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Air Monitoring Program
Sydney Tar Ponds Agency
Sydney, Nova Scotia

Plain Language Version of
Final Monthly Report
September 2009

Sydney Tar Ponds Agency
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INTRODUCTION

This report is a plain language summary of the regular, monthly air monitoring report prepared for the Sydney Tar Ponds Agency by ALL-TECH Environmental Services Cape Breton Limited (ALL-TECH).

Monitoring air quality is an important part of the Sydney Tar Ponds Agency's work at the Tar Ponds and Coke Ovens site. The air monitoring program helps to ensure work at the site complies with Provincial and Federal regulations. It also tracks air quality trends, evaluates the progress of the cleanup project and supports the creation of emission control programs.

Air monitoring involves collecting various air contaminants in the outdoor air. The data collected is then compared to various Provincial and Federal regulations to see if the amounts of contaminants in the air are within acceptable levels. These Provincial and Federal regulations are not identified individually by name within this report, but are instead referred to as *allowable standard(s)*. More detailed information on the specific regulations used is available in the full version of this report, which can be obtained by contacting the Sydney Tar Ponds Agency.

Air monitoring has been conducted around the Tar Ponds and Coke Ovens site since 1989. In March 2007, ALL-TECH was awarded the contract to carry out air monitoring during the cleanup of the site.

The following report outlines the results obtained through the air monitoring program for September 2009.

AIR SAMPLING STANDARDS AND METHODS

Following is a list of the air quality standards being measured at fixed monitoring stations located throughout Sydney.

Total Suspended Particulate Matter (TSP) and Metals

TSP refers to airborne particles with a diameter of less than 50 µm (please note that the abbreviation µm stands for a *micrometre*, which is a measurement representing one-millionth of a metre or one-thousandth of a millimetre). The upper size limit depends on sampling conditions, especially wind speed and direction. These particles remain suspended in the atmosphere for a period of time, rather than settling near the emission source.

These particles constantly enter the atmosphere from many sources, including:

Natural sources:
- Soil
- Bacteria, fungi
- Pollen
- Salt particles from sea water

Man-made sources:
- Combustion products
- Industrial processes
- Power generation
- Motor vehicle use

Metals exist in elemental form or as ions dissolved in water, as vapours, as salts or minerals in rock, sand, dust, and form a variety of inorganic or organic compounds. Both natural and man-made processes emit metals and their compounds into the air. The processing of minerals, incineration of metallic objects and combustion of fossil fuels result in the emission of metals associated with particulate matter. Metals occur naturally in soil and in rocks rich with minerals. This means that wind-blown dust can release metals into air as particulate matter.

A scan for common metals associated with the Tar Ponds and Coke Ovens site is completed as part of the air monitoring program. Table 1 outlines the metals that samples are analyzed for as part of the Air Monitoring Program at the Tar Ponds and Coke Ovens site.

Table 1: Metals Analyzed

Aluminum	Beryllium	Chromium	Lead	Mercury	Selenium	Sulphur	Vanadium
Antimony	Boron	Cobalt	Lithium	Molybdenum	Silver	Thallium	Zinc
Arsenic	Cadmium	Copper	Magnesium	Nickel	Sodium	Tin	
Barium	Calcium	Iron	Manganese	Potassium	Strontium	Uranium	

Particulate Matter 10 (PM_{10})

PM_{10} describes airborne particles less than 10 µm in diameter. For comparison, a human hair has a diameter of 50 to 100 µm. Airborne particulate matter consists of many different substances suspended in air in the form of particles (solid or liquid droplets) that vary widely in size. These smaller particles can

pose a hazard to humans because they can bypass upper respiratory defences and reach further into the respiratory tract.

Particulate Matter 2.5 ($PM_{2.5}$)

$PM_{2.5}$ describes airborne particles that are 2.5 µm or smaller in diameter. The diameter of a human hair is approximately 30 times larger than 2.5 µm, so several thousand particles of this size could fit on the period at the end of this sentence. Because these particles are so small, they can penetrate into the deepest part of the lungs[1].

There is increasing evidence to suggest that, of the total amount of PM_{10}, the amount of $PM_{2.5}$ airborne particles may be a major area of concern with regard to health effects. However, this has not been established conclusively. $PM_{2.5}$ particles are almost exclusively the product of combustion processes, including motor vehicle emissions, industrial boilers, incineration, bushfires, hazard-reduction burning, wood-burning heaters and cigarette smoke[2].

Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOCs) are organic compounds that have boiling points in the range of 50 to 250 degrees Celsius. Several thousand synthetic and natural chemicals are considered to be VOCs. The term “organic compounds” covers all chemicals containing carbon and hydrogen. These bonded compounds can easily evaporate at room temperature and enter the atmosphere as a gas under normal conditions. Chemicals, stored fuel, vehicle exhaust and numerous other substances can contribute to outdoor VOC emissions.

The most common VOCs associated with the Tar Ponds and Coke Ovens site are benzene, toluene, ethylbenzene and xylene (BTEX). Higher concentrations of VOCs are normally found indoors rather than outdoors. Table 2 outlines the VOCs that samples are analyzed for as part of the Air Monitoring Program at the Tar Ponds and Coke Ovens site.

1 EPA, Laboratory and Field Operations - $PM_{2.5}$.

2 Queensland Government, Environmental Protection Agency; Ambient air quality monitoring in Queensland 1998 Annual Summary Report, Queensland, Australia, 1998, Page 33.

Table 2: VOCs Analyzed

Benzene	Freon 114 (1,2-Dichlorotetrafluoroethane)	1,2,4-Trichlorobenzene
Carbon Tetrachloride	Freon 11 (Trichlorofluoromethane)	1,1,1-Trichloroethane
Dichloromethane	Freon 113 (1,1,2-Trichlorotrifluoroethane)	1,2,4-Trimethylbenzene
Ethyl benzene	Tetrachloroethene	m,p-Xylene
Freon 12 (Dichlorodifluoromethane)	Toluene	o-Xylene

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are organic compounds produced by incomplete combustion of organic material. They are widespread in the environment. Natural sources include forest fires, volcanoes and decaying organic matter. Man-made sources include combustion of fossil fuels and various manufacturing processes. They were formed on the Tar Ponds and Coke Ovens site as a result of uncontrolled emissions from the Coke Ovens while they were in operation. During their operation, the Coke Ovens burned fossil fuels, which produced a large amount of PAHs. These PAHs were washed down the Coke Ovens Brook, which contaminated the sediment in the Tar Ponds. Table 3 outlines the PAHs that samples are analyzed for as part of the Air Monitoring Program at the Tar Ponds and Coke Ovens site.

Table 3: PAHs Analyzed

Acenaphthylene	Benzo(b)fluoranthene	Chrysene	Indeno(1,2,3-cd)pyrene
Acenaphthene	Benzo(g,h,i)perylene	Dibenz(a,h)anthracene	Naphthalene
Anthracene	Benzo(a)pyrene	Fluoranthene	Pyrene
Benzo(a)anthracene	Benzo(k)fluoranthene	Fluorine	Phenanthrene

Polychlorinated Biphenyls (PCBs)

PCBs are a man-made family of organic compounds that are stable and heat resistant (meaning they have very high boiling points). PCBs do not occur naturally. Manufacturing of PCBs began in 1929 and they were used until the 1970s in many different products, including hydraulic fluid, casting wax,

insulating fluid in electrical equipment, etc. PCB pollution is widespread throughout the world and, because of the risk to human health, the manufacturing of PCBs was banned in Canada in 1977. PCBs are found in localized areas of the Tar Ponds, most of which do not contain high concentrations of the contaminant. Table 4 outlines the PCBs that samples are analyzed for as part of the Air Monitoring Program at the Tar Ponds and Coke Ovens site.

Table 4: PCBs Analyzed

Monochlorobiphenyls	Hexachlorobiphenyls
Dichlorobiphenyls	Heptachlorobiphenyls
Trichlorobiphenyls	Octachlorobiphenyls
Tetrachlorobiphenyls	Nona-,Decachlorobiphenyls
Pentachlorobiphenyls	

AIR QUALITY STANDARDS

The Federal and Provincial governments currently have numerous regulations and guidelines related to air quality monitoring. All air quality data collected during the air monitoring program is compared with current provincial and federal air quality regulations to ensure the samples collected comply with the appropriate standards. This helps to ensure that human health and well-being are protected and serves as a way to interpret the data collected.

Real-time Standards

Real-time air quality regulatory standards for Tar Ponds and Coke Ovens site action levels have been developed for instant measurement and reporting of air quality when construction activities are carried out on the site.

