-1  | ND                  | ND   | 58                                                                                        | Isobutyl alcohol               | 78-83-1             | ND                  | ND   |
| 23                                                                    | D-Limonene                | 138-86-1  | ND                  | ND   | 59                                                                                        | Isopropyl alcohol              | 67-63-0             | ND                  | ND   |
| <b>Chlorinated hydrocarbons (DL = 5µg/compound/section)</b>           |                           |           |                     |      | 60                                                                                        | 2-Ethyl hexanol                | 104-76-7            | ND                  | ND   |
| 24                                                                    | Dichloromethane           | 75-09-2   | ND                  | ND   | 61                                                                                        | Cyclohexanol                   | 108-93-0            | ND                  | ND   |
| 25                                                                    | 1,1-Dichloroethane        | 75-34-3   | ND                  | ND   | <b>Acetates (DL = 25µg/compound/section)</b>                                              |                                |                     |                     |      |
| 26                                                                    | 1,2-Dichloroethane        | 107-06-3  | ND                  | ND   | 62                                                                                        | Ethyl acetate                  | 141-78-6            | ND                  | ND   |
| 27                                                                    | Chloroform                | 67-66-3   | ND                  | ND   | 63                                                                                        | n-Propyl acetate               | 109-60-4            | ND                  | ND   |
| 28                                                                    | 1,1,1-Trichloroethane     | 71-55-6   | ND                  | ND   | 64                                                                                        | n-Butyl acetate                | 123-86-4            | ND                  | ND   |
| 29                                                                    | 1,1,2-Trichloroethane     | 79-00-1   | ND                  | ND   | 65                                                                                        | Isobutyl acetate               | 110-19-0            | ND                  | ND   |
| 30                                                                    | Trichloroethylene         | 79-01-6   | ND                  | ND   | <b>Ethers (DL = 25µg/compound/section)</b>                                                |                                |                     |                     |      |
| 31                                                                    | Carbon tetrachloride      | 56-23-2   | ND                  | ND   | 66                                                                                        | Ethyl ether                    | 60-29-7             | ND                  | ND   |
| 32                                                                    | Perchloroethylene         | 127-18-4  | ND                  | ND   | 67                                                                                        | tert-Butyl methyl ether (MTBE) | 1634-04-4           | ND                  | ND   |
| 33                                                                    | 1,1,2,2-Tetrachloroethane | 79-34-1   | ND                  | ND   | 68                                                                                        | Tetrahydrofuran (THF)          | 109-99-9            | ND                  | ND   |
| 34                                                                    | Chlorobenzene             | 108-90-7  | ND                  | ND   | <b>Glycols (DL = 25µg/compound/section)</b>                                               |                                |                     |                     |      |
| 35                                                                    | 1,2-Dichlorobenzene       | 95-50-1   | ND                  | ND   | 69                                                                                        | PGME                           | 107-98-2            | ND                  | ND   |
| 36                                                                    | 1,4-Dichlorobenzene       | 106-46-7  | ND                  | ND   | 70                                                                                        | Ethylene glycol diethyl ether  | 629-14-1            | ND                  | ND   |
| <b>Miscellaneous (DL #37 = 5µg &amp; #38 = 25µg/compound/section)</b> |                           |           |                     |      | 71                                                                                        | PGMEA                          | 108-65-6            | ND                  | ND   |
| 37                                                                    | Acetonitrile              | 75-05-2   | ND                  | ND   | 72                                                                                        | Cellosolve acetate             | 111-15-9            | ND                  | ND   |
| 38                                                                    | n-Vinyl-2-pyrrolidinone   | 68-12-1   | ND                  | ND   | 73                                                                                        | DGMEA                          | 112-15-2            | ND                  | ND   |
|                                                                       |                           |           |                     |      |                                                                                           | Worksheet check                |                     | YES                 | YES  |

2006-0769

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Accreditation No. 3726

TestSafe Australia - Chemical Analysis Branch

ABN 94 084 639 032 5A Pioneer Avenue Thornleigh NSW 2120 AUSTRALIA

Telephone: 61 2 9473 4000 Facsimile: 61 2 9980 6849 Email: lab@workcover.nsw.gov.au

WorkCover Assistance Service 13 10 50 Website: www.workcover.nsw.gov.au

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025

61 2 99806849



## CHEMICAL ANALYSIS BRANCH

Analysis of Volatile Organic Compounds in Workplace Air by GC/MS

Client : Steve Bowly - URS

Date Reported : 30-Mar-06

Date Sampled : 29-Mar-06

ND = Not Detected

Method : Analysis of Volatile Organic Compounds in Workplace Air by Gas Chromatography/Mass Spectrometry  
 Method Number : WCA.207

Detection Limit : 5µg/section; 25µg/section for oxygenated hydrocarbons except acetone, MEK and MIBK at 5µg/section.

Brief Description : Volatile organic compounds are trapped from the workplace air onto charcoal tubes by the use of a personal air monitoring pump. The volatile organic compounds are then desorbed from the charcoal in the laboratory with CS<sub>2</sub>. An aliquot of the desorbant is analysed by capillary gas chromatography with mass spectrometry (ion-trap) detection.

PGME : Propylene Glycol Monomethyl Ether

PGMEA : Propylene Glycol Monomethyl Ether Acetate

DGMEA : Diethylene Glycol Monoethyl Ether Acetate

## Measurement Uncertainty

The measurement uncertainty is an estimate that characterises the range of values within which the true value is asserted to lie. The uncertainty estimate is an expanded uncertainty using a coverage factor of 2, which gives a level of confidence of approximately 95%. The estimate is compliant with the "ISO Guide to the Expression of Uncertainty in Measurement" and is a full estimate based on in-house method validation and quality control data.

## Quality Assurance

In order to ensure the highest degree of accuracy and precision in our analytical results, we undertake extensive intra- and inter-laboratory quality assurance (QA) activities. Within our own laboratory, we analyse laboratory and field blanks and perform duplicate and repeat analysis of samples. Spiked QA samples are also included routinely in each run to ensure the accuracy of the analyses. WorkCover Laboratory Services has participated for many years in several national and international inter-laboratory comparison programs listed below:-

- ☐ Workplace Analysis Scheme for Proficiency (WASP) conducted by the Health & Safety Executive UK;
- ☐ Quality Management in Occupational and Environmental Medicine QA Program, conducted by the Institute for Occupational, Social and Environmental Medicine, University of Erlangen – Nuremberg, Germany;
- ☐ Quality Control Technologies QA Program, Australia;
- ☐ Royal College of Pathologists QA Program, Australia.

2006-0769

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TestSafe Australia – Chemical Analysis Branch

ABN 94 084 639 032 5A Pioneer Avenue Thornleigh NSW 2120 AUSTRALIA

Telephone: 61 2 9473 4000 Facsimile 61 2 9980 6349 Email: [lab@workcover.nsw.gov.au](mailto:lab@workcover.nsw.gov.au)WorkCover Assistance Service 13 10 50 Website: [www.workcover.nsw.gov.au](http://www.workcover.nsw.gov.au)

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## Appendix B: VOC Results



No. 13542.

**AQIS**AUSTRALIAN QUARANTINE  
AND INSPECTION SERVICE

SYDNEY License No. N0356.

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Quarantine Approved premises criteria 5.1 for quarantine containment level 1 (QCI) facilities. Class five criteria cover premises utilised for research, analysis and/or testing of biological material, soil, animal, plant and human products.

**CUSTOMER CENTRIC - ANALYTICAL CHEMISTS****FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION**

**Laboratory Report No:** E026012  
**Client Name:** URS (Australia) Pty. Ltd  
**Client Reference:** 4E and 07  
**Contact Name:** Stephen Bowly  
**Chain of Custody No:** ns  
**Sample Matrix:** AIR

Cover Page 1 of 3  
 plus Sample Results

Date Received: 30/03/2006  
 Date Reported: 01/06/2006

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

**QUALITY ASSURANCE CRITERIA**

**Accuracy:** matrix spike: 1 in first 5-20, then 1 every 20 samples  
 lcs, crm, method: 1 per analytical batch  
 surrogate spike: addition per target organic method

**Precision:** laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

**Holding Times:** soils, waters: Refer to LabMark Preservation & THT table  
 VOC's 14 days water / soil  
 VAC's 7 days water or 14 days acidified  
 VAC's 14 days soil  
 SVOC's 7 days water, 14 days soil  
 Pesticides 7 days water, 14 days soil  
 Metals 6 months general elements  
 Mercury 28 days

**Confirmation:** target organic analysis: GC/MS, or confirmatory column

**Sensitivity:** EQL: Typically 2-5 x Method Detection Limit (MDL)

**QUALITY CONTROL****GLOBAL ACCEPTANCE CRITERIA (GAC)**

**Accuracy:** spike, lcs, crm surrogate: general analytes 70% - 130% recovery  
 phenol analytes 50% - 130% recovery  
 organophosphorous pesticide analytes 60% - 130% recovery  
 phenoxy acid herbicides 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 meq/l),  
 +/- 5% (>3 meq/l)  
**Precision:** method blank: not detected >95% of the reported EQL  
 duplicate lab: 0-30% (>10xEQL), 0-75% (5-10xEQL)  
 RPD (metals): 0-100% (<5xEQL)  
 duplicate lab: 0-50% (>10xEQL), 0-75% (5-10xEQL)  
 RPD: 0-100% (<5xEQL)

**QUALITY CONTROL****ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)**

**Accuracy:** spike, lcs, crm surrogate: analyte specific recovery data  
 <3xsd of historical mean

**Uncertainty:** spike, lcs: measurement calculated from historical analyte specific control charts

**RESULT ANNOTATION**

DQO: Data Quality Objective  
 DQI: Data Quality Indicator  
 EQL: Estimated Quantitation Limit  
 --: not applicable

s: matrix spike recovery  
 d: laboratory duplicate  
 t: laboratory triplicate  
 r: RPD relative % difference

p: pending  
 lcs: laboratory control sample  
 crm: certified reference material  
 mb: method blank

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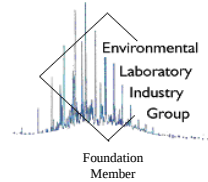
\* SYDNEY: Unit 1, 8 Leighton Place Asquith NSW 2077  
 \* Telephone: (02) 9476 6533 \* Fax: (02) 9476 8219

\* MELBOURNE: 116 Moray Street, South Melbourne VIC 3205  
 \* Telephone: (03) 9686 8344 \* Fax: (03) 9686 7344

Form QS0144, Rev. 0 : Date Issued 10/03/05



CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



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## NEPC GUIDELINE COMPLIANCE - DQO

### 1. GENERAL

- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.
- C. Laboratory QA/QC samples are specific to this project.
- D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at [www.nata.asn.au](http://www.nata.asn.au).
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

### 2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

- A. SRN issued to client upon sample receipt & login verification.
- B. Preservation & sampling date details specified on COC and SRN, unless noted.
- C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

### 3. NATA ACCREDITED METHODS

- A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).
- B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 13542.
- C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.

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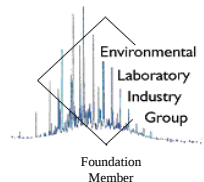
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CUSTOMER CENTRIC - ANALYTICAL CHEMISTS



## Laboratory Report: E026012

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### 4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: **AIR**

| Page: | Method:                          | Totals: | #d | %d-ratio | #t | #s | %s-ratio |
|-------|----------------------------------|---------|----|----------|----|----|----------|
| 1     | Volatile Organic Compounds (VOC) | 6       | 0  | 0%       | 0  | 0  | 0%       |

#### GLOSSARY:

|          |                                                                           |
|----------|---------------------------------------------------------------------------|
| #d       | number of discrete duplicate extractions/analyses performed.              |
| %d-ratio | NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).    |
| #t       | number of triplicate extractions/analyses performed.                      |
| #s       | number of spiked samples analysed.                                        |
| %s-ratio | USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%). |

### 5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

- A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, Corporate Site No. 13535
- B. VOC : sample surrogate recovery range is 50% - 105%, corresponding LCS recovery range is 86% - 128%.
- C. Report re-issued on 01/06/06 with amended result for TBME for LCS recovery.

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.



**Laboratory Report No:** E026012  
**Client Name:** URS (Australia) Pty. Ltd  
**Contact Name:** Stephen Bowly  
**Client Reference** 4E and 07

**Page:** 1 of 3  
plus cover page  
**Date:** 01/06/06

Final  
**Certificate**  
of Analysis



This report supercedes reports issued on: 05/04/06

| Laboratory Identification                |                                 |       | 13826   | 13829   | 13832   | 13834   | 15072   | 15075   | lcs     | mb      |  |  |
|------------------------------------------|---------------------------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|--|--|
| Sample Identification                    |                                 |       | C010758 | D018877 | D019102 | D019375 | B07553  | B08011  | QC      | QC      |  |  |
| Depth (m)                                |                                 |       | --      | --      | --      | --      | --      | --      | --      | --      |  |  |
| Sampling Date recorded on COC            |                                 |       | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | --      | --      |  |  |
| Laboratory Extraction (Preparation) Date |                                 |       | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 |  |  |
| Laboratory Analysis Date                 |                                 |       | 31/3/06 | 31/3/06 | 31/3/06 | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  |  |  |
| Method                                   | Volatil Organic Compounds (VOC) | EQL   |         |         |         |         |         |         |         |         |  |  |
| E025.4                                   | Trichlorofluoromethane          | 0.01  | <0.01   | <0.01   | <0.01   | <0.01   | <0.01   | <0.01   | 91%     | <0.01   |  |  |
|                                          | 1,1-dichloroethene              | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 122%    | <0.005  |  |  |
|                                          | trans-1,2-dichloroethene        | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 110%    | <0.005  |  |  |
|                                          | Tributylmethylether (TBME)      | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 111%    | <0.005  |  |  |
|                                          | 1,1-dichloroethane              | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 113%    | <0.005  |  |  |
|                                          | cis-1,2-dichloroethene          | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 111%    | <0.005  |  |  |
|                                          | Chloroform                      | 0.005 | <0.005  | <0.005  | 0.019   | <0.005  | <0.005  | 0.010   | 110%    | <0.005  |  |  |
|                                          | 1,1,1-trichloroethane           | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 116%    | <0.005  |  |  |
|                                          | 1,2-dichloroethane              | 0.005 | 0.012   | 0.018   | 0.018   | 0.018   | 0.021   | 0.021   | 89%     | <0.005  |  |  |
|                                          | 1,1-dichloropropene             | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 110%    | <0.005  |  |  |
|                                          | Carbon tetrachloride            | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 116%    | <0.005  |  |  |
|                                          | Benzene                         | 0.005 | 0.24    | 0.31    | 4.38    | 0.50    | 3.46    | 2.39    | 116%    | <0.005  |  |  |
|                                          | Trichloroethene                 | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 107%    | <0.005  |  |  |
|                                          | 1,2-dichloropropane             | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 108%    | <0.005  |  |  |
|                                          | Dibromomethane                  | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 108%    | <0.005  |  |  |
|                                          | Bromodichloromethane            | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 118%    | <0.005  |  |  |
|                                          | cis-1,3-dichloropropene         | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 109%    | <0.005  |  |  |
|                                          | Toluene                         | 0.005 | 0.12    | 0.12    | 2.32    | 0.29    | 1.90    | 1.39    | 120%    | <0.005  |  |  |
|                                          | trans-1,3-dichloropropene       | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 114%    | <0.005  |  |  |
|                                          | 1,1,2-trichloroethane           | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 120%    | <0.005  |  |  |
|                                          | 1,3-dichloropropane             | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 114%    | <0.005  |  |  |
|                                          | Chlorodibromomethane            | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 115%    | <0.005  |  |  |
|                                          | Tetrachloroethene               | 0.005 | 0.012   | 0.013   | 0.017   | <0.005  | 0.018   | 0.013   | 111%    | <0.005  |  |  |
|                                          | 1,2-dibromoethane               | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 114%    | <0.005  |  |  |
|                                          | Chlorobenzene                   | 0.005 | 5.35    | 5.55    | 11.4    | 0.82    | 12.7    | 8.86    | 119%    | <0.005  |  |  |
|                                          | 1,1,1,2-tetrachloroethane       | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 109%    | <0.005  |  |  |
|                                          | Ethylbenzene                    | 0.005 | 0.060   | 0.057   | 0.037   | 0.008   | 0.034   | 0.027   | 114%    | <0.005  |  |  |



**Laboratory Report No:** E026012  
**Client Name:** URS (Australia) Pty. Ltd  
**Contact Name:** Stephen Bowly  
**Client Reference** 4E and 07

**Page:** 2 of 3  
plus cover page  
**Date:** 01/06/06

Final  
**Certificate**  
of Analysis



This report supercedes reports issued on: 05/04/06

| Laboratory Identification                |                                  |       | 13826   | 13829   | 13832   | 13834   | 15072   | 15075   | lcs     | mb      |  |  |
|------------------------------------------|----------------------------------|-------|---------|---------|---------|---------|---------|---------|---------|---------|--|--|
| Sample Identification                    |                                  |       | C010758 | D018877 | D019102 | D019375 | B07553  | B08011  | QC      | QC      |  |  |
| Depth (m)                                |                                  |       | --      | --      | --      | --      | --      | --      | --      | --      |  |  |
| Sampling Date recorded on COC            |                                  |       | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | --      | --      |  |  |
| Laboratory Extraction (Preparation) Date |                                  |       | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 |  |  |
| Laboratory Analysis Date                 |                                  |       | 31/3/06 | 31/3/06 | 31/3/06 | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  |  |  |
| Method                                   | Volatile Organic Compounds (VOC) | EQL   |         |         |         |         |         |         |         |         |  |  |
| E025.4                                   | meta- & para- xylene             | 0.01  | 0.36    | 0.33    | 0.30    | 0.04    | 0.27    | 0.20    | 127%    | <0.01   |  |  |
|                                          | Styrene                          | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 125%    | <0.005  |  |  |
|                                          | Bromoform                        | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 109%    | <0.005  |  |  |
|                                          | ortho-xylene                     | 0.005 | 0.12    | 0.12    | 0.11    | 0.017   | 0.10    | 0.074   | 114%    | <0.005  |  |  |
|                                          | 1,1,2,2-tetrachloroethane        | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 95%     | <0.005  |  |  |
|                                          | Isopropylbenzene                 | 0.005 | 0.026   | 0.026   | 0.020   | 0.005   | 0.017   | 0.013   | 108%    | <0.005  |  |  |
|                                          | 1,2,3-trichloropropane           | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 111%    | <0.005  |  |  |
|                                          | Bromobenzene                     | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 112%    | <0.005  |  |  |
|                                          | n-propylbenzene                  | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 111%    | <0.005  |  |  |
|                                          | 2-chlorotoluene                  | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 105%    | <0.005  |  |  |
|                                          | 4-chlorotoluene                  | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 115%    | <0.005  |  |  |
|                                          | 1,3,5-trimethylbenzene           | 0.005 | 0.18    | 0.19    | 0.16    | 0.020   | 0.19    | 0.13    | 108%    | <0.005  |  |  |
|                                          | tert-butylbenzene                | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 104%    | <0.005  |  |  |
|                                          | 1,2,4-trimethylbenzene           | 0.005 | 0.34    | 0.35    | 0.27    | 0.037   | 0.33    | 0.23    | 106%    | <0.005  |  |  |
|                                          | sec-butylbenzene                 | 0.005 | 0.015   | 0.017   | 0.016   | <0.005  | 0.016   | 0.011   | 96%     | <0.005  |  |  |
|                                          | 1,3-dichlorobenzene              | 0.005 | 0.13    | 0.12    | 0.16    | 0.031   | 0.31    | 0.20    | 113%    | <0.005  |  |  |
|                                          | 1,4-dichlorobenzene              | 0.005 | 4.52    | 4.37    | 4.51    | 1.50    | 2.24    | 4.70    | 112%    | <0.005  |  |  |
|                                          | p-isopropyltoluene               | 0.005 | 0.024   | 0.024   | 0.020   | <0.005  | 0.028   | 0.017   | 105%    | <0.005  |  |  |
|                                          | 1,2-dichlorobenzene              | 0.005 | 3.02    | 2.81    | 3.20    | 0.83    | 4.72    | 3.48    | 117%    | <0.005  |  |  |
|                                          | n-butylbenzene                   | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 90%     | <0.005  |  |  |
|                                          | 1,2-dibromo-3-chloropropane      | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 93%     | <0.005  |  |  |
|                                          | 1,2,4-trichlorobenzene           | 0.005 | 4.10    | 3.66    | 5.72    | 3.17    | 7.15    | 5.67    | 115%    | <0.005  |  |  |
|                                          | Naphthalene                      | 0.005 | 0.69    | 0.58    | 0.55    | 0.10    | 0.79    | 0.50    | 87%     | <0.005  |  |  |
|                                          | Hexachlorobutadiene              | 0.005 | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | <0.005  | 71%     | <0.005  |  |  |
|                                          | 1,2,3-trichlorobenzene           | 0.005 | 0.22    | 0.18    | 0.54    | 0.15    | 0.98    | 0.54    | 85%     | <0.005  |  |  |
|                                          | CTFCB (Surr @ 0.04ug/tube)       | --    | 50%     | 69%     | 67%     | 71%     | 82%     | 87%     | 93%     | 106%    |  |  |
|                                          | BCP (Surr @ 0.04ug/tube)         | --    | 66%     | 92%     | 90%     | 85%     | 99%     | 105%    | 86%     | 103%    |  |  |



**Laboratory Report No:** E026012  
**Client Name:** URS (Australia) Pty. Ltd  
**Contact Name:** Stephen Bowly  
**Client Reference** 4E and 07

**Page:** 3 of 3  
plus cover page  
**Date:** 01/06/06

Final  
**Certificate**  
of Analysis



This report supercedes reports issued on: 05/04/06

| Laboratory Identification                |                                         |            | 13826   | 13829   | 13832   | 13834   | 15072   | 15075   | lcs     | mb      |  |  |
|------------------------------------------|-----------------------------------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|--|--|
| Sample Identification                    |                                         |            | C010758 | D018877 | D019102 | D019375 | B07553  | B08011  | QC      | QC      |  |  |
| Depth (m)                                |                                         |            | --      | --      | --      | --      | --      | --      | --      | --      |  |  |
| Sampling Date recorded on COC            |                                         |            | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | 29/3/06 | --      | --      |  |  |
| Laboratory Extraction (Preparation) Date |                                         |            | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 | 31/3/06 |  |  |
| Laboratory Analysis Date                 |                                         |            | 31/3/06 | 31/3/06 | 31/3/06 | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  | 3/4/06  |  |  |
| <b>Method</b>                            | <b>Volatile Organic Compounds (VOC)</b> | <b>EQL</b> |         |         |         |         |         |         |         |         |  |  |
| E025.4                                   | DCFB (Surr @ 0.04ug/tube)               | --         | 81%     | 70%     | 70%     | 93%     | 97%     | 98%     | 128%    | 106%    |  |  |

Results expressed in ug per tube unless otherwise specified

Comments:

E025.4: Direct analysis by Thermal Desorption GC-MS.

## Appendix C: Odour Results

# THE ODOUR UNIT PTY LIMITED



Suite G03 Bay 16 Phone: +61 2 9209 4420  
Australian Technology Park Facsimile: +61 2 9209 4421  
Locomotive Street Email: [tschulz@odourunit.com.au](mailto:tschulz@odourunit.com.au)  
Eveleigh Internet: [www.odourunit.com.au](http://www.odourunit.com.au)  
NSW 1430 ABN: 53 091 165 061

## Form 06 - Sydney Laboratory Odour Concentration Measurement Results

The measurement was commissioned by:

|                 |               |               |                                                                          |
|-----------------|---------------|---------------|--------------------------------------------------------------------------|
| Organisation    | URS           | Telephone     | (02) 8925 5500                                                           |
| Contact         | Stephen Bowly | Facsimile     | (02) 8925 5555                                                           |
| Sampling Site   | Not Provided  | Email         | <a href="mailto:stephen_bowly@urscorp.com">stephen_bowly@urscorp.com</a> |
| Sampling Method | Drum and Pump | Sampling Team | URS                                                                      |

Order details:

|                    |            |                   |           |
|--------------------|------------|-------------------|-----------|
| Order requested by | S. Bowly   | Order accepted by | A. Balch  |
| Date of order      | 27/03/2006 | TOU Project #     | 1259      |
| Order number       | 43217483   | Project Manager   | A. Balch  |
| Signed by          | S. Bowly   | Testing operator  | J. Schulz |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Investigated Item           | Odour concentration in odour units 'ou', determined by sensory odour concentration measurements, of an odour sample supplied in a sampling bag. Odour character is also assessed, however, this assessment is not covered by AS4323.3:2001.                                                                                                                                                                                                            |
| Identification              | The odour sample bags were labelled individually. Each label recorded the testing laboratory, sample number, sampling location (or Identification), sampling date and time, dilution ratio (if dilution was used) and whether further chemical analysis was required.                                                                                                                                                                                  |
| Method                      | The odour concentration measurements were performed using dynamic olfactometry according to the Australian Standard 'Determination of Odour Concentration by Dynamic Olfactometry AS/NZS4323.3:2001. The odour perception characteristics of the panel within the presentation series for the samples were analogous to that for butanol calibration. Any deviation from the Australian standard is recorded in the 'Comments' section of this report. |
| Measuring Range             | The measuring range of the olfactometer is $2^2 \leq \chi \leq 2^{18}$ ou. If the measuring range was insufficient the odour samples will have been pre-diluted. The machine is not calibrated beyond dilution setting $2^{17}$ . This is specifically mentioned with the results.                                                                                                                                                                     |
| Environment                 | The measurements were performed in an air- and odour-conditioned room. The room temperature is maintained between 22°C and 25°C.                                                                                                                                                                                                                                                                                                                       |
| Measuring Dates             | The date of each measurement is specified with the results.                                                                                                                                                                                                                                                                                                                                                                                            |
| Instrument Used             | The olfactometer used during this testing session was:<br>ODORMAT SERIES V02                                                                                                                                                                                                                                                                                                                                                                           |
| Instrumental Precision      | The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the Australian Standard AS/NZS4323.3:2001.<br>ODORMAT SERIES V02: $r = 0.1684$ (2/28 February, 2006) Compliance – Yes                                                                                                                                                                                                |
| Instrumental Accuracy       | The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the Australian Standard AS/NZS4323.3:2001.<br>ODORMAT SERIES V02: $A = 0.1725$ (2/28 February, 2006) Compliance – Yes                                                                                                                                                                                                                              |
| Lower Detection Limit (LDL) | The LDL for the olfactometer has been determined to be 16 ou (four times the lowest dilution setting)                                                                                                                                                                                                                                                                                                                                                  |
| Traceability                | The measurements have been performed using standards for which the traceability to the national standard has been demonstrated. The assessors are individually selected to comply with fixed criteria and are monitored in time to keep within the limits of the standard. The results from the assessors are traceable to primary standards of n-butanol in nitrogen.                                                                                 |

Date: Tuesday, 4<sup>th</sup> April 2006

Report Number / Panel Roster Number: SYD20060330\_030

**T. Schulz**  
Principal and Managing Director

**J. Schulz**  
Authorised Signatory



# THE ODOUR UNIT PTY LIMITED

## Odour Sample Measurement Results

| Sample Location  | TOU Sample ID | Sampling Date & Time | Analysis Date & Time  | Panel Size | Valid ITEs | Nominal Sample Dilution | Actual Sample Dilution (Adjusted for Temperature) | Sample Odour Concentration (as received, in the bag) (ou) | Sample Odour Concentration (Final, allowing for dilution) (ou) | Odour Character          |
|------------------|---------------|----------------------|-----------------------|------------|------------|-------------------------|---------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------|--------------------------|
| Pit 1 – Sample 1 | SC60166       | 29.03.2006<br>---    | 30.03.2006<br>1549hrs | 5          | 10         | ---                     | ---                                               | 588                                                       | 588                                                            | Oily, rubber, antiseptic |
| Pit 1 – Sample 2 | SC60162       | 29.03.2006<br>---    | 30.03.2006<br>1313hrs | 5          | 10         | ---                     | ---                                               | 724                                                       | 724                                                            | Antiseptic, rubber       |
| Pit 2 – Sample 1 | SC60164       | 29.03.2006<br>---    | 30.03.2006<br>1439hrs | 5          | 10         | ---                     | ---                                               | 892                                                       | 892                                                            | Antiseptic, rubber       |
| Pit 2 – Sample 2 | SC60165       | 29.03.2006<br>---    | 30.03.2006<br>1538hrs | 5          | 10         | ---                     | ---                                               | 892                                                       | 892                                                            | Antiseptic, rubber       |
| Pit 3 – Sample 1 | SC60167       | 29.03.2006<br>---    | 30.03.2006<br>1613hrs | 5          | 10         | ---                     | ---                                               | 776                                                       | 776                                                            | Antiseptic, rubber       |
| Pit 3 – Sample 2 | SC60163       | 29.03.2006<br>---    | 30.03.2006<br>1347hrs | 5          | 10         | ---                     | ---                                               | 724                                                       | 724                                                            | Antiseptic, rubber, oily |



# THE ODOUR UNIT PTY LIMITED

## Odour Panel Calibration Results

| Reference Odorant | Reference Odorant Panel Roster Number | Concentration of Reference gas (ppb) | Panel Target Range for n-butanol (ppb) | Measured Concentration (ou) | Measured Panel Threshold (ppb) | Does this panel calibration measurement comply with AS/NZS4323.3:2001 (Yes / No) |
|-------------------|---------------------------------------|--------------------------------------|----------------------------------------|-----------------------------|--------------------------------|----------------------------------------------------------------------------------|
| n-butanol         | SYD20060330_030                       | 49,600                               | $20 \leq \chi \leq 80$                 | 724                         | 69                             | Yes                                                                              |

Comments Sampling times were not provided.

Disclaimer Parties, other than TOU, responsible for collecting odour samples hereby certify that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit Pty Limited for the purpose of odour testing. The collection of odour samples by parties other than The Odour Unit Pty Limited relinquishes The Odour Unit Pty Limited from all responsibility for the sample collection and any effects or actions that the results from the test(s) may have.

Note This report shall not be reproduced, except in full, without written approval of The Odour Unit Pty Limited.

END OF DOCUMENT

## Appendix D: VOC Emission Rates

**Table A-1**  
**Air Emissions Sampling Results Sheet**

**Field Data:**

|                                                    | <b>PIT1_2.0m_M2</b> | <b>PIT2_2.0m_PM2</b> | <b>PIT1_4.0m_M2</b> | <b>PIT1_4.0m_PM1</b> | <b>PIT1_6.0m_M2</b> | <b>PIT1_6.0m_PM2</b> |
|----------------------------------------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|
| <b>Collection Date:</b>                            | 29 March 2006       | 29 March 2006        | 29 March 2006       | 29 March 2006        | 29 March 2006       | 29 March 2006        |
| <b>Tube ID (Analysed)</b>                          | <b>C010758</b>      | <b>D018877</b>       | <b>D019102</b>      | <b>D019375</b>       | <b>B07553</b>       | <b>B08011</b>        |
| <b>Sample Time (mins):</b>                         | 20                  | 20                   | 20                  | 2                    | 20                  | 20                   |
| <b>Sample Flow Rate (l/min):</b>                   | 0.058               | 0.058                | 0.058               | 0.058                | 0.058               | 0.058                |
| <b>Flux Hood Area (m<sup>2</sup>):</b>             | 0.126               | 0.126                | 0.126               | 0.126                | 0.126               | 0.126                |
| <b>Flowrate into Flux Hood (m<sup>3</sup>/min)</b> | 0.005               | 0.005                | 0.005               | 0.005                | 0.005               | 0.005                |

## Results:

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 2.0m M2 |                                                         |                                                              |
|-----------------------------|-------------|-------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)         | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                        | < 0.01                                                  | 3.4E-04                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chloroform                  | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloroethane          | 0.005       | 0.012                         | 0.01                                                    | 4.1E-04                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Benzene                     | 0.005       | 0.24                          | 0.21                                                    | 8.2E-03                                                      |
| Trichloroethene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Dibromomethane              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Toluene                     | 0.005       | 0.12                          | 0.10                                                    | 4.1E-03                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tetrachloroethene           | 0.005       | 0.012                         | 0.01                                                    | 4.1E-04                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorobenzene               | 0.005       | 5.35                          | 4.61                                                    | 1.8E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Ethylbenzene                | 0.005       | 0.06                          | 0.05                                                    | 2.1E-03                                                      |
| meta- & para- xylene        | 0.01        | 0.36                          | 0.31                                                    | 1.2E-02                                                      |
| Styrene                     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromoform                   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| ortho-xylene                | 0.005       | 0.12                          | 0.10                                                    | 4.1E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Isopropylbenzene            | 0.005       | 0.026                         | 0.02                                                    | 8.9E-04                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromobenzene                | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| n-propylbenzene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.18                          | 0.16                                                    | 6.2E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.34                          | 0.29                                                    | 1.2E-02                                                      |
| sec-butylbenzene            | 0.005       | 0.015                         | 0.01                                                    | 5.1E-04                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.13                          | 0.11                                                    | 4.4E-03                                                      |
| 1,4-dichlorobenzene         | 0.005       | 4.52                          | 3.90                                                    | 1.5E-01                                                      |
| p-isopropyltoluene          | 0.005       | 0.024                         | 0.02                                                    | 8.2E-04                                                      |
| 1,2-dichlorobenzene         | 0.005       | 3.02                          | 2.60                                                    | 1.0E-01                                                      |
| n-butylbenzene              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 4.1                           | 3.53                                                    | 1.4E-01                                                      |
| Naphthalene                 | 0.005       | 0.69                          | 0.59                                                    | 2.4E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.22                          | 0.19                                                    | 7.5E-03                                                      |

### Notes:

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

**Results:**

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 2.0m PM2 |                                                         |                                                              |
|-----------------------------|-------------|--------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)          | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                         | < 0.01                                                  | 3.4E-04                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chloroform                  | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloroethane          | 0.005       | 0.018                          | 0.02                                                    | 6.2E-04                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Benzene                     | 0.005       | 0.31                           | 0.27                                                    | 1.1E-02                                                      |
| Trichloroethene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Dibromomethane              | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Toluene                     | 0.005       | 0.12                           | 0.10                                                    | 4.1E-03                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Tetrachloroethene           | 0.005       | 0.013                          | 0.01                                                    | 4.4E-04                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chlorobenzene               | 0.005       | 5.55                           | 4.78                                                    | 1.9E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Ethylbenzene                | 0.005       | 0.057                          | 0.05                                                    | 1.9E-03                                                      |
| meta- & para- xylene        | 0.01        | 0.33                           | 0.28                                                    | 1.1E-02                                                      |
| Styrene                     | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromoform                   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| ortho-xylene                | 0.005       | 0.12                           | 0.10                                                    | 4.1E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Isopropylbenzene            | 0.005       | 0.026                          | 0.02                                                    | 8.9E-04                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromobenzene                | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| n-propylbenzene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.19                           | 0.16                                                    | 6.5E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.35                           | 0.30                                                    | 1.2E-02                                                      |
| sec-butylbenzene            | 0.005       | 0.017                          | 0.01                                                    | 5.8E-04                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.12                           | 0.10                                                    | 4.1E-03                                                      |
| 1,4-dichlorobenzene         | 0.005       | 4.37                           | 3.77                                                    | 1.5E-01                                                      |
| p-isopropyltoluene          | 0.005       | 0.024                          | 0.02                                                    | 8.2E-04                                                      |
| 1,2-dichlorobenzene         | 0.005       | 2.81                           | 2.42                                                    | 9.6E-02                                                      |
| n-butylbenzene              | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 3.66                           | 3.16                                                    | 1.3E-01                                                      |
| Naphthalene                 | 0.005       | 0.58                           | 0.50                                                    | 2.0E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.18                           | 0.16                                                    | 6.2E-03                                                      |

**Notes:**

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

**Results:**

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 4.0m M2 |                                                         |                                                              |
|-----------------------------|-------------|-------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)         | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                        | < 0.01                                                  | 3.4E-04                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chloroform                  | 0.005       | 0.019                         | 0.02                                                    | 6.5E-04                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloroethane          | 0.005       | 0.018                         | 0.02                                                    | 6.2E-04                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Benzene                     | 0.005       | 4.38                          | 3.78                                                    | 1.5E-01                                                      |
| Trichloroethene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Dibromomethane              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Toluene                     | 0.005       | 2.32                          | 2.00                                                    | 7.9E-02                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tetrachloroethene           | 0.005       | 0.017                         | 0.01                                                    | 5.8E-04                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorobenzene               | 0.005       | 11.4                          | 9.83                                                    | 3.9E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Ethylbenzene                | 0.005       | 0.037                         | 0.03                                                    | 1.3E-03                                                      |
| meta- & para- xylene        | 0.01        | 0.3                           | 0.26                                                    | 1.0E-02                                                      |
| Styrene                     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromoform                   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| ortho-xylene                | 0.005       | 0.11                          | 0.09                                                    | 3.8E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Isopropylbenzene            | 0.005       | 0.02                          | 0.02                                                    | 6.8E-04                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromobenzene                | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| n-propylbenzene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.16                          | 0.14                                                    | 5.5E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.27                          | 0.23                                                    | 9.2E-03                                                      |
| sec-butylbenzene            | 0.005       | 0.016                         | 0.01                                                    | 5.5E-04                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.16                          | 0.14                                                    | 5.5E-03                                                      |
| 1,4-dichlorobenzene         | 0.005       | 4.51                          | 3.89                                                    | 1.5E-01                                                      |
| p-isopropyltoluene          | 0.005       | 0.02                          | 0.02                                                    | 6.8E-04                                                      |
| 1,2-dichlorobenzene         | 0.005       | 3.2                           | 2.76                                                    | 1.1E-01                                                      |
| n-butylbenzene              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 5.72                          | 4.93                                                    | 2.0E-01                                                      |
| Naphthalene                 | 0.005       | 0.55                          | 0.47                                                    | 1.9E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.54                          | 0.47                                                    | 1.8E-02                                                      |

**Notes:**

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

**Results:**

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 4.0m PM1 |                                                         |                                                              |
|-----------------------------|-------------|--------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)          | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                         | < 0.09                                                  | 3.4E-03                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Chloroform                  | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2-dichloroethane          | 0.005       | 0.018                          | 0.16                                                    | 6.2E-03                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Benzene                     | 0.005       | 0.5                            | 4.31                                                    | 1.7E-01                                                      |
| Trichloroethene             | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Dibromomethane              | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Toluene                     | 0.005       | 0.29                           | 2.50                                                    | 9.9E-02                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Tetrachloroethene           | 0.005       | 0.005                          | 0.04                                                    | 1.7E-03                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Chlorobenzene               | 0.005       | 0.82                           | 7.07                                                    | 2.8E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Ethylbenzene                | 0.005       | 0.008                          | 0.07                                                    | 2.7E-03                                                      |
| meta- & para- xylene        | 0.01        | 0.04                           | 0.34                                                    | 1.4E-02                                                      |
| Styrene                     | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Bromoform                   | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| ortho-xylene                | 0.005       | 0.017                          | 0.15                                                    | 5.8E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Isopropylbenzene            | 0.005       | 0.005                          | 0.04                                                    | 1.7E-03                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| Bromobenzene                | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| n-propylbenzene             | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.02                           | 0.17                                                    | 6.8E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.037                          | 0.32                                                    | 1.3E-02                                                      |
| sec-butylbenzene            | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.031                          | 0.27                                                    | 1.1E-02                                                      |
| 1,4-dichlorobenzene         | 0.005       | 1.5                            | 12.93                                                   | 5.1E-01                                                      |
| p-isopropyltoluene          | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2-dichlorobenzene         | 0.005       | 0.83                           | 7.16                                                    | 2.8E-01                                                      |
| n-butylbenzene              | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 3.17                           | 27.33                                                   | 1.1E+00                                                      |
| Naphthalene                 | 0.005       | 0.1                            | 0.86                                                    | 3.4E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                        | < 0.04                                                  | 1.7E-03                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.15                           | 1.29                                                    | 5.1E-02                                                      |

**Notes:**

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

**Results:**

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 6.0m M2 |                                                         |                                                              |
|-----------------------------|-------------|-------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)         | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                        | < 0.01                                                  | 3.4E-04                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chloroform                  | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloroethane          | 0.005       | 0.021                         | 0.02                                                    | 7.2E-04                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Benzene                     | 0.005       | 3.46                          | 2.98                                                    | 1.2E-01                                                      |
| Trichloroethene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Dibromomethane              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Toluene                     | 0.005       | 1.9                           | 1.64                                                    | 6.5E-02                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Tetrachloroethene           | 0.005       | 0.018                         | 0.02                                                    | 6.2E-04                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Chlorobenzene               | 0.005       | 12.7                          | 10.95                                                   | 4.3E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Ethylbenzene                | 0.005       | 0.034                         | 0.03                                                    | 1.2E-03                                                      |
| meta- & para- xylene        | 0.01        | 0.27                          | 0.23                                                    | 9.2E-03                                                      |
| Styrene                     | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromoform                   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| ortho-xylene                | 0.005       | 0.1                           | 0.09                                                    | 3.4E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Isopropylbenzene            | 0.005       | 0.017                         | 0.01                                                    | 5.8E-04                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| Bromobenzene                | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| n-propylbenzene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.19                          | 0.16                                                    | 6.5E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.33                          | 0.28                                                    | 1.1E-02                                                      |
| sec-butylbenzene            | 0.005       | 0.016                         | 0.01                                                    | 5.5E-04                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.31                          | 0.27                                                    | 1.1E-02                                                      |
| 1,4-dichlorobenzene         | 0.005       | 2.24                          | 1.93                                                    | 7.7E-02                                                      |
| p-isopropyltoluene          | 0.005       | 0.028                         | 0.02                                                    | 9.6E-04                                                      |
| 1,2-dichlorobenzene         | 0.005       | 4.72                          | 4.07                                                    | 1.6E-01                                                      |
| n-butylbenzene              | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 7.15                          | 6.16                                                    | 2.4E-01                                                      |
| Naphthalene                 | 0.005       | 0.79                          | 0.68                                                    | 2.7E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                       | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.98                          | 0.84                                                    | 3.4E-02                                                      |

**Notes:**

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

**Results:**

| Chemical                    | PQL<br>(µg) | Flux Hood Sample PIT1 6.0m PM2 |                                                         |                                                              |
|-----------------------------|-------------|--------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
|                             |             | Mass Detected<br>(µg)          | Calculated Air<br>Concentration<br>(mg/m <sup>3</sup> ) | Calculated Flux<br>Emission Rate<br>(mg/min.m <sup>2</sup> ) |
| Trichlorofluoromethane      | 0.01        | < 0.01                         | < 0.01                                                  | 3.4E-04                                                      |
| 1,1-dichloroethene          | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| trans-1,2-dichloroethene    | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Tributylmethylether (TBME)  | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,1-dichloroethane          | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,2-dichloroethene      | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chloroform                  | 0.005       | 0.01                           | 0.01                                                    | 3.4E-04                                                      |
| 1,1,1-trichloroethane       | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloroethane          | 0.005       | 0.021                          | 0.02                                                    | 7.2E-04                                                      |
| 1,1-dichloropropene         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Carbon tetrachloride        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Benzene                     | 0.005       | 2.39                           | 2.06                                                    | 8.2E-02                                                      |
| Trichloroethene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dichloropropane         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Dibromomethane              | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromodichloromethane        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| cis-1,3-dichloropropene     | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Toluene                     | 0.005       | 1.39                           | 1.20                                                    | 4.8E-02                                                      |
| trans-1,3-dichloropropene   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,1,2-trichloroethane       | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,3-dichloropropane         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chlorodibromomethane        | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Tetrachloroethene           | 0.005       | 0.013                          | 0.01                                                    | 4.4E-04                                                      |
| 1,2-dibromoethane           | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Chlorobenzene               | 0.005       | 8.86                           | 7.64                                                    | 3.0E-01                                                      |
| 1,1,1,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Ethylbenzene                | 0.005       | 0.027                          | 0.02                                                    | 9.2E-04                                                      |
| meta- & para- xylene        | 0.01        | 0.2                            | 0.17                                                    | 6.8E-03                                                      |
| Styrene                     | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromoform                   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| ortho-xylene                | 0.005       | 0.074                          | 0.06                                                    | 2.5E-03                                                      |
| 1,1,2,2-tetrachloroethane   | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Isopropylbenzene            | 0.005       | 0.013                          | 0.01                                                    | 4.4E-04                                                      |
| 1,2,3-trichloropropane      | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| Bromobenzene                | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| n-propylbenzene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 2-chlorotoluene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 4-chlorotoluene             | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,3,5-trimethylbenzene      | 0.005       | 0.13                           | 0.11                                                    | 4.4E-03                                                      |
| tert-butylbenzene           | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trimethylbenzene      | 0.005       | 0.23                           | 0.20                                                    | 7.9E-03                                                      |
| sec-butylbenzene            | 0.005       | 0.011                          | 0.01                                                    | 3.8E-04                                                      |
| 1,3-dichlorobenzene         | 0.005       | 0.2                            | 0.17                                                    | 6.8E-03                                                      |
| 1,4-dichlorobenzene         | 0.005       | 4.7                            | 4.05                                                    | 1.6E-01                                                      |
| p-isopropyltoluene          | 0.005       | 0.017                          | 0.01                                                    | 5.8E-04                                                      |
| 1,2-dichlorobenzene         | 0.005       | 3.48                           | 3.00                                                    | 1.2E-01                                                      |
| n-butylbenzene              | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2-dibromo-3-chloropropane | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,4-trichlorobenzene      | 0.005       | 5.67                           | 4.89                                                    | 1.9E-01                                                      |
| Naphthalene                 | 0.005       | 0.5                            | 0.43                                                    | 1.7E-02                                                      |
| Hexachlorobutadiene         | 0.005       | < 0.005                        | < 0.00                                                  | 1.7E-04                                                      |
| 1,2,3-trichlorobenzene      | 0.005       | 0.54                           | 0.47                                                    | 1.8E-02                                                      |

**Notes:**

< = Analyte was not measured at the level of detection; reported value is the PQL

PQL = Practical quantitation limit for the analytical method

\* = Reported by laboratory at level below the PQL

Refer to Section 3.1 for details on the equations used to calculate air concentrations and flux emission rates

## **Appendix E: Odour Emission Rates**

Client: Meriton  
 Site Location: Forner Allied Feeds Site, Rhodes  
 Project Number: 43217483  
 Sampling Date: 29/03/2006

| Sample Location    | Sample ID as Per Report | Odour Concentration (ou) | Enclosed surface area (m <sup>2</sup> ) | IFH sweep air flow rate (L/min) | IFH sweep air flow rate (m <sup>3</sup> /min) | Odour Emission Rate at Source (Not corrected for temperature) (OU/min/m <sup>2</sup> ) | Odour Emission Rate at Source (Corrected for temperature) (OU/min/m <sup>2</sup> ) | Odour Emission Rate (OU/s/m <sup>2</sup> ) |
|--------------------|-------------------------|--------------------------|-----------------------------------------|---------------------------------|-----------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------|
| PIT1_2.0m_Sample 1 | Pit1_Sample 1           | 558                      | 0.192                                   | 10                              | 0.01                                          | 29.063                                                                                 | 29.1                                                                               | 0.48                                       |
| PIT1_2.0m_Sample 2 | Pit1_Sample 2           | 724                      | 0.192                                   | 10                              | 0.01                                          | 37.708                                                                                 | 37.7                                                                               | 0.63                                       |
| PIT1_4.0m_Sample 1 | Pit2_Sample 1           | 892                      | 0.192                                   | 10                              | 0.01                                          | 46.458                                                                                 | 46.5                                                                               | 0.77                                       |
| PIT1_4.0m_Sample 2 | Pit2_Sample 2           | 892                      | 0.192                                   | 10                              | 0.01                                          | 46.458                                                                                 | 46.5                                                                               | 0.77                                       |
| PIT1_6.0m_Sample 1 | Pit3_Sample 1           | 776                      | 0.192                                   | 10                              | 0.01                                          | 40.417                                                                                 | 40.4                                                                               | 0.67                                       |
| PIT1_6.0m_Sample 2 | Pit3_Sample 2           | 724                      | 0.192                                   | 10                              | 0.01                                          | 37.708                                                                                 | 37.7                                                                               | 0.63                                       |

## Appendix F: VOC Data Validation

# Contents

## Appendix B Data Validation

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## F1.1 Introduction

Analytical data validation is the process of assessing if data are in compliance with method requirements and project specifications. The primary objective of this process is to provide data of known quality, and to identify if the data can be used to fulfil the overall project objectives.

