WORLD HEALTH ORGANIZATION
EUROPE

Health basis for air quality management in Eastern Europe, Caucasus and Central Asia

Report from a WHO consultative meeting
Moscow, Russian Federation

30-31 May 2005

ABSTRACT

The workshop gathering representatives of the national health and environmental authorities in 11 countries of eastern Europe, Caucasus and Central Asia (EECCA), as well as external experts, discussed current and future strategies aiming at the prevention of health impacts of air pollution in EECCA countries. The workshop participants agreed on the key elements of the future strategies, in particular on the pollutants to be in the focus of the future actions as well as on the main components of the air quality assessment and abatement strategies. Among the follow up actions, the formulation of a framework plan for development of monitoring of particulate matter in the EECCA countries was selected as a priority.

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Background

Recent scientific evidence indicates that the current levels of air pollution in European cities are causing significant damage to health, increasing mortality, shortening life expectancy by almost one year, increasing morbidity, and affecting the healthy development of children. In recognition of these risks, the Fifth Ministerial Conference "Environment for Europe" (Kiev, May 2003), adopted an environmental strategy, calling for the optimization of air quality standards as a key action and requesting the WHO Regional Office for Europe to facilitate the implementation of this action. Also the Fourth Ministerial Conference on Environment and Health, Budapest 2004, requested the WHO Regional Office for Europe to assist the Member States of eastern Europe, Caucasus and Central Asia (EECCA) in strengthening their capacities to reduce the health risks of exposures to environmental hazards.

The urgent need for harmonization of national air quality regulations as well as monitoring and control systems of the EECCA countries with WHO guidelines was recognized by the WHO meeting "Air Quality and Health in EECCA", St. Petersburg, Russian Federation, 13-14 October 2003. The meeting also recommended developing a comprehensive air quality assessment and management strategy, and emphasized the need to address pollutants with the most impact on human health, including particulate matter (PM10 and PM2.5)[1].

Following these recommendations and to assist the EECCA countries in their efforts to reduce health impacts of air pollution, the WHO Regional Office for Europe organized this consultation meeting in Moscow, 30-31 May 2005. Its main objective was to agree on an action plan to harmonize the national air quality regulations with WHO Air Quality Guidelines. The elements of the General Strategy and Action Plan to reduce the negative impacts of air pollution on health were discussed, and a practical approach to implementing the plan in the EECCA countries was proposed.

The consultation meeting gathered 31 representatives of national health and environmental authorities responsible for the prevention of health impacts of air pollution, for setting air pollution prevention strategies and for air quality legislation in 11 EECCA countries (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, the Russian Federation, Tajikistan, Ukraine and Uzbekistan), assisted by experts from Austria, Germany, Norway, and the Russian Federation as well as WHO staff. Ten observers (scientists and representatives of local institutions) also participated in the workshop. See Annex 1 for the list of participants. The workshop was organized by WHO Regional Office for Europe's Air Quality and Health programme, with support from the WHO Collaborating Centre for Air Quality Management and Air Pollution Control at the Federal Environmental Agency, Berlin, Germany, with partial funding from the German Ministry of the Environment, Nature Conservation and Nuclear Safety, and was hosted by the Ministry of Public Health and Social Development of the Russian Federation.

Preparation to the workshop and its format

Before the workshop, invited experts drafted a working paper: "Guidance for a General Strategy and Action Plan for reducing the negative impacts of air pollution in the EECCA countries" (Annex 2). The paper (available in English and Russian) was distributed to the workshop participants four weeks before the workshop. At the same time, the participants were asked to prepare short national papers answering five questions formulated by the WHO in consultation with the experts:

[1] See report from the meeting in English http://www.euro.who.int/document/E82809.pdf or in Russian http://www.euro.who.int/document/e82809r.pdf

1. Has your country adopted a general strategy (or a similar national policy framework) for air quality management? If yes, when it was adopted and at what decision-making level (parliament, government, ministry, agency…)?
2. What are the leading objectives of the Air Quality (AQ) strategy in your country? (e.g. compliance with certain AQ standards; reduction of population exposure to certain pollutants…)
3. Is the effectiveness of the implemented actions systematically evaluated? (e.g. through air quality monitoring, emission inventories etc) If yes, are you satisfied with the reliability of this monitoring?
4. Can you identify any major problems encountered in implementing the current national strategy and air quality management in your country? If yes, what are they?
5. Are you aware of the preparation of any new, or updated, national strategy on air quality in your country? If yes, is it a part of an international action?

The national papers were obtained from nine countries and were distributed to the meeting participants shortly before the workshop.

Dr Schevureva opened the workshop on behalf of its host, the Ministry of Public Health of the Russian Federation. Dr Mikko Viennonen, special representative of the Director General of WHO and head of the WHO Office in Russian Federation, welcomed the participants of behalf of WHO. The workshop consisted of plenary sessions and small group discussions addressing the questions formulated by the meeting facilitators (invited experts). Dr Michal Krzyzanowski, WHO, acted as a general facilitator of the workshop discussion. Dr Ruth Baumann and Dr Sergei Chicherin kept notes from the discussion, and the main decisions of the group were summarized "on screen". The report from the meeting, prepared by the WHO secretariat and the rapporteurs, was circulated for comments to all workshop participants prior to its publication.

Summary of the discussion

Introductory session

Dr Hans-Guido Mücke (Germany) presented and specified the workshop objectives. Following a short discussion, Dr Michal Krzyzanowski summarized recent developments concerning assessment of health impacts of air pollution in Europe and strategies implemented to reduce those impacts. The main health concerns were about the impacts of particulate air pollution (PM10 and PM2.5). It was likely that the estimated nine months of life lost by an average citizen of the 25 EU countries due to the exposure to particulate matter from anthropogenic sources could be also observed in the EECCA countries, specially in their densely populated areas. Current policies concerning emission reduction of primary PM, as well as reduction of gases leading to formation of secondary PM, should reduce those impacts by some 50% in the EU countries in the next 15-20 years (which was only half of the reduction possible if the maximum feasible reductions were implemented). However, according to the data available in international databases, the planned reductions of PM2.5 emissions in EECCA countries, and related reduction of impacts on health, were much smaller (only ca. 10% of the current emission levels), while the maximum feasible reductions had a potential to cut the emissions by 80%. The current plans addressed mainly emissions from production processes and from combustion in energy production (with ca. 20% emissions reduction). The planned emission reductions were very small or non-existent in other economic activities, in particular in non-industrial combustion, which currently contributed 20% of overall emissions, i.e. as much as the industrial processes. No apparent policies on emission reductions existed for road transport, contributing only ca 5% to all emission volume but probably much more to population exposure and to health effects.

Country presentations

All represented EECCA countries made their presentations, summarizing the answers to the questions received from WHO in advance to the workshop. The text of the presentations, received from some

countries in revised version after the workshop, is available as Annex 3 to this report. Dr Sergei Chicherin (RF) summarized the situation in the participating EECCA countries using both the submitted text and the oral presentations.

In all participating EECCA countries the parliaments and/or governments had updated their national policy frameworks for air quality management in the recent years. In several countries, the ministries had issued additional regulatory acts. The reduction of population exposure to air pollution was one of the leading objectives of the strategies. The new acts updated the older legislation and harmonizde national legislation with international approaches. They also addressed air quality standards and air quality monitoring. However, while the objectives and principles were well covered by the existing laws and regulations, they did not address implementation mechanisms in sufficient detail.

Most of the countries pointed to air quality monitoring as the main instrument applied to assess the effectiveness of the strategy. The available data were sufficient to indicate that the level of pollution was high in many locations and that the pollution caused serious health problems. However, the methods used in monitoring were often obsolete and equipment outdated, therefore its effectiveness in evaluation of the policies was limited. Also unsatisfactory in most countries was the emission inventory. No country conducted an assessment of energy efficiency or of transition to "clean" technologies.

Among the main problems related to the implementation of the existing strategies and existing regulations, the presenters listed:

- Incompleteness of the legislation;
- Declamatory style of the action plans, not accompanied by implementation tools;
- Common violation of the law, especially by enterprises;
- Lack of implementation mechanisms of the legislation related to air quality;
- Weak intersectorial coordination and lack of collaboration between various sectors of administration / ministries.

Besides legal or organizational problems, the implementation of the air quality strategies in EECCA was hampered by apparent inability to reduce emissions from road transport, use of old technologies by industry, lack of funds for relevant, contemporary research and insufficient state monitoring of air quality. The presenters stressed that implementation of the modern air quality standards required proper financing, technical equipment, personnel capacity building and the application of modern information processing technology in data handling.

Few EECCA countries addressed directly the problem of air pollution with particulate matter (PM10 or PM2.5), but in Belarus, this issue was already the subject of new legislation. The monitoring of PM10 was initiated in Minsk in 2005. Additionally, in Moscow systematic monitoring of PM10 in seven locations (considered to represent urban background, not exposed directly to pollution sources) had been started by the city authorities in 2004 (http://www.airmoscow.nm.ru/index). Reported annual average PM10 concentrations were in the range 23-45 μg/m3 with recorded maximum daily mean concentration of 230 μg/m3 in one of the locations.

General strategy for reducing negative impacts of air pollution on health in EECCA countries

Dr Ruth Baumann introduced the main points of the background paper, stressing the overall role of the strategy as a framework for general and individual action plans. The discussion in small groups addressed selected specific issues included in the general strategy, providing examples of decisions to be made when the country develops the strategy. Answers to each question, proposed by small groups, were discussed in plenary and a common answer was formulated as the workshop conclusion.

Pollutants in the focus of future strategies

The first question addressed the pollutants, which should be the focus of the national strategy. At present, the legislation of most EECCA countries included a long list of pollutants with established standard values or whose emission is forbidden. In the Russian Federation, these lists cover, respectively, 665 and 44 substances. While an assessment of the hazards presented by such a broad range of pollutants might be justified, their comprehensive and regular control was extremely difficult and costly. Therefore the national strategies of many countries focused on a small set of key pollutants, often indicative of a broader range of pollutants emitted simultaneously. The discussion concluded that:

- The key pollutants to be addressed by the national strategies of the EECCA countries in the future should be : **particulate matter (PM10 and PM2.5), NOx, SO2, and ozone (O3)**.
- In special situations (e.g. depending on the kind or proximity of the source) further pollutants, or their groups, could be added to the list for local monitoring and control (e.g. certain volatile organic compounds, VOCs).
- **WHO Air Quality Guidelines** should be used as a primary source for assessment of the health relevance of the pollutants included in the strategy.

Verification parameters

The participants agreed that both the amount of the emissions of the pollutant (or its precursors) as well as ambient concentrations of the key pollutants should be monitored and assessed against specified targets. For the emission inventories, it was important to specify the types and minimum size of the sources to be included in the inventory, assessment periods (i.e. the time for which the evaluation was conducted, e.g. calendar year) and methods of assessment (only in some cases, mainly at high stacks, the assessment would rely on measurements; in most cases it relied on estimates). Ambient concentrations of selected pollutants would be measured and averaged over a specified averaging time, consistent with the target / limit value (e.g. 1-hour for NO2, 24 hours for PM, one year for NO2, PM and heavy metals). In evaluation of the compliance with the target / limit values, the time (date) of reaching the target and the consequences of non-attainment should be specified by the strategy.

Role of various sectors in strategy implementation

The strategy should define the roles and assign responsibilities of the various sectors involved both in the pollution generating activities (industry, transport, agriculture, domestic sector) as well as in the pollution monitoring and control.