Real-time sampling results can't be compared against 24-hour standards because they are overly cautious for short-term exposures. Shifting winds, normal on even calm days, will cause peak impacts from point sources to result in a lower exposure over a 24-hour period. Therefore, short-term (one-hour) modified standards are required. These are not health-based standards, but instead serve as indicators that regulated levels may have been exceeded.

SAMPLING LOCATIONS AND EQUIPMENT

The Sydney Tar Ponds Agency's air monitoring program consists of six fixed station sampling locations and real-time perimeter sampling. The six fixed stations operate every six days and measure air quality for a 24-hour period (midnight to midnight). The real-time monitoring involves measuring air quality at the perimeter of the Tar Ponds and Coke Ovens site, both upwind and downwind of the site when cleanup activities are occurring.

Fixed Station Sampling Locations and Data Analyzed

Air monitoring was conducted every six days by ALL-TECH during September 2009. The sampling was conducted at six fixed air monitoring stations throughout the Sydney area. These six stations have been operational since November 2001. Air sampling was performed at each location on September 4, 10, 16, 22 and 28, 2009. Table 5 shows the locations of the fixed stations and the data analyzed at each station during September 2009.

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Table 5: Fixed Station Sampling Locations and Parameters Sampled for September 2009

LOCATION	Substances Monitored	September 4, 2009	September 10, 2009	September 16, 2009	September 22, 2009	September 28, 2009
1 Victoria Road	PAHs	✓	✓	✓	✓	✓
	VOCs	✓	✓	✓	✓	✓
	PM_{10}	✓	✓	✓	✓	✓
	$PM_{2.5}$	✓	✓	✓	✓	✓
2 Currys Lane	PAHs	✓	✓	✓	✓	✓
	VOCs	✓	✓	✓	**See note (1)**	✓
	PM_{10}	✓	✓	✓	✓	✓
	TSP/Metals/Hg	✓	✓	✓	✓	✓
3 Henry Street	PAHs	✓	✓	✓	✓	✓
	$PM_{2.5}$	✓	✓	✓	✓	✓
4 Alexandra Street	PAHs/PCBs	✓	✓	✓	✓	✓
	VOCs	✓	✓	✓	✓	✓
	PM_{10}	✓	✓	✓	✓	✓
	$PM_{2.5}$	✓	✓	✓	✓	✓
	TSP/Metals/Hg	✓	✓	✓	✓	✓
5 Intercolonial Street	PAHs/PCBs	✓	✓	✓	✓	✓
	TSP/Metals/Hg	✓	✓	✓	✓	✓
	VOCs	✓	✓	✓	✓	✓
6 DesBarres Street	PAHs/PCBs	✓	✓	✓	✓	✓
	VOCs	✓	✓	✓	✓	✓
	PM_{10}	✓	✓	✓	✓	✓
Field Blanks	PAHs		✓		✓	
	PAHs/PCBs		✓			
	VOCs					
	PM_{10}		✓		✓	
	$PM_{2.5}$		✓		✓	
	TSP/Metals/Hg				✓	
Field Duplicates	PAHs			✓		✓
	PAHs					✓
	PAHs/PCBs	✓		✓		
	VOCs	✓				
	PM_{10}	✓		✓		✓
	$PM_{2.5}$					✓
	TSP/Metals/Hg	✓		✓		✓

Notes: (1) Sample was collected for only 9 hours.

Real-time Perimeter Monitoring

The purpose of the real-time air monitoring program is to provide information about current air quality conditions in air surrounding the Tar Ponds and Coke Ovens site. The data is reported daily and

immediately or within the hour when permitted levels are exceeded, which allows sufficient time for contractors to modify Tar Ponds and Coke Ovens site construction activities.

Method

All real-time measurements are performed at pre-determined sample locations outside the Tar Ponds and Coke Ovens site perimeter. Exact measurement locations are selected based on the type and location of construction activity (taking into consideration possible sources of air contaminants), as well as prevailing wind direction and wind speed relative to downwind air monitoring devices. The field technologist remains in the same location for the duration of the sample, and changes locations as the wind direction changes. Precise locations are identified with the aid of a hand-held Global Positioning System (GPS). At a minimum, measurements are collected downwind of construction activities twice per hour, for 15-minute sample durations. In addition, one upwind measurement is collected each hour for 15 minutes. Real-time air quality measurements are recorded into air monitoring instrument memories for later download and archiving.

