ENVIRONMENT in the City of BELGRADE 2010
ENVIRONMENT IN THE CITY OF BELGRADE

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Belgrade, our city, has a long and diversified history and a very rich natural heritage. It was founded on the confluence of the Danube and Sava, persisting throughout history and changing its inhabitants, look and magnitude ever since historians have marked its name as „Singidunum”. It was approximately 300 years B.C. The city has been expanding on the account of its green areas, using lavishly natural resources of the so-called „Beam of Sumadija”. Belgrade has overtaken its hills, valleys, and parts of the Pannonia plain. It has become a major international crossroad point, one among the most appealing urban environments of the European continent.

Belgrade is an area of high biodiversity and rich geological heritage that have been jeopardized by numerous anthropologic factors. The care for them and maintenance are an imperative of our civilian awareness and mutual responsibility we have for the generations to come.

We do not have sufficient information concerning the city’s natural heritage, the one important for living and surviving of humankind. Not even biological and geological diversity has been well known. Many a citizen has not had the opportunity to see them, get to know better the habitats within the city with rare species, or sites with important „minutes” of the Planet’s evolution – rocks and minerals of our environment.

Getting to know natural diversity of Belgrade is just a first step toward validation of the natural basis of sustainable development and lasting of the city’s ecosystem, central axis of biodiversity and geodiversity.

SEARCHING FOR GEODIVERSITY OF BELGRADE

There is an inseparable connection between biological and geological diversity; our planet is a unity of the living and inanimate environments. It has been functioning in harmony with the laws of nature.

Geological diversity is a reflection of the former biodiversity and its foundation today. It represents a diversity of geological and geo-morphological phenomena that had occurred through actions of inner and outer forces of the planet itself. It encompasses fossil remnants of flora and fauna, rocks and minerals of all kinds and all processes and phenomena that document major phases in the evolution of live and inanimate worlds. It also encompasses different periods of geologic history of our planet.

The wealth of geodiversity depends on the types of geologic processes that have occurred in certain moment on a certain soil.

Geological history has given Belgrade rich heritage: in the form of „inscriptions” in the rocks, from which we may find out what the space we have been living today had looked like several hundred million years ago. Geological heritage of our capital is present in the form of collections of minerals, rocks and fossils that are carefully stored and kept in the Museum of Natural History, School of Mining and Geology and other relevant facilities. An important part of the city’s geodiversity is also seen as buildings. Made from rock that had come from all over Serbia, these edifices represent a recognizable seal in urban architecture. Based on the fossils excavated from the rocks and on the very rocks of diverse composition, we may claim that geological history of Belgrade has covered the period of approximately 200 million years ago.

The above samples may be found in deep gorges, on the shores of our rivers and along the roads. In Mesozoic (251 to 65 million years ago), neogenic and post- neogenic (23 million years ago until today), this area had witnessed very complex tectonic processes. Oldest rocks in Belgrade and its surrounding are from Mesozoic (Jurassic-206 to 144 million years ago and Cretaceous-146 to 65 million years ago).

Most famous geological heritage from this period is the Tesic Mine (in the settlement of Ripanj, characterized by magma and sediment rocks originating from Cretaceous). Another site is the Masin Mine, located in the summer stage in Topcider. It was built from oceanic sandbank material of the Lower Cretaceous period.

Magma rocks and serpentine peridotites have used tectonic movements in order to surface over 100 kilometers. At the time of their creation, this environment had been witnessing the formation of rocks. Cretaceous rocks, most prominent among them, have been capturing fossils ever since. Such rocks are the foundation of Belgrade, with „younger” ones having been sedimented upon them afterwards.

Most important geoheritage objects are serpentinites and peridotites, found in Bubanj Potok (the settlement of Beli Potok). The rocks with above minerals and stones are oldest in the city and are visible on the surface.

In paleogenic time (65 to 23 million years ago), this area was dry again.
Therefore, we have no sea fossils originating from that time. In neogenoc (23 million years ago), the entire area had been covered by Pannonia Sea. When the sea had retreated, huge sediment findings remained in the entire area covered by what we today call „Belgrade“. These are clay of many sorts, sand, and conglomerate, cretaceous soil - all rich in fossils, shellfish, snails, algae - witnesses of the long and rich history of our city.

Most prominent geoheritage sites of the period are: geological profile in Veliko selo (older Miocene), the Kalemegdan Miocene sandbank, created from the material originating from the former Pannonia Sea; a unique remnant of the oldest stage of this sea - the Mediterranean stage; the Tasmajdan Miocene sandbank (also origination from the Pannonia Sea, with the status of protected natural heritage). The entire Kraljadjerjeva Street, leading to Zeleni venac has been built from littoral layers originating from the lake stage of the Pannonia Sea.

The quartar sediments (pleistocene - 2.5 million to 12 thousand years ago) also belong to the city geodiversity. River and lake marl, eolic sands and diluvial formations belong to Holocene period (starting from 12 thousand years ago and still lasting).

Most representative remnants of this geological period are the Zemun marl profiles (originating from Pleistocene), the marl profile of Kapela and an accumulative formation - the Veliko ratno ostrvo (which has been changing its shape even today - due to the slowing spot on the confluence of the Sava to Danube).

Various types of relief also make the geoheritage of Belgrade. In the relief of average height above the sea level of 132 meters, we can distinctively see the hilly region of Sumadija and wide Pannonia plain. Due to the rivers Sava and Danube and their aluvial layers, on which our city lies, we have the Belgrade Podunavje, and Zemun Posavina. In the hilly Belgrade Posavina, most interesting part is the confluence of Topciderska Reka: it has been cut into the „Beam of Sumadija“, the geological foundation of Belgrade. We may distinguish formations created by the Pannonia Sea wave activities and by the river erosion. Fossil meanders (still waters) are especially interesting - they have been transformed to arable land. The relief of Zemunska Posavina is rather simple: in its thick marl layers, we may see the relief created by river activity.

There are karst reliefs in Belgrade: they spread from Kosutnjak and Zarkovo (in the north) to Lisovic and Manic (in the south). We may see sinkholes, karst fens, salines and rare underground karst forms (caves and pits). The karst of Belgrade has developed in thin karst formations and that is the reason it has been threatened today.

Most prominent and famous types of karst relief in Belgrade is represented by a sinkhole. It is known under the name of „Rakina bara“ or „The Lake of Srem“, located in the settlement of Sremcica.

The Rivulet of Topcider (Topciderska reka) is the best representative of rare and interesting sample of our geoheritage. Its valley of karst composition hides numerous fossils. The Stream of Rakovica has source surrounded by bank rocks originating from the Pannonia Sea. Numerous mineral and thermal waters can be found near Belgrade, in the settlements of Ovcanodka banja, Visnjicka banja, the Miljakovac spring, etc...

Our geoheritage can be best seen in construction assignments and art. It is important to know that:

- the building of National Assembly has been built from kersantine (originating from Ripanj);
- the building of Main Post office was made from granodiorite originating from Boranja;
- St Mark Church, the Hall of Syndicate and decorative staircase of the Bridge of Branko were made from gray sandstone originating from Bele vode (near Krusevac);
- The street of Knez Mihailo was paved by the stone called „lablanicka gabra“. The same stone was used to erect the „Monument to the Unknown Hero“ in the Mount of Avala.

**Biodiversity in Belgrade**

Belgrade ranges among the areas of high biodiversity. It has remnants of natural habitats (big and small rivers and forests) and of semi-natural ones (meadows, fields). Moreover, it has great diversity of urban biotopes (housing zones, gardens, parks, industrial zones, traffic arteries, barren areas). At the same time, Belgrade is the center of immigration, import, naturalization and widening of exotic, sometimes, invasive species. Diversity and colorfulness are not evenly distributed in the tissue of the city. They are not visible or present throughout the year. There are plants that seem to vanish during winter; birds do migrate and numerous other animals find shelter to hibernate. The winters of Belgrade are rather cold. Other birds, like those who live in the North, come to our city in fall, leaving us again in spring. The origin of plants and animals living in Belgrade is diverse. Some species have been here forever. Dug in securely, they remain in the last oases of the former natural areas and are persistently fighting for their place under the Belgrade sun. They have been resisting the incessant ecological transformations of our city. Contrary to these, some species brought from afar and transplanted to the soil of Belgrade. Many of plants and animal spe-
cies have found new home under the Belgrade sun, being unexpectedly well “adopted” by the novel environment. In the paved streets of the city, ornamented with concrete buildings, numerous cave and canyon inhabitants have found new homes. The largest number of the species is pioneers, opportune settlers and intruders to this ground, profiting from the way we clumsily handle our natural heritage. That is how biodiversities of different cities become more and more alike.

The Belgrade biodiversity map contains the following:

- Parks, forest parks in the proper or greater area. Some of them are protected because of their biodiversity, or cradle valuable samples. Most important are: Avala, Akademski park, Kalemegdanski park, Banjicka suma, “Jevremovac” Botanical gardens, Zemun city park, Stepin lug, Miljakovacka forest, The Friendship and Peace Park, Pioneers’ Park, Veliko ratno ostrvo, Manjez Park, Tasmajdan, etc.
- Rare and interesting samples of trees predominantly having the status of protected natural goods are found in public and private gardens, promenades and parks. There are 48 protected trees in the area of Belgrade. Their representative looks and characteristics made the trees identified as “significant natural good”.
- Animal species which hide, move, travel by air and water: birds, fish, mammals, reptiles and amphibian animals and insects.

Diversity of the city has been largely changed.

The changes are essential, deep and have been of permanent character. When the city was founded, it occupied a small area in the strategic position of a rocky elevation, in the confluence of the rivers Sava and Danube. Walls and granges encircled it. Green, natural and woody areas were all around the city.

Today, the old fortress, a spot where the first settlement known as “Belgrade” lay, has been turned to a park with forest trees. Around the fortress, as far as the eye can see, we have residential and industrial zones...

This text is an excerpt from the “Guide to Bio Geo Diversity of Belgrade. It was created by an NGO “School for Survival”.

Goran Trivan B.Sc (Eng)
**CITY of Belgrade**

Belgrade is one of the oldest cities in Europe and is the largest urban centre in the Balkans after Athens. The oldest archaeological finds in the area date from the fifth millennium B.C. The historic site of Vinca, with its cultural artifacts dating from prehistoric man (Neolithic plastic arts) is located on the banks of the Danube. The city of Singidunum was established by Celtic tribesmen in the third century B.C. at the confluence of the Save and Danube, and the city is also mentioned by ancient sources. In the sixth century, Slavs made ever more frequent crossings of the Danube in order to settle permanently in the area. And so they built their first settlement, known as Beli Grad (White City), on a rocky outcrop overlooking the confluence of the two rivers. The name of Belgrade is mentioned for the first time in 878, and during its long and stormy history the city was occupied by 40 different armies and rebuilt from its ashes 38 times. From the 16th to the 19th century the city had numerous names in various languages, including Alba Graeca, Alba Bulgarica, Bello grado, Nandor Alba, Grie chisch Weissenburg and Castel bianco, all of which are translations of the Slavic word Beograd.

Belgrade has huge significance as a road and rail junction at the crossroads of eastern and western Europe, as well as being an international river port, airport and telecommunications centre. It comprises 3.6% of the territory of Serbia, is home to 15.8% of the population of the country and 31.2% of the employed population of the republic work there.

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Facts about BELGRADE

Status:
Capital of the Republic of Serbia, having city status as a separate territorial unit, and with its own local government bodies

Administrative divisions:
- 17 city municipalities, each having their own local government

Geographic position:
- Southern Europe, on the Balkan peninsula, West Balkan
- At the confluence of the rivers Sava and Danube, between the Panonian Plain to the north and the mountainous central region of Serbia known as Sumadija to the south; also the location of Mt. Avala (511 m) and Mt. Kosmaj (628 m)

Map coordinates:
- Latitude north: 44°49’14”
- Longitude east: 20°27’44”

Average height above sea level: 116.75 m

Area: 3,222.68 sq. km

Climate:
- Mean annual air temperature: 11.7 °C
- Moderate continental
- Mean annual rainfall: 669.5 litres/m²
- Mean atmospheric pressure: 1,001 millibars
- Mean relative humidity: 69.5%

Population: 1,732,400 (2005 figure)

Religion: Orthodox Christian 90.68%, Islam 1.29%, Catholic 1.03%, Protestant 0.24%, Jewish 0.03%, atheist 3%, unknown 2.02% (2002 census)

The City of Belgrade: www.beograd.rs
**CLIMATE**

**The 2007 Data**
Belgrade and its surroundings have moderate continental climate, with average annual temperature of 14°C. December is coldest month, with -5.1°C (average minimum temperature being 9.7°C). July is warmest, with 25.8°C. Maximum temperature recorded in July 2007 was 43.6°C. There were 44 days with tropical temperature during 2007. There were 103 summer days, 16 days with frost and 14 days with ice.

The average annual precipitation was 839.0 mm. Greatest quantity of rainfall was recorded in November - 131.5 mm and June - 107.6 mm. There were 136 rainy days; 15 days with snow and sleet. Maximum height of snow was 16 cm. Average annual relative humidity was 64%. April has the smallest humidity (average relative humidity being 45%).

Greatest humidity was recorded in December - 83%. Average value of air pressure was 1001.1 mbar. In December, it was 1008.6 mbar. During the year, there were 80 clear days (greatest number being recorded in April - 18 and July - 18). There were 91 murky days (14 in October and 21 in December). Mean velocity of the wind during the year was 2.3 m/sec.

**HISTORY**

Singidunum, Singedon, Nandor fehervar, Nandor Alba, Alba Graeca, Grieschisch Weisenburg, Misir of Rumelia, Dar ul Jihad, Fichirbair, the Hill of Battle and Glory, The House of Freedom, The Gate of East, the Gate of West... these are but a few names denominating Belgrade, pointing to its fervent past, starting from the third century B.C. It was then founded by the Scordisc tribes, on the confluence of the Danube and Sava. Belgrade ranges among oldest cities in Europe; its history has been lasting for over 7,000 years. Its archeological findings have dated from 5. millennium B.C. Members of the Celtic tribe founded Singidunum in the third century B.C. The city was first mentioned in 878 A.D.