The data validation guidelines adopted by URS provide a consistent approach for the evaluation of analytical data. These guidelines are based upon data validation guidance documents published by the United States Environment Protection Agency (1994). The process involves the assessment of the accuracy<sup>1</sup> and precision<sup>2</sup> of analytical data from a range of quality control measurements generated from both the sampling and analytical programs.

The following sections provide descriptions of the specific mechanisms and data validation procedures used in the assessment of accuracy, precision and useability of analytical data for the air monitoring undertaken at the former Allied Feeds site in March 2006. The data validation assessment included a review of the:

- Holding times and sample storage;
- Contamination in field and method blanks; and
- Reported percent recoveries (%R) for surrogate compounds introduced into laboratory samples.

Multi-sorbent tubes were sent to Labmark for analysis. The samples were analysed by the TO-17 method.

A summary of the information discussed below is provided in Attachment 1.

## F1.2 Data Validation

### F1.2.1 Holding Times and Sample Storage

#### ***Multi Sorbent tubes***

In accordance with US EPA Method TO-17, sample tubes containing a single sorbent bed should be stored at 4°C and analysed within 14 days of sample collection

Samples were analysed within 2 days of sample collection. Samples were packed in an 'esky' with an ice brick during transportation.

---

<sup>1</sup> accuracy - the degree of agreement of a measurement (or an average of measurements) with the accepted reference or true value.

<sup>2</sup> precision - the degree to which data generated from replicate or repetitive measurements differ from one another.

## F1.2.2 Limit of Reporting

### ***Multi Sorbent Tubes***

The limit of reporting for the target chemicals was 5 ng with the exception of meta and para xylenes, and Trichlorofluoromethane (LOR 10 ng).

## F1.2.3 Blanks

Blank samples are designed to monitor the introduction of artefacts or interferences into the analysis, which might lead to the reporting of false positive data. Two different types of blanks (trip blanks, and laboratory blanks) were evaluated during the sampling and analytical rounds.

Laboratory blanks consist of samples prepared and analysed by the laboratory in the same manner as the regular field samples. The preparation and analysis of reagent/method (laboratory) blanks enables the measurement of incidental or accidental contamination within the laboratory. Laboratory blank results should be reported for each 12-hour time period of analysis. Additional blanks should be run if any sample has saturated ions from a given compound to evaluate the possibility of cross contamination between samples during analysis.

Trip Blanks consist of clean sample media (i.e. multi sorbent tube) that travel at all times with the samples. The analysis of the trip blank, following the same sample preparation and analysis as the primary samples provides assessment of cross contamination of samples during transportation.

### ***Multi Sorbent Tubes***

No analytes were reported above the detection limit in the laboratory method blank analysed by LabMark. *No trip blank was conducted in this monitoring event.*

## F1.2.4 Surrogate Spike Analysis

Surrogate spike analyses are conducted by the analytical laboratory on a per sample basis to evaluate the effects of the sample matrix on the method of analysis. These analyses are conducted by spiking a sample or blank with a known concentration of various surrogate compounds, analysing the samples for these compounds and assessing the concentrations recovered. This assessment is expressed in terms of accuracy by calculating a *percent recovery* (%R) between the observed and spiked concentrations (USEPA, 1994):

$$\%R = (C_{\text{observed}}/C_{\text{spiked}}) \bullet 100\%$$

where:  $C_{\text{observed}}$  = Concentration of the compound obtained by analysis  
 $C_{\text{spiked}}$  = Known concentration of the spiked compound

Ideally, all the calculated *percent recovery* values should be within laboratory control limits that are listed on the Laboratory Reports of Analyses as *Method Limits*. In the event that control limit outliers are

reported (flagged by “#”), professional judgment is used to assess the extent to which such results may affect the overall useability of the data. This is achieved by evaluating matrix spike data in conjunction with other QC criteria, rather than assessing the matrix spike data in isolation.

## **Multi Sorbent Tubes**

The laboratory spiked all tubes with BCP and DCFB the recovery of the surrogates are:

- The recovery of CTFCB ranged from 50 % to 93 % which is outside the acceptable range. The following samples had recovery rates outside the acceptable recovery limits: Pit1\_2.0m\_M2 (50%), Pit2\_2.0m\_PM2 (69%) and Pit1\_4.0m\_M2 (67%)
- The recovery of BCP ranged from 66 % to 105 % which is outside the acceptable range. The following sample had recovery rates outside the acceptable recovery limits: Pit1\_2.0m\_M2 (66%)
- The recovery of DCFB ranged from 70 % to 98% which is within the acceptable range.

## **F1.2.5 Laboratory Control Samples**

Laboratory control samples were prepared within the laboratory by spiking an aliquot of an appropriate clean matrix reagent with known concentrations of target analytes. The check spike is spiked separately and then extracted and analysed using the same procedure as that used for field samples. This type of laboratory control sample is evaluated on a per batch basis for each analysis where appropriate. The results are used to assess laboratory precision and accuracy and provide a baseline for comparison of matrix effects in field sample analyses.

Check spike results were evaluated in terms of accuracy by calculating a percent recovery (%R) between the observed and spiked concentrations:

$$\%R = (C_{\text{observed}} / C_{\text{spiked}}) \bullet 100\%$$

where:  $C_{\text{observed}}$  = Concentration of the compound obtained by Laboratory Control Sample analysis

$C_{\text{spiked}}$  = True concentration of the spiked compound

## **Multi Sorbent Tubes**

All calculated %R, which ranged between 71% and 127%, are within acceptance limits as specified by the testing laboratory or US EPA protocols.

## F1.2.6 Trip Spike Analysis

Trip spikes are used to provide an assessment of potential loss of volatile compounds during sample transport and storage.

*No trip spikes were analysed*

## F1.2.7 Duplicates

Duplicate samples can be either field or laboratory:

### **Field Duplicates**

These are a set of two discrete samples collected from one sampling point in the field. The sample is prepared in the field by splitting a field sample, then submitting both samples to the same laboratory as two independent samples, which are labelled as two discrete locations, the duplicate sample label having no reference to the primary sample.

### **Laboratory Duplicates**

These are prepared within the laboratory by dividing a field sample into two samples and analysing separately.

Field duplicates were used to assess the precision and accuracy of the whole process (sampling, sample preparation and analysis) while laboratory duplicates provided an indication of laboratory precision.

Precision is assessed by calculating the *relative percent difference* (RPD) between original and duplicate results as follows:

$$RPD = \frac{(D1 - D2)}{(D1 + D2)/2} \bullet 100\%$$

where: D<sub>1</sub> = Reported concentration for original sample  
D<sub>2</sub> = Reported concentration for duplicate sample

Precision between is generally deemed to be acceptable if calculated RPDs are less than or equal to 35% for field duplicates and less than 20 % for Laboratory duplicates, for each analyte detected (in both samples) at concentrations greater than 10times the associated reporting limit. For analytes that are detected at concentrations less than 10 times the associated reporting limit, acceptable agreement between results is indicated by an absolute difference between sample results (i.e., |D1 - D2|) that is equal to or less than the magnitude of the associated reporting limit.

### **Multi Sorbent Tubes**

*No duplicates were analysed*

## **F2.1 Overall Assessment**

The review of quality control elements for sampling from the ambient air sampling into sorbent tubes generally indicates an acceptable degree of accuracy and precision with the exception of the sorbent tube results for surrogate recoveries which the laboratory indicated were affected by high concentrations of analytes in the tube. However, the results are still considered suitable for providing indicative data for a risk assessment.

## **F3.1 References**

USEPA (1994). National Functional Guidelines for Organic Data Review, USEPA Contract Laboratory Programme. Office of Emergency and Remedial Response. Publication 9240.1-05 February, 1994.

# Contents

## *Attachment 1: Data Validation Summary*

Project Name: Meriton Air Sampling Project/Task Number: 43217483  
 Analytical Laboratory: Air Toxics LTD Batch/Ref. Number(s): E026012

| Primary Sample Type | No. of Primary Samples Analysed | QA/QC Samples                                  | Analytes              |
|---------------------|---------------------------------|------------------------------------------------|-----------------------|
| Air                 | 6                               | 1 method blank<br>1 laboratory control samples | VOCs - Full TO17 Scan |

| Sample Handling, Receipt and Holding Times                                | Yes/No     | Comments                                              |
|---------------------------------------------------------------------------|------------|-------------------------------------------------------|
| COC completed adequately                                                  | Yes        |                                                       |
| Samples received intact and chilled                                       | Yes        |                                                       |
| Date(s) Sampled:                                                          | 29/03/2006 |                                                       |
| Date Received at laboratory:                                              | 30/03/2006 |                                                       |
| Date(s) Extracted:                                                        | 31/03/2006 |                                                       |
| Samples analysed within appropriate holding times per analytical methods. | Yes        | Samples are to be analysed within 20 days of sampling |

| Blanks<br>Method Blank (MB), Rinsate Blank (RB), Trip Blank (TB), Field Blank (FB) |              |                                                                              |
|------------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------|
| Type                                                                               | Analysed for | Comments                                                                     |
| Method Blank                                                                       | VOCs         | Acceptable: No analytes were detected above the estimated quantitation limit |

| Laboratory Control Spike (LCS) |        |                                                                 |
|--------------------------------|--------|-----------------------------------------------------------------|
| Analyte                        | % R    | Comments                                                        |
| VOCs                           | 71-127 | LCS recoveries were within acceptable laboratory control limits |

| Matrix Spike (MS) /Matrix Spike Duplicate (MSD) Samples |     |       |          |
|---------------------------------------------------------|-----|-------|----------|
| Analyte                                                 | % R | RPD % | Comments |
| NOT CONDUCTED                                           |     |       |          |

| Continuing Calibration Verification (CCV) |     |          |
|-------------------------------------------|-----|----------|
| Analyte                                   | % R | Comments |
| Not Conducted                             |     |          |

| Duplicates            |       |          |
|-----------------------|-------|----------|
| Laboratory Duplicates | RPD % | Comments |
| NOT CONDUCTED         |       |          |

| Intra-Laboratory | RPD % | Comments |
|------------------|-------|----------|
| NOT CONDUCTED    |       |          |

| Inter-Laboratory Duplicates | RPD % | Comments |
|-----------------------------|-------|----------|
| NOT CONDUCTED               |       |          |

| Surrogate Monitoring Compound Analyses |        |                                                                                                                                                                               |
|----------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analyte                                | % R    | Comments                                                                                                                                                                      |
| CTFCB                                  | 50-93  | Samples Pit1_2.0m_M2 (50%), Pit2_2.0m_PM2 (69%) and Pit1_4.0m_M2 (67%) were below the quality control limits. All other surrogate recoveries were within the acceptable range |
| BCP                                    | 66-105 | Samples Pit1_2.0m_M2 (66%) is below the quality control limit. All other surrogate recoveries were within the control limits                                                  |
| DCFB                                   | 70-98  | Acceptable: within control limits                                                                                                                                             |

| Overall Assessment                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Surrogate recoveries for CTFCB for samples Pit1_2.0m_M2 (50%), Pit2_2.0m_PM2 (69%) and Pit1_4.0m_M2 (67%) were below the quality control limits. Surrogate recoveries for BCP for sample Pit1_2.0m_M2 (66%) is below the quality control limit. Data considered suitable for indicative assessment. |

## Notes:

%R = Percent Recovery, RPD = Relative Percent Difference, LOR = Limit of Reporting

%AveR = Average Percentage Recovery

N/A = Not applicable

Performed By: Kmasters  
 Date: 30-May-06

Reviewed By: S Bowly  
 Date: 02-Jun-06

# **Appendix G: HAS Dispersion Modelling Report**



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5 May 2006

Amanda Lee  
URS Australia  
Level 3  
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NORTH SYDNEY NSW 2060

**Re: Stack, VOC and odour modelling at the former Allied Feeds site odour, Rhodes**

Dear Amanda,

This letter provides a summary of work carried out at the former Allied Feeds site with regard to stack modelling as well as odour and VOC modelling. The work was essentially done in three parts as follows;

1. modelling of emissions from the PTB and DTD stacks on the former Allied Feeds site and the PTB and ITD stacks on the Lednez site,
2. modelling of odour from the remediation works on Lots 101 and 104 to the south and southwest of the Meriton development proposed for Lot 100, and
3. modelling of speciated VOCs from the remediation works on Lots 101 and 104 to the south and southwest of the Meriton development proposed for Lot 100

Part 1, the stack modelling, was undertaken to determine the concentrations at the site due to emissions from the various stacks. The model was run using a constant 'unit' emission rate of 1 g/s from all stacks with the other emission parameters listed in **Table 1** below. Averaging times of 1-hour, 8-hours and 24-hours were determined, as well as the annual average.

| <b>Table 1 – Emission parameters used for the stack modelling</b> |                          |                 |                    |                 |
|-------------------------------------------------------------------|--------------------------|-----------------|--------------------|-----------------|
|                                                                   | <b>Allied Feeds site</b> |                 | <b>Lednez site</b> |                 |
|                                                                   | <b>DTD</b>               | <b>PTBA</b>     | <b>ITD</b>         | <b>PTBL</b>     |
| Stack location (MGA)                                              | 322963, 6255572          | 322959, 6255475 | 322676, 6255226    | 322634, 6255213 |
| Stack height (m)                                                  | 30                       | 16              | 20                 | 20              |
| Stack tip diameter (m)                                            | 1.2                      | 1               | 1.16               | 1.3             |
| Temperature (°C)                                                  | 89                       | 25              | 760                | 20              |
| Exit velocity (m/s)                                               | 18.9                     | 15              | 10.7               | 15              |
| Emission rate (g/s)                                               | 1                        | 1               | 1                  | 1               |

The model was run to determine the relative contributions from each stack as well as the total cumulative contribution. The model was also set to determine these concentrations at ground level, as well as heights of 10m, 20m, 30m and 40m, representing various heights of proposed buildings to be located on Lot 100. The accompanying EXCEL spreadsheets (results\_0m.xls etc..) contain the full set of modelling results including each height scenario, averaging time and stack contribution.

Part 2 of this exercise involved modelling the potential odour from Lots 101 and 104 to the south and southwest of the proposed development site, Lot 100. Five (5) scenarios were investigated and these were, that whilst Lot 100 is under construction;

1. all of Lots 104 and 101 will undergo excavation/remediation
2. all of Lot 104 will undergo excavation/remediation
3. all of Lot 101 will undergo excavation/remediation
4. half the area of Lot 104 will undergo excavation/remediation
5. half the area of Lot 101 will undergo excavation/remediation

Lots 101 and 104 were each divided into four smaller area sources and the maximum measured emission rate of  $0.77 \text{ ou/s/m}^2$  was used in combination with the near-field area source peak-to-mean factors. A 1-hour averaging time was used. A number of sensitive receptors were located on Lot 100 and the results for these are shown in **Table 2** below. The locations of these nine receptors are shown in **Figure 1**.

| <b>Table 2 – Predicted maximum 1-hour average ground level odour concentrations at sensitive receptors</b> |            |            |            |            |            |
|------------------------------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|
| Receptor                                                                                                   | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Scenario 5 |
| 1                                                                                                          | 112        | 62.1       | 99.7       | 62.1       | 53.3       |
| 2                                                                                                          | 134        | 63.5       | 134        | 63.5       | 52.7       |
| 3                                                                                                          | 155        | 62.4       | 135        | 62.3       | 57.4       |
| 4                                                                                                          | 162        | 59.8       | 134        | 59.6       | 58.8       |
| 5                                                                                                          | 64.1       | 33.6       | 57.9       | 33.5       | 26.3       |
| 6                                                                                                          | 73.5       | 33.3       | 63.3       | 33.0       | 26.3       |
| 7                                                                                                          | 79.0       | 44.2       | 76.2       | 44.2       | 34.0       |
| 8                                                                                                          | 97.9       | 43.4       | 84.1       | 43.2       | 34.5       |
| 9                                                                                                          | 85.7       | 43.1       | 82.2       | 43.1       | 32.6       |

Part 3 was similar to Part 2 in that the same area sources were used, but this time speciated VOCs were modeled instead of odour. Maximum and average emission rates were determined for 20 compounds including benzene and ground-level concentrations determined for the surrounding area. Both 1-hour and annual averaging periods were used. A single model run was done for benzene and then the remaining results calculated on a pro-rata basis given that all other conditions remained the same. The results are contained in the accompanying spreadsheets (VOC\_1hravg.xls and VOC\_annavg.xls) and include the calculations for the same five scenarios as for Part 2.

A summary of the maximum results for the nine special receptors can be seen in **Table 3**. These results contain the predicted concentrations for Scenario 1 which includes both Lots 101 and 104 undergoing excavation and remediation at the same time. The results in **Table 3** are also for the maximum measured emission rates rather than the average emissions rates, and provide a worst case scenario. The full results tables can be found in the spreadsheets.

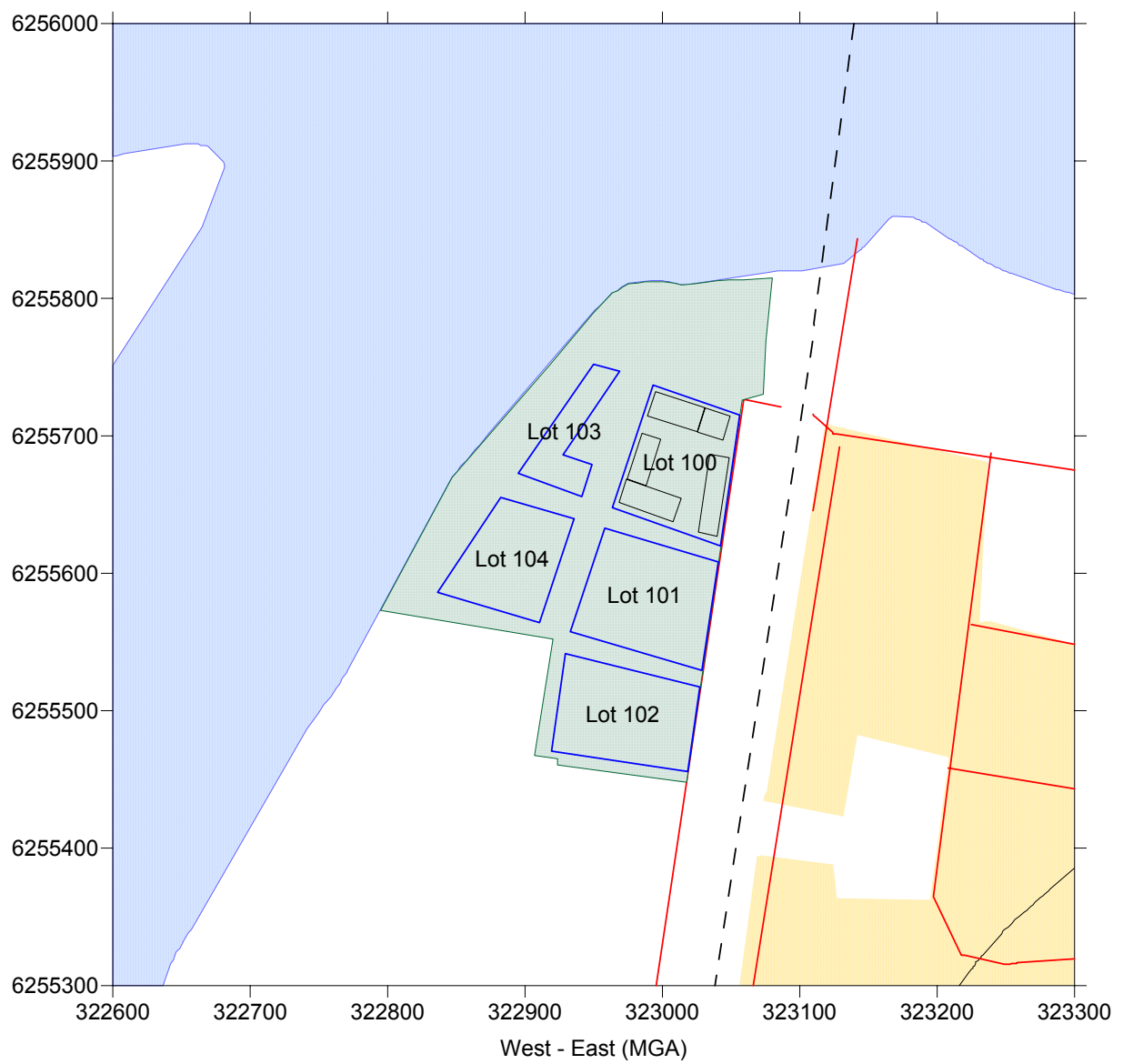
Please contact us should you require any further information.

Yours faithfully  
Holmes Air Sciences

Kerry Holmes PhD  
Environmental Chemist

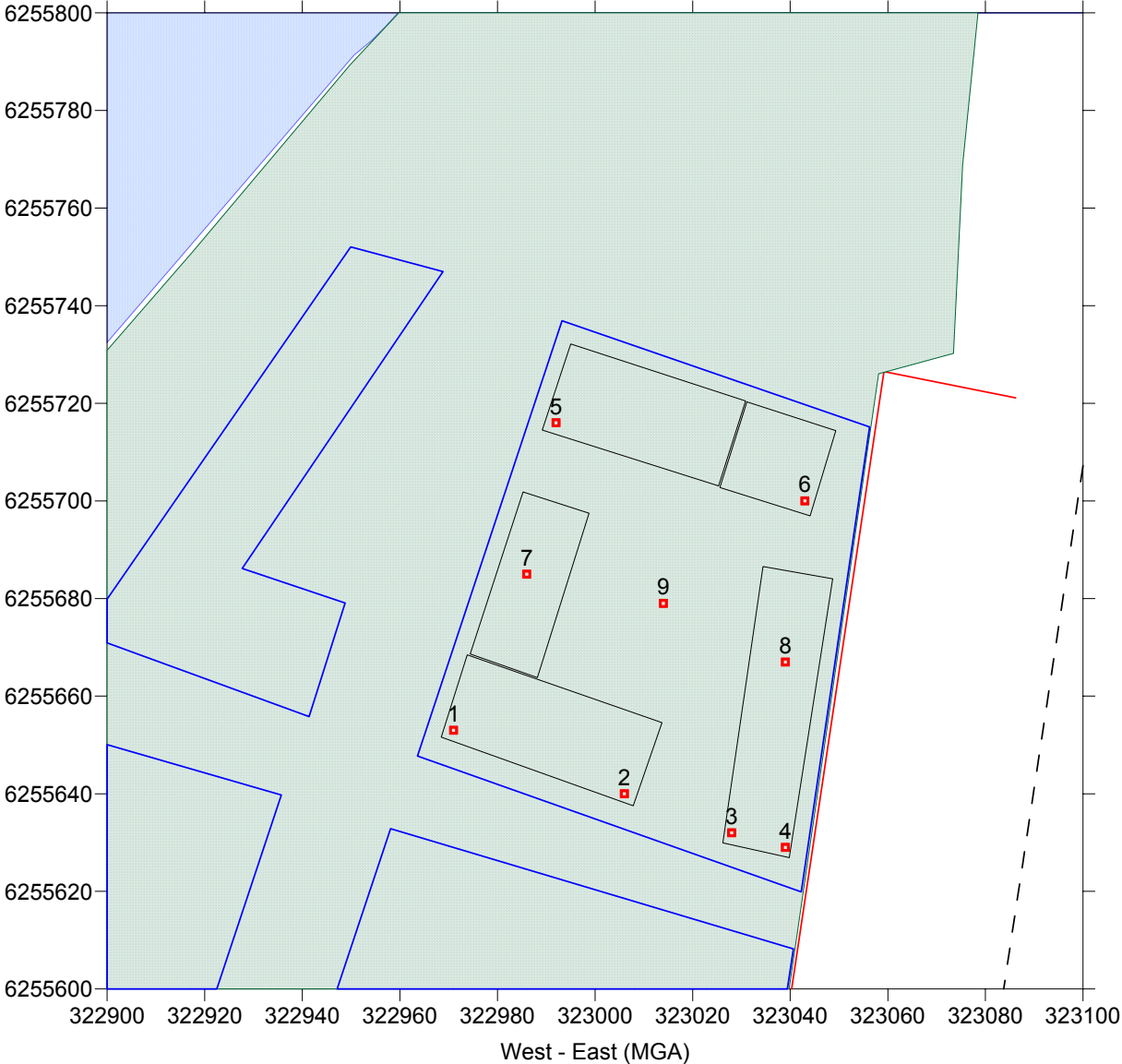
**Table 3 – Predicted maximum 1-hour average concentrations for Scenario 1 using maximum emission rates (milligrams per cubic metre)**

|                        | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Chloroform             | 1.77E-01 | 2.12E-01 | 2.45E-01 | 2.56E-01 | 1.01E-01 | 1.16E-01 | 1.25E-01 | 1.55E-01 | 1.36E-01 |
| 1,2-dichloroethane     | 6.76E-04 | 8.10E-04 | 9.38E-04 | 9.79E-04 | 3.88E-04 | 4.44E-04 | 4.78E-04 | 5.92E-04 | 5.18E-04 |
| Benzene                | 6.44E-03 | 7.72E-03 | 8.95E-03 | 9.34E-03 | 3.70E-03 | 4.24E-03 | 4.56E-03 | 5.64E-03 | 4.94E-03 |
| Toluene                | 1.03E-01 | 1.23E-01 | 1.43E-01 | 1.49E-01 | 5.91E-02 | 6.77E-02 | 7.28E-02 | 9.01E-02 | 7.89E-02 |
| Tetrachloroethane      | 1.77E-03 | 2.12E-03 | 2.45E-03 | 2.56E-03 | 1.01E-03 | 1.16E-03 | 1.25E-03 | 1.55E-03 | 1.36E-03 |
| Chlorobenzene          | 4.47E-01 | 5.36E-01 | 6.21E-01 | 6.48E-01 | 2.56E-01 | 2.94E-01 | 3.16E-01 | 3.91E-01 | 3.43E-01 |
| Ethylbenzene           | 2.81E-03 | 3.36E-03 | 3.90E-03 | 4.07E-03 | 1.61E-03 | 1.85E-03 | 1.99E-03 | 2.46E-03 | 2.15E-03 |
| meta- & para- xylene   | 1.46E-02 | 1.74E-02 | 2.02E-02 | 2.11E-02 | 8.35E-03 | 9.57E-03 | 1.03E-02 | 1.27E-02 | 1.12E-02 |
| ortho-xylene           | 6.03E-03 | 7.23E-03 | 8.37E-03 | 8.74E-03 | 3.46E-03 | 3.96E-03 | 4.26E-03 | 5.28E-03 | 4.62E-03 |
| Isopropylbenzene       | 1.77E-03 | 2.12E-03 | 2.45E-03 | 2.56E-03 | 1.01E-03 | 1.16E-03 | 1.25E-03 | 1.55E-03 | 1.36E-03 |
| 1,3,5-trimethylbenzene | 7.07E-03 | 8.47E-03 | 9.82E-03 | 1.02E-02 | 4.06E-03 | 4.65E-03 | 5.00E-03 | 6.19E-03 | 5.42E-03 |
| 1,2,4-trimethylbenzene | 1.35E-02 | 1.62E-02 | 1.88E-02 | 1.96E-02 | 7.75E-03 | 8.89E-03 | 9.56E-03 | 1.18E-02 | 1.04E-02 |
| sec-butylbenzene       | 6.03E-04 | 7.23E-04 | 8.37E-04 | 8.74E-04 | 3.46E-04 | 3.96E-04 | 4.26E-04 | 5.28E-04 | 4.62E-04 |
| 1,3-dichlorobenzene    | 1.14E-02 | 1.37E-02 | 1.59E-02 | 1.66E-02 | 6.56E-03 | 7.52E-03 | 8.09E-03 | 1.00E-02 | 8.77E-03 |
| 1,4-dichlorobenzene    | 5.30E-01 | 6.35E-01 | 7.36E-01 | 7.68E-01 | 3.04E-01 | 3.49E-01 | 3.75E-01 | 4.64E-01 | 4.07E-01 |
| p-isopropyltoluene     | 9.98E-04 | 1.20E-03 | 1.39E-03 | 1.45E-03 | 5.73E-04 | 6.56E-04 | 7.06E-04 | 8.74E-04 | 7.65E-04 |
| 1,2-dichlorobenzene    | 2.91E-01 | 3.49E-01 | 4.04E-01 | 4.22E-01 | 1.67E-01 | 1.91E-01 | 2.06E-01 | 2.55E-01 | 2.23E-01 |
| 1,2,4-trichlorobenzene | 1.14E+00 | 1.37E+00 | 1.59E+00 | 1.66E+00 | 6.56E-01 | 7.52E-01 | 8.09E-01 | 1.00E+00 | 8.77E-01 |
| Napthalene             | 3.53E-02 | 4.24E-02 | 4.91E-02 | 5.12E-02 | 2.03E-02 | 2.32E-02 | 2.50E-02 | 3.09E-02 | 2.71E-02 |
| 1,2,3-trichlorobenzene | 5.30E-02 | 6.35E-02 | 7.36E-02 | 7.68E-02 | 3.04E-02 | 3.49E-02 | 3.75E-02 | 4.64E-02 | 4.07E-02 |



Proposed layout of Lots on the former Allied Feeds site

**Figure 1**



Location of special receptors on the proposed buildings on Lot 100

Figure 2

**THE DISPERSION MODELLING RESULTS ARE CONTAINED ON A CD  
ATTACHED TO THIS REPORT.**

## **Appendix H: URS Stack Emission Calculations**

## **Appendix H – URS Stack Emission Calculation**

### **Calculation of concentrations at receptors**

The receptor concentrations presented in this report bring together emissions from various sources to produce a single concentration for individual species, at each receptor.

The stack sources included:

- Allied Feeds Direct Thermal Desorption unit
- Allied Feeds Pre-treatment Building outlet
- Lednez Indirect Thermal Desorption unit
- Lednez Feeds Pre-treatment Building outlet

Each of the stack sources were modelled individually by Holmes Air Sciences for a unity emission rate (1g/s), allowing the concentration at each receptor to be calculated for individual species, for individual stack sources. As the area of concern is a multi-level construction site, receptor concentrations were given at heights of 0m, 10m, 20m, 30m and 40m. As each stack emission source had a varying impact on the receptor, dependant on the meteorology, the concentrations at each receptor was divided into the impact from individual stack sources as well as the cumulative total from all sources under the same meteorology. For example, the following lists the concentration (in microgram/m<sup>3</sup>) of Benzene at Receptor 1, at 0m elevation from the individual stack sources:

- Allied Feeds DTD: 0 (source does not emit any Benzene)
- Allied Feeds PTB: 1.43
- Lednez ITD: 0.000022
- Lednez PTB: 0.731

Thus, the total concentration at Receptor 1 from all four stacks combined is 2.16 microgram/m<sup>3</sup>.

Holmes air Sciences also conducted the modelling for the emissions from various excavation scenarios that may occur on the Allied Feeds allotment. VOC Emission rates from excavated soil were generated from flux hood sampling conducted by URS. Holmes Air Sciences were provided with these emission rates in order to perform the modelling for the various scenarios (see Appendix G for further detail).

These area source model outputs were given for a 1 hour averaging time. In order to make these compatible with the 8 hour averaging times used elsewhere, the 1 hour average results were converted using the formula below.

$$C_t = C_{60} \left[ \frac{60}{t} \right]^{0.2}$$

Where:  $C_{60}$  = concentration for 1 hour averaging time  
 $t$  = new averaging time in minutes  
 $C_t$  = concentration for averaging time 't'

To convert from a one to an eight hour averaging time using the formula above requires the one hour concentrations to be multiplied by 0.66.

Finally, the results for the stack and area sources were added for the 0m and 10m scenarios only. It was considered that the VOC emissions from the area sources were unlikely to occur above 20m in height. For the scenarios above 10m, only stack emissions were included.

Thus the 2.16 microgram/ m<sup>3</sup> of Benzene at Receptor 1 (from the stacks) is added to 116.58(=176.7x 0.66) microgram/ m<sup>3</sup> from the Scenario 1 excavation emissions, to give a final total of 118.74 microgram/ m<sup>3</sup> at Receptor 1 for Scenario 1.

## ***Limitations***

Given their experience with modelling the Lednez and Allied Feeds sites, Holmes Air Sciences were contracted to carry out the dispersion modelling for each stack, with a unity output (1g/s). For each individual stack, this provides a result of the worst hour concentration at each individual receptor. The model is run for an entire year of meteorological data, thus the worst hour result represents the highest concentration experienced at a receptor over 8760 hours modelled.

When adding emissions from multiple sources, a conservative result is generated. This is due to the fact that worst hour concentrations for each source do not occur simultaneously. Conversely, it is possible that the worst hour concentration for a particular stack may occur when there are minimal contributions from other stacks. Thus adding the worst hour concentrations from various sources, depicts an artificially conservative scenario. This method was used to generate the concentrations at the sensitive receptors, as detailed in the above Section.

The HAS results (Appendix.G) also predicted worst hour concentration for all stacks combined. As discussed, for the purposes to the risk assessment the four individual stack source concentrations were added to produce a combined total, which was greater than the 'All Stacks'<sup>A</sup> total. This provided a conservative approach to the assessment.

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<sup>A</sup> If the 'All Stacks' total were used and the pollutants were proportioned to the relative contributions of each individual stack, then there would exist a potential for an individual stack to be underestimated in relation to its impact at the receptor. Consequently the conservative approach was taken to add individual receptor concentrations to use in the risk assessment.

| Species                                | Total Concentration: 0m Scenario 1 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                     | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 8.26E+00                                                       | 1.91E+00   | 2.02E+01   | 2.39E+01   | 1.61E+01   | 1.21E+01   | 1.82E+01   | 1.38E+01   | 1.24E+01   | 2.39E+01 |
| CO                                     | 6.41E-01                                                       | 1.40E-01   | 1.58E+00   | 1.88E+00   | 1.26E+00   | 9.46E-01   | 1.43E+00   | 1.08E+00   | 9.70E-01   | 1.88E+00 |
| PM10                                   | 3.22E+00                                                       | 9.01E-01   | 7.60E+00   | 8.97E+00   | 6.10E+00   | 4.66E+00   | 6.87E+00   | 5.28E+00   | 4.77E+00   | 8.97E+00 |
| SO2                                    | 2.83E-01                                                       | 6.52E-02   | 6.91E-01   | 8.20E-01   | 5.53E-01   | 4.16E-01   | 6.24E-01   | 4.74E-01   | 4.26E-01   | 8.20E-01 |
| HCl                                    | 9.13E-01                                                       | 9.81E-01   | 9.57E-01   | 9.28E-01   | 8.82E-01   | 1.01E+00   | 9.14E-01   | 9.99E-01   | 9.87E-01   | 1.01E+00 |
| B(a)P (dustborne)                      | 2.10E-05                                                       | 2.42E-05   | 2.55E-05   | 2.63E-05   | 1.77E-05   | 1.86E-05   | 2.00E-05   | 2.19E-05   | 2.05E-05   | 2.63E-05 |
| DDD (dustborne)                        | 6.49E-04                                                       | 7.47E-04   | 7.87E-04   | 8.13E-04   | 5.48E-04   | 5.75E-04   | 6.17E-04   | 6.77E-04   | 6.34E-04   | 8.13E-04 |
| Dieldrin (dustborne)                   | 9.62E-06                                                       | 1.11E-05   | 1.17E-05   | 1.21E-05   | 8.12E-06   | 8.52E-06   | 9.14E-06   | 1.00E-05   | 9.41E-06   | 1.21E-05 |
| PAH's                                  | 1.35E-06                                                       | 1.09E-06   | 2.00E-06   | 2.17E-06   | 1.72E-06   | 1.65E-06   | 1.86E-06   | 1.72E-06   | 1.64E-06   | 2.17E-06 |
| PCB's (vapour)                         | 1.52E-04                                                       | 2.78E-05   | 3.84E-04   | 4.57E-04   | 3.06E-04   | 2.27E-04   | 3.46E-04   | 2.60E-04   | 2.33E-04   | 4.57E-04 |
| PCB's (dustborne)                      | 6.62E-04                                                       | 7.62E-04   | 8.03E-04   | 8.29E-04   | 5.59E-04   | 5.86E-04   | 6.29E-04   | 6.90E-04   | 6.47E-04   | 8.29E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.01E-08                                                       | 3.46E-08   | 3.68E-08   | 3.80E-08   | 2.56E-08   | 2.68E-08   | 2.88E-08   | 3.15E-08   | 2.96E-08   | 3.80E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 5.74E-08                                                       | 6.60E-08   | 6.96E-08   | 7.19E-08   | 4.84E-08   | 5.08E-08   | 5.45E-08   | 5.98E-08   | 5.61E-08   | 7.19E-08 |
| Dichloromethane                        | 3.40E-05                                                       | 6.20E-06   | 8.58E-05   | 1.02E-04   | 6.84E-05   | 5.07E-05   | 7.74E-05   | 5.80E-05   | 5.20E-05   | 1.02E-04 |
| Dibromoethane                          | 1.17E-04                                                       | 2.13E-05   | 2.94E-04   | 3.50E-04   | 2.34E-04   | 1.74E-04   | 2.65E-04   | 1.99E-04   | 1.78E-04   | 3.50E-04 |
| Phenol                                 | 1.13E-06                                                       | 1.21E-06   | 1.18E-06   | 1.15E-06   | 1.09E-06   | 1.25E-06   | 1.13E-06   | 1.24E-06   | 1.22E-06   | 1.25E-06 |
| 2-Chlorophenol                         | 5.27E-03                                                       | 6.07E-03   | 6.40E-03   | 6.61E-03   | 4.45E-03   | 4.67E-03   | 5.01E-03   | 5.50E-03   | 5.16E-03   | 6.61E-03 |
| Benzene                                | 1.19E+02                                                       | 1.42E+02   | 1.65E+02   | 1.72E+02   | 6.87E+01   | 7.86E+01   | 8.45E+01   | 1.04E+02   | 9.15E+01   | 1.72E+02 |
| Chlorobenzene                          | 3.10E+02                                                       | 3.71E+02   | 4.28E+02   | 4.46E+02   | 1.82E+02   | 2.07E+02   | 2.23E+02   | 2.74E+02   | 2.41E+02   | 4.46E+02 |
| Dichlorobenzene                        | 4.24E-05                                                       | 4.56E-05   | 4.44E-05   | 4.31E-05   | 4.10E-05   | 4.70E-05   | 4.25E-05   | 4.64E-05   | 4.58E-05   | 4.70E-05 |
| 1,2-Dichlorobenzene                    | 1.98E+02                                                       | 2.37E+02   | 2.74E+02   | 2.86E+02   | 1.15E+02   | 1.31E+02   | 1.41E+02   | 1.74E+02   | 1.53E+02   | 2.86E+02 |
| 1,3-Dichlorobenzene                    | 7.67E+00                                                       | 9.19E+00   | 1.06E+01   | 1.11E+01   | 4.44E+00   | 5.08E+00   | 5.46E+00   | 6.74E+00   | 5.91E+00   | 1.11E+01 |
| 1,4-Dichlorobenzene                    | 3.63E+02                                                       | 4.35E+02   | 5.02E+02   | 5.24E+02   | 2.12E+02   | 2.42E+02   | 2.60E+02   | 3.20E+02   | 2.82E+02   | 5.24E+02 |
| Tetrachlorobenzene                     | 2.63E-01                                                       | 3.02E-01   | 3.19E-01   | 3.29E-01   | 2.22E-01   | 2.33E-01   | 2.50E-01   | 2.74E-01   | 2.57E-01   | 3.29E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 4.13E-03                                                       | 4.75E-03   | 5.01E-03   | 5.17E-03   | 3.48E-03   | 3.65E-03   | 3.92E-03   | 4.30E-03   | 4.04E-03   | 5.17E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 2.34E-03                                                       | 2.69E-03   | 2.84E-03   | 2.93E-03   | 1.97E-03   | 2.07E-03   | 2.22E-03   | 2.44E-03   | 2.29E-03   | 2.93E-03 |
| Pentachlorobenzene                     | 1.32E-02                                                       | 1.52E-02   | 1.60E-02   | 1.65E-02   | 1.11E-02   | 1.17E-02   | 1.25E-02   | 1.38E-02   | 1.29E-02   | 1.65E-02 |
| Hexachlorobenzene (vapour)             | 2.49E-03                                                       | 2.87E-03   | 3.03E-03   | 3.12E-03   | 2.11E-03   | 2.21E-03   | 2.37E-03   | 2.60E-03   | 2.44E-03   | 3.12E-03 |
| Hexachlorobenzene (dustborne)          | 1.09E-04                                                       | 1.26E-04   | 1.33E-04   | 1.37E-04   | 9.24E-05   | 9.69E-05   | 1.04E-04   | 1.14E-04   | 1.07E-04   | 1.37E-04 |
| Ethylbenzene                           | 3.24E+00                                                       | 3.81E+00   | 4.25E+00   | 4.42E+00   | 2.23E+00   | 2.44E+00   | 2.63E+00   | 3.07E+00   | 2.77E+00   | 4.42E+00 |
| Napthalene (vapour)                    | 2.38E+01                                                       | 2.85E+01   | 3.30E+01   | 3.44E+01   | 1.38E+01   | 1.58E+01   | 1.70E+01   | 2.10E+01   | 1.84E+01   | 3.44E+01 |
| Napthalene (dustborne)                 | 8.70E-04                                                       | 1.00E-03   | 1.06E-03   | 1.09E-03   | 7.34E-04   | 7.70E-04   | 8.26E-04   | 9.07E-04   | 8.50E-04   | 1.09E-03 |
| Xylenes                                | 4.44E-01                                                       | 5.10E-01   | 5.38E-01   | 5.56E-01   | 3.75E-01   | 3.93E-01   | 4.22E-01   | 4.63E-01   | 4.34E-01   | 5.56E-01 |
| meta- & para- xylene                   | 9.60E+00                                                       | 1.15E+01   | 1.33E+01   | 1.39E+01   | 5.51E+00   | 6.31E+00   | 6.79E+00   | 8.41E+00   | 7.36E+00   | 1.39E+01 |
| ortho-xylene                           | 3.98E+00                                                       | 4.77E+00   | 5.52E+00   | 5.76E+00   | 2.28E+00   | 2.62E+00   | 2.81E+00   | 3.48E+00   | 3.05E+00   | 5.76E+00 |
| Chloroform                             | 4.46E-01                                                       | 5.34E-01   | 6.19E-01   | 6.46E-01   | 2.56E-01   | 2.93E-01   | 3.15E-01   | 3.90E-01   | 3.42E-01   | 6.46E-01 |
| 1,2-dichloroethane                     | 4.25E+00                                                       | 5.10E+00   | 5.90E+00   | 6.16E+00   | 2.44E+00   | 2.80E+00   | 3.01E+00   | 3.72E+00   | 3.26E+00   | 6.16E+00 |
| Toluene                                | 6.79E+01                                                       | 8.14E+01   | 9.43E+01   | 9.84E+01   | 3.90E+01   | 4.46E+01   | 4.80E+01   | 5.94E+01   | 5.21E+01   | 9.84E+01 |
| Tetrachloroethane                      | 1.17E+00                                                       | 1.40E+00   | 1.62E+00   | 1.69E+00   | 6.69E-01   | 7.67E-01   | 8.25E-01   | 1.02E+00   | 8.94E-01   | 1.69E+00 |
| Isopropylbenzene                       | 1.17E+00                                                       | 1.40E+00   | 1.62E+00   | 1.69E+00   | 6.69E-01   | 7.67E-01   | 8.25E-01   | 1.02E+00   | 8.94E-01   | 1.69E+00 |
| 1,3,5-trimethylbenzene                 | 4.66E+00                                                       | 5.59E+00   | 6.48E+00   | 6.76E+00   | 2.68E+00   | 3.07E+00   | 3.30E+00   | 4.08E+00   | 3.58E+00   | 6.76E+00 |
| 1,2,4-trimethylbenzene                 | 8.91E+00                                                       | 1.07E+01   | 1.24E+01   | 1.29E+01   | 5.12E+00   | 5.86E+00   | 6.31E+00   | 7.80E+00   | 6.84E+00   | 1.29E+01 |
| sec-butylbenzene                       | 3.98E-01                                                       | 4.77E-01   | 5.52E-01   | 5.76E-01   | 2.28E-01   | 2.62E-01   | 2.81E-01   | 3.48E-01   | 3.05E-01   | 5.76E-01 |
| 1,2,4-trichlorobenzene                 | 7.54E+02                                                       | 9.04E+02   | 1.05E+03   | 1.09E+03   | 4.33E+02   | 4.96E+02   | 5.34E+02   | 6.60E+02   | 5.78E+02   | 1.09E+03 |
| 1,2,3-trichlorobenzene                 | 3.50E+01                                                       | 4.19E+01   | 4.86E+01   | 5.07E+01   | 2.01E+01   | 2.30E+01   | 2.47E+01   | 3.06E+01   | 2.68E+01   | 5.07E+01 |
| p-isopropyltoluene                     | 6.58E-01                                                       | 7.89E-01   | 9.14E-01   | 9.54E-01   | 3.78E-01   | 4.33E-01   | 4.66E-01   | 5.76E-01   | 5.05E-01   | 9.54E-01 |
| Hg                                     | 3.74E-05                                                       | 6.83E-06   | 9.45E-05   | 1.13E-04   | 7.53E-05   | 5.58E-05   | 8.52E-05   | 6.39E-05   | 5.73E-05   | 1.13E-04 |
| As                                     | 1.74E-04                                                       | 3.17E-05   | 4.39E-04   | 5.23E-04   | 3.50E-04   | 2.59E-04   | 3.96E-04   | 2.97E-04   | 2.66E-04   | 5.23E-04 |
| Pb                                     | 5.50E-04                                                       | 1.00E-04   | 1.39E-03   | 1.65E-03   | 1.11E-03   | 8.21E-04   | 1.25E-03   | 9.40E-04   | 8.42E-04   | 1.65E-03 |
| Tl                                     | 1.61E-05                                                       | 2.93E-06   | 4.06E-05   | 4.83E-05   | 3.23E-05   | 2.40E-05   | 3.66E-05   | 2.75E-05   | 2.46E-05   | 4.83E-05 |
| Ba                                     | 1.30E-03                                                       | 2.37E-04   | 3.28E-03   | 3.91E-03   | 2.61E-03   | 1.94E-03   | 2.96E-03   | 2.22E-03   | 1.99E-03   | 3.91E-03 |
| Cd                                     | 6.96E-05                                                       | 1.27E-05   | 1.76E-04   | 2.09E-04   | 1.40E-04   | 1.04E-04   | 1.58E-04   | 1.19E-04   | 1.07E-04   | 2.09E-04 |
| Total Cr                               | 1.80E-04                                                       | 3.28E-05   | 4.54E-04   | 5.40E-04   | 3.61E-04   | 2.68E-04   | 4.09E-04   | 3.07E-04   | 2.75E-04   | 5.40E-04 |
| Cu                                     | 1.19E-04                                                       | 2.18E-05   | 3.01E-04   | 3.58E-04   | 2.40E-04   | 1.78E-04   | 2.71E-04   | 2.04E-04   | 1.83E-04   | 3.58E-04 |
| Ni                                     | 5.72E-05                                                       | 1.04E-05   | 1.44E-04   | 1.72E-04   | 1.15E-04   | 8.53E-05   | 1.30E-04   | 9.77E-05   | 8.75E-05   | 1.72E-04 |
| Sb                                     | 4.46E-05                                                       | 8.13E-06   | 1.13E-04   | 1.34E-04   | 8.96E-05   | 6.65E-05   | 1.01E-04   | 7.61E-05   | 6.82E-05   | 1.34E-04 |
| Va                                     | 8.25E-05                                                       | 1.51E-05   | 2.08E-04   | 2.48E-04   | 1.66E-04   | 1.23E-04   | 1.88E-04   | 1.41E-04   | 1.26E-04   | 2.48E-04 |
| Zn                                     | 2.59E-03                                                       | 4.73E-04   | 6.55E-03   | 7.80E-03   | 5.22E-03   | 3.87E-03   | 5.91E-03   | 4.43E-03   | 3.97E-03   | 7.80E-03 |