WEATHER MONITORING

During air monitoring, it is important to collect and record weather data related to each sample taken. Temperature, relative humidity, wind direction and speed can all have an impact on airborne pollutants. The two weather stations used to collect wind direction and speed data are the Coke Ovens project weather station, located at the southeast edge of the Coke Ovens site and the Public Information Display Centre weather station, located south of the South Tar Pond off Terminal Road.

Data related to relative humidity, precipitation, barometric pressure, fog and snow cover was also obtained from the Environment Canada weather station at the Sydney Airport. All measurements were recorded hourly.

In September, weather data from the Coke Ovens weather station was different from the other weather stations. Usually, the data from the Coke Ovens station is most like the data from the airport weather station, likely because the two are at a similar elevation. ALL-TECH collects data from the weather stations, but does not have direct access to the equipment. An Environment Canada technician was on site on October 29 and 30 and maintenance was performed on the Coke Ovens station. It is now fully operational and meets inspected criteria. Because there is back-up weather information available from other sources, the air monitoring analysis is not at risk in any way.

In addition to weather data, environmental conditions that could affect air quality outside of the Tar Ponds and Coke Ovens site were noted. These conditions can be a result of local activities (such as building fires, accidental release of pollutants from industrial sites) or nation-wide activities (such as forest fires or volcanic activity in the western hemisphere). These environmental conditions were noted by field observations or through news reports.

AIR POLLUTANTS FOR SEPTEMBER 2009

Following is a summary of all air monitoring data (both fixed station and real-time data) collected during September 2009.

Fixed Station Levels of Air Pollutants

TSP

TSP concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

TSP levels at all fixed monitoring stations in September 2009 were consistently within allowable standards.

TSP levels were slightly high at the Currys Lane and Intercolonial Street stations on September 4 and 22.

PM_{10}

PM_{10} concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

PM_{10} levels at all fixed monitoring stations in September 2009 were consistently within the allowable standard.

PM_{10} levels were slightly high at all locations on September 4 and 22.

$PM_{2.5}$

$PM_{2.5}$ concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

$PM_{2.5}$ levels at all fixed monitoring stations in September 2009 were consistently within the allowable standard.

$PM_{2.5}$ levels were slightly high at all locations on September 4.

Metals in TSP

When the TSP analysis was done, a metal scan of the TSP sample was completed for common metals.

All metals were within allowable standards.

Copper levels were slightly high at the Currys Lane location for all dates tested (except September 22), at the Intercolonial Street location on September 16 and at the Alexandra Street location on September 28.

Mercury was detected for the first time under the current air monitoring contract, at the Currys Lane location on September 22.

VOCs

VOCs were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

VOC concentrations for September 2009 were consistently within allowable standards for various VOCs. Table 2 (see page 3 of this report) shows the list of VOCs that are included in air monitoring at the Tar Ponds and Coke Ovens site.

The Currys Lane VOC sample on September 22 was collected for only nine hours as the valve was not properly opened during start-up. It was discovered during the quality check and was properly opened at that time. A new procedure has been put in place, where both technologists performing the sampling must physically check that the valve on the VOC canister has been properly opened/closed.

PAHs

PAHs were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

PAHs at all fixed monitoring stations in September 2009 were within typical average concentrations, except for slightly elevated values for some PAHs on September 4, 16 and 22.

Concentrations for naphthalene and benzo(a)pyrene were within allowable standards.

PCBs

PCBs were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009.

No PCBs were detected at any of the six fixed monitoring stations tested during September 2009.

Unsuccessful Samples for September 2009

There were no unsuccessful fixed station air samples for September 2009.

Real-time Air Monitoring

The main goal of real-time air monitoring is to determine real-time airborne concentrations of airborne particulates such as PM_{10} and VOCs using hand held instruments during actual construction activities on the Tar Ponds and Coke Ovens site. This data is used to modify construction activities to prevent airborne pollutants from leaving the Tar Ponds and Coke Ovens site. Real-time monitoring is completed in conjunction with site activities and performed upwind and downwind at the perimeter of the Tar Ponds and Coke Ovens site.

Real-time Results for September 2009

TVOCs

TVOCs were measured both using smell checks and electronically to verify the accuracy of the smell checks. Measurements were taken for 15-minute periods, at a minimum of two samples downwind every hour and one sample upwind every hour. No TVOCs were detected in September 2009.