During its long and turbulent history, Belgrade was target of many conquerors. Thirty-eight times it rose from the ashes. Romans conquered it in the beginning of the new era and have remained in it for the next four centuries. Numerous tribes have fought to conquer it: the city at the crossroads of worlds- Byzantine warriors, Huns, Geppids, Sarmatians, Eastern Goths, Slavic tribes, Avars, Franks, Bulgarians, Hungarians... It was so until the 13. Century A.D., when Belgrade became a part of the Serbian state. During the reign of Despot Stefan Lazarevic, in 1403, it become the capital and witnessed material and cultural peak. The Turks invaded it in 1521, remaining in it until April 19, 1867, with several short breaks. The keys to the Belgrade Fortress were then given to the Serbian Prince Mihailo Obrenovic. During the First World War, since the autumn of 1915, it has been under occupation of the Austrian-Hungarian army. In the Second World War, from April 12, 1941 to October 20, 1944, the city was under occupation of the Nazi Germany. Special encyclopedia of the cities, issued in Great Britain, claims that Belgrade is the city with greatest number of battles in its history. On the walls of the fortress, the city was witness to 114 major disputes and the loss of more than six million people. Archeological sites witness that the settlements in the area of the today’s Belgrade have existed in Early Neolithic times, five thousand years B.C., near Belgrade. The widest disseminated culture of Europe was dubbed after Vinca, the archeological locality. Today, Belgrade ranks second (to Athens) urban agglomeration in the Balkans. It is the capital of Serbia, of its culture, education and science. Numerous institutions of national significance have been situated in Belgrade: Serbian Academy of Arts and Sciences, founded in 1886 (as the Serbian Royal Academy); National Library of Serbia (founded in 1832), the national Museum (founded in 1844) and the National Theater (founded in 1868). The city is also a residence of Belgrade University (founded in 1808 as High School), and of the University of Arts.

Most important architectural heritage is in Belgrade, Kalemegdan with the Fortress, numerous monuments of culture and other types of cultural goods, archeological localities with material remnants, witnessing of a supreme civilization and culture on the grounds of the city, from prehistoric times to the present day.
In the territory of the city, forests occupy 13,513 hectares. Forest Holding “Beograd” within Public Utility “Srbijasume” has been entrusted to care for them; Most prominent sorts of trees are ash, oak, beech, maple and black locust. In the proper area of the city, there are 19 parks-forests, covering 732.50 hectares. The Forest of Zvezdara, Kosutnjak and Banjicka Forest are most famous.

First Public Park was built in 1860, on the corner of two streets (Kneza Mihajla and Nemanjina). It was dubbed “The Park of Finances”. Regulation of green areas There are 64 public parks in the city, covering the area of 358.51 hectares. Kalemegdanski park, Topciderski park, Tasmajdanski park and the Park of Friendship are most famous. Public Utility for the maintenance of green areas “Zelenilo Beograd” has been taking care of the parks-forests and of additional 2,236.42 hectares of public green areas, 67,063 trees in rows and 2,474 jardiniere pots with seasonal flowers.

City ADMINISTRATION

The City Administration performs an administrative role within the framework of the powers and responsibilities delegated to the City, as well as certain professional functions required by the City Assembly, the Mayor and the City Council.

Departments:
- Finance Department
- Town Planning and Building Projects Department
- Public Works and Housing Department
- Property Rights and Building Inspection Department
- Traffic Department
- Environmental Protection Department
- Commerce Department
- Culture Department
- Education Department
- Sport and Youth Department
- Health Department
- Social and Children’s Welfare Department
- Inspections Department
- Administration Department

Professional services:
- Assembly Business and Regulations Service
- Information Service
- General Affairs Service
- Service for Communications and Citizen Relations
- Public Procurement Service
- City Assembly Chairman’s Office
- Mayor’s Office

Special Organizations:
- Institute for IT and Statistics
- Belgrade City Commercial Premises Agency
- Budget Audit Office
- Agency for Cooperation with Non-governmental Organizations and European Harmonization
City public COMPANIES AND INSTITUTIONS

The City of Belgrade has founded the following: 10 public service companies, seven public companies, one organization, 34 cultural institutions (theatres, cultural centres, museums, libraries and other organizations), 27 health institutions (local health centres, pharmacies, institutes and medical centres), 17 child welfare institutions (pre-school centres), three social welfare institutions and three physical culture institutions (sports centres).

Public service companies:
- Belgrade City Transport Company (www.gsp.co.rs)
- Belgrade Roads public service company (www.beogradput.org.rs)
- Belgrade Waterworks and Sewage public service company (www.bvk.co.rs)
- Belgrade Power Stations public service company (www.beoelektrane.co.rs)
- City Markets public service company (www.bgpijace.co.rs)
- City Hygiene public service company
- Infostan public service company (www.infostan.co.rs)
- Belgrade Parks public service company (www.zelenilo.co.rs)
- Parking Service public service company (www.parking-servis.co.rs)
- Funeral Services public service company (www.beogradskagroblja.co.rs)

Companies and organizations:
- Belgrade City Construction Land and Building Directorate (www.beoland.com)
- Belgrade Town Planning Office (www.urbel.com)
- City Housing (www.stambeno.com)
- Sava Centre (www.savacentar.com)
- Ada Ciganlija (www.adaciganlija.co.rs)
- Belgrade Fortress (www.beogradskatvrdjava.co.rs)
- Studio B Public Radio Broadcasting Company (www.studio-b.co.rs)
- Belgrade Tourist Organization (www.tob.co.rs)

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27. marta 43-45, switchboard 3227-241
Kraljice Marije 1
Tirsova 1, switchboard 2688-655
Golsvordijeva 35, switchboard 3083-800
Masarikova 5, switchboard 3614-500
Makenzijeva 31, switchboard 2453-142

photo: nebojša čović
INTRODUCTION
Secretariat for the Environment performs assignments related to the protection and promotion of the environment as defined by relevant legislation: Decision related to the City Administration (Official Gazette of City of Belgrade No 51/08, 61/09, 6/10, 23/10 i 32/10) and other Serbian documents as primary work assigned to the City by Republic of Serbia.
Activities and work of the Secretariat for the Environment has been organized within four sectors as it follows:

1. Sector for monitoring of the quality of the Environment: the quality of environment is and was preformed by examining and monitoring the media of the environment, analytical and other professional jobs, annual programs for monitoring of Air pollution, public fountains/water springs, quality of river waters, bathing areas Lake Savsko jezero, Lido, soil, measurement of communal noise, level of radioactivity and UV index. Inside this Sector have been formed Department for monitoring, protection and from accidents and preventive protection.

2. Sector for management of Protection of Environment: works on regulatory issues, administrative and legal documents, standards and control of operational programs, for the protection of environment.

3. Sector for environmental protection works on surveillance of enforcement of legal obligatory issues and other aspects of implementing and respecting regulations in the field of environmental protection.

SECTOR FOR MONITORING OF THE QUALITY OF THE ENVIRONMENT

1. Control of the quality of environment in Belgrade

The assignment has been realized through annual programs, with the exception of Ambient Air Quality Program, which is adopted for bi-annual period. The latter is adopted and approved by the Belgrade City Assembly. In 2010, and 2011, the Ambient Air Quality (Official Gazette of the City of Belgrade, no 40/07).

During 2010, regular control of the quality of environment was performed by examining and monitoring the following:

- The quality of river waters of the Sava, Danube, Kolubara, Golovica Canal and of 20 minor water streams; quality of other canals, retentions and of the Sava Lake, Lido bathing area and locations under the Mt. Avala (Panguz, Bela Reka and Duboki Potok).
- The quality of drinking water, produced in central and local waterworks
- The level of communal noise, during the day and night, at 30 measuring spots
- The degree of pollution of agricultural (arable) land in the zones of sources of drinking water and along the traffic arteries, at 30 spots
- The level of radioactivity in the environment (air, water, rainfall, river water, drinking water, soil, foods, animal feed).

Individual annual programs encompass control of the quality of environmental media. They also define the scope and type of examinations and grading of environmental indicators.

Regular control of the quality of environment is performed by authorized, accredited facilities: Institute
of Public Health of Belgrade, Serbian Institute of Public Health “Dr. Milan Jovanovic- Batut” and Clinical center of Serbia- Institute for Occupational Radiological Health “Dr. Dragomir Karajovic”.

The results of all examinations have been published monthly in “Ecological Bulletin”. Once a year, on June 5, the World Environment Day, the Secretariat issues a publication on environment quality.

Indicative and targeted measurements in the environment have started in 2010, as the part of greater efficiency of the Sector for environmental Inspection. Indicative and targeted measurements of communal noise were performed at 170 locations, while indicative measurements of air pollution were performed at 7 sites.

Indicative and targeted measurements of radon in preschool objects and in schools were performed as a preventive action in protection of the health of the youngest and vulnerable population. Measurements were from August to November 2010, in 75 object each 35.

Monitoring of UV index at the location of recreational area Ada Ciganlija was set up in 2010, as the result of need to inform the population about the preventive measures to protect their health from UV radiation which is proved to have negative effects to skin causing skin cancer.

2. Eradication and control of pest population

In 2010, the program dealt with eradication and control of mosquitoes, ticks and rodents in the territory of 17 municipalities of the city.

Mosquito Control was realized by control of the larvae, adult and domestic forms of these populations, in the campaigns that have been continuously organized from March to November.

Tick control was realized through control and follow-up of the occurrence and activities of the tick populations in green areas of the city. This has been done through campaigns performed between June and July and September-October.

Rodent control encompassed systematic placing of rodenticides in housing and dwelling areas with poor hygiene, in partially regulated or completely unregulated free and littoral areas, in Ada Ciganlija and Ada Huja. Rodenticides were used in two campaigns, in spring and autumn.

3. Local register of pollution emission sources to the Environment on the territory of Belgrade I PHASE

4. Pilot project of noise protection from river raft night life

In 2010, there were done some examinations in order to reduce the noise coming from river rafts during night hours.

5. Project of determining acoustic zones in Belgrade

Project started in 2010. godine and is still going on.

SECTOR FOR PLANNING AND MANAGEMENT OF PROJECTS

Sector for Planning and Management of projects has been performing management of projects within the legal frame and its responsibilities.

1. Program on Environmental protection on the territory of Belgrade is at the beginning and will be the Document which will give historical qualitative and quantitative data on the state of environment, it will also give recommendations and directions for the future activities in this field. Project is running.

2. Program of removal of Radioactive Lightning Rods has been running for the last 10 years and has come to its completion.

3. Programs and projects of greening of Belgrade in order to renew devasted areas this program is dealing with bringing green belts, grass and other green surfaces.

4. Project of „Inventory of green Areas in Belgrade”

In 2010 we continued the Project, in order to create a comprehensive system for registration of the existing green areas and put them into function in compact territory.

5. Preservation of Natural Forest Ecosystems. Their Restoration in the Littoral Area of the Rivers Sava and Danube in the Belgrade Area. Validation of their Ambient and Recreational Value”

The Project is running and its aim is to analyze the existing environmental situation. To collect different types of the data (aerial shots, maps of the forest bases, field reports). And also to list and register the existing ecosystems, defined environmental conditions, climate, periodic flooding of the foreland, physical-chemical characteristics and vegetation.

The Study has been planned to last two years.

6. Project „Monitoring of microbiological activity of forest soil” in order to examine presence of soil microorganisms as indicators of quality of the environment. The examination has been done in Belgrade forests.

7. Examination of pollutants in forest ecosystems of protected natural good mountain Avala

Project is going on focused on heavy metals in plants.

8. Project of remediation of area of endangered environment of river Bolecica into the river Danube) – According to the Study performed on the parameters giving information on the state of the area Secretariat started the Project of remediation and sanitation of this river and environment.
9. Project “Toxic Elements and Pesticides in Agricultural Land and Plants Produced in Belgrade Area” Project was completed there is now a comprehensive database on environmental pollution in the city. Preconditions now exist for a more rational use of pesticides in agriculture.

10. Project “Research and Rehabilitation of the space of Ada Huja in Belgrade” - This is a three years project realized with the Ministry of Protection of Environment. The results were presented after it was completed in December 2010.

11. Project “Radioecological research of healthy environment” – in 2010, we continued with this research specially in agricultural areas.

12. Work on uniform Programme of management with water resources in the territory of Belgrade - “Blue Regulation” – strategic program of management with water resources and their protection in the frame of (WFD - Water framework Directive EU2000/60/EC).

13. Adequate Concept of Integrated Waste Water Management (priority is territory of Belgrade) the objective is to define adequate standards and parameters for the documentation in order to choose technology of waste water treatment.

14. Construction of waste water management in order to protect park- forest „Avala“. At present in 2010, the work is completed and its under the Public Utility JKP „Vodovod i kanalizacija“.

15. Local Plan of Waste Management for the Territory of Belgrade this Local Plan is managed by Secretariat for Environmental Protection of Belgrade. It is the basis for the future management of waste and will be done through intersectoral cooperation.

16. Projekat „Waste Oils Management in the territory of Belgrade“, it will serve as indicator for monitoring the state of pollution by these substances in Belgrade and as well as the basis for future control.

17. Projekat „Mangement of waste of fluorescent rods containing Mercury“ it is planned to make inventory of rods with Mercury in order to make adequate plan for management to stop uncontrolled pollution of soil and underground waters.

18. Project for cleaning the Air in Terazijan tunel the aim of this project is to protect air from heavy pollution from traffic.

19. Project „Inventory of Septic Tanks in Belgrade“ the Project started in 2009 and is still going on. The inventory will cover the statements that do not have sewerage system. Another step will be the definition of activities for an adequate system of collection, channelling and purification of the communal wastewater in this area.

20. Project “Remediation of Wastewater Collectors in Padinska Skela“ The Secretariat provided financial support for the Municipality of Plilula fro the above project. The project was finished in 2010.

21. Project „Ecological state, sources of pollution, analysis of river Veliki Lug from its spring in Sopot to bridge Jafnjilo in Municipality Mladenovac“ this project task is to collect data on which it will be possible to make proposal for project for remediation.

22. Project of how to use alternative energy resources Use biomass for heating the schools it was applied in one preschool object kindergarten „Sveta Petka“.

23. „Inventory and its innovation for water objects in Belgrade with digital map data” term objective is to establish new basis for valuing resources of underground waters.

24. Project of “Raising the awareness of population about importance of protection of environment” together with NGO “My City is White City” was the Topic for Public Competition in 2010. We received 107 applications from which we supported 57 projects.

**Sector for Management of Protection of Environment**

Work done in this sector is defining Mesures and Conditions to Protect the Environment for the Needs of Spatial and Urban Planning.

1. Strategy of Afforestation of the Belgrade Area Purpose of The Strategy is to provide basis for new forest plants what would increase forest resources by 6%. This way we should create preconditions for a complete promotion of the environment and development of other activities related to better utilization of those resources.

2. Management of Protected Natural Goods
   - preserving the valuable monuments, protecting and promoting, as well as utilizing them have been realized through relevant management plans,
   - defining proposals and decisions about financing plan and programs for management of protected natural goods,
   - giving permits for plans and programs for their protection,

3. Project of revitalization of “blue-green corridors” in territory of Belgrade

4. Work on defining the conditions and protection of environment
in spatial and urban plans and other legal documents for construction of objects
Analysis and evaluation of requests for measures for protection of environment for spatial and urban planning.
5. Auditing and giving permits for strategic EIA
6. Giving permits for management with waste

Legal and Law matters: Legal and Law issues are concerned with normative, and standards, enforcement of regulation and other acts and documents in connection to protection of environment.