General Action Plan

Air quality assessment strategy

Dr Hans-Guido Mücke introduced the topic and facilitated the discussion. The workshop participants agreed that:

- The intensity of the monitoring of key pollutants (**number of monitoring stations)** should depend on the size of the city, possibly with at least one monitoring station per 200,000-300,000 people. The countries should gradually develop PM10 / PM2.5 monitoring networks, allowing for training, building the expertise and personnel capacities, preferably starting with 2-4 stations in one (capital) city. However already at this stage the monitors should be located in places with various pollution level (e.g. in traffic and urban background locations) to allow analysis of the variability of the pollution within the city area.
- The **quality of present monitoring of gaseous pollutants** was assessed as insufficient. The workshop participants pointed to the low sensitivity of the methods, often lower than the maximum permissible concentrations of the assessed pollutants. They also complained about the reliability of the staff and field procedures. Lack of harmonization of work between various networks active in the city increased the problem and made the data interpretation difficult.

Quality assurance and control (QA/QC) were being slowly introduced into the EECCA countries, including intra- and inter-laboratory comparisons. Some of the EECCA countries (such as Armenia, Georgia, Russian Federation, Ukraine and Uzbekistan) had in recent years been able to participate in the

inter-calibration study organized by the WHO Collaborating Centre for Air Quality Management and Air Pollution Control and its QA/QC programme on air quality monitoring.. The experience from this study indicated that the results of manual methods (still operated in EECCA countries) were mainly in a good accordance with the data obtained by automatic devices (monitors), though they could still be improved. Problems occurred within network operations, where present procedures were considered to be insufficient, e.g. regular flow rate control needed to be introduced in some networks. Also the network design and operation was not well controlled or supervised. Unfortunately, the experiences gained during such workshops were not yet implemented to initiate routine QA/QC actions in air quality monitoring network operations in EECCA.

Pollution abatement strategy

Dr Ruth Baumann introduced the subject and facilitated the discussion. The conclusions from the discussions were as follows:

- **Adoption at a high governmental level** was essential to improving the effectiveness of abatement strategies. The decision makers should actively seek public support for the pollution abatement actions, and involve the public in the actions through communication and collaboration of various sectors. The instruments applied to implement the strategy should include both **sanctions AND incentives** (such as tax reductions or preferred treatment) to encourage the strategy's implementation.
- The strategy should define the **details of emission data**, including their specification, and statistics to be used as well as sources coverage. As an overall recommendation, the guidelines developed by EMEP for the parties of the Convention on Long Range Transboundary Air Pollution had been recommended (see EMER/CORINAIR Emission Guidebook http://tfeip-secretariat.org/unece.htm)
- Also the exact area or territory in which an abatement strategy had to be improved, should be specified. The size of this area depended on various parameters, but its main determinant was the pollutant under consideration. In the case of secondary air pollutants, the strategy might require also national or even supranational actions (e.g. in the framework of the Convention on Long-Range Transboundary Air Pollution) for reducing the background pollution levels.

Review of the strategy's efficiency

Dr Paul Rosland introduced the topic by describing the strategy's implementation in Norway. The strategy relied on a wide and timely dissemination of data and other relevant information, and on the active involvement of various stakeholders supported by a strong national professional organisation. Dr Paul Rosland was himself a representative of a stakeholder (Norwegian Public Road Administration - NPRA). Since traffic-pollution is the main problem in the cities, NPRA had had the responsibility to establish a common air quality surveillance system and decision basis for local action plans. In Norway there was a public web site (http://www.luftkvalitet.info/) providing daily numerical forecasting, air quality warnings and online measuring data from 10 cities. The historical data and model estimates, together with health data, were used to assess air pollution effects as well as to evaluate cost and benefits of various options to reduce air pollution. Because all data were easily available and well known, NPRA enjoyed the confidence of citizens and authorities. As Dr Rosland emphasized, transparency in data handling and their accessibility greatly facilitated actions and the formulation of accepted policies.

The discussion following the presentation concluded that:

- The parameters included in efficiency monitoring should address key air pollutants emissions and concentrations, as well as the meteorological data and information about the activities implemented according to the strategy implementation plan. Information should be also available about the applied QA/QC. The workshop stressed the necessity for publication and communication of the results of the actions taken.
- **Strategy implementation should be supervised by an inter-agency or inter-sectoral body**, such as that established for the implementation of national environmental health action plans

(NEHAPs), representing health, environmental and economic sectors, and including scientists. It should be able to draw on the expertise and results of a technical work of the agencies represented by this supervisory body.

- As the first milestone of the action plan implementation, the participants proposed availability of **data on PM10 concentration** in selected location(s) of the country. A necessary condition would be implementation of the administrative measures, such as the update and better specification of the national policies and action plans (such as the NEHAPs).

The way forward

Workshop participants agreed that updating their national strategies taking into consideration the workshop recommendations should be thoroughly discussed at their institutions. The decisions would require involvement of the ministry of health, ministry of environment and, in some countries, other agencies such as Hydromet. NEHAP committees could provide a convenient forum for such discussion and preparation of decisions for governmental approval. In some countries, the current update and revision of the NEHAP provided a convenient opportunity for this action, enabling activities to be specified that would be very relevant to the implementation of the political commitments made at the Fourth Ministerial Conference on Environment and Health held in Budapest in June 2004.

To assist the EECCA countries in the harmonized development of the PM10 and PM2.5 monitoring, the workshop participants recommended extending the mandate of the present WHO working group. The Working Group would be used as a consultative forum, with a first task to formulate a “Framework plan for development of PM monitoring in the EECCA countries”.

Annex 1

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Annex 2

GUIDANCE FOR A GENERAL STRATEGY AND ACTION PLAN FOR REDUCING THE NEGATIVE IMPACTS OF AIR POLLUTION IN THE EECCA COUNTRIES

CONTENTS

Background

The environmental strategy adopted by the 5th Ministerial Conference on "Environment for Europe" (Kiev, May 2003), called for the optimization of air quality standards of the EECCA countries as one of the key actions necessary to reduce the health impacts of air pollution. The urgent need for harmonization of the national air quality regulations as well as its monitoring and control systems of the EECCA countries with WHO guidelines was recognized by the WHO meeting "Air Quality and Health in EECCA", St. Petersburg, 13-14 October 2003. The meeting also recommended the development of a comprehensive air quality assessment and management strategy, and emphasized the need to address the pollutants which were most relevant to human health, including particulate matter (PM10 and PM2.5).

The Fourth Ministerial Conference on Environment and Health, Budapest 2004, requested WHO Regional Office for Europe to assist the Member States of the EECCA in strengthening their capacities to reduce the health risks of exposures to environmental hazards. An agreement on the general strategy providing a policy framework of the actions, as well as a general action plan focusing on the implementation issues, would be an important step towards those objectives.

This document proposes an outline of the common general strategy and the general action plan, which will be discussed and refined by the representatives of the EECCA countries gathered at the WHO consultation in Moscow, 30-31 May 2005.

Objective

The general objective is the reduction of the negative impacts on human health (and on the environment as a whole) caused by air pollutants. To protect human health, the exposure to harmful air pollutants should be avoided, prevented or reduced.

A **General Strategy** for the EECCA countries has to define the basic principles so that the general aim can be reached. This general strategy is the basis for the **general action plan**, which specifies in a more stringent way some essential points; both can be worked out in parallel. Afterwards, on that basis, **individual action plans** for specific urban areas (agglomerations) or highly industrialized regions may be established. Such comprehensive strategic documents, based on WHO guidelines and recognizing the current practices and conditions of the EECCA countries, should facilitate progress towards more effective prevention of adverse effects of air pollution on health.

Besides indicating a general direction for the future activities, the strategy and action plans should be sufficiently detailed to guarantee that the legal basis is established, that the actions are monitored, and that the implementation of laws and ordinances necessary for the improvement of air quality can be verified.

It will take time to get agreement to the entire content of general strategy and action plan. Therefore all efforts should be taken to reach agreement on some essential points, so that harmonized complex work on can begin soon after. Further steps will follow.

General Strategy

To provide a harmonized approach for the protection of public health (and the environment as a whole) from adverse effects of air pollution, the general strategy sets out basic principles concerning:

- definition and establishment of the verifiable objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health;
- assessment of the ambient air quality on the basis of agreed common (standard) methods of monitoring and, where appropriate, modelling;
- information on air pollution emissions and emission reduction technologies applicable for various sources.

The general principle of the general strategy should be to maintain ambient air quality where it is good and improve it in other cases.

The general strategy provides the basis for upgrading national laws and ordinances, and assures a harmonized way for air quality monitoring, assessing, controlling and managing. It is the basis of the general action plan, which contains a practical guidance addressing various pollution sources. The general strategy also identifies the role of the individual action plans.

The establishment of the legally binding air quality objectives for air quality, which are in line with the WHO Air Quality Guidelines, should belong to the general strategy. It should also define the priority pollutants it addresses, the territory it will cover and the time frame of the implementation of its essential components, as well as methodology for the verification of the achievement of the strategy objectives. The strategy should define the responsibilities of various stakeholders (economic sectors, environmental agencies, administration etc).

In line with the conclusions of the workshop in St. Petersburg (13 -14 October 2003) the general strategy should address respirable particulate matter (PM10 and PM2.5) as one of the priority pollutants. But controlling particulate matter means also controlling gaseous pollutants such as NO, NO_2, SO_2, CO. Controlling ozone, another pollutant of health relevance, means controlling NO, NO_2 and NMVOC (Non methane volatile organic compounds).

Air quality assessment has a prominent role in the strategy since it provides the background to its design and is necessary for assessment of its effectiveness. It should use objective reference values, such as the limit values or maximum permissible concentrations and/or deposition of different pollutant (a numerical value combined with an averaging time). Though the basic knowledge about air pollution exists in the EECCA countries, prompting for urgent actions for pollution reduction, specific data on pollution levels, and especially those related to particulate matter, will be urgently needed. Even when first priority is given to urban areas, it will be necessary to get information about larger regions, maybe even the whole territory of the country. Data on air quality, appropriate for the assessment of population exposure to ambient air pollutants, must be accompanied by data on emissions of the primary pollutants and their precursors.

Identification of major issues

The purpose of the WHO Consultation meeting: “Health basis for air quality management in Eastern Europe, Caucasus and Central Asia”, 30-31 May 2005 in Moscow, is to find agreement on essential issues, so that the general strategy and action plan for the EECCA countries can be worked out. To this end, it is very helpful to look into national legislation for comparing the main issues relevant to many countries. This gives an overview of the current situation in the different countries, shows similarities and differences of the national strategies and the action plans.

The "evaluation" of the national legislation includes:

- existing national strategy and its objectives, and verification of their implementation and feasibility;
- pollutants and kind of limit values; their agreement with the WHO AQ Guidelines and approaches of other countries (e.g. in EU)
- kind of area for air quality control; its relevance to population exposure and health risks
- type/number of monitoring stations;
- real situation of concentration in comparison with the national limit values;
- availability and quality of emission data;
- model(s) used as a support for measurements and air quality management;
- reporting requirements;
- information made available to the public;
- time frames for obligatory actions.

There should be agreement about selected strategy elements to be obligatory in each country.

The agreed drafts should guarantee that the upgrading process of national legislation can be done in a more harmonized way and be followed by an improvement of air quality.

Proposed tasks for the Workshop:

1) ***Agreement on the essential elements to be considered in the evaluation of the national legislation***
2) ***Agreement on the essential elements of the general strategy***
3) ***Recommendation of the process to define the strategy.***

General Action Plan

In line with the general strategy and based on the strategy's legal framework, the action plan guarantees in a more precise and technical definition of monitoring, assessing, controlling and managing air quality. The plan is implemented to achieve certain air quality objectives defined by the strategy. It contains a variety of tasks, but the plan can be successful only if all its elements are well harmonized and coordinated. It should be feasible and realistic, and consider all practical conditions and constraints in the country.