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Table 6: Summary of Real-time TVOC Results for September 2009

Date	Location	Daily Average (ppm)	Activities/Observations
September 1, 2009	Material Processing Facility	0.05(1)	Dozer moving material
September 1, 2009	Tar Cell, Pug Mill	0.05	Excavator operating
September 1, 2009	Tar Cell, Sysco Site	0.05	Excavator operating
September 1, 2009	Flow Diversion, South Pond	0.05	Excavators and dump trucks operating
September 1, 2009	Flow Diversion, Cooling Pond	0.05	Machines operating
September 1, 2009	Collection System, Water Treatment	0.05	Backhoe and trucks operating
September 2, 2009	Material Processing Facility	0.05	Mini loader spreading gravel
September 2, 2009	Tar Cell, Pug Mill	0.05	Excavator operating
September 2, 2009	Tar Cell, Sysco Site	0.05	Excavator operating
September 2, 2009	Flow Diversion, South Pond	0.05	Excavators and crane in operation
September 2, 2009	Flow Diversion, Cooling Pond	0.05	Machines operating
September 2, 2009	Collection System, Water Treatment	0.05	Excavator operating
September 3, 2009	Material Processing Facility	0.05	Man-lift and scissor-lift operating, excavator moving material
September 3, 2009	Tar Cell, Pug Mill	0.05	Excavator, dump truck and roller operating
September 3, 2009	Tar Cell, Sysco Site	0.05	Excavator operating
September 3, 2009	Flow Diversion, South Pond	0.05	Excavators and crane in operation
September 3, 2009	Flow Diversion, Cooling Pond	0.05	Excavators operating
September 3, 2009	Collection System, Water Treatment	0.05	Backhoe and trucks operating
September 3, 2009	Tar Cell, Pug Mill	0.05	Excavator, dump trucks and roller operating
September 4, 2009	Tar Cell, Sysco Site	0.05	Excavator and dump trucks operating

Date	Location	Daily Average (ppm)	Activities/Observations
September 4, 2009	Flow Diversion, South Pond	0.05	Excavator operating
September 4, 2009	Flow Diversion, Cooling Pond	0.05	Excavator operating
September 4, 2009	Collection System, Water Treatment	0.05	Backhoe, trucks and roller operating
September 4, 2009	Material Processing Facility	0.05	Man-lift, scissor-lift and mini-loader operating
September 8, 2009	Tar Cell, Pug Mill	0.05	Excavators and dump trucks in operating
September 8, 2009	Flow Diversion, South Pond	0.05	Crane in operation
September 8, 2009	Flow Diversion, Cooling Pond	0.05	Excavators operating / Dozers unloading pipe from trailers
September 8, 2009	Material Processing Facility	0.05	Excavator and loader moving material, scissor-lift operating
September 8, 2009	Collection System, Water Treatment	0.05	Excavator and dozer operating
September 9, 2009	Material Processing Facility	0.05	Scissor-lift operating, excavator moving material
September 9, 2009	Tar Cell, Pug Mill	0.05	Excavators and dump trucks in operating
September 9, 2009	Collection System, Water Treatment	0.05	Dozer and grader operating
September 9, 2009	Flow Diversion, South Pond	0.05	Crane, excavators and dump trucks in operation
September 9, 2009	Flow Diversion, Cooling Pond	0.05	Excavator and trucks operating
September 10, 2009	Material Processing Facility	0.05	Man-lift and scissor lift operating
September 10, 2009	Collection System, Water Treatment	0.05	Dozer and Backhoe operating
September 10, 2009	Tar Cell, Pug Mill	0.05	Excavators and dump trucks operating
September 10, 2009	Flow Diversion, South Pond	0.05	Excavators and trucks in operation
September 10, 2009	Flow Diversion, Cooling Pond	0.05	Excavator and trucks operating
September 11, 2009	Material Processing Facility	0.05	Man-lift operating
September 11, 2009	Collection System, Water Treatment	0.05	Dozer operating