7. Economic issues:
Realization of Economic matters in connection with budgeting of work done in Protection of Environment
8. Documentation and Administrative issues

SECUTOR FOR INSPECTION AND SURVEILLANCE
The Sector controls application and realization of the legal provisions and regulations in the area of environmental protection.

Priorities in the work
In 2010, inspector for environmental control focused on the following:
- sources of nonionizing radiation of special interest: control of basic mobile station, land and wireless telephones, internet providers,
- control of efficiency of purifying systems of waste waters,
- control and state of the art of protected natural goods,
- control of sources and objects generating waste,
- control of management with inert and nonhazardous waste,
- control of registered boilers room,
- measurement and control of noise in public places.

Other activities
Besides above mentioned which are regular there are other activities in which inspectors are taking active part, such as:
- being members of different commissions,
- working on inventories,
- forming data basis in areas of interest for the environment protection,
- taking active part in writing action plans and remediation plans,
- working together with other inspectors and on the level of Republic,
- taking active part in seminars, workshops and trainings,
- working with NGOs,
- preparing information of importance for Public, media and etc.

EMPLOYEES OF THE SECRETARIAT FOR THE ENVIRONMENT

1. Trivan Goran - Secretary
2. Dragoslav Budimirović - Deputy secretary
3. Jevtić Ivana - Coordinator
4. Sretković Mirjana - Technical Secretary

Sector for monitoring of the quality of the Environment
5. Grubačević Marija - Assistant Secretary

Department for monitoring, protection accidents and preventive protection
6. Radić Vukčević Olivera - Section Head
7. Mijić Radomir
8. Petrušić Nataša

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9. Đokić Nataša - Section Head
10. Biljana Glamočić
11. Popović Zorica

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12. Abramović Filip - Section Head
13. Jasmina Vučenović
14. Višnjevac Vesna

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15. Gucić Mirjana - Assistant secretary

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16. Bujas Milena - Section Head
17. Marković Dragana
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20. Đorđević Aleksandar
21. Košpić Sanja

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22. Novaković Slavica - Section Head
23. Jovanović Maja
24. Obradović Magdalena

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25. Radojičić Zelić Andreja - Section Head
26. Mirjana Milivojević
27. Verica Rakočević
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35. Biljana Krvavac
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38. Sežana Jelić
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41. Radoš Nedeljković
42. Snežana Hinić
43. Vladimir Petrović
44. Marko Molić
45. Krajičinović Suzana
46. Jelena Đorđević
47. Milica Zapletić

Department for surveillance in nature, and management of waste
48. Mirjana Ružić - Section Head
49. Radoš Nedeljković
50. Snežana Hinić
51. Vladimir Petrović
52. Marko Molić
53. Krajičinović Suzana
54. Jelena Đorđević
55. Daliborka Radulović

Department for surveillance, of ambient air and communal noise
48. Ljubinka Jovanov - Section Head
49. Vesna Radojčić
50. Vesna Miljenković
51. Aleksandra Popović
52. Rajko Stolica
53. Ljiljana Reljić
54. Jovica Delić
55. Daliborka Radulović
Air Quality Control - Objectives
Systematic, program-based measuring of air pollution on the territory of Belgrade, with the following objectives:

- monitoring of the degree of air pollution in relation to imission limit values (ILVs);
- undertaking preventive measures in the segments which are important for the protection of air quality from pollution;
- informing the public and defining recommendations for individual behavior in cases of episodes of increased air pollution;
- monitoring of concentration trends, by city zones;
- assessment of population exposure;
- identification of the sources of pollution or risk;
- evaluation of long-term trends; and
- analysis of the measures undertaken to prevent air pollution.

Legal basis
The legal basis for adoption of the Program of Air Quality Control in the area of Belgrade, Serbia has been contained in the Law on Environmental Protection, Law on Air Protection, Decree on Conditions on Monitoring of Air Pollution and Data Quality Objectives. Therefore, the authorities of Belgrade are obliged by law, within their competence, to provide continuous control and monitoring of the environment. A systematic measuring of imissions included in the Program, have been performed through monitoring networks set up in urban territory of Belgrade.
**PARAMETRI QUALITETA VAŽUHVA**

1. SO₂, NO₂, ČAD, TT, PAU, AS, PO3  
2. SO₂, NO₂, ČAD, TT, PAU, AS, SC  
3. SO₂, NO₂, ČAD, TT, PAU, AS  
4. SO₂, ČAD, TT, PAU, AS  
5. SO₂, ČAD, TT, PAU, AS, SC  
6. SO₂, NO₂, ČAD, PAU, AS, SC  
7. SO₂, NO₂, ČAD, SC  
8. SO₂, ČAD, AS  
9. NO₂

**TT**  - Tenk i toksični metali

**PAU**  - Poludijelovi aromatski ugljovodonici i 3.4 benzopirjen

**AS**  - Aerosediment

**SC**  - Suspendovane čestice

**PO3**  - Poznati cancer

**SD**  - Sumpordioksid

**NO**  - Azotdioksid

-INSTITUTE OF PUBLIC HEALTH OF BELGRADE

AGENCY FOR CITY BUILDING LAND  
AND DEVELOPMENT OF BELGRADE

AIR  
Map 31  

Beograd, 2002
Main pollutants in ambient air, of interest in an urban setting, in the present air quality monitoring network of Belgrade have been presented in Table 1. The group of substances, widespread in ambient air, has been selected because of their impact on human health. Additional increased attention has been paid to air toxics such as PAHs, acid aerosols and BTEX.

Table 1 Belgrade: Main pollutants in ambient air that have been monitored

<table>
<thead>
<tr>
<th>Ambient air</th>
<th>Gas components</th>
<th>SO\textsubscript{2}, NO\textsubscript{X}, NO\textsubscript{2} – 24-hour averages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O\textsubscript{3} – 24-hour, 4 and 8- hour averages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CO – 30 minute, 1 hour, BTEX 1- hour and 24- hour averages</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solid phases in the air</th>
<th>PAH – 3,4 benzo-a-pyrene (BaP) – averages per month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soot, total deposited matter – 24-hour averages</td>
</tr>
<tr>
<td></td>
<td>SPM (mass conc.) mass concentration, 24-hour averages 7-day sampling interval</td>
</tr>
<tr>
<td></td>
<td>Pb, Cd, Zn, Mn, Ni, Hg, Cr – averages per month</td>
</tr>
</tbody>
</table>

Methodologies of Air Monitoring

The local urban air quality network consists of 18 stationary measurement sites. These sites cover the territory according to the above mentioned objectives. Nowadays, since 2002, up to 2008, the existing air monitoring network was upgraded with six automatic analyzers (Horiba AP-360, series APNA-NOX, APSA-SO\textsubscript{2}, APMA-CO, APHA-total hydrocarbons). In order to fulfill the ISO 17025 requirements, we have also obtained measurement devices for sampling SPM\textsubscript{2.5} and SPM\textsubscript{10}, PM\textsubscript{10} (EN 12341), PM\textsubscript{2.5} and BTEX Analyser – type airmo BTX 1000.

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter*</th>
<th>Number of stations</th>
<th>Principle of measurement</th>
<th>Sampling period</th>
<th>EU Directive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SO\textsubscript{2}/soot</td>
<td>18/19</td>
<td>UV fluorescencion/ reflektometar</td>
<td>continuous</td>
<td>1999/30/EC</td>
</tr>
<tr>
<td>2</td>
<td>NO\textsubscript{2}/NO\textsubscript{X}</td>
<td>13</td>
<td>hemiluminiscencion</td>
<td>continuous</td>
<td>1999/30/EC</td>
</tr>
<tr>
<td>3</td>
<td>O\textsubscript{3}</td>
<td>2</td>
<td>UV absorption</td>
<td>continuous</td>
<td>2002/03/EC</td>
</tr>
<tr>
<td>4</td>
<td>CO</td>
<td>2</td>
<td>not disperziv infrared spectrofotometry</td>
<td>continuous</td>
<td>2000/69/EC</td>
</tr>
<tr>
<td>5</td>
<td>PM\textsubscript{10}</td>
<td>4</td>
<td>absorption of β radiation</td>
<td>continuous</td>
<td>1999/30/EC</td>
</tr>
<tr>
<td>6</td>
<td>SPM\textsubscript{2.5}</td>
<td>10</td>
<td>gravimetry</td>
<td>daily (24 h)</td>
<td>1999/30/EC</td>
</tr>
<tr>
<td>7</td>
<td>PM\textsubscript{10}</td>
<td>0</td>
<td>gravimetry</td>
<td>daily (24 h)</td>
<td>1999/30/EC</td>
</tr>
<tr>
<td>8</td>
<td>BTEX</td>
<td>2</td>
<td>GC - FID</td>
<td>continuous</td>
<td>2000/69/EC</td>
</tr>
<tr>
<td>9</td>
<td>VOC\textsuperscript{2}</td>
<td>1</td>
<td>sampling on solid adsorb / GC - FID</td>
<td>daily (24 časa)</td>
<td>2000/69/EC</td>
</tr>
<tr>
<td>11</td>
<td>Heavy\textsuperscript{2} metals (As, Cd, Hg, Ni)</td>
<td>11</td>
<td>gravimetry - PM10 /AAS/ICP</td>
<td>daily (24 h)</td>
<td>2004/107/EC</td>
</tr>
<tr>
<td>12</td>
<td>PAH/BaP</td>
<td>11</td>
<td>gravimetry - PM10/ GC - MS</td>
<td>daily (24 h)</td>
<td>2004/107/EC</td>
</tr>
</tbody>
</table>

AMBIENT AIR QUALITY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean annual value of sulphurdioxide in 2010. was below LV of 50µg/m\textsuperscript{3}. 4 days were registered over LV* (125 µg/m\textsuperscript{3})</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO\textsubscript{2}</td>
<td>Mean annual value of soot in 2010. was below LV of 50 µg/m\textsuperscript{3}. 139 days were registered over LV (50 µg/m\textsuperscript{3})</td>
</tr>
<tr>
<td>Soot</td>
<td>Mean annual value of nitogendioxide in 2010. was below LV of 40µg/m\textsuperscript{3}. 152 days were registered over LV(85µg/m\textsuperscript{3})</td>
</tr>
<tr>
<td>NO\textsubscript{X}</td>
<td>Mean annual value of airsediment in 2010. Was over LV of 200mg/m\textsuperscript{3} dan at 8 mesurement sites out of total 22.</td>
</tr>
</tbody>
</table>
Obtained results of benzo(a)pyren (BaP) in 2010 show the BaP-a concentrations over target value (TV) at all measurement sites. Mean annual value was in range from 1.13 ng/m³ to 19.62 ng/m³.

Specific airborne substances from industries

The results show the presence of substances specific for the technological processes, with concentrations which were over LV from time to time, due to the emissions from the process.

Maximum yearly concentration

Maximum concentrations in 2010 were as follows: Soot 219 µg/m³ for sulphur dioxide 131 µg/m³ and for nitrogendioxide 382 µg/m³.

Suspended particulate PM₁₀ <10 mikrona

The results of measuring PM₁₀ at 14 sites show that they were over LV 40 µg/m³ at 13 measurement sites. Daily LV was exceeded in 431 measurements. Margin of tolerance (TV 75 µg/m³) was exceeded 192 measurement.

1. Annual Mean concentrations of SO₂, black smoke and NO₂ at four measurement sites in Belgrade u µg/m³

2. Average Number of days exceeding LV per location in Belgrade

3. Maximum annual concentrations registered in Belgrade

SO₂ – detection limit of applied method 10 mg/m³

* SO₂ automatic monitor; Ø = not measured

* expressed in µg/m³
Mean annual and Seasonal values of SO₂ in Belgrade in 2010.

Mean annual and Seasonal values of NO₂ in Belgrade in 2010.

Mean annual and Seasonal values of PM10 in Belgrade in 2010.
AIR POLLUTION PRODUCED BY THE SUBSTANCES ORIGINATING FROM MOBILE SOURCES

<table>
<thead>
<tr>
<th>Substance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>All mean annual values of carbon monoxide at all measurements sites were over ILVy (3.0 mg/m³). Concentrations are higher during winter due to low temperature and higher RH.</td>
</tr>
<tr>
<td>NO₂</td>
<td>All mean annual values of nitrogen dioxide at all measurements sites were over ILVy (40.0 µg/m³).</td>
</tr>
<tr>
<td>Pb</td>
<td>All mean annual values of lead at all measurements sites were over ILVy (0.5 µg/m³).</td>
</tr>
<tr>
<td>VOC</td>
<td>Concentrations of VOC do not have AQS but in urban environment their emission from traffic is approximately 60 - 70%.</td>
</tr>
<tr>
<td>SO₂</td>
<td>All mean annual values of sulphur dioxide at all measurements sites were over ILVy (50.0 µg/m³).</td>
</tr>
<tr>
<td>BTEX</td>
<td>There are no AQS for the mixture of these concentrations on National level.</td>
</tr>
</tbody>
</table>

Measuring of all parameters has been performed at 16 intersections in Belgrade from January to December 2010. Measurements were twice a month, at 12 intersections and at 4 intersections four times a month. Most endangered zones of the city are the central one and transition route, where we have seen elevations of concentrations of all pollutants. This is explained by the traffic structure and types of vehicles using these routes.

According to the results it is possible to recognize five “zones” in the city:

- **ZONE I** central city zone (the locations of London, Nusiceva Street, Federal Assembly and Zeleni venac (green market))
- **ZONE II** transit city zone (Cvijiceva, Railway Station, Mostar, Pancevaki most)
- **ZONE III** old city squears (Slavija, Vukov Spomenik)
- **ZONE IV** wider city zone (City Hospital, Karaburma, Autokomanda, Banovo Brdo)
- **ZONE V** territory across the Sava river (Novi Beograd and Zemun)

Let us stress that differences in concentrations of the pollutants have not been significant. The narrow city core has directly been jeopardized by the intersections. The data also stress the impact of meteorological conditions, which directly influence the spread of pollutants.