The general action plan covers the following three main issues:

1) Air quality assessment strategy (air quality monitoring and evaluation), including reporting and communication;
2) Emission control measures / abatement strategies;
3) Review of efficiency (control).

Besides technical parts, the general action plan should:

- Define the area to which the plan applies and the pollutants of interest;
- Define conditions when an individual action plan has to be considered;
- List the elements to be included in the individual action plans;
- Recommend periodic (e.g. every 5 years) evaluation and update of the action plan and its elements;
- ….

<u>Management of the general action plan</u>

The implementation of the plan is a complex managerial task, including:

- coordination of each involved group;

- coordination of interaction of all groups;
- finding ways for getting the relevant data in due time;
- proper presentation of information to the public;
- …

Air Quality Assessment Strategy

Air quality assessment has a prominent role in air quality management strategy. Its objective is to provide the air quality management process with relevant data through a proper characterization of the current air pollution situation based on the monitoring and/or modelling, as well as predicting changes in air quality associated with alternative strategies. The assessment also provides the necessary data on the effects of the air quality management.

Basic principles are described in "Monitoring Ambient Air Quality for Health Impact Assessment", WHO Regional Publications, European Series, no. 85. Some more details concerning the design of monitoring network are given in the Annex to this paper.

Air quality assessment leads to the compilation of data on the concentrations of specific pollutants over various ranges of time and space. Meaningful comparison of such data, from different sites and/or different times, is only possible if the data are of the comparable quality, represent the same variable and are presented in the same way. This is only possible if agreed common methods are used for all issues.

The issue of measurements includes consideration of:

- the design of the network;
- the measuring methods;
- the quality and accuracy of the methods.

Beside designing a network and choosing the proper monitoring methods, a harmonized quality control of the methods has to be established. If relevant / applicable, the models of air quality to be used in the assessment should be chosen and characterized.

The methods of data management, particularly data treatment, statistical handling of the data and data validation procedures also have to be worked out. Guidelines should be given for documentation of all these procedures.

Though monitoring provides an essential input of data for assessing air quality, models are also useful in supporting this task. Air quality modelling is more successful and is easier in flat areas than in mountainous ones. In all situations, the quality of emission data, meteorological and topographic data have to be sufficient for the requirements of the model used.

In the planning phase it is necessary to gather basic information on the assessment area, such as: plan of the area; spatial distribution of industries (types); major traffic flows, emission data from all significant point sources; topographical and meteorological data relevant to dispersion on emissions and of transport phenomena; spatial distribution of the population living in this area and their health status. All information about air pollution emissions and concentrations observed over previous years or any observation about pollution-related nature damage could be helpful.

The management must be aware that:

- most of the responsibilities and work for the process of assessing air quality (and later on reviewing) lies at the local level, but one or two levels more will be needed for compilation of emission data from various sources (transport, industrial or other significant sources) and background concentrations. This will result in a system increasing in depth and complexity;
- necessary tools and expertise may be scarce;
- monitoring programmes need to be cost-effective, to have guaranteed financial, material and personnel resources, and be adjusted to local needs and conditions;

- technologies and procedures should be consistent with the overall objectives of monitoring, be as simple as possible and adjusted to local conditions, personnel availability and training;
- economic considerations of monitoring programmes need to take full account of installation and maintenance costs, data management, quality assurance and costs for control mechanisms;
- …

Emission control and abatement strategies

Abatement strategies define the measures to be taken to reduce pollutant emissions and therefore improve air quality and meet the air quality objectives stated by the general strategy.

This will now be possible because the air quality management process will have thoroughly described the air pollution situation at present and the extent of emission reduction will be known; both will be the basis for projections of future air quality associated with alternative strategies. When the scientific information is not available to support the strategy, the solutions should be developed based on the precautionary principle.

To work out not only the correct, but also the most efficient abatement strategies, one has to set priorities. The highest priority is the protection of health and health of children in particular. The strategy depends on the type of pollutant if measures have to be chosen to reduce emissions (mainly) affecting:

- Long-term average pollution levels;
- Repeatable high pollution peaks;
- Local episodes of high pollution.

While the objective of pollution abatement is to reduce its effects on the health of people and ecosystems, the means to reach these objectives are most often source-oriented such as limitation of emission, emission standards and product standards. These give appropriate possibilities not only for pollution prevention but also for control measures to improve air quality.

The next important step in selecting abatement strategies is the size of the area in which

- the limit values or MPC is exceeded (can be some sub-areas within an urban area);
- pollution abatement measures have to be taken (very often this area will be greater than the urban area).

The size of these areas depends highly on the topography and on the meteorological conditions, beside the spatial distribution of the relevant emission sources and their emission heights.

In defining the area(s) for abatement strategies one should have in mind the contribution of sources from neighbouring areas. This may involve actions not only on the local level, but also on regional, national or even supranational level.

Measures on the local level have very often the greatest influence in improving air quality at a specific point, followed by regional measures. The national and also the supranational actions are most effective in reducing background levels of air pollutants, such as the UNECE Convention of Long-range Transboundary Air Pollution to which most of the EECCA countries are signatories.

The general action plan should define the means for verification of the abatement strategies based on, both emission and air quality assessment. The geographical and temporal scale of such assessment should be defined by the strategy. The details of this assessment should, for example, include the required frequency of emission measurements at a high stack or the density of the monitors in a certain area.

Review of Efficiency

After implementing the abatement strategies and giving time for all measures to come fully into operation, special evaluations should be done to show the effectiveness of the emission reduction programme. These evaluations should include:

- comparison of actual measured concentration data with the data before starting the programme;
- comparison of the measured concentration data with the limit values or MPC;
- control of the documentation of the quality and accuracy process;
- comparison of actual emission data (if in line with licenses);
- verification of the extent of the reduction of concentration took place and how great the discrepancy is against the goal written down in the general action plan;
- comparison of the installed technology system for reduction of emissions with actual ones;
- …

This evaluation process can show that:

- all goals/some goals, given in the general action plan, are reached;
- the omitted emission reduction figures are reached/partly reached (the evaluation process will show where and why not completely);
- where, when and how often still a limit values or MPC is exceeded; firstly the extent of the exceedance has to be discussed, secondly for each case an explanation has to be given, showing the cause of the exceedance;
- due to topographic and meteorological conditions, it is still possible that the limit values or MPC is exceeded; in this case one has to see if in the meantime a new technology has become available so it could be installed;
- meanwhile there could be some progress in technology processes, in using of burner, possibilities in changing fuel, etc
- …

Proposed tasks for the Workshop:

1) ***Assessment of the existence and needs for improvements of each of the elements of the GAP elements in the EECCA countries***
2) ***Recommendation for the process to define/update of the GAP***

INDIVIDUAL ACTION PLAN

The individual action plan has to be established to plan, work out, control and document all necessary steps for running the assessment programme in a given area. It has to consider the special conditions in the area and the local requirements. This has to be in line with the given obligations in the general strategy and the general action plan. The results of the individual action plan have to show in a quantitative way the improvement of air quality in the area of interest.

Annex: Design of the monitoring network

The design of a network takes place in some steps; information of the different issues has to be collected. If they are not available, start working them out.

The design of a network for gaseous is not necessarily identical to that for particulate matter . In both cases it belongs on the distribution of emission mainly from the dominant and/or most important sources. Besides the emission height is essential for dispersion.

To design the network, it could be sensible to start with a pilot project to gain a good understanding of the spatial distribution of pollutants and to identify the areas with the highest concentration and/or deposition as well as the exposure of the urban population. With these first measurement results, deficiencies or gaps in the emission data could be identified.

To receive comparable data some harmonization of site selection and number of stations should also be given. Some indications for site location requirements and the minimum number of sampling points are listed in the section “Criteria to be considered in monitoring network design” below. All decisions have to be justified and documented.

Preparatory work

Measurements should be taken:

- mainly at fixed sites (to assess trends), accompanied by a few mobile monitoring stations for pre-assessment;
- mainly with automatic monitors, accompanied by semi-automatic and manual monitoring methods;
- with automatic samplers, accompanied by random sampling; in this case the number of measurements should be sufficiently large to enable the levels observed to be determined.

Based on very early data, a decision should be made at which site a continuous working monitor should be installed and in parallel a few mobile monitoring equipments should be used. As an essential support a dense network with passive sampler can be used, so one gets an overview about the spatial concentration field in due time.

When equipment is limited or the area of interest is too large, one can consider if and in which way the area of interest could be divided in two or three sub areas. These sub areas will be assessed with the available equipment one after the other. Therefore monitoring will start with a delay of one year each. If doing so, it would be wise to run a continuous monitor at one fixed site from sub area 1 also during the measurement periods 2 and 3.

When the pilot period has finished and a complete evaluation of all relevant data, mainly monitoring data, emission data and meteorological/topographical conditions, are brought together, the concrete planning of a network can start.

At this time one knows the concentration field and the special behaviour of the time resolution of concentration on the one hand and information about specific emission situations on the other hand. From this, one can see the seriousness of the ambient air situation and where, when and how often the limit values or MPC is exceeded.

Lastly, at this time one should start to check the potential for reducing emissions.
This is the essential question because very often the emission source(s), causing a contribution to the concentration (so that limit values or MPC is exceeded) will be located outside the area of exceedances; sometimes part of the concentration will be transported from neighbouring areas, very near or far away.

Principal questions for designing a network

- for which purpose; local, regional, national, international;
- at which type of area; high population density (urban area), suburban, industrial area, rural, background;
- at which type of site; industrial, traffic, residential;
- number of stations;
- pollutants at each of the stations.

In designing the network, all efforts should be made to depict the connection between emission and ambient air concentration in the "best" way. Therefore emission data are urgently needed.

When looking at the known issues and examining all data to select the correct sites for measuring stations, one must consider if the highest or average concentration should be observed on a certain point.

In principle one has to observe the ambient air concentration near traffic and near industry ("hot-spots"), but also in residential areas; sometime it is wise to situate a monitoring site outside the urban area at a background station; the comparison of both data can help to understand air pollution behaviour over the urban area, because it shows the differences and their possible origin in composition-mix much better.

The number of monitoring stations will be a compromise between an adequate number – but representative enough to show the improvement of air quality – and budget.

Monitoring methods

The field of monitoring methods has become a very specific one. There are automatic, semi-automatic and manual monitoring methods. The automatic monitoring method should be a continuous working monitor with a high time resolution.

In principle four steps exist with different levels of harmonization for a monitoring method; the higher the harmonisation level, the less quality and accuracy activities are needed. All four levels have to be taken into consideration.

1. The weakest possibility is a method by common agreement.
   This means that a group of experts declares one monitoring method as the chosen method for working in practice.
2. The next level is a standardized method (for example ISO).
   This means that the chemical reaction or physical reaction and detection are handled by a standard.

In the European Union there exist principally two steps with different (but higher) levels of harmonization:

3. Equivalent method.
   It is possible to use any method if one can demonstrate that this method produces equivalent results or shows consistent relationship to the reference method. (Using such a method one has to undertake studies to show comparability with a reference method!).

4. The measurement principles of the reference method are laid down in the specific Directives. The measurement method is defined in the European Standards (EN). The Directives set requirements on the reference method regarding time resolution, data quality objectives and their application. The requirements for the data quality objectives vary with the concentration level.

Since air quality assessment needs high comparability of data, an agreement should be reached on not only some kind of harmonization of monitoring methods and the reliability of measuring results by some kind of quality and accuracy activities, but also on harmonization of data handling and evaluation.