| Total Concentration: 0m Scenario 2 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |            |          |
|----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| Species                                                        | Receptor 1 | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                                            | 8.26E+00   | 1.91E+00   | 2.02E+01   | 2.39E+01   | 1.61E+01   | 1.21E+01   | 1.82E+01   | 1.38E+01   | 1.24E+01   | 2.39E+01 |
| CO                                                             | 6.41E-01   | 1.40E-01   | 1.58E+00   | 1.88E+00   | 1.26E+00   | 9.46E-01   | 1.43E+00   | 1.08E+00   | 9.70E-01   | 1.88E+00 |
| PM10                                                           | 3.22E+00   | 9.01E-01   | 7.60E+00   | 8.97E+00   | 6.10E+00   | 4.66E+00   | 6.87E+00   | 5.28E+00   | 4.77E+00   | 8.97E+00 |
| SO2                                                            | 2.83E-01   | 6.52E-02   | 6.91E-01   | 8.20E-01   | 5.53E-01   | 4.16E-01   | 6.24E-01   | 4.74E-01   | 4.26E-01   | 8.20E-01 |
| HCl                                                            | 9.13E-01   | 9.81E-01   | 9.57E-01   | 9.28E-01   | 8.82E-01   | 1.01E+00   | 9.14E-01   | 9.99E-01   | 9.87E-01   | 1.01E+00 |
| B(a)P (dustborne)                                              | 2.10E-05   | 2.42E-05   | 2.55E-05   | 2.63E-05   | 1.77E-05   | 1.86E-05   | 2.00E-05   | 2.19E-05   | 2.05E-05   | 2.63E-05 |
| DDD (dustborne)                                                | 6.49E-04   | 7.47E-04   | 7.87E-04   | 8.13E-04   | 5.48E-04   | 5.75E-04   | 6.17E-04   | 6.77E-04   | 6.34E-04   | 8.13E-04 |
| Dieldrin (dustborne)                                           | 9.62E-06   | 1.11E-05   | 1.17E-05   | 1.21E-05   | 8.12E-06   | 8.52E-06   | 9.14E-06   | 1.00E-05   | 9.41E-06   | 1.21E-05 |
| PAH's                                                          | 1.35E-06   | 1.09E-06   | 2.00E-06   | 2.17E-06   | 1.72E-06   | 1.65E-06   | 1.86E-06   | 1.72E-06   | 1.64E-06   | 2.17E-06 |
| PCB's (vapour)                                                 | 1.52E-04   | 2.78E-05   | 3.84E-04   | 4.57E-04   | 3.06E-04   | 2.27E-04   | 3.46E-04   | 2.60E-04   | 2.33E-04   | 4.57E-04 |
| PCB's (dustborne)                                              | 6.62E-04   | 7.62E-04   | 8.03E-04   | 8.29E-04   | 5.59E-04   | 5.86E-04   | 6.29E-04   | 6.90E-04   | 6.47E-04   | 8.29E-04 |
| Dioxins/Furans(TEQ vapour)                                     | 3.01E-08   | 3.46E-08   | 3.68E-08   | 3.80E-08   | 2.56E-08   | 2.68E-08   | 2.88E-08   | 3.15E-08   | 2.96E-08   | 3.80E-08 |
| Dioxins/Furans(TEQ Dustborne)                                  | 5.74E-08   | 6.60E-08   | 6.96E-08   | 7.19E-08   | 4.84E-08   | 5.08E-08   | 5.45E-08   | 5.98E-08   | 5.61E-08   | 7.19E-08 |
| Dichloromethane                                                | 3.40E-05   | 6.20E-06   | 8.58E-05   | 1.02E-04   | 6.84E-05   | 5.07E-05   | 7.74E-05   | 5.80E-05   | 5.20E-05   | 1.02E-04 |
| Dibromoethane                                                  | 1.17E-04   | 2.13E-05   | 2.94E-04   | 3.50E-04   | 2.34E-04   | 1.74E-04   | 2.65E-04   | 1.99E-04   | 1.78E-04   | 3.50E-04 |
| Phenol                                                         | 1.13E-06   | 1.21E-06   | 1.18E-06   | 1.15E-06   | 1.09E-06   | 1.25E-06   | 1.13E-06   | 1.24E-06   | 1.22E-06   | 1.25E-06 |
| 2-Chlorophenol                                                 | 5.27E-03   | 6.07E-03   | 6.40E-03   | 6.61E-03   | 4.45E-03   | 4.67E-03   | 5.01E-03   | 5.50E-03   | 5.16E-03   | 6.61E-03 |
| Benzene                                                        | 6.70E+01   | 6.87E+01   | 6.77E+01   | 6.51E+01   | 3.69E+01   | 3.66E+01   | 4.82E+01   | 4.75E+01   | 4.71E+01   | 6.87E+01 |
| Chlorobenzene                                                  | 1.79E+02   | 1.85E+02   | 1.83E+02   | 1.77E+02   | 1.01E+02   | 1.01E+02   | 1.31E+02   | 1.30E+02   | 1.29E+02   | 1.85E+02 |
| Dichlorobenzene                                                | 4.24E-05   | 4.56E-05   | 4.44E-05   | 4.31E-05   | 4.10E-05   | 4.70E-05   | 4.25E-05   | 4.64E-05   | 4.58E-05   | 4.70E-05 |
| 1,2-Dichlorobenzene                                            | 1.13E+02   | 1.16E+02   | 1.14E+02   | 1.10E+02   | 6.27E+01   | 6.24E+01   | 8.15E+01   | 8.07E+01   | 7.99E+01   | 1.16E+02 |
| 1,3-Dichlorobenzene                                            | 4.32E+00   | 4.44E+00   | 4.37E+00   | 4.20E+00   | 2.38E+00   | 2.36E+00   | 3.11E+00   | 3.06E+00   | 3.04E+00   | 4.44E+00 |
| 1,4-Dichlorobenzene                                            | 2.08E+02   | 2.14E+02   | 2.12E+02   | 2.04E+02   | 1.17E+02   | 1.16E+02   | 1.51E+02   | 1.50E+02   | 1.48E+02   | 2.14E+02 |
| Tetrachlorobenzene                                             | 2.63E-01   | 3.02E-01   | 3.19E-01   | 3.29E-01   | 2.22E-01   | 2.33E-01   | 2.50E-01   | 2.74E-01   | 2.57E-01   | 3.29E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne)                         | 4.13E-03   | 4.75E-03   | 5.01E-03   | 5.17E-03   | 3.48E-03   | 3.65E-03   | 3.92E-03   | 4.30E-03   | 4.04E-03   | 5.17E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne)                         | 2.34E-03   | 2.69E-03   | 2.84E-03   | 2.93E-03   | 1.97E-03   | 2.07E-03   | 2.22E-03   | 2.44E-03   | 2.29E-03   | 2.93E-03 |
| Pentachlorobenzene                                             | 1.32E-02   | 1.52E-02   | 1.60E-02   | 1.65E-02   | 1.11E-02   | 1.17E-02   | 1.25E-02   | 1.38E-02   | 1.29E-02   | 1.65E-02 |
| Hexachlorobenzene (vapour)                                     | 2.49E-03   | 2.87E-03   | 3.03E-03   | 3.12E-03   | 2.11E-03   | 2.21E-03   | 2.37E-03   | 2.60E-03   | 2.44E-03   | 3.12E-03 |
| Hexachlorobenzene (dustborne)                                  | 1.09E-04   | 1.26E-04   | 1.33E-04   | 1.37E-04   | 9.24E-05   | 9.69E-05   | 1.04E-04   | 1.14E-04   | 1.07E-04   | 1.37E-04 |
| Ethylbenzene                                                   | 2.42E+00   | 2.65E+00   | 2.72E+00   | 2.73E+00   | 1.73E+00   | 1.78E+00   | 2.05E+00   | 2.16E+00   | 2.07E+00   | 2.73E+00 |
| Napthalene (vapour)                                            | 1.35E+01   | 1.38E+01   | 1.36E+01   | 1.31E+01   | 7.45E+00   | 7.40E+00   | 9.72E+00   | 9.59E+00   | 9.51E+00   | 1.38E+01 |
| Napthalene (dustborne)                                         | 8.70E-04   | 1.00E-03   | 1.06E-03   | 1.09E-03   | 7.34E-04   | 7.70E-04   | 8.26E-04   | 9.07E-04   | 8.50E-04   | 1.09E-03 |
| Xylenes                                                        | 4.44E-01   | 5.10E-01   | 5.38E-01   | 5.56E-01   | 3.75E-01   | 3.93E-01   | 4.22E-01   | 4.63E-01   | 4.34E-01   | 5.56E-01 |
| meta- & para- xylene                                           | 5.34E+00   | 5.46E+00   | 5.36E+00   | 5.14E+00   | 2.89E+00   | 2.86E+00   | 3.80E+00   | 3.73E+00   | 3.71E+00   | 5.46E+00 |
| ortho-xylene                                                   | 2.21E+00   | 2.26E+00   | 2.22E+00   | 2.13E+00   | 1.20E+00   | 1.18E+00   | 1.57E+00   | 1.54E+00   | 1.54E+00   | 2.26E+00 |
| Chloroform                                                     | 2.48E-01   | 2.53E-01   | 2.49E-01   | 2.38E-01   | 1.34E-01   | 1.33E-01   | 1.76E-01   | 1.73E-01   | 1.72E-01   | 2.53E-01 |
| 1,2-dichloroethane                                             | 2.36E+00   | 2.42E+00   | 2.37E+00   | 2.27E+00   | 1.28E+00   | 1.27E+00   | 1.68E+00   | 1.65E+00   | 1.64E+00   | 2.42E+00 |
| Toluene                                                        | 3.77E+01   | 3.86E+01   | 3.79E+01   | 3.63E+01   | 2.04E+01   | 2.02E+01   | 2.69E+01   | 2.64E+01   | 2.62E+01   | 3.86E+01 |
| Tetrachloroethane                                              | 6.48E-01   | 6.62E-01   | 6.51E-01   | 6.24E-01   | 3.50E-01   | 3.47E-01   | 4.61E-01   | 4.53E-01   | 4.50E-01   | 6.62E-01 |
| Isopropylbenzene                                               | 6.48E-01   | 6.62E-01   | 6.51E-01   | 6.24E-01   | 3.50E-01   | 3.47E-01   | 4.61E-01   | 4.53E-01   | 4.50E-01   | 6.62E-01 |
| 1,3,5-trimethylbenzene                                         | 2.59E+00   | 2.65E+00   | 2.60E+00   | 2.49E+00   | 1.40E+00   | 1.39E+00   | 1.84E+00   | 1.81E+00   | 1.80E+00   | 2.65E+00 |
| 1,2,4-trimethylbenzene                                         | 4.96E+00   | 5.07E+00   | 4.98E+00   | 4.77E+00   | 2.68E+00   | 2.65E+00   | 3.53E+00   | 3.46E+00   | 3.44E+00   | 5.07E+00 |
| sec-butylbenzene                                               | 2.21E-01   | 2.26E-01   | 2.22E-01   | 2.13E-01   | 1.20E-01   | 1.18E-01   | 1.57E-01   | 1.54E-01   | 1.54E-01   | 2.26E-01 |
| 1,2,4-trichlorobenzene                                         | 4.19E+02   | 4.29E+02   | 4.21E+02   | 4.04E+02   | 2.27E+02   | 2.24E+02   | 2.98E+02   | 2.93E+02   | 2.91E+02   | 4.29E+02 |
| 1,2,3-trichlorobenzene                                         | 1.94E+01   | 1.99E+01   | 1.95E+01   | 1.87E+01   | 1.05E+01   | 1.04E+01   | 1.38E+01   | 1.36E+01   | 1.35E+01   | 1.99E+01 |
| p-isopropyltoluene                                             | 3.66E-01   | 3.74E-01   | 3.67E-01   | 3.52E-01   | 1.98E-01   | 1.96E-01   | 2.60E-01   | 2.56E-01   | 2.54E-01   | 3.74E-01 |
| Hg                                                             | 3.74E-05   | 6.83E-06   | 9.45E-05   | 1.13E-04   | 7.53E-05   | 5.58E-05   | 8.52E-05   | 6.39E-05   | 5.73E-05   | 1.13E-04 |
| As                                                             | 1.74E-04   | 3.17E-05   | 4.39E-04   | 5.23E-04   | 3.50E-04   | 2.59E-04   | 3.96E-04   | 2.97E-04   | 2.66E-04   | 5.23E-04 |
| Pb                                                             | 5.50E-04   | 1.00E-04   | 1.39E-03   | 1.65E-03   | 1.11E-03   | 8.21E-04   | 1.25E-03   | 9.40E-04   | 8.42E-04   | 1.65E-03 |
| Tl                                                             | 1.61E-05   | 2.93E-06   | 4.06E-05   | 4.83E-05   | 3.23E-05   | 2.40E-05   | 3.66E-05   | 2.75E-05   | 2.46E-05   | 4.83E-05 |
| Ba                                                             | 1.30E-03   | 2.37E-04   | 3.28E-03   | 3.91E-03   | 2.61E-03   | 1.94E-03   | 2.96E-03   | 2.22E-03   | 1.99E-03   | 3.91E-03 |
| Cd                                                             | 6.96E-05   | 1.27E-05   | 1.76E-04   | 2.09E-04   | 1.40E-04   | 1.04E-04   | 1.58E-04   | 1.19E-04   | 1.07E-04   | 2.09E-04 |
| Total Cr                                                       | 1.80E-04   | 3.28E-05   | 4.54E-04   | 5.40E-04   | 3.61E-04   | 2.68E-04   | 4.09E-04   | 3.07E-04   | 2.75E-04   | 5.40E-04 |
| Cu                                                             | 1.19E-04   | 2.18E-05   | 3.01E-04   | 3.58E-04   | 2.40E-04   | 1.78E-04   | 2.71E-04   | 2.04E-04   | 1.83E-04   | 3.58E-04 |
| Ni                                                             | 5.72E-05   | 1.04E-05   | 1.44E-04   | 1.72E-04   | 1.15E-04   | 8.53E-05   | 1.30E-04   | 9.77E-05   | 8.75E-05   | 1.72E-04 |
| Sb                                                             | 4.46E-05   | 8.13E-06   | 1.13E-04   | 1.34E-04   | 8.96E-05   | 6.65E-05   | 1.01E-04   | 7.61E-05   | 6.82E-05   | 1.34E-04 |
| Va                                                             | 8.25E-05   | 1.51E-05   | 2.08E-04   | 2.48E-04   | 1.66E-04   | 1.23E-04   | 1.88E-04   | 1.41E-04   | 1.26E-04   | 2.48E-04 |
| Zn                                                             | 2.59E-03   | 4.73E-04   | 6.55E-03   | 7.80E-03   | 5.22E-03   | 3.87E-03   | 5.91E-03   | 4.43E-03   | 3.97E-03   | 7.80E-03 |

| Total Concentration: 0m Scenario 3 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |            |          |
|----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| Species                                                        | Receptor 1 | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                                            | 8.26E+00   | 1.91E+00   | 2.02E+01   | 2.39E+01   | 1.61E+01   | 1.21E+01   | 1.82E+01   | 1.38E+01   | 1.24E+01   | 2.39E+01 |
| CO                                                             | 6.41E-01   | 1.40E-01   | 1.58E+00   | 1.88E+00   | 1.26E+00   | 9.46E-01   | 1.43E+00   | 1.08E+00   | 9.70E-01   | 1.88E+00 |
| PM10                                                           | 3.22E+00   | 9.01E-01   | 7.60E+00   | 8.97E+00   | 6.10E+00   | 4.66E+00   | 6.87E+00   | 5.28E+00   | 4.77E+00   | 8.97E+00 |
| SO2                                                            | 2.83E-01   | 6.52E-02   | 6.91E-01   | 8.20E-01   | 5.53E-01   | 4.16E-01   | 6.24E-01   | 4.74E-01   | 4.26E-01   | 8.20E-01 |
| HCl                                                            | 9.13E-01   | 9.81E-01   | 9.57E-01   | 9.28E-01   | 8.82E-01   | 1.01E+00   | 9.14E-01   | 9.99E-01   | 9.87E-01   | 1.01E+00 |
| B(a)P (dustborne)                                              | 2.10E-05   | 2.42E-05   | 2.55E-05   | 2.63E-05   | 1.77E-05   | 1.86E-05   | 2.00E-05   | 2.19E-05   | 2.05E-05   | 2.63E-05 |
| DDD (dustborne)                                                | 6.49E-04   | 7.47E-04   | 7.87E-04   | 8.13E-04   | 5.48E-04   | 5.75E-04   | 6.17E-04   | 6.77E-04   | 6.34E-04   | 8.13E-04 |
| Dieldrin (dustborne)                                           | 9.62E-06   | 1.11E-05   | 1.17E-05   | 1.21E-05   | 8.12E-06   | 8.52E-06   | 9.14E-06   | 1.00E-05   | 9.41E-06   | 1.21E-05 |
| PAH's                                                          | 1.35E-06   | 1.09E-06   | 2.00E-06   | 2.17E-06   | 1.72E-06   | 1.65E-06   | 1.86E-06   | 1.72E-06   | 1.64E-06   | 2.17E-06 |
| PCB's (vapour)                                                 | 1.52E-04   | 2.78E-05   | 3.84E-04   | 4.57E-04   | 3.06E-04   | 2.27E-04   | 3.46E-04   | 2.60E-04   | 2.33E-04   | 4.57E-04 |
| PCB's (dustborne)                                              | 6.62E-04   | 7.62E-04   | 8.03E-04   | 8.29E-04   | 5.59E-04   | 5.86E-04   | 6.29E-04   | 6.90E-04   | 6.47E-04   | 8.29E-04 |
| Dioxins/Furans(TEQ vapour)                                     | 3.01E-08   | 3.46E-08   | 3.68E-08   | 3.80E-08   | 2.56E-08   | 2.68E-08   | 2.88E-08   | 3.15E-08   | 2.96E-08   | 3.80E-08 |
| Dioxins/Furans(TEQ Dustborne)                                  | 5.74E-08   | 6.60E-08   | 6.96E-08   | 7.19E-08   | 4.84E-08   | 5.08E-08   | 5.45E-08   | 5.98E-08   | 5.61E-08   | 7.19E-08 |
| Dichloromethane                                                | 3.40E-05   | 6.20E-06   | 8.58E-05   | 1.02E-04   | 6.84E-05   | 5.07E-05   | 7.74E-05   | 5.80E-05   | 5.20E-05   | 1.02E-04 |
| Dibromoethane                                                  | 1.17E-04   | 2.13E-05   | 2.94E-04   | 3.50E-04   | 2.34E-04   | 1.74E-04   | 2.65E-04   | 1.99E-04   | 1.78E-04   | 3.50E-04 |
| Phenol                                                         | 1.13E-06   | 1.21E-06   | 1.18E-06   | 1.09E-06   | 1.09E-06   | 1.25E-06   | 1.13E-06   | 1.24E-06   | 1.22E-06   | 1.25E-06 |
| 2-Chlorophenol                                                 | 5.27E-03   | 6.07E-03   | 6.40E-03   | 6.61E-03   | 4.45E-03   | 4.67E-03   | 5.01E-03   | 5.50E-03   | 5.16E-03   | 6.61E-03 |
| Benzene                                                        | 1.06E+02   | 1.42E+02   | 1.43E+02   | 1.43E+02   | 6.23E+01   | 6.80E+01   | 8.15E+01   | 9.30E+01   | 8.78E+01   | 1.43E+02 |
| Chlorobenzene                                                  | 2.78E+02   | 3.70E+02   | 3.74E+02   | 3.73E+02   | 1.66E+02   | 1.81E+02   | 2.15E+02   | 2.45E+02   | 2.32E+02   | 3.74E+02 |
| Dichlorobenzene                                                | 4.24E-05   | 4.56E-05   | 4.44E-05   | 4.31E-05   | 4.10E-05   | 4.70E-05   | 4.25E-05   | 4.64E-05   | 4.58E-05   | 4.70E-05 |
| 1,2-Dichlorobenzene                                            | 1.77E+02   | 2.36E+02   | 2.39E+02   | 2.38E+02   | 1.05E+02   | 1.14E+02   | 1.36E+02   | 1.56E+02   | 1.47E+02   | 2.39E+02 |
| 1,3-Dichlorobenzene                                            | 6.86E+00   | 9.16E+00   | 9.26E+00   | 9.22E+00   | 4.02E+00   | 4.39E+00   | 5.26E+00   | 6.01E+00   | 5.67E+00   | 9.26E+00 |
| 1,4-Dichlorobenzene                                            | 3.26E+02   | 4.34E+02   | 4.38E+02   | 4.37E+02   | 1.93E+02   | 2.10E+02   | 2.51E+02   | 2.87E+02   | 2.70E+02   | 4.38E+02 |
| Tetrachlorobenzene                                             | 2.63E-01   | 3.02E-01   | 3.19E-01   | 3.29E-01   | 2.22E-01   | 2.33E-01   | 2.50E-01   | 2.74E-01   | 2.57E-01   | 3.29E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne)                         | 4.13E-03   | 4.75E-03   | 5.01E-03   | 5.17E-03   | 3.48E-03   | 3.65E-03   | 3.92E-03   | 4.30E-03   | 4.04E-03   | 5.17E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne)                         | 2.34E-03   | 2.69E-03   | 2.84E-03   | 2.93E-03   | 1.97E-03   | 2.07E-03   | 2.22E-03   | 2.44E-03   | 2.29E-03   | 2.93E-03 |
| Pentachlorobenzene                                             | 1.32E-02   | 1.52E-02   | 1.60E-02   | 1.65E-02   | 1.11E-02   | 1.17E-02   | 1.25E-02   | 1.38E-02   | 1.29E-02   | 1.65E-02 |
| Hexachlorobenzene (vapour)                                     | 2.49E-03   | 2.87E-03   | 3.03E-03   | 3.12E-03   | 2.11E-03   | 2.21E-03   | 2.37E-03   | 2.60E-03   | 2.44E-03   | 3.12E-03 |
| Hexachlorobenzene (dustborne)                                  | 1.09E-04   | 1.26E-04   | 1.33E-04   | 1.37E-04   | 9.24E-05   | 9.69E-05   | 1.04E-04   | 1.14E-04   | 1.07E-04   | 1.37E-04 |
| Ethylbenzene                                                   | 3.04E+00   | 3.81E+00   | 3.91E+00   | 3.96E+00   | 2.13E+00   | 2.28E+00   | 2.58E+00   | 2.89E+00   | 2.72E+00   | 3.96E+00 |
| Napthalene (vapour)                                            | 2.13E+01   | 2.85E+01   | 2.88E+01   | 2.87E+01   | 1.25E+01   | 1.37E+01   | 1.64E+01   | 1.87E+01   | 1.76E+01   | 2.88E+01 |
| Napthalene (dustborne)                                         | 8.70E-04   | 1.00E-03   | 1.06E-03   | 1.09E-03   | 7.34E-04   | 7.70E-04   | 8.26E-04   | 9.07E-04   | 8.50E-04   | 1.09E-03 |
| Xylenes                                                        | 4.44E-01   | 5.10E-01   | 5.38E-01   | 5.56E-01   | 3.75E-01   | 3.93E-01   | 4.22E-01   | 4.63E-01   | 4.34E-01   | 5.56E-01 |
| meta- & para- xylene                                           | 8.57E+00   | 1.15E+01   | 1.16E+01   | 1.15E+01   | 4.98E+00   | 5.44E+00   | 6.54E+00   | 7.48E+00   | 7.06E+00   | 1.16E+01 |
| ortho-xylene                                                   | 3.55E+00   | 4.75E+00   | 4.80E+00   | 4.78E+00   | 2.06E+00   | 2.25E+00   | 2.71E+00   | 3.10E+00   | 2.92E+00   | 4.80E+00 |
| Chloroform                                                     | 3.98E-01   | 5.33E-01   | 5.38E-01   | 5.35E-01   | 2.31E-01   | 2.53E-01   | 3.04E-01   | 3.47E-01   | 3.28E-01   | 5.38E-01 |
| 1,2-dichloroethane                                             | 3.79E+00   | 5.08E+00   | 5.13E+00   | 5.11E+00   | 2.20E+00   | 2.41E+00   | 2.90E+00   | 3.31E+00   | 3.13E+00   | 5.13E+00 |
| Toluene                                                        | 6.06E+01   | 8.11E+01   | 8.19E+01   | 8.15E+01   | 3.52E+01   | 3.85E+01   | 4.63E+01   | 5.29E+01   | 4.99E+01   | 8.19E+01 |
| Tetrachloroethane                                              | 1.04E+00   | 1.39E+00   | 1.41E+00   | 1.40E+00   | 6.04E-01   | 6.60E-01   | 7.94E-01   | 9.08E-01   | 8.57E-01   | 1.41E+00 |
| Isopropylbenzene                                               | 1.04E+00   | 1.39E+00   | 1.41E+00   | 1.40E+00   | 6.04E-01   | 6.60E-01   | 7.94E-01   | 9.08E-01   | 8.57E-01   | 1.41E+00 |
| 1,3,5-trimethylbenzene                                         | 4.16E+00   | 5.57E+00   | 5.62E+00   | 5.60E+00   | 2.42E+00   | 2.64E+00   | 3.18E+00   | 3.63E+00   | 3.43E+00   | 5.62E+00 |
| 1,2,4-trimethylbenzene                                         | 7.96E+00   | 1.07E+01   | 1.08E+01   | 1.07E+01   | 4.62E+00   | 5.05E+00   | 6.07E+00   | 6.94E+00   | 6.55E+00   | 1.08E+01 |
| sec-butylbenzene                                               | 3.55E-01   | 4.75E-01   | 4.80E-01   | 4.78E-01   | 2.06E-01   | 2.25E-01   | 2.71E-01   | 3.10E-01   | 2.92E-01   | 4.80E-01 |
| 1,2,4-trichlorobenzene                                         | 6.73E+02   | 9.01E+02   | 9.10E+02   | 9.06E+02   | 3.91E+02   | 4.27E+02   | 5.14E+02   | 5.87E+02   | 5.55E+02   | 9.10E+02 |
| 1,2,3-trichlorobenzene                                         | 3.12E+01   | 4.18E+01   | 4.22E+01   | 4.20E+01   | 1.81E+01   | 1.98E+01   | 2.38E+01   | 2.72E+01   | 2.57E+01   | 4.22E+01 |
| p-isopropyltoluene                                             | 5.88E-01   | 7.86E-01   | 7.94E-01   | 7.91E-01   | 3.41E-01   | 3.73E-01   | 4.49E-01   | 5.13E-01   | 4.84E-01   | 7.94E-01 |
| Hg                                                             | 3.74E-05   | 6.83E-06   | 9.45E-05   | 1.13E-04   | 7.53E-05   | 5.58E-05   | 8.52E-05   | 6.39E-05   | 5.73E-05   | 1.13E-04 |
| As                                                             | 1.74E-04   | 3.17E-05   | 4.39E-04   | 5.23E-04   | 3.50E-04   | 2.59E-04   | 3.96E-04   | 2.97E-04   | 2.66E-04   | 5.23E-04 |
| Pb                                                             | 5.50E-04   | 1.00E-04   | 1.39E-03   | 1.65E-03   | 1.11E-03   | 8.21E-04   | 1.25E-03   | 9.40E-04   | 8.42E-04   | 1.65E-03 |
| Tl                                                             | 1.61E-05   | 2.93E-06   | 4.06E-05   | 4.83E-05   | 3.23E-05   | 2.40E-05   | 3.66E-05   | 2.75E-05   | 2.46E-05   | 4.83E-05 |
| Ba                                                             | 1.30E-03   | 2.37E-04   | 3.28E-03   | 3.91E-03   | 2.61E-03   | 1.94E-03   | 2.96E-03   | 2.22E-03   | 1.99E-03   | 3.91E-03 |
| Cd                                                             | 6.96E-05   | 1.27E-05   | 1.76E-04   | 2.09E-04   | 1.40E-04   | 1.04E-04   | 1.58E-04   | 1.19E-04   | 1.07E-04   | 2.09E-04 |
| Total Cr                                                       | 1.80E-04   | 3.28E-05   | 4.54E-04   | 5.40E-04   | 3.61E-04   | 2.68E-04   | 4.09E-04   | 3.07E-04   | 2.75E-04   | 5.40E-04 |
| Cu                                                             | 1.19E-04   | 2.18E-05   | 3.01E-04   | 3.58E-04   | 2.40E-04   | 1.78E-04   | 2.71E-04   | 2.04E-04   | 1.83E-04   | 3.58E-04 |
| Ni                                                             | 5.72E-05   | 1.04E-05   | 1.44E-04   | 1.72E-04   | 1.15E-04   | 8.53E-05   | 1.30E-04   | 9.77E-05   | 8.75E-05   | 1.72E-04 |
| Sb                                                             | 4.46E-05   | 8.13E-06   | 1.13E-04   | 1.34E-04   | 8.96E-05   | 6.65E-05   | 1.01E-04   | 7.61E-05   | 6.82E-05   | 1.34E-04 |
| Va                                                             | 8.25E-05   | 1.51E-05   | 2.08E-04   | 2.48E-04   | 1.66E-04   | 1.23E-04   | 1.88E-04   | 1.41E-04   | 1.26E-04   | 2.48E-04 |
| Zn                                                             | 2.59E-03   | 4.73E-04   | 6.55E-03   | 7.80E-03   | 5.22E-03   | 3.87E-03   | 5.91E-03   | 4.43E-03   | 3.97E-03   | 7.80E-03 |

| Total Concentration: 0m Scenario 4 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |            |          |
|----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| Species                                                        | Receptor 1 | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                                            | 8.26E+00   | 1.91E+00   | 2.02E+01   | 2.39E+01   | 1.61E+01   | 1.21E+01   | 1.82E+01   | 1.38E+01   | 1.24E+01   | 2.39E+01 |
| CO                                                             | 6.41E-01   | 1.40E-01   | 1.58E+00   | 1.88E+00   | 1.26E+00   | 9.46E-01   | 1.43E+00   | 1.08E+00   | 9.70E-01   | 1.88E+00 |
| PM10                                                           | 3.22E+00   | 9.01E-01   | 7.60E+00   | 8.97E+00   | 6.10E+00   | 4.66E+00   | 6.87E+00   | 5.28E+00   | 4.77E+00   | 8.97E+00 |
| SO2                                                            | 2.83E-01   | 6.52E-02   | 6.91E-01   | 8.20E-01   | 5.53E-01   | 4.16E-01   | 6.24E-01   | 4.74E-01   | 4.26E-01   | 8.20E-01 |
| HCl                                                            | 9.13E-01   | 9.81E-01   | 9.57E-01   | 9.28E-01   | 8.82E-01   | 1.01E+00   | 9.14E-01   | 9.99E-01   | 9.87E-01   | 1.01E+00 |
| B(a)P (dustborne)                                              | 2.10E-05   | 2.42E-05   | 2.55E-05   | 2.63E-05   | 1.77E-05   | 1.86E-05   | 2.00E-05   | 2.19E-05   | 2.05E-05   | 2.63E-05 |
| DDD (dustborne)                                                | 6.49E-04   | 7.47E-04   | 7.87E-04   | 8.13E-04   | 5.48E-04   | 5.75E-04   | 6.17E-04   | 6.77E-04   | 6.34E-04   | 8.13E-04 |
| Dieldrin (dustborne)                                           | 9.62E-06   | 1.11E-05   | 1.17E-05   | 1.21E-05   | 8.12E-06   | 8.52E-06   | 9.14E-06   | 1.00E-05   | 9.41E-06   | 1.21E-05 |
| PAH's                                                          | 1.35E-06   | 1.09E-06   | 2.00E-06   | 2.17E-06   | 1.72E-06   | 1.65E-06   | 1.86E-06   | 1.72E-06   | 1.64E-06   | 2.17E-06 |
| PCB's (vapour)                                                 | 1.52E-04   | 2.78E-05   | 3.84E-04   | 4.57E-04   | 3.06E-04   | 2.27E-04   | 3.46E-04   | 2.60E-04   | 2.33E-04   | 4.57E-04 |
| PCB's (dustborne)                                              | 6.62E-04   | 7.62E-04   | 8.03E-04   | 8.29E-04   | 5.59E-04   | 5.86E-04   | 6.29E-04   | 6.90E-04   | 6.47E-04   | 8.29E-04 |
| Dioxins/Furans(TEQ vapour)                                     | 3.01E-08   | 3.46E-08   | 3.68E-08   | 3.80E-08   | 2.56E-08   | 2.68E-08   | 2.88E-08   | 3.15E-08   | 2.96E-08   | 3.80E-08 |
| Dioxins/Furans(TEQ Dustborne)                                  | 5.74E-08   | 6.60E-08   | 6.96E-08   | 7.19E-08   | 4.84E-08   | 5.08E-08   | 5.45E-08   | 5.98E-08   | 5.61E-08   | 7.19E-08 |
| Dichloromethane                                                | 3.40E-05   | 6.20E-06   | 8.58E-05   | 1.02E-04   | 6.84E-05   | 5.07E-05   | 7.74E-05   | 5.80E-05   | 5.20E-05   | 1.02E-04 |
| Dibromoethane                                                  | 1.17E-04   | 2.13E-05   | 2.94E-04   | 3.50E-04   | 2.34E-04   | 1.74E-04   | 2.65E-04   | 1.99E-04   | 1.78E-04   | 3.50E-04 |
| Phenol                                                         | 1.13E-06   | 1.21E-06   | 1.18E-06   | 1.15E-06   | 1.09E-06   | 1.25E-06   | 1.13E-06   | 1.24E-06   | 1.22E-06   | 1.25E-06 |
| 2-Chlorophenol                                                 | 5.27E-03   | 6.07E-03   | 6.40E-03   | 6.61E-03   | 4.45E-03   | 4.67E-03   | 5.01E-03   | 5.50E-03   | 5.16E-03   | 6.61E-03 |
| Benzene                                                        | 6.70E+01   | 6.87E+01   | 6.76E+01   | 6.48E+01   | 3.68E+01   | 3.63E+01   | 4.82E+01   | 4.73E+01   | 4.70E+01   | 6.87E+01 |
| Chlorobenzene                                                  | 1.79E+02   | 1.85E+02   | 1.83E+02   | 1.76E+02   | 1.01E+02   | 1.01E+02   | 1.31E+02   | 1.30E+02   | 1.28E+02   | 1.85E+02 |
| Dichlorobenzene                                                | 4.24E-05   | 4.56E-05   | 4.44E-05   | 4.31E-05   | 4.10E-05   | 4.70E-05   | 4.25E-05   | 4.64E-05   | 4.58E-05   | 4.70E-05 |
| 1,2-Dichlorobenzene                                            | 1.13E+02   | 1.16E+02   | 1.14E+02   | 1.10E+02   | 6.26E+01   | 6.19E+01   | 8.15E+01   | 8.04E+01   | 7.97E+01   | 1.16E+02 |
| 1,3-Dichlorobenzene                                            | 4.32E+00   | 4.44E+00   | 4.36E+00   | 4.19E+00   | 2.37E+00   | 2.34E+00   | 3.11E+00   | 3.05E+00   | 3.03E+00   | 4.44E+00 |
| 1,4-Dichlorobenzene                                            | 2.08E+02   | 2.14E+02   | 2.12E+02   | 2.04E+02   | 1.16E+02   | 1.15E+02   | 1.51E+02   | 1.50E+02   | 1.48E+02   | 2.14E+02 |
| Tetrachlorobenzene                                             | 2.63E-01   | 3.02E-01   | 3.19E-01   | 3.29E-01   | 2.22E-01   | 2.33E-01   | 2.50E-01   | 2.74E-01   | 2.57E-01   | 3.29E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne)                         | 4.13E-03   | 4.75E-03   | 5.01E-03   | 5.17E-03   | 3.48E-03   | 3.65E-03   | 3.92E-03   | 4.30E-03   | 4.04E-03   | 5.17E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne)                         | 2.34E-03   | 2.69E-03   | 2.84E-03   | 2.93E-03   | 1.97E-03   | 2.07E-03   | 2.22E-03   | 2.44E-03   | 2.29E-03   | 2.93E-03 |
| Pentachlorobenzene                                             | 1.32E-02   | 1.52E-02   | 1.60E-02   | 1.65E-02   | 1.11E-02   | 1.17E-02   | 1.25E-02   | 1.38E-02   | 1.29E-02   | 1.65E-02 |
| Hexachlorobenzene (vapour)                                     | 2.49E-03   | 2.87E-03   | 3.03E-03   | 3.12E-03   | 2.11E-03   | 2.21E-03   | 2.37E-03   | 2.60E-03   | 2.44E-03   | 3.12E-03 |
| Hexachlorobenzene (dustborne)                                  | 1.09E-04   | 1.26E-04   | 1.33E-04   | 1.37E-04   | 9.24E-05   | 9.69E-05   | 1.04E-04   | 1.14E-04   | 1.07E-04   | 1.37E-04 |
| Ethylbenzene                                                   | 2.42E+00   | 2.65E+00   | 2.71E+00   | 2.72E+00   | 1.73E+00   | 1.77E+00   | 2.05E+00   | 2.16E+00   | 2.07E+00   | 2.72E+00 |
| Napthalene (vapour)                                            | 1.35E+01   | 1.38E+01   | 1.36E+01   | 1.31E+01   | 7.43E+00   | 7.35E+00   | 9.72E+00   | 9.56E+00   | 9.49E+00   | 1.38E+01 |
| Napthalene (dustborne)                                         | 8.70E-04   | 1.00E-03   | 1.06E-03   | 1.09E-03   | 7.34E-04   | 7.70E-04   | 8.26E-04   | 9.07E-04   | 8.50E-04   | 1.09E-03 |
| Xylenes                                                        | 4.44E-01   | 5.10E-01   | 5.38E-01   | 5.56E-01   | 3.75E-01   | 3.93E-01   | 4.22E-01   | 4.63E-01   | 4.34E-01   | 5.56E-01 |
| meta- & para- xylene                                           | 5.34E+00   | 5.46E+00   | 5.35E+00   | 5.12E+00   | 2.88E+00   | 2.84E+00   | 3.80E+00   | 3.71E+00   | 3.70E+00   | 5.46E+00 |
| ortho-xylene                                                   | 2.21E+00   | 2.26E+00   | 2.22E+00   | 2.12E+00   | 1.19E+00   | 1.17E+00   | 1.57E+00   | 1.54E+00   | 1.53E+00   | 2.26E+00 |
| Chloroform                                                     | 2.48E-01   | 2.53E-01   | 2.49E-01   | 2.38E-01   | 1.34E-01   | 1.32E-01   | 1.76E-01   | 1.72E-01   | 1.72E-01   | 2.53E-01 |
| 1,2-dichloroethane                                             | 2.36E+00   | 2.42E+00   | 2.37E+00   | 2.27E+00   | 1.28E+00   | 1.26E+00   | 1.68E+00   | 1.64E+00   | 1.64E+00   | 2.42E+00 |
| Toluene                                                        | 3.77E+01   | 3.86E+01   | 3.78E+01   | 3.62E+01   | 2.04E+01   | 2.01E+01   | 2.68E+01   | 2.63E+01   | 2.61E+01   | 3.86E+01 |
| Tetrachloroethane                                              | 6.48E-01   | 6.62E-01   | 6.50E-01   | 6.21E-01   | 3.50E-01   | 3.44E-01   | 4.61E-01   | 4.51E-01   | 4.49E-01   | 6.62E-01 |
| Isopropylbenzene                                               | 6.48E-01   | 6.62E-01   | 6.50E-01   | 6.21E-01   | 3.50E-01   | 3.44E-01   | 4.61E-01   | 4.51E-01   | 4.49E-01   | 6.62E-01 |
| 1,3,5-trimethylbenzene                                         | 2.59E+00   | 2.65E+00   | 2.60E+00   | 2.49E+00   | 1.40E+00   | 1.38E+00   | 1.84E+00   | 1.80E+00   | 1.80E+00   | 2.65E+00 |
| 1,2,4-trimethylbenzene                                         | 4.96E+00   | 5.07E+00   | 4.97E+00   | 4.75E+00   | 2.67E+00   | 2.63E+00   | 3.53E+00   | 3.45E+00   | 3.43E+00   | 5.07E+00 |
| sec-butylbenzene                                               | 2.21E-01   | 2.26E-01   | 2.22E-01   | 2.12E-01   | 1.19E-01   | 1.17E-01   | 1.57E-01   | 1.54E-01   | 1.53E-01   | 2.26E-01 |
| 1,2,4-trichlorobenzene                                         | 4.19E+02   | 4.29E+02   | 4.21E+02   | 4.02E+02   | 2.26E+02   | 2.23E+02   | 2.98E+02   | 2.92E+02   | 2.91E+02   | 4.29E+02 |
| 1,2,3-trichlorobenzene                                         | 1.94E+01   | 1.99E+01   | 1.95E+01   | 1.86E+01   | 1.05E+01   | 1.03E+01   | 1.38E+01   | 1.35E+01   | 1.35E+01   | 1.99E+01 |
| p-isopropyltoluene                                             | 3.66E-01   | 3.74E-01   | 3.67E-01   | 3.51E-01   | 1.97E-01   | 1.94E-01   | 2.60E-01   | 2.55E-01   | 2.54E-01   | 3.74E-01 |
| Hg                                                             | 3.74E-05   | 6.83E-06   | 9.45E-05   | 1.13E-04   | 7.53E-05   | 5.58E-05   | 8.52E-05   | 6.39E-05   | 5.73E-05   | 1.13E-04 |
| As                                                             | 1.74E-04   | 3.17E-05   | 4.39E-04   | 5.23E-04   | 3.50E-04   | 2.59E-04   | 3.96E-04   | 2.97E-04   | 2.66E-04   | 5.23E-04 |
| Pb                                                             | 5.50E-04   | 1.00E-04   | 1.39E-03   | 1.65E-03   | 1.11E-03   | 8.21E-04   | 1.25E-03   | 9.40E-04   | 8.42E-04   | 1.65E-03 |
| Tl                                                             | 1.61E-05   | 2.93E-06   | 4.06E-05   | 4.83E-05   | 3.23E-05   | 2.40E-05   | 3.66E-05   | 2.75E-05   | 2.46E-05   | 4.83E-05 |
| Ba                                                             | 1.30E-03   | 2.37E-04   | 3.28E-03   | 3.91E-03   | 2.61E-03   | 1.94E-03   | 2.96E-03   | 2.22E-03   | 1.99E-03   | 3.91E-03 |
| Cd                                                             | 6.96E-05   | 1.27E-05   | 1.76E-04   | 2.09E-04   | 1.40E-04   | 1.04E-04   | 1.58E-04   | 1.19E-04   | 1.07E-04   | 2.09E-04 |
| Total Cr                                                       | 1.80E-04   | 3.28E-05   | 4.54E-04   | 5.40E-04   | 3.61E-04   | 2.68E-04   | 4.09E-04   | 3.07E-04   | 2.75E-04   | 5.40E-04 |
| Cu                                                             | 1.19E-04   | 2.18E-05   | 3.01E-04   | 3.58E-04   | 2.40E-04   | 1.78E-04   | 2.71E-04   | 2.04E-04   | 1.83E-04   | 3.58E-04 |
| Ni                                                             | 5.72E-05   | 1.04E-05   | 1.44E-04   | 1.72E-04   | 1.15E-04   | 8.53E-05   | 1.30E-04   | 9.77E-05   | 8.75E-05   | 1.72E-04 |
| Sb                                                             | 4.46E-05   | 8.13E-06   | 1.13E-04   | 1.34E-04   | 8.96E-05   | 6.65E-05   | 1.01E-04   | 7.61E-05   | 6.82E-05   | 1.34E-04 |
| Va                                                             | 8.25E-05   | 1.51E-05   | 2.08E-04   | 2.48E-04   | 1.66E-04   | 1.23E-04   | 1.88E-04   | 1.41E-04   | 1.26E-04   | 2.48E-04 |
| Zn                                                             | 2.59E-03   | 4.73E-04   | 6.55E-03   | 7.80E-03   | 5.22E-03   | 3.87E-03   | 5.91E-03   | 4.43E-03   | 3.97E-03   | 7.80E-03 |