RADIOACTIVITY IN THE AIR

Table 1. Intensity of the absorbed dose of gamma irradiation in the air was in 2010 within the intervals of 74 to 143 nSv/h, with mean annual value of 83.6 ± 0.9 nSv/h. This corresponds to the limits of change of the natural radiation in the air.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma irradiation</td>
<td>Intensity of the absorbed dose of gamma irradiation in the air was in 2010. within the intervals of 74 to 143 nSv/h, with mean annual value of 83.6 ± 0.9 nSv/h. This corresponds to the limits of change of the natural radiation in the air.</td>
</tr>
<tr>
<td>¹³⁷ Cs in the air</td>
<td>Activity of ¹³⁷ Cs in the air was low in 2010.</td>
</tr>
<tr>
<td>¹³⁷ Cs in precipitation</td>
<td>The values of ¹³⁷ Cs were below the detection limits.</td>
</tr>
</tbody>
</table>

**Table 2. Annual Values of intensity of absorbed dose of gamma radiation in the Air in Belgrade 2010. (nSv/h)**

<table>
<thead>
<tr>
<th>Minimum annual value</th>
<th>Mean annual value</th>
<th>Maximum annual value</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>83.6 ± 0.9</td>
<td>143</td>
</tr>
</tbody>
</table>

**Table 3. Specific Activity of ¹³⁷ Cs in the Air in Belgrade in 2010. (mBq/m³)**

<table>
<thead>
<tr>
<th>Minimum annual value</th>
<th>Mean annual value</th>
<th>Maximum annual value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.2</td>
<td>0.78 ± 0.39</td>
<td>1.8 ± 0.3</td>
</tr>
</tbody>
</table>
Table 4. Specific Activity of $^{7}$Be in the Air in Belgrade, measurement site Karađorđev park 2010. (mBq/m$^{3}$)

<table>
<thead>
<tr>
<th></th>
<th>Minimum annual value</th>
<th>Mean annual value</th>
<th>Maximum annual value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.23 ± 0.08</td>
<td>3.5 ± 1.5</td>
<td>5.65 ± 0.35</td>
</tr>
</tbody>
</table>

Results on measurement of specific activity of rainfall in Belgrade in 2010.

Table 5. Specific Activity of $^{90}$Sr in rainfall in Belgrade in 2010. (Bq/m$^{2}$)

<table>
<thead>
<tr>
<th>Measurement site</th>
<th>Karadordev park</th>
<th>Zeleno brdo</th>
<th>Lazarevac</th>
<th>Obrenovac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum annual value</td>
<td>&lt; 0.19</td>
<td>&lt; 0.02 ± 0.01</td>
<td>&lt; 0.18</td>
<td>&lt; 0.18</td>
</tr>
<tr>
<td>Mean annual value</td>
<td>1.2 ± 1.1</td>
<td>0.26 ± 0.36</td>
<td>0.86 ± 0.60</td>
<td>1.18 ± 0.90</td>
</tr>
<tr>
<td>Maximum annual value</td>
<td>3.61 ± 0.20</td>
<td>130 ± 0.04</td>
<td>2.18 ± 0.16</td>
<td>2.88 ± 0.18</td>
</tr>
</tbody>
</table>

Table 6. Specific Activity of $^{7}$Be in rainfall in Belgrade in 2010 (Bq/m$^{2}$)

<table>
<thead>
<tr>
<th>Measurement site</th>
<th>Karadordev park</th>
<th>Zeleno brdo</th>
<th>Lazarevac</th>
<th>Obrenovac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum annual value</td>
<td>17.9 ± 3.2</td>
<td>3.88 ± 0.687</td>
<td>&lt; 2.7</td>
<td>&lt; 3.2</td>
</tr>
<tr>
<td>Mean annual value</td>
<td>58 ± 40</td>
<td>35 ± 58</td>
<td>15.9 ± 9.6</td>
<td>21 ± 16</td>
</tr>
<tr>
<td>Maximum annual value</td>
<td>132 ± 7</td>
<td>191 ± 6</td>
<td>33.8 ± 6.4</td>
<td>57.0 ± 7.3</td>
</tr>
</tbody>
</table>

QUALITY OF SURFACE WATERS IN BELGRADE

For more than 40 years, Institute of Public Health of Belgrade has been cooperating with Secretariat for the Environment on monitoring the quality of surface waters in Belgrade. Based on the proposal of measures to be undertaken, Program of Control of the Quality of Surface Waters has suffered significant and large changes in 2010. They relate to the controlled watercourses, their profiles (points) and control parameters. The Program has been updated, improved and harmonized with state-of-the-art knowledge on harmful and hazardous substances, negative impact of these substances, and performance of laboratory equipment. The changes relate also to standpoints of EU and ICPDR in the area of surface water control. To be more precise, all previous drawbacks have been eliminated.

Today, Program of Control encompasses 24 watercourses with 30 control points (profiles). It has been covering watercourses, profiles, controlled media and parameters, frequency of sampling and analytical methods of control of the quality of surface waters.

The aim of control is to estimate the water class for watercourses in relation to the relevant regulations. It also monitors pollution trends, estimates water supply adequacy for Belgrade, Obrenovac, Vinca and Baric. Based on the Program, we estimate sanitation of each watercourse, analyze options for safe and secure recreation of the population; assess adequacy of the water to be used for irrigation of arable land, monitor sedimentation of inorganic and organic micro pollutants in the sediment, monitor bioaccumulation of inorganic and organic macro pollutants in hydrobionts, assess self-purification, saprobic status and advancement of eutrophication, provide data for construction of devices for wastewater treatment. Program enables us verify the efficacy of measures undertaken to maintain the water quality and the need to apply additional measures of remediation, protection and promotion.

Dynamics of sampling, scope and type of field and laboratory investigations were defined depending on the importance of a watercourse and the profile (spot) for a community, degree of its endangerment and wastewaters.

Estimate of the quality of water was done based on domestic and international relevant regulations (quality of surface waters).
The Sava

In 40 samples taken from the Sava, 22 of them (55.0%) belong to River water Class II. We found aberrations from the Class II norms, in physical-chemical, chemical and sanitary-microbiological examination, in only 3 (7.5%) samples. We proved exceedence of limit values for some physical-chemical and chemical parameters in 6 (15.0%) samples. In 9 (22.5%) samples, we found aberrations only in the sanitary-microbiological sense.

This is one of best years in the last decade. In relation to 2008 and 2009, we found fewer aberrations from the proper river water class. This applies to certain physical-chemical and sanitary-microbiological parameters.

The Danube

We found aberrations from the proper river class, in the sense of physical-chemical and chemical parameters, in 13 (32.5%) samples. We found exceedence of MAC for only certain physical-chemical and chemical parameters in 6 (15.0%) samples. In 11 (27.5%) samples, we found aberrations only in the sanitary-microbiological sense, i.e. we detected high titer of total coliform bacteria.

In relation to results obtained in 2009, we observed slight improvement of water quality. It is especially visible in sanitary-microbiological sense. We should bear in mind that the year 2010 was among the poor ones in the last decade.

The Sava

The Makis-Duboko and Zabran profiles are near the capture of Belgrade, Baric and Obrenovac Waterworks. Therefore, those three points have high significance.

Aberrations from river waters Class II, in physical-chemical and chemical sense, were not important (in number of parameters and defined concentrations). We found aberrations in the following parameters: quantity of dissolved oxygen (1), oxygen saturation degree (5), 5-day BOD (3), iron concentrations (15), suspended substances (2) and mineral oils (3).

Examinations of the so-called "nitrogen triad (HN4+, NO2- and NO3-) show that the burden Sava has by proteins and nitric fertilizers is rather weak. Oxidation, i.e. first and second stage of mineralization is so far successful, as the result of the river’s huge flow and good active (and passive) water aeration.

As for sanitation and microbiology, the quality of Sava water was significantly better in 2010 than before. The process of self-purification has been effective in the river, since the authorities of the city have not done anything to build a device for purification and treatment of communal wastewaters. Improvement of the water quality did not occur due to decrease of pollution. Quality of the Sava water in 2010 can be fully analyzed only in comparison with the previous ones. Comparative results are given in the following table.

Table Quality of the Sava Water, 2001-2010

<table>
<thead>
<tr>
<th>Year</th>
<th>No of samples</th>
<th>Class II</th>
<th>Changed parameters and therefore beyond class II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>bacteriology and only bacteriology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>no of samples</td>
<td>%</td>
</tr>
<tr>
<td>2001</td>
<td>64</td>
<td>40</td>
<td>62.5</td>
</tr>
<tr>
<td>2002</td>
<td>66</td>
<td>35</td>
<td>53.0</td>
</tr>
<tr>
<td>2003</td>
<td>68</td>
<td>24</td>
<td>35.3</td>
</tr>
<tr>
<td>2004</td>
<td>68</td>
<td>34</td>
<td>50.0</td>
</tr>
<tr>
<td>2005</td>
<td>68</td>
<td>39</td>
<td>27.9</td>
</tr>
<tr>
<td>2006</td>
<td>68</td>
<td>32</td>
<td>47.1</td>
</tr>
<tr>
<td>2007</td>
<td>68</td>
<td>38</td>
<td>26.5</td>
</tr>
<tr>
<td>2008</td>
<td>68</td>
<td>27</td>
<td>39.7</td>
</tr>
<tr>
<td>2009</td>
<td>68</td>
<td>32</td>
<td>47.1</td>
</tr>
<tr>
<td>2010</td>
<td>40</td>
<td>22</td>
<td>55.0</td>
</tr>
</tbody>
</table>
Generally, the Sava water quality in 2010 was significantly improved, according to sanitary-microbiological parameters. According to chemical-physical ones, this improvement was less prominent.

As in 2009, the number of population and growth of volume of sanitary and industrial wastewaters has not been significantly changed. The change of water quality can be explained by more effective self-purification, practically due to absence of toxic substances. We did not record any major accidental pollution by inorganic and organic substances, a favorable fact for the water quality.

**The Danube**

Out of 40 samples taken in 2010, only 10 (25%) corresponded Class II by all examined parameters. These were waters suitable for water supply, food-processing industries, fisheries and recreation.

In relation to 2009 results, we noticed a slight improvement in quality, especially in respect of sanitation and microbiology. In the past decade, however, the year 2010 was among the worst.

Comparative results of examinations of the Danube water, per groups of parameters, in the area of Belgrade, 2001-2010, are given in the following table.

<table>
<thead>
<tr>
<th>Year</th>
<th>No of samples</th>
<th>Class II</th>
<th>Changed parameters and therefore beyond class II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of samples</td>
<td>%</td>
<td>bacteriology and physical-chemical</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>no of samples</td>
</tr>
<tr>
<td>2001</td>
<td>64</td>
<td>21</td>
<td>32.8</td>
</tr>
<tr>
<td>2002</td>
<td>66</td>
<td>26</td>
<td>39.5</td>
</tr>
<tr>
<td>2003</td>
<td>67</td>
<td>19</td>
<td>28.4</td>
</tr>
<tr>
<td>2004</td>
<td>68</td>
<td>27</td>
<td>39.7</td>
</tr>
<tr>
<td>2005</td>
<td>68</td>
<td>13</td>
<td>19.2</td>
</tr>
<tr>
<td>2006</td>
<td>68</td>
<td>11</td>
<td>16.2</td>
</tr>
<tr>
<td>2007</td>
<td>68</td>
<td>20</td>
<td>29.4</td>
</tr>
<tr>
<td>2008</td>
<td>68</td>
<td>27</td>
<td>39.7</td>
</tr>
<tr>
<td>2009</td>
<td>68</td>
<td>12</td>
<td>17.6</td>
</tr>
<tr>
<td>2010</td>
<td>40</td>
<td>10</td>
<td>25.0</td>
</tr>
</tbody>
</table>

It is obvious that worsening of the quality of Danube water, perceived in 2009, did not continue in 2010. It is important now to maintain the attained improvement.

**Final Remarks**

Based on the results of laboratory examinations and field investigations, undertaken within the "Program for the Control of Quality of Surface Waters in Belgrade in 2010" and comparing the obtained results with the ones from 2009, these are our final remarks:

- The Program was significantly altered and improved in 2010. New water courses, locations (profiles) for sampling and parameters of control were added. They will give a more detailed and precise overview of the situation in area of surface waters in the Belgrade area. Our control was performed in 24 water courses and 30 monitoring profiles.
- The Program was completely realized in 2010.
- In 2009 and 2010, the Sava quality was significantly better than the Danube: in the sense of physical-chemical and chemical parameters. The difference, in favor of the Sava, was much more prominent in microbiological sense.
- Generally, during 2010, we have measured significant improvement of the Sava water quality. Improvement of the quality of Danube was small, while it was very small in Kolubara and Turija.
- In the waters of Sava and Danube, exceedances of MAC is most frequently registered in iron content, suspended substances, certain parameters belonging to oxygen regimen and mineral oils. So far, it does not hinder water supply, recreation and irrigation.
- We did not find triazine, urea, herbicides, pesticides, insecticides, PCBs, PAHs, and volatile hydrocarbons in the water streams. In some instances, the above were detected in low concentrations that do not jeopardize aquatic ecosystem.
- In the Sava and Danube, a majority of toxic and carcinogenic substances was not detected, or was detected sporadically - in small, negligible concentrations that pose no health threat and do not impact hydrobionts. This is important from the standpoint of water supply of Obrenovac, Baric, Belgrade and Vinca.
In the sediment of Sava and Danube, we did not register the content of heavy and toxic metals above “effective” values. PAHs and mineral oils are moderately high. Other micro pollutants were not detected.

It is good that we did not register concentrations of toxic bio accumulative heavy metals above their “effective” limits in the sediment near Makis and Vinca water capture. This was not the case in previous years. These substances show characteristics of bio magnification in food chains.

In soft tissue of certain shellfish species and muscles of benthophagoid fish species in the Sava and Danube, we registered bioaccumulation of certain organic micro pollutants insecticides, PCBs and PAHs. The concentrations, however, were low. We did not detect triazine herbicides.

Concerning inorganic micro pollutants (Hg, As, Pb, Cd), in the muscle tissue of ichthyophagoid and benthophagoid species of the fish we found slightly elevated concentration of mercury, in only one sample (captured in the Danube). Prominent accumulation of lead and cadmium was recorded in the shellfish.

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### QUALITY OF THE WATER IN ADA CIGANLIJA LAKE, “LIDO” SWIMMING AREA AND THE RESERVOIRS AT THE FOOT OF MT. AVALA: “PARIGUZ”, “BELA REKA” AND “DUBOKI POTOK” IN 2010

Monitoring and control of the quality of water in the Ada Ciganlija Lake has been performed since the foundation of this area. Since it has a double-purpose use (recreation and water supply), the aim of our activities is to protect the health of its users as well as the water source used for the needs of Belgrade Waterworks. The aim of monitoring and control is also to estimate the velocity of eutrophization processes, effectiveness of the measures undertaken to maintain the water quality and possible need to undertake additional protective remediation measures.

Quality of water in the “Lido” swimming/bathing area (public beach) has been periodically checked in order to protect public health. Reservoirs at the foot of Mt. Avala have been included in the Program of control after 2004. Their basic function is to hold the flood wave. Therefore, their water has been rarely used for field crops or recreation.

