APPENDIX C. MEXICO NATIONAL AIR QUALITY MONITORING NETWORK

In México, the first official air quality monitoring network began operating in Mexico City, in the late 1960s. At present, Mexico is consolidating the monitoring efforts with the National Air Quality Monitoring Program, Programa Nacional de Monitoreo Atmosférico, PNMA 2003 – 2007. The principal objective is to establish an atmospheric monitoring program to guarantee adequate diagnostics and surveillance of air quality at the national level. This will generate information that is accurate, valid, and comparable among the different sites and air quality networks in the country and serve as a foundation for the design and establishment of environmental policy for the protection of the health of the population and the well-being of ecosystems.

This program is divided in three different stages with specific objectives which, upon implementation, will serve as basis for the subsequent stage. The first stage is the *analysis and development of tools*, where PNMA's main task is to produce a diagnosis of the current state of the air quality monitoring networks in the country, and of the laws, institutions, and financial mechanisms that support them. Also, this stage focuses on the development of tools and/or procedures that guide air quality monitoring practices at the national level, in order to guarantee quality systems and comparability of data. This includes strengthening of the Standard Reference and Calibration Laboratory of the Center for Environmental Research and Training (DGCENICA) which is one of the components of the National Institute of Ecology (INE), among other activities. The first Latin-American ozone standard reference photometer was installed at the INE/DGCENICA laboratory in 2007.

The second stage is the establishment of strategies for identifying the sites where it is a priority to implement air quality monitoring programs. These strategies include identification criteria, launch of awareness and information campaigns, and implementation of the monitoring plans of the various states. Enforcement of regulations about air quality monitoring was to begin in 2008.

Finally, the third stage involves application of the tools and strategies to: monitor air quality in priority sites; obtain the homologation of monitoring practices; establish quality control and quality assurance programs that guarantee the veracity of the data generated by these air

monitoring systems; and set up national surveillance programs through audits. This stage should help create a proposal for a Second National Atmospheric Program that includes countrywide multi-pollutant and toxic pollutants monitoring networks in expected high concentration areas. The PNMA 2008 – 2012 has been developed and is currently under review

The PNMA had identified 62 localities with air quality monitoring equipment; 60 have operational equipment but only 32 have automatic monitoring. Air quality is monitored using automatic, manual, and mixed methods. There are 6 criteria pollutants: SO_2, NO_2, PM, Pb, CO, and O_3 which are routinely monitored in the metropolitan areas. However, $PM_{2.5}$ is measured continuously only at two monitoring networks; Mexico City and Monterrey. Lead (Pb), hydrogen sulfide (H_2S), heavy metals, sulfates, nitrates, and other parameters are monitored mainly in Mexico City by the Atmospheric Deposition Network, *Red de Depósito Atmosférico*, REDDA, http://www.sma.df.gob.mx/simat/pnredda2.htm, and in few localities but more as case studies. Table C.1 shows the official air quality monitoring equipment per city.

Data from the air quality monitoring networks are centralized by the National Institute of Ecology (INE) http://www.ine.gob.mx/dgicur/calaire/indicadores.html and distributed as biannual publications, http://www.ine.gob.mx/dgicur/calaire/descargas/tercer_almanaque_calaire_2007_v4.pdf. Currently, INE has the National Air Quality Information System, SINAICA in Spanish, *http://sinaica.ine.gob.mx/*, which allows the public to access raw air quality data of 20 cities with air quality monitoring systems, plus the information of INE/DGCENICA research air quality monitoring station in circa real time and data of two particulate matter networks, located in Torreón and in the Tula - Tepeji region. Figure C.1 shows the location of the monitoring networks incorporated to SINAICA.