| Total Concentration: 0m Scenario 5 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |            |          |
|----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| Species                                                        | Receptor 1 | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                                            | 8.26E+00   | 1.91E+00   | 2.02E+01   | 2.39E+01   | 1.61E+01   | 1.21E+01   | 1.82E+01   | 1.38E+01   | 1.24E+01   | 2.39E+01 |
| CO                                                             | 6.41E-01   | 1.40E-01   | 1.58E+00   | 1.88E+00   | 1.26E+00   | 9.46E-01   | 1.43E+00   | 1.08E+00   | 9.70E-01   | 1.88E+00 |
| PM10                                                           | 3.22E+00   | 9.01E-01   | 7.60E+00   | 8.97E+00   | 6.10E+00   | 4.66E+00   | 6.87E+00   | 5.28E+00   | 4.77E+00   | 8.97E+00 |
| SO2                                                            | 2.83E-01   | 6.52E-02   | 6.91E-01   | 8.20E-01   | 5.53E-01   | 4.16E-01   | 6.24E-01   | 4.74E-01   | 4.26E-01   | 8.20E-01 |
| HCl                                                            | 9.13E-01   | 9.81E-01   | 9.57E-01   | 9.28E-01   | 8.82E-01   | 1.01E+00   | 9.14E-01   | 9.99E-01   | 9.87E-01   | 1.01E+00 |
| B(a)P (dustborne)                                              | 2.10E-05   | 2.42E-05   | 2.55E-05   | 2.63E-05   | 1.77E-05   | 1.86E-05   | 2.00E-05   | 2.19E-05   | 2.05E-05   | 2.63E-05 |
| DDD (dustborne)                                                | 6.49E-04   | 7.47E-04   | 7.87E-04   | 8.13E-04   | 5.48E-04   | 5.75E-04   | 6.17E-04   | 6.77E-04   | 6.34E-04   | 8.13E-04 |
| Dieldrin (dustborne)                                           | 9.62E-06   | 1.11E-05   | 1.17E-05   | 1.21E-05   | 8.12E-06   | 8.52E-06   | 9.14E-06   | 1.00E-05   | 9.41E-06   | 1.21E-05 |
| PAH's                                                          | 1.35E-06   | 1.09E-06   | 2.00E-06   | 2.17E-06   | 1.72E-06   | 1.65E-06   | 1.86E-06   | 1.72E-06   | 1.64E-06   | 2.17E-06 |
| PCB's (vapour)                                                 | 1.52E-04   | 2.78E-05   | 3.84E-04   | 4.57E-04   | 3.06E-04   | 2.27E-04   | 3.46E-04   | 2.60E-04   | 2.33E-04   | 4.57E-04 |
| PCB's (dustborne)                                              | 6.62E-04   | 7.62E-04   | 8.03E-04   | 8.29E-04   | 5.59E-04   | 5.86E-04   | 6.29E-04   | 6.90E-04   | 6.47E-04   | 8.29E-04 |
| Dioxins/Furans(TEQ vapour)                                     | 3.01E-08   | 3.46E-08   | 3.68E-08   | 3.80E-08   | 2.56E-08   | 2.68E-08   | 2.88E-08   | 3.15E-08   | 2.96E-08   | 3.80E-08 |
| Dioxins/Furans(TEQ Dustborne)                                  | 5.74E-08   | 6.60E-08   | 6.96E-08   | 7.19E-08   | 4.84E-08   | 5.08E-08   | 5.45E-08   | 5.98E-08   | 5.61E-08   | 7.19E-08 |
| Dichloromethane                                                | 3.40E-05   | 6.20E-06   | 8.58E-05   | 1.02E-04   | 6.84E-05   | 5.07E-05   | 7.74E-05   | 5.80E-05   | 5.20E-05   | 1.02E-04 |
| Dibromoethane                                                  | 1.17E-04   | 2.13E-05   | 2.94E-04   | 3.50E-04   | 2.34E-04   | 1.74E-04   | 2.65E-04   | 1.99E-04   | 1.78E-04   | 3.50E-04 |
| Phenol                                                         | 1.13E-06   | 1.21E-06   | 1.18E-06   | 1.15E-06   | 1.09E-06   | 1.25E-06   | 1.13E-06   | 1.24E-06   | 1.22E-06   | 1.25E-06 |
| 2-Chlorophenol                                                 | 5.27E-03   | 6.07E-03   | 6.40E-03   | 6.61E-03   | 4.45E-03   | 4.67E-03   | 5.01E-03   | 5.50E-03   | 5.16E-03   | 6.61E-03 |
| Benzene                                                        | 5.77E+01   | 5.74E+01   | 6.24E+01   | 6.40E+01   | 2.92E+01   | 2.93E+01   | 3.75E+01   | 3.82E+01   | 3.61E+01   | 6.40E+01 |
| Chlorobenzene                                                  | 1.56E+02   | 1.56E+02   | 1.70E+02   | 1.74E+02   | 8.21E+01   | 8.28E+01   | 1.04E+02   | 1.07E+02   | 1.01E+02   | 1.74E+02 |
| Dichlorobenzene                                                | 4.24E-05   | 4.56E-05   | 4.44E-05   | 4.31E-05   | 4.10E-05   | 4.70E-05   | 4.25E-05   | 4.64E-05   | 4.58E-05   | 4.70E-05 |
| 1,2-Dichlorobenzene                                            | 9.74E+01   | 9.73E+01   | 1.06E+02   | 1.08E+02   | 5.01E+01   | 5.04E+01   | 6.40E+01   | 6.54E+01   | 6.18E+01   | 1.08E+02 |
| 1,3-Dichlorobenzene                                            | 3.73E+00   | 3.71E+00   | 4.03E+00   | 4.13E+00   | 1.88E+00   | 1.89E+00   | 2.42E+00   | 2.46E+00   | 2.33E+00   | 4.13E+00 |
| 1,4-Dichlorobenzene                                            | 1.80E+02   | 1.81E+02   | 1.96E+02   | 2.01E+02   | 9.37E+01   | 9.43E+01   | 1.19E+02   | 1.22E+02   | 1.15E+02   | 2.01E+02 |
| Tetrachlorobenzene                                             | 2.63E-01   | 3.02E-01   | 3.19E-01   | 3.29E-01   | 2.22E-01   | 2.33E-01   | 2.50E-01   | 2.74E-01   | 2.57E-01   | 3.29E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne)                         | 4.13E-03   | 4.75E-03   | 5.01E-03   | 5.17E-03   | 3.48E-03   | 3.65E-03   | 3.92E-03   | 4.30E-03   | 4.04E-03   | 5.17E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne)                         | 2.34E-03   | 2.69E-03   | 2.84E-03   | 2.93E-03   | 1.97E-03   | 2.07E-03   | 2.22E-03   | 2.44E-03   | 2.29E-03   | 2.93E-03 |
| Pentachlorobenzene                                             | 1.32E-02   | 1.52E-02   | 1.60E-02   | 1.65E-02   | 1.11E-02   | 1.17E-02   | 1.25E-02   | 1.38E-02   | 1.29E-02   | 1.65E-02 |
| Hexachlorobenzene (vapour)                                     | 2.49E-03   | 2.87E-03   | 3.03E-03   | 3.12E-03   | 2.11E-03   | 2.21E-03   | 2.37E-03   | 2.60E-03   | 2.44E-03   | 3.12E-03 |
| Hexachlorobenzene (dustborne)                                  | 1.09E-04   | 1.26E-04   | 1.33E-04   | 1.37E-04   | 9.24E-05   | 9.69E-05   | 1.04E-04   | 1.14E-04   | 1.07E-04   | 1.37E-04 |
| Ethylbenzene                                                   | 2.27E+00   | 2.47E+00   | 2.63E+00   | 2.71E+00   | 1.60E+00   | 1.66E+00   | 1.88E+00   | 2.02E+00   | 1.90E+00   | 2.71E+00 |
| Napthalene (vapour)                                            | 1.16E+01   | 1.16E+01   | 1.26E+01   | 1.29E+01   | 5.92E+00   | 5.94E+00   | 7.59E+00   | 7.74E+00   | 7.32E+00   | 1.29E+01 |
| Napthalene (dustborne)                                         | 8.70E-04   | 1.00E-03   | 1.06E-03   | 1.09E-03   | 7.34E-04   | 7.70E-04   | 8.26E-04   | 9.07E-04   | 8.50E-04   | 1.09E-03 |
| Xylenes                                                        | 4.44E-01   | 5.10E-01   | 5.38E-01   | 5.56E-01   | 3.75E-01   | 3.93E-01   | 4.22E-01   | 4.63E-01   | 4.34E-01   | 5.56E-01 |
| meta- & para- xylene                                           | 4.58E+00   | 4.52E+00   | 4.93E+00   | 5.05E+00   | 2.26E+00   | 2.26E+00   | 2.92E+00   | 2.96E+00   | 2.80E+00   | 5.05E+00 |
| ortho-xylene                                                   | 1.90E+00   | 1.87E+00   | 2.04E+00   | 2.09E+00   | 9.35E-01   | 9.35E-01   | 1.21E+00   | 1.23E+00   | 1.16E+00   | 2.09E+00 |
| Chloroform                                                     | 2.12E-01   | 2.10E-01   | 2.29E-01   | 2.34E-01   | 1.05E-01   | 1.05E-01   | 1.36E-01   | 1.38E-01   | 1.30E-01   | 2.34E-01 |
| 1,2-dichloroethane                                             | 2.03E+00   | 2.00E+00   | 2.18E+00   | 2.24E+00   | 9.99E-01   | 1.00E+00   | 1.29E+00   | 1.31E+00   | 1.24E+00   | 2.24E+00 |
| Toluene                                                        | 3.24E+01   | 3.20E+01   | 3.48E+01   | 3.57E+01   | 1.60E+01   | 1.60E+01   | 2.07E+01   | 2.09E+01   | 1.98E+01   | 3.57E+01 |
| Tetrachloroethane                                              | 5.56E-01   | 5.49E-01   | 5.98E-01   | 6.13E-01   | 2.74E-01   | 2.74E-01   | 3.55E-01   | 3.60E-01   | 3.40E-01   | 6.13E-01 |
| Isopropylbenzene                                               | 5.56E-01   | 5.49E-01   | 5.98E-01   | 6.13E-01   | 2.74E-01   | 2.74E-01   | 3.55E-01   | 3.60E-01   | 3.40E-01   | 6.13E-01 |
| 1,3,5-trimethylbenzene                                         | 2.22E+00   | 2.20E+00   | 2.39E+00   | 2.45E+00   | 1.10E+00   | 1.10E+00   | 1.42E+00   | 1.44E+00   | 1.36E+00   | 2.45E+00 |
| 1,2,4-trimethylbenzene                                         | 4.25E+00   | 4.20E+00   | 4.57E+00   | 4.69E+00   | 2.09E+00   | 2.10E+00   | 2.71E+00   | 2.75E+00   | 2.60E+00   | 4.69E+00 |
| sec-butylbenzene                                               | 1.90E-01   | 1.87E-01   | 2.04E-01   | 2.09E-01   | 9.35E-02   | 9.35E-02   | 1.21E-01   | 1.23E-01   | 1.16E-01   | 2.09E-01 |
| 1,2,4-trichlorobenzene                                         | 3.60E+02   | 3.55E+02   | 3.87E+02   | 3.97E+02   | 1.77E+02   | 1.77E+02   | 2.29E+02   | 2.33E+02   | 2.20E+02   | 3.97E+02 |
| 1,2,3-trichlorobenzene                                         | 1.67E+01   | 1.65E+01   | 1.79E+01   | 1.84E+01   | 8.22E+00   | 8.22E+00   | 1.06E+01   | 1.08E+01   | 1.02E+01   | 1.84E+01 |
| p-isopropyltoluene                                             | 3.14E-01   | 3.10E-01   | 3.38E-01   | 3.46E-01   | 1.55E-01   | 1.55E-01   | 2.00E-01   | 2.03E-01   | 1.92E-01   | 3.46E-01 |
| Hg                                                             | 3.74E-05   | 6.83E-06   | 9.45E-05   | 1.13E-04   | 7.53E-05   | 5.58E-05   | 8.52E-05   | 6.39E-05   | 5.73E-05   | 1.13E-04 |
| As                                                             | 1.74E-04   | 3.17E-05   | 4.39E-04   | 5.23E-04   | 3.50E-04   | 2.59E-04   | 3.96E-04   | 2.97E-04   | 2.66E-04   | 5.23E-04 |
| Pb                                                             | 5.50E-04   | 1.00E-04   | 1.39E-03   | 1.65E-03   | 1.11E-03   | 8.21E-04   | 1.25E-03   | 9.40E-04   | 8.42E-04   | 1.65E-03 |
| Tl                                                             | 1.61E-05   | 2.93E-06   | 4.06E-05   | 4.83E-05   | 3.23E-05   | 2.40E-05   | 3.66E-05   | 2.75E-05   | 2.46E-05   | 4.83E-05 |
| Ba                                                             | 1.30E-03   | 2.37E-04   | 3.28E-03   | 3.91E-03   | 2.61E-03   | 1.94E-03   | 2.96E-03   | 2.22E-03   | 1.99E-03   | 3.91E-03 |
| Cd                                                             | 6.96E-05   | 1.27E-05   | 1.76E-04   | 2.09E-04   | 1.40E-04   | 1.04E-04   | 1.58E-04   | 1.19E-04   | 1.07E-04   | 2.09E-04 |
| Total Cr                                                       | 1.80E-04   | 3.28E-05   | 4.54E-04   | 5.40E-04   | 3.61E-04   | 2.68E-04   | 4.09E-04   | 3.07E-04   | 2.75E-04   | 5.40E-04 |
| Cu                                                             | 1.19E-04   | 2.18E-05   | 3.01E-04   | 3.58E-04   | 2.40E-04   | 1.78E-04   | 2.71E-04   | 2.04E-04   | 1.83E-04   | 3.58E-04 |
| Ni                                                             | 5.72E-05   | 1.04E-05   | 1.44E-04   | 1.72E-04   | 1.15E-04   | 8.53E-05   | 1.30E-04   | 9.77E-05   | 8.75E-05   | 1.72E-04 |
| Sb                                                             | 4.46E-05   | 8.13E-06   | 1.13E-04   | 1.34E-04   | 8.96E-05   | 6.65E-05   | 1.01E-04   | 7.61E-05   | 6.82E-05   | 1.34E-04 |
| Va                                                             | 8.25E-05   | 1.51E-05   | 2.08E-04   | 2.48E-04   | 1.66E-04   | 1.23E-04   | 1.88E-04   | 1.41E-04   | 1.26E-04   | 2.48E-04 |
| Zn                                                             | 2.59E-03   | 4.73E-04   | 6.55E-03   | 7.80E-03   | 5.22E-03   | 3.87E-03   | 5.91E-03   | 4.43E-03   | 3.97E-03   | 7.80E-03 |

| Species                                | Total Concentration: 10m Scenario 1 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|-----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                      | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 1.49E+01                                                        | 3.54E+00   | 4.76E+01   | 4.45E+01   | 1.98E+01   | 1.33E+01   | 2.42E+01   | 1.80E+01   | 1.51E+01   | 4.76E+01 |
| CO                                     | 1.16E+00                                                        | 2.64E-01   | 3.73E+00   | 3.49E+00   | 1.54E+00   | 1.04E+00   | 1.89E+00   | 1.41E+00   | 1.17E+00   | 3.73E+00 |
| PM10                                   | 5.70E+00                                                        | 1.57E+00   | 1.77E+01   | 1.66E+01   | 7.49E+00   | 5.16E+00   | 9.12E+00   | 6.89E+00   | 5.79E+00   | 1.77E+01 |
| SO2                                    | 5.09E-01                                                        | 1.21E-01   | 1.63E+00   | 1.53E+00   | 6.77E-01   | 4.56E-01   | 8.28E-01   | 6.18E-01   | 5.16E-01   | 1.63E+00 |
| HCl                                    | 1.25E+00                                                        | 1.33E+00   | 1.28E+00   | 1.23E+00   | 1.16E+00   | 1.32E+00   | 1.22E+00   | 1.32E+00   | 1.31E+00   | 1.33E+00 |
| B(a)P (dustborne)                      | 2.76E-05                                                        | 2.78E-05   | 2.89E-05   | 2.91E-05   | 2.49E-05   | 2.26E-05   | 2.54E-05   | 2.41E-05   | 2.35E-05   | 2.91E-05 |
| DDD (dustborne)                        | 8.53E-04                                                        | 8.58E-04   | 8.93E-04   | 9.00E-04   | 7.68E-04   | 6.98E-04   | 7.84E-04   | 7.45E-04   | 7.24E-04   | 9.00E-04 |
| Dieldrin (dustborne)                   | 1.26E-05                                                        | 1.27E-05   | 1.32E-05   | 1.33E-05   | 1.14E-05   | 1.04E-05   | 1.16E-05   | 1.11E-05   | 1.07E-05   | 1.33E-05 |
| PAH's                                  | 2.02E-06                                                        | 1.53E-06   | 3.73E-06   | 3.53E-06   | 2.19E-06   | 2.02E-06   | 2.48E-06   | 2.26E-06   | 2.10E-06   | 3.73E-06 |
| PCB's (vapour)                         | 2.77E-04                                                        | 5.59E-05   | 9.15E-04   | 8.56E-04   | 3.74E-04   | 2.47E-04   | 4.59E-04   | 3.39E-04   | 2.81E-04   | 9.15E-04 |
| PCB's (dustborne)                      | 8.70E-04                                                        | 8.76E-04   | 9.11E-04   | 9.18E-04   | 7.84E-04   | 7.12E-04   | 8.00E-04   | 7.61E-04   | 7.39E-04   | 9.18E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.97E-08                                                        | 3.98E-08   | 4.21E-08   | 4.24E-08   | 3.59E-08   | 3.25E-08   | 3.67E-08   | 3.48E-08   | 3.38E-08   | 4.24E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 7.54E-08                                                        | 7.59E-08   | 7.89E-08   | 7.96E-08   | 6.80E-08   | 6.17E-08   | 6.93E-08   | 6.59E-08   | 6.41E-08   | 7.96E-08 |
| Dichloromethane                        | 6.20E-05                                                        | 1.25E-05   | 2.04E-04   | 1.91E-04   | 8.35E-05   | 5.52E-05   | 1.03E-04   | 7.57E-05   | 6.27E-05   | 2.04E-04 |
| Dibromoethane                          | 2.12E-04                                                        | 4.29E-05   | 7.00E-04   | 6.55E-04   | 2.86E-04   | 1.89E-04   | 3.52E-04   | 2.59E-04   | 2.15E-04   | 7.00E-04 |
| Phenol                                 | 1.54E-06                                                        | 1.65E-06   | 1.59E-06   | 1.53E-06   | 1.43E-06   | 1.64E-06   | 1.51E-06   | 1.63E-06   | 1.63E-06   | 1.65E-06 |
| 2-Chlorophenol                         | 6.93E-03                                                        | 6.98E-03   | 7.26E-03   | 7.31E-03   | 6.25E-03   | 5.67E-03   | 6.37E-03   | 6.06E-03   | 5.89E-03   | 7.31E-03 |
| Benzene                                | 1.19E+02                                                        | 1.43E+02   | 1.65E+02   | 1.72E+02   | 6.95E+01   | 7.90E+01   | 8.51E+01   | 1.05E+02   | 9.18E+01   | 1.72E+02 |
| Chlorobenzene                          | 3.15E+02                                                        | 3.74E+02   | 4.30E+02   | 4.48E+02   | 1.87E+02   | 2.10E+02   | 2.27E+02   | 2.76E+02   | 2.43E+02   | 4.48E+02 |
| Dichlorobenzene                        | 5.79E-05                                                        | 6.17E-05   | 5.95E-05   | 5.73E-05   | 5.38E-05   | 6.14E-05   | 5.67E-05   | 6.13E-05   | 6.10E-05   | 6.17E-05 |
| 1,2-Dichlorobenzene                    | 2.00E+02                                                        | 2.38E+02   | 2.75E+02   | 2.86E+02   | 1.17E+02   | 1.33E+02   | 1.43E+02   | 1.75E+02   | 1.54E+02   | 2.86E+02 |
| 1,3-Dichlorobenzene                    | 7.72E+00                                                        | 9.22E+00   | 1.07E+01   | 1.11E+01   | 4.48E+00   | 5.10E+00   | 5.49E+00   | 6.75E+00   | 5.93E+00   | 1.11E+01 |
| 1,4-Dichlorobenzene                    | 3.68E+02                                                        | 4.37E+02   | 5.05E+02   | 5.26E+02   | 2.17E+02   | 2.45E+02   | 2.64E+02   | 3.22E+02   | 2.83E+02   | 5.26E+02 |
| Tetrachlorobenzene                     | 3.45E-01                                                        | 3.47E-01   | 3.61E-01   | 3.64E-01   | 3.11E-01   | 2.82E-01   | 3.17E-01   | 3.02E-01   | 2.93E-01   | 3.64E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.42E-03                                                        | 5.46E-03   | 5.68E-03   | 5.72E-03   | 4.89E-03   | 4.44E-03   | 4.99E-03   | 4.74E-03   | 4.61E-03   | 5.72E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 3.07E-03                                                        | 3.10E-03   | 3.22E-03   | 3.24E-03   | 2.77E-03   | 2.52E-03   | 2.83E-03   | 2.69E-03   | 2.61E-03   | 3.24E-03 |
| Pentachlorobenzene                     | 1.73E-02                                                        | 1.75E-02   | 1.82E-02   | 1.83E-02   | 1.56E-02   | 1.42E-02   | 1.59E-02   | 1.52E-02   | 1.47E-02   | 1.83E-02 |
| Hexachlorobenzene (vapour)             | 3.28E-03                                                        | 3.30E-03   | 3.43E-03   | 3.46E-03   | 2.95E-03   | 2.68E-03   | 3.01E-03   | 2.86E-03   | 2.78E-03   | 3.46E-03 |
| Hexachlorobenzene (dustborne)          | 1.44E-04                                                        | 1.45E-04   | 1.51E-04   | 1.52E-04   | 1.30E-04   | 1.18E-04   | 1.32E-04   | 1.26E-04   | 1.22E-04   | 1.52E-04 |
| Ethylbenzene                           | 3.67E+00                                                        | 4.05E+00   | 4.48E+00   | 4.61E+00   | 2.70E+00   | 2.71E+00   | 2.98E+00   | 3.21E+00   | 2.97E+00   | 4.61E+00 |
| Napthalene (vapour)                    | 2.40E+01                                                        | 2.86E+01   | 3.31E+01   | 3.45E+01   | 1.40E+01   | 1.59E+01   | 1.71E+01   | 2.10E+01   | 1.85E+01   | 3.45E+01 |
| Napthalene (dustborne)                 | 1.14E-03                                                        | 1.15E-03   | 1.20E-03   | 1.21E-03   | 1.03E-03   | 9.35E-04   | 1.05E-03   | 9.99E-04   | 9.71E-04   | 1.21E-03 |
| Xylenes                                | 5.83E-01                                                        | 5.87E-01   | 6.11E-01   | 6.15E-01   | 5.26E-01   | 4.77E-01   | 5.36E-01   | 5.10E-01   | 4.95E-01   | 6.15E-01 |
| meta- & para- xylene                   | 9.60E+00                                                        | 1.15E+01   | 1.33E+01   | 1.39E+01   | 5.51E+00   | 6.31E+00   | 6.79E+00   | 8.41E+00   | 7.36E+00   | 1.39E+01 |
| ortho-xylene                           | 3.98E+00                                                        | 4.77E+00   | 5.52E+00   | 5.76E+00   | 2.28E+00   | 2.62E+00   | 2.81E+00   | 3.48E+00   | 3.05E+00   | 5.76E+00 |
| Chloroform                             | 4.46E-01                                                        | 5.34E-01   | 6.19E-01   | 6.46E-01   | 2.56E-01   | 2.93E-01   | 3.15E-01   | 3.90E-01   | 3.42E-01   | 6.46E-01 |
| 1,2-dichloroethane                     | 4.25E+00                                                        | 5.10E+00   | 5.90E+00   | 6.16E+00   | 2.44E+00   | 2.80E+00   | 3.01E+00   | 3.72E+00   | 3.26E+00   | 6.16E+00 |
| Toluene                                | 6.79E+01                                                        | 8.14E+01   | 9.43E+01   | 9.84E+01   | 3.90E+01   | 4.46E+01   | 4.80E+01   | 5.94E+01   | 5.21E+01   | 9.84E+01 |
| Tetrachloroethane                      | 1.17E+00                                                        | 1.40E+00   | 1.62E+00   | 1.69E+00   | 6.69E-01   | 7.67E-01   | 8.25E-01   | 1.02E+00   | 8.94E-01   | 1.69E+00 |
| Isopropylbenzene                       | 1.17E+00                                                        | 1.40E+00   | 1.62E+00   | 1.69E+00   | 6.69E-01   | 7.67E-01   | 8.25E-01   | 1.02E+00   | 8.94E-01   | 1.69E+00 |
| 1,3,5-trimethylbenzene                 | 4.66E+00                                                        | 5.59E+00   | 6.48E+00   | 6.76E+00   | 2.68E+00   | 3.07E+00   | 3.30E+00   | 4.08E+00   | 3.58E+00   | 6.76E+00 |
| 1,2,4-trimethylbenzene                 | 8.91E+00                                                        | 1.07E+01   | 1.24E+01   | 1.29E+01   | 5.12E+00   | 5.86E+00   | 6.31E+00   | 7.80E+00   | 6.84E+00   | 1.29E+01 |
| sec-butylbenzene                       | 3.98E-01                                                        | 4.77E-01   | 5.52E-01   | 5.76E-01   | 2.28E-01   | 2.62E-01   | 2.81E-01   | 3.48E-01   | 3.05E-01   | 5.76E-01 |
| 1,2,4-trichlorobenzene                 | 7.54E+02                                                        | 9.04E+02   | 1.05E+03   | 1.09E+03   | 4.33E+02   | 4.96E+02   | 5.34E+02   | 6.60E+02   | 5.78E+02   | 1.09E+03 |
| 1,2,3-trichlorobenzene                 | 3.50E+01                                                        | 4.19E+01   | 4.86E+01   | 5.07E+01   | 2.01E+01   | 2.30E+01   | 2.47E+01   | 3.06E+01   | 2.68E+01   | 5.07E+01 |
| p-isopropyltoluene                     | 6.58E-01                                                        | 7.89E-01   | 9.14E-01   | 9.54E-01   | 3.78E-01   | 4.33E-01   | 4.66E-01   | 5.76E-01   | 5.05E-01   | 9.54E-01 |
| Hg                                     | 6.82E-05                                                        | 1.38E-05   | 2.25E-04   | 2.11E-04   | 9.20E-05   | 6.08E-05   | 1.13E-04   | 8.33E-05   | 6.91E-05   | 2.25E-04 |
| As                                     | 3.17E-04                                                        | 6.39E-05   | 1.04E-03   | 9.78E-04   | 4.27E-04   | 2.82E-04   | 5.25E-04   | 3.87E-04   | 3.21E-04   | 1.04E-03 |
| Pb                                     | 1.00E-03                                                        | 2.02E-04   | 3.31E-03   | 3.09E-03   | 1.35E-03   | 8.93E-04   | 1.66E-03   | 1.23E-03   | 1.02E-03   | 3.31E-03 |
| Tl                                     | 2.93E-05                                                        | 5.91E-06   | 9.66E-05   | 9.04E-05   | 3.95E-05   | 2.61E-05   | 4.85E-05   | 3.58E-05   | 2.97E-05   | 9.66E-05 |
| Ba                                     | 2.37E-03                                                        | 4.78E-04   | 7.82E-03   | 7.31E-03   | 3.20E-03   | 2.11E-03   | 3.93E-03   | 2.89E-03   | 2.40E-03   | 7.82E-03 |
| Cd                                     | 1.27E-04                                                        | 2.56E-05   | 4.18E-04   | 3.91E-04   | 1.71E-04   | 1.13E-04   | 2.10E-04   | 1.55E-04   | 1.28E-04   | 4.18E-04 |
| Total Cr                               | 3.27E-04                                                        | 6.61E-05   | 1.08E-03   | 1.01E-03   | 4.42E-04   | 2.92E-04   | 5.42E-04   | 4.00E-04   | 3.32E-04   | 1.08E-03 |
| Cu                                     | 2.17E-04                                                        | 4.38E-05   | 7.17E-04   | 6.71E-04   | 2.93E-04   | 1.94E-04   | 3.60E-04   | 2.65E-04   | 2.20E-04   | 7.17E-04 |
| Ni                                     | 1.04E-04                                                        | 2.10E-05   | 3.44E-04   | 3.22E-04   | 1.41E-04   | 9.28E-05   | 1.73E-04   | 1.27E-04   | 1.06E-04   | 3.44E-04 |
| Sb                                     | 8.12E-05                                                        | 1.64E-05   | 2.68E-04   | 2.51E-04   | 1.10E-04   | 7.23E-05   | 1.35E-04   | 9.92E-05   | 8.22E-05   | 2.68E-04 |
| Va                                     | 1.50E-04                                                        | 3.04E-05   | 4.96E-04   | 4.64E-04   | 2.03E-04   | 1.34E-04   | 2.49E-04   | 1.84E-04   | 1.52E-04   | 4.96E-04 |
| Zn                                     | 4.73E-03                                                        | 9.54E-04   | 1.56E-02   | 1.46E-02   | 6.38E-03   | 4.21E-03   | 7.84E-03   | 5.78E-03   | 4.79E-03   | 1.56E-02 |

| Species                                | Total Concentration: 10m Scenario 2 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|-----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                      | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 1.49E+01                                                        | 3.54E+00   | 4.76E+01   | 4.45E+01   | 1.98E+01   | 1.33E+01   | 2.42E+01   | 1.80E+01   | 1.51E+01   | 4.76E+01 |
| CO                                     | 1.16E+00                                                        | 2.64E-01   | 3.73E+00   | 3.49E+00   | 1.54E+00   | 1.04E+00   | 1.89E+00   | 1.41E+00   | 1.17E+00   | 3.73E+00 |
| PM10                                   | 5.70E+00                                                        | 1.57E+00   | 1.77E+01   | 1.66E+01   | 7.49E+00   | 5.16E+00   | 9.12E+00   | 6.89E+00   | 5.79E+00   | 1.77E+01 |
| SO2                                    | 5.09E-01                                                        | 1.21E-01   | 1.63E+00   | 1.53E+00   | 6.77E-01   | 4.56E-01   | 8.28E-01   | 6.18E-01   | 5.16E-01   | 1.63E+00 |
| HCl                                    | 1.25E+00                                                        | 1.33E+00   | 1.28E+00   | 1.23E+00   | 1.16E+00   | 1.32E+00   | 1.22E+00   | 1.32E+00   | 1.31E+00   | 1.33E+00 |
| B(a)P (dustborne)                      | 2.76E-05                                                        | 2.78E-05   | 2.89E-05   | 2.91E-05   | 2.49E-05   | 2.26E-05   | 2.54E-05   | 2.41E-05   | 2.35E-05   | 2.91E-05 |
| DDD (dustborne)                        | 8.53E-04                                                        | 8.58E-04   | 8.93E-04   | 9.00E-04   | 7.68E-04   | 6.98E-04   | 7.84E-04   | 7.45E-04   | 7.24E-04   | 9.00E-04 |
| Dieldrin (dustborne)                   | 1.26E-05                                                        | 1.27E-05   | 1.32E-05   | 1.33E-05   | 1.14E-05   | 1.04E-05   | 1.16E-05   | 1.11E-05   | 1.07E-05   | 1.33E-05 |
| PAH's                                  | 2.02E-06                                                        | 1.53E-06   | 3.73E-06   | 3.53E-06   | 2.19E-06   | 2.02E-06   | 2.48E-06   | 2.26E-06   | 2.10E-06   | 3.73E-06 |
| PCB's (vapour)                         | 2.77E-04                                                        | 5.59E-05   | 9.15E-04   | 8.56E-04   | 3.74E-04   | 2.47E-04   | 4.59E-04   | 3.39E-04   | 2.81E-04   | 9.15E-04 |
| PCB's (dustborne)                      | 8.70E-04                                                        | 8.76E-04   | 9.11E-04   | 9.18E-04   | 7.84E-04   | 7.12E-04   | 8.00E-04   | 7.61E-04   | 7.39E-04   | 9.18E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.97E-08                                                        | 3.98E-08   | 4.21E-08   | 4.24E-08   | 3.59E-08   | 3.25E-08   | 3.67E-08   | 3.48E-08   | 3.38E-08   | 4.24E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 7.54E-08                                                        | 7.59E-08   | 7.89E-08   | 7.96E-08   | 6.80E-08   | 6.17E-08   | 6.93E-08   | 6.59E-08   | 6.41E-08   | 7.96E-08 |
| Dichloromethane                        | 6.20E-05                                                        | 1.25E-05   | 2.04E-04   | 1.91E-04   | 8.35E-05   | 5.52E-05   | 1.03E-04   | 7.57E-05   | 6.27E-05   | 2.04E-04 |
| Dibromoethane                          | 2.12E-04                                                        | 4.29E-05   | 7.00E-04   | 6.55E-04   | 2.86E-04   | 1.89E-04   | 3.52E-04   | 2.59E-04   | 2.15E-04   | 7.00E-04 |
| Phenol                                 | 1.54E-06                                                        | 1.65E-06   | 1.59E-06   | 1.53E-06   | 1.43E-06   | 1.64E-06   | 1.51E-06   | 1.63E-06   | 1.63E-06   | 1.65E-06 |
| 2-Chlorophenol                         | 6.93E-03                                                        | 6.98E-03   | 7.26E-03   | 7.31E-03   | 6.25E-03   | 5.67E-03   | 6.37E-03   | 6.06E-03   | 5.89E-03   | 7.31E-03 |
| Benzene                                | 6.76E+01                                                        | 6.91E+01   | 6.80E+01   | 6.54E+01   | 3.76E+01   | 3.70E+01   | 4.87E+01   | 4.77E+01   | 4.74E+01   | 6.91E+01 |
| Chlorobenzene                          | 1.84E+02                                                        | 1.88E+02   | 1.85E+02   | 1.79E+02   | 1.07E+02   | 1.04E+02   | 1.35E+02   | 1.32E+02   | 1.31E+02   | 1.88E+02 |
| Dichlorobenzene                        | 5.79E-05                                                        | 6.17E-05   | 5.95E-05   | 5.73E-05   | 5.38E-05   | 6.14E-05   | 5.67E-05   | 6.13E-05   | 6.10E-05   | 6.17E-05 |
| 1,2-Dichlorobenzene                    | 1.14E+02                                                        | 1.17E+02   | 1.15E+02   | 1.11E+02   | 6.47E+01   | 6.35E+01   | 8.31E+01   | 8.13E+01   | 8.07E+01   | 1.17E+02 |
| 1,3-Dichlorobenzene                    | 4.37E+00                                                        | 4.46E+00   | 4.39E+00   | 4.22E+00   | 2.42E+00   | 2.39E+00   | 3.14E+00   | 3.08E+00   | 3.06E+00   | 4.46E+00 |
| 1,4-Dichlorobenzene                    | 2.12E+02                                                        | 2.17E+02   | 2.14E+02   | 2.06E+02   | 1.21E+02   | 1.19E+02   | 1.55E+02   | 1.51E+02   | 1.50E+02   | 2.17E+02 |
| Tetrachlorobenzene                     | 3.45E-01                                                        | 3.47E-01   | 3.61E-01   | 3.64E-01   | 3.11E-01   | 2.82E-01   | 3.17E-01   | 3.02E-01   | 2.93E-01   | 3.64E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.42E-03                                                        | 5.46E-03   | 5.68E-03   | 5.72E-03   | 4.89E-03   | 4.44E-03   | 4.99E-03   | 4.74E-03   | 4.61E-03   | 5.72E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 3.07E-03                                                        | 3.10E-03   | 3.22E-03   | 3.24E-03   | 2.77E-03   | 2.52E-03   | 2.83E-03   | 2.69E-03   | 2.61E-03   | 3.24E-03 |
| Pentachlorobenzene                     | 1.73E-02                                                        | 1.75E-02   | 1.82E-02   | 1.83E-02   | 1.56E-02   | 1.42E-02   | 1.59E-02   | 1.52E-02   | 1.47E-02   | 1.83E-02 |
| Hexachlorobenzene (vapour)             | 3.28E-03                                                        | 3.30E-03   | 3.43E-03   | 3.46E-03   | 2.95E-03   | 2.68E-03   | 3.01E-03   | 2.86E-03   | 2.78E-03   | 3.46E-03 |
| Hexachlorobenzene (dustborne)          | 1.44E-04                                                        | 1.45E-04   | 1.51E-04   | 1.52E-04   | 1.30E-04   | 1.18E-04   | 1.32E-04   | 1.26E-04   | 1.22E-04   | 1.52E-04 |
| Ethylbenzene                           | 2.85E+00                                                        | 2.89E+00   | 2.94E+00   | 2.91E+00   | 2.20E+00   | 2.04E+00   | 2.41E+00   | 2.31E+00   | 2.26E+00   | 2.94E+00 |
| Napthalene (vapour)                    | 1.36E+01                                                        | 1.39E+01   | 1.37E+01   | 1.32E+01   | 7.62E+00   | 7.50E+00   | 9.85E+00   | 9.65E+00   | 9.58E+00   | 1.39E+01 |
| Napthalene (dustborne)                 | 1.14E-03                                                        | 1.15E-03   | 1.20E-03   | 1.21E-03   | 1.03E-03   | 9.35E-04   | 1.05E-03   | 9.99E-04   | 9.71E-04   | 1.21E-03 |
| Xylenes                                | 5.83E-01                                                        | 5.87E-01   | 6.11E-01   | 6.15E-01   | 5.26E-01   | 4.77E-01   | 5.36E-01   | 5.10E-01   | 4.95E-01   | 6.15E-01 |
| meta- & para- xylene                   | 5.34E+00                                                        | 5.46E+00   | 5.36E+00   | 5.14E+00   | 2.89E+00   | 2.86E+00   | 3.80E+00   | 3.73E+00   | 3.71E+00   | 5.46E+00 |
| ortho-xylene                           | 2.21E+00                                                        | 2.26E+00   | 2.22E+00   | 2.13E+00   | 1.20E+00   | 1.18E+00   | 1.57E+00   | 1.54E+00   | 1.54E+00   | 2.26E+00 |
| Chloroform                             | 2.48E-01                                                        | 2.53E-01   | 2.49E-01   | 2.38E-01   | 1.34E-01   | 1.33E-01   | 1.76E-01   | 1.73E-01   | 1.72E-01   | 2.53E-01 |
| 1,2-dichloroethane                     | 2.36E+00                                                        | 2.42E+00   | 2.37E+00   | 2.27E+00   | 1.28E+00   | 1.27E+00   | 1.68E+00   | 1.65E+00   | 1.64E+00   | 2.42E+00 |
| Toluene                                | 3.77E+01                                                        | 3.86E+01   | 3.79E+01   | 3.63E+01   | 2.04E+01   | 2.02E+01   | 2.69E+01   | 2.64E+01   | 2.62E+01   | 3.86E+01 |
| Tetrachloroethane                      | 6.48E-01                                                        | 6.62E-01   | 6.51E-01   | 6.24E-01   | 3.50E-01   | 3.47E-01   | 4.61E-01   | 4.53E-01   | 4.50E-01   | 6.62E-01 |
| Isopropylbenzene                       | 6.48E-01                                                        | 6.62E-01   | 6.51E-01   | 6.24E-01   | 3.50E-01   | 3.47E-01   | 4.61E-01   | 4.53E-01   | 4.50E-01   | 6.62E-01 |
| 1,3,5-trimethylbenzene                 | 2.59E+00                                                        | 2.65E+00   | 2.60E+00   | 2.49E+00   | 1.40E+00   | 1.39E+00   | 1.84E+00   | 1.81E+00   | 1.80E+00   | 2.65E+00 |
| 1,2,4-trimethylbenzene                 | 4.96E+00                                                        | 5.07E+00   | 4.98E+00   | 4.77E+00   | 2.68E+00   | 2.65E+00   | 3.53E+00   | 3.46E+00   | 3.44E+00   | 5.07E+00 |
| sec-butylbenzene                       | 2.21E-01                                                        | 2.26E-01   | 2.22E-01   | 2.13E-01   | 1.20E-01   | 1.18E-01   | 1.57E-01   | 1.54E-01   | 1.54E-01   | 2.26E-01 |
| 1,2,4-trichlorobenzene                 | 4.19E+02                                                        | 4.29E+02   | 4.21E+02   | 4.04E+02   | 2.27E+02   | 2.24E+02   | 2.98E+02   | 2.93E+02   | 2.91E+02   | 4.29E+02 |
| 1,2,3-trichlorobenzene                 | 1.94E+01                                                        | 1.99E+01   | 1.95E+01   | 1.87E+01   | 1.05E+01   | 1.04E+01   | 1.38E+01   | 1.36E+01   | 1.35E+01   | 1.99E+01 |
| p-isopropyltoluene                     | 3.66E-01                                                        | 3.74E-01   | 3.67E-01   | 3.52E-01   | 1.98E-01   | 1.96E-01   | 2.60E-01   | 2.56E-01   | 2.54E-01   | 3.74E-01 |
| Hg                                     | 6.82E-05                                                        | 1.38E-05   | 2.25E-04   | 2.11E-04   | 9.20E-05   | 6.08E-05   | 1.13E-04   | 8.33E-05   | 6.91E-05   | 2.25E-04 |
| As                                     | 3.17E-04                                                        | 6.39E-05   | 1.04E-03   | 9.78E-04   | 4.27E-04   | 2.82E-04   | 5.25E-04   | 3.87E-04   | 3.21E-04   | 1.04E-03 |
| Pb                                     | 1.00E-03                                                        | 2.02E-04   | 3.31E-03   | 3.09E-03   | 1.35E-03   | 8.93E-04   | 1.66E-03   | 1.23E-03   | 1.02E-03   | 3.31E-03 |
| Tl                                     | 2.93E-05                                                        | 5.91E-06   | 9.66E-05   | 9.04E-05   | 3.95E-05   | 2.61E-05   | 4.85E-05   | 3.58E-05   | 2.97E-05   | 9.66E-05 |
| Ba                                     | 2.37E-03                                                        | 4.78E-04   | 7.82E-03   | 7.31E-03   | 3.20E-03   | 2.11E-03   | 3.93E-03   | 2.89E-03   | 2.40E-03   | 7.82E-03 |
| Cd                                     | 1.27E-04                                                        | 2.56E-05   | 4.18E-04   | 3.91E-04   | 1.71E-04   | 1.13E-04   | 2.10E-04   | 1.55E-04   | 1.28E-04   | 4.18E-04 |
| Total Cr                               | 3.27E-04                                                        | 6.61E-05   | 1.08E-03   | 1.01E-03   | 4.42E-04   | 2.92E-04   | 5.42E-04   | 4.00E-04   | 3.32E-04   | 1.08E-03 |
| Cu                                     | 2.17E-04                                                        | 4.38E-05   | 7.17E-04   | 6.71E-04   | 2.93E-04   | 1.94E-04   | 3.60E-04   | 2.65E-04   | 2.20E-04   | 7.17E-04 |
| Ni                                     | 1.04E-04                                                        | 2.10E-05   | 3.44E-04   | 3.22E-04   | 1.41E-04   | 9.28E-05   | 1.73E-04   | 1.27E-04   | 1.06E-04   | 3.44E-04 |
| Sb                                     | 8.12E-05                                                        | 1.64E-05   | 2.68E-04   | 2.51E-04   | 1.10E-04   | 7.23E-05   | 1.35E-04   | 9.92E-05   | 8.22E-05   | 2.68E-04 |
| Va                                     | 1.50E-04                                                        | 3.04E-05   | 4.96E-04   | 4.64E-04   | 2.03E-04   | 1.34E-04   | 2.49E-04   | 1.84E-04   | 1.52E-04   | 4.96E-04 |
| Zn                                     | 4.73E-03                                                        | 9.54E-04   | 1.56E-02   | 1.46E-02   | 6.38E-03   | 4.21E-03   | 7.84E-03   | 5.78E-03   | 4.79E-03   | 1.56E-02 |