<table>
<thead>
<tr>
<th>Area</th>
<th>Quality Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Sava Lake</strong></td>
<td>Out of 111 analyzed samples, 104 (93.7%) were within the limits of classes II and I. Three analyzed samples (1.9%) were beyond the ascribed water class limits. Aberrations were registered in 7 samples (6.3%), only because of worsened microbiological parameters. There is an improving trend in the quality of this water. In relation to the previous decade, 2010 was favorable in bathing sense.</td>
</tr>
<tr>
<td><strong>“Lido” Swimming Area (Public Beach)</strong></td>
<td>None of 10 samples was within the II class water quality, according to all parameters: physical, chemical and microbiological. Due to the changes in certain physical and chemical parameters and increase of the coli-titer, we found four samples beyond the water class limits. Elevations in MPN were found in 5 samples, while 1 had aberrations in certain physical and chemical parameters. However, the situation is somewhat worse than in 2009.</td>
</tr>
<tr>
<td><strong>“Pariguz” Reservoir</strong></td>
<td>Water quality was determined from 11 samples, between April and September 2008. The results show that only two samples were within the limits of Class II. According to several physical and chemical parameters, aberrations were found in five samples. In 4 of them, we found aberrations in the sense of microbiology, physical and chemical features of the water.</td>
</tr>
<tr>
<td><strong>“Bela reka” Reservoir</strong></td>
<td>Eleven samples were taken between April and September: 6 of them were within the limits for Class II. The remaining five had aberrations in relation to the defined class quality In respect to certain physical and chemical parameters, we found aberrations in 3 samples. (Each of them had aberrations due to altered physical, chemical and microbiological parameters and elevated coli-titer).</td>
</tr>
</tbody>
</table>
Quality control was performed in 11 samples, between April and September. Seven of the samples were within the Class II. The remaining two had aberrations in respect to the class.

Due to elevated coli-titer defined for the Class II, aberrations were recorded in the two samples: one sample had aberrations in physical-chemical and microbiological parameters. Another one had elevations in total coli-titer values.

**Dynamics and Parameters of Control**

Control of the water quality of Lake, “Lido” and reservoirs at the foot of Mt. Avala is performed with varying dynamics, using varying parameters. Neither the purpose of our investigations nor ecosystems are identical in all cases. We had to deal with lake, river and outflow reservoirs.

In 2010, the quality of water in the Lake has been controlled in three locations (profiles): “Children’s Swimming Pool (near Sudijski tornja)”, “Okruglo kupatilo” and “Ranney Collector Well RB 12-1. During the bathing season, quality of water has been controlled twice a week. In the remaining period, it was done once a month, when the field conditions allowed. Quality control of the water in “Lido” during the bathing season (July and August) was performed once a week, on the spot “Sredina plaze”. In reservoirs at the foot of Mt. Avala, it was performed twice a month, from June to mid-September. Before the bathing season, the control of Lido was not performed, due to high waters. After the termination of bathing season, it was done according to the plan. In reservoirs at the foot of Mt. Avala, it was performed twice before the season—in April and May.

Institute of Public Health of Belgrade performs physical, chemical and microbiological examinations of the water quality of Ada Ciganlija Lake, “Lido” and reservoirs at the foot of Mt. Avala. Hydro biologists from Institute for Biology “Sinisa Stankovic” perform seasonal hydro-ecological examinations of the Lake and reservoirs at the foot of Mt. Avala.

Sampling methods, preparation of samples and analyses are defined in various Serbian regulations and standards, as well as with SMEWW and US EPA regulations.

**Quality of the Water in Ada Ciganlija Lake**

Our results show that the situation in Lake is somewhat better than it was in previous year. Out of 111 samples taken for analysis, only 7 (6.3%) were out of the legal class limits. In 2009, this percentage was higher—8.3%.

The recommendations state that on annual basis, there may be microbiological aberrations in up to 10% of the samples. In 2010, we had 8.1% of such samples.

Values of all physical-chemical parameters were within the limits for classes I and II.

Microbiological quality of the Lake is shown in the following chart. It covers the period of 15 years.

**Water Quality in the “Lido” Bathing Area**

The “Lido” Bathing Area is among largest bathing areas on the banks of Danube. Quality of the water area has significant aberrations from the mandatory recreational water class.

In 9 samples, we found MPN greater than 20,000/ l (open space bathing
water norm). It has ranged from 21,000 to 2,400,000 (as in 2009 and significantly far worse than in 2008). Maximum number is out of any class for river waters. Differences between the number of total and fecal coliform bacteria have been seldom recorded (only twice during the bathing season). This is an unfortunate situation, since they pose a huge health risk. Due to increased MPN, there is often risk for bathers’ health. Infections and damaged mucous membranes in the children are frequent infections. They can be prevented by an after-bath shower.

Quality of the Water in Reservoirs at the Foot of Mt. Avala
The results of field and laboratory investigations show that 2 out of 11 samples (taken from the “Pariguz” Reservoir) were in accordance with norms for River Water Class II. Only 5 samples had aberrations from the above class, according to certain physical-chemical parameters. In four samples we found aberrations in sanitation, microbiology and physical-chemical features. Generally, in 2010 the water quality did not correspond to the one regulated for bathing waters. Public health safety was jeopardized. However, this water might have been used for other purposes.

Concluding remarks
The results of our examinations, in relation to the quality of water of the Lake, sedimentation basin in Ada Ciganlija, “Lido” Bathing area and reservoirs under Mt. Avala show that:

- Permanently large numbers of bathers, overcoming ecological capacity of the lake and its ability of self-purification, combined with an ever-growing number of services and recreational spots, have a huge impact on the quality of water in those locations.
- The trend of improvement of the water quality has been maintained in 2010.
- The water quality corresponds to the EU Directive 2006/7/EC (Quality of the Water in Open Bathing Areas), imposing that sanitation and maintenance regimen should be permanently monitored (both of the entire Lake and bathing area). The document stresses that it is necessary to pay special attention to promotion of good behavior of the users. From the standpoint of sanitation, the process of self-purification, controlled flow and passive aeration have maintained balance of the aquatic system.
- In respect to microbiology, during bathing season we only had 6 samples with aberrations (8.1%). It is slightly worse than in 2009 and significantly worse than in 2008, although it corresponds to the WHO recommendations.
- Presence of enteropatogenic microorganisms, causing agents of water-borne outbreaks has not been registered in the Lake water.
- Occasionally present in recent years, *Proteus* and *Pseudomonas aeruginosa* were not detected in 2010.
- In one sample, we detected *Group D* fecal *streptococci*, whose presence is not allowed by the EU Bathing Water Directive.
- Using the Carlson Trophic State Index, we found that *chlorophyll a* concentration, water transparency and the content of total phosphates were satisfactory in 2010. Compared to 2009, the situation is somewhat more favorable but still demands constant monitoring.
- Macrophytes removal has been performed almost daily, starting from the middle of spring. It was performed on the areas anticipated by the Ecological Study. It did not have any unfavorable consequences on the water quality.
- Reduction of the number of coliform bacteria and the content of suspended substances and trophogenic salts was successfully performed in the sedimentation basin.
- Quality of the water in “Lido” bathing area has been found to be worse than in 2009 and 2008 (when 3 and 1 samples were within the limits of Class II). Nine out of 11 samples with elevated coli-titer point to the fact that recreational activities in “Lido” are not safe for public health.
- Of the three reservoirs at the foot of Mt. Avala, best water quality was found in “Dubok potok”, followed by (in descending order) “Bela reka” and “Pariguz”.
- In all three reservoirs, we have recorded worsening of trophism-speedy ageing and creation of ponds, which may have serious implications on the quality of the water and reduction of its multi-purpose use.
- The fact that in reservoirs “Duboki potok” and “Pariguz” we have noticed “flowering” of the water caused by dark green algae, are the reason for concern. This indicates possibility of toxin creation (microcystine) in the water, which would result in the prohibition of its use for recreation and irrigation.
<table>
<thead>
<tr>
<th><strong>QUALITY OF DRINKING WATER FROM THE BELGRADE WATERWORKS</strong></th>
</tr>
</thead>
</table>

### Physical and chemical examinations

Results of analyses of samples of drinking water, taken from the Belgrade Waterworks System and the Vinca Waterworks in 2010, show that in 111 samples (1.7%) out of 6,637 we have found aberrations in relation to the norms defined by the Rulebook.

In the samples taken from installations, reservoirs and the network, most frequent aberration in relation to the Rulebook is turbidity and iron content. This is of no major importance to consumers’ health.

### Bacteriological examinations

Results of analyses of the samples taken from both Belgrade and Vinca Waterworks show that, in 360 samples (5.4%) out of 6,637, aberrations were found in relation to norms defined by the Rulebook.

Aberrations are significantly rarer than in previous years. Most frequent reason for unsafe samples was elevated total number of bacteria in 1 ml of water. This is of no greater significance for consumer health but rather is an indicator of the situation important for the estimate of quality and integrity of the drinking water distribution system. This parameter has been translated to norms in different ways, or has not been translated at all in other countries’ Rulebooks. In Serbia, limit for this parameter has been defined rather strictly. If we wanted to perform harmonization of norms, then the estimate of bacteriological quality would have been different- aberrations would have been slighter. It is important to notice that we have never isolated pathogenic microorganisms.

### Radioactivity

In 2010, we have examined 10 samples of drinking water. The results showed total $\alpha$ activity < 0.1 Bq/l. Total $\beta$ activity was < 1 Bq/l. All samples were safe.

Systematic control of radioactivity in drinking water and environment has been performed by the relevant, authorized facilities.

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For several decades, Institute of Public Health of Belgrade has been monitoring the quality of drinking water processed in the Belgrade Waterworks Public Utility. The monitoring has been performed in order to secure safe, hygienic drinking water for the Belgrade population.

The control has been performed according to the Program based on the Rulebook on Hygienic Safety of Drinking Water (published in the “Official Herald of the FR Yugoslavia", no 42/98). Beside this, additional examination of the water quality has been performed in the as internal control of the very Water processing Utility, at installations for water purification and in the Service for Sanitation and Control of the Belgrade Waterworks. This Service takes approximately equal number of samples as Institute of Public Health of Belgrade. Fourth degree of control is surveillance done by Sanitary Inspection of the Ministry of Health. It is done without announcement, several times a year.

Within the systematic control of quality of drinking water, the samples have been taken:
- At five installations for water treatment (Banovo Brdo, Bezanija, Belevode, Makis and Vinca);
- From 16 tanks, and
- At 90 distribution network points, in various parts of the city.

The samples from installations have been taken daily; the samples from the tanks have been taken during one week. During the same time interval, all points from the distributive network have been covered.

Planned sampling is very often followed by demands for unplanned, extraordinary sampling. They come from individuals and facilities, in cases of suspicion that the quality had been worsened. Such suspicions often occur after malfunctioning of the water supply network or in cases of other individually perceived characteristics of drinking water. Extraordinary monitoring of water quality, by specific indicators and special parameters occurs in every accident related to the pollution of surface water that may jeopardize the source of water capture. It is often done in cases of natural disasters or unfavorable events or in cases where professionals think that they may represent a threat to drinking water quality.

The Vinca Waterworks is a part of the Belgrade Waterworks System. Since February 1993, its maintenance has been taken over by the Public Utility “Waterworks and Sewerage”. The Vinca System supplies approximately 20,000 inhabitants of the settlements Vinca and Lestane. Samples of drinking water are taken...
from the pumping station (twice a week) and from four points within a distribution network (once a week).

In the samples of water, we examine their physical-chemical characteristics, bacteriology, biological quality and the degree of radioactivity.

Results of laboratory examinations of water samples taken from the Belgrade Waterworks have been presented in monthly and annual reports, submitted to Sanitary Inspection Service, Secretariat for the Environment and PU “Belgrade Waterworks and Sewerage System. During 2010, Laboratory for Human Ecology of Institute of Public Health of Belgrade analyzed 6,637 samples of drinking water, originating from the Belgrade Waterworks. Within physical and chemical examinations, 6,145 samples were subject to basic regimen - “A”; 360 samples to periodical analysis - “B.” The remaining 132 samples were subject to “large regimen”. Monitoring microbiological safety was done in 6,673 samples taken for bacteriological examination. In 353 samples, we have monitored biological parameters.

<table>
<thead>
<tr>
<th>Sampling sites</th>
<th>Total no of samples for physical/chemical analysis</th>
<th>No of samples according to the Program related to physical-chemical examinations</th>
<th>No of samples for bacteriological examinations</th>
<th>No of samples for biological examinations</th>
<th>No of samples for radiological examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installations</td>
<td>1460</td>
<td>1364</td>
<td>48</td>
<td>48</td>
<td>1460</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>742</td>
<td>574</td>
<td>168</td>
<td>0</td>
<td>742</td>
</tr>
<tr>
<td>Network</td>
<td>4135</td>
<td>3955</td>
<td>120</td>
<td>60</td>
<td>4135</td>
</tr>
<tr>
<td>Vinca pumping station</td>
<td>113</td>
<td>89</td>
<td>12</td>
<td>12</td>
<td>113</td>
</tr>
<tr>
<td>Vinca network</td>
<td>187</td>
<td>163</td>
<td>12</td>
<td>12</td>
<td>187</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6637</td>
<td>6145</td>
<td>360</td>
<td>132</td>
<td>6637</td>
</tr>
</tbody>
</table>

Table 2.4.1.1: Total number of samples examined in 2010 and taken from the Belgrade Waterworks, per sampling site and type of examination

![Environmental Atlas of Belgrade](image_url)
In the samples of drinking water taken from reservoir and network, the only registered aberration was in relation to water turbidity and iron content. We did not find any aberrations in the samples taken from installations.

Except for the aberrations in iron content and water turbidity, all other parameters were within the limits of maximum allowed values. We did not detect PAHs, PCBs, pesticides, phenols, cyanides, mineral oils, alkylbenzosulphates, toxic metals (mercury, lead, cadmium and chrome). While nitrates had been at detection limit values. Other parameters were significantly below maximum allowed concentrations (MAC). It is favorable, from the standpoint of consumer health, that the values of disinfection by-products had been five times as low as the defined limits.

In comparison with earlier years, total aberration from the Rulebooks and norms regarding physical and chemical features of drinking water have maintained between 1.0% and 1.7% (2001 – 2010).

### RESULTS OF MICROBIOLOGICAL ANALYSES

#### Bacteriology

We have performed bacteriological analyses 6,637 samples of water taken from the Belgrade Waterworks. Only in 360 samples (5.4%) we have found slight aberrations from the Rulebook in this respect. Most frequently seen aberrations were in the form of increased number of mesophilic bacteria in 1 ml of water. These were identified as Bacillus spp and/or saprophytic cocci. All these findings are rather irrelevant since such findings have not been followed by the presence of other indicator(s) of bacteriological unsafety.

Our relevant Rulebook defines that the total number of bacteria in 1 ml of water (at 37°C) should not surpass 10, which is rather strict. A majority of foreign Rulebooks treats this parameter as indicator parameter. As such, it is not been subject to standardization, or the values are significantly higher. With harmonization of our norms and standards with foreign ones, the estimate of bacteriological quality of drinking water would be much different than it is today. Aberrations would be certainly slighter.