Date	Location	Daily Average (ppm)	Activities/Observations
September 11, 2009	Tar Cell, Pug Mill	0.05	Excavator and dump trucks in operation
September 11, 2009	Flow Diversion, South Pond	0.05	Excavator and crane in operation
September 11, 2009	Flow Diversion, Cooling Pond	0.05	Excavators operating
September 12, 2009	Flow Diversion, South Pond	0.05	Excavator operating
September 14, 2009	Material Processing Facility	0.05	Workers moving material, machines in operation
September 14, 2009	Collection System, Water Treatment	0.05	Dozer and excavator operating
September 14, 2009	Tar Cell, Sysco Site	0.05	Excavators and dump trucks in operation
September 14, 2009	Flow Diversion, South Pond	0.05	Excavator and trucks operating
September 14, 2009	Flow Diversion, Cooling Pond	0.05	Excavator in operation
September 14, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Backhoe operating
September 15, 2009	Material Processing Facility	0.05	Boom truck and NSP trucks operating
September 15, 2009	Collection System, Water Treatment	0.05	Dozer, excavator and drill operating
September 15, 2009	Tar Cell, Pug Mill	0.05	Excavator in operation
September 15, 2009	Flow Diversion, South Pond	0.05	Crane operating
September 15, 2009	Flow Diversion, Cooling Pond	0.05	Excavator in operation
September 15, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Excavator in operation
September 16, 2009	Material Processing Facility	0.05	Man-lift and scissor lift operating
September 16, 2009	Collection System, Water Treatment	0.05	Excavators, dozers, rock trucks and drill operating
September 16, 2009	Tar Cell, Pug Mill	0.05	Excavator and machines operating
September 16, 2009	Flow Diversion, South Pond	0.05	Cutting metal, crane operating
September 16, 2009	Flow Diversion, Cooling Pond	0.05	Excavator in operation

Date	Location	Daily Average (ppm)	Activities/Observations
September 16, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Excavator moving material
September 17, 2009	Material Processing Facility	0.05	Excavator and dump truck moving material
September 17, 2009	Collection System, Water Treatment	0.05	Excavators and dozer operating
September 17, 2009	Tar Cell, Pug Mill	0.05	Dump truck operating
September 17, 2009	Flow Diversion, South Pond	0.05	Excavator and crane in operation
September 17, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Excavator moving earth
September 17, 2009	South Pond Additional Works	0.05	Excavators in operation
September 18, 2009	Material Processing Facility	0.05	Excavator moving material
September 18, 2009	Collection System, Water Treatment	0.05	No activity on site
September 18, 2009	Tar Cell, Pug Mill	0.05	Dump truck operating
September 18, 2009	Flow Diversion, South Pond	0.05	Excavator and crane operating
September 18, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Activity not visible from site
September 18, 2009	Collection System, Water Treatment	0.05	No activity observed on site
September 19, 2009	Flow Diversion, South Pond	0.05	Crane operating
September 21, 2009	Material Processing Facility	0.05	Excavator moving material
September 21, 2009	Collection System, Water Treatment	0.05	Dozer, trucks and excavators operating
September 21, 2009	Flow Diversion, South Pond	0.05	Crane in operation, workers welding
September 21, 2009	Flow Diversion, Cooling Pond	0.05	Crane and excavator operating
September 22, 2009	Material Processing Facility	0.05	Excavator and dump trucks moving material
September 22, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 22, 2009	Flow Diversion, South Pond	0.05	Crane in operation

Date	Location	Daily Average (ppm)	Activities/Observations
September 22, 2009	Flow Diversion, Cooling Pond	0.05	Crane and excavator operating
September 23, 2009	Material Processing Facility	0.05	Excavator and dump truck moving material
September 23, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 23, 2009	Flow Diversion, South Pond	0.05	Excavator and crane in operation
September 23, 2009	Flow Diversion, Cooling Pond	0.05	Excavator and crane operating
September 23, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Tandem truck dumping load
September 24, 2009	Material Processing Facility	0.05	Excavator moving material
September 24, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 24, 2009	Flow Diversion, South Pond	0.05	Crane in operation
September 24, 2009	Flow Diversion, Cooling Pond	0.05	Crane in operation
September 24, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Loader and excavator operating
September 25, 2009	Material Processing Facility	0.05	Excavator moving material
September 25, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 25, 2009	Flow Diversion, South Pond	0.05	Excavator, crane and dump trucks in operation
September 25, 2009	Flow Diversion, Cooling Pond	0.05	Crane and loader in operation
September 25, 2009	Vertical Cut-off Wall, Clay Wall	0.05	Dump truck and excavator operating
September 26, 2009	Flow Diversion, South Pond	0.05	Excavator and crane in operation
September 28, 2009	Material Processing Facility	0.05	Man-lift in operation
September 28, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 28, 2009	Flow Diversion, South Pond	0.05	Excavator in operation
September 28, 2009	Flow Diversion, Cooling Pond	0.05	Crane operating