| Species                                | Total Concentration: 10m Scenario 3 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|-----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                      | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 1.49E+01                                                        | 3.54E+00   | 4.76E+01   | 4.45E+01   | 1.98E+01   | 1.33E+01   | 2.42E+01   | 1.80E+01   | 1.51E+01   | 4.76E+01 |
| CO                                     | 1.16E+00                                                        | 2.64E-01   | 3.73E+00   | 3.49E+00   | 1.54E+00   | 1.04E+00   | 1.89E+00   | 1.41E+00   | 1.17E+00   | 3.73E+00 |
| PM10                                   | 5.70E+00                                                        | 1.57E+00   | 1.77E+01   | 1.66E+01   | 7.49E+00   | 5.16E+00   | 9.12E+00   | 6.89E+00   | 5.79E+00   | 1.77E+01 |
| SO2                                    | 5.09E-01                                                        | 1.21E-01   | 1.63E+00   | 1.53E+00   | 6.77E-01   | 4.56E-01   | 8.28E-01   | 6.18E-01   | 5.16E-01   | 1.63E+00 |
| HCl                                    | 1.25E+00                                                        | 1.33E+00   | 1.28E+00   | 1.23E+00   | 1.16E+00   | 1.32E+00   | 1.22E+00   | 1.32E+00   | 1.31E+00   | 1.33E+00 |
| B(a)P (dustborne)                      | 2.76E-05                                                        | 2.78E-05   | 2.89E-05   | 2.91E-05   | 2.49E-05   | 2.26E-05   | 2.54E-05   | 2.41E-05   | 2.35E-05   | 2.91E-05 |
| DDD (dustborne)                        | 8.53E-04                                                        | 8.58E-04   | 8.93E-04   | 9.00E-04   | 7.68E-04   | 6.98E-04   | 7.84E-04   | 7.45E-04   | 7.24E-04   | 9.00E-04 |
| Dieldrin (dustborne)                   | 1.26E-05                                                        | 1.27E-05   | 1.32E-05   | 1.33E-05   | 1.14E-05   | 1.04E-05   | 1.16E-05   | 1.11E-05   | 1.07E-05   | 1.33E-05 |
| PAH's                                  | 2.02E-06                                                        | 1.53E-06   | 3.73E-06   | 3.53E-06   | 2.19E-06   | 2.02E-06   | 2.48E-06   | 2.26E-06   | 2.10E-06   | 3.73E-06 |
| PCB's (vapour)                         | 2.77E-04                                                        | 5.59E-05   | 9.15E-04   | 8.56E-04   | 3.74E-04   | 2.47E-04   | 4.59E-04   | 3.39E-04   | 2.81E-04   | 9.15E-04 |
| PCB's (dustborne)                      | 8.70E-04                                                        | 8.76E-04   | 9.11E-04   | 9.18E-04   | 7.84E-04   | 7.12E-04   | 8.00E-04   | 7.61E-04   | 7.39E-04   | 9.18E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.97E-08                                                        | 3.98E-08   | 4.21E-08   | 4.24E-08   | 3.59E-08   | 3.25E-08   | 3.67E-08   | 3.48E-08   | 3.38E-08   | 4.24E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 7.54E-08                                                        | 7.59E-08   | 7.89E-08   | 7.96E-08   | 6.80E-08   | 6.17E-08   | 6.93E-08   | 6.59E-08   | 6.41E-08   | 7.96E-08 |
| Dichloromethane                        | 6.20E-05                                                        | 1.25E-05   | 2.04E-04   | 1.91E-04   | 8.35E-05   | 5.52E-05   | 1.03E-04   | 7.57E-05   | 6.27E-05   | 2.04E-04 |
| Dibromoethane                          | 2.12E-04                                                        | 4.29E-05   | 7.00E-04   | 6.55E-04   | 2.86E-04   | 1.89E-04   | 3.52E-04   | 2.59E-04   | 2.15E-04   | 7.00E-04 |
| Phenol                                 | 1.54E-06                                                        | 1.65E-06   | 1.59E-06   | 1.53E-06   | 1.43E-06   | 1.64E-06   | 1.51E-06   | 1.63E-06   | 1.63E-06   | 1.65E-06 |
| 2-Chlorophenol                         | 6.93E-03                                                        | 6.98E-03   | 7.26E-03   | 7.31E-03   | 6.25E-03   | 5.67E-03   | 6.37E-03   | 6.06E-03   | 5.89E-03   | 7.31E-03 |
| Benzene                                | 1.07E+02                                                        | 1.42E+02   | 1.44E+02   | 1.43E+02   | 6.30E+01   | 6.84E+01   | 8.20E+01   | 9.33E+01   | 8.81E+01   | 1.44E+02 |
| Chlorobenzene                          | 2.83E+02                                                        | 3.72E+02   | 3.77E+02   | 3.75E+02   | 1.71E+02   | 1.83E+02   | 2.19E+02   | 2.47E+02   | 2.34E+02   | 3.77E+02 |
| Dichlorobenzene                        | 5.79E-05                                                        | 6.17E-05   | 5.95E-05   | 5.73E-05   | 5.38E-05   | 6.14E-05   | 5.67E-05   | 6.13E-05   | 6.10E-05   | 6.17E-05 |
| 1,2-Dichlorobenzene                    | 1.79E+02                                                        | 2.37E+02   | 2.40E+02   | 2.39E+02   | 1.07E+02   | 1.15E+02   | 1.38E+02   | 1.56E+02   | 1.48E+02   | 2.40E+02 |
| 1,3-Dichlorobenzene                    | 6.90E+00                                                        | 9.19E+00   | 9.28E+00   | 9.24E+00   | 4.07E+00   | 4.41E+00   | 5.30E+00   | 6.02E+00   | 5.69E+00   | 9.28E+00 |
| 1,4-Dichlorobenzene                    | 3.30E+02                                                        | 4.36E+02   | 4.41E+02   | 4.39E+02   | 1.97E+02   | 2.13E+02   | 2.55E+02   | 2.88E+02   | 2.72E+02   | 4.41E+02 |
| Tetrachlorobenzene                     | 3.45E-01                                                        | 3.47E-01   | 3.61E-01   | 3.64E-01   | 3.11E-01   | 2.82E-01   | 3.17E-01   | 3.02E-01   | 2.93E-01   | 3.64E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.42E-03                                                        | 5.46E-03   | 5.68E-03   | 5.72E-03   | 4.89E-03   | 4.44E-03   | 4.99E-03   | 4.74E-03   | 4.61E-03   | 5.72E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 3.07E-03                                                        | 3.10E-03   | 3.22E-03   | 3.24E-03   | 2.77E-03   | 2.52E-03   | 2.83E-03   | 2.69E-03   | 2.61E-03   | 3.24E-03 |
| Pentachlorobenzene                     | 1.73E-02                                                        | 1.75E-02   | 1.82E-02   | 1.83E-02   | 1.56E-02   | 1.42E-02   | 1.59E-02   | 1.52E-02   | 1.47E-02   | 1.83E-02 |
| Hexachlorobenzene (vapour)             | 3.28E-03                                                        | 3.30E-03   | 3.43E-03   | 3.46E-03   | 2.95E-03   | 2.68E-03   | 3.01E-03   | 2.86E-03   | 2.78E-03   | 3.46E-03 |
| Hexachlorobenzene (dustborne)          | 1.44E-04                                                        | 1.45E-04   | 1.51E-04   | 1.52E-04   | 1.30E-04   | 1.18E-04   | 1.32E-04   | 1.26E-04   | 1.22E-04   | 1.52E-04 |
| Ethylbenzene                           | 3.47E+00                                                        | 4.05E+00   | 4.14E+00   | 4.15E+00   | 2.60E+00   | 2.54E+00   | 2.94E+00   | 3.03E+00   | 2.91E+00   | 4.15E+00 |
| Napthalene (vapour)                    | 2.15E+01                                                        | 2.85E+01   | 2.88E+01   | 2.87E+01   | 1.27E+01   | 1.38E+01   | 1.65E+01   | 1.88E+01   | 1.77E+01   | 2.88E+01 |
| Napthalene (dustborne)                 | 1.14E-03                                                        | 1.15E-03   | 1.20E-03   | 1.21E-03   | 1.03E-03   | 9.35E-04   | 1.05E-03   | 9.99E-04   | 9.71E-04   | 1.21E-03 |
| Xylenes                                | 5.83E-01                                                        | 5.87E-01   | 6.11E-01   | 6.15E-01   | 5.26E-01   | 4.77E-01   | 5.36E-01   | 5.10E-01   | 4.95E-01   | 6.15E-01 |
| meta- & para- xylene                   | 8.57E+00                                                        | 1.15E+01   | 1.16E+01   | 1.15E+01   | 4.98E+00   | 5.44E+00   | 6.54E+00   | 7.48E+00   | 7.06E+00   | 1.16E+01 |
| ortho-xylene                           | 3.55E+00                                                        | 4.75E+00   | 4.80E+00   | 4.78E+00   | 2.06E+00   | 2.25E+00   | 2.71E+00   | 3.10E+00   | 2.92E+00   | 4.80E+00 |
| Chloroform                             | 3.98E-01                                                        | 5.33E-01   | 5.38E-01   | 5.35E-01   | 2.31E-01   | 2.53E-01   | 3.04E-01   | 3.47E-01   | 3.28E-01   | 5.38E-01 |
| 1,2-dichloroethane                     | 3.79E+00                                                        | 5.08E+00   | 5.13E+00   | 5.11E+00   | 2.20E+00   | 2.41E+00   | 2.90E+00   | 3.31E+00   | 3.13E+00   | 5.13E+00 |
| Toluene                                | 6.06E+01                                                        | 8.11E+01   | 8.19E+01   | 8.15E+01   | 3.52E+01   | 3.85E+01   | 4.63E+01   | 5.29E+01   | 4.99E+01   | 8.19E+01 |
| Tetrachloroethane                      | 1.04E+00                                                        | 1.39E+00   | 1.41E+00   | 1.40E+00   | 6.04E-01   | 6.60E-01   | 7.94E-01   | 9.08E-01   | 8.57E-01   | 1.41E+00 |
| Isopropylbenzene                       | 1.04E+00                                                        | 1.39E+00   | 1.41E+00   | 1.40E+00   | 6.04E-01   | 6.60E-01   | 7.94E-01   | 9.08E-01   | 8.57E-01   | 1.41E+00 |
| 1,3,5-trimethylbenzene                 | 4.16E+00                                                        | 5.57E+00   | 5.62E+00   | 5.60E+00   | 2.42E+00   | 2.64E+00   | 3.18E+00   | 3.63E+00   | 3.43E+00   | 5.62E+00 |
| 1,2,4-trimethylbenzene                 | 7.96E+00                                                        | 1.07E+01   | 1.08E+01   | 1.07E+01   | 4.62E+00   | 5.05E+00   | 6.07E+00   | 6.94E+00   | 6.55E+00   | 1.08E+01 |
| sec-butylbenzene                       | 3.55E-01                                                        | 4.75E-01   | 4.80E-01   | 4.78E-01   | 2.06E-01   | 2.25E-01   | 2.71E-01   | 3.10E-01   | 2.92E-01   | 4.80E-01 |
| 1,2,4-trichlorobenzene                 | 6.73E+02                                                        | 9.01E+02   | 9.10E+02   | 9.06E+02   | 3.91E+02   | 4.27E+02   | 5.14E+02   | 5.87E+02   | 5.55E+02   | 9.10E+02 |
| 1,2,3-trichlorobenzene                 | 3.12E+01                                                        | 4.18E+01   | 4.22E+01   | 4.20E+01   | 1.81E+01   | 1.98E+01   | 2.38E+01   | 2.72E+01   | 2.57E+01   | 4.22E+01 |
| p-isopropyltoluene                     | 5.88E-01                                                        | 7.86E-01   | 7.94E-01   | 7.91E-01   | 3.41E-01   | 3.73E-01   | 4.49E-01   | 5.13E-01   | 4.84E-01   | 7.94E-01 |
| Hg                                     | 6.82E-05                                                        | 1.38E-05   | 2.25E-04   | 2.11E-04   | 9.20E-05   | 6.08E-05   | 1.13E-04   | 8.33E-05   | 6.91E-05   | 2.25E-04 |
| As                                     | 3.17E-04                                                        | 6.39E-05   | 1.04E-03   | 9.78E-04   | 4.27E-04   | 2.82E-04   | 5.25E-04   | 3.87E-04   | 3.21E-04   | 1.04E-03 |
| Pb                                     | 1.00E-03                                                        | 2.02E-04   | 3.31E-03   | 3.09E-03   | 1.35E-03   | 8.93E-04   | 1.66E-03   | 1.23E-03   | 1.02E-03   | 3.31E-03 |
| Tl                                     | 2.93E-05                                                        | 5.91E-06   | 9.66E-05   | 9.04E-05   | 3.95E-05   | 2.61E-05   | 4.85E-05   | 3.58E-05   | 2.97E-05   | 9.66E-05 |
| Ba                                     | 2.37E-03                                                        | 4.78E-04   | 7.82E-03   | 7.31E-03   | 3.20E-03   | 2.11E-03   | 3.93E-03   | 2.89E-03   | 2.40E-03   | 7.82E-03 |
| Cd                                     | 1.27E-04                                                        | 2.56E-05   | 4.18E-04   | 3.91E-04   | 1.71E-04   | 1.13E-04   | 2.10E-04   | 1.55E-04   | 1.28E-04   | 4.18E-04 |
| Total Cr                               | 3.27E-04                                                        | 6.61E-05   | 1.08E-03   | 1.01E-03   | 4.42E-04   | 2.92E-04   | 5.42E-04   | 4.00E-04   | 3.32E-04   | 1.08E-03 |
| Cu                                     | 2.17E-04                                                        | 4.38E-05   | 7.17E-04   | 6.71E-04   | 2.93E-04   | 1.94E-04   | 3.60E-04   | 2.65E-04   | 2.20E-04   | 7.17E-04 |
| Ni                                     | 1.04E-04                                                        | 2.10E-05   | 3.44E-04   | 3.22E-04   | 1.41E-04   | 9.28E-05   | 1.73E-04   | 1.27E-04   | 1.06E-04   | 3.44E-04 |
| Sb                                     | 8.12E-05                                                        | 1.64E-05   | 2.68E-04   | 2.51E-04   | 1.10E-04   | 7.23E-05   | 1.35E-04   | 9.92E-05   | 8.22E-05   | 2.68E-04 |
| Va                                     | 1.50E-04                                                        | 3.04E-05   | 4.96E-04   | 4.64E-04   | 2.03E-04   | 1.34E-04   | 2.49E-04   | 1.84E-04   | 1.52E-04   | 4.96E-04 |
| Zn                                     | 4.73E-03                                                        | 9.54E-04   | 1.56E-02   | 1.46E-02   | 6.38E-03   | 4.21E-03   | 7.84E-03   | 5.78E-03   | 4.79E-03   | 1.56E-02 |

| Species                                | Total Concentration: 10m Scenario 4 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|-----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                      | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 1.49E+01                                                        | 3.54E+00   | 4.76E+01   | 4.45E+01   | 1.98E+01   | 1.33E+01   | 2.42E+01   | 1.80E+01   | 1.51E+01   | 4.76E+01 |
| CO                                     | 1.16E+00                                                        | 2.64E-01   | 3.73E+00   | 3.49E+00   | 1.54E+00   | 1.04E+00   | 1.89E+00   | 1.41E+00   | 1.17E+00   | 3.73E+00 |
| PM10                                   | 5.70E+00                                                        | 1.57E+00   | 1.77E+01   | 1.66E+01   | 7.49E+00   | 5.16E+00   | 9.12E+00   | 6.89E+00   | 5.79E+00   | 1.77E+01 |
| SO2                                    | 5.09E-01                                                        | 1.21E-01   | 1.63E+00   | 1.53E+00   | 6.77E-01   | 4.56E-01   | 8.28E-01   | 6.18E-01   | 5.16E-01   | 1.63E+00 |
| HCl                                    | 1.25E+00                                                        | 1.33E+00   | 1.28E+00   | 1.23E+00   | 1.16E+00   | 1.32E+00   | 1.22E+00   | 1.32E+00   | 1.31E+00   | 1.33E+00 |
| B(a)P (dustborne)                      | 2.76E-05                                                        | 2.78E-05   | 2.89E-05   | 2.91E-05   | 2.49E-05   | 2.26E-05   | 2.54E-05   | 2.41E-05   | 2.35E-05   | 2.91E-05 |
| DDD (dustborne)                        | 8.53E-04                                                        | 8.58E-04   | 8.93E-04   | 9.00E-04   | 7.68E-04   | 6.98E-04   | 7.84E-04   | 7.45E-04   | 7.24E-04   | 9.00E-04 |
| Dieldrin (dustborne)                   | 1.26E-05                                                        | 1.27E-05   | 1.32E-05   | 1.33E-05   | 1.14E-05   | 1.04E-05   | 1.16E-05   | 1.11E-05   | 1.07E-05   | 1.33E-05 |
| PAH's                                  | 2.02E-06                                                        | 1.53E-06   | 3.73E-06   | 3.53E-06   | 2.19E-06   | 2.02E-06   | 2.48E-06   | 2.26E-06   | 2.10E-06   | 3.73E-06 |
| PCB's (vapour)                         | 2.77E-04                                                        | 5.59E-05   | 9.15E-04   | 8.56E-04   | 3.74E-04   | 2.47E-04   | 4.59E-04   | 3.39E-04   | 2.81E-04   | 9.15E-04 |
| PCB's (dustborne)                      | 8.70E-04                                                        | 8.76E-04   | 9.11E-04   | 9.18E-04   | 7.84E-04   | 7.12E-04   | 8.00E-04   | 7.61E-04   | 7.39E-04   | 9.18E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.97E-08                                                        | 3.98E-08   | 4.21E-08   | 4.24E-08   | 3.59E-08   | 3.25E-08   | 3.67E-08   | 3.48E-08   | 3.38E-08   | 4.24E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 7.54E-08                                                        | 7.59E-08   | 7.89E-08   | 7.96E-08   | 6.80E-08   | 6.17E-08   | 6.93E-08   | 6.59E-08   | 6.41E-08   | 7.96E-08 |
| Dichloromethane                        | 6.20E-05                                                        | 1.25E-05   | 2.04E-04   | 1.91E-04   | 8.35E-05   | 5.52E-05   | 1.03E-04   | 7.57E-05   | 6.27E-05   | 2.04E-04 |
| Dibromoethane                          | 2.12E-04                                                        | 4.29E-05   | 7.00E-04   | 6.55E-04   | 2.86E-04   | 1.89E-04   | 3.52E-04   | 2.59E-04   | 2.15E-04   | 7.00E-04 |
| Phenol                                 | 1.54E-06                                                        | 1.65E-06   | 1.59E-06   | 1.53E-06   | 1.43E-06   | 1.64E-06   | 1.51E-06   | 1.63E-06   | 1.63E-06   | 1.65E-06 |
| 2-Chlorophenol                         | 6.93E-03                                                        | 6.98E-03   | 7.26E-03   | 7.31E-03   | 6.25E-03   | 5.67E-03   | 6.37E-03   | 6.06E-03   | 5.89E-03   | 7.31E-03 |
| Benzene                                | 6.76E+01                                                        | 6.91E+01   | 6.80E+01   | 6.51E+01   | 3.75E+01   | 3.68E+01   | 4.87E+01   | 4.76E+01   | 4.73E+01   | 6.91E+01 |
| Chlorobenzene                          | 1.84E+02                                                        | 1.88E+02   | 1.85E+02   | 1.78E+02   | 1.06E+02   | 1.03E+02   | 1.35E+02   | 1.32E+02   | 1.31E+02   | 1.88E+02 |
| Dichlorobenzene                        | 5.79E-05                                                        | 6.17E-05   | 5.95E-05   | 5.73E-05   | 5.38E-05   | 6.14E-05   | 5.67E-05   | 6.13E-05   | 6.10E-05   | 6.17E-05 |
| 1,2-Dichlorobenzene                    | 1.14E+02                                                        | 1.17E+02   | 1.15E+02   | 1.11E+02   | 6.46E+01   | 6.31E+01   | 8.31E+01   | 8.10E+01   | 8.05E+01   | 1.17E+02 |
| 1,3-Dichlorobenzene                    | 4.37E+00                                                        | 4.46E+00   | 4.39E+00   | 4.20E+00   | 2.42E+00   | 2.37E+00   | 3.14E+00   | 3.07E+00   | 3.05E+00   | 4.46E+00 |
| 1,4-Dichlorobenzene                    | 2.12E+02                                                        | 2.17E+02   | 2.14E+02   | 2.05E+02   | 1.21E+02   | 1.18E+02   | 1.55E+02   | 1.51E+02   | 1.50E+02   | 2.17E+02 |
| Tetrachlorobenzene                     | 3.45E-01                                                        | 3.47E-01   | 3.61E-01   | 3.64E-01   | 3.11E-01   | 2.82E-01   | 3.17E-01   | 3.02E-01   | 2.93E-01   | 3.64E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.42E-03                                                        | 5.46E-03   | 5.68E-03   | 5.72E-03   | 4.89E-03   | 4.44E-03   | 4.99E-03   | 4.74E-03   | 4.61E-03   | 5.72E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 3.07E-03                                                        | 3.10E-03   | 3.22E-03   | 3.24E-03   | 2.77E-03   | 2.52E-03   | 2.83E-03   | 2.69E-03   | 2.61E-03   | 3.24E-03 |
| Pentachlorobenzene                     | 1.73E-02                                                        | 1.75E-02   | 1.82E-02   | 1.83E-02   | 1.56E-02   | 1.42E-02   | 1.59E-02   | 1.52E-02   | 1.47E-02   | 1.83E-02 |
| Hexachlorobenzene (vapour)             | 3.28E-03                                                        | 3.30E-03   | 3.43E-03   | 3.46E-03   | 2.95E-03   | 2.68E-03   | 3.01E-03   | 2.86E-03   | 2.78E-03   | 3.46E-03 |
| Hexachlorobenzene (dustborne)          | 1.44E-04                                                        | 1.45E-04   | 1.51E-04   | 1.52E-04   | 1.30E-04   | 1.18E-04   | 1.32E-04   | 1.26E-04   | 1.22E-04   | 1.52E-04 |
| Ethylbenzene                           | 2.85E+00                                                        | 2.89E+00   | 2.94E+00   | 2.91E+00   | 2.20E+00   | 2.04E+00   | 2.41E+00   | 2.31E+00   | 2.26E+00   | 2.94E+00 |
| Napthalene (vapour)                    | 1.36E+01                                                        | 1.39E+01   | 1.37E+01   | 1.32E+01   | 7.61E+00   | 7.45E+00   | 9.85E+00   | 9.62E+00   | 9.56E+00   | 1.39E+01 |
| Napthalene (dustborne)                 | 1.14E-03                                                        | 1.15E-03   | 1.20E-03   | 1.21E-03   | 1.03E-03   | 9.35E-04   | 1.05E-03   | 9.99E-04   | 9.71E-04   | 1.21E-03 |
| Xylenes                                | 5.83E-01                                                        | 5.87E-01   | 6.11E-01   | 6.15E-01   | 5.26E-01   | 4.77E-01   | 5.36E-01   | 5.10E-01   | 4.95E-01   | 6.15E-01 |
| meta- & para- xylene                   | 5.34E+00                                                        | 5.46E+00   | 5.35E+00   | 5.12E+00   | 2.88E+00   | 2.84E+00   | 3.80E+00   | 3.71E+00   | 3.70E+00   | 5.46E+00 |
| ortho-xylene                           | 2.21E+00                                                        | 2.26E+00   | 2.22E+00   | 2.12E+00   | 1.19E+00   | 1.17E+00   | 1.57E+00   | 1.54E+00   | 1.53E+00   | 2.26E+00 |
| Chloroform                             | 2.48E-01                                                        | 2.53E-01   | 2.49E-01   | 2.38E-01   | 1.34E-01   | 1.32E-01   | 1.76E-01   | 1.72E-01   | 1.72E-01   | 2.53E-01 |
| 1,2-dichloroethane                     | 2.36E+00                                                        | 2.42E+00   | 2.37E+00   | 2.27E+00   | 1.28E+00   | 1.26E+00   | 1.68E+00   | 1.64E+00   | 1.64E+00   | 2.42E+00 |
| Toluene                                | 3.77E+01                                                        | 3.86E+01   | 3.78E+01   | 3.62E+01   | 2.04E+01   | 2.01E+01   | 2.68E+01   | 2.63E+01   | 2.61E+01   | 3.86E+01 |
| Tetrachloroethane                      | 6.48E-01                                                        | 6.62E-01   | 6.50E-01   | 6.21E-01   | 3.50E-01   | 3.44E-01   | 4.61E-01   | 4.51E-01   | 4.49E-01   | 6.62E-01 |
| Isopropylbenzene                       | 6.48E-01                                                        | 6.62E-01   | 6.50E-01   | 6.21E-01   | 3.50E-01   | 3.44E-01   | 4.61E-01   | 4.51E-01   | 4.49E-01   | 6.62E-01 |
| 1,3,5-trimethylbenzene                 | 2.59E+00                                                        | 2.65E+00   | 2.60E+00   | 2.49E+00   | 1.40E+00   | 1.38E+00   | 1.84E+00   | 1.80E+00   | 1.80E+00   | 2.65E+00 |
| 1,2,4-trimethylbenzene                 | 4.96E+00                                                        | 5.07E+00   | 4.97E+00   | 4.75E+00   | 2.67E+00   | 2.63E+00   | 3.53E+00   | 3.45E+00   | 3.43E+00   | 5.07E+00 |
| sec-butylbenzene                       | 2.21E-01                                                        | 2.26E-01   | 2.22E-01   | 2.12E-01   | 1.19E-01   | 1.17E-01   | 1.57E-01   | 1.54E-01   | 1.53E-01   | 2.26E-01 |
| 1,2,4-trichlorobenzene                 | 4.19E+02                                                        | 4.29E+02   | 4.21E+02   | 4.02E+02   | 2.26E+02   | 2.23E+02   | 2.98E+02   | 2.92E+02   | 2.91E+02   | 4.29E+02 |
| 1,2,3-trichlorobenzene                 | 1.94E+01                                                        | 1.99E+01   | 1.95E+01   | 1.86E+01   | 1.05E+01   | 1.03E+01   | 1.38E+01   | 1.35E+01   | 1.35E+01   | 1.99E+01 |
| p-isopropyltoluene                     | 3.66E-01                                                        | 3.74E-01   | 3.67E-01   | 3.51E-01   | 1.97E-01   | 1.94E-01   | 2.60E-01   | 2.55E-01   | 2.54E-01   | 3.74E-01 |
| Hg                                     | 6.82E-05                                                        | 1.38E-05   | 2.25E-04   | 2.11E-04   | 9.20E-05   | 6.08E-05   | 1.13E-04   | 8.33E-05   | 6.91E-05   | 2.25E-04 |
| As                                     | 3.17E-04                                                        | 6.39E-05   | 1.04E-03   | 9.78E-04   | 4.27E-04   | 2.82E-04   | 5.25E-04   | 3.87E-04   | 3.21E-04   | 1.04E-03 |
| Pb                                     | 1.00E-03                                                        | 2.02E-04   | 3.31E-03   | 3.09E-03   | 1.35E-03   | 8.93E-04   | 1.66E-03   | 1.23E-03   | 1.02E-03   | 3.31E-03 |
| Tl                                     | 2.93E-05                                                        | 5.91E-06   | 9.66E-05   | 9.04E-05   | 3.95E-05   | 2.61E-05   | 4.85E-05   | 3.58E-05   | 2.97E-05   | 9.66E-05 |
| Ba                                     | 2.37E-03                                                        | 4.78E-04   | 7.82E-03   | 7.31E-03   | 3.20E-03   | 2.11E-03   | 3.93E-03   | 2.89E-03   | 2.40E-03   | 7.82E-03 |
| Cd                                     | 1.27E-04                                                        | 2.56E-05   | 4.18E-04   | 3.91E-04   | 1.71E-04   | 1.13E-04   | 2.10E-04   | 1.55E-04   | 1.28E-04   | 4.18E-04 |
| Total Cr                               | 3.27E-04                                                        | 6.61E-05   | 1.08E-03   | 1.01E-03   | 4.42E-04   | 2.92E-04   | 5.42E-04   | 4.00E-04   | 3.32E-04   | 1.08E-03 |
| Cu                                     | 2.17E-04                                                        | 4.38E-05   | 7.17E-04   | 6.71E-04   | 2.93E-04   | 1.94E-04   | 3.60E-04   | 2.65E-04   | 2.20E-04   | 7.17E-04 |
| Ni                                     | 1.04E-04                                                        | 2.10E-05   | 3.44E-04   | 3.22E-04   | 1.41E-04   | 9.28E-05   | 1.73E-04   | 1.27E-04   | 1.06E-04   | 3.44E-04 |
| Sb                                     | 8.12E-05                                                        | 1.64E-05   | 2.68E-04   | 2.51E-04   | 1.10E-04   | 7.23E-05   | 1.35E-04   | 9.92E-05   | 8.22E-05   | 2.68E-04 |
| Va                                     | 1.50E-04                                                        | 3.04E-05   | 4.96E-04   | 4.64E-04   | 2.03E-04   | 1.34E-04   | 2.49E-04   | 1.84E-04   | 1.52E-04   | 4.96E-04 |
| Zn                                     | 4.73E-03                                                        | 9.54E-04   | 1.56E-02   | 1.46E-02   | 6.38E-03   | 4.21E-03   | 7.84E-03   | 5.78E-03   | 4.79E-03   | 1.56E-02 |

| Species                                | Total Concentration: 10m Scenario 5 max (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          |
|----------------------------------------|-----------------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
|                                        | Receptor 1                                                      | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
| NOx                                    | 1.49E+01                                                        | 3.54E+00   | 4.76E+01   | 4.45E+01   | 1.98E+01   | 1.33E+01   | 2.42E+01   | 1.80E+01   | 1.51E+01   | 4.76E+01 |
| CO                                     | 1.16E+00                                                        | 2.64E-01   | 3.73E+00   | 3.49E+00   | 1.54E+00   | 1.04E+00   | 1.89E+00   | 1.41E+00   | 1.17E+00   | 3.73E+00 |
| PM10                                   | 5.70E+00                                                        | 1.57E+00   | 1.77E+01   | 1.66E+01   | 7.49E+00   | 5.16E+00   | 9.12E+00   | 6.89E+00   | 5.79E+00   | 1.77E+01 |
| SO2                                    | 5.09E-01                                                        | 1.21E-01   | 1.63E+00   | 1.53E+00   | 6.77E-01   | 4.56E-01   | 8.28E-01   | 6.18E-01   | 5.16E-01   | 1.63E+00 |
| HCl                                    | 1.25E+00                                                        | 1.33E+00   | 1.28E+00   | 1.23E+00   | 1.16E+00   | 1.32E+00   | 1.22E+00   | 1.32E+00   | 1.31E+00   | 1.33E+00 |
| B(a)P (dustborne)                      | 2.76E-05                                                        | 2.78E-05   | 2.89E-05   | 2.91E-05   | 2.49E-05   | 2.26E-05   | 2.54E-05   | 2.41E-05   | 2.35E-05   | 2.91E-05 |
| DDD (dustborne)                        | 8.53E-04                                                        | 8.58E-04   | 8.93E-04   | 9.00E-04   | 7.68E-04   | 6.98E-04   | 7.84E-04   | 7.45E-04   | 7.24E-04   | 9.00E-04 |
| Dieldrin (dustborne)                   | 1.26E-05                                                        | 1.27E-05   | 1.32E-05   | 1.33E-05   | 1.14E-05   | 1.04E-05   | 1.16E-05   | 1.11E-05   | 1.07E-05   | 1.33E-05 |
| PAH's                                  | 2.02E-06                                                        | 1.53E-06   | 3.73E-06   | 3.53E-06   | 2.19E-06   | 2.02E-06   | 2.48E-06   | 2.26E-06   | 2.10E-06   | 3.73E-06 |
| PCB's (vapour)                         | 2.77E-04                                                        | 5.59E-05   | 9.15E-04   | 8.56E-04   | 3.74E-04   | 2.47E-04   | 4.59E-04   | 3.39E-04   | 2.81E-04   | 9.15E-04 |
| PCB's (dustborne)                      | 8.70E-04                                                        | 8.76E-04   | 9.11E-04   | 9.18E-04   | 7.84E-04   | 7.12E-04   | 8.00E-04   | 7.61E-04   | 7.39E-04   | 9.18E-04 |
| Dioxins/Furans(TEQ vapour)             | 3.97E-08                                                        | 3.98E-08   | 4.21E-08   | 4.24E-08   | 3.59E-08   | 3.25E-08   | 3.67E-08   | 3.48E-08   | 3.38E-08   | 4.24E-08 |
| Dioxins/Furans(TEQ Dustborne)          | 7.54E-08                                                        | 7.59E-08   | 7.89E-08   | 7.96E-08   | 6.80E-08   | 6.17E-08   | 6.93E-08   | 6.59E-08   | 6.41E-08   | 7.96E-08 |
| Dichloromethane                        | 6.20E-05                                                        | 1.25E-05   | 2.04E-04   | 1.91E-04   | 8.35E-05   | 5.52E-05   | 1.03E-04   | 7.57E-05   | 6.27E-05   | 2.04E-04 |
| Dibromoethane                          | 2.12E-04                                                        | 4.29E-05   | 7.00E-04   | 6.55E-04   | 2.86E-04   | 1.89E-04   | 3.52E-04   | 2.59E-04   | 2.15E-04   | 7.00E-04 |
| Phenol                                 | 1.54E-06                                                        | 1.65E-06   | 1.59E-06   | 1.53E-06   | 1.43E-06   | 1.64E-06   | 1.51E-06   | 1.63E-06   | 1.63E-06   | 1.65E-06 |
| 2-Chlorophenol                         | 6.93E-03                                                        | 6.98E-03   | 7.26E-03   | 7.31E-03   | 6.25E-03   | 5.67E-03   | 6.37E-03   | 6.06E-03   | 5.89E-03   | 7.31E-03 |
| Benzene                                | 5.84E+01                                                        | 5.78E+01   | 6.28E+01   | 6.43E+01   | 3.00E+01   | 2.97E+01   | 3.81E+01   | 3.84E+01   | 3.64E+01   | 6.43E+01 |
| Chlorobenzene                          | 1.61E+02                                                        | 1.59E+02   | 1.72E+02   | 1.76E+02   | 8.73E+01   | 8.57E+01   | 1.08E+02   | 1.08E+02   | 1.03E+02   | 1.76E+02 |
| Dichlorobenzene                        | 5.79E-05                                                        | 6.17E-05   | 5.95E-05   | 5.73E-05   | 5.38E-05   | 6.14E-05   | 5.67E-05   | 6.13E-05   | 6.10E-05   | 6.17E-05 |
| 1,2-Dichlorobenzene                    | 9.93E+01                                                        | 9.83E+01   | 1.07E+02   | 1.09E+02   | 5.21E+01   | 5.15E+01   | 6.55E+01   | 6.60E+01   | 6.26E+01   | 1.09E+02 |
| 1,3-Dichlorobenzene                    | 3.77E+00                                                        | 3.73E+00   | 4.05E+00   | 4.15E+00   | 1.93E+00   | 1.91E+00   | 2.45E+00   | 2.48E+00   | 2.35E+00   | 4.15E+00 |
| 1,4-Dichlorobenzene                    | 1.85E+02                                                        | 1.83E+02   | 1.98E+02   | 2.03E+02   | 9.84E+01   | 9.69E+01   | 1.23E+02   | 1.24E+02   | 1.17E+02   | 2.03E+02 |
| Tetrachlorobenzene                     | 3.45E-01                                                        | 3.47E-01   | 3.61E-01   | 3.64E-01   | 3.11E-01   | 2.82E-01   | 3.17E-01   | 3.02E-01   | 2.93E-01   | 3.64E-01 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.42E-03                                                        | 5.46E-03   | 5.68E-03   | 5.72E-03   | 4.89E-03   | 4.44E-03   | 4.99E-03   | 4.74E-03   | 4.61E-03   | 5.72E-03 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 3.07E-03                                                        | 3.10E-03   | 3.22E-03   | 3.24E-03   | 2.77E-03   | 2.52E-03   | 2.83E-03   | 2.69E-03   | 2.61E-03   | 3.24E-03 |
| Pentachlorobenzene                     | 1.73E-02                                                        | 1.75E-02   | 1.82E-02   | 1.83E-02   | 1.56E-02   | 1.42E-02   | 1.59E-02   | 1.52E-02   | 1.47E-02   | 1.83E-02 |
| Hexachlorobenzene (vapour)             | 3.28E-03                                                        | 3.30E-03   | 3.43E-03   | 3.46E-03   | 2.95E-03   | 2.68E-03   | 3.01E-03   | 2.86E-03   | 2.78E-03   | 3.46E-03 |
| Hexachlorobenzene (dustborne)          | 1.44E-04                                                        | 1.45E-04   | 1.51E-04   | 1.52E-04   | 1.30E-04   | 1.18E-04   | 1.32E-04   | 1.26E-04   | 1.22E-04   | 1.52E-04 |
| Ethylbenzene                           | 2.70E+00                                                        | 2.71E+00   | 2.86E+00   | 2.90E+00   | 2.08E+00   | 1.93E+00   | 2.24E+00   | 2.16E+00   | 2.09E+00   | 2.90E+00 |
| Napthalene (vapour)                    | 1.18E+01                                                        | 1.17E+01   | 1.27E+01   | 1.30E+01   | 6.10E+00   | 6.04E+00   | 7.72E+00   | 7.79E+00   | 7.39E+00   | 1.30E+01 |
| Napthalene (dustborne)                 | 1.14E-03                                                        | 1.15E-03   | 1.20E-03   | 1.21E-03   | 1.03E-03   | 9.35E-04   | 1.05E-03   | 9.99E-04   | 9.71E-04   | 1.21E-03 |
| Xylenes                                | 5.83E-01                                                        | 5.87E-01   | 6.11E-01   | 6.15E-01   | 5.26E-01   | 4.77E-01   | 5.36E-01   | 5.10E-01   | 4.95E-01   | 6.15E-01 |
| meta- & para- xylene                   | 4.58E+00                                                        | 4.52E+00   | 4.93E+00   | 5.05E+00   | 2.26E+00   | 2.26E+00   | 2.92E+00   | 2.96E+00   | 2.80E+00   | 5.05E+00 |
| ortho-xylene                           | 1.90E+00                                                        | 1.87E+00   | 2.04E+00   | 2.09E+00   | 9.35E-01   | 9.35E-01   | 1.21E+00   | 1.23E+00   | 1.16E+00   | 2.09E+00 |
| Chloroform                             | 2.12E-01                                                        | 2.10E-01   | 2.29E-01   | 2.34E-01   | 1.05E-01   | 1.05E-01   | 1.36E-01   | 1.38E-01   | 1.30E-01   | 2.34E-01 |
| 1,2-dichloroethane                     | 2.03E+00                                                        | 2.00E+00   | 2.18E+00   | 2.24E+00   | 9.99E-01   | 1.00E+00   | 1.29E+00   | 1.31E+00   | 1.24E+00   | 2.24E+00 |
| Toluene                                | 3.24E+01                                                        | 3.20E+01   | 3.48E+01   | 3.57E+01   | 1.60E+01   | 1.60E+01   | 2.07E+01   | 2.09E+01   | 1.98E+01   | 3.57E+01 |
| Tetrachloroethane                      | 5.56E-01                                                        | 5.49E-01   | 5.98E-01   | 6.13E-01   | 2.74E-01   | 2.74E-01   | 3.55E-01   | 3.60E-01   | 3.40E-01   | 6.13E-01 |
| Isopropylbenzene                       | 5.56E-01                                                        | 5.49E-01   | 5.98E-01   | 6.13E-01   | 2.74E-01   | 2.74E-01   | 3.55E-01   | 3.60E-01   | 3.40E-01   | 6.13E-01 |
| 1,3,5-trimethylbenzene                 | 2.22E+00                                                        | 2.20E+00   | 2.39E+00   | 2.45E+00   | 1.10E+00   | 1.10E+00   | 1.42E+00   | 1.44E+00   | 1.36E+00   | 2.45E+00 |
| 1,2,4-trimethylbenzene                 | 4.25E+00                                                        | 4.20E+00   | 4.57E+00   | 4.69E+00   | 2.09E+00   | 2.10E+00   | 2.71E+00   | 2.75E+00   | 2.60E+00   | 4.69E+00 |
| sec-butylbenzene                       | 1.90E-01                                                        | 1.87E-01   | 2.04E-01   | 2.09E-01   | 9.35E-02   | 9.35E-02   | 1.21E-01   | 1.23E-01   | 1.16E-01   | 2.09E-01 |
| 1,2,4-trichlorobenzene                 | 3.60E+02                                                        | 3.55E+02   | 3.87E+02   | 3.97E+02   | 1.77E+02   | 1.77E+02   | 2.29E+02   | 2.33E+02   | 2.20E+02   | 3.97E+02 |
| 1,2,3-trichlorobenzene                 | 1.67E+01                                                        | 1.65E+01   | 1.79E+01   | 1.84E+01   | 8.22E+00   | 8.22E+00   | 1.06E+01   | 1.08E+01   | 1.02E+01   | 1.84E+01 |
| p-isopropyltoluene                     | 3.14E-01                                                        | 3.10E-01   | 3.38E-01   | 3.46E-01   | 1.55E-01   | 1.55E-01   | 2.00E-01   | 2.03E-01   | 1.92E-01   | 3.46E-01 |
| Hg                                     | 6.82E-05                                                        | 1.38E-05   | 2.25E-04   | 2.11E-04   | 9.20E-05   | 6.08E-05   | 1.13E-04   | 8.33E-05   | 6.91E-05   | 2.25E-04 |
| As                                     | 3.17E-04                                                        | 6.39E-05   | 1.04E-03   | 9.78E-04   | 4.27E-04   | 2.82E-04   | 5.25E-04   | 3.87E-04   | 3.21E-04   | 1.04E-03 |
| Pb                                     | 1.00E-03                                                        | 2.02E-04   | 3.31E-03   | 3.09E-03   | 1.35E-03   | 8.93E-04   | 1.66E-03   | 1.23E-03   | 1.02E-03   | 3.31E-03 |
| Tl                                     | 2.93E-05                                                        | 5.91E-06   | 9.66E-05   | 9.04E-05   | 3.95E-05   | 2.61E-05   | 4.85E-05   | 3.58E-05   | 2.97E-05   | 9.66E-05 |
| Ba                                     | 2.37E-03                                                        | 4.78E-04   | 7.82E-03   | 7.31E-03   | 3.20E-03   | 2.11E-03   | 3.93E-03   | 2.89E-03   | 2.40E-03   | 7.82E-03 |
| Cd                                     | 1.27E-04                                                        | 2.56E-05   | 4.18E-04   | 3.91E-04   | 1.71E-04   | 1.13E-04   | 2.10E-04   | 1.55E-04   | 1.28E-04   | 4.18E-04 |
| Total Cr                               | 3.27E-04                                                        | 6.61E-05   | 1.08E-03   | 1.01E-03   | 4.42E-04   | 2.92E-04   | 5.42E-04   | 4.00E-04   | 3.32E-04   | 1.08E-03 |
| Cu                                     | 2.17E-04                                                        | 4.38E-05   | 7.17E-04   | 6.71E-04   | 2.93E-04   | 1.94E-04   | 3.60E-04   | 2.65E-04   | 2.20E-04   | 7.17E-04 |
| Ni                                     | 1.04E-04                                                        | 2.10E-05   | 3.44E-04   | 3.22E-04   | 1.41E-04   | 9.28E-05   | 1.73E-04   | 1.27E-04   | 1.06E-04   | 3.44E-04 |
| Sb                                     | 8.12E-05                                                        | 1.64E-05   | 2.68E-04   | 2.51E-04   | 1.10E-04   | 7.23E-05   | 1.35E-04   | 9.92E-05   | 8.22E-05   | 2.68E-04 |
| Va                                     | 1.50E-04                                                        | 3.04E-05   | 4.96E-04   | 4.64E-04   | 2.03E-04   | 1.34E-04   | 2.49E-04   | 1.84E-04   | 1.52E-04   | 4.96E-04 |
| Zn                                     | 4.73E-03                                                        | 9.54E-04   | 1.56E-02   | 1.46E-02   | 6.38E-03   | 4.21E-03   | 7.84E-03   | 5.78E-03   | 4.79E-03   | 1.56E-02 |