### Table 2.4.1.3: Medium, minimum and maximum concentrations of certain parameters in drinking water in 2010. The samples have been taken in Belgrade Waterworks

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>Bele Vode</th>
<th>Makiš</th>
<th>Bežanija</th>
<th>Topčider pumping station***</th>
<th>Vinča</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al (mg/l)</td>
<td>med. 0.037</td>
<td>0.079</td>
<td>&lt;0.003</td>
<td>0.034</td>
<td>0.040</td>
</tr>
<tr>
<td></td>
<td>max. 0.065</td>
<td>0.133</td>
<td>0.052</td>
<td>0.066</td>
<td>0.080</td>
</tr>
<tr>
<td></td>
<td>min. 0.014</td>
<td>0.010</td>
<td>&lt;0.003</td>
<td>&lt;0.003</td>
<td>0.017</td>
</tr>
<tr>
<td>As (mg/l)</td>
<td>med. &lt;0.001</td>
<td>&lt;0.001</td>
<td>0.005</td>
<td>0.002</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>max. 0.001</td>
<td>0.001</td>
<td>0.007</td>
<td>0.005</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>min. &lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Cu (mg/l)</td>
<td>med. 0.109</td>
<td>0.203</td>
<td>0.001</td>
<td>0.016</td>
<td>0.090</td>
</tr>
<tr>
<td></td>
<td>max. 0.198</td>
<td>0.219</td>
<td>0.003</td>
<td>0.101</td>
<td>0.144</td>
</tr>
<tr>
<td></td>
<td>min. 0.009</td>
<td>0.004</td>
<td>0.001</td>
<td>0.003</td>
<td>0.066</td>
</tr>
<tr>
<td>Calcium</td>
<td>med. 67.7</td>
<td>59.7</td>
<td>78.8</td>
<td>67.4</td>
<td>55.3</td>
</tr>
<tr>
<td></td>
<td>max. 75.7</td>
<td>72.5</td>
<td>83.0</td>
<td>77.7</td>
<td>62.2</td>
</tr>
<tr>
<td></td>
<td>min. 51.4</td>
<td>50.8</td>
<td>75.2</td>
<td>56.5</td>
<td>47.7</td>
</tr>
<tr>
<td>Potassium</td>
<td>med. 13.4</td>
<td>14.4</td>
<td>1.93</td>
<td>1.48</td>
<td>2.19</td>
</tr>
<tr>
<td></td>
<td>max. 1.66</td>
<td>1.92</td>
<td>2.06</td>
<td>2.02</td>
<td>3.04</td>
</tr>
<tr>
<td></td>
<td>min. 1.08</td>
<td>1.05</td>
<td>1.78</td>
<td>1.18</td>
<td>1.76</td>
</tr>
<tr>
<td>Magnesium</td>
<td>med. 14.60</td>
<td>10.06</td>
<td>26.2</td>
<td>15.8</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>max. 18.00</td>
<td>17.00</td>
<td>28.5</td>
<td>25.2</td>
<td>14.30</td>
</tr>
<tr>
<td></td>
<td>min. 7.14</td>
<td>3.91</td>
<td>24.7</td>
<td>13.3</td>
<td>8.47</td>
</tr>
<tr>
<td>Sodium</td>
<td>med. 7.99</td>
<td>6.29</td>
<td>17.40</td>
<td>8.19</td>
<td>19.06</td>
</tr>
<tr>
<td></td>
<td>max. 11.70</td>
<td>10.80</td>
<td>18.20</td>
<td>10.50</td>
<td>11.90</td>
</tr>
<tr>
<td></td>
<td>min. 3.62</td>
<td>3.79</td>
<td>16.80</td>
<td>5.78</td>
<td>6.22</td>
</tr>
<tr>
<td>Sulphates</td>
<td>med. 52.5</td>
<td>43.2</td>
<td>32.2</td>
<td>33.3</td>
<td>49.2</td>
</tr>
<tr>
<td></td>
<td>max. 63.4</td>
<td>68.5</td>
<td>47.4</td>
<td>57.6</td>
<td>62.4</td>
</tr>
<tr>
<td></td>
<td>min. 42.8</td>
<td>29.5</td>
<td>13.4</td>
<td>23.7</td>
<td>35.7</td>
</tr>
<tr>
<td>Orthophos-</td>
<td>max. &lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td></td>
<td>min. &lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Fluorides</td>
<td>med. 0.06</td>
<td>0.04</td>
<td>0.09</td>
<td>0.07</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>max. 0.15</td>
<td>0.10</td>
<td>0.20</td>
<td>0.30</td>
<td>0.11</td>
</tr>
<tr>
<td>Bicarbonat-</td>
<td>max. 223.6</td>
<td>189.5</td>
<td>347.5</td>
<td>254.3</td>
<td>172.3</td>
</tr>
<tr>
<td></td>
<td>min. 253.8</td>
<td>244.9</td>
<td>370.4</td>
<td>276.9</td>
<td>197.8</td>
</tr>
<tr>
<td>Total hard-</td>
<td>med. 12.8</td>
<td>10.7</td>
<td>17.1</td>
<td>13.1</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>max. 14.8</td>
<td>14.1</td>
<td>18.2</td>
<td>15.3</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>min. 8.9</td>
<td>9.2</td>
<td>16.4</td>
<td>12.1</td>
<td>9.1</td>
</tr>
</tbody>
</table>

**/ mixed water, from installations in Banovo brdo and Makiš.
Table: Total number of samples, percentage of bacteriological aberrations in the samples of drinking water taken from The Belgrade Waterworks

<table>
<thead>
<tr>
<th>Samples taken at</th>
<th>Total number of examined samples</th>
<th>Bacteriologic Unsafety no of samples</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installations</td>
<td>1460</td>
<td>13</td>
<td>0.9</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>742</td>
<td>14</td>
<td>1.9</td>
</tr>
<tr>
<td>Waterworks</td>
<td>4135</td>
<td>297</td>
<td>7.2</td>
</tr>
<tr>
<td>Vinča Pumping station</td>
<td>113</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Vinča Water network</td>
<td>187</td>
<td>34</td>
<td>18.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>6637</td>
<td>360</td>
<td>5.4</td>
</tr>
</tbody>
</table>

Parasitology

In 2010, we examined 353 samples of drinking water and found no intestinal protozoa, eggs or larvae of helminths. We used the concentration method to detect these.

RADIOACTIVITY

Water samples for radiological analysis are taken twice a year, from installations and the network. The examination is carried out in Institute for Occupational Medicine “Dr. Dragomir Karajovic”. Radiological analysis encompasses measuring of total α and β activity. In 2010, these examinations were made in March and September. All examined samples (10-4 samples from installations, 5 from the network and 1 from the Vinca Pumping station) showed that total α activity < 0.1 Bq/l. Total β activity was < 1 Bq/l.

All examined samples of drinking water are radiologically safe and range within standard values given in the Rulebook.

FINAL REMARKS

Results of examinations of the water from Belgrade Waterworks in 2010 show that:

- in the physical/chemical sense, the water quality was in accordance with the Rulebook provisions. Most frequent were slight increase in iron concentration and turbidity, of no significance for human health. These were mostly the result of pressure oscillations within the network or shortages due to planned switch offs and problems in the distribution network.

- We did not detect toxic metals (mercury, lead, cadmium, and chrome), PCBs, PAHs. Other examined physical-chemical parameters were within the allowed values. Concentrations of disinfection by-products, i.e. the compounds that occur in water after application of chlorine as disinfectant, are on the average level, five times as low as the maximum allowed values.

- Bacteriological aberrations were mostly present as increased total number of bacteria, whose presence is allowed in drinking water. These aberrations have no health-related impact but are an indicator of situation within the waterworks.

- We never isolated pathogenic microorganisms nor had water-borne outbreak in the area covered and supplied by the Belgrade Waterworks.

- Based on the scientific results, examination methods and state-of-the-art technical findings, we may assess that the water produced in the Belgrade Waterworks Public Utility in 2010 is safe and healthy for human consumption.
QUALITY OF DRINKING WATER FROM PUBLIC FOUNTAINS, BELGRADE 2010

General remark
In 2010, control of quality of spring water captured in public fountains showed that a large number of these fountains do not have safe drinking water.

Physical-chemical characteristics
Out of 300 samples from public fountains, taken for laboratory examinations in 2010, 104 (34.7%) were unsafe. Most frequent cause of unsafety was elevation of concentrations of nitrates, chlorides and increased values of electrical conductivity.

Microbiology
Out of 300 samples taken from public fountains, 175 (58.3%) were bacteriologically unsafe. Most frequent cause of bacteriological unsafety of source water was presence of coliform bacteria of fecal origin (E.coli, etc.) and increased number of total coliform bacteria. Some sporadic samples were contaminated by group “D” Streptococcus.

Biology
Biological quality of spring water was satisfactory in a majority of public fountains. In the water of certain number of them, we have registered presence of biological indicators of pollution or increased presence of fungi.

Program for the control of quality of water from the springs, captured in public fountains and faucets encompassed (in 2010) 26 public fountains, located in the area of the city. Twice a month we have examined physical-chemical and bacteriological characteristics from public fountains). The water from other facilities is examined once a month. Once a year, the water samples from all public fountains is examined through the so-called “periodic” physical-chemical, bacteriological and biological analysis.

Aim - Hygienic safety of spring water from public fountains is performed in order to protect public health. We also monitor the quality of underground sources that are used as alternate water captures, representing an indicator of environmental situation. Based on the results of laboratory examinations and knowledge of sanitation and hygiene of each public fountain (and its surroundings), we issue opinion on the possibility of utilization of each concrete fountain as the source of drinking water from the point of view of public health. Quality Control of the water from public fountains is done according to the current Regulations.

Activities - Institute of Public Health of Belgrade has carried out numerous activities aimed at monitoring, maintenance and improving the quality of spring water captured in public fountains. These activities were undertaken within the Program of Control of Hygienic Safety of Water from Public Fountains. Most prominent ones were:

- Regular sampling and laboratory examinations of spring water captured in public fountains, according to the predefined dynamics;
- Submission of the relevant reports to Secretariat for the Environment, Secretariat for Communal and Housing Affairs, Directorate for Waters, and Serbian Sanitary Inspection Services-Belgrade Department;
- Opinions concerning the quality of spring water, issued on demand by Secretariat for the Environment and other administrations;
- Controlling sanitation and hygiene in the fountains and in their surroundings. Issuing opinions to remediate the existing situation(s);
- Informing the public and media on the current examination results of hygiene and safety of the water from public fountains, issuing recommendations to use (or not to use) this water for drinking, and
- Extraordinary sampling and laboratory examinations of the water taken from public fountains according to sanitation and epidemiological indications.

LABORATORY RESULTS
In 2010, within the Program of Control of Hygienic Safety of Water from Public Fountains, we took 300 samples and examined them in our laboratories. Basic examinations were carried out in 279 samples and periodic analysis was made on the remaining 21 samples.
Microbiologic unsafety of the samples taken in 2010 is shown in Graph 1.

CLASSIFICATION OF PUBLIC FOUNTAINS BASED ON THE WATER QUALITY, 2010

Regulations and relevant norms for quality and safety of drinking water define that water facilities under public health surveillance may have a tolerable aberration level of 5% for microbiological and 20% for physical-chemical unsafety.

Based on our 2010 examination results, all public fountains were divided into the following groups, according to safety of drinking water:

1. Fountains with low percentage of physical-chemical unsafety and of relatively low of bacteriological unsafety - the Miljakovac spring, the Sveta Petka spring (in Kalemegdan, in location after the filter), and the Topcider fountain (left one).

2. Fountains with low percentage of physical-chemical unsafety and high percentage of bacteriological unsafety - a majority of facilities under our control.

3. Fountains with high percentage of physical-chemical and bacteriological unsafety - the Mokroluska fountain, the source Tocak Zuce, Pasina fountain and Visnjicka banja.

4. Fountains with high percentage of physical-chemical unsafety and of relatively low percentage of bacteriological unsafety - "Velika cesma" fountain in Resnik and "Soko- Stark" fountain.

SANITATION AND HYGIENE

Based on the results of hygienic safety of drinking water obtained from IPH Belgrade, Sanitary Inspection Services have issued decrees to the municipalities with unsafe water in public fountains.

During 2010, the website of Institute of Public Health (www.zdravlje.org.rs) has updated its link with basic information concerning the Program of control of the quality of water from the springs, captured in public fountains in Belgrade, offering latest data of quality control and recommendations for use of public fountains.

PROPOSAL OF THE MEASURES TO BE UNDERTAKEN

We propose the following measures, which would result in promotion and maintenance of quality of the water from public fountains in Belgrade:

1. Get an overview of sanitation and hygiene in the facilities of public fountains encompassed by the Program. Based on these results, perform remediation of facilities and the environment;

2. Once a year, perform disinfection in these facilities. Once in two years, perform cleaning of intake structures (reservoirs) of these facilities.

3. Register potential polluters in the environment. Start the activities to remove the influence of these polluters.

4. Define zones of sanitary protection around the public fountains.

5. Gather available construction and technical documents related to the existing public fountains under surveillance. Based on this, issue property law decrees related to the status of such facilities. Initiate the procedure of changing the status of public fountains so that they become public goods of general importance.

<table>
<thead>
<tr>
<th>Scope of examinations</th>
<th>No of samples</th>
<th>Bacteriologic unsafety</th>
<th>Physical-chemical unsafety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic analysis</td>
<td>279</td>
<td>163 (58.4%)</td>
<td>95 (34.1%)</td>
</tr>
<tr>
<td>Periodic analysis</td>
<td>21</td>
<td>12 (57.1%)</td>
<td>9 (42.8%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>300</td>
<td>175 (58.3%)</td>
<td>104 (34.7%)</td>
</tr>
</tbody>
</table>
6. In 2011, expand the existing program to examine the samples from certain facilities by "major (V)" analysis - in accordance with hygiene and epidemiological indicators.

7. Based on the results of laboratory analyses, quality of the water from public fountains and field examinations, sighs should be placed on each facility that does not comply with water quality standards.

8. Perform follow-up of the content of heavy metals and other contaminants found in the water of certain public fountains.

9. Gather data related to the number and locations of public fountains in the Belgrade area (by municipality). Make the Inventory of Public Fountains in Belgrade.

10. Continue systematic control of the quality of drinking water from public fountains and maintain protection of public health.