Table C.1. Mexican Official Air Quality Monitoring Networks

	City	Federal Entity	Pollutants Monitored								No. of AMS[1]	No. of MMS[2]	Mobil Units (MU)
			O_3	CO	SO_2	NO_2	PM 2.5[1]	PM 10[1]	PM 10[2]	PST[2]			
1	Aguascalientes	Aguascalientes	2	2	2	2			3	3	1		
2	Mexicali	Baja California	4	4	2	4	1	1	4	2	4	4	

3	Tecate	Baja California	1	1		1			1		1	1	
4	Rosarito	Baja California	1	1	1	1	1	1	1		1	1	
5	Tijuana	Baja California	3	3	1	3	1	1	3	1	3	3	
6	Cd. Juárez	Chihuahua	3	3					6		3	5	1
7	ZMVM	Distrito Federal	23	28	29	22	8	15	7	13	36	13	2
8	Durango	Durango	1	1	1				1	1	1	2	1
9	Goméz Palacio	Durango	1	1	1	1		2	1		1	1	
10	Celaya	Guanajuato	3	2	2	3					3		
11	Irapuato	Guanajuato	3	3	3	3					3		
12	León	Guanajuato	3	3	3	3		3			3		
13	Silao	Guanajuato	1	1	1	1		1			1		
14	Salamanca	Guanajuato	3	3	3	3		1	2	1	3	2	1
15	Tula	Hidalgo	2	2	2	2		2	1	1	2	1	
16	ZMG	Jalisco	8	8	8	8		8			8		
17	ZMVT	México	7	4	7	7		7	2	5	7	7	1
18	Cuautla	Morelos	1	1	1	1					1		
19	Ocuituco	Morelos	1	1	1	1				1	1	1	
20	Cuernavaca	Morelos	1	1	1	1				4	1	1	
21	Morelia	Michoacán	1	1	1	1		1		1	1	1	
22	ZMM	Nuevo León	5	5	5	5	5	5			5		2
23	Puebla	Puebla	4	4	4	4		4			4		1
24	San Luis Potosí (oficial)	San Luis Potosí	2	2	2	2		1	1		1		
25	Villahermosa Of.	Tabasco	1	1	1	1		1	1		1	1	
26	Torreón	Coahuila	1	1	1	1			1	5	1	5	
27	Chihuahua	Chihuahua	1	1	1	1		1			1		
28	Culiacán	Sinaloa	1	1	1	1		1			1		
TOTAL											**99**	**49**	**9**

[1]Automatic Monitoring Stations
[2] Manual Monitoring Stations

MMS- Automatic Monitoring Station
AMS.- estación de monitoreo automático

Figure C.1. SINAICA's Air Quality Monitoring Networks MAP

The Mexican Dioxin Air Monitoring Network (MDAMN) was established in March 2008 to measure dioxins, furans and coplanar PCBs in air. It has 9 stations -- 8 sites where the background levels will be monitored and one urban site located in Mexico City. This network is a joint effort of Environment Canada, USEPA, INE/SEMARNAT and participating institutions in cooperation with NACEC. The data from this network will be available in 2009.

The Mexico City Metropolitan Area (MCMA) is the largest urban zone in Mexico. It comprises all of the 16 demarcations of the Federal District and 59 adjoined municipalities of the State of Mexico and concentrates more than 18 million inhabitants. In MCMA longstanding routine continuous ambient air and deposition monitoring has been performed by the Mexico City Ambient Air Quality Monitoring System (AAQMS) since 1985. The AAQMS provides 49 platforms for the measurement of criteria gases, aerosols and atmospheric deposition; 36 are located inside the Federal District boundaries and the other 13 are located in seven of the neighboring municipalities of the State of Mexico (Figure C.2). Operation and maintenance of the AAQMS are funded by the Government of the Federal District. The local Environment

Secretariat provides the database support, guidance and quality assurance protocols for the routine operations. For the purpose of surveying the air quality, the AAQMS operates four measuring systems: The Automatic Atmospheric Monitoring Network (*Red Automática de Monitoreo Atmosférico - RAMA*), with 35 remote stations for criteria gases, PM_{10} and $PM_{2.5}$; the Manual Atmospheric Monitoring Network (*Red Manual* - REDMA), with 12 remote stations for $PM_{2.5}$, PM_{10}, TSP and Pb sample collection; the Atmospheric Deposition Network (*Red de Depósito Atmosférico* - REDDA), with 16 remote stations for dry/wet atmospheric deposition sampling; and the Meteorologic Network (*Red Meteorológica* - REDMET) for surface meteorology and solar radiation continuous monitoring. Data from the RAMA stations are automatically sent to a central data processing facility, where the data are quality controlled and released to the public on an hourly basis at http://www.sma.df.gob.mx/simat/.

Figure C.2. Mexico City Ambient Air Quality Monitoring Network