REPORT OF THE SAMPLE TAKEN DOWNWIND OF THE KODUNGAIYUR DUMPYARD

Following community complaints about an incessant fire at the Kodungaiyur Dumpyard, an air sample was taken by Community Environmental Monitoring (CEM) and the Global Alliance for Incinerator Alternatives (GAIA). On the day of sampling, the area surrounding the dumpyard was covered in thick smoke emanating from multiple sites within the dumpyard. The wind direction at the time of the sampling was from North East to South West. The sample was taken at a time when the smoke was intense. Residents said the smoke of similar intensity, and a pungent odour of burning garbage, throughout the day. The sampling team also experienced headache, throat irritation, giddiness, nausea and difficulty in breathing as a result of the exposure to the smoke from the area.

The sample was taken with the help of a low cost air sampling device called the 'The Bucket'. The sample was sent for analysis to the Colombia Analytical Services in Simi Valley, California and was tested for 68 Volatile Organic and 20 Sulphur compounds.

Sampling Date/Time: 12 March 2012, 5pm.

Sampling Location: On top of the terrace of house of Mr. V. M. Gopi, Door no 6, T.H. Road, K. K. Nagar, Chennai. Southwest of the garbage dump.

Wind Direction: Northeast to Southwest

Sample taken in the presence of: Members of Kodungaiyur Residents Welfare Association.

Results of the sample:

1. Total of 19 chemicals were detected. The chemicals identified include Carbon Disulphide, Carbonyl Sulphide, Propene, Chloromethane, 1-3 Butadiene, Ethanol, Acetonitrile, Acrolein, Acetone, n-Hexane, Tetrahydrofuran, Benzene, n-Heptane, Toluene, n-Octane, Ethylbenzene, Styrene, n-Nonane and d-Limonene.

2. 3 of the chemicals found, 1-3 Butadiene, Benzene and Chloromethane are known carcinogens. Out of the three, two chemicals were above levels considered safe for lifetime exposure by the US Environmental Protection Agency.

   - **1-3 Butadiene was 8.5 times above the US EPA RfC* Screening Level.**
   - **Benzene 50 times above the US EPA RfC* Screening Level.**

3. Out of the 19 chemicals found 16 chemicals target the Central Nervous System, 15 target the respiratory system, 13 target the eyes, 12 target the skin, 6 target the liver, 5 target the kidneys and reproductive system, 2 target the Cardio Vascular System and Peripheral Nervous System and 1 targets blood, heart and bone marrow.

4. Another chemical of concern was Acrolein and the level detected exceeds California short-term (acute)** health-based standards indicating that there is sufficient evidence of exposure to an air pollutant level that is associated with adverse health

effects.

"Acrolein can exert toxic effects following inhalation, oral, and dermal exposures. It is a potent irritant to the mucous membranes. At high concentrations, it can also cause irritation to skin. As such, its toxicity is exerted at the point of contact with tissues. Signs and symptoms resulting from inhalation exposure to airborne acrolein may include irritation of the nose, throat and lungs, pulmonary edema, lung hemorrhage, and death. The nasal tissues appear to be the most sensitive target of inhalation exposure, with onset of noticeable irritation occurring in seconds (0.3 ppm). Higher airborne concentrations of acrolein (2– 5 ppm) result in increasingly severe manifestations of irritation over the entire respiratory tract."

The open burning of waste (for example, smoldering combustion) is a known source of significant emissions of acrolein. According to the Toxicological Profile for Acrolein: *"Acrolein can be formed in burning tobacco, wood, plastics, gasoline and diesel fuel, paraffin wax, and in the heating of animal and vegetable fats and oils at high temperatures."*

*Rfc Screening Limit refers to the concentration to which an individual can be exposed to a substance for a life time without suffering from adverse effects.
**Acute Toxicity describes the adverse effects resulting from a single exposure to a substance. Short-term Exposure Limit refers to the concentration to which an individual can be exposed continuously for a short period to a substance without suffering from adverse effects.

Compilation of results:

S No	Chemical found	Levels detected (ug/m3)	Odour	Health Effects	Target Organs	Carcinogen
1.	Carbon Disulphide	15	A sweet ether-like odour	Dizziness, headache, poor sleep, weakness, exhaustion, anxiety, weight loss; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	No
2.	Carbonyl Sulfide	20				
3.	Propene	110	--	Anesthetic effects, unconsciousness	Respiratory System and CNS	No
4.	Chloromethane	57	A faint, sweet odour which is not noticeable at dangerous levels	Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; reproductive damage; [potential occupational carcinogen]	Central nervous system, liver, kidneys, reproductive system Cancer Site [in animals: lung, kidney & forestomach tumors]	Yes
5.	1-3 Butadiene	17		Irritation eyes, nose, throat; drowsiness, dizziness; reproductive damages; [potential occupational	Eyes, respiratory system, central nervous system, reproductive system **Cancer Site** [blood cancer]	Yes

				carcinogen]		
6.	Ethanol	170	A pungent fruity odour	Irritation eyes, skin, nose; headache, drowsiness, weakness, exhaustion, cough; liver damage; reproductive damages	Eyes, skin, respiratory system, central nervous system, liver, blood, reproductive system	No
7.	Acetonitrile	16	Aromatic odour	Irritation nose, throat; nausea, vomiting; chest pain; weakness, exhaustion, convulsions; in animals: liver, kidney damage	Respiratory system, cardiovascular system, central nervous system, liver, kidneys	No
8.	Acrolein	31	A piercing, disagreeable odour	Irritation eyes, skin, mucous membrane; chronic respiratory disease	Eyes, skin, respiratory system, heart	No
9.	Acetone	89	A fragrant, mint-like odour	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	No
10.	n-Hexane	12	--	Irritation eyes, nose; nausea, headache; muscle weakness; dermatitis; dizziness; chemical pneumonitis	Eyes, skin, respiratory system, central nervous system, peripheral nervous system	No
11.	Tetrahydrofura	5.3	Ether-	Irritation eyes,	Eyes, respiratory	No

	n		like odor	upper respiratory system; nausea, dizziness, headache, central nervous system depression	system, central nervous system	
12.	Benzene	150	An aromatic odour	Irritation eyes, skin, nose, dizziness; headache, nausea, exhaustion; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow Cancer Site [leukaemia]	Yes
13.	n-Heptane	16	Gasoline like odour	Dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Skin, respiratory system, central nervous system	No
14.	Toluene	48	A sweet, pungent, benzene-like odour	Irritation eyes, nose; weakness, exhaustion, confusion, euphoria, dizziness, headache; discharge of tears; anxiety, muscle fatigue, insomnia; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	No
15.	n-Octane	12	Gasoline like odour	eyes, nose; drowsiness; dermatitis; chemical pneumonitis (aspiration liquid); in animals: narcosis	Eyes, skin, respiratory system, central nervous system	No

16.	Ethylbenzene	20		Irritation eyes, skin, mucous membrane; headache; dermatitis; coma	Eyes, skin, respiratory system, central nervous system	No
17.	Styrene	28	A sweet floral odour	Irritation eyes, nose, respiratory system; headache, weakness, exhaustion, dizziness, confusion, drowsiness, possible liver injury; reproductive effects	Eyes, skin, respiratory system, central nervous system, liver, reproductive system	No
18.	N-nonane	9.4	--	--	--	--
19.	D-Limonene	27	--	Irritation eyes, skin, nose, throat; headache, dizziness, convulsions; blood in the urine, kidney damage; abdominal pain, nausea, vomiting, diarrhoea; chemical pneumonitis	Eyes, skin, respiratory system, central nervous system, kidneys	No