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**POLLUTION OF THE SOIL IN BELGRADE IN 2010**

<table>
<thead>
<tr>
<th>Scope of Investigation</th>
<th>During the realization of the Program &quot;Examination of Pollution of the Soil in Belgrade in 2010&quot;, we took 66 samples and submitted them to laboratory examinations. The samples were taken from 33 locations (spots).</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Remarks</td>
<td>Within the Project, we stressed the need to research the content of hazardous and harmful substances in the soil, especially in the soil near public fountains with spring water. Our interest was to examine the soil in the zones of sanitary protection of the water source for Belgrade Waterworks, from communal areas and along busy traffic arteries. The results show that in several locations we found aberrations in soil quality (content of hazardous and harmful substances, in relation to standards).</td>
</tr>
<tr>
<td>Most Frequent Pollutants</td>
<td>In a majority of the samples, we registered aberrations in respect to the content of nickel. This is explained by specific geological/chemical features of the surface layer of soil in the examined areas.</td>
</tr>
<tr>
<td>Other Pollutants</td>
<td>In a smaller number of samples, we found elevated concentration of other pollutants - heavy metals (Cu, Zn, Pb, Cd) and organic parameters (DDT, PAHs, hydrocarbon index C10-C40 and PCB).</td>
</tr>
</tbody>
</table>

Examination of the Soil Quality has been realized through the Program, based on the contract among the City of Belgrade- Administration, Secretariat for the Environment and Institute of Public Health of Belgrade. Interpretation of results was done based on comparing them to norms defined in Act on the Program of System-Based Monitoring of Quality of Soil, Indicators for Estimate the Risk of Soil Degradation and Methodology to Define Remediation Programs ("Official Herald RS, no 88/2010").

THE AIM OF EXAMINATION OF SOIL POLLUTION

The program of Systematic Examination of Soil Pollution in the Area of Belgrade enables realization of the following aims:

- Determination of concentrations of hazardous and harmful substances in the soil,
- Monitoring of the degree of pollution in urban zones, especially in the proper zone of sanitary protection of the source of water capture for the Belgrade Waterworks,
- Processing of relevant information and updating databases dealing with the degree of pollution and features of the soil, and
- Defining the measures to decrease pollution in the area of the city.

The Program has several areas of interest in 2010. The areas of interest were:

I. The soil within the Zone of sanitary protection for the source of water capture of the Belgrade Waterworks, from where we analyzed samples taken from 6 locations (in the area of river mouth).

II. The soil near busy traffic arteries, from where we analyzed 3 samples (the locations of Novi Beograd, Mirijevo and Lešane).

III. The soil within communal environments, from where we analyzed 5 samples (the loca-
IV. The soil around public fountains, which consisted of 19 locations: Topčider, Košutnjak, Rakovica, Miljakovac, Jajinci, Beli Potok, Resnik, Žarkovo, Višnjička banja, Kaluđerica, Leštane, Boleč and Mali mokri Lug.

In 2010, according to the Program of Systematic Examination of Soil Pollution in the Area of Belgrade, we examined 66 samples of the soil, taken from 33 locations.

INTERPRETATION OF RESULTS

In 2010, increased content of nickel in the soil was most frequently seen exceedance in our examinations. Increased content of nickel in the soil is related to specific geological/chemical composition of surface layers in this area. It is not directly caused by contamination of anthropogenic origin. Regardless of soil composition, elevated content of this type can be attributed to pollution.

In the locations that belong to Zone of sanitary protection for the source of water capture of the Belgrade Waterworks, we did not register any major aberrations in the examined parameter concentrations.

We found elevated values of hydrocarbons C10-C40 (mineral oils) and Cu in the soil near busy traffic arteries. This can be ascribed to the impact of motor vehicles on the soil along these routes.

In 2010, we focused on examination of the content of hazardous and harmful substances in the soil near public fountains with spring water. Institute of Public Health of Belgrade performed control in order to establish how the sources of pollution in urban areas influence the water-capturing zone for public fountains. We also wanted to make estimate of possible impacts of such sources on safe drinking water. It is significant that we found PCBs in the soil near the fountain Zelenjak in Resnik. It has not been safe to use the fountain for a long time. There is a sign nearby, with information „Water unsafe for drinking“.

We found no significant aberrations from the values regulated by the relevant Act. In 2010, concentrations of all parameters that had exceedances of LV did not reach the Remediation Value, given in the Act.
COMMUNAL NOISE IN BELGRADE

Communal noise mostly originates from traffic while industrial facilities, construction works, small-scale economy and other activities are less important as its sources.

Introducing 24hr measuring rhythm and an expanded procedure enabled us to obtain more precise and reliable data concerning levels of communal noise, during the day and night.

The levels we have measured in 2010 are still high (26 measuring spots for the day and 29 measuring spots for the night). They all exceed regulated values.

During the day, exceedances are 0-15 dB (A). During the night, they are 0-2 dB (A), depending on the zone. Both results are unfavorable, compared to those obtained in 2009.

On the average, greatest exceedances were found in residential zones and these along traffic arteries.

Absolutely highest levels of noise were registered in the streets of Glavna and Krivolacka. The relevant level during the day reached 80 dB (A) and 76 dB (A) during the night.

Day and night variations of the equivalent noise level were especially prominent in these streets that have traffic of small intensity.

In 2010, the level of noise has usually been monitored in 30 reference spots, as agreed with the Secretariat for the Environment and Institute for Urban Planning. Those spots have been chosen to represent different city zones of various purposes, laying along major traffic arteries of the city. Zoning of Belgrade, with reference to noise, was done in 1984, only in five municipalities.

Network of Measuring Spots for Communal Noise

- Residential Area
- Area near Traffic Routes
- Urban Center
- Industrial Zone
- Hospitals Zone
- Schools Zone
- Recreational Zone
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Bul despot St. 122</td>
<td>day</td>
<td>78</td>
<td>80</td>
<td>73</td>
<td>73</td>
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<td>59</td>
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<td>Arsenja Ćarnojevića 119</td>
<td>day</td>
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<td>63</td>
<td>64</td>
<td>64</td>
<td>67</td>
<td>65</td>
<td>61</td>
<td></td>
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</tr>
<tr>
<td>Blagaja Parovića 63</td>
<td>day</td>
<td>74</td>
<td>69</td>
<td>67</td>
<td>68</td>
<td>69</td>
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</tr>
<tr>
<td></td>
<td>night</td>
<td>66</td>
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<td>59</td>
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<td>Borića, Bele Bartok 26</td>
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</tr>
<tr>
<td>Bulevar Kralja Aleksandra 69</td>
<td>day</td>
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<td>68</td>
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<td>63</td>
<td>65</td>
<td>63</td>
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Mobile Unit for Ecotoxicology or Unit for Quick Response and Monitoring of Environmental Hazards has been operating within the Center for Ecotoxicology. It has been engaged as a standing unit for chemical accidents, identification and quantification of environmental pollutants and risk assessment in relation to human health and the environment.

Mobile Ecotoxicological Unit (MEU) of Institute of Public Health of Belgrade receives calls for action through The Belgrade Information Center. Direct assignments, however, come to the Unit through the following bodies and services: Ecological Inspection, Sector for Inspection Services- Secretariat for the Environment of the Belgrade City Assembly, representatives of Ministry of the Interior Department for Emergencies, from other representatives of the police forces, Serbian Ecological Inspection - Department for the Control and Surveillance in Accidents Management, Serbian Ministry of the Environment and Spatial Planning, civilian ecological associations and societies of the city of Belgrade.

Regulation concerning the content of Prevention of Accidents Policy (addenda 1 and 2), content and methodology of Safety Reports and Accident Prevention Plan (“Official Herald RS”, no 41/10) define assignments of all professional bodies in cases of emergencies and accidents.

In accidental situations and emergencies, Mobile Ecotoxicological Unit of Institute of Public Health of Belgrade is prepared to identify and quantify health and environmental risks - pollutants in the atmosphere. This relates to time during and after a chemical accident. It also determines the presence of other pollutants in the atmosphere and other substrates of the environment: surface and underground water sources, soil and sediments of the rivers and other water bodies.

Mobile IPH Laboratory is also used to monitor the situation in the environment not otherwise jeopardized by accidents but by other sources of pollution- stationary and mobile facilities. It also covers other types of handling of hazardous and harmful substances. Mobile Ecotoxicological unit, which covers the area of Belgrade, is comprised of a medical doctor-specialist in hygiene, a chemist, technologist and senior sanitary...
The team has been very experienced in the issues of chemical accidents and communal pollution issues.

In 2010, MEU had seven interventions (measuring of emission values of harmful and hazardous substances from heating plants within primary schools, vocational and high schools, one hotel and two health care facilities). All facilities were in the municipalities of greater and proper Belgrade.

In 2010, Mobile Ecotoxicological Unit of Institute of Public Health of Belgrade had 19 field interventions, threat to the soil had occurred in the coastal area of the Sava River, in the zone of protection for water capture performed by the Belgrade Waterworks. The accident that occurred was related to the pouring of 7 tons of crude oil from a tank truck, as the consequence of a car accident on the Umka - Obrenovac highway.

There were four accidents in 2010 that were related to type of transportation of harmful and hazardous substances or to impact such substances may have had on the substrates of the environment. Chemical accidents related to road transportation and transportation of harmful and hazardous substances (such as oil derivatives) have been most frequently registered in recent years. In 2010, we registered seven chemical accidents related to working process within industrial facilities. Generally, these may be qualified as lesser ones, with limited impact on substrates of the environment.

An important industrial accident was fire that occurred in the “Nelt” Firm warehouse in Dobanovci. A huge amount of cardboard and paper packing material was destroyed in the fire. Irreparable damage also hit 3,000 square meters of the storage area.

Leaking of approximately 400 kg of ammonium was registered as an industrial accident, in the slaughterhouse “Imes” PKB by the Zrenjanin highway.

There were two chemical accidents related to improper storage, handling, transportation and final disposal of waste. On December 15, 2010, there was an accident related to improper disposal of seven 200-liter volume barrels of medical waste. They were dumped in the Danube, near the surface water capture belonging to the Vinca Waterworks.

In all reported and processed accidents in 2010, there were injured persons: with minor wounds, intoxication or low-degree burns. However, there were no lethal outcomes.

Head of MEU was participant in the event organized by NATO, “Science for Peace and Security Programme-Bioterrorism Preparedness and Response”. The event took place in Serbian Academy of Sciences and Arts in Belgrade, from November 15 to 17, 2010. There were presentations by countries of the EU, countries of the SEE and the Balkans related to preparedness of healthcare services and other state facilities in cases of emergencies posed by bioterrorism.

Addenda

Chemical Accidents in Belgrade in 2010

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<th>No</th>
<th>Description of Accident</th>
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<tr>
<td>1</td>
<td>Poisoning of stray dogs by creosan in 58 Uciteljska Str, Municipality of Zvezdara</td>
<td>Jan 14, 2010</td>
<td>Municipality of Zvezdara, 58 Uciteljska Str</td>
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<td>2</td>
<td>Poisoning of pets and stray dogs in the school yard of PS “Cirilo and Metodije”</td>
<td>Jan 16, 2010</td>
<td>Municipality of Zvezdara, Uciteljska Str</td>
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<td>3</td>
<td>Pouring of crude oil and an oil stain (6-10 m in length) in the Sava. The stain stretches from “Novi Beograd” Heating Plant to Block 45</td>
<td>Apr 13, 2010</td>
<td>Municipality of Novi Beograd, coastal zone of the Sava, from Novi Beograd Heating Plant to Block 45</td>
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<td>Pouring of 7 t of crude oil from the tank truck, after a road accident on the road Umka- Obrenovac, in the coastal area of the Sava</td>
<td>May 14 to 19, 2010</td>
<td>Municipality of Obrenovac, the village of Duboka, near the Belgrade-Obrenovac highway</td>
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<td>5</td>
<td>Sinking of the Romanian barge with 1,000 t of nitrogen fertilizer, after it had hit the pillar of the Pancevo Bridge on the Danube</td>
<td>June 1 to 2, 2010</td>
<td>Municipality of Palilula, 500 m under the Pancevo Bridge</td>
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<td>6</td>
<td>Poisoning of stray dogs and cats in 28 Veljka Dugosevica Str, Municipality of Zvezdara</td>
<td>June 7, 2010</td>
<td>Municipality of Zvezdara, 28 Veljka Dugosevica Str</td>
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<td>Pollution of the Topciderska Rivulet and occurrence of navy blue color in the water stream, approx. 1 km upstream from the flow of Rakovica Stream to the Topciderska Rivulet. The color originated from &quot;Juniriks&quot; Firm</td>
<td>Aug 6 to 7, 2010, Municipality of Rakovica, 7-13 Patrijarha Dimitrija Str</td>
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<td>8</td>
<td>Leaking of propane- butane from a vehicle in 39 Vidakovacki venac Str, Municipality of Rakovica</td>
<td>Aug 11, 2010, Municipality of Rakovica, 39 Vidakovacki venac Str</td>
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<td>9</td>
<td>Chemical pollution of the Vukicevica Rivulet, nearby the village of Orasac, spreading several km to its flow to the Sava. The accident was followed by killing of the fish</td>
<td>Aug 17, 2010, Municipality of Obrenovac, village of Orasac</td>
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<td>Leaking of approx. 400 kg of ammonia, from the PKB &quot;Slaughterhouse &quot;compressor cold storage plant. In Zrenjanin highway</td>
<td>Sep 9, 2010, Municipality of Palilula, Padinska skela, The PKB Imes slaughterhouse Complex, by the Zrenjanin highway</td>
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<td>Report of unpleasant smells, characteristic to decomposition of organic matter in a wider area of Visnjica, Zvezdara, Novi Beograd, Zemun, Palilula, originating from the coastal area of the Sava and Danube (due to unfavorable weather conditions)</td>
<td>Sep 20 to Oct 12, 2010, Municipalities of Zvezdara, Novi Beograd, Zemun and Palilula</td>
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<td>Air pollution by benzene (5- 25 µg/m³), in settlements of Ovca and Borca, originating from operations of the Pancevo Southern Industrial Zone</td>
<td>Oct 11 to 12, 2010, Municipality of Palilula - settlements of Ovca and Borca</td>
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<td>13</td>
<td>Numerous reports and complaints of the public, concerning unpleasant smells (characteristic of chemicals) in the air of Palilula, Zvezdara, Banovo brdo</td>
<td>Oct 12, 2010, Municipality of Zvezdara, Palilula ans Cukarica</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Leaking of crude oil (approx. 10 l) from a fuel- carrying vehicle, on the road, during transportation. In Bulevar oslobodjenja nn, Municipality of Vozdovac</td>
<td>Oct 17, 2010, Municipality of Vozdovac, Bulevar oslobodjenja nn</td>
<td></td>
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<tr>
<td>15</td>
<td>Leaking of transformer oil (approx. 1 l) contaminated by pyralene, from a used transformer station, during transportation, at the junction of streets Tadeusa Koscuska and Cara Dusana, Belgrade</td>
<td>Dec 4, 2010, Municipality of Stari grad, junction of streets Cara Dusana and Tadeusa Koscuska</td>
<td></td>
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<tr>
<td>16</td>
<td>Fire in the &quot;Nelt&quot; warehouse, in Dobanovci, 265 Marsala Tita Str, with demolition of approx. 3,000 m² of space and huge quantities of cardboard packaging and paper</td>
<td>Municipality of Surcin, Industrial zone, &quot;Nelt&quot; warehouse</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Measuring and identification of unknown gaseous substances in a residential building, in 89 Zorana Djindjica Str, originating from the heating plant station</td>
<td>Dec 11, 2010, Municipality of Novi Beograd</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Irregular disposal of seven barrels with medical waste, in the Danube, near Vinca settlement</td>
<td>Dec 15, 2010, Municipality of Grocka</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Pollution of the environment by unknown chemical, left on the ground in order to poison pets and stray animals</td>
<td>Dec 20, 2011, Municipality of Zemun, 10 Vukova Str</td>
<td></td>
</tr>
</tbody>
</table>
Healthy and safe environment is one of the prerogatives of World Health Organization within the program “Health for All 21”. Aiming at protecting health of the populations, it stresses that everyday exposure to concentrations of pollutants should not exceed the prescribed limits. In order to provide data on concentrations of pollutants in the environment, and consequently, analyze them and provide measurements, as risk factors in relation to health, we should found a system of environmental monitoring. The data obtained through this system should be available and used to interconnect the wider notion of “Monitoring system of environment and health”.