Quality and accuracy of the methods

Some data quality objectives must be given for the required accuracy of assessment methods, not only for the measurement data, but also for minimum data capture (data completeness) and time coverage.

Quality control has to start as soon as a measuring method is selected; the different levels of harmonization of a monitoring method are given above. Therefore one needs to specify performance criteria like precision, repeatability, reproducibility and correctness of the measurements.

Also specifications are needed with regard to the daily measurement procedures, which also could be changed by time, if necessary.

The aim of all these procedures must be a complete quality assurance and quality control programme (QA/QC) that allows starting with any agreed measuring method and ending with methods comparable with reference method.

Analysis of the situation

The first analysis has to be done at the start of planning the monitoring network; often the basis is very weak. So this will be a preliminary assessment based on first estimations of the emission of single sources and different optical observations such as locations where damage to nature has occurred.. Perhaps some data about concentrations observed over previous years are available.

The second analysis should be done after one year of monitoring; it will be an interim analysis. It gives first advice about the emission sources (under concrete meteorological conditions) contributing mostly to the concentration at a distinct measuring point. This analysis gives some indication about the correctness of the network that should be built up, but also about possibly omissions in the emission data.

The third analysis has to look in detail at those factors responsible for exceeding the limit values or MPC.

At this time one knows:

- the concentration field and the special behaviour of the time resolution of concentration;
- the seriousness of the ambient air situation; where, when and how often the limit values or MPC is exceeded;
- the specific emission situations; the local distribution of the emission sources and their individual emission values;
- the weather conditions during the time of observation,
- any unfavourable local dispersion conditions;
- ….

Out of this analysis one knows which source or which mix of sources is responsible for exceeding the limit values or MPC. Very often the emission source(s) in question will be located outside the area of the exceedance; sometimes part of the concentration will be transported from neighbouring areas, very near or far away.

Lastly at this time one must also start to check where the potential lies for reducing emissions.

The fourth analysis will be the analysis after all the measures have come into force. This will be the first analysis showing an improvement of air quality.

Documentation

Documentation has to take account of the need for

- quality and accuracy ;
- site-selection procedures which should be fully documented at the classification stage by photographs of the surrounding area and a detailed map. Sites should be reviewed at regular intervals with repeated documentation to ensure that selection criteria remain valid over time;
- …..

Air quality modelling and its role in AQ assessment

Air quality models are used to establish a relationship between emissions and air quality in a given area.

The contribution of the emission of a single source to pollution concentration at ground level can be done with a relatively simple model, but a highly sophisticated dispersion model is needed to evaluate the concentration field over a wide urban– even in mountainous regions.

There is a strong need to evaluate the model results by measured data, or to use measured data as input data for establishing a model.

CRITERIA TO BE CONSIDERED IN MONITORING NETWORK DESIGN

Macro-scale Conditions

Some guidance will be given to harmonize the location of the different sampling points. The main purpose of the macros-scale siting is the protection of human health. Sampling points directed to the protection of human health should be sited:

- to provide data on the interested area and/or sub-areas where the highest concentrations occur to which the population is likely to be directly or indirectly exposed, for a period which is significant in relation to the averaging period of the PMC
- to provide data on levels in other areas within the interested area and/or sub-areas which are representative of the exposure of the general population.

The area can be

- urban;
- suburban;
- rural.

With the characterization of the area

- residential;
- commercial;
- industrial;
- residential/commercial;
- commercial/industrial;
- industrial/residential;
- residential/commercial/industrial;
- agricultural;

- natural;
- agricultural/natural.

Sampling points in general should be sited to avoid measuring very small micro-environments in their immediate vicinity. As a guideline, a sampling point should be sited to be representative of air quality in a surrounding area of no less than 200 m^2 at traffic-orientated sites and of several square kilometres at urban-background sites.
Sampling points should also, where possible, be representative of similar locations not in their immediate vicinity.

Micro-scale Conditions

Some guidance will be given to harmonize the conditions in the vicinity of the different sampling points.

The main purpose of the micro scale siting is the protection of human health.

The measurements can be taken at different station types
- traffic;
- industrial;
- residential;
- background.

And in the case of traffic oriented measurements one has to differentiate between types of street
- wide;
- canyon;
- highway.

With different traffic intensity
- high;
- medium;
- low.

The following guidelines should be met as far as practicable
- the flow around the inlet sampling probe should be unrestricted without any obstructions affecting the airflow in the vicinity of the sampler (normally some metres away from buildings, balconies, trees, and other obstacles and at least 0,5 m from the nearest building in the case of sampling points representing air quality at the building line);
- in general, the inlet sampling point should be between 1,5 m (the breathing zone) and 4 m above the ground. Higher positions (up to 8 m) may be necessary in some circumstances. Higher siting may also be appropriate if the station is representative of a large area;
- the inlet probe should not be positioned in the immediate vicinity of sources in order to avoid the direct intake of emissions unmixed with ambient air;
- the sampler's exhaust outlet should be positioned so that recirculation of exhaust air to the sampler inlet is avoided.

In the case of traffic-oriented measurements one has to take into account:
- for all pollutants, such sampling points should be at least 25 m from the edge of major junctions and at least 4 m from the centre of the nearest traffic lane;
- for nitrogen dioxide and carbon monoxide, inlets should be no more than 5 m from the curb side;
- for particulate matter, lead and benzene, inlets should be sited so as to be representative of air quality near to the building line.

The following factors may also be taken into account: interfering sources; security; access; availability of electrical power and telephone communications; visibility of the site in relation to its surroundings; safety

of public and operators; the desirability of co-locating sampling points for different pollutants; and planning requirements.

Numbers of Sampling Points

This text provides some guidelines for determining minimum numbers of sampling points to assess compliance with limit values or MPC for the protection of human health (and alert thresholds) in areas of interest where measurement is the sole source of information.

The minimum numbers of measurement stations depends on:

- actual concentration in comparison to the level of limit values or MPC (e.g. when the concentration is about 60% of the limit values or MPC no measurement will be necessary, but when it is about 80 % an observation at least on one station will be necessary);
- number of inhabitants (starting with one station for an area with about 250.000 inhabitants and increasing the number of stations with increasing number of inhabitants);
- type of urban area;
  * without any big point sources;
  * with one big point source (in this case one station has to be situated at the point where the highest contribution of this source is supposed and a second station in that direction where no contribution caused by this point source is expected);
  * dominated by point sources (in this case the number should be calculated taking into account emission densities, the likely distribution patterns of ambient air pollution and the potential exposure of the population);
  * traffic dominated;
- the mix of one pollutant of different sources;
- ….

This gives at least one station for

- the highest exposition of the area
- the medium exposition
- near traffic
- the neighbourhood of a single point source

in the area of interest.

Annex 3

COUNTRY REPORTS

The text presented in this annex is a translation of the unedited contributions of the authors listed in the papers. These reports are expected to provide answers to the following questions formulated by the WHO:

1. Has your country adopted a General Strategy (or a similar national policy framework) for air quality management? If yes, when it was adopted and at what decision making level (parliament, government, ministry, agency…)?
2. What are the leading objectives of the AQ strategy in your country (e.g. compliance with certain AQ standards; reduction of population exposure to certain pollutants…)?
3. Is the effectiveness of the implemented actions systematically evaluated (e.g. through air quality monitoring, emission inventories, etc.)? If yes, are you satisfied with the reliability of this monitoring?
4. Can you identify any major problems encountered in implementation of the current National Strategy[1] and air quality management in your country? If yes, what are they?
5. Are you aware of preparation of any new or updated, national strategy on air quality in your country? If yes, is it a part of an international action?

[1]Associated terminology is based on Background Paper "Guidance for a General Strategy and Action Plan for reducing the negative impacts of air pollution in the EECCA countries."

Country presentations

Contents

On situation with air quality monitoring in Armenia and its prospects

L. Kazaryan (*SNPO "Armecomonitoring"*)
Yerevan, Armenia

In November, 1994, the Government of the Republic of Armenia (RA) adopted the Law of the RA on Air Quality Protection. The objectives of the passed Law consisted in legislative assurance of air cleanliness and its quality improvement, reduction or prevention of the negative impacts of air pollution, regulation of social relations in this domain, as well in the strengthening of relevant legislation. Specifically, 18 Chapters of the Law regulate the issues covering the standards of maximum permissible concentrations (MPCs) of the assessed air pollutants, maximum permissible emission levels and permissible physical exposure limits. Moreover, the provisions of the Law cover the issues related to physical planning, designing, construction and operation of enterprises, facilities and other sites whose emissions affect air quality. Aspects of responsibility for failing to comply with the air quality protection legislation, etc. are also accounted for.

Using the given Law as the basis, on 14 October, 2004, the Government of Armenia approved the Concept of Reduction of Vehicle Emissions with a detailed description of the whole array of activities needed to minimize the amount of harmful atmospheric emissions from road transport.

The following conventions were ratified by the National Assembly of the RA: UNECE Convention on Long-Range Transboundary Air Pollution – 21.02.1997; Vienna Convention for the Protection of the Ozone Layer – 30.09.1999; and Montreal Protocol on Substances that Deplete the Ozone Layer – 30.09.1999.

As stipulated by the National Programme on Ozone Depleter Substitution and Refrigeration Technology Management, at least 6 projects are currently under way, including one being implemented by the Ministry of Nature Protection and UNEP, and the other 5 – by UNDP-UNOPS.

The Government of Armenia has passed a number of resolutions concerned with the problem of air quality betterment and whose provisions are in line with the international Conventions signed by Armenia.

Since 2003, the activities related to air quality monitoring in Armenia are being undertaken by the State Non-Profit Organization (SNPO) "Armecomonitoring". Routine work done by the "Armecomonitoring" in this area combines two approaches:

а) organization and implementation of air pollution monitoring, techniques of chemical analysis of the air pollutant concentrations, methods of data collection and processing, and statistical analysis of the monitoring findings – all mainly stem from the inherited Soviet Guidelines on Air Pollution Monitoring РД 52.04. 186-89;

б) gradual introduction of the WHO basic requirements recommended for countries of the European Region and contained, in particular, in the «Air Quality Guidelines for Europe" that emphasize the need to address pollutants most relevant to human health during one's lifetime or the given period of time.

In Armenia at present there are 13 fixed sites for atmospheric bottom layer monitoring with 5 ones located in Yerevan. All 13 stations can merely maintain an incomplete monitoring programme. In other words, according to РД 52.04.186-89 Guidelines, both sampling procedures and measurements of *atmospheric pressure* and *air temperature* are performed daily (except Sundays) at 7, 13, 19 hours. At the moment, the samples collected are tested for 11 substances, i.e. PM_{TOTAL}, *CO,* SO_2, NO_2, *NO,* O_3, *benzene, toluene, ethylbenzene, dimethylbenzene and chloroprene.*

All these fixed sites still run obsolete equipment and instruments whose performance life had expired long time ago. Therefore, acquisition of up-to-date instruments and equipment seems to be a priority so that a fundamentally new air quality monitoring network could be created in Armenia. That is why, no matter the SNPO "Armecomonitoring" being a fairly young organization without ample experience in designing monitoring networks, it has nevertheless developed a draft monitoring concept to be used as the basis for a novel air quality monitoring network during 2007-2010. As prescribed by the

concept, such network should be based on the operation of automatic and semi-automatic instruments and equipment.