Date	Location	Daily Average (ppm)	Activities/Observations
September 29, 2009	Material Processing Facility	0.05	Man-lift operation
September 29, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 29, 2009	Flow Diversion, South Pond	0.05	Excavator in operation
September 29, 2009	Flow Diversion, Cooling Pond	0.05	Crane operating
September 30, 2009	Material Processing Facility	0.05	Excavator moving material
September 30, 2009	Collection System, Water Treatment	0.05	Trucks and excavators operating
September 30, 2009	Flow Diversion, South Pond	0.05	Crane and excavator in operation
September 30, 2009	Flow Diversion, Cooling Pond	0.05	Loader, crane and dump trucks in operation

Notes: (1) The Detection Limit for VOCs using the PID is 0.1 ppm(v). Values less than the Detection Limit (<DL) or Not-detected (ND) are recorded at half the DL (0.05 ppm(v)) to provide a more conservative approach for the daily cumulative value, than assigning 0 ppm(v) for all values measured as <DL or ND. Hence, values in the table of 0.05 ppm(v) are likely to have been measured at <DL (or ND).

PM_{10}

PM_{10} measurements were taken for 15-minute periods, at a minimum of two samples downwind and one sample upwind every hour. All real-time PM_{10} results for September 2009 were well within allowable standards, with the exception of one 15-minute downwind exceedance on September 9 at the Flow Diversion (South Pond) site. A 15-minute average of 164 µg/m^3 was measured at 3 p.m., and was attributed to heavy dust from site activity.

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Table 7: Summary of Site Earth Work for September 2009

Site Location	Description of Earth Work Activities						
	Excavation of material	Operation of dump truck	Operation of dozer	Operation of backhoe	Operation of crane	Operation of roller	Operation of man-lift
Materials Processing Facility	✓		✓				✓
Tar Cell (Pug Mill site)	✓	✓				✓	
Tar Cell (Sysco site)	✓						
Flow Diversion sites (South Pond and Cooling Pond)	✓	✓			✓		
Collection System/Water Treatment Plant (Coke Ovens site)	✓		✓	✓			

DISCUSSION OF RESULTS

The following section discusses the results of the Sydney Tar Pond Agency's air monitoring program for September 2009. Included here are results from fixed station sampling events and real-time monitoring of Tar Ponds and Coke Ovens site activities.

TSP and Metals

TSP concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. TSP levels at all fixed monitoring stations in September 2009 were found to be consistently within the allowable 24-hour standard of 120 µg/m^3.

TSP levels were slightly elevated at the Currys Lane and Intercolonial Street locations on September 4 and 22, although not above allowable standards.

There were site activities on both days, but dust levels were normal. The main wind direction on both days was from the Southwest, which places the Currys Lane location downwind and the Intercolonial Street location upwind of site activities.

When the TSP analysis was finished, a scan of the sample was carried out for common metals. All metals were consistently within allowable standards.

Copper levels were slightly high at the Currys Lane location for all dates measured (with the exception of September 22), at the Intercolonial Street location on September 16 and at the Alexandra Street location on September 28, but not above allowable standards.

Mercury was detected for the first time under the current air monitoring contract, at the Currys Lane location on September 22, but was much lower than the allowable standard.

There were site activities on all sampling dates. The main wind directions were from the Southwest on September 4 and 22, from the Northwest on September 10, from the North on September 16 and from the Southeast on September 28. Real-time dust levels were low to normal on all sampling dates. The Currys Lane location would have been downwind of site activities on September 4 and 22, and upwind of activities for the remainder of sampling dates. The Intercolonial Street location would have been downwind of site activities on September 16 and the Alexandra Street location upwind of site activities on September 28.

PM_{10}

PM_{10} concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. PM_{10} levels at all fixed monitoring stations in September 2009 were consistently within the allowable standard.

PM_{10} levels were slightly high at all locations on September 4 and 22, although not above the allowable standard. There were site activities, but dust levels were low to normal. The main wind direction was from the Southwest on both dates. The Victoria Road and Currys Lane locations would have been downwind of site activities and the Intercolonial Street and DesBarres Street locations upwind of site activities on both dates.