Environmental monitoring provides data on the state of the environment. It informs the professionals about the presence of health risk factors in a population. We need health indicators to provide political decision-making based on the information obtained from this system and to improve the communications with the public.

Indicators are a powerful instrument in communication for policy management in environmental protection. They enhance professional communications and relations with the public. It is very important to educate all participants in the “System of environmental and health indicators” about the practical aspects and options it offers. Founding the system of indicators, according to WHO recommendations and methodology, is a necessary step towards promotion of public health in our country.

The Fourth Ministerial Conference dedicated to the Environment was held in Budapest in 2004. It was organized by World health Organization. There, the participating health and environment ministers signed the Ministerial Declaration “For the Future of Our Children”. Creation of national environmental and health action plans for children was defined as one of the assignments from the Declaration, on the national level.

National Committee for Children’s Health and the Environment has defined Action Plan for the Environment and Health of the Children. The document was further adopted by the Serbian Government in October 2009. This Plan defines priorities, defined as four priority goals, previously accepted at the Fourth Ministerial Conference on the Environment and Health, as unanimous priority goals for the European Region.

Regional Priority I - Water and Sanitation; Regional Priority II - Accidents, injuries and Physical Activity; Regional Priority III - Air Quality; and Regional Priority IV - Chemical, Physical and Biological Agents and Occupational Health.

We have thus created a solid legal base (Law on Public Health) as a good methodological guide through Strategy of Public Health and Action Plan for the Environment and Children’s Health. In this manner, we shall be able to promote the health of this population, through application of the above strategic documents and systematic activities.

Dr Snežana Matić-Besarabić, MD
PUBLIC UTILITIES OF BELGRADE IN THE PROTECTION OF THE ENVIRONMENT

ORGANIZATIONS OF ASSIGNMENTS IN RELATION TO THE ENVIRONMENT

The following services have been performing the assignments in the area of environmental protection:

- PUBLIC UTILITY “Srbija Sume”, the Beograd Holding, Forest Holding “Beograd”
- The Serbian Institute for the Protection of Nature
- Botanical Garden “Jevremovac”
- Tourist organization of Belgrade
- Communal and construction affairs
- Department for Inspections
- Sub-department for urban planning, communal and construction affairs
- Independent advisors for ecology (or the like)
- Belgrade Roads Public service company
- Belgrade Waterworks and Sewage public service company
- City Hygiene public service company
- Belgrade Parks public service company
- Ada Ciganlija

THE BELGRADE POWERHOUSE PUBLIC UTILITY

Introduction

Within the remote heating system, “Belgrade Powerhouse PU” has been generating heat in hot boilers. The heat is then distributed through the network of hot water pipelines, delivered to the customers and in measured quantity. The system of remote heating has three units: thermal sources, used for the production of heat energy; distributive network of pipes for its transportation; and primary stations, located in the facilities of our consumers. There, through such stations, we measure and deliver thermal energy.

Monitoring

Since 1980, “Belgrade Powerhouse PU” has been undertaking the analysis and remediation of its wastewaters. We have also been measuring immision and emission. In recent years, we have expanded our engagement to other aspects of environmental protection: waste, soil quality and noise. We have entrusted accredited, registered laboratories with the assignment of measuring those. In the process, we have been applying relevant regulations and EU Directives. In a geographical plan of Belgrade, we have shown our major heating sources, with the network of remote heating. Monitoring and follow-up of air pollution and wastewaters are done in the marked locations. For the measuring of dust-like substances, we have had measuring points installed in the following heating stations: Konjarnik, Banovo brdo, Dunav, Resnik, Zemun, Mladenovac and Banovci.

Conclusions

Based on the new regulations, we shall have directed all activities toward fulfilling the conditions to obtain integrated permits. Those are necessary for the performance of heating plants. According to the currently installed power of our heating sources, we need to obtain nine integrated permits (the Zemun Heating Plant will have undergone reconstruction). Those permits will have provided utilization of best available techniques. Since the BATs are expensive, the sum cannot be compensated from the “Belgrade Powerhouse PU” business operations, regardless of the benefits that will have been obtained within the system of environmental protection.

THE CITY WE DESIRE

SUSTAINABILITY BASED ON KNOWLEDGE - PUBLIC TRAFFIC

The Present

Basic features of the existing road and street network of Belgrade is its radial disposition. Merging and connecting of primary traffic routes have been realized in the central zone of the city.

Out of 617 km of the streets, as much as 67% have only one-way track per direction. The situation is even more difficult when we
know that approximately 90% of
the vehicles in the center have been
parked on the sidewalks and pave-
ments at the same time.

General aims of development of the
traffic system in Belgrade:
- inclusion of Belgrade in the
  European network of multimodal
  traffic knots,
- creation of the conditions to
develop traffic as a significant
economic activity of the city,
- (internal and external) connecting
of all types of networks,
- harmonization among and be-
tween all types of traffic,
- optimal connecting of all city func-
tions through traffic,
- effective and rational utilization of
traffic capacities,
- increasing the levels of services and
safety in traffic,
- decreasing the scope of traffic in
road and street networks,
- enhancing the appeal of public
transportation in relation to pas-
senger vehicle transportation,
- restoring the streets to their basic
function - unhindered and safe
movements of pedestrians and
vehicles,
- decreasing harmful impacts traffic
has on individuals and the environ-
ment, natural, cultural and historic
heritage, and
- rational utilization of financial and
material resources.

The Activities carried out so far
1. Campaign “No cars in the Center
   of the City”
2. Decreasing the parking fee
3. Improving public transportation
   (purchase of new, low-floor busses,
   tramways and trolleybuses)
4. Reconstruction of tramway tracks
   and power networks.

WHAT THE CITY NEEDS AND HAS NOT
YET BEEN DONE
1. Metro
2. Distributive ring
3. Taxes for entering the city center
4. Finalization of Works in the Train
   Station “Beograd- Prokop”
5. Leaving out of poor-quality fossil
   fuels
6. Introduction of alternative fuels:
   biogas, biodiesel, ethanol
7. Introduction of Euro 5 and 6 fuels
8. Supportive measures for greater
   use of hybrid vehicles.

PROTECTION AND PROMOTION OF THE ENVIRONMENT IN THERMAL POWER STATIONS
“NIKOLA TESLA” A and B

Monitoring of environmental
impact of thermal power stations
“Nikola Tesla” A (TENT A) and B
(TENT B) has been performed by an
authorized Environmental Impact
Assessment Service within the
TENT.
In 2010, they have performed the
following:
1. Internal measurements, related to:
   - the quality of ground layer of the
     air, immision in the surrounding of
     TENT A and B - on a daily basis;
   - the quality of surface and ground
     water - once a month,
   - monitoring of performance of EF
     on a daily basis
2. Periodical mandatory measurements,
in cooperation with authorized
facilities:
   - wastewater quality generated in
     TENT A and B and their impact on
     surface and underground water
     (Institute for General and Physical
     Chemistry)
   - Individual measurements of emis-
     sion of harmful and hazardous
     substances to the air (Institute for
     Mining - Zemun)
   - Radioactivity as occupational and
     environmental hazard (Institute for
     Nuclear Energy- Vinca)
   - Impact assessment of the slag
     and waste heaps of TENT A and
     B on the soil and the amelioration
     canals’ waters (Institute for the
     Soil- Belgrade).

COOPERATION WITH LOCAL AUTHO-
RITIES AND BODIES OF THE CITY AND
SERBIAN ADMINISTRATION
During 2010, TENT has continued
its cooperation with the bodies of
Belgrade and Serbian administration.
In order to submit regular informa-
tion to the public and professional
bodies, we have regularly submitted
our reports.
MONTHLY REPORT: Impact of
TENT on Ambient Air in Obrenovac
and surrounding settlements. The
Report is submitted to:
- Ministry for the Environment and
  Spatial Planning
- Agency for the Environment, and
- Municipality of Obrenovac (Ser-
  vice for the Environment), and
- The Obrenovac Fund for the
  Environment.
ACTIVITIES IN ADA CIGANLIJA 2010: PROTECTING AND PROMOTING THE ENVIRONMENT

We had numerous assignments in 2010, that were related to the promotion of environment in Ada Ciganlija.

We have planted 118 trees and covered additional 1,500 m² by perennial plants. Another 650 m² have been planted with seasonal flowers. About 4,500 m² of grass-covered area has been restored. Ten hectares of the area have been prepared for recreation by removing communal waste and huge quantities of weed.

The area had undergone rough planning. In 120 hectares, we have removed PET bottles, aluminum and other types of communal waste. Institute of Public Health of Belgrade has been performing regular control of the Sava Lake. The results show that the water is of class I and II. So far, no presence of causative agents of diseases has been recorded.

In accordance with the Environmental Study concerning the Control of Eutrophization and Production of Macrophytes, we have been reaping the weed under the water. Within the actions concerning regular preparations of the bathing area for the coming season, we placed the new layers of gravel and performed preparations for weed control. The workers of PU “Ada Ciganlija” have been maintaining communal hygiene in 80 hectares of the beach. Their diligence made this recreational area a pride of Belgrade.

ACTIVITIES OF MUNICIPAL WASTE SERVICES “GRADSKA CISTOCA”

During 2010, Public Utility “Gradska cistoca” has organized numerous activities aimed at a healthier and cleaner Belgrade. In many others, it has participated under the auspices of other city authorities. The Utility took efforts to renew its mechanization.

MECHANIZATION

We have introduced a state-of-the-art mechanization. It enabled us to attain better effects of our business, with less physical effort of the employed. In 2009/2010, we have introduced new trucks with side load and 3.2 m³ containers. The advantage is that the truck needs only one worker, i.e. the driver, to empty it.

The improvements were purchased for:
- water cistern additions,
- additions for tank trucks for waste water and fecal water for roll kippers.
- tank trucks for safe drinking water; industrial water (used for cleaning the streets) for automated lifters,
- communal upgraded devices for fecal water tank trucks for automated lifters,
- communal upgraded devices for fecal water tank trucks for automated lifters (5m³ volume),
- communal upgraded devices for safe drinking water tank trucks for automated lifters (5m³ volume).

RECYCLING POINTS AND EDUCATION

In order to be as close to the city population and raise public awareness, Municipal Waste Services “Gradska cistoca” initiated a new project in 2009/2010. The drive encompassed placing of “Recycling Points” throughout the city. Our aim is to initiate the opening of such points and introduce the European standards in the area of waste management. This, in turn, will have decreased the pressures put on the city landfill in Vinca. Separation and categorization of the waste will result in a healthier and cleaner environment of Belgrade.

We have installed 39 recycling points throughout the city.

Our plan is to add 99 such points. In order to make recycling and separation of the waste more appealing, “Gradska cistoca” has initiated a campaign under the slogan “Clean or dirty - it’s not the same”. We covered every primary school by the campaign. “Gradska cistoca” has supported the auction “Workshop for Recycled Dolls”, aimed at the children aged 8-12, as a part of a huger project of international summer workshops.

WASTE CONTAINERS AND BINS

The 2010 Year Annual Plan is to introduce underground containers and the suitable technology for emptying them and remove the waste to proper landfills.
Recreational forests maintenance has been financed by the City Administration, Secretariat for Communal Affairs and Housing. Field assignments have been entrusted to the PU “Srbijasume”, Forest Holding of Belgrade.

Pleasing surrounding in these forests has been created by numerous activities of our workers. They plant flowers, rake and cut grass, take care of hygiene in all recreational areas. We have standing rotation hours of duty. We have been taking care of public fountains and toilets, springs, ditches and road canals. Plants around monuments and memorials are also under our care. In winter, we remove snow and take care of man-made rustic addition components around monuments.

There are eleven recreational forests around Belgrade - Avala, Kosutnjak, Ada Ciganlija, Miljakovac, Kosmaj, Obrenovacki zabran, Bojcin, Makis, Stepin lug, Tresnja, and the forest along the Beograd-Sid highway. Based on the 2009/2010. Program for the Protection and Development of Landscapes of Extremely fine Characteristics, Avala and Kosmaj, financed by the City administration- Secretariat for the Environmental Protection, PU “Srbijasume”, Forest Holding “Beograd” has been active and realized all anticipated assignments.

In “Avala”, we have stressed the need to equip the surface of the forest with new items for children. We have installed six see-saws, eight swings, two climbers and two play structures. We have also made a basketball field with one hoop, summer school made entirely of wood and a mini-mall, with five wooden shacks. In order to offer comprehensive information about the “Avala” Forest we have placed a 3 x 2 m post with “Forest Rules” and a three-dimensional depiction of the mountain. There are ten new direction signs and three info points. Fifteen old direction signs have been replaced. We have also renovated the pedestrian path, from the bus stop (in the foot of Avala Mountain) to the downward road. Another reconstruction is on the way: it will improve the path for pedestrians from the “Beograd” Hostel and the “Sakinac” spring.

Thanks to a good cooperation with local administration offices and schools in the foot of Avala, we have organized education of the population, related to protective environmental measures and development of the protected natural good. In the end, we wish to stress devotedness and dedication of our guards’ services in both protected areas. They are an indispensable factor in keeping the exquisite areas under protection and open for further development as landscapes of extraordinary characteristics.

**PUBLIC UTILITY FOR THE MAINTENANCE OF GREEN AREAS “Zelenilo Beograd”**

“These public areas are the lifeblood of our city. The PU was founded in 1929. Today, we have 1