| Species                                | Total Concentration: 20m (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          | Total Concentration: 20m (8hr AT, mg/m^3) |            |            |            |            |            |            |            |            |  |
|----------------------------------------|--------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
|                                        | Receptor 1                                       | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      | Receptor 1                                | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 |  |
| NOx                                    | 3.21E+01                                         | 9.32E+00   | 1.28E+02   | 1.16E+02   | 2.78E+01   | 1.64E+01   | 3.73E+01   | 4.29E+01   | 2.17E+01   | 1.28E+02 | 3.21E-02                                  | 9.32E-03   | 1.28E-01   | 1.16E-01   | 2.78E-02   | 1.64E-02   | 3.73E-02   | 4.29E-02   | 2.17E-02   |  |
| CO                                     | 2.51E+00                                         | 7.09E-01   | 1.01E+01   | 9.11E+00   | 2.17E+00   | 1.27E+00   | 2.92E+00   | 3.35E+00   | 1.69E+00   | 1.01E+01 | 2.51E-03                                  | 7.09E-04   | 1.01E-02   | 9.11E-03   | 2.17E-03   | 1.27E-03   | 2.92E-03   | 3.35E-03   | 1.69E-03   |  |
| PM10                                   | 1.23E+01                                         | 3.90E+00   | 4.74E+01   | 4.30E+01   | 1.06E+01   | 6.49E+00   | 1.41E+01   | 1.62E+01   | 8.44E+00   | 4.74E+01 | 1.23E-02                                  | 3.90E-03   | 4.74E-02   | 4.30E-02   | 1.06E-02   | 6.49E-03   | 1.41E-02   | 1.62E-02   | 8.44E-03   |  |
| SO2                                    | 1.10E+00                                         | 3.18E-01   | 4.38E+00   | 3.97E+00   | 9.51E-01   | 5.63E-01   | 1.28E+00   | 1.47E+00   | 7.44E-01   | 4.38E+00 | 1.10E-03                                  | 3.18E-04   | 4.38E-03   | 3.97E-03   | 9.51E-04   | 5.63E-04   | 1.28E-03   | 1.47E-03   | 7.44E-04   |  |
| HCl                                    | 2.26E+00                                         | 2.38E+00   | 2.26E+00   | 2.29E+00   | 1.98E+00   | 2.24E+00   | 2.14E+00   | 2.28E+00   | 2.28E+00   | 2.38E+00 | 2.26E-03                                  | 2.38E-03   | 2.26E-03   | 2.29E-03   | 1.98E-03   | 2.24E-03   | 2.14E-03   | 2.28E-03   | 2.28E-03   |  |
| B(a)P (dustborne)                      | 9.96E-05                                         | 6.37E-05   | 1.04E-04   | 1.14E-04   | 6.45E-05   | 5.12E-05   | 7.02E-05   | 7.20E-05   | 4.39E-05   | 1.14E-04 | 9.96E-08                                  | 6.37E-08   | 1.04E-07   | 1.14E-07   | 6.45E-08   | 5.12E-08   | 7.02E-08   | 7.20E-08   | 4.39E-08   |  |
| DDD (dustborne)                        | 3.07E-03                                         | 1.97E-03   | 3.22E-03   | 3.53E-03   | 1.99E-03   | 1.58E-03   | 2.17E-03   | 2.22E-03   | 1.36E-03   | 3.53E-03 | 3.07E-06                                  | 1.97E-06   | 3.22E-06   | 3.53E-06   | 1.99E-06   | 1.58E-06   | 2.17E-06   | 2.22E-06   | 1.36E-06   |  |
| Dieldrin (dustborne)                   | 4.56E-05                                         | 2.92E-05   | 4.78E-05   | 5.23E-05   | 2.95E-05   | 2.34E-05   | 3.22E-05   | 3.30E-05   | 2.01E-05   | 5.23E-05 | 4.56E-08                                  | 2.92E-08   | 4.78E-08   | 5.23E-08   | 2.95E-08   | 2.34E-08   | 3.22E-08   | 3.30E-08   | 2.01E-08   |  |
| PAH's                                  | 3.93E-06                                         | 2.89E-06   | 8.84E-06   | 8.26E-06   | 3.43E-06   | 3.11E-06   | 4.08E-06   | 4.50E-06   | 3.43E-06   | 8.84E-06 | 3.93E-09                                  | 2.89E-09   | 8.84E-09   | 8.26E-09   | 3.43E-09   | 3.11E-09   | 4.08E-09   | 4.50E-09   | 3.43E-09   |  |
| PCB's (vapour)                         | 6.04E-04                                         | 1.58E-04   | 2.47E-03   | 2.24E-03   | 5.22E-04   | 2.99E-04   | 7.06E-04   | 8.13E-04   | 4.02E-04   | 2.47E-03 | 6.04E-07                                  | 1.58E-07   | 2.47E-06   | 2.24E-06   | 5.22E-07   | 2.99E-07   | 7.06E-07   | 8.13E-07   | 4.02E-07   |  |
| PCB's (dustborne)                      | 3.14E-03                                         | 2.01E-03   | 3.29E-03   | 3.60E-03   | 2.03E-03   | 1.61E-03   | 2.21E-03   | 2.27E-03   | 1.38E-03   | 3.60E-03 | 3.14E-06                                  | 2.01E-06   | 3.29E-06   | 3.60E-06   | 2.03E-06   | 1.61E-06   | 2.21E-06   | 2.27E-06   | 1.38E-06   |  |
| Dioxins/Furans(TEQ vapour)             | 1.43E-07                                         | 9.12E-08   | 1.51E-07   | 1.65E-07   | 9.26E-08   | 7.33E-08   | 1.01E-07   | 1.04E-07   | 6.31E-08   | 1.65E-07 | 1.43E-10                                  | 9.12E-11   | 1.51E-10   | 1.65E-10   | 9.26E-11   | 7.33E-11   | 1.01E-10   | 1.04E-10   | 6.31E-11   |  |
| Dioxins/Furans(TEQ Dustborne)          | 2.72E-07                                         | 1.74E-07   | 2.85E-07   | 3.12E-07   | 1.76E-07   | 1.40E-07   | 1.92E-07   | 1.97E-07   | 1.20E-07   | 3.12E-07 | 2.72E-10                                  | 1.74E-10   | 2.85E-10   | 3.12E-10   | 1.76E-10   | 1.40E-10   | 1.92E-10   | 1.97E-10   | 1.20E-10   |  |
| Dichloromethane                        | 1.35E-04                                         | 3.54E-05   | 5.52E-04   | 5.00E-04   | 1.17E-04   | 6.67E-05   | 1.58E-04   | 1.82E-04   | 8.97E-05   | 5.52E-04 | 1.35E-07                                  | 3.54E-08   | 5.52E-07   | 5.00E-07   | 1.17E-07   | 6.67E-08   | 1.58E-07   | 1.82E-07   | 8.97E-08   |  |
| Dibromoethane                          | 4.63E-04                                         | 1.21E-04   | 1.89E-03   | 1.71E-03   | 4.00E-04   | 2.29E-04   | 5.41E-04   | 6.23E-04   | 3.08E-04   | 1.89E-03 | 4.63E-07                                  | 1.21E-07   | 1.89E-06   | 1.71E-06   | 4.00E-07   | 2.29E-07   | 5.41E-07   | 6.23E-07   | 3.08E-07   |  |
| Phenol                                 | 2.80E-06                                         | 2.95E-06   | 2.80E-06   | 2.84E-06   | 2.45E-06   | 2.77E-06   | 2.66E-06   | 2.82E-06   | 2.83E-06   | 2.95E-06 | 2.80E-09                                  | 2.95E-09   | 2.80E-09   | 2.84E-09   | 2.45E-09   | 2.77E-09   | 2.66E-09   | 2.82E-09   | 2.83E-09   |  |
| 2-Chlorophenol                         | 2.50E-02                                         | 1.60E-02   | 2.62E-02   | 2.87E-02   | 1.62E-02   | 1.28E-02   | 1.76E-02   | 1.81E-02   | 1.10E-02   | 2.87E-02 | 2.50E-05                                  | 1.60E-05   | 2.62E-05   | 2.87E-05   | 1.62E-05   | 1.28E-05   | 1.76E-05   | 1.81E-05   | 1.10E-05   |  |
| Benzene                                | 1.02E+01                                         | 6.55E+00   | 1.07E+01   | 1.18E+01   | 6.63E+00   | 5.26E+00   | 7.22E+00   | 7.40E+00   | 4.51E+00   | 1.18E+01 | 1.02E-02                                  | 6.55E-03   | 1.07E-02   | 1.18E-02   | 6.63E-03   | 5.26E-03   | 7.22E-03   | 7.40E-03   | 4.51E-03   |  |
| Chlorobenzene                          | 7.21E+01                                         | 4.61E+01   | 7.55E+01   | 8.27E+01   | 4.67E+01   | 3.70E+01   | 5.08E+01   | 5.21E+01   | 3.18E+01   | 8.27E+01 | 7.21E-02                                  | 4.61E-02   | 7.55E-02   | 8.27E-02   | 4.67E-02   | 3.70E-02   | 5.08E-02   | 5.21E-02   | 3.18E-02   |  |
| Dichlorobenzene                        | 1.05E-04                                         | 1.10E-04   | 1.05E-04   | 1.06E-04   | 9.20E-05   | 1.04E-04   | 9.96E-05   | 1.06E-04   | 1.06E-04   | 1.10E-04 | 1.05E-07                                  | 1.10E-07   | 1.05E-07   | 1.06E-07   | 9.20E-08   | 1.04E-07   | 9.96E-08   | 1.06E-07   | 1.06E-07   |  |
| 1,2-Dichlorobenzene                    | 2.79E+01                                         | 1.79E+01   | 2.92E+01   | 3.21E+01   | 1.81E+01   | 1.43E+01   | 1.97E+01   | 2.02E+01   | 1.23E+01   | 3.21E+01 | 2.79E-02                                  | 1.79E-02   | 2.92E-02   | 3.21E-02   | 1.81E-02   | 1.43E-02   | 1.97E-02   | 2.02E-02   | 1.23E-02   |  |
| 1,3-Dichlorobenzene                    | 6.21E-01                                         | 3.98E-01   | 6.51E-01   | 7.13E-01   | 4.02E-01   | 3.19E-01   | 4.38E-01   | 4.49E-01   | 2.74E-01   | 7.13E-01 | 6.21E-04                                  | 3.98E-04   | 6.51E-04   | 7.13E-04   | 4.02E-04   | 3.19E-04   | 4.38E-04   | 4.49E-04   | 2.74E-04   |  |
| 1,4-Dichlorobenzene                    | 6.47E+01                                         | 4.14E+01   | 6.78E+01   | 7.43E+01   | 4.19E+01   | 3.33E+01   | 4.57E+01   | 4.68E+01   | 2.85E+01   | 7.43E+01 | 6.47E-02                                  | 4.14E-02   | 6.78E-02   | 7.43E-02   | 4.19E-02   | 3.33E-02   | 4.57E-02   | 4.68E-02   | 2.85E-02   |  |
| Tetrachlorobenzene                     | 1.24E+00                                         | 7.96E-01   | 1.30E+00   | 1.43E+00   | 8.06E-01   | 6.39E-01   | 8.78E-01   | 9.00E-01   | 5.49E-01   | 1.43E+00 | 1.24E-03                                  | 7.96E-04   | 1.30E-03   | 1.43E-03   | 8.06E-04   | 6.39E-04   | 8.78E-04   | 9.00E-04   | 5.49E-04   |  |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 1.96E-02                                         | 1.25E-02   | 2.05E-02   | 2.25E-02   | 1.27E-02   | 1.00E-02   | 1.38E-02   | 1.41E-02   | 8.62E-03   | 2.25E-02 | 1.96E-05                                  | 1.25E-05   | 2.05E-05   | 2.25E-05   | 1.27E-05   | 1.00E-05   | 1.38E-05   | 1.41E-05   | 8.62E-06   |  |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 1.11E-02                                         | 7.09E-03   | 1.16E-02   | 1.27E-02   | 7.18E-03   | 5.70E-03   | 7.82E-03   | 8.02E-03   | 4.89E-03   | 1.27E-02 | 1.11E-05                                  | 7.09E-06   | 1.16E-05   | 1.27E-05   | 7.18E-06   | 5.70E-06   | 7.82E-06   | 8.02E-06   | 4.89E-06   |  |
| Pentachlorobenzene                     | 6.25E-02                                         | 4.00E-02   | 6.55E-02   | 7.18E-02   | 4.05E-02   | 3.21E-02   | 4.41E-02   | 4.52E-02   | 2.76E-02   | 7.18E-02 | 6.25E-05                                  | 4.00E-05   | 6.55E-05   | 7.18E-05   | 4.05E-05   | 3.21E-05   | 4.41E-05   | 4.52E-05   | 2.76E-05   |  |
| Hexachlorobenzene (vapour)             | 1.18E-02                                         | 7.56E-03   | 1.24E-02   | 1.36E-02   | 7.65E-03   | 6.07E-03   | 8.34E-03   | 8.55E-03   | 5.21E-03   | 1.36E-02 | 1.18E-05                                  | 7.56E-06   | 1.24E-05   | 1.36E-05   | 7.65E-06   | 6.07E-06   | 8.34E-06   | 8.55E-06   | 5.21E-06   |  |
| Hexachlorobenzene (dustborne)          | 5.19E-04                                         | 3.32E-04   | 5.43E-04   | 5.95E-04   | 3.36E-04   | 2.67E-04   | 3.66E-04   | 3.75E-04   | 2.29E-04   | 5.95E-04 | 5.19E-07                                  | 3.32E-07   | 5.43E-07   | 5.95E-07   | 3.36E-07   | 2.67E-07   | 3.66E-07   | 3.75E-07   | 2.29E-07   |  |
| Ethylbenzene                           | 6.57E+00                                         | 4.20E+00   | 6.88E+00   | 7.54E+00   | 4.25E+00   | 3.37E+00   | 4.63E+00   | 4.75E+00   | 2.90E+00   | 7.54E+00 | 6.57E-03                                  | 4.20E-03   | 6.88E-03   | 7.54E-03   | 4.25E-03   | 3.37E-03   | 4.63E-03   | 4.75E-03   | 2.90E-03   |  |
| Napthalene (vapour)                    | 2.47E+00                                         | 1.58E+00   | 2.58E+00   | 2.83E+00   | 1.60E+00   | 1.27E+00   | 1.74E+00   | 1.78E+00   | 1.09E+00   | 2.83E+00 | 2.47E-03                                  | 1.58E-03   | 2.58E-03   | 2.83E-03   | 1.60E-03   | 1.27E-03   | 1.74E-03   | 1.78E-03   | 1.09E-03   |  |
| Napthalene (dustborne)                 | 4.12E-03                                         | 2.64E-03   | 4.32E-03   | 4.73E-03   | 2.67E-03   | 2.12E-03   | 2.91E-03   | 2.98E-03   | 1.82E-03   | 4.73E-03 | 4.12E-06                                  | 2.64E-06   | 4.32E-06   | 4.73E-06   | 2.67E-06   | 2.12E-06   | 2.91E-06   | 2.98E-06   | 1.82E-06   |  |
| Xylenes                                | 2.10E+00                                         | 1.35E+00   | 2.20E+00   | 2.41E+00   | 1.36E+00   | 1.08E+00   | 1.48E+00   | 1.52E+00   | 9.27E-01   | 2.41E+00 | 2.10E-03                                  | 1.35E-03   | 2.20E-03   | 2.41E-03   | 1.36E-03   | 1.08E-03   | 1.48E-03   | 1.52E-03   | 9.27E-04   |  |
| Hg                                     | 1.49E-04                                         | 3.90E-05   | 6.08E-04   | 5.51E-04   | 1.28E-04   | 7.35E-05   | 1.74E-04   | 2.00E-04   | 9.88E-05   | 6.08E-04 | 1.49E-07                                  | 3.90E-08   | 6.08E-07   | 5.51E-07   | 1.28E-07   | 7.35E-08   | 1.74E-07   | 2.00E-07   | 9.8        |  |

| Species                                | Total Concentration: 20m (8hr AT, microgram/m^3) |            |            |            |            |            |            |            |            |          | Total Concentration: 20m (8hr AT, mg/m^3) |            |            |            |            |            |            |            |            |  |
|----------------------------------------|--------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-------------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
|                                        | Receptor 1                                       | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      | Receptor 1                                | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 |  |
| NOx                                    | 4.72E+01                                         | 2.07E+01   | 2.06E+02   | 1.86E+02   | 3.53E+01   | 2.03E+01   | 4.95E+01   | 6.97E+01   | 2.92E+01   | 2.06E+02 | 4.72E-02                                  | 2.07E-02   | 2.06E-01   | 1.86E-01   | 3.53E-02   | 2.03E-02   | 4.95E-02   | 6.97E-02   | 2.92E-02   |  |
| CO                                     | 3.68E+00                                         | 1.58E+00   | 1.62E+01   | 1.46E+01   | 2.75E+00   | 1.56E+00   | 3.86E+00   | 5.45E+00   | 2.26E+00   | 1.62E+01 | 3.68E-03                                  | 1.58E-03   | 1.62E-02   | 1.46E-02   | 2.75E-03   | 1.56E-03   | 3.86E-03   | 5.45E-03   | 2.26E-03   |  |
| PM10                                   | 1.81E+01                                         | 8.39E+00   | 7.63E+01   | 6.91E+01   | 1.36E+01   | 8.17E+00   | 1.89E+01   | 2.63E+01   | 1.15E+01   | 7.63E+01 | 1.81E-02                                  | 8.39E-03   | 7.63E-02   | 6.91E-02   | 1.36E-02   | 8.17E-03   | 1.89E-02   | 2.63E-02   | 1.15E-02   |  |
| SO2                                    | 1.62E+00                                         | 7.06E-01   | 7.05E+00   | 6.38E+00   | 1.21E+00   | 6.93E-01   | 1.69E+00   | 2.39E+00   | 9.98E-01   | 7.05E+00 | 1.62E-03                                  | 7.06E-04   | 7.05E-03   | 6.38E-03   | 1.21E-03   | 6.93E-04   | 1.69E-03   | 2.39E-03   | 9.98E-04   |  |
| HCl                                    | 3.85E+00                                         | 4.01E+00   | 3.91E+00   | 4.06E+00   | 3.24E+00   | 3.62E+00   | 3.57E+00   | 3.73E+00   | 3.77E+00   | 4.06E+00 | 3.85E-03                                  | 4.01E-03   | 3.91E-03   | 4.06E-03   | 3.24E-03   | 3.62E-03   | 3.57E-03   | 3.73E-03   | 3.77E-03   |  |
| B(a)P (dustborne)                      | 2.38E-04                                         | 1.45E-04   | 1.65E-04   | 1.59E-04   | 1.41E-04   | 9.73E-05   | 1.76E-04   | 1.23E-04   | 1.17E-04   | 2.38E-04 | 2.38E-07                                  | 1.45E-07   | 1.65E-07   | 1.59E-07   | 1.41E-07   | 9.73E-08   | 1.76E-07   | 1.23E-07   | 1.17E-07   |  |
| DDD (dustborne)                        | 7.36E-03                                         | 4.48E-03   | 5.09E-03   | 4.92E-03   | 4.35E-03   | 3.00E-03   | 5.43E-03   | 3.80E-03   | 3.60E-03   | 7.36E-03 | 7.36E-06                                  | 4.48E-06   | 5.09E-06   | 4.92E-06   | 4.35E-06   | 3.00E-06   | 5.43E-06   | 3.80E-06   | 3.60E-06   |  |
| Dieldrin (dustborne)                   | 1.09E-04                                         | 6.64E-05   | 7.56E-05   | 7.30E-05   | 6.45E-05   | 4.45E-05   | 8.05E-05   | 5.64E-05   | 5.34E-05   | 1.09E-04 | 1.09E-07                                  | 6.64E-08   | 7.56E-08   | 7.30E-08   | 6.45E-08   | 4.45E-08   | 8.05E-08   | 5.64E-08   | 5.34E-08   |  |
| PAH's                                  | 6.32E-06                                         | 5.12E-06   | 1.45E-05   | 1.36E-05   | 5.09E-06   | 4.70E-06   | 6.15E-06   | 7.35E-06   | 5.31E-06   | 1.45E-05 | 6.32E-09                                  | 5.12E-09   | 1.45E-08   | 1.36E-08   | 5.09E-09   | 4.70E-09   | 6.15E-09   | 7.35E-09   | 5.31E-09   |  |
| PCB's (vapour)                         | 8.83E-04                                         | 3.63E-04   | 3.97E-03   | 3.59E-03   | 6.56E-04   | 3.60E-04   | 9.29E-04   | 1.32E-03   | 5.32E-04   | 3.97E-03 | 8.83E-07                                  | 3.63E-07   | 3.97E-06   | 3.59E-06   | 6.56E-07   | 3.60E-07   | 9.29E-07   | 1.32E-06   | 5.32E-07   |  |
| PCB's (dustborne)                      | 7.51E-03                                         | 4.57E-03   | 5.20E-03   | 5.02E-03   | 4.44E-03   | 3.07E-03   | 5.54E-03   | 3.88E-03   | 3.67E-03   | 7.51E-03 | 7.51E-06                                  | 4.57E-06   | 5.20E-06   | 5.02E-06   | 4.44E-06   | 3.07E-06   | 5.54E-06   | 3.88E-06   | 3.67E-06   |  |
| Dioxins/Furans(TEQ vapour)             | 3.41E-07                                         | 2.07E-07   | 2.39E-07   | 2.31E-07   | 2.02E-07   | 1.39E-07   | 2.52E-07   | 1.77E-07   | 1.67E-07   | 3.41E-07 | 3.41E-10                                  | 2.07E-10   | 2.39E-10   | 2.31E-10   | 2.02E-10   | 1.39E-10   | 2.52E-10   | 1.77E-10   | 1.67E-10   |  |
| Dioxins/Furans(TEQ Dustborne)          | 6.51E-07                                         | 3.96E-07   | 4.51E-07   | 4.35E-07   | 3.85E-07   | 2.66E-07   | 4.80E-07   | 3.36E-07   | 3.18E-07   | 6.51E-07 | 6.51E-10                                  | 3.96E-10   | 4.51E-10   | 4.35E-10   | 3.85E-10   | 2.66E-10   | 4.80E-10   | 3.36E-10   | 3.18E-10   |  |
| Dichloromethane                        | 1.97E-04                                         | 8.12E-05   | 8.87E-04   | 8.01E-04   | 1.47E-04   | 8.04E-05   | 2.08E-04   | 2.95E-04   | 1.19E-04   | 8.87E-04 | 1.97E-07                                  | 8.12E-08   | 8.87E-07   | 8.01E-07   | 1.47E-07   | 8.04E-08   | 2.08E-07   | 2.95E-07   | 1.19E-07   |  |
| Dibromoethane                          | 6.77E-04                                         | 2.78E-04   | 3.04E-03   | 2.75E-03   | 5.03E-04   | 2.76E-04   | 7.12E-04   | 1.01E-03   | 4.07E-04   | 3.04E-03 | 6.77E-07                                  | 2.78E-07   | 3.04E-06   | 2.75E-06   | 5.03E-07   | 2.76E-07   | 7.12E-07   | 1.01E-06   | 4.07E-07   |  |
| Phenol                                 | 4.76E-06                                         | 4.96E-06   | 4.84E-06   | 5.03E-06   | 4.01E-06   | 4.48E-06   | 4.42E-06   | 4.62E-06   | 4.67E-06   | 5.03E-06 | 4.76E-09                                  | 4.96E-09   | 4.84E-09   | 5.03E-09   | 4.01E-09   | 4.48E-09   | 4.42E-09   | 4.62E-09   | 4.67E-09   |  |
| 2-Chlorophenol                         | 5.98E-02                                         | 3.64E-02   | 4.14E-02   | 4.00E-02   | 3.54E-02   | 2.44E-02   | 4.41E-02   | 3.09E-02   | 2.93E-02   | 5.98E-02 | 5.98E-05                                  | 3.64E-05   | 4.14E-05   | 4.00E-05   | 3.54E-05   | 2.44E-05   | 4.41E-05   | 3.09E-05   | 2.93E-05   |  |
| Benzene                                | 2.45E+01                                         | 1.49E+01   | 1.70E+01   | 1.64E+01   | 1.45E+01   | 1.00E+01   | 1.81E+01   | 1.27E+01   | 1.20E+01   | 2.45E+01 | 2.45E-02                                  | 1.49E-02   | 1.70E-02   | 1.64E-02   | 1.45E-02   | 1.00E-02   | 1.81E-02   | 1.27E-02   | 1.20E-02   |  |
| Chlorobenzene                          | 1.72E+02                                         | 1.05E+02   | 1.19E+02   | 1.15E+02   | 1.02E+02   | 7.04E+01   | 1.27E+02   | 8.92E+01   | 8.44E+01   | 1.72E+02 | 1.72E-01                                  | 1.05E-01   | 1.19E-01   | 1.15E-01   | 1.02E-01   | 7.04E-02   | 1.27E-01   | 8.92E-02   | 8.44E-02   |  |
| Dichlorobenzene                        | 1.79E-04                                         | 1.86E-04   | 1.81E-04   | 1.89E-04   | 1.50E-04   | 1.68E-04   | 1.66E-04   | 1.73E-04   | 1.75E-04   | 1.89E-04 | 1.79E-07                                  | 1.86E-07   | 1.81E-07   | 1.89E-07   | 1.50E-07   | 1.68E-07   | 1.66E-07   | 1.73E-07   | 1.75E-07   |  |
| 1,2-Dichlorobenzene                    | 6.68E+01                                         | 4.06E+01   | 4.63E+01   | 4.47E+01   | 3.95E+01   | 2.73E+01   | 4.93E+01   | 3.46E+01   | 3.27E+01   | 6.68E+01 | 6.68E-02                                  | 4.06E-02   | 4.63E-02   | 4.47E-02   | 3.95E-02   | 2.73E-02   | 4.93E-02   | 3.46E-02   | 3.27E-02   |  |
| 1,3-Dichlorobenzene                    | 1.49E+00                                         | 9.04E-01   | 1.03E+00   | 9.94E-01   | 8.79E-01   | 6.07E-01   | 1.10E+00   | 7.69E-01   | 7.27E-01   | 1.49E+00 | 1.49E-03                                  | 9.04E-04   | 1.03E-03   | 9.94E-04   | 8.79E-04   | 6.07E-04   | 1.10E-03   | 7.69E-04   | 7.27E-04   |  |
| 1,4-Dichlorobenzene                    | 1.55E+02                                         | 9.42E+01   | 1.07E+02   | 1.04E+02   | 9.16E+01   | 6.32E+01   | 1.14E+02   | 8.01E+01   | 7.58E+01   | 1.55E+02 | 1.55E-01                                  | 9.42E-02   | 1.07E-01   | 1.04E-01   | 9.16E-02   | 6.32E-02   | 1.14E-01   | 8.01E-02   | 7.58E-02   |  |
| Tetrachlorobenzene                     | 2.98E+00                                         | 1.81E+00   | 2.06E+00   | 1.99E+00   | 1.76E+00   | 1.22E+00   | 2.20E+00   | 1.54E+00   | 1.46E+00   | 2.98E+00 | 2.98E-03                                  | 1.81E-03   | 2.06E-03   | 1.99E-03   | 1.76E-03   | 1.22E-03   | 2.20E-03   | 1.54E-03   | 1.46E-03   |  |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 4.68E-02                                         | 2.85E-02   | 3.24E-02   | 3.13E-02   | 2.77E-02   | 1.91E-02   | 3.45E-02   | 2.42E-02   | 2.29E-02   | 4.68E-02 | 4.68E-05                                  | 2.85E-05   | 3.24E-05   | 3.13E-05   | 2.77E-05   | 1.91E-05   | 3.45E-05   | 2.42E-05   | 2.29E-05   |  |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 2.65E-02                                         | 1.61E-02   | 1.84E-02   | 1.77E-02   | 1.57E-02   | 1.08E-02   | 1.96E-02   | 1.37E-02   | 1.30E-02   | 2.65E-02 | 2.65E-05                                  | 1.61E-05   | 1.84E-05   | 1.77E-05   | 1.57E-05   | 1.08E-05   | 1.96E-05   | 1.37E-05   | 1.30E-05   |  |
| Pentachlorobenzene                     | 1.50E-01                                         | 9.10E-02   | 1.04E-01   | 1.00E-01   | 8.85E-02   | 6.11E-02   | 1.10E-01   | 7.74E-02   | 7.32E-02   | 1.50E-01 | 1.50E-04                                  | 9.10E-05   | 1.04E-04   | 1.00E-04   | 8.85E-05   | 6.11E-05   | 1.10E-04   | 7.74E-05   | 7.32E-05   |  |
| Hexachlorobenzene (vapour)             | 2.83E-02                                         | 1.72E-02   | 1.96E-02   | 1.89E-02   | 1.67E-02   | 1.15E-02   | 2.09E-02   | 1.46E-02   | 1.38E-02   | 2.83E-02 | 2.83E-05                                  | 1.72E-05   | 1.96E-05   | 1.89E-05   | 1.67E-05   | 1.15E-05   | 2.09E-05   | 1.46E-05   | 1.38E-05   |  |
| Hexachlorobenzene (dustborne)          | 1.24E-03                                         | 7.55E-04   | 8.59E-04   | 8.30E-04   | 7.34E-04   | 5.07E-04   | 9.16E-04   | 6.42E-04   | 6.07E-04   | 1.24E-03 | 1.24E-06                                  | 7.55E-07   | 8.59E-07   | 8.30E-07   | 7.34E-07   | 5.07E-07   | 9.16E-07   | 6.42E-07   | 6.07E-07   |  |
| Ethylbenzene                           | 1.57E+01                                         | 9.56E+00   | 1.09E+01   | 1.05E+01   | 9.29E+00   | 6.42E+00   | 1.16E+01   | 8.13E+00   | 7.69E+00   | 1.57E+01 | 1.57E-02                                  | 9.56E-03   | 1.09E-02   | 1.05E-02   | 9.29E-03   | 6.42E-03   | 1.16E-02   | 8.13E-03   | 7.69E-03   |  |
| Napthalene (vapour)                    | 5.90E+00                                         | 3.59E+00   | 4.09E+00   | 3.95E+00   | 3.49E+00   | 2.41E+00   | 4.36E+00   | 3.05E+00   | 2.89E+00   | 5.90E+00 | 5.90E-03                                  | 3.59E-03   | 4.09E-03   | 3.95E-03   | 3.49E-03   | 2.41E-03   | 4.36E-03   | 3.05E-03   | 2.89E-03   |  |
| Napthalene (dustborne)                 | 9.86E-03                                         | 6.00E-03   | 6.83E-03   | 6.60E-03   | 5.83E-03   | 4.03E-03   | 7.27E-03   | 5.10E-03   | 4.82E-03   | 9.86E-03 | 9.86E-06                                  | 6.00E-06   | 6.83E-06   | 6.60E-06   | 5.83E-06   | 4.03E-06   | 7.27E-06   | 5.10E-06   | 4.82E-06   |  |
| Xylenes                                | 5.03E+00                                         | 3.06E+00   | 3.48E+00   | 3.37E+00   | 2.97E+00   | 2.05E+00   | 3.71E+00   | 2.60E+00   | 2.46E+00   | 5.03E+00 | 5.03E-03                                  | 3.06E-03   | 3.48E-03   | 3.37E-03   | 2.97E-03   | 2.05E-03   | 3.71E-03   | 2.60E-03   | 2.46E-03   |  |
| Hg                                     | 2.17E-04                                         | 8.95E-05   | 9.77E-04   | 8.83E-04   | 1.61E-04   | 8.86E-05   | 2.29E-04   | 3.25E-04   | 1.31E-04   | 9.77E-04 | 2.17E-07                                  | 8.95E-08   | 9.77E-07   | 8.83E-07   | 1.61E-07   | 8.86E-08   | 2.29E-07   | 3.25E-07   | 1.3        |  |

| Species                                | Total Concentration: 40m (8hr AT, microgram/m^3) |          |          |          |          |          |          |          |          |          |     | Total Concentration: 40m (8hr AT, mg/m^3) |          |          |          |          |          |          |          |          |  |
|----------------------------------------|--------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----|-------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|--|
|                                        | Receptor                                         | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | MAX | Receptor                                  | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor | Receptor |  |
|                                        | 1                                                | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |          |     | 1                                         | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        |  |
| NOx                                    | 8.12E+01                                         | 1.10E+02 | 1.97E+02 | 1.80E+02 | 4.06E+01 | 2.97E+01 | 5.40E+01 | 7.85E+01 | 4.54E+01 | 1.97E+02 |     | 8.12E-02                                  | 1.10E-01 | 1.97E-01 | 1.80E-01 | 4.06E-02 | 2.97E-02 | 5.40E-02 | 7.85E-02 | 4.54E-02 |  |
| CO                                     | 6.34E+00                                         | 8.64E+00 | 1.55E+01 | 1.41E+01 | 3.15E+00 | 2.29E+00 | 4.20E+00 | 6.13E+00 | 3.52E+00 | 1.55E+01 |     | 6.34E-03                                  | 8.64E-03 | 1.55E-02 | 1.41E-02 | 3.15E-03 | 2.29E-03 | 4.20E-03 | 6.13E-03 | 3.52E-03 |  |
| PM10                                   | 3.09E+01                                         | 4.17E+01 | 7.35E+01 | 6.74E+01 | 1.58E+01 | 1.19E+01 | 2.09E+01 | 2.99E+01 | 1.77E+01 | 7.35E+01 |     | 3.09E-02                                  | 4.17E-02 | 7.35E-02 | 6.74E-02 | 1.58E-02 | 1.19E-02 | 2.09E-02 | 2.99E-02 | 1.77E-02 |  |
| SO2                                    | 2.78E+00                                         | 3.78E+00 | 6.75E+00 | 6.18E+00 | 1.39E+00 | 1.02E+00 | 1.85E+00 | 2.69E+00 | 1.55E+00 | 6.75E+00 |     | 2.78E-03                                  | 3.78E-03 | 6.75E-03 | 6.18E-03 | 1.39E-03 | 1.02E-03 | 1.85E-03 | 2.69E-03 | 1.55E-03 |  |
| HCl                                    | 5.57E+00                                         | 5.75E+00 | 5.89E+00 | 6.12E+00 | 4.58E+00 | 5.06E+00 | 5.09E+00 | 5.26E+00 | 5.34E+00 | 6.12E+00 |     | 5.57E-03                                  | 5.75E-03 | 5.89E-03 | 6.12E-03 | 4.58E-03 | 5.06E-03 | 5.09E-03 | 5.26E-03 | 5.34E-03 |  |
| B(a)P (dustborne)                      | 2.56E-04                                         | 2.23E-04 | 3.39E-04 | 3.92E-04 | 1.28E-04 | 1.44E-04 | 1.47E-04 | 2.28E-04 | 1.69E-04 | 3.92E-04 |     | 2.56E-07                                  | 2.23E-07 | 3.39E-07 | 3.92E-07 | 1.28E-07 | 1.44E-07 | 1.47E-07 | 2.28E-07 | 1.69E-07 |  |
| DDD (dustborne)                        | 7.89E-03                                         | 6.90E-03 | 1.05E-02 | 1.21E-02 | 3.95E-03 | 4.43E-03 | 4.55E-03 | 7.05E-03 | 5.20E-03 | 1.21E-02 |     | 7.89E-06                                  | 6.90E-06 | 1.05E-05 | 1.21E-05 | 3.95E-06 | 4.43E-06 | 4.55E-06 | 7.05E-06 | 5.20E-06 |  |
| Dieldrin (dustborne)                   | 1.17E-04                                         | 1.02E-04 | 1.55E-04 | 1.79E-04 | 5.86E-05 | 6.58E-05 | 6.74E-05 | 1.05E-04 | 7.72E-05 | 1.79E-04 |     | 1.17E-07                                  | 1.02E-07 | 1.55E-07 | 1.79E-07 | 5.86E-08 | 6.58E-08 | 6.74E-08 | 1.05E-07 | 7.72E-08 |  |
| PAH's                                  | 9.79E-06                                         | 1.15E-05 | 1.60E-05 | 1.54E-05 | 6.71E-06 | 6.65E-06 | 7.92E-06 | 9.35E-06 | 7.73E-06 | 1.60E-05 |     | 9.79E-09                                  | 1.15E-08 | 1.60E-08 | 1.54E-08 | 6.71E-09 | 6.65E-09 | 7.92E-09 | 9.35E-09 | 7.73E-09 |  |
| PCB's (vapour)                         | 1.53E-03                                         | 2.10E-03 | 3.78E-03 | 3.45E-03 | 7.46E-04 | 5.30E-04 | 1.00E-03 | 1.48E-03 | 8.33E-04 | 3.78E-03 |     | 1.53E-06                                  | 2.10E-06 | 3.78E-06 | 3.45E-06 | 7.46E-07 | 5.30E-07 | 1.00E-06 | 1.48E-06 | 8.33E-07 |  |
| PCB's (dustborne)                      | 8.05E-03                                         | 7.04E-03 | 1.07E-02 | 1.23E-02 | 4.03E-03 | 4.52E-03 | 4.64E-03 | 7.20E-03 | 5.31E-03 | 1.23E-02 |     | 8.05E-06                                  | 7.04E-06 | 1.07E-05 | 1.23E-05 | 4.03E-06 | 4.52E-06 | 4.64E-06 | 7.20E-06 | 5.31E-06 |  |
| Dioxins/Furans(TEQ vapour)             | 3.66E-07                                         | 3.21E-07 | 4.87E-07 | 5.63E-07 | 1.84E-07 | 2.06E-07 | 2.11E-07 | 3.28E-07 | 2.41E-07 | 5.63E-07 |     | 3.66E-10                                  | 3.21E-10 | 4.87E-10 | 5.63E-10 | 1.84E-10 | 2.06E-10 | 2.11E-10 | 3.28E-10 | 2.41E-10 |  |
| Dioxins/Furans(TEQ Dustborne)          | 6.98E-07                                         | 6.10E-07 | 9.26E-07 | 1.07E-06 | 3.50E-07 | 3.92E-07 | 4.02E-07 | 6.24E-07 | 4.60E-07 | 1.07E-06 |     | 6.98E-10                                  | 6.10E-10 | 9.26E-10 | 1.07E-09 | 3.50E-10 | 3.92E-10 | 4.02E-10 | 6.24E-10 | 4.60E-10 |  |
| Dichloromethane                        | 3.41E-04                                         | 4.68E-04 | 8.45E-04 | 7.72E-04 | 1.67E-04 | 1.18E-04 | 2.24E-04 | 3.30E-04 | 1.86E-04 | 8.45E-04 |     | 3.41E-07                                  | 4.68E-07 | 8.45E-07 | 7.72E-07 | 1.67E-07 | 1.18E-07 | 2.24E-07 | 3.30E-07 | 1.86E-07 |  |
| Dibromoethane                          | 1.17E-03                                         | 1.61E-03 | 2.90E-03 | 2.65E-03 | 5.72E-04 | 4.06E-04 | 7.68E-04 | 1.13E-03 | 6.38E-04 | 2.90E-03 |     | 1.17E-06                                  | 1.61E-06 | 2.90E-06 | 2.65E-06 | 5.72E-07 | 4.06E-07 | 7.68E-07 | 1.13E-06 | 6.38E-07 |  |
| Phenol                                 | 6.89E-06                                         | 7.12E-06 | 7.29E-06 | 7.58E-06 | 5.67E-06 | 6.27E-06 | 6.30E-06 | 6.51E-06 | 6.61E-06 | 7.58E-06 |     | 6.89E-09                                  | 7.12E-09 | 7.29E-09 | 7.58E-09 | 5.67E-09 | 6.27E-09 | 6.30E-09 | 6.51E-09 | 6.61E-09 |  |
| 2-Chlorophenol                         | 6.42E-02                                         | 5.61E-02 | 8.51E-02 | 9.83E-02 | 3.21E-02 | 3.60E-02 | 3.70E-02 | 5.73E-02 | 4.23E-02 | 9.83E-02 |     | 6.42E-05                                  | 5.61E-05 | 8.51E-05 | 9.83E-05 | 3.21E-05 | 3.60E-05 | 3.70E-05 | 5.73E-05 | 4.23E-05 |  |
| Benzene                                | 2.63E+01                                         | 2.30E+01 | 3.49E+01 | 4.03E+01 | 1.32E+01 | 1.48E+01 | 1.51E+01 | 2.35E+01 | 1.73E+01 | 4.03E+01 |     | 2.63E-02                                  | 2.30E-02 | 3.49E-02 | 4.03E-02 | 1.32E-02 | 1.48E-02 | 1.51E-02 | 2.35E-02 | 1.73E-02 |  |
| Chlorobenzene                          | 1.85E+02                                         | 1.62E+02 | 2.45E+02 | 2.83E+02 | 9.26E+01 | 1.04E+02 | 1.07E+02 | 1.65E+02 | 1.22E+02 | 2.83E+02 |     | 1.85E-01                                  | 1.62E-01 | 2.45E-01 | 2.83E-01 | 9.26E-02 | 1.04E-01 | 1.07E-01 | 1.65E-01 | 1.22E-01 |  |
| Dichlorobenzene                        | 2.58E-04                                         | 2.67E-04 | 2.73E-04 | 2.84E-04 | 2.13E-04 | 2.35E-04 | 2.36E-04 | 2.44E-04 | 2.48E-04 | 2.84E-04 |     | 2.58E-07                                  | 2.67E-07 | 2.73E-07 | 2.84E-07 | 2.13E-07 | 2.35E-07 | 2.36E-07 | 2.44E-07 | 2.48E-07 |  |
| 1,2-Dichlorobenzene                    | 7.17E+01                                         | 6.26E+01 | 9.50E+01 | 1.10E+02 | 3.59E+01 | 4.03E+01 | 4.13E+01 | 6.41E+01 | 4.73E+01 | 1.10E+02 |     | 7.17E-02                                  | 6.26E-02 | 9.50E-02 | 1.10E-01 | 3.59E-02 | 4.03E-02 | 4.13E-02 | 6.41E-02 | 4.73E-02 |  |
| 1,3-Dichlorobenzene                    | 1.59E+00                                         | 1.39E+00 | 2.11E+00 | 2.44E+00 | 7.99E-01 | 8.96E-01 | 9.19E-01 | 1.43E+00 | 1.05E+00 | 2.44E+00 |     | 1.59E-03                                  | 1.39E-03 | 2.11E-03 | 2.44E-03 | 7.99E-04 | 8.96E-04 | 9.19E-04 | 1.43E-03 | 1.05E-03 |  |
| 1,4-Dichlorobenzene                    | 1.66E+02                                         | 1.45E+02 | 2.20E+02 | 2.55E+02 | 8.32E+01 | 9.34E+01 | 9.57E+01 | 1.49E+02 | 1.10E+02 | 2.55E+02 |     | 1.66E-01                                  | 1.45E-01 | 2.20E-01 | 2.55E-01 | 8.32E-02 | 9.34E-02 | 9.57E-02 | 1.49E-01 | 1.10E-01 |  |
| Tetrachlorobenzene                     | 3.19E+00                                         | 2.79E+00 | 4.24E+00 | 4.90E+00 | 1.60E+00 | 1.79E+00 | 1.84E+00 | 2.86E+00 | 2.11E+00 | 4.90E+00 |     | 3.19E-03                                  | 2.79E-03 | 4.24E-03 | 4.90E-03 | 1.60E-03 | 1.79E-03 | 1.84E-03 | 2.86E-03 | 2.11E-03 |  |
| 1,2,3,4-Tetrachlorobenzene (dustborne) | 5.02E-02                                         | 4.39E-02 | 6.66E-02 | 7.69E-02 | 2.51E-02 | 2.82E-02 | 2.89E-02 | 4.49E-02 | 3.31E-02 | 7.69E-02 |     | 5.02E-05                                  | 4.39E-05 | 6.66E-05 | 7.69E-05 | 2.51E-05 | 2.82E-05 | 2.89E-05 | 4.49E-05 | 3.31E-05 |  |
| 1,2,3,5-Tetrachlorobenzene (dustborne) | 2.85E-02                                         | 2.49E-02 | 3.77E-02 | 4.36E-02 | 1.43E-02 | 1.60E-02 | 1.64E-02 | 2.54E-02 | 1.88E-02 | 4.36E-02 |     | 2.85E-05                                  | 2.49E-05 | 3.77E-05 | 4.36E-05 | 1.43E-05 | 1.60E-05 | 1.64E-05 | 2.54E-05 | 1.88E-05 |  |
| Pentachlorobenzene                     | 1.61E-01                                         | 1.40E-01 | 2.13E-01 | 2.46E-01 | 8.04E-02 | 9.02E-02 | 9.25E-02 | 1.43E-01 | 1.06E-01 | 2.46E-01 |     | 1.61E-04                                  | 1.40E-04 | 2.13E-04 | 2.46E-04 | 8.04E-05 | 9.02E-05 | 9.25E-05 | 1.43E-04 | 1.06E-04 |  |
| Hexachlorobenzene (vapour)             | 3.03E-02                                         | 2.65E-02 | 4.02E-02 | 4.65E-02 | 1.52E-02 | 1.70E-02 | 1.75E-02 | 2.71E-02 | 2.00E-02 | 4.65E-02 |     | 3.03E-05                                  | 2.65E-05 | 4.02E-05 | 4.65E-05 | 1.52E-05 | 1.70E-05 | 1.75E-05 | 2.71E-05 | 2.00E-05 |  |
| Hexachlorobenzene (dustborne)          | 1.33E-03                                         | 1.16E-03 | 1.77E-03 | 2.04E-03 | 6.67E-04 | 7.48E-04 | 7.67E-04 | 1.19E-03 | 8.78E-04 | 2.04E-03 |     | 1.33E-06                                  | 1.16E-06 | 1.77E-06 | 2.04E-06 | 6.67E-07 | 7.48E-07 | 7.67E-07 | 1.19E-06 | 8.78E-07 |  |
| Ethylbenzene                           | 1.69E+01                                         | 1.47E+01 | 2.24E+01 | 2.58E+01 | 8.44E+00 | 8.44E+00 | 9.47E+00 | 9.71E+00 | 1.51E+01 | 1.11E+01 |     | 1.69E-02                                  | 1.47E-02 | 2.24E-02 | 2.58E-02 | 8.44E-03 | 9.47E-03 | 9.71E-03 | 1.51E-02 | 1.11E-02 |  |
| Napthalene (vapour)                    | 6.34E+00                                         | 5.54E+00 | 8.40E+00 | 9.71E+00 | 3.17E+00 | 3.56E+00 | 3.65E+00 | 5.66E+00 | 4.18E+00 | 9.71E+00 |     | 6.34E-03                                  | 5.54E-03 | 8.40E-03 | 9.71E-03 | 3.17E-03 | 3.56E-03 | 3.65E-03 | 5.66E-03 | 4.18E-03 |  |
| Napthalene (dustborne)                 | 1.06E-02                                         | 9.24E-03 | 1.40E-02 | 1.62E-02 | 5.30E-03 | 5.94E-03 | 6.09E-03 | 9.45E-03 | 6.97E-03 | 1.62E-02 |     | 1.06E-05                                  | 9.24E-06 | 1.40E-05 | 1.62E-05 | 5.30E-06 | 5.94E-06 | 6.09E-06 | 9.45E-06 | 6.97E-06 |  |
| Xylenes                                | 5.40E+00                                         | 4.72E+00 | 7.16E+00 | 8.27E+00 | 2.70E+00 | 3.03E+00 | 3.11E+00 | 4.82E+00 | 3.56E+00 | 8.27E+00 |     | 5.40E-03                                  | 4.72E-03 | 7.16E-03 | 8.27E-03 | 2.70E-03 | 3.03E-03 | 3.11E-03 | 4.82E-03 | 3.56E-03 |  |
| Hg                                     | 3.76E-04                                         | 5.16E-04 | 9.31E-04 | 8.50E-04 | 1.84E-04 | 1.30E-04 | 2.47E-04 | 3.64E-04 | 2.05E-04 | 9.31E-04 |     | 3.76E-07                                  | 5.16E-07 | 9.31E-07 | 8.50E-07 | 1.84E-07 | 1.30E-07 | 2.47E-07 | 3.64E-07 | 2.05E-07 |  |
| As                                     | 1.75E-03                                         | 2.40E-03 | 4.32E-03 | 3.95E-03 | 8.53E-04 | 6.05E-04 | 1.15E-03 | 1.69E-03 | 9.52E-04 | 4.32E-03 |     | 1.75E-06                                  | 2.40E-06 | 4.32E-06 | 3.95E-06 | 8.53E-07 | 6.05E-07 | 1.15E-06 | 1.69E-06 | 9.52E-07 |  |
| Pb                                     | 5.53E-03                                         | 7.58E-03 | 1.37E-02 | 1.25E-02 | 2.70E-03 | 1.92E-03 | 3.63E-03 | 5.35E-03 | 3.01E-03 | 1.37E-02 |     | 5.53E-06                                  | 7.58E-06 | 1.37E-05 | 1.25E-05 | 2.70E-06 | 1.92E-06 | 3.63E-06 | 5.35E-06 | 3.01E-06 |  |
| Tl                                     | 1.61E-04                                         | 2.22E-04 | 4.00E-04 | 3.65E-04 | 7.89E-05 | 5.60E-05 | 1.06E-04 | 1.56E-04 | 8.80E-05 | 4.00E-04 |     | 1.61E-07                                  | 2.22E-07 | 4.00E-07 | 3.65E-07 | 7.89E-08 | 5.60E-08 | 1.06E-07 | 1.56E-07 | 8.80E-08 |  |
| Ba                                     | 1.31E-02                                         | 1.79E-02 | 3.23E-02 | 2.95E-02 | 6.38E-03 | 4.53E-03 | 8.57E-03 | 1.26E-02 | 7.12E-03 | 3.23E-02 |     | 1.31E-05                                  | 1.79E-05 | 3.23E-05 | 2.95E-05 | 6.38E-06 | 4.53E-06 | 8.57E-06 | 1.26E-05 | 7.12E-06 |  |
| Cd                                     | 6.99E-04                                         | 9.59E-04 | 1.73E-03 | 1.58E-03 | 3.41E-04 | 2.42E-04 | 4.59E-04 | 6.77E-04 | 3.81E-04 | 1.73E-03 |     | 6.99E-07                                  | 9.59E-07 | 1.73E-06 | 1.58E-06 | 3.41E-07 | 2.42E-07 | 4.59E-07 | 6.77E-07 | 3.81E-07 |  |
| Total Cr                               | 1.80E-03                                         | 2.48E-03 | 4.47E-03 | 4.08E-03 | 8.81E-04 | 6.26E-04 | 1.18E-03 | 1.75E-03 | 9.84E-04 | 4.47E-03 |     | 1.80E-06                                  | 2.48E-06 | 4.47E-06 | 4.08E-06 | 8.81E-07 | 6.26E-07 | 1.18E-06 | 1.75E-06 | 9.84E-07 |  |
| Cu                                     | 1.20E-03                                         | 1.64E-03 | 2.96E-03 | 2.71E-03 | 5.85E-04 | 4.15E-04 | 7.86E-04 | 1.16E-03 | 6.53E-04 | 2.96E-03 |     | 1.20E-06                                  | 1.64E-06 | 2.96E-06 | 2.71E-06 | 5.85E-07 | 4.15E-07 | 7.86E-07 | 1.16E-06 | 6.53E-07 |  |
| Ni                                     | 5.74E-04                                         | 7.88E-04 | 1.42E-03 | 1.30E-03 | 2.80E-04 | 1.99E-04 | 3.77E-04 | 5.56E-04 | 3.13E-04 | 1.42E-03 |     | 5.74E-07                                  | 7.88E-07 | 1.42E-06 | 1.30E-06 | 2.80E-07 | 1.99E-07 | 3.77E-07 | 5.56E-07 | 3.13E-07 |  |
| Sb                                     | 4.48E-04                                         | 6.14E-04 | 1.11E-03 | 1.01E-03 | 2.19E-04 | 1.55E-04 | 2.94E-04 | 4.33E-04 | 2.44E-04 | 1.11E-03 |     | 4.48E-07                                  | 6.14E-07 | 1.11E-06 | 1.01E-06 | 2.19E-07 | 1.55E-07 | 2.94E-07 | 4.33E-07 | 2.44E-07 |  |
| Va                                     | 8.29E-04                                         | 1.14E-03 | 2.05E-03 | 1.87E-03 | 4.05E-04 | 2.87E-04 | 5.44E-04 | 8.02E-04 | 4.52E-04 | 2.05E-03 |     | 8.29E-07                                  | 1.14E-06 | 2.05E-06 | 1.87E-06 | 4.05E-07 | 2.87E-07 | 5.44E-07 | 8.02E-07 | 4.52E-07 |  |
| Zn                                     | 2.61E-02                                         | 3.58E-02 | 6.45E-02 | 5.89E-02 | 1.27E-02 | 9.04E-03 | 1.71E-02 | 2.52E-02 | 1.42E-02 | 6.45E-02 |     | 2.61E-05                                  | 3.58E-05 | 6.45E-05 |          |          |          |          |          |          |  |