According to this plan, by 2010 to monitor the emissions of SO_2, NO_x, CO, O_3, NH_3, PM_{10}, $PM_{2,5}$, PM_{TOTAL}, VOC_X, POP_X, CH_2O, SF_6 and *radon*, Armenia is planning to set up 52 fixed sites equipped with 172 automatic samplers and 224 active air samplers, while passive samplers should be located in 1380 points. It is also planned to purchase 7 special-purpose motor vehicles to organize mobile monitoring stations in the Republic Armenia. Total allocations needed for purchasing the instruments and equipment for launching the air monitoring network in Armenia in 2010 will make up about 4.000.000 US dollars.

By 2010, in Yerevan alone it is expected to locate 15 fixed sites to be equipped with 49 automatic analyzers and 59 active air samplers, and to install passive samplers in 140 points within the city limits. Three special-purpose motor vehicles will be presumably purchased to set up mobile monitoring stations. It is planned to spend over 1.000.000 US dollars on the equipment needed for establishing the municipal air monitoring network.

To develop a novel network of surface water and air monitoring network, the Government of Armenia has planned to allocate 420.000 US dollars during 2007-2008. Despite all these efforts, it is evident that without appropriate international support the Government will not be able to fully implement the project by 2010.

It would be also important to rely on international word of advice about possible modification of the project and its expert appraisal for the purpose of improved performance of the evolving network.

Another burning problem we are facing has to do with mastering both newly developed methods and young specialist training. We do need help from WHO/EURO in this area.

In 2005, the Republic witnessed the starting moment in research efforts taken in connection with future monitoring of the precipitation chemistry which will enhance the scope of air quality monitoring with respect to detecting the contributing transboundary pollution. In this matter, Armenia is in need of both methodological and technical assistance.

National air quality policy of Armenia

V. Nalbandyan (Eco-Globe)
Yerevan, Armenia

The national policy of the Republic of Armenia (RA) in the area of air quality management is reflected in the Law "On Air Quality Protection" (adopted by the RA Parliament), in the provisions of the "National Environmental Action Programme (NEAP)" (approved by the RA Government), and in the Government directions aimed at reducing, measuring and controlling harmful emissions, and at improving air quality.

These Government directions have provided the basis for establishing standards and monitoring the emissions contributed by 900 entities with 2000 emission sources which constitute more than 90% of the total stationary sources in the RA. A number of the decisions made by the Government of the RA are meant to limit the amount of road transport emissions, including its Resolution П 913 on Banning Production, Use and Imports of Leaded Petrol (passed on 29.09.2001), thus meeting some of the requirements posed by the "European Air Quality Strategy".

The functions of air quality control are performed by the State Non-Profit Organization (SNPO) "Environmental Impact Monitoring Centre" of the Ministry of Nature Conservation of the RA. Air pollution assessment is based on collation with maximum permissible concentrations (MPCs). In the past, such an assessment used to be also made with regard to "air pollution index" (API).

Both emission inventories and standardization of air pollutants are carried out by setting maximum permissible emission (MPE) values that serve as a basis for planning environmental actions and conducting expert appraisal.

Another mechanism of nature conservation is boiled down to the principle of paid use of natural resources by virtue of imposing marketable air pollution permits as well as emission charges for exceeding MPEs and MPCs.

So, the national policy and the relevant regulatory framework are aimed at improving air quality and preventing exceedances of atmospheric emissions. At the same time, it should be noted that in real-life situations numerous unauthorized emissions and other violations may take place thus hampering the implementation of the national policy in this area.

What are the main causes of negative impacts on air quality? These are as follows:

- legal nihilism demonstrated by non-compliance with environmental legislation, particularly on the part of developing business community;
- imperfection of the monitoring and control system due to inadequate material and technical supply, and the lack of qualified personnel;
- imperfection of inspectorates, and the problem of corruption;
- low penalty rates which at times lead to non-adherence to environmental standards by paying much less than the amount needed for the introduction of treatment facilities and modern technologies;
- inadequate awareness of the population, including decision-makers, regarding environmental problems.

Presentation made by a representative of Azerbaijan

M. Kazimov (Azerbaijan Medical University)
Baku, Azerbaijan

The representatives of the Republic of Azerbaijan show their respect to you and to the meeting participants, and wish every success in our deliberations.

The topics of this Consultation happen to be of utmost importance since among the objects being exposed to air pollutants human health enjoys the first priority.

The strategy of improvement and optimization of air quality standards for the EECCA countries requires, first and foremost, further accumulation and scientific apprehension of information at a national level in addition to its subsequent comparison with the WHO recommendations.

Our country has managed to create a substantive legislative framework on air quality management. A recent decade is marked by the adoption of such laws, as the Law "On Air Quality Protection", the Law "On Health Care of the Population" and the Law "On the Protection of the Atmospheric Ozone Layer".

Some ministries, agencies and concerns have developed a number of national programmes and concepts for further approval by the Government and putting into action. Some of these documents are listed below:

a) "National Programme of the Countrywide Development in Terms of Hydrometeorological Activities during 2003–2010";
b) "General Principles of Introducing Rules for State Environment and Natural Resources Monitoring";
c) "The First Programme of the National Monitoring Activity Development";
d) "National Environmental Action Programme (NEAP)";
e) "National Environment and Health Action Plan (NEHAP)".

Along with a comprehensive situation analysis related to environmental conditions and public health, these legislative and policy documents indicate the ways of achieving sustainable and environmentally safe development of these areas with due regard for specific eco-geopolitical characteristics of the Republic.

One can observe an ongoing systematic air quality control and performance evaluation of efforts being taken to maintain ambient air quality. Eight cities and industrial centres have introduced a system of air quality monitoring based on triple daily measurements. Suffice it to say that under the Ministry of Ecology and Natural Resources as many as 9 fixed air monitoring sites are now functioning in the capital.

I presume similar, possibly even more stringent measures, are currently taken by other EECCA countries too. However, still much has to be done to significantly improve the air quality.

As is well known, the sources and the nature of air pollution don't differ much in different countries, including Member States of the EECCA. In our Republic man-made sources of air pollution include road transport, oil and petrochemical industry, construction material enterprises (producing cement, bentonites, asbestos slates, etc.).

Among them, motor transport really takes the lead. So, during a year (2000) the stationary sources in totality were responsible for 515 thousand tons of atmospheric emissions, while the motor traffic alone – for nearly 400 thousand tons. An ongoing steep rise in motorization is accompanied by soaring emissions.

With ever-increasing chemical burden on ambient air, the implemented measures turn out to be insufficient. At our fixed sites of air monitoring we can merely measure concentrations of about 20 ingredients, while the exhaust fumes from motor vehicles contain more than 200 chemically detrimental substances. Despite significant air pollution with dust of complex chemical composition, and with heavy metals, asbestos, etc., we have not yet started to measure PM_{10} and $PM_{2,5}$ in the atmospheric dust; the

composition of dust pollution remains to be unspecified, and the list of determined carcinogenic substances is still incomplete, etc.

Air pollution undoubtedly affects health status of the population to a great extent through exposures to polluted air, water and food products. In our Republic there have reports of some food poisonings due to eating edible mushrooms picked up in the vicinity of highways.

Most obvious reason of such problems is associated with inadequate methodological, and material and technical basis at a national level. For the monitoring system to be reliable enough one should not simply rely on the national network of monitoring stations and the equipment provided. Moreover, lack of interagency coordination of the monitoring systems under different agencies is in the way of producing an objective and complete air quality assessment.

Consequently, when developing the principles of an integrated strategy of air quality assessment and management, one should consider the above obstacles most probably typical of many EECCA countries.

Thank you for your attention.

National air quality management policy of Belarus

P. Amvrosiev (Department of Environmental Hygiene, Minsk City Centre for Hygiene and Epidemiology),
V. Zavialov (Ministry of Nature Resources and Environment)
Minsk, Belarus

1. The national policy of the Republic of Belarus in the area of air quality management is built upon a number of legislative acts and Government regulations. This list includes the following instruments: the Law "On Environment Protection" of 26.11.1992; the Law "On the Protection of Air" of 15.04.1997; the Law of the Republic of Belarus "On Sanitary and Epidemic Well-Being of the Population" (2000); National Environment and Health Action Plan covering the period of 2001–2005; National Sustainable Development Strategy of the Republic of Belarus until 2020;

Resolution # 82 of the Council of Ministers of the Republic of Belarus of 27.01.2004 "On Approving Regulations for Environment and Health Monitoring System" for 2004–2006; Resolution # 949 of the Council of Ministers of the Republic of Belarus of 14.07.2003 "On the National Environmental Monitoring System of the Republic of Belarus".

2. The objectives of the National Strategy of the Republic of Belarus are as follows:

- ensuring conformity of air quality to the national standards;
- decreasing population exposure to certain pollutants contained in vehicle exhaust fumes;
- systematic revision and improvement of the national standards in line with the WHO recommendations.

It should be pointed out that in keeping with the WHO recommendations, the Republic of Belarus has established standards for the airborne fine particulate matter (PM10 and PM2,5) and ozone. A technical approach to risk assessment has been elaborated, and a series of assessments made.

3. Belarus makes systematic evaluations of effectiveness of undertaken actions aimed at preserving and improving air quality. Its monitoring is organized in 16 industrial cities of the Republic at 52 air monitoring stations. In 2004, a route instrument for measuring ozone concentrations in the lowest atmospheric layer was put into operation.

Nevertheless, the experts concerned are not happy with data representativeness collected as a result of the existing air quality monitoring system performance with regard to subsequent, more accurate assessment of exposure of selected population groups. We are still lacking advanced data bases on air basin condition generated by means of geo-information technologies.

4. Major problems and objectives are as follows:
Improvement of the air quality monitoring system, including:

- measurements of fine particulate matter (PM10 and PM2,5);
- optimization of location of the network of air quality monitoring stations;
- standardization of the pollutant sampling and analysis procedures in accordance with international requirements, including the use of continuously operating automatic analyzers;
- enlarged list of substances selected in connection with air quality monitoring;
- improvement of meteorological measurements.
- Wider use of the risk assessment procedure at the stage of environmental impact audit on account of construction or reconstruction of pollution sources.

5. Implementation of the air quality management strategy in the Republic is based, *inter alia*, on further development of the air monitoring system and its network improvement up to the EU standards with subsequent integration of the Belarus monitoring network into a unified European monitoring system. In 2005, we are planning to buy and deploy two PM_{10} measuring stations in Minsk, including subsequent risk assessment.

National strategy of Georgia on air quality

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1. Georgia has adopted laws on environment, air and health protection, and the Presidential Decrees have provided for the approval of the National Environment and Health Action Plan – environment and health (2003) and the National Environmental Action Programme (2000). These documents basically determine a national policy of air quality management. As to the National Environment and Health Action Plan, it has a declarative character and fails to provide any deadlines of future actions. The National Environmental Action Programme for the period of 2000–2004 contained 9 air quality-related actions of which just one has been implemented, 5 actions are under way, and 3 actions more have not been initiated at all despite their expired time limit. These two documents require drastic revision with due regard for the international experience and up-to-date requirements.

2. The main objectives of the air quality management strategy in our country include:
   - refining of the legislative, normative and technical framework of air quality improvement and control, including its sanitary conservation, and harmonization of such regulations in the context of international requirements;
   - development and step-wise implementation of the air pollution abatement programmes with different timelines in major cities of Georgia;
   - creation of a unified monitoring system and the database on health status of the population and air quality assessment;
   - gradual decrease in the volume of imported fuels containing substances with harmful effects on human health, such as sulfur, heavy metals, etc.;
   - provision of the industrial facilities with high-performance waste-treatment systems, etc.