$PM_{2.5}$

$PM_{2.5}$ concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. $PM_{2.5}$ concentrations at each of these sampling events were consistently within the allowable standard of 30 $\mu g/m^3$.

$PM_{2.5}$ levels were slightly elevated at all locations on September 4, although not above allowable standards. There were site activities, but dust levels were normal. The main wind direction was from the Southwest, which places the Victoria Road and Henry Street locations downwind and the Alexandra Street location upwind of site activities.

VOCs

VOC concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. Results for VOCs in each of these samples were consistently within allowable standards for various VOCs.

PAHs

PAH concentrations were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. PAHs at all fixed monitoring stations in September 2009 were within typical average concentrations, except for slightly elevated values for acenaphthene, fluorene and phenanthrene on September 4 at the Currys Lane location, for acenaphthene and phenanthrene on September 16 at the Intercolonial Street location and for phenanthrene on September 22 at the Currys Lane location.

There were site activities during all three events and dust levels were low to normal. The main wind direction on September 4 and 22 was from the Southwest, which places the Currys Lane location downwind of site activities during both events. The main wind direction on September 16 was from the North, which places the Intercolonial Street location downwind of site activities.

Concentrations for naphthalene and benzo(a)pyrene were within allowable standards.

PCBs

PCB levels were measured over 24-hour periods on September 4, 10, 16, 22 and 28, 2009. No PCBs were detected in September 2009.

Real-time PM_{10} and TVOC

All real-time site activity results for PM_{10} were within allowable standards, with the exception of one downwind exceedance of allowable standards at the Flow Diversion (South Pond) site, which was attributed to heavy dust from site activities.

No TVOCs were detected during the month of September 2009.

CONCLUSION

All air quality measurements obtained through the Sydney Tar Ponds Agency's Ambient Air Monitoring Program for the month of September 2009 were within the stated regulatory guidelines and criteria, with the exception of one downwind exceedance of allowable standards at the Flow Diversion (South Pond) site.

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BIBLIOGRAPHY

AMEC. *Ambient Air Monitoring Program, Muggah Creek Remediation Project, March 2005 Sampling Events*, Sydney, Nova Scotia, March 2005.

Canadian Council of Ministers of the Environment, *Canada Wide Standards for Particulate Matter (PM) and Ozone*, Quebec City, Quebec, June 2000.

Nova Scotia Department of Environment and Labour, *Nova Scotia Environment Act, Air Quality Regulations Section 112*, Nova Scotia Reg. 28/2005, Halifax, Nova Scotia, March 1, 2005.

Ontario Ministry of Environment, *Ontario Reg. 419/05 Standards and Point of Impingement Guidelines & Ambient Air Quality Criteria (AAQCs),* Toronto, Ontario, December 2005.

United States Environmental Protection Agency (US EPA), *National Ambient Air Monitoring Strategy (Draft)*, Washington, D.C., USA, October 17, 2001.

US EPA *National Primary and Secondary Ambient Air Quality Standards, Appendix B – Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method)* (40 CFR Subchapter C, Part 50).

US EPA Compendium Method TO-3.5 *Determination of Metals in Ambient Particulate Matter Using Inductively Coupled Plasma / Mass Spectrometry* (ICP/MS).

US EPA *National Primary and Secondary Ambient Air Quality Standards, Appendix J – Reference Method for the Determination of Particulate Matter as PM_{10} in the Atmosphere* (40 CFR Subchapter C, Part 50).

US EPA *National Primary and Secondary Ambient Air Quality Standards, Appendix L – Reference Method for the Determination of Fine Particulate Matter as $PM_{2.5}$ in the Atmosphere* (40 CFR Subchapter C Part 50).

US EPA Compendium Method TO-15, *Determination of VOCs in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)*.

US EPA Compendium Method TO-13A, *Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Ambient Air using Gas Chromatography /Mass Spectrometry* (GC/MS). Method modified using XAD Resin with Polyurethane Foam (PUF) sample media.

US EPA Compendium Method TO-4A, *Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air using High Volume Polyurethane Foam (PUF) sampling, followed by Gas Chromatographic / Multi-Detector Detection* (GC/MD). Method modified using XAD Resin with Polyurethane Foam (PUF) sample media.

Queensland Government Environmental Protection Agency, *Ambient Air Quality Monitoring in Queensland, 1998 Annual Summary and Trend Report*, Environmental Technical Report No. 30, January 2001.