# **Appendix I: TWA Assessment for Total Modelled Concentrations**

**Table 1: Total Concentration: 0m Scenario 1 max (8hr AT, mg/m<sup>3</sup>)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                                | TWA Chemicals<br>(mg/m <sup>3</sup> ) | Surrogate TWA<br>Chemicals (mg/m <sup>3</sup> ) | TLV                | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | MAX      |
|----------------------------------------|---------------------------------------|-------------------------------------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|
| NOx                                    | 45                                    |                                                 |                    | 0.008261658   | 0.001914842   | 0.02018652    | 0.02393423    | 0.01614095    | 0.012148452   | 0.01822633    | 0.013830801   | 0.01244427    | 0.023934 |
| CO                                     | 34                                    |                                                 |                    | 0.000641004   | 0.000140242   | 0.001580016   | 0.001875588   | 0.0012621     | 0.000946152   | 0.001426044   | 0.00107883    | 0.00096973    | 0.001876 |
| PM10*                                  | 10                                    |                                                 |                    | 0.003216402   | 0.000901095   | 0.007601256   | 0.008970678   | 0.00610155    | 0.004662684   | 0.006873354   | 0.005277501   | 0.00476623    | 0.008971 |
| SO2                                    | 5.2                                   |                                                 |                    | 0.00028276    | 6.51733E-05   | 0.000691498   | 0.000819975   | 0.00055286    | 0.000415945   | 0.000624327   | 0.000473618   | 0.0004261     | 0.00082  |
| HCl                                    | 7.5                                   |                                                 |                    | 0.00091308    | 0.00098112    | 0.00095676    | 0.00092778    | 0.000882      | 0.00101178    | 0.00091434    | 0.00099918    | 0.000987      | 0.001012 |
| B(a)P (dustborne)                      |                                       |                                                 |                    | 2.10097E-08   | 2.41741E-08   | 2.54965E-08   | 2.6319E-08    | 1.77348E-08   | 1.86059E-08   | 1.99653E-08   | 2.19074E-08   | 2.0543E-08    | 2.63E-08 |
| DDD (dustborne)                        |                                       | 1 <sup>a</sup>                                  |                    | 6.48829E-07   | 7.46554E-07   | 7.87391E-07   | 8.12792E-07   | 5.47693E-07   | 5.74594E-07   | 6.16577E-07   | 6.76553E-07   | 6.3442E-07    | 8.13E-07 |
| Dieldrin (dustborne)                   | 0.25                                  |                                                 |                    | 9.62208E-09   | 1.10713E-08   | 1.1677E-08    | 1.20537E-08   | 8.12224E-09   | 8.52118E-09   | 9.14379E-09   | 1.00332E-08   | 9.4084E-09    | 1.21E-08 |
| PAH's                                  |                                       |                                                 |                    | 1.34756E-09   | 1.09143E-09   | 2.00245E-09   | 2.16503E-09   | 1.71959E-09   | 1.64653E-09   | 1.85912E-09   | 1.71993E-09   | 1.6366E-09    | 2.17E-09 |
| PCB's (vapour)                         | 1                                     |                                                 |                    | 1.52111E-07   | 2.77573E-08   | 3.84084E-07   | 4.57404E-07   | 3.0597E-07    | 2.26897E-07   | 3.46296E-07   | 2.59807E-07   | 2.329E-07     | 4.57E-07 |
| PCB's (dustborne)                      |                                       | 1 <sup>b</sup>                                  |                    | 6.6207E-07    | 7.6179E-07    | 8.0346E-07    | 8.2938E-07    | 5.5887E-07    | 5.8632E-07    | 6.2916E-07    | 6.9036E-07    | 6.4737E-07    | 8.29E-07 |
| Dioxins/Furans (TEQ vapour)            |                                       | 1.0E-9 <sup>c</sup>                             |                    | 3.01487E-11   | 3.45605E-11   | 3.67616E-11   | 3.80008E-11   | 2.5605E-11    | 2.67803E-11   | 2.88268E-11   | 3.15256E-11   | 2.9553E-11    | 3.8E-11  |
| Dioxins/Furans (TEQ Dustborne)         |                                       | 1.0E-9 <sup>c</sup>                             |                    | 5.73794E-11   | 6.60218E-11   | 6.96332E-11   | 7.18796E-11   | 4.84354E-11   | 5.08144E-11   | 5.45272E-11   | 5.98312E-11   | 5.6105E-11    | 7.19E-11 |
| Dichloromethane                        | 174                                   |                                                 |                    | 3.39822E-08   | 6.20109E-09   | 8.5806E-08    | 1.02186E-07   | 6.8355E-08    | 5.06898E-08   | 7.7364E-08    | 5.80419E-08   | 5.2032E-08    | 1.02E-07 |
| Dibromoethane                          |                                       | 19 <sup>d</sup>                                 |                    | 1.1651E-07    | 2.12609E-08   | 2.94192E-07   | 3.50352E-07   | 2.3436E-07    | 1.73794E-07   | 2.65248E-07   | 1.99001E-07   | 1.7839E-07    | 3.5E-07  |
| Phenol                                 | 4                                     |                                                 |                    | 1.13048E-09   | 1.21472E-09   | 1.18456E-09   | 1.14868E-09   | 1.092E-09     | 1.25268E-09   | 1.13204E-09   | 1.23708E-09   | 1.222E-09     | 1.25E-09 |
| 2-Chlorophenol                         |                                       | 0.5 <sup>e</sup>                                |                    | 5.27449E-06   | 6.06893E-06   | 6.4009E-06    | 6.60739E-06   | 4.45233E-06   | 4.67102E-06   | 5.01231E-06   | 5.49987E-06   | 5.1574E-06    | 6.61E-06 |
| Benzene                                | 3.2                                   |                                                 |                    | 0.118739101   | 0.142221886   | 0.164525601   | 0.171669554   | 0.068722851   | 0.078576792   | 0.084522425   | 0.104316836   | 0.09150927    | 0.17167  |
| Chlorobenzene                          | 46                                    |                                                 |                    | 0.310080663   | 0.37094541    | 0.427973754   | 0.446425096   | 0.182050658   | 0.207379181   | 0.223048417   | 0.274017025   | 0.24098893    | 0.446425 |
| Dichlorobenzene                        | 150                                   |                                                 |                    | 4.2393E-08    | 4.5552E-08    | 4.4421E-08    | 4.30755E-08   | 4.095E-08     | 4.69755E-08   | 4.24515E-08   | 4.63905E-08   | 4.5825E-08    | 4.7E-08  |
| 1,2-Dichlorobenzene                    | 150                                   |                                                 |                    | 0.197904109   | 0.236933158   | 0.273815581   | 0.285673462   | 0.115160615   | 0.131487393   | 0.141431221   | 0.174249512   | 0.15300315    | 0.285673 |
| 1,3-Dichlorobenzene                    |                                       | 150 <sup>f</sup>                                |                    | 0.007674406   | 0.009192568   | 0.010635202   | 0.011097116   | 0.004439418   | 0.005076665   | 0.005460819   | 0.006740828   | 0.00591267    | 0.011097 |
| 1,4-Dichlorobenzene                    | 150                                   |                                                 |                    | 0.363396283   | 0.43492593    | 0.50228892    | 0.524001838   | 0.212228504   | 0.242087965   | 0.260389401   | 0.320436239   | 0.28154738    | 0.524002 |
| Tetrachlorobenzene                     |                                       | 46 <sup>g</sup>                                 |                    | 0.000262621   | 0.000302177   | 0.000318706   | 0.000328987   | 0.000221685   | 0.000232574   | 0.000249567   | 0.000273843   | 0.00025679    | 0.000329 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) |                                       | 46 <sup>g</sup>                                 |                    | 4.1269E-06    | 4.74849E-06   | 5.00823E-06   | 5.1698E-06    | 3.48362E-06   | 3.65473E-06   | 3.92176E-06   | 4.30324E-06   | 4.0353E-06    | 5.17E-06 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) |                                       | 46 <sup>g</sup>                                 |                    | 2.33931E-06   | 2.69166E-06   | 2.83889E-06   | 2.93048E-06   | 1.97467E-06   | 2.07166E-06   | 2.22303E-06   | 2.43927E-06   | 2.2874E-06    | 2.93E-06 |
| Pentachlorobenzene                     |                                       |                                                 | 0.002 <sup>j</sup> | 1.31973E-05   | 1.5185E-05    | 1.60156E-05   | 1.65323E-05   | 1.11401E-05   | 1.16873E-05   | 1.25413E-05   | 1.37612E-05   | 1.2904E-05    | 1.65E-05 |
| Hexachlorobenzene (vapour)             |                                       |                                                 | 0.002              | 2.4938E-06    | 2.86941E-06   | 3.02637E-06   | 3.124E-06     | 2.10508E-06   | 2.20847E-06   | 2.36984E-06   | 2.60036E-06   | 2.4384E-06    | 3.12E-06 |
| Hexachlorobenzene (dustborne)          |                                       |                                                 | 0.002 <sup>j</sup> | 1.09462E-07   | 1.25949E-07   | 1.32839E-07   | 1.37124E-07   | 9.23998E-08   | 9.69382E-08   | 1.04021E-07   | 1.1414E-07    | 1.0703E-07    | 1.37E-07 |
| Ethylbenzene                           | 434                                   |                                                 |                    | 0.003237474   | 0.003814015   | 0.00425332    | 0.004419699   | 0.002232416   | 0.002444959   | 0.002626847   | 0.003066169   | 0.00277499    | 0.00442  |
| Napthalene (vapour)                    | 52                                    |                                                 |                    | 0.023836533   | 0.028546452   | 0.033012779   | 0.034445043   | 0.013819455   | 0.01579392    | 0.016988788   | 0.020955871   | 0.0183886     | 0.034445 |

**Table 1: Total Concentration: 0m Scenario 1 max (8hr AT, mg/m<sup>3</sup>)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                | TWA Chemicals (mg/m <sup>3</sup> ) | Surrogate TWA Chemicals (mg/m <sup>3</sup> ) | TLV | Receptor 1  | Receptor 2  | Receptor 3  | Receptor 4  | Receptor 5  | Receptor 6  | Receptor 7  | Receptor 8  | Receptor 9 | MAX      |
|------------------------|------------------------------------|----------------------------------------------|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|----------|
| Napthalene (dustborne) |                                    | 52 <sup>h</sup>                              |     | 8.69519E-07 | 1.00048E-06 | 1.05521E-06 | 1.08925E-06 | 7.33983E-07 | 7.70034E-07 | 8.26297E-07 | 9.06673E-07 | 8.5021E-07 | 1.09E-06 |
| Xylenes                | 350                                |                                              |     | 0.000443644 | 0.00051041  | 0.000538461 | 0.000555855 | 0.000374557 | 0.000392919 | 0.000421666 | 0.000462638 | 0.00043382 | 0.000556 |
| meta- & para- xylene   | 350                                |                                              |     | 0.009600584 | 0.011507661 | 0.013333239 | 0.013914599 | 0.005509334 | 0.006313457 | 0.006791585 | 0.008405265 | 0.00736208 | 0.013915 |
| ortho-xylene           | 350                                |                                              |     | 0.003977385 | 0.00476746  | 0.005523771 | 0.00576462  | 0.002282438 | 0.002615575 | 0.002813657 | 0.003482181 | 0.00305    | 0.005765 |
| Chloroform             | 10                                 |                                              |     | 0.000445741 | 0.000534284 | 0.000619043 | 0.000646035 | 0.00025579  | 0.000293125 | 0.000315324 | 0.000390244 | 0.00034181 | 0.000646 |
| 1,2-dichloroethane     | 40                                 |                                              |     | 0.004251687 | 0.00509625  | 0.00590472  | 0.00616218  | 0.002439848 | 0.00279596  | 0.003007702 | 0.003722332 | 0.00326035 | 0.006162 |
| Toluene                | 191                                |                                              |     | 0.067889846 | 0.081375605 | 0.09428505  | 0.098396093 | 0.038958859 | 0.044645162 | 0.048026207 | 0.059437234 | 0.05206041 | 0.098396 |
| Tetrachloroethane      | 6.9                                |                                              |     | 0.001165785 | 0.001397359 | 0.001619036 | 0.00168963  | 0.000668991 | 0.000766634 | 0.000824692 | 0.001020639 | 0.00089397 | 0.00169  |
| Isopropylbenzene       | 125                                |                                              |     | 0.001165785 | 0.001397359 | 0.001619036 | 0.00168963  | 0.000668991 | 0.000766634 | 0.000824692 | 0.001020639 | 0.00089397 | 0.00169  |
| 1,3,5-trimethylbenzene |                                    | 123 <sup>i</sup>                             |     | 0.004663141 | 0.005589436 | 0.006476145 | 0.00675852  | 0.002675962 | 0.003066536 | 0.00329877  | 0.004082557 | 0.00357587 | 0.006759 |
| 1,2,4-trimethylbenzene | 123                                |                                              |     | 0.008914828 | 0.010685686 | 0.012380865 | 0.012920699 | 0.00511581  | 0.005862496 | 0.006306472 | 0.007804889 | 0.00683622 | 0.012921 |
| sec-butylbenzene       |                                    |                                              |     | 0.000397738 | 0.000476746 | 0.000552377 | 0.000576462 | 0.000228244 | 0.000261558 | 0.000281366 | 0.000348218 | 0.000305   | 0.000576 |
| 1,2,4-trichlorobenzene | 37                                 |                                              |     | 0.754331625 | 0.904173391 | 1.047611663 | 1.093289922 | 0.432876213 | 0.496057356 | 0.533624523 | 0.660413709 | 0.57844898 | 1.09329  |
| 1,2,3-trichlorobenzene |                                    | 37 <sup>j</sup>                              |     | 0.034973557 | 0.041920766 | 0.048571086 | 0.050688896 | 0.020069715 | 0.022999023 | 0.024740773 | 0.030619181 | 0.026819   | 0.050689 |
| p-isopropyltoluene     |                                    | 125 <sup>k</sup>                             |     | 0.000658326 | 0.000789097 | 0.000914279 | 0.000954144 | 0.000377783 | 0.000432923 | 0.000465709 | 0.000576361 | 0.00050483 | 0.000954 |
| Hg                     | 0.025                              |                                              |     | 3.74344E-08 | 6.83104E-09 | 9.45228E-08 | 1.12567E-07 | 7.5299E-08  | 5.58392E-08 | 8.52232E-08 | 6.39382E-08 | 5.7317E-08 | 1.13E-07 |
| As                     | 0.05                               |                                              |     | 1.73795E-07 | 3.17141E-08 | 4.38836E-07 | 5.22608E-07 | 3.49587E-07 | 2.59242E-07 | 3.95662E-07 | 2.96843E-07 | 2.661E-07  | 5.23E-07 |
| Pb                     | 0.15                               |                                              |     | 5.50188E-07 | 1.00399E-07 | 1.38924E-06 | 1.65444E-06 | 1.1067E-06  | 8.20692E-07 | 1.25256E-06 | 9.39726E-07 | 8.4242E-07 | 1.65E-06 |
| Ti                     | 0.1                                |                                              |     | 1.60741E-08 | 2.93321E-09 | 4.05876E-08 | 4.83356E-08 | 3.2333E-08  | 2.39771E-08 | 3.65944E-08 | 2.74547E-08 | 2.4612E-08 | 4.83E-08 |
| Ba                     | 0.5                                |                                              |     | 1.29995E-06 | 2.37216E-07 | 3.28242E-06 | 3.90902E-06 | 2.61485E-06 | 1.93909E-06 | 2.95948E-06 | 2.22033E-06 | 1.9904E-06 | 3.91E-06 |
| Cd                     | 0.1                                |                                              |     | 6.95826E-08 | 1.26975E-08 | 1.75698E-07 | 2.09238E-07 | 1.39965E-07 | 1.03793E-07 | 1.58412E-07 | 1.18848E-07 | 1.0654E-07 | 2.09E-07 |
| Total Cr               | 0.5                                |                                              |     | 1.7962E-07  | 3.27772E-08 | 4.53546E-07 | 5.40126E-07 | 3.61305E-07 | 2.67932E-07 | 4.08924E-07 | 3.06793E-07 | 2.7502E-07 | 5.4E-07  |
| Cu                     | 0.2                                |                                              |     | 1.19207E-07 | 2.1753E-08  | 3.01002E-07 | 3.58462E-07 | 2.39785E-07 | 1.77817E-07 | 2.71388E-07 | 2.03607E-07 | 1.8252E-07 | 3.58E-07 |
| Ni                     | 0.1                                |                                              |     | 5.71764E-08 | 1.04336E-08 | 1.44372E-07 | 1.71932E-07 | 1.1501E-07  | 8.52876E-08 | 1.30168E-07 | 9.76578E-08 | 8.7545E-08 | 1.72E-07 |
| Sb                     | 0.5                                |                                              |     | 4.45544E-08 | 8.13032E-09 | 1.12501E-07 | 1.33977E-07 | 8.9621E-08  | 6.646E-08   | 1.01433E-07 | 7.60994E-08 | 6.8219E-08 | 1.34E-07 |
| Va                     | 0.05                               |                                              |     | 8.25282E-08 | 1.50598E-08 | 2.08386E-07 | 2.48166E-07 | 1.66005E-07 | 1.23104E-07 | 1.87884E-07 | 1.40959E-07 | 1.2636E-07 | 2.48E-07 |
| Zn                     | 5                                  |                                              |     | 2.59451E-06 | 4.73448E-07 | 6.55122E-06 | 7.80182E-06 | 5.21885E-06 | 3.87013E-06 | 5.90668E-06 | 4.43145E-06 | 3.9726E-06 | 7.8E-06  |

**Legend:**

\* Inhalable Dust

a - DDT

b - PCB's Vapour

c -

d - Bromoethane

e - PCP

f - Dichlorobenzene

g - Chlorobenzene

h - Napthalene (Vapour)

i - 1,2,4 -trimethylbenzene

j - 1,2,4 trichlorobenzene

k - Isopropylbenzene

l - Hexachlorobenzene (vapour)

**Worcover TWA (1995)/ ILO**

TWA Workcover- Exposure standards for Atmospheric contaminants in the occupational environment; NOSHC:1003c1995

International Labour Organisation; international Health and Safety Information Centre (CIS)

TLV-American Conference of Industrial Hygienists

**Table 2: Total Concentration: 10m Scenario 1 max (8hr AT, mg/m<sup>3</sup>)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                                | TWA Chemicals<br>(mg/m <sup>3</sup> ) | Surrogate TWA<br>Chemicals<br>(mg/m <sup>3</sup> ) | TLV                | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | Max         |
|----------------------------------------|---------------------------------------|----------------------------------------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| NOx                                    | 45                                    |                                                    |                    | 0.014853498   | 0.003535708   | 0.04756734    | 0.04451896    | 0.01976661    | 0.013331432   | 0.02418273    | 0.01803871    | 0.015061345   | 0.04756734  |
| CO                                     | 34                                    |                                                    |                    | 0.001156716   | 0.000264168   | 0.003733656   | 0.003494016   | 0.001544748   | 0.001035984   | 0.00189198    | 0.001406868   | 0.001172382   | 0.003733656 |
| PM10*                                  | 10*                                   |                                                    |                    | 0.005702994   | 0.001566396   | 0.017714916   | 0.016586496   | 0.007488018   | 0.005159736   | 0.00912141    | 0.006886638   | 0.005792517   | 0.017714916 |
| SO2                                    | 5.2                                   |                                                    |                    | 0.000508556   | 0.000120568   | 0.001629899   | 0.00152543    | 0.000677009   | 0.000456348   | 0.000828354   | 0.000617704   | 0.00051565    | 0.001629899 |
| HCl                                    | 7.5                                   |                                                    |                    | 0.0012474     | 0.00132972    | 0.00128226    | 0.00123396    | 0.00115878    | 0.001323      | 0.0012222     | 0.00132048    | 0.00131292    | 0.00132972  |
| B(a)P (dustborne)                      |                                       |                                                    |                    | 2.7608E-08    | 2.77984E-08   | 2.89027E-08   | 2.91312E-08   | 2.48834E-08   | 2.25995E-08   | 2.53898E-08   | 2.41361E-08   | 2.34573E-08   | 2.91312E-08 |
| DDD (dustborne)                        |                                       | 1 <sup>a</sup>                                     |                    | 8.526E-07     | 8.5848E-07    | 8.92584E-07   | 8.9964E-07    | 7.68457E-07   | 6.97927E-07   | 7.84098E-07   | 7.45378E-07   | 7.24416E-07   | 8.9964E-07  |
| Dieldrin (dustborne)                   | 0.25                                  |                                                    |                    | 1.2644E-08    | 1.27312E-08   | 1.3237E-08    | 1.33416E-08   | 1.13962E-08   | 1.03502E-08   | 1.16281E-08   | 1.10539E-08   | 1.0743E-08    | 1.33416E-08 |
| PAH's                                  |                                       |                                                    |                    | 2.02362E-09   | 1.52739E-09   | 3.73417E-09   | 3.52916E-09   | 2.18549E-09   | 2.02222E-09   | 2.47585E-09   | 2.26073E-09   | 2.1006E-09    | 3.73417E-09 |
| PCB's (vapour)                         | 1                                     |                                                    |                    | 2.77319E-07   | 5.59488E-08   | 9.14526E-07   | 8.55588E-07   | 3.73932E-07   | 2.46919E-07   | 4.59378E-07   | 3.38682E-07   | 2.80731E-07   | 9.14526E-07 |
| PCB's (dustborne)                      |                                       | 1 <sup>b</sup>                                     |                    | 0.00000087    | 0.000000876   | 9.108E-07     | 0.000000918   | 7.8414E-07    | 7.1217E-07    | 8.001E-07     | 7.6059E-07    | 7.392E-07     | 0.000000918 |
| Dioxins/Furans(TEQ vapour)             |                                       | 1.0E-9 <sup>c</sup>                                |                    | 3.96851E-11   | 3.97633E-11   | 4.20928E-11   | 4.23675E-11   | 3.58772E-11   | 3.25036E-11   | 3.66757E-11   | 3.4779E-11    | 3.37586E-11   | 4.23675E-11 |
| Dioxins/Furans(TEQ Dustborne)          |                                       | 1.0E-9 <sup>c</sup>                                |                    | 7.54E-11      | 7.592E-11     | 7.8936E-11    | 7.956E-11     | 6.79588E-11   | 6.17214E-11   | 6.9342E-11    | 6.59178E-11   | 6.4064E-11    | 7.956E-11   |
| Dichloromethane                        | 174                                   |                                                    |                    | 6.19542E-08   | 1.24992E-08   | 2.04309E-07   | 1.91142E-07   | 8.3538E-08    | 5.51628E-08   | 1.02627E-07   | 7.5663E-08    | 6.27165E-08   | 2.04309E-07 |
| Dibromomethane                         |                                       | 19 <sup>d</sup>                                    |                    | 2.12414E-07   | 4.28544E-08   | 7.00488E-07   | 6.55344E-07   | 2.86416E-07   | 1.8913E-07    | 3.51864E-07   | 2.59416E-07   | 2.15028E-07   | 7.00488E-07 |
| Phenol                                 | 4                                     |                                                    |                    | 1.5444E-09    | 1.64632E-09   | 1.58756E-09   | 1.52776E-09   | 1.43468E-09   | 1.638E-09     | 1.5132E-09    | 1.63488E-09   | 1.62552E-09   | 1.64632E-09 |
| 2-Chlorophenol                         |                                       | 0.5 <sup>e</sup>                                   |                    | 0.000006931   | 6.9788E-06    | 7.25604E-06   | 7.3134E-06    | 6.24698E-06   | 5.67362E-06   | 6.37413E-06   | 6.05937E-06   | 5.88896E-06   | 7.3134E-06  |
| Benzene                                | 3.2                                   |                                                    |                    | 0.119417654   | 0.1425946     | 0.164875985   | 0.171958758   | 0.069457989   | 0.07898749    | 0.085080267   | 0.104546027   | 0.091808949   | 0.171958758 |
| Chlorobenzene                          | 46                                    |                                                    |                    | 0.314856133   | 0.373568445   | 0.430439007   | 0.448460412   | 0.187224369   | 0.210269547   | 0.22697435    | 0.275629986   | 0.243097972   | 0.448460412 |
| Dichlorobenzene                        | 150                                   |                                                    |                    | 5.7915E-08    | 6.1737E-08    | 5.95335E-08   | 5.7291E-08    | 5.38005E-08   | 6.1425E-08    | 5.6745E-08    | 6.1308E-08    | 6.0957E-08    | 6.1737E-08  |
| 1,2-Dichlorobenzene                    | 150                                   |                                                    |                    | 0.199754686   | 0.237949627   | 0.274770907   | 0.28646218    | 0.117165518   | 0.132607458   | 0.142952587   | 0.174874559   | 0.153820439   | 0.28646218  |
| 1,3-Dichlorobenzene                    |                                       | 150 <sup>f</sup>                                   |                    | 0.0007715576  | 0.009215182   | 0.010656455   | 0.011114663   | 0.004484022   | 0.005101583   | 0.005494665   | 0.006754734   | 0.005930851   | 0.011114663 |
| 1,4-Dichlorobenzene                    | 150                                   |                                                    |                    | 0.367886572   | 0.437282463   | 0.504503702   | 0.525830364   | 0.216876575   | 0.24468467    | 0.263916463   | 0.321885318   | 0.283442143   | 0.525830364 |
| Tetrachlorobenzene                     |                                       | 46 <sup>g</sup>                                    |                    | 0.0003451     | 0.00034748    | 0.000361284   | 0.00036414    | 0.000311042   | 0.000282494   | 0.000317373   | 0.000301701   | 0.000293216   | 0.00036414  |
| 1,2,3,4-Tetrachlorobenzene (dustborne) |                                       | 46 <sup>g</sup>                                    |                    | 0.000005423   | 5.4604E-06    | 5.67732E-06   | 5.7222E-06    | 4.88781E-06   | 4.43919E-06   | 4.98729E-06   | 4.74101E-06   | 4.60768E-06   | 5.7222E-06  |
| 1,2,3,5-Tetrachlorobenzene (dustborne) |                                       | 46 <sup>g</sup>                                    |                    | 0.000003074   | 3.0952E-06    | 3.21816E-06   | 3.2436E-06    | 2.77063E-06   | 2.51633E-06   | 2.82702E-06   | 2.68742E-06   | 2.61184E-06   | 3.2436E-06  |
| Pentachlorobenzene                     |                                       |                                                    | 0.002 <sup>i</sup> | 0.000017342   | 1.74616E-05   | 1.81553E-05   | 1.82988E-05   | 1.56305E-05   | 1.41959E-05   | 1.59487E-05   | 1.51611E-05   | 1.47347E-05   | 1.82988E-05 |
| Hexachlorobenzene (vapour)             |                                       |                                                    | 0.002              | 0.000003277   | 3.2996E-06    | 3.43068E-06   | 3.4578E-06    | 2.95359E-06   | 2.68251E-06   | 3.01371E-06   | 2.86489E-06   | 2.78432E-06   | 3.4578E-06  |
| Hexachlorobenzene (dustborne)          |                                       |                                                    | 0.002 <sup>j</sup> | 1.4394E-07    | 1.44832E-07   | 1.50598E-07   | 1.51778E-07   | 1.29644E-07   | 1.17745E-07   | 1.32283E-07   | 1.25751E-07   | 1.22214E-07   | 1.51778E-07 |
| Ethylbenzene                           | 434                                   |                                                    |                    | 0.003672741   | 0.004053095   | 0.004478018   | 0.00460521    | 0.002703981   | 0.002709405   | 0.002984682   | 0.003213184   | 0.002967221   | 0.00460521  |
| Naphthalene (vapour)                   | 52                                    |                                                    |                    | 0.024000105   | 0.028636298   | 0.034514758   | 0.034514758   | 0.013996867   | 0.015892922   | 0.017123261   | 0.021011118   | 0.018460836   | 0.034514758 |
| Naphthalene (dustborne)                |                                       | 52 <sup>h</sup>                                    |                    | 1.1426E-06    | 1.15048E-06   | 1.19618E-06   | 1.20564E-06   | 1.02984E-06   | 9.35317E-07   | 1.0508E-06    | 9.98908E-07   | 9.70816E-07   | 1.20564E-06 |
| Xylenes                                | 350                                   |                                                    |                    | 0.000583003   | 0.000586941   | 0.000610577   | 0.000615379   | 0.000525513   | 0.000477246   | 0.000536238   | 0.000509721   | 0.000496369   | 0.000615379 |
| meta- & para- xylene                   | 350                                   |                                                    |                    | 0.009600584   | 0.011507861   | 0.013333239   | 0.013914599   | 0.005509334   | 0.006313457   | 0.006791585   | 0.008405265   | 0.007362078   | 0.013914599 |
| ortho-xylene                           | 350                                   |                                                    |                    | 0.003977385   | 0.00476746    | 0.005523771   | 0.00576462    | 0.002282438   | 0.002615575   | 0.002813657   | 0.003482181   | 0.003050004   | 0.00576462  |
| Chloroform                             | 10                                    |                                                    |                    | 0.000445741   | 0.000534284   | 0.000619043   | 0.000646035   | 0.00025579    | 0.000293125   | 0.000315324   | 0.000390244   | 0.000341811   | 0.000646035 |
| 1,2-dichloroethane                     | 40                                    |                                                    |                    | 0.004251687   | 0.00509625    | 0.00590472    | 0.00616218    | 0.002439848   | 0.00279596    | 0.003007702   | 0.003722332   | 0.003260349   | 0.00616218  |
| Toluene                                | 191                                   |                                                    |                    | 0.06789846    | 0.081375605   | 0.09428505    | 0.098396093   | 0.038958859   | 0.044645162   | 0.048026207   | 0.059437234   | 0.052060408   | 0.098396093 |

Table 2: Total Concentration: 10m Scenario 1 max (8hr AT, mg/m^3)  
Client: Meriton  
Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                | TWA Chemicals<br>(mg/m <sup>3</sup> ) | Surrogate TWA<br>Chemicals<br>(mg/m <sup>3</sup> ) | TLV | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | Max         |
|------------------------|---------------------------------------|----------------------------------------------------|-----|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| Tetrachloroethane      | 6.9                                   |                                                    |     | 0.001165785   | 0.001397359   | 0.001619036   | 0.00168963    | 0.000668991   | 0.000766634   | 0.000824692   | 0.001020639   | 0.000893967   | 0.00168963  |
| Isopropylbenzene       | 125                                   |                                                    |     | 0.001165785   | 0.001397359   | 0.001619036   | 0.00168963    | 0.000668991   | 0.000766634   | 0.000824692   | 0.001020639   | 0.000893967   | 0.00168963  |
| 1,3,5-trimethylbenzene |                                       | 123 <sup>i</sup>                                   |     | 0.004663141   | 0.005589436   | 0.006476145   | 0.00675852    | 0.002675962   | 0.003066536   | 0.00329877    | 0.004082557   | 0.003575866   | 0.00675852  |
| 1,2,4-trimethylbenzene | 123                                   |                                                    |     | 0.008914828   | 0.010685686   | 0.012380865   | 0.012920699   | 0.00511581    | 0.005862496   | 0.006306472   | 0.007804889   | 0.006836215   | 0.012920699 |
| sec-butylbenzene       |                                       |                                                    |     | 0.000397738   | 0.000476746   | 0.000552377   | 0.000576462   | 0.000228244   | 0.000261558   | 0.000281366   | 0.000348218   | 0.000305      | 0.000576462 |
| 1,2,4-trichlorobenzene | 37                                    |                                                    |     | 0.754331625   | 0.904173391   | 1.047611663   | 1.093289922   | 0.432876213   | 0.496057356   | 0.533624523   | 0.660413709   | 0.578448983   | 1.093289922 |
| 1,2,3-trichlorobenzene |                                       | 37 <sup>j</sup>                                    |     | 0.034973557   | 0.041920766   | 0.048571086   | 0.050688896   | 0.020069715   | 0.022999023   | 0.024740773   | 0.030619181   | 0.026818998   | 0.050688896 |
| p-isopropyltoluene     |                                       | 125 <sup>k</sup>                                   |     | 0.000658326   | 0.000789097   | 0.000914279   | 0.000954144   | 0.000377783   | 0.000432923   | 0.000465709   | 0.000576361   | 0.000504828   | 0.000954144 |
| Hg                     | 0.025                                 |                                                    |     | 6.8248E-08    | 1.3769E-08    | 2.25064E-07   | 2.1056E-07    | 9.20244E-08   | 6.07666E-08   | 1.13053E-07   | 8.33494E-08   | 6.90877E-08   | 2.25064E-07 |
| As                     | 0.05                                  |                                                    |     | 3.16851E-07   | 6.39245E-08   | 1.04489E-06   | 9.77555E-07   | 4.27237E-07   | 2.82118E-07   | 5.24864E-07   | 3.86962E-07   | 3.2075E-07    | 1.04489E-06 |
| Pb                     | 0.15                                  |                                                    |     | 1.00307E-06   | 2.02368E-07   | 3.30786E-06   | 3.09468E-06   | 1.35252E-06   | 8.93112E-07   | 1.66158E-06   | 1.22502E-06   | 1.01541E-06   | 3.30786E-06 |
| Tl                     | 0.1                                   |                                                    |     | 2.93053E-08   | 5.91232E-09   | 9.66414E-08   | 9.04132E-08   | 3.95148E-08   | 2.60929E-08   | 4.85442E-08   | 3.57898E-08   | 2.96659E-08   | 9.66414E-08 |
| Ba                     | 0.5                                   |                                                    |     | 2.36999E-06   | 4.78144E-07   | 7.81563E-06   | 7.31194E-06   | 3.19566E-06   | 2.1102E-06    | 3.92589E-06   | 2.89441E-06   | 2.39916E-06   | 7.81563E-06 |
| Cd                     | 0.1                                   |                                                    |     | 1.26859E-07   | 2.55936E-08   | 4.18347E-07   | 3.91386E-07   | 1.71054E-07   | 1.12952E-07   | 2.10141E-07   | 1.54929E-07   | 1.2842E-07    | 4.18347E-07 |
| Total Cr               | 0.5                                   |                                                    |     | 3.27472E-07   | 6.60672E-08   | 1.07992E-06   | 1.01032E-06   | 4.41558E-07   | 2.91575E-07   | 5.42457E-07   | 3.99933E-07   | 3.31502E-07   | 1.07992E-06 |
| Cu                     | 0.2                                   |                                                    |     | 2.17331E-07   | 4.38464E-08   | 7.16703E-07   | 6.70514E-07   | 2.93046E-07   | 1.93508E-07   | 3.60009E-07   | 2.65421E-07   | 2.20006E-07   | 7.16703E-07 |
| Ni                     | 0.1                                   |                                                    |     | 1.0424E-07    | 2.10304E-08   | 3.43758E-07   | 3.21604E-07   | 1.40556E-07   | 9.28136E-08   | 1.72674E-07   | 1.27306E-07   | 1.05523E-07   | 3.43758E-07 |
| Sb                     | 0.5                                   |                                                    |     | 8.12288E-08   | 1.63878E-08   | 2.67872E-07   | 2.50608E-07   | 1.09528E-07   | 7.23246E-08   | 1.34555E-07   | 9.92026E-08   | 8.22283E-08   | 2.67872E-07 |
| Va                     | 0.05                                  |                                                    |     | 1.5046E-07    | 3.03552E-08   | 4.96179E-07   | 4.64202E-07   | 2.02878E-07   | 1.33967E-07   | 2.49237E-07   | 1.83753E-07   | 1.52312E-07   | 4.96179E-07 |
| Zn                     | 5                                     |                                                    |     | 4.73015E-06   | 9.54304E-07   | 1.55988E-05   | 1.45935E-05   | 6.37806E-06   | 4.21164E-06   | 7.83549E-06   | 5.77681E-06   | 4.78836E-06   | 1.55988E-05 |

Legend:  
\* Inhalable Dust  
a - DDT  
b - PCB's Vapour  
c -  
d - Bromoethane  
e - PCP  
f - Dichlorobenzene  
g - Chlorobenzene  
h - Napthalene (Vapour)  
i - 1,2,4 -trimethylbenzene  
j - 1,2,4 trichlorobenzene  
k - Isopropylbenzene  
l - Hexachlorobenzene (vapour)

Worcover TWA (1995/ ILO)  
Worcover: Exposure standards for Atmospheric contaminants in the occupational environment: NOSHC:1003c1995  
International Labour Organisation; International Health and Safety Information Centre (CIS)  
TLV-American Conference of Industrial Hygienists

**Table 3: Total Concentration: 20m (8hr AT, mg/m³)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                                | TWA Chemicals<br>(mg/m³) | Surrogate TWA<br>Chemicals<br>(mg/m³) | TLV                | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | MAX         |
|----------------------------------------|--------------------------|---------------------------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| NOx                                    | 45                       |                                       |                    | 0.0321394     | 0.00932       | 0.12790       | 0.11594       | 0.02776       | 0.01644       | 0.03732       | 0.04287       | 0.02175       | 0.12790147  |
| CO                                     | 34                       |                                       |                    | 0.0025076     | 0.00071       | 0.01005       | 0.00911       | 0.00217       | 0.00127       | 0.00292       | 0.00335       | 0.00169       | 0.0100521   |
| PM10*                                  | 10*                      |                                       |                    | 0.0122512     | 0.00390       | 0.04739       | 0.04301       | 0.01059       | 0.00649       | 0.01413       | 0.01619       | 0.00844       | 0.04739247  |
| SO2                                    | 5.2                      |                                       |                    | 0.0011006     | 0.00032       | 0.00438       | 0.00397       | 0.00095       | 0.00056       | 0.00128       | 0.00147       | 0.00074       | 0.004383116 |
| HCl                                    | 7.5                      |                                       |                    | 0.0022604     | 0.00238       | 0.00226       | 0.00229       | 0.00198       | 0.00224       | 0.00214       | 0.00228       | 0.00228       | 0.00237972  |
| B(a)P (dustborne)                      |                          |                                       |                    | 9.956E-08     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.14297E-07 |
| DDD (dustborne)                        |                          | 1 <sup>a</sup>                        |                    | 3.075E-06     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 3.52976E-06 |
| Dieldrin (dustborne)                   | 0.25                     |                                       |                    | 4.56E-08      | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 5.23462E-08 |
| PAH's                                  |                          |                                       |                    | 3.935E-09     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 8.83758E-09 |
| PCB's (vapour)                         | 1                        |                                       |                    | 6.043E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 2.4706E-06  |
| PCB's (dustborne)                      |                          | 1 <sup>b</sup>                        |                    | 3.137E-06     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 3.6018E-06  |
| Dioxins/Furans (TEQ vapour)            |                          | 1.0E-9 <sup>c</sup>                   |                    | 1.428E-10     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.65245E-10 |
| Dioxins/Furans (TEQ Dustborne)         |                          | 1.0E-9 <sup>c</sup>                   |                    | 2.719E-10     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 3.12156E-10 |
| Dichloromethane                        | 174                      |                                       |                    | 1.35E-07      | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 5.51943E-07 |
| Dibromoethane                          |                          | 19 <sup>d</sup>                       |                    | 4.629E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.89238E-06 |
| Phenol                                 | 4                        |                                       |                    | 2.799E-09     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 2.94632E-09 |
| 2-Chlorophenol                         |                          | 0.5 <sup>e</sup>                      |                    | 2.499E-05     | 0.00002       | 0.00003       | 0.00003       | 0.00002       | 0.00001       | 0.00002       | 0.00002       | 0.00001       | 2.86943E-05 |
| Benzene                                | 3.2                      |                                       |                    | 0.0102384     | 0.00655       | 0.01072       | 0.01175       | 0.00663       | 0.00526       | 0.00722       | 0.00740       | 0.00451       | 0.011753929 |
| Chlorobenzene                          | 46                       |                                       |                    | 0.0720557     | 0.04611       | 0.07546       | 0.08272       | 0.04666       | 0.03702       | 0.05084       | 0.05211       | 0.03176       | 0.08272142  |
| Dichlorobenzene                        | 150                      |                                       |                    | 1.049E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.10487E-07 |
| 1,2-Dichlorobenzene                    | 150                      |                                       |                    | 0.0279229     | 0.01787       | 0.02924       | 0.03206       | 0.01808       | 0.01435       | 0.01970       | 0.02019       | 0.01231       | 0.03205602  |
| 1,3-Dichlorobenzene                    |                          | 150 <sup>f</sup>                      |                    | 0.0006212     | 0.00040       | 0.00065       | 0.00071       | 0.00040       | 0.00032       | 0.00044       | 0.00045       | 0.00027       | 0.000713156 |
| 1,4-Dichlorobenzene                    | 150                      |                                       |                    | 0.064735      | 0.04142       | 0.06779       | 0.07432       | 0.04192       | 0.03326       | 0.04568       | 0.04681       | 0.02854       | 0.07431714  |
| Tetrachlorobenzene                     |                          | 46 <sup>g</sup>                       |                    | 0.0012445     | 0.00080       | 0.00130       | 0.00143       | 0.00081       | 0.00064       | 0.00088       | 0.00090       | 0.00055       | 0.001428714 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) |                          | 46 <sup>g</sup>                       |                    | 1.956E-05     | 0.00001       | 0.00002       | 0.00002       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 2.24512E-05 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) |                          | 46 <sup>g</sup>                       |                    | 1.109E-05     | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 1.27264E-05 |
| Pentachlorobenzene                     |                          |                                       | 0.002 <sup>j</sup> | 6.254E-05     | 0.00004       | 0.00007       | 0.00007       | 0.00004       | 0.00003       | 0.00004       | 0.00005       | 0.00003       | 7.17959E-05 |
| Hexachlorobenzene (vapour)             |                          |                                       | 0.002              | 1.182E-05     | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 1.35668E-05 |
| Hexachlorobenzene (dustborne)          |                          |                                       | 0.002 <sup>j</sup> | 5.187E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 5.95498E-07 |
| Ethylbenzene                           | 434                      |                                       |                    | 0.0065676     | 0.00420       | 0.00688       | 0.00754       | 0.00425       | 0.00337       | 0.00463       | 0.00475       | 0.00290       | 0.007539768 |
| Napthalene (vapour)                    | 52                       |                                       |                    | 0.0024681     | 0.00158       | 0.00258       | 0.00283       | 0.00160       | 0.00127       | 0.00174       | 0.00178       | 0.00109       | 0.002833416 |
| Napthalene (dustborne)                 |                          | 52 <sup>h</sup>                       |                    | 4.12E-06      | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 4.73036E-06 |
| Xylenes                                | 350                      |                                       |                    | 0.0021023     | 0.00135       | 0.00220       | 0.00241       | 0.00136       | 0.00108       | 0.00148       | 0.00152       | 0.00093       | 0.002414039 |

Table 3: Total Concentration: 20m (8hr AT, mg/m^3)

Client: Meriton  
Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

|          | TWA Chemicals<br>(mg/m <sup>3</sup> ) | Surrogate TWA<br>Chemicals<br>(mg/m <sup>3</sup> ) | TLV | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | MAX         |
|----------|---------------------------------------|----------------------------------------------------|-----|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| Species  |                                       |                                                    |     | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             |             |
| Hg       | 0.025                                 |                                                    |     | 1.487E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 6.08013E-07 |
| As       | 0.05                                  |                                                    |     | 6.905E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 2.82279E-06 |
| Pb       | 0.15                                  |                                                    |     | 2.186E-06     | 0.00000       | 0.00001       | 0.00001       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 8.93622E-06 |
| Tl       | 0.1                                   |                                                    |     | 6.386E-08     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 2.61078E-07 |
| Ba       | 0.5                                   |                                                    |     | 5.165E-06     | 0.00000       | 0.00002       | 0.00002       | 0.00000       | 0.00000       | 0.00001       | 0.00001       | 0.00000       | 2.1114E-05  |
| Cd       | 0.1                                   |                                                    |     | 2.764E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.13017E-06 |
| Total Cr | 0.5                                   |                                                    |     | 7.136E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 2.91741E-06 |
| Cu       | 0.2                                   |                                                    |     | 4.736E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.93618E-06 |
| Ni       | 0.1                                   |                                                    |     | 2.272E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 9.28666E-07 |
| Sb       | 0.5                                   |                                                    |     | 1.77E-07      | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 7.23659E-07 |
| Va       | 0.05                                  |                                                    |     | 3.279E-07     | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 0.00000       | 1.34043E-06 |
| Zn       | 5                                     |                                                    |     | 1.031E-05     | 0.00000       | 0.00004       | 0.00004       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 0.00001       | 4.21404E-05 |

- Legend:**  
\* Inhalable Dust  
a - DDT  
b - PCB's Vapour  
c -  
d - Bromoethane  
e - PCP  
f - Dichlorobenzene  
g - Chlorobenzene  
h - Napthalene (Vapour)  
i - 1,2,4 -trimethylbenzene  
j - 1,2,4 trichlorobenzene  
k - Isopropylbenzene  
l - Hexachlorobenzene (vapour)

**Worcover TWA (1995)/ ILO**  
*Workcover- Exposure standards for Atmospheric contaminants in the occupational environment; NOSHC:1003c1995*  
*International Labour Organisation; International Health and Safety Information Centre (CIS)*  
*TLV-ACGIH American Conference of Industrial Hygienists*