3 A systematic evaluation of effectiveness of the measures taken is made on a limited scale and leaves much to be desired. Specifically, air pollution monitoring is implemented in merely 6 urban areas (Tbilisi, Rustavi, Kutaissi, Batumi, Zestafoni and Akhaltsikhe) at 20 fixed sites by measuring 7 indicators only (including dust, sulfur dioxide, carbon dioxide, nitrogen oxide, nitrogen dioxide). Emission inventories are unsatisfactory and performed on the basis of improbable data, etc.

4. Major problems encountered during implementation of the National Air Quality Management Strategy are listed below:
   - relevant legislative, normative and technical framework is far from being acceptable;
   - lack of financial resources and the enabling mechanisms for targeted actions;
   - lack of an updated National Air Quality Management Strategy;
   - weakness of the state system of control and surveillance;
   - inadequate training of the personnel, and unsatisfactory material and technical basis of the regulatory authorities;
   - lack of modern methodology and the software needed for the assessment of health status of the population, atmospheric pollution and air quality;
   - obsolete monitoring system and an extremely low level of statistical recording and reporting, etc.

5. To date, nothing is being done in Georgia to prepare a revised version of the National Air Quality Management Strategy.

Air quality strategy in Kazakhstan

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Fundamentals of the state policy of the Republic of Kazakhstan in the area of environment protection were laid down in the "Environmental Safety Concept" approved by the President of the Republic of Kazakhstan in his Decree of 30 April, 1996, and devoted to such issues, as environmental priorities of the transition period and the need for developing a system of environmental legislation, state control and expertise, environmental management and monitoring mechanisms.

Since the adoption of the said Concept, the Republic of Kazakhstan has witnessed serious changes in its societal development. A number of policy documents concerning national development have been elaborated, including the creation of environmental legislation basis (by passing the Law "On Environment Protection" in 1997, and the Law "On Air Quality Protection" in 2002, etc.), the signing of a number of international environment-related conventions (totaling 19), and the establishment of environmental management system.

However, the status of a country with an environmentally vulnerable terrain and unresolved ecological problems still remains unclear. In view of the above, the "Environmental Safety Concept of the Republic of Kazakhstan Covering the Period of 2004–2015" has been already developed and approved by the Decree #1241of the President of the Republic of Kazakhstan on 3 December, 2003.

To put it into practice, an "Action Plan for 2004–2006 on Implementing the Environmental Safety Concept of the Republic of Kazakhstan Covering the Period of 2004–2015" was approved by the Resolution #131of the Government of the Republic of Kazakhstan on 3 February, 2004.

The main objective of the public policy of the Republic of Kazakhstan in the area of environmental safety, including air quality management, consists in a stepwise pollution abatement (2004–2007), stabilization of quality indicators (2008–2010), improvement in air quality and achievement of a favorable level of environmentally-sustainable societal development (2011–2015).

In accordance with the legislation of the Republic of Kazakhstan, state monitoring of the ambient air quality is organized by a central executive agency in the sphere of environmental health and the local executive bodies. Territorial offices of the central executive environmental agency are entitled to compile a list of entities responsible for industrial air monitoring. Such monitoring is also carried out by the governmental bodies and the organizations of the SanEpi Service.

Recording and reporting procedures regarding air pollution research are carried out according to the medical documentation forms approved by the Executive Order #437of the Minister of Health of the Republic of Kazakhstan on 20 October, 1993.

Health standards for the ambient air pollutants are subject to sanitary and epidemiological rules and guidelines "Sanitary and Epidemiological Air Monitoring Requirements" approved by the Executive Order # 629 of the Acting Minister of Health of the Republic of Kazakhstan on 18 August, 2004. On 18 September, 2004, this document went through the state registration and was filed at the Ministry of Justice under # 3076. There are no generally accepted environmental standards for air pollution in the Republic.

At the present moment, the reliability of air monitoring fails to fully meet up-to-date requirements due to the following:

- insufficient number of the state-run monitoring stations, the lack of measuring equipment, and worn-out monitoring and measurement facilities entail a decreased volume and lower validity of the obtained information;
- inadequate interdepartmental coordination of the monitoring systems functioning under different ministries and agencies makes it impossible to produce a fairly objective air quality assessment or timely operational information.

The following obstacles are observed in implementing public policy of air quality management:

- further development of research, including basic research, in the area of air quality protection fails to fulfill present-day requirements;
- introduction of a unified air monitoring system appears to be indispensable.

In order to hold a comprehensive discussion of the Ecological Code concept, the Ministry of Environment and the Ministry of Health in cooperation with some other ministries of the Republic of Kazakhstan have organized a number of meetings attended by nternational experts, and representatives of NGOs and subsoil user industries. As a results of these meetings, a decision regarding the need for a substantial reform of the environmental management system was made so that it could satisfy market economy requirements with due regard for the experience gained by the European Union countries.

Review of the national strategies and action plans with regard to air quality management in Kyrgyzstan

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The main thrusts of the environmental policy of the Republic of Kyrgyzstan (RK) are laid down in the Environmental Safety Concept of the Republic of Kyrgyzstan which was developed and approved in 1997 by the RK Security Council as a basic document in the field of environment protection.

In 2001, a nation-wide long-term strategy "Integrated Development Basis (IDB) of the Republic of Kyrgyzstan Covering the Period up to 2010" was adopted by the Zhogorku Kenesh (Legislative Assembly). The IDB contains a separate section "Environmental Protection" that specifies principal actions and expected outcomes for achieving sustainable development of the Republic.

The National Poverty Reduction Strategy (NPRS) of the Republic of Kyrgyzstan is being put into reality within the IDB framework. The NPRS was approved by the Resolution # 269 of the Government on 08.05.2003. It includes a section "Rational Nature Management" that incorporates specific activities aimed at achieving environmental safety.

Pursuant to the Resolution # 263 of the Government of the Republic of Kyrgyzstan dated 29.04.2002, a Government Programme on Phasing-Out the Use of Ozone Depleters has been developed. The Ozone Centre has been created in the Republic to be run by the Ministry of Ecology and Emergency Situations.

In 1995, the National Environmental Action Programme (NEAP) Covering the Period of 1995 –1997 was developed in the Republic of Kyrgyzstan.

In collaboration with WHO, the Republic of Kyrgyzstan elaborated the State Environment and Health Action Plan (SEHAP) which was approved by the Resolution # 611of the RK Government on 08.11.1999. The SEHAP is targeted at achieving two main objectives, i.e. protection of health and well-being of the nation, and environment protection. In 1999, within the SEHAP framework the Local Environment and Health Action Plan (LEHAP) of the city of Bishkek was developed. The Local Action Plan is meant to assist the city hall of Bishkek to address specific targets related to the improvement of environmental health.

In 2000, the Regional Environmental Action Plan (REAP) for Central Asia was devised. It was presented in 2001 at the Almaty Conference of Ministers of Environment of the Central Asian Countries and approved by the Central Asia International Commission on Sustainable Development (ICSD) subject to its further elaboration and an ongoing update. The REAP defines the main lines of activities of the Central Asian countries in their efforts to resolve priority environmental health problems on short- and long-term basis, including those of air quality management.

A systematic evaluation of effectiveness of the activities being implemented in the area of air quality management is carried out through urban air quality monitoring; emission control; statistical reporting on emissions of the users of natural resources; development of ecological certificates for each enterprise; inventory of greenhouse gases (GHGs) and persistent organic pollutants (POPs); control of the composition of motor transport exhaust fumes every time a vehicle undergoes annual inspections; and air quality monitoring for health impact assessment.

However, to provide for proper efficiency of the air quality management efforts, it is necessary to create a unified national system of ambient air monitoring in the Republic, including its retooling with modern instruments and equipment; elaboration of legislative and regulatory framework for all types of monitoring activities with reference to the international standards; introduction of low- and non-waste technologies; improvement of reliability, objectivity and timeliness of the human environment assessment. The main problem restraining all these activities is rooted in scarce government financing. Some of the activities listed in the above documents are being implemented at the expense of different international projects under way in the Republic, including the resources made available by donors.

At present, within the framework of an international project the work has been started to devise the National Strategy of Sustainable Development of the Republic of Kyrgyzstan, which should contain a separate cluster on ecology. The National Strategy of Sustainable Development of the Republic of Kyrgyzstan is being elaborated on the basis of the Regional Strategy of Sustainable Development in Central Asia.

National strategy of air quality management in the Russian Federation

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At the present time, the National Strategy of Air Quality Management in the Russian Federation is subject to a number of such basic documents, as:

1. Constitution of the Russian Federation (Article 42).
2. Federal Law # 52-ФЗ "On Sanitary and Epidemiological Well-Being of the Population" of 30 March, 1999, with supplements.
3. Federal Law # 96-ФЗ "On Air Quality Protection" of 4 May, 1999.
4. Resolution # 554 of the Government of the Russian Federation of 24 July, 2000, "On Approval of the Statute on the State Sanitary and Epidemiological Service of the Russian Federation, and the Statute on the State Sanitary and Epidemiological Regulatory Actions".
5. Resolution # 426 of the Government of the Russian Federation of 01.06.00 "On Approval of the Regulations for Environment and Health Monitoring".
6. Guidelines P 2.1.10.1920-04 "Human Health Risk Assessment from Environmental Chemicals" approved on 5 March, 2004.
7. Public Health Regulations SanPiN 2.1.6.1338-03 "Health-Related Requirements to Air Quality Assurance in Human Settlements".
8. Sanitary Regulations СП 1.1.1058-01 "Organization of Production Supervision for Compliance with Sanitary Regulations and Infection Control Requirements".
9. The Concept of Health and Medical Science Development in the Russian Federation, approved on 5 November, 1997, # 1387.
10. The Concept of Development of the State Sanitary and Epidemiological Service of the Russian Federation during 2003-2007, approved on 22 December, 2002.
11. National Environment and Health Action Plan of the Russian Federation for the period of 2001-2003, etc.

The main objectives of the air quality management strategy are as follows: its compliance with enacted health standards (MPCs or OBUV[2]), decreased population exposure to "priority pollutants", carcinogens, chemical substances of hazard class 1 and 2, selection of priority lines of activities to reduce the amount of emissions of harmful air pollutants.

Serious attention is currently paid to specific pollutants form some industries which helps to compile a list of priority pollutants affecting human health.

To date, over 656 maximum permissible concentrations (MPCs) of both chemical and biological air pollutants have been developed in the Russian Federation to be used as criteria of safety and harmlessness of human environment factors. A health standard ГН 2.1.6.1338-03 "Maximum Permissible Concentrations (MPCs) of Pollutants in the Ambient Air of Human Settlements" was approved. It reproduces the names of substances according to the nomenclature of the International Union of Pure and Applied Chemistry (IUPAC), including CAS numbers, values of maximum single and daily average MPC, and substance hazard class limiting health hazard indicator. The given regulatory document includes a new section which bans the emission of harmful substances due to their extremely high

[2] Translator's note:
OBUV – from Russian ОБУВ (ориентировочный безопасный уровень воздействия) meaning "tentative safe exposure level".

biological activity. There are 44 substances whose atmospheric emission is forbidden in the Russian Federation.

Further efforts are being taken in the Russian Federation to harmonize domestic standards with international ones, but when doing so convincing scientific evidence has to be retrieved, and repeated experiments and foreign standard expertise performed.

As a result of the work done certain domestic standards have been revised and finalized on the grounds of international experience, and by taking into account a carcinogenic activity of every substance and new domestically produced scientific findings on such substances, as beryllium, arsenic, epichlorohydrin, toluene diisocyanate, benzene, etc.

At the present time, the Commission on State Sanitary and Epidemiological Standardization under the Federal Service for Supervision of Consumer Rights and Welfare has been requested to consider around 30 updated standards for approval. Specifically, maximum single MPCs for nitrogen dioxide and sulfur dioxide have been produced with greater precision.