**Table 4: Total Concentration: 30m (8hr AT, mg/m<sup>3</sup>)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                                | TWA Chemicals (mg/m <sup>3</sup> ) | Surrogate TWA Chemicals (mg/m <sup>3</sup> ) | TLV                | Receptor 1 | Receptor 2 | Receptor 3 | Receptor 4 | Receptor 5 | Receptor 6 | Receptor 7 | Receptor 8 | Receptor 9 | MAX      |
|----------------------------------------|------------------------------------|----------------------------------------------|--------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|
| NOx                                    | 45                                 |                                              |                    | 0.047244   | 0.020656   | 0.205692   | 0.186091   | 0.035292   | 0.020274   | 0.049477   | 0.069686   | 0.029161   | 0.205692 |
| CO                                     | 34                                 |                                              |                    | 0.00368    | 0.001584   | 0.016163   | 0.014617   | 0.002745   | 0.001558   | 0.003859   | 0.00545    | 0.002257   | 0.016163 |
| PM10*                                  | 10*                                |                                              |                    | 0.018115   | 0.008391   | 0.076272   | 0.069111   | 0.013607   | 0.008172   | 0.018878   | 0.026327   | 0.011464   | 0.076272 |
| SO2                                    | 5.2                                |                                              |                    | 0.001618   | 0.000706   | 0.007049   | 0.006377   | 0.001208   | 0.000693   | 0.001694   | 0.002387   | 0.000998   | 0.007049 |
| HCl                                    | 7.5                                |                                              |                    | 0.003848   | 0.004009   | 0.003909   | 0.004065   | 0.003241   | 0.003621   | 0.003568   | 0.00373    | 0.00377    | 0.004065 |
| B(a)P (dustborne)                      |                                    |                                              |                    | 2.38E-07   | 1.45E-07   | 1.65E-07   | 1.59E-07   | 1.41E-07   | 9.73E-08   | 1.76E-07   | 1.23E-07   | 1.17E-07   | 2.38E-07 |
| DDD (dustborne)                        |                                    | 1 <sup>a</sup>                               |                    | 7.36E-06   | 4.48E-06   | 5.09E-06   | 4.92E-06   | 4.35E-06   | 3E-06      | 5.43E-06   | 3.8E-06    | 3.6E-06    | 7.36E-06 |
| Dieldrin (dustborne)                   | 0.25                               |                                              |                    | 1.09E-07   | 6.64E-08   | 7.56E-08   | 7.3E-08    | 6.45E-08   | 4.45E-08   | 8.05E-08   | 5.64E-08   | 5.34E-08   | 1.09E-07 |
| PAH's                                  |                                    |                                              |                    | 6.32E-09   | 5.12E-09   | 1.45E-08   | 1.36E-08   | 5.09E-09   | 4.7E-09    | 6.15E-09   | 7.35E-09   | 5.31E-09   | 1.45E-08 |
| PCB's (vapour)                         | 1                                  |                                              |                    | 8.83E-07   | 3.63E-07   | 3.97E-06   | 3.59E-06   | 6.56E-07   | 3.6E-07    | 9.29E-07   | 1.32E-06   | 5.32E-07   | 3.97E-06 |
| PCB's (dustborne)                      |                                    | 1 <sup>b</sup>                               |                    | 7.51E-06   | 4.57E-06   | 5.2E-06    | 5.02E-06   | 4.44E-06   | 3.07E-06   | 5.54E-06   | 3.88E-06   | 3.67E-06   | 7.51E-06 |
| Dioxins/Furans (TEQ vapour)            |                                    | 1.0E-9 <sup>c</sup>                          |                    | 3.41E-10   | 2.07E-10   | 2.39E-10   | 2.31E-10   | 2.02E-10   | 1.39E-10   | 2.52E-10   | 1.77E-10   | 1.67E-10   | 3.41E-10 |
| Dioxins/Furans (TEQ Dustborne)         |                                    | 1.0E-9 <sup>c</sup>                          |                    | 6.51E-10   | 3.96E-10   | 4.51E-10   | 4.35E-10   | 3.85E-10   | 2.66E-10   | 4.8E-10    | 3.36E-10   | 3.18E-10   | 6.51E-10 |
| Dichloromethane                        | 174                                |                                              |                    | 1.97E-07   | 8.12E-08   | 8.87E-07   | 8.01E-07   | 1.47E-07   | 8.04E-08   | 2.08E-07   | 2.95E-07   | 1.19E-07   | 8.87E-07 |
| Dibromoethane                          |                                    | 19 <sup>d</sup>                              |                    | 6.77E-07   | 2.78E-07   | 3.04E-06   | 2.75E-06   | 5.03E-07   | 2.76E-07   | 7.12E-07   | 1.01E-06   | 4.07E-07   | 3.04E-06 |
| Phenol                                 | 4                                  |                                              |                    | 4.76E-09   | 4.96E-09   | 4.84E-09   | 5.03E-09   | 4.01E-09   | 4.48E-09   | 4.42E-09   | 4.62E-09   | 4.67E-09   | 5.03E-09 |
| 2-Chlorophenol                         |                                    | 0.5 <sup>e</sup>                             |                    | 5.98E-05   | 3.64E-05   | 4.14E-05   | 4E-05      | 3.54E-05   | 2.44E-05   | 4.41E-05   | 3.09E-05   | 2.93E-05   | 5.98E-05 |
| Benzene                                | 3.2                                |                                              |                    | 0.024495   | 0.014903   | 0.016964   | 0.016391   | 0.014487   | 0.010003   | 0.018072   | 0.012669   | 0.011988   | 0.024495 |
| Chlorobenzene                          | 46                                 |                                              |                    | 0.172388   | 0.104887   | 0.11939    | 0.115353   | 0.101958   | 0.070395   | 0.12719    | 0.089164   | 0.084368   | 0.172388 |
| Dichlorobenzene                        | 150                                |                                              |                    | 1.79E-07   | 1.86E-07   | 1.81E-07   | 1.89E-07   | 1.5E-07    | 1.68E-07   | 1.66E-07   | 1.73E-07   | 1.75E-07   | 1.89E-07 |
| 1,2-Dichlorobenzene                    | 150                                |                                              |                    | 0.066803   | 0.040645   | 0.046266   | 0.044701   | 0.039511   | 0.027279   | 0.049288   | 0.034552   | 0.032694   | 0.066803 |
| 1,3-Dichlorobenzene                    |                                    | 150 <sup>f</sup>                             |                    | 0.001486   | 0.000904   | 0.001029   | 0.000994   | 0.000879   | 0.000607   | 0.001097   | 0.000769   | 0.000727   | 0.001486 |
| 1,4-Dichlorobenzene                    | 150                                |                                              |                    | 0.154874   | 0.09423    | 0.10726    | 0.103633   | 0.0916     | 0.063243   | 0.114267   | 0.080105   | 0.075797   | 0.154874 |
| Tetrachlorobenzene                     |                                    | 46 <sup>g</sup>                              |                    | 0.002977   | 0.001812   | 0.002062   | 0.001992   | 0.001761   | 0.001216   | 0.002197   | 0.00154    | 0.001457   | 0.002977 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) |                                    | 46 <sup>g</sup>                              |                    | 4.68E-05   | 2.85E-05   | 3.24E-05   | 3.13E-05   | 2.77E-05   | 1.91E-05   | 3.45E-05   | 2.42E-05   | 2.29E-05   | 4.68E-05 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) |                                    | 46 <sup>g</sup>                              |                    | 2.65E-05   | 1.61E-05   | 1.84E-05   | 1.77E-05   | 1.57E-05   | 1.08E-05   | 1.96E-05   | 1.37E-05   | 1.3E-05    | 2.65E-05 |
| Pentachlorobenzene                     |                                    |                                              | 0.002 <sup>j</sup> | 0.00015    | 9.1E-05    | 0.000104   | 0.0001     | 8.85E-05   | 6.11E-05   | 0.00011    | 7.74E-05   | 7.32E-05   | 0.00015  |
| Hexachlorobenzene (vapour)             |                                    |                                              | 0.002              | 2.83E-05   | 1.72E-05   | 1.96E-05   | 1.89E-05   | 1.67E-05   | 1.15E-05   | 2.09E-05   | 1.46E-05   | 1.38E-05   | 2.83E-05 |
| Hexachlorobenzene (dustborne)          |                                    |                                              | 0.002 <sup>j</sup> | 1.24E-06   | 7.55E-07   | 8.59E-07   | 8.3E-07    | 7.34E-07   | 5.07E-07   | 9.16E-07   | 6.42E-07   | 6.07E-07   | 1.24E-06 |
| Ethylbenzene                           | 434                                |                                              |                    | 0.015713   | 0.00956    | 0.010882   | 0.010514   | 0.009293   | 0.006416   | 0.011593   | 0.008127   | 0.00769    | 0.015713 |
| Napthalene (vapour)                    | 52                                 |                                              |                    | 0.005905   | 0.003593   | 0.004089   | 0.003951   | 0.003492   | 0.002411   | 0.004357   | 0.003054   | 0.00289    | 0.005905 |
| Napthalene (dustborne)                 |                                    | 52 <sup>h</sup>                              |                    | 9.86E-06   | 6E-06      | 6.83E-06   | 6.6E-06    | 5.83E-06   | 4.03E-06   | 7.27E-06   | 5.1E-06    | 4.82E-06   | 9.86E-06 |
| Xylenes                                | 350                                |                                              |                    | 0.005029   | 0.00306    | 0.003484   | 0.003366   | 0.002975   | 0.002054   | 0.003711   | 0.002602   | 0.002461   | 0.005029 |

**Table 5: Total Concentration: 40m (8hr AT, mg/m³)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

| Species                                | TWA Chemicals (mg/m³) | Surrogate TWA Chemicals (mg/m³) | TLV | Receptor 1  | Receptor 2  | Receptor 3  | Receptor 4  | Receptor 5  | Receptor 6  | Receptor 7  | Receptor 8  | Receptor 9  | MAX      |
|----------------------------------------|-----------------------|---------------------------------|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| NOx                                    | 45                    |                                 |     | 0.08118096  | 0.11044488  | 0.1969869   | 0.1803193   | 0.04057662  | 0.02971963  | 0.05401499  | 0.07852435  | 0.04541348  | 0.196987 |
| CO                                     | 34                    |                                 |     | 0.00633552  | 0.00863904  | 0.01545564  | 0.01413996  | 0.00314724  | 0.00228666  | 0.00420042  | 0.00612954  | 0.00352008  | 0.015456 |
| PM10*                                  | 10*                   |                                 |     | 0.03091608  | 0.04169232  | 0.07347834  | 0.06740946  | 0.01581606  | 0.01192959  | 0.02085111  | 0.02987919  | 0.01774476  | 0.073478 |
| SO2                                    | 5.2                   |                                 |     | 0.002780078 | 0.003783094 | 0.0067495   | 0.00617806  | 0.001388716 | 0.001016334 | 0.001849112 | 0.00268916  | 0.001554154 | 0.00675  |
| HCl                                    | 7.5                   |                                 |     | 0.005565    | 0.0057498   | 0.0058884   | 0.0061236   | 0.004578    | 0.005061    | 0.0050904   | 0.0052584   | 0.0053382   | 0.006124 |
| B(a)P (dustborne)                      |                       |                                 |     | 2.55555E-07 | 2.23368E-07 | 3.38893E-07 | 3.917E-07   | 1.27996E-07 | 1.43571E-07 | 1.47208E-07 | 2.28423E-07 | 1.68514E-07 | 3.92E-07 |
| DDD (dustborne)                        |                       | 1 <sup>a</sup>                  |     | 7.89214E-06 | 6.89812E-06 | 1.04658E-05 | 1.20966E-05 | 3.95283E-06 | 4.43381E-06 | 4.54612E-06 | 7.05424E-06 | 5.20409E-06 | 1.21E-05 |
| Dieldrin (dustborne)                   | 0.25                  |                                 |     | 1.1704E-07  | 1.02299E-07 | 1.55207E-07 | 1.79392E-07 | 5.86202E-08 | 6.57532E-08 | 6.74187E-08 | 1.04614E-07 | 7.71764E-08 | 1.79E-07 |
| PAH's                                  |                       |                                 |     | 9.79174E-09 | 1.14774E-08 | 1.60495E-08 | 1.54341E-08 | 6.71309E-09 | 6.64614E-09 | 7.92006E-09 | 9.34527E-09 | 7.73047E-09 | 1.6E-08  |
| PCB's (vapour)                         | 1                     |                                 |     | 1.52788E-06 | 2.09639E-06 | 3.78162E-06 | 3.4545E-06  | 7.46172E-07 | 5.29878E-07 | 1.00307E-06 | 1.47909E-06 | 8.33028E-07 | 3.78E-06 |
| PCB's (dustborne)                      |                       | 1 <sup>b</sup>                  |     | 8.0532E-06  | 7.0389E-06  | 1.06794E-05 | 1.23435E-05 | 4.0335E-06  | 4.5243E-06  | 4.6389E-06  | 7.1982E-06  | 5.3103E-06  | 1.23E-05 |
| Dioxins/Furans (TEQ vapour)            |                       | 1.0E-9 <sup>c</sup>             |     | 3.66426E-10 | 3.20943E-10 | 4.87455E-10 | 5.62608E-10 | 1.83513E-10 | 2.05574E-10 | 2.11184E-10 | 3.27623E-10 | 2.41472E-10 | 5.63E-10 |
| Dioxins/Furans (TEQ Dustborne)         |                       | 1.0E-9 <sup>c</sup>             |     | 6.97944E-10 | 6.10038E-10 | 9.25548E-10 | 1.06977E-09 | 3.4957E-10  | 3.92106E-10 | 4.02038E-10 | 6.23844E-10 | 4.60226E-10 | 1.07E-09 |
| Dichloromethane                        | 174                   |                                 |     | 3.41334E-07 | 4.68342E-07 | 8.4483E-07  | 7.7175E-07  | 1.66698E-07 | 1.18377E-07 | 2.24091E-07 | 3.30435E-07 | 1.86102E-07 | 8.45E-07 |
| Dibromoethane                          |                       | 19 <sup>d</sup>                 |     | 1.17029E-06 | 1.60574E-06 | 2.89656E-06 | 0.000002646 | 5.71536E-07 | 4.05864E-07 | 7.68312E-07 | 1.13292E-06 | 6.38064E-07 | 2.9E-06  |
| Phenol                                 | 4                     |                                 |     | 6.89E-09    | 7.1188E-09  | 7.2904E-09  | 7.5816E-09  | 5.668E-09   | 6.266E-09   | 6.3024E-09  | 6.5104E-09  | 6.6092E-09  | 7.58E-09 |
| 2-Chlorophenol                         |                       | 0.5 <sup>e</sup>                |     | 6.41572E-05 | 5.60766E-05 | 8.50792E-05 | 9.83366E-05 | 3.21336E-05 | 3.60436E-05 | 3.69566E-05 | 5.73457E-05 | 4.23054E-05 | 9.83E-05 |
| Benzene                                | 3.2                   |                                 |     | 0.02628041  | 0.022970415 | 0.034850584 | 0.040281102 | 0.013162765 | 0.014764421 | 0.015138399 | 0.023490252 | 0.017329407 | 0.040281 |
| Chlorobenzene                          | 46                    |                                 |     | 0.184955353 | 0.16166027  | 0.245270425 | 0.283489263 | 0.092636209 | 0.103908266 | 0.106540247 | 0.165318843 | 0.121960076 | 0.283489 |
| Dichlorobenzene                        | 150                   |                                 |     | 2.58375E-07 | 2.66955E-07 | 2.7339E-07  | 2.8431E-07  | 2.1255E-07  | 2.34975E-07 | 2.3634E-07  | 2.4414E-07  | 2.47845E-07 | 2.84E-07 |
| 1,2-Dichlorobenzene                    | 150                   |                                 |     | 0.07167348  | 0.06264621  | 0.09504686  | 0.10985715  | 0.03589815  | 0.04026627  | 0.04128621  | 0.06406398  | 0.04726167  | 0.109857 |
| 1,3-Dichlorobenzene                    |                       | 150 <sup>f</sup>                |     | 0.001594534 | 0.001393702 | 0.002114521 | 0.002444013 | 0.000798633 | 0.000895811 | 0.000918502 | 0.001425244 | 0.001051439 | 0.002444 |
| 1,4-Dichlorobenzene                    | 150                   |                                 |     | 0.16616436  | 0.14523597  | 0.22035162  | 0.25468755  | 0.08322455  | 0.09335139  | 0.09571597  | 0.14852286  | 0.10956919  | 0.254688 |
| Tetrachlorobenzene                     |                       | 46 <sup>g</sup>                 |     | 0.003194436 | 0.002792097 | 0.004236162 | 0.004896255 | 0.001599955 | 0.001794639 | 0.001840097 | 0.002855286 | 0.002106419 | 0.004896 |
| 1,2,3,4-Tetrachlorobenzene (dustborne) |                       | 46 <sup>g</sup>                 |     | 5.01983E-05 | 4.38758E-05 | 6.65683E-05 | 7.69412E-05 | 2.51422E-05 | 2.82015E-05 | 2.89158E-05 | 4.48688E-05 | 3.31009E-05 | 7.69E-05 |
| 1,2,3,5-Tetrachlorobenzene (dustborne) |                       | 46 <sup>g</sup>                 |     | 2.84546E-05 | 2.48708E-05 | 3.77339E-05 | 4.36137E-05 | 1.42517E-05 | 1.59859E-05 | 1.63908E-05 | 2.54336E-05 | 1.87631E-05 | 4.36E-05 |
| Pentachlorobenzene                     |                       | 0.002 <sup>j</sup>              |     | 0.000160527 | 0.000140309 | 0.000212876 | 0.000246047 | 8.04011E-05 | 9.01844E-05 | 9.24687E-05 | 0.000143484 | 0.000105852 | 0.000246 |
| Hexachlorobenzene (vapour)             |                       | 0.002                           |     | 3.03337E-05 | 2.65132E-05 | 4.02257E-05 | 4.64939E-05 | 1.51929E-05 | 1.70415E-05 | 1.74732E-05 | 2.71132E-05 | 2.00021E-05 | 4.65E-05 |
| Hexachlorobenzene (dustborne)          |                       | 0.002 <sup>j</sup>              |     | 1.33146E-06 | 1.16376E-06 | 1.76566E-06 | 2.04079E-06 | 6.66872E-07 | 7.48018E-07 | 7.66965E-07 | 1.1901E-06  | 8.7797E-07  | 2.04E-06 |
| Ethylbenzene                           | 434                   |                                 |     | 0.016858032 | 0.014734764 | 0.022355544 | 0.02583906  | 0.00844346  | 0.009470868 | 0.009710764 | 0.015068232 | 0.011116228 | 0.025839 |
| Napthalene (vapour)                    | 52                    |                                 |     | 0.006335184 | 0.005537268 | 0.008401128 | 0.00971022  | 0.00317302  | 0.003559116 | 0.003649268 | 0.005662584 | 0.004177436 | 0.00971  |
| Napthalene (dustborne)                 |                       | 52 <sup>h</sup>                 |     | 1.05765E-05 | 9.24442E-06 | 1.40256E-05 | 1.62111E-05 | 5.29733E-06 | 5.94191E-06 | 6.09242E-06 | 9.45364E-06 | 6.97419E-06 | 1.62E-05 |
| Xylenes                                | 350                   |                                 |     | 0.005396213 | 0.004716844 | 0.007156606 | 0.008271431 | 0.002702723 | 0.003031478 | 0.003108436 | 0.004823345 | 0.003558211 | 0.008271 |

**Table 4: Total Concentration: 30m (8hr AT, mg/m<sup>3</sup>)**

Client: Meriton

Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

|          | TWA<br>Chemicals<br>(mg/m <sup>3</sup> ) | Surrogate TWA<br>Chemicals<br>(mg/m <sup>3</sup> ) | TLV | Receptor<br>1 | Receptor<br>2 | Receptor<br>3 | Receptor<br>4 | Receptor<br>5 | Receptor<br>6 | Receptor<br>7 | Receptor<br>8 | Receptor<br>9 | MAX      |
|----------|------------------------------------------|----------------------------------------------------|-----|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|
| Species  |                                          |                                                    |     |               |               |               |               |               |               |               |               |               |          |
| Hg       | 0.025                                    |                                                    |     | 2.17E-07      | 8.95E-08      | 9.77E-07      | 8.83E-07      | 1.61E-07      | 8.86E-08      | 2.29E-07      | 3.25E-07      | 1.31E-07      | 9.77E-07 |
| As       | 0.05                                     |                                                    |     | 1.01E-06      | 4.15E-07      | 4.54E-06      | 4.1E-06       | 7.5E-07       | 4.11E-07      | 1.06E-06      | 1.51E-06      | 6.07E-07      | 4.54E-06 |
| Pb       | 0.15                                     |                                                    |     | 3.19E-06      | 1.31E-06      | 1.44E-05      | 1.3E-05       | 2.37E-06      | 1.3E-06       | 3.36E-06      | 4.78E-06      | 1.92E-06      | 1.44E-05 |
| Tl       | 0.1                                      |                                                    |     | 9.33E-08      | 3.84E-08      | 4.2E-07       | 3.79E-07      | 6.93E-08      | 3.8E-08       | 9.82E-08      | 1.4E-07       | 5.62E-08      | 4.2E-07  |
| Ba       | 0.5                                      |                                                    |     | 7.55E-06      | 3.11E-06      | 3.39E-05      | 3.07E-05      | 5.61E-06      | 3.08E-06      | 7.94E-06      | 1.13E-05      | 4.54E-06      | 3.39E-05 |
| Cd       | 0.1                                      |                                                    |     | 4.04E-07      | 1.66E-07      | 1.82E-06      | 1.64E-06      | 3E-07         | 1.65E-07      | 4.25E-07      | 6.05E-07      | 2.43E-07      | 1.82E-06 |
| Total Cr | 0.5                                      |                                                    |     | 1.04E-06      | 4.29E-07      | 4.69E-06      | 4.24E-06      | 7.75E-07      | 4.25E-07      | 1.1E-06       | 1.56E-06      | 6.28E-07      | 4.69E-06 |
| Cu       | 0.2                                      |                                                    |     | 6.92E-07      | 2.85E-07      | 3.11E-06      | 2.81E-06      | 5.14E-07      | 2.82E-07      | 7.28E-07      | 1.04E-06      | 4.17E-07      | 3.11E-06 |
| Ni       | 0.1                                      |                                                    |     | 3.32E-07      | 1.37E-07      | 1.49E-06      | 1.35E-06      | 2.47E-07      | 1.35E-07      | 3.49E-07      | 4.97E-07      | 2E-07         | 1.49E-06 |
| Sb       | 0.5                                      |                                                    |     | 2.59E-07      | 1.06E-07      | 1.16E-06      | 1.05E-06      | 1.92E-07      | 1.05E-07      | 2.72E-07      | 3.87E-07      | 1.56E-07      | 1.16E-06 |
| Va       | 0.05                                     |                                                    |     | 4.79E-07      | 1.97E-07      | 2.15E-06      | 1.95E-06      | 3.56E-07      | 1.95E-07      | 5.04E-07      | 7.17E-07      | 2.88E-07      | 2.15E-06 |
| Zn       | 5                                        |                                                    |     | 1.51E-05      | 6.2E-06       | 6.77E-05      | 6.12E-05      | 1.12E-05      | 6.14E-06      | 1.59E-05      | 2.25E-05      | 9.07E-06      | 6.77E-05 |

**Legend:**

\* Inhalable Dust

a - DDT

b - PCB's Vapour

c -

d - Bromoethane

e - PCP

f - Dichlorobenzene

g - Chlorobenzene

h - Napthalene (Vapour)

i - 1,2,4 -trimethylbenzene

j - 1,2,4 trichlorobenzene

k - Isopropylbenzene

l - Hexachlorobenzene (vapour)

**Workcover TWA (1995)/ ILO**

Workcover- Exposure standards for Atmospheric contaminants in the occupational environment; NOSHC:1003c1995

International Labour Organisation; international Health and Safety Information Centre (CIS)

TLV-American Conference of Industrial Hygienists

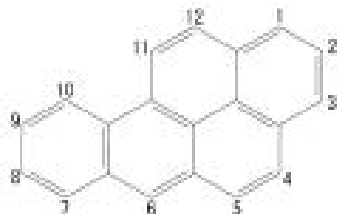
**Table 5: Total Concentration: 40m (8hr AT, mg/m^3)**  
 Client: Meriton  
 Project: Human Health Risk Assessment for Onsite Construction Workers, former Allied Feeds site Rhodes

|          | TWA<br>Chemicals<br>(mg/m³) | Surrogate TWA<br>Chemicals<br>(mg/m³) | TLV | Receptor    | Receptor    | Receptor    | Receptor    | Receptor    | Receptor    | Receptor    | Receptor    | Receptor    | MAX      |
|----------|-----------------------------|---------------------------------------|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------|
| Species  |                             |                                       |     | 1           | 2           | 3           | 4           | 5           | 6           | 7           | 8           | 9           |          |
| Hg       | 0.025                       |                                       |     | 3.76009E-07 | 5.1592E-07  | 9.30654E-07 | 8.5015E-07  | 1.83632E-07 | 1.30403E-07 | 2.46856E-07 | 3.64003E-07 | 2.05008E-07 | 9.31E-07 |
| As       | 0.05                        |                                       |     | 1.74568E-06 | 2.39523E-06 | 4.3207E-06  | 3.94695E-06 | 8.52541E-07 | 6.05414E-07 | 1.14607E-06 | 1.68994E-06 | 9.51779E-07 | 4.32E-06 |
| Pb       | 0.15                        |                                       |     | 5.52636E-06 | 7.58268E-06 | 1.36782E-05 | 0.000012495 | 2.69892E-06 | 1.91658E-06 | 3.62814E-06 | 5.3499E-06  | 3.01308E-06 | 1.37E-05 |
| Tl       | 0.1                         |                                       |     | 1.61456E-07 | 2.21533E-07 | 3.99618E-07 | 3.6505E-07  | 7.88508E-08 | 5.59942E-08 | 1.05999E-07 | 1.56301E-07 | 8.80292E-08 | 4E-07    |
| Ba       | 0.5                         |                                       |     | 1.30574E-05 | 1.79159E-05 | 3.23181E-05 | 2.95225E-05 | 6.37686E-06 | 4.52839E-06 | 8.57237E-06 | 1.26405E-05 | 7.11914E-06 | 3.23E-05 |
| Cd       | 0.1                         |                                       |     | 6.98922E-07 | 9.58986E-07 | 1.72989E-06 | 1.58025E-06 | 3.41334E-07 | 2.42391E-07 | 4.58853E-07 | 6.76605E-07 | 3.81066E-07 | 1.73E-06 |
| Total Cr | 0.5                         |                                       |     | 1.80419E-06 | 2.47552E-06 | 4.46553E-06 | 4.07925E-06 | 8.81118E-07 | 6.25707E-07 | 1.18448E-06 | 1.74659E-06 | 9.83682E-07 | 4.47E-06 |
| Cu       | 0.2                         |                                       |     | 1.19738E-06 | 1.64291E-06 | 2.96361E-06 | 2.70725E-06 | 5.84766E-07 | 4.15259E-07 | 7.86097E-07 | 1.15915E-06 | 6.52834E-07 | 2.96E-06 |
| Ni       | 0.1                         |                                       |     | 5.74308E-07 | 7.88004E-07 | 1.42146E-06 | 1.2985E-06  | 2.80476E-07 | 1.99174E-07 | 3.77042E-07 | 5.5597E-07  | 3.13124E-07 | 1.42E-06 |
| Sb       | 0.5                         |                                       |     | 4.47527E-07 | 6.14048E-07 | 1.10767E-06 | 1.01185E-06 | 2.1856E-07  | 1.55205E-07 | 2.93808E-07 | 4.33237E-07 | 2.44E-07    | 1.11E-06 |
| Va       | 0.05                        |                                       |     | 8.28954E-07 | 1.1374E-06  | 2.05173E-06 | 1.87425E-06 | 4.04838E-07 | 2.87487E-07 | 5.44221E-07 | 8.02485E-07 | 4.51962E-07 | 2.05E-06 |
| Zn       | 5                           |                                       |     | 2.60606E-05 | 3.57575E-05 | 6.45021E-05 | 5.89225E-05 | 1.27273E-05 | 9.03799E-06 | 1.71092E-05 | 2.52285E-05 | 1.42087E-05 | 6.45E-05 |

**Legend:**  
 \* Inhalable Dust  
 a - DDT  
 b - PCB's Vapour  
 c -  
 d - Bromoethane  
 e - PCP  
 f - Dichlorobenzene  
 g - Chlorobenzene  
 h - Napthalene (Vapour)  
 i - 1,2,4 -trimethylbenzene  
 j - 1,2,4 trichlorobenzene  
 k - Isopropylbenzene  
 l - Hexachlorobenzene (vapour)  
**Worcover TWA (1995)/ ILO)**  
*Workcover- Exposure standards for Atmospheric contaminants in the occupational environment; NOSHC:1003c1995*  
*International Labour Organisation; international Health and Safety Information Centre (CIS)*  
*TLV-American Conference of Industrial Hygienists*

# **Appendix J: Benzo(a)pyrene Toxicity Summary**

## GENERAL



**Benzo(a)pyrene** (also known as benzo(d,e,f)chrysene, 3,4-benzopyrene, 3,4-benzpyrene, benz(a)pyrene, 6,7-benzopyrene, BP and abbreviated to **BaP**) is a yellowish solid with very low vapour pressure and low water solubility. BaP is the most well known and most widely studied polycyclic aromatic hydrocarbon (PAH). PAHs are a large group of hydrocarbons containing two or more benzene rings fused to each other or to other hydrocarbon rings.

PAHs are formed mainly as a result of pyrolytic processes, especially the incomplete combustion of organic materials during industrial and other human activities, such as processing of coal and crude oil, combustion of natural gas, including for heating, combustion of refuse, vehicle traffic, cooking and cigarette smoking, as well as in natural processes such as carbonization. PAHs are also present in many foodstuffs. Natural sources include volcanoes and forest fires. Crude oil, shale oil and coal tar contain small amounts of PAHs.

There are several hundred individual PAH compounds.

## PROPERTIES

BaP is a pale yellow solid (plates or needles) with a faint aromatic odour. BaP is not very soluble in water, sparingly soluble in ethanol and methanol, soluble in benzene, toluene, xylene and ether. Key properties are presented below (ATSDR 1995, USEPA 2004 and ORNL Database 2006):

|                             |                                                                                |
|-----------------------------|--------------------------------------------------------------------------------|
| CAS No                      | 50-32-8                                                                        |
| Chemical Formula            | C <sub>20</sub> H <sub>12</sub>                                                |
| Molecular Weight            | 252.32                                                                         |
| Vapour Pressure             | 5.49x10 <sup>-9</sup> mmHg at 25°C                                             |
| Vapour Density              | 8.7                                                                            |
| Density                     | 1.351 g/ml at 20°C                                                             |
| Solubility                  | 0.00162 mg/L at 20°C                                                           |
| Air Diffusion Coefficient   | 0.043 cm <sup>2</sup> /s                                                       |
| Water Diffusion Coefficient | 9 x 10 <sup>-6</sup> cm <sup>2</sup> /s                                        |
| Henry's Law Coefficient     | 4.9x10 <sup>-7</sup> atm.m <sup>3</sup> /mol<br>= 0.0000187 at 25°C (unitless) |
| Koc                         | 787 000 cm <sup>3</sup> /g                                                     |
| Log Kow                     | 6.13                                                                           |
| Odour Threshold             | NA                                                                             |
| Dermal Absorption           | 0.13 (unitless)                                                                |
| Permeability Constant       | 1.24 cm/hr                                                                     |

## **EXPOSURE**

PAHs are present throughout the environment with exposure of the general population via inhalation of particulates (dust) or cigarette smoke, oral (including food) or dermal routes. In most cases the inhalation of PAHs from cigarette smoke, wood smoke, ambient air and ingestion of foods are the primary routes of exposure. Exposure may also occur through oral ingestion of drinking water or soils. Apart from occupational exposures, the primary concern is ingestion of PAHs in food.

If released into the environment the following can be noted with respect to PAHs:

- Air: PAHs released to the atmosphere are subject to short and long range transport and are removed by wet and dry deposition onto soil, water and vegetation. As BaP is not considered volatile, it is generally present in the atmosphere sorbed to particulates with dry deposition responsible for most of the removal.
- Water: In water PAHs can volatilise (not relevant for BaP), oxidise, biodegrade, bind to suspended particles or sediments or accumulate in aquatic organisms.
- Soil and Sediments: In sediment, PAHs can biodegrade or accumulate in aquatic organisms. In soils PAHs can volatilise (Not relevant for BaP), undergo abiotic degradation, biodegrade or accumulate in plants. PAHs in soils can also enter groundwater.
- The low solubility, low vapour pressure and high  $K_{ow}$  of BaP results in partitioning mainly between soil (82%) and sediment (17%) with very minimal partitioning to water, air and biota.
- The estimated half-lives for BaP are less than 1-6 days in the atmosphere, less than 1-8 hours in water, 5-10 years in sediment, and greater than 14-16 months in soil (for complete degradation).
- PAHs can be accumulated in aquatic organisms from water, sediments and food. Bioconcentration is greater for higher molecular weight compounds, such as BaP. However the ability of fish to metabolise PAHs has resulted in BaP not frequently detected, or only detected at low concentrations, in fish from environments with heavily contaminated PAHs.
- Some plants can take up PAHs from soil via the roots or from the air (deposition). Biomagnification in plants is low.
- PAHs may accumulate in terrestrial animals via the food chain or ingestion of soils.

## **HEALTH EFFECTS**

### General

The following has been summarised from information presented by EA (2002), ATSDR (1995) and the WHO (2000).

PAHs are extremely lipophilic and are generally rapidly absorbed upon inhalation, ingestion or dermal exposure with rapid and wide distribution to the organs. The metabolism of BaP has been extensively studied in the literature and one of the most important pathway is the metabolism initially by the microsomal cytochrome P-450 monooxygenase system and epoxide hydrolases to several arene oxides including an intensely reactive intermediate (7,8-diol-9,10-epoxide). The intermediate is considered electrophilic and is considered an “ultimate” carcinogen as it can bind directly to informational macromolecules, forming adducts. Such adducts in DNA results in mutations when the nucleic acid is replicated and is considered a probable basis for PAH carcinogenic action.

Data from animal studies indicate that several PAHs may induce a number of adverse effects, such as immunotoxicity, genotoxicity, carcinogenicity, reproductive toxicity (affecting both male and female offspring), and may possibly also influence development of atherosclerosis. However, the critical endpoint for the health risk evaluation is the well-documented carcinogenicity of several PAHs.

BaP is considered to have fairly low acute toxicity, however exposures to high levels (mg range) may result in body weight loss, peripheral blood pattern changes, changes in the liver and kidney function and peribronchial pathologies. Following repeated exposures, adverse effects include chronic dermatitis, breathing problems, chest pains, chest and throat irritation, non-tumour pathology in the lung, cancer of the skin and lung and a depressed immune system.

There is an extensive literature on the epidemiology of workforces exposed to complex mixtures of PAHs in, for example, aluminium production and coke production, and in those handling coal tar, coal tar pitches and soot (UA, 2002). These studies conclusively demonstrate an elevated incidence of lung tumours on inhalation and of skin tumours from skin contact. It is not possible, however, to assess with confidence the contribution of individual PAHs to the observed cancer burden.

### Genotoxicity

BaP has been thoroughly studied for genotoxicity. BaP induces genetic damage *in vitro* and produces a wide range of genotoxic effects. The results of *in vivo* studies indicate many of the same types of adverse effects observed *in vitro*. The available data also indicate that BaP is genotoxic in both somatic and germinal cells of animals. The formation of diol epoxides that covalently bond to DNA appears to be the primary mechanism for both genotoxicity and carcinogenicity.

The genotoxic activity of BaP is well established and is frequently used as a positive control to review the genotoxic action of unknown compounds and serves as the model compound for PAHs with the information available on the formation of metabolites and structure of BaP theoretically used to predict the potential genotoxicity and carcinogenicity of other PAHs that have not been as extensively studied.

### Carcinogenicity

Evidence exists (primarily from occupational studies) that mixtures of PAHs are carcinogenic in humans. BaP is by far the most intensively studied PAH in experimental animals. It produces tumours of many different tissues, depending on the species tested and the route of application. BaP is the only PAH that has been tested for carcinogenicity following inhalation, and it produced lung tumours in hamsters, the only species tested. Induction of lung tumours in rats and hamsters has also been documented for BaP and

several other PAHs following direct application, e.g. intratracheal instillation into the pulmonary tissue. The lung carcinogenicity of BaP can be enhanced by coexposure to other substances such as cigarette smoke, asbestos and probably also airborne particles.

Because several PAHs have been shown to be carcinogenic, and many more have been shown to be genotoxic, due the level of knowledge associated with BaP, BaP is typically used as a suitable indicator for the carcinogenic fraction of the large number of PAHs.

## **TOXICITY CLASSIFICATION**

BaP is classified as a "probable" human carcinogen (Category B2) by the USEPA for all routes of exposure based on evidence from animal studies. Human data specifically linking BaP to a carcinogenic effect are lacking.

IARC has classified BaP in Group 2A (probably carcinogenic to humans) based on sufficient evidence that BaP is carcinogenic to experimental animals.

## **EXPOSURE LIMITS AND TOXICITY EVALUATIONS**

### Australia

The Australian Drinking Water Guidelines (NHMRC, 2004) have established a health based guideline of 0.00001 mg/L (10 ng/L) for BaP. The value was established based on the consideration of health effects (consideration of the WHO guideline established, refer below) and the determination for analysis using commonly available techniques.

The NEPC (2002) has established an ambient air investigation level for BaP as a marker for PAHs of 0.3 ng/m<sup>3</sup> based on an annual average and an 8-year goal. As discussed in NEPM (2003), this value was derived in New Zealand from the WHO unit risk value and an incremental lifetime risk of 10<sup>-5</sup>. Due to the transparency provided in the derivation of the WHO unit risk value and the New Zealand air quality guideline the NEPC adopted the guideline value of 0.3 ng/m<sup>3</sup>. The available WHO unit risk is presented in the discussion below.

Worksafe Australia (NOHSC) have established "Exposure Standards for Atmospheric Contaminants in the Occupational Environment". For BaP the NOHSC have identified the chemical as a Category 2, probable human carcinogen for which there is sufficient evidence to provide a strong presumption that human exposure may result in the development of cancer. As such it has been determined that it is not currently possible to establish an appropriate exposure standard and that for BaP, exposure should be controlled to the lowest practicable level.

## WHO

The WHO (Drinking Water Guideline 2004) identified BaP as one of the most carcinogenic PAHs and established a drinking water guideline of 0.7 ug/L, corresponding to an excess lifetime cancer risk of  $10^{-5}$ . This was based on an oral carcinogenicity study.

The oral slope factor associated with this guideline value:

$$\begin{aligned}
 SF \text{ (mg/kg/day)}^{-1} &= \text{Risk/Intake(mg/kg/day)} \\
 &= [\text{Risk} \times \text{Body Weight}]/[\text{Concentration (in water)} \times \text{Ingestion Rate}] \\
 &= [1 \times 10^{-5} \times 70 \text{ kg}]/[0.0007 \text{ mg/L} \times 2 \text{ L/day}] \\
 &= \mathbf{0.5 \text{ (mg/kg/day)}^{-1}}
 \end{aligned}$$

The WHO (2000) provided a review of PAHs in air. With respect to establishing an air guideline, BaP was identified as an indicator chemical due to the more extensive database available. Based on epidemiological data from studies in coke-oven workers, a unit risk for BaP was estimated to be  $8.7 \times 10^{-5} \text{ (ng/m}^3\text{)}^{-1}$  (ie for an air concentration of 1 ng/m<sup>3</sup>, the lifetime risk is estimated to be  $8.7 \times 10^{-5}$ ).

The unit risk value is equivalent to the following slope factor:

$$\begin{aligned}
 SF \text{ (mg/kg/day)}^{-1} &= \text{Risk/Intake(mg/kg/day)} \\
 &= [\text{Risk} \times \text{Body Weight}]/[\text{Concentration (in air)} \times \text{Inhalation Rate}] \\
 &= [8.7 \times 10^{-5} \times 70 \text{ kg}]/[0.000001 \text{ mg/m}^3 \times 20 \text{ m}^3/\text{day}] \\
 &= \mathbf{304.5 \text{ (mg/kg/day)}^{-1}}
 \end{aligned}$$

## EU

The European Commission (2001) developed a limit value for PAH compounds in ambient air. Following review of available unit risk estimates derived from relevant epidemiological studies, the working group recommended the unit risk adopted by the WHO Air Quality Guideline for Europe from a US coke oven workers study (noted above) as a starting point. BaP was identified as a suitable marker for the carcinogenic risk of PAHs in air, despite not necessarily being the most potent carcinogen present. The EU set an air quality limit of 0.5 – 1.0 ng/m<sup>3</sup> (annual average) for PAHs in air on this basis.

## US

The USEPA has established an **oral slope factor for BaP of  $7.3 \text{ (mg/kg/day)}^{-1}$**  based on the geometric mean of four slope factors obtained by different modelling procedures undertaken on the combination of multiple data sets from two different reports.

No inhalation specific carcinogenic assessment is provided by the USEPA. Common practice in the US is to adopt the oral slope factor for the assessment of inhalation exposures.

No Minimum Risk levels (MRLs) have been derived by ATSDR for BaP.

The OEHHA (1994) has established a cancer potency factor of  $11.5 \text{ (mg/kg/day)}^{-1}$  and an inhalation unit risk for the evaluation of chronic exposure to BaP that ranges from  $1.1 \times 10^{-3}$  to  $3.3 \times 10^{-3} \text{ (}\mu\text{g/m}^3\text{)}^{-1}$ . The unit risk value of  $1.1 \times 10^{-3} \text{ (}\mu\text{g/m}^3\text{)}^{-1}$  is considered the best value for the assessment of inhalation exposures as it is based on an inhalation study (hamsters).

## SUGGESTED TOXICITY VALUES FOR RISK CHARACTERISATION

### Background Intake

For common contaminants, intakes from background sources such as food, water and/or air must also be considered in the evaluation and use of the ADI, TDI or RfD in assessing potential exposures to site related chemicals. With respect to BaP, assessment is undertaken on the basis of a non-threshold approach for oral, dermal and inhalation exposures and hence potential background intakes are not relevant.

### Toxicity Values

Toxicity data relevant for use in the characterisation of risk to human health have been selected for BaP following review of the available information in general accordance with guidelines from enHealth (2002) and NEPM (1999), accounting for background intake where relevant.

|                   |                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Oral</b>       | Oral Slope Factor = $0.5 \text{ (mg/kg/day)}^{-1}$ (WHO Drinking Water Guidelines, 2004)                                                                                                                                                                                                                                                                             |
| <b>Dermal</b>     | No dermal guidelines are available, hence it has been assumed that dermal toxicity is equivalent to oral toxicity.                                                                                                                                                                                                                                                   |
| <b>Inhalation</b> | <p>Inhalation unit risk of <math>8.7 \times 10^{-5}</math> (per <math>\text{ng/m}^3</math>), equivalent to <math>304.5 \text{ (mg/kg/day)}^{-1}</math> (WHO 2000 and NEPC 2002).</p> <p>Occupational inhalation exposure evaluated using the following (NOHSC):</p> <p><i>No guideline available, exposure to be controlled to the lowest practicable level.</i></p> |

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## **Appendix K: Risk E Calculation Sheets**

## Toxicity and Dermal Absorption Parameters

| Chemical       | Oral<br>(mg/kg/day) <sup>-1</sup> | <u>Non-Threshold Slope Factor</u>       |     | Dermal<br>(mg/kg/day) <sup>-1</sup> | <u>Occupational Exposure</u> |                    |
|----------------|-----------------------------------|-----------------------------------------|-----|-------------------------------------|------------------------------|--------------------|
|                |                                   | Inhalation<br>(mg/kg/day) <sup>-1</sup> |     |                                     | TWA<br>(mg/m <sup>3</sup> )  | TWA<br>(mg/kg/day) |
| Benzo(a)pyrene |                                   | 3.05E+02                                | WHO |                                     |                              | 0.00E+00           |

## Inhalation of Volatile Chemicals

| General Data/ Equations                                                                          |                        | Exposure Parameters (RME)<br>Inhalation Outdoors by Worker |                                                         |
|--------------------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------|---------------------------------------------------------|
| <b>Exposure Parameters</b>                                                                       |                        |                                                            |                                                         |
| Exposure Frequency (EF)                                                                          | days/year              | 312                                                        | Exposure for 6 days per week                            |
| Exposure Duration (ED)                                                                           | years                  | 5                                                          | Duration of exposure for Meriton construction workers   |
| Body Weight (BW)                                                                                 | kg                     | 70                                                         | USEPA 1989 and CSMS 1996                                |
| Averaging Time - NonThreshold (ATc)                                                              | days                   | 25550                                                      | USEPA 1989 and CSMS 1996                                |
| Averaging Time - Threshold (ATn)                                                                 | days                   | 1825                                                       | USEPA 1989 and CSMS 1996                                |
| Inhalation Rate (InhR)                                                                           | m <sup>3</sup> /hr     | 2.20                                                       | Inhalation rate indoors for adults as per enHealth 2002 |
| Exposure Time (ET)                                                                               | hr/day                 | 10                                                         | Time spent outdoors                                     |
| Fraction Inhaled from Contaminated Source (FI)                                                   | -                      | 1                                                          | Assume all of workplace above groundwater/soils         |
| <b>Intake Factor = <math>\frac{InhR \cdot ET \cdot FI \cdot EF \cdot ED}{BW \cdot AT}</math></b> | m <sup>3</sup> /kg/day | <b>1.9E-02</b><br><b>2.7E-01</b>                           | <b>NonThreshold</b><br><b>Threshold</b>                 |

*Daily Intake from Air = Concentration in Air x Intake Factor*

*NonThreshold Risk = Daily Intake from Air for NonThreshold Effects x Slope Factor*

*Hazard Quotients = (Daily Intake from Air for Threshold Effects/ADI)*

| Chemical       | Toxicity Data                 |                                 | Concentration        | Daily Intake                               |                                      | Calculated Risk      |                 |
|----------------|-------------------------------|---------------------------------|----------------------|--------------------------------------------|--------------------------------------|----------------------|-----------------|
|                | Non-Threshold<br>Slope Factor | Threshold<br>ADI, TDI or<br>RfD | in Indoor Air        | Daily Intake from<br>Air -<br>NonThreshold | Daily Intake from<br>Air - Threshold | NonThreshold<br>Risk | Hazard Quotient |
|                | (mg/kg-day) <sup>-1</sup>     | (mg/kg/day)                     | (mg/m <sup>3</sup> ) | (mg/kg/day)                                | (mg/kg/day)                          | (unitless)           | (unitless)      |
|                |                               |                                 |                      |                                            | <b>TOTAL</b>                         | <b>2.3E-6</b>        |                 |
| Benzo(a)pyrene | 3.1E+02                       |                                 | 3.92E-07             | 7.5E-09                                    | 1.1E-07                              | 2.3E-6               | --              |

↑  
Concentration Adopted from "Total Modelled Emission Rate" at 40m

## Inhalation of Particulates

| General Data/ Equations                                                                                                                                                           |                    | Exposure Parameters (RME)<br>Inhalation Outdoors by Worker |                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Exposure Parameters</b>                                                                                                                                                        |                    |                                                            |                                                                                                                                                                   |
| Exposure Frequency (EF)                                                                                                                                                           | days/year          | 312                                                        | Exposure for 6 days per week                                                                                                                                      |
| Exposure Duration (ED)                                                                                                                                                            | years              | 5                                                          | Duration of exposure for Meriton Construction Worker                                                                                                              |
| Body Weight (BW)                                                                                                                                                                  | kg                 | 70                                                         | USEPA 1989 and CSMS 1996                                                                                                                                          |
| Averaging Time - NonThreshold (ATc)                                                                                                                                               | days               | 25550                                                      | USEPA 1989 and CSMS 1996                                                                                                                                          |
| Averaging Time - Threshold (ATn)                                                                                                                                                  | days               | 1825                                                       | USEPA 1989 and CSMS 1996                                                                                                                                          |
| Inhalation Rate (InhR)                                                                                                                                                            | m <sup>3</sup> /hr | 2.20                                                       | Inhalation rate outdoors for adults as per enHealth 2002                                                                                                          |
| Exposure Time (ET)                                                                                                                                                                | hr/day             | 9                                                          | Time spent outdoors at work                                                                                                                                       |
| Deposition Fraction (DF)                                                                                                                                                          | -                  | 0.75                                                       | 75% of inhaled dust will be retained in respiratory tract with remaining 25% exhaled (NEPM 1999)                                                                  |
| Ciliary Clearance Factor (CC)                                                                                                                                                     | -                  | 0.5                                                        | 50% of inspirable dust small enough to reach pulmonary alveoli - this is the respirable fraction (if particulate data used is respirable fractions, 100% assumed) |
| Fraction Inhaled from Contaminated Source (FI)                                                                                                                                    | -                  | 1                                                          | Assume all of workplace above groundwater/soils                                                                                                                   |
| <b>Intake Factor = <math>\frac{\text{InhR} \cdot \text{ET} \cdot \text{DF} \cdot \text{CC} \cdot \text{FI} \cdot \text{EF} \cdot \text{ED}}{\text{BW} \cdot \text{AT}}</math></b> |                    | <b>6.5E-03</b><br><b>9.1E-02</b>                           | <b>NonThreshold</b><br><b>Threshold</b>                                                                                                                           |

*Daily Intake from Air = Concentration in Air x Intake Factor*

*NonThreshold Risk = Daily Intake from Air for NonThreshold Effects x Slope Factor*

*Hazard Quotients = (Daily Intake from Air for Threshold Effects/ADI)*

| Chemical       | Toxicity Data                 |                                 | Concentration<br>in Indoor Air | Daily Intake                               |                                      | Calculated Risk      |                 |
|----------------|-------------------------------|---------------------------------|--------------------------------|--------------------------------------------|--------------------------------------|----------------------|-----------------|
|                | Non-Threshold<br>Slope Factor | Threshold<br>ADI, TDI or<br>RfD |                                | Daily Intake from<br>Air -<br>NonThreshold | Daily Intake from<br>Air - Threshold | NonThreshold<br>Risk | Hazard Quotient |
|                | (mg/kg-day) <sup>-1</sup>     | (mg/kg/day)                     | (mg/m <sup>3</sup> )           | (mg/kg/day)                                | (mg/kg/day)                          | (unitless)           | (unitless)      |
|                |                               |                                 |                                |                                            | <b>TOTAL</b>                         | <b>7.7E-7</b>        |                 |
| Benzo(a)pyrene | 3.1E+02                       |                                 | 3.92E-07                       | 2.5E-09                                    | 3.6E-08                              | 7.7E-7               | --              |

Concentration Adopted from "Total Modelled Emission Rate" at 40m