Consequently, the following major objectives for the future have been formulated:

1. Continued harmonization of pollutant standards with those of other countries and international organizations both in terms of MPC values and temporal characteristics.
2. Clarification of a directional effect of selected substances with regard to recent scientific findings.
3. Clarification on the basis of up-to-date technical approaches, including possible revision of MPCs established 30-40 years ago.
4. Development of the approaches to be exercised to ascertaining differential MPCs of chemicals similar to those available in a number of foreign countries (the US, Japan, etc.) and international organizations (WHO, EU) by taking into account the averaging time of the actual concentrations (single, daily, annual) since the air pollution assessment should be specifically made stemming from such MPCs.
5. Continued efforts aimed at standardizing ambient air pollutants.

One of the strategic technical approaches is boiled down to the scrutiny of air quality management issues when it comes to physical planning, designing, construction, reconstruction (retooling) and regular operation of different facilities, as well as when developing town planning documentation at its every stage with due regard for health-related requirements, including air quality assurance in human settlements and industrial control planning.

Health-related requirements to be met by air quality management activities in view of industrial emissions are included into the technical regulations that serve as the basis of air quality control.

Work coordination activities and analysis of data on the ambient air pollution in human settlements and its harmful effects on health of the population are carried out by the State Sanitary and Epidemiological Service of the Russian Federation pursuant to the Resolution # 426 of the Government of the Russian Federation of 01.06.00 “On Approval of the Regulations for Environment and Health Monitoring” (now the Federal Service for Supervision of Consumer Rights and Welfare). The system of environment and health monitoring (EHM) functions as a pivotal mechanism of management (assurance) of sanitary and epidemiological welfare of the population in accordance with the Federal Law of the Russian Federation “On Sanitary and Epidemiological Well-Being of the Population”. All 89 sub-National bodies of the Russian Federation have joined the system of environment and health monitoring. At the 1st stage, relevant indicators have been selected and data collection organized for conducting environment and health monitoring, while the 2nd stage dealt with the establishment of priority indicators and certain populations exposed to polluted air, as well as with the compilation of the list of territories graded according to air pollution level.

One of the important conditions for EHM is connected with interagency coordination of these activities. To introduce the EHM system since 2000 onwards, cooperation agreements have been signed

with such agencies, as Goscomsport of Russia, Roshydromet of Russia, Goscomstat of Russia, Ministries of Education, Natural Resources, Rail Transport, Defense, Labor and Economic Development of the

Russian Federation. In 2000, for ensuring sanitary and epidemiological well-being of the population, an Agreement was signed and the Coordination Council on Cooperation set up for creating a Single Information Area of the CIS Member-States. In 2002, the Agreement on Cooperation between the CIS Member-States in the field of Environment and Health Monitoring was prepared and agreed upon with all members of the Coordination Council.

Further steps in this direction will contribute to the harmonization of the approaches exercised by the CIS Member-States to the environmental health impact assessment.

In the Russian Federation, as recommended by the London Declaration (Third Ministerial Conference on Environment and Health, London, 1999), the National Environmental Health Action Plan (NEHAP) was developed and approved on 21.09.01 at the meeting of the Government Commission on Health Care of the Citizens. The MOH of Russia has been requested to provide for the coordination of efforts in implementing NEHAP, to assist the executive authorities of the sub-National bodies of the Russian Federation in developing the regional environmental health action plans and to submit annual information on the progress made to the Governmental Commission on Health Care of the Citizens.

The results of the environment and health monitoring activities and health risk assessments have been taken into account in the situation analysis, priority setting and substantiation of a list of top-priority activities to be included into the National Environmental Health Action Plan of the Russian Federation during 2001-2003.

As specified by the main goal of NEHAP, i.e. health care of the present and the future population of Russia, the NEHAP is aimed at establishing priority, most urgent country-wide problems at federal, regional and municipal levels.

In 2002, in the light of the NEHAP implementation, a Federal Law “On Environment Protection” and another Law # 34-ФЗ of 22 March, 2003, “On Banning the Production and Turnover of Leaded Motor Petrol in the Russian Federation” became effective, including a number of laws passed at the level of the Russian Federation entities.

As far as the reduction of harmful air pollutants is concerned, as many as 180 different activities have been carried out, and these are as follows: reconstruction of specialty plant in Primorsky krai; modernization of 22 industrial enterprises in Samarskaya oblast; renovation of aluminous facility in the town of Kamensk-Uralsky (Sverdlovskaya oblast); relocation of an industrial enterprise beyond the residential block limits in the town of Staraya Russa (Novgorodskaya oblast); construction of by-pass roads and viaducts in the Republic of Kabardino-Balkaria; and a number of other projects.

Within the framework of NEHAP, more extensive research work has been undertaken in the field of environmental health of which at least 63 studies are already completed or still under way.

In keeping with paragraph 7 of the recommendations of the International Conference “Problems of Harmonization of the Russia’s Legislation with the Norms of International Law in Developing Technical Regulations”, a decision was made to submit a proposal to the Government of the Russian Federation regarding the National Environmental Health Action Plan for the period of 2006-2008.

In 2004, more than 4 million ambient air tests for 106 chemicals were performed in the Russian Federation, including 990 666 tests (0.14 % exceeding MPCs by 5 times) made by the institutions reporting to the Federal Service for Supervision of Consumer Rights and Welfare. These studies were conducted in the areas affected by manufacturing facilities, as well as in residential areas nearby highways, which makes it possible to assess air quality, to detect pollution sources and to take atmospheric emission abatement measures.

According to the monitoring data, air pollution is characterized by a downward trend, and the percentage of residential air samples in excess of prescribed health standards made up 6,01% in 2001; 5,58% in 2002; 4,4% in 2003; and 4,15% in 2004.

The number of chemicals to be tested in residential air has more than doubled, and there has been an increase by the factor of 2 of the analyzed substances of hazard class 1 and 2.

As suggested by the environment and health monitoring data, major substances under control by the monitoring stations in the Russian Federation are represented by nitrogen dioxide, suspended substances, sulfur dioxide, formaldehyde, phenol, nitrogen oxide, ammonia, hydrogen sulphide, lead, 3,4-ben(a)pyrene. Ambient air has been also tested for such carcinogens, as lead, toluene, chrome V1,`ozone, cobalt, cadmium salts and butadiene.

The main industries contributing to air pollution include road transport, power engineering, municipal housing economy, food-processing industry, etc.

As before, the lead in air pollution is taken by motor transport the pool of which multiplies annually by 30-40% on the average.

In the Russian Federation, over 11 million people have to reside in the areas being exposed to harmful substances exceeding their MPCs by 5 times or more.

To prevent detrimental effects of lead on human health and environment, a Federal Law # 34-ФЗ "On Banning the Production and Turnover of Leaded Motor Petrol in the Russian Federation" was developed and adopted on 22 March, 2003, and came into force as of 01.07.2003. In pursuance of the said Federal Law, the output of leaded petrol at the oil refineries in Irkutskaya, Nizhegorodskaya, Samarskaya, Permskaya and Volgogradskaya oblasts, as well as in Krasnodarsky krai and the Republic of Bashkortostan, has been discontinued. In some sub-National bodies of the Russian Federation the use and distribution of leaded petrol as motor fuel was forbidden by resolutions of the governors. The laboratory tests performed in 2003-2004 have proved that in the regions with discontinued manufacture and use of leaded petrol the air samples in the vicinity of motor-roads did not contain any traces of lead. Furthermore, studies on developing and testing alternative motor fuels are currently conducted in the Russian Federation.

One of the main problems is connected with pending issues of purification of vehicle exhaust fumes. The volume of vehicle emissions in the total amount of atmospheric emissions in urban areas constitutes from 50% to 85%. The analysis of monitoring data on air pollution along the highways has shown that maximum concentrations of carbon oxide, butadiene and hydrocarbons exceeded MPCs by the factor of 2-5 or more. Atmospheric air pollution rises sharply with traffic jams.

The work on health risk assessment is being done in the Russian Federation for detecting potential adverse effects of polluted air and environment on health of the population. To this end, in 2004 the "Guidelines on Human Health Risk Assessment from Environmental Chemicals" approved by the State Chief Medical Officer of the Russian Federation G.G.Onischenko were developed and are being put into everyday practice of the Federal Service. This document is meant to ensure standardization of requirements, principles, methods and criteria for health risk assessment due to impacts of chemicals polluting the environment with regard to the experience gained by domestic, foreign and international organizations (United Nations Environment Program, Organization for Economic Co-operation and Development, World Health Organization, International Labor Office, International Programme on Chemical Safety, European Commission). Fully harmonized criteria of risk assessment have been made available.

In the Russian Federation today major construction projects of industrial enterprises can be accepted for consideration provided prior health risk assessment is made by the nationally accredited institutions.

Still, despite considerable work been done in this connection, up to now one fails to acknowledge country-wide monitoring coverage or 24-hour air sampling procedures, including testing for PM_{10} and $PM_{2,5}$. WHO assistance in needed in the provision of air samplers, including comparative assessments of pollution caused by PM_{10} and $PM_{2,5}$. Further introduction of health risk assessment methodology will make it possible to devise adequate preventive activities focused on air pollution abatement.

National air quality strategy in Tajikistan

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In terms of air pollution, the Republic of Tajikistan (RT) is characterized as a region with tense environmental situation. Industries and transport are the major users of resources and materials, and consequently, bear responsibility for harmful emissions and environmental pollution in general.

In 2000, on the basis of the Helsinki Declaration of 1994 the Resolution of the Government of the Republic of Tajikistan endorsed the National Environment and Health Action Plan (NEHAP) that embraces top-priority activities destined to control environmental factors detrimental to health by adhering to the principles of uninterrupted cooperation between relevant sectors. As to air quality management, one of the inherent objectives consists in the following: to achieve by 2005 maximum reduction of atmospheric emissions and to bring the content of airborne harmful substances down to maximum permissible concentrations.

As prescribed by the updated "Strategy of the Republic of Tajikistan on Health Care of the Population up to the year 2010", which was developed along the lines of the novel health for all policy framework for the WHO European Region "Health21" and approved by the Resolution # 436 of the Government of the Republic of Tajikistan on 5 November, 2002, – a multisectoral action strategy encompasses problems with air quality and lies in a significant improvement by the year 2010 of the condition of physical environment in terms of its safety for human health.

It entails the following:

- development of control strategies for stationary and other sources of air pollution;
- elaboration of legislative regulations and requirements targeted at improving the transport means operation technologies with relation to their impact on air quality.

The main role in air pollution is played by motor exhaust fumes and the industry. Check-ups of harmful substances in vehicle exhaust gases indicate that up to 80% of the motor transport fails to meet environmental requirements. Sky-rocketing petrol prices and disruptions in the natural gas supply compel drivers to buy low quality fuel which leads to greater exposure to harmful air pollutants.

In 2004, in the RT the pool of motor vehicles made up roughly 300 thousand, including 170 private cars of which those with service life of 3 years constituted less than 3% of the total number, while vehicles older than 13 years accounted for 36% or more.

In the early 1990s, the emissions of harmful substances from motor transport made up 40% or 77 thousand tons, and in 2004 – 123 thousand tons of the total harmful emissions throughout the Republic.

The emerging transportation problems deserve special attention. Appropriate measures, like the Dushanbe Transport Initiative, are aimed at promoting further development of public transportation and improving traffic control. Over and above, it is necessary to introduce a programme of nationwide vehicle inspections, car service and replacement of old motor vehicles. In Tajikistan fuel quality standards and vehicle emissions are based on standards prescribed by the former GOST system. These standards no longer correspond to the present-day requirements of the motor pool turnover, being obsolete and failing to comply with modern international practice.

Ambient air standards are rooted in the GOST system currently incompatible with international norms and standards, in particular with air quality standards of the World Health Organization (WHO) being derived from impacts on human health. Turning from domestic standards to international ones will be associated with difficulties and should inevitably entail personnel training and additional funding. There is a need not only to revise the values, but also to introduce changes into the system of data collection, processing and analysis.

Given that over the recent 10-12 years the existing industrial enterprises were not operating at full capacity, the amount of harmful atmospheric emissions went down. At the moment, as the industrial facilities recover from standstill, this problem deserves attention and becomes more evident in big industrial cities. Among the main air polluters, one may list the Tajik Aluminium Plant in the town of Tursunzade, Dushanbe Cement Factory, Nitrogen-Fertilizer Plant in the town of Sarband, Chemical Combine in the town of Yavan, etc. – all these enterprises still use obsolete technologies incompatible with the WHO criteria and standards.

A systematic evaluation of effectiveness of the measures taken leaves much to be desired. Air quality monitoring is not performed on a regular basis; the emission inventories are not carried out to the full extent; and there had been a 70% reduction in the volume of atmospheric studies, and a decline in the number of stationary air pollution monitoring sites has resulted in deterioration of the monitoring and information systems.

Environmental tobacco smoke appears to be most direct and significant source of air pollution affecting health of a great many people.

"The Strategy of the Republic of Tajikistan on Health Care of the Population up to the year 2010" makes the following provisions: development of the state law "On Tobacco Smoking Market Monitoring"; introduction of measures on restriction of access to tobacco products for persons under 18 years; imposition of additional tax on tobacco products to finance specific smoking control activities; and development of education and data base for raising community awareness of the hazardous effects of tobacco use. The said document has been tabled for consideration by the central Government.

It is planned in the nearest two years, to develop and implement an updated policy of promotion of healthy lifestyles, to launch smoking control advocacy campaigns and to carry out the initial projects, like "Healthy Cities" and "Health Promoting Schools".

In the coming two years it is also envisaged to develop a draft legislation "On Tobacco Market Monitoring and Tobacco Smoking Prevention" which should regulate all aspects of tobacco product manufacture, imports and exports.

Antismoking actions among youth are being contemplated as well.

Furthermore, in the nearest two years it is planned to develop and implement educational programmes for training primary health care workers in smoking cessation methods.

Today there is an urgent need in smoking situation analysis and prevalence studies, as well as in the establishment of tobacco smoking characteristics in different socio-economic groups.

In Tajikistan today the prevalence of tobacco smoking and sublingual tobacco use (nas) turns out to be one of the burning public health problems.

In this country tobacco smoking is more common among urban population than in rural places, while sublingual tobacco use is preferred by the villagers. However, such prevalence studies in the population are for the time being limited. Tobacco use surveys are not adequate enough. Even with available data on tobacco product output and imports, there happens to be no reference to such indicators, as tobacco-induced mortality and morbidity, or to the role of tobacco in the national economy and public opinion on tobacco.

At the moment, a draft National Programme of Tajikistan "On Tobacco Smoking Control" has been prepared and submitted for approval by the Parliament of this country.

To date, the following regulations defining the activities of all government agencies regarding environment protection and health care of the population have been adopted in the Republic of Tajikistan:

1. Constitution of the Republic of Tajikistan (dated 6.11.1994).
2. Law of the Republic of Tajikistan "On Health Care of the Population" (# 419 of 15.05.1997).
3. Law of the Republic of Tajikistan "On Sanitary and Epidemiological Well-Being of the Population" (# 49 of 8.12. 2003).
4. Law of the Republic of Tajikistan "On Wastes of Production and Consumption" (# 44 of 10.05.2002).
5. Law of the Republic of Tajikistan "On Nature Conservation" (1994).

6. Law of the Republic of Tajikistan “On Ambient Air Protection” (#228 of 01.02.1996).
7. Code of the Republic of Tajikistan “On Administrative Violations” (of 5 December, 1985).
8. National Environment and Health Action Plan (NEHAP) of the Republic of Tajikistan for the period of 2000-2005 approved by the Resolution of the Government of the Republic of Tajikistan (2000).
9. Strategy of the Republic of Tajikistan on Health Care of the Population (# 436 of 05.11.2002).

National strategy of Ukraine on air quality

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1. A strategy regarding air quality is defined by the following instruments: the Law "On Ambient Air Protection" (approved by the Supreme Council (SC) of Ukraine on 16.10.92 # 2708-12, with supplements and revisions made in 2001) that stipulates legal and organizational framework, and the environmental requirements in the domain of air quality management; the Law "On Sanitary and Epidemic Well-Being of the Population" (approved by the SC of Ukraine on 17.12.96, # 607/96) that determines health-related requirements to air quality in human settlements, production and other premises; the State Health Regulations for the Protection of Air from Chemical and Biological Pollution that specify basic requirements to the air quality in human settlements and recreational areas (approved by the MOH of Ukraine on 09.07.97, # 201); the Procedure of Development and Approval of the Environmental Air Safety Standards (approved by the Cabinet of Ministers of Ukraine (CMU) on 13.03.2002, # 299) that streamlines the mechanism of development and approval of science-based environmental standards, etc.
2. The strategy goal consists in achieving compliance with accepted air quality standards.
3. A systematic evaluation of effectiveness of the undertaken measures is made through air quality monitoring (Resolution # 343 of the Cabinet of Ministers of Ukraine (CMU) of 9.03.1999 "On Approval of the Procedures of Air Quality Monitoring"), and emission inventories. Both lines of activity require improvement, and the monitoring system, in particular, needs methodological and technical support.
4. Lack of coordination of actions taken by different public institutions; need for revision of the standards by taking into account the requirements specified in the EU Directives; problems with population exposure assessment due to selected substances, including PM10 and PM2,5, etc.
5. Improvement of the air quality management strategy is targeted at reducing pollutant emissions from stationary and mobile sources with account for air pollution prevention, and more extensive use of economic management methods and technological emission control.
6. The process of improvement evolves within the conceptual framework adopted by the international community.

Air quality assessment in Uzbekistan

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Air basin pollution in Uzbekistan is caused by a number of factors.

Natural conditions of the Republic, including small amount of precipitation, temperature inversions and geological substate dryness, contribute to the elevated levels of air pollution of a natural origin. In case of all Central Asian countries, the main sources of air pollution are associated with the Kara Kum and Kyzyl Kum deserts, as well as with a dried out seabed of the Aral Sea being the source of deposition of over 40 million tons of salt every year.

Man-made polluting substances are coming from road transport and the enterprises of leading industries of the Republic, including gas and oil producing and process industries, power engineering, steel, chemical and building industries, etc.

In the Republic of Uzbekistan, the Goscompriroda and Uzhydromet services are responsible for monitoring both ambient air and its pollution sources. The Ministry of Health is also involved as concerns environment and health monitoring.

The Republic of Uzbekistan is currently implementing a project “Ecological Indicators for Environmental Quality Monitoring in Uzbekistan».

All-in-all in 2004, nearly 2000 enterprises with about 80 000 stationary sources of emissions of 159 harmful pollutants were registered in the Republic of Uzbekistan.

The lead in the amount of discharged air pollutants, primarily sulfur dioxide and untreated hydrocarbons, is taken by the enterprises of oil and gas industry, and power engineering. The facilities of fuel and energy complex are also listed among major sources of such pollutant emissions, as carbon dioxide and methane which bring about a greenhouse effect causing global climate change.

The distribution of total emissions from stationary sources is as follows: fuel and energy complex – 34.10 %; steel industry – 31.90%; building industry – 16.50%; community facilities – 3.80%; chemical industry – 3.60%; other – 2.60 %.

Such metallurgic plants, as Open Joint-Stock Company “AGMK”, State Concern “Kyzylkumredmetzoloto” and Uzbek Integrated Iron-and-Steel Works, happen to be the sources of air pollution with gaseous impurities and heavy metal aerosols. The Almalykskiy Mining-and-Metallurgical Integrated Works is contributing 30% of the total sulfur dioxide emissions in the Republic as a whole.

Such chemical industry enterprises, like “Navoiazot Production Association”, Almalyk “Ammofos” Production Association, Chirchik “Electrokhimprom”, Samarkand Chemical Factory and others, are responsible for polluting air with ammonium nitrate mist, nitrogen oxides, ammonia, phenol and organic solvents.

The building industry facilities, including cement factories in the town of Akhangaran, Kuvasai, Navoi and Bekabad, belong to the major sources of dust.

A general strategy of air quality management has been developed within the framework of the National Environmental Action Plan of the Republic of Uzbekistan which was used by the Government as the basis for adopting “The Environmental Action Programme in the Republic of Uzbekistan for the period of 1999-2005”.

This year the Republic of Uzbekistan will adopt “The Environmental Action Programme in the Republic of Uzbekistan covering the period of 2006-2010”.

In 2002, an air pollution index (API) above 5 (elevated level of air pollution) was reported in three cities, including Navoi, Tashkent and Fergana. Navoi with its large-scale enterprises of power engineering, chemical and building industries happens to be the most polluted city in the Republic.

Motor vehicles represent the main source of environmental contamination and air pollution, in particular.

Emissions from automobile transport are as follows: carbon oxide – 70 %, hydrocarbons – 13 %, nitrogen oxides – 8 % and other – 9 %. These percentages reflect cumulative contribution of pollutants from road transport.

Nearly 90 % of the total emissions of carbon oxide and above 60% of nitrogen oxides are contributed by automobile transport.

Certain physical environmental factors are also associated with health risk. It has been known for many years that ionizing radiation is hazardous to health. Recently radon and its decomposition products have turned out to be the cause of concern due to their accumulation in dwelling houses. Negative impacts of nonionizing radiation in ultraviolet band are also well known. Energetic efforts are being made now to study potential health hazard posed by electric and magnetic fields. An ever-increasing attention is being paid to health problems that might arise in the coming decades as a consequence of global warming and ozone layer depletion.

Air pollution is characterized by negative impacts on the natural resources, including animals and plants, and particularly on human health. A direct association between morbidity of the population in terms of major classes of diseases, on the one hand, and air pollution, on the other, has been established virtually everywhere. Annually, overall adult morbidity makes up 87984.59 per 100.000 population; overall adult mortality – 5.3 per 100.000 population; overall morbidity in children under 14 – 83759.72 per 100.000 population; infant mortality (under 1 year olds) – 16.4 per 1000 births.

To make an environmental air assessment in the Republic of Uzbekistan, air quality monitoring and emission measurements are performed at the industrial enterprises. The monitoring of air pollution emissions and air quality is based on allowable emissions and maximum permissible concentrations (MPCs) developed more than 6 years ago. They include short-term (20-30 min), daily average, monthly average, and yearly average concentrations of 457 harmful substances. In many cases these norms mismatch the WHO standards.

For reducing the emissions, it is necessary to develop emission abatement measures. These measures should be elaborated both for the whole Republic and for the industries contributing to pollutant emissions.

Further steps aimed at reducing pollutant emissions are as follows:

- Implementation of measures related to production and introduction of exhaust gas aftertreatment systems.
- Introduction of regulatory controls for car imports.
- Development of European-based domestic standards for exhaust fumes from newly-acquired motor cars and from those on-the-road.
- Introduction of automatic monitors along highways for air pollution level monitoring.
- Assimilation of the production of gas analyzers to exercise control over exhaust fume toxicity and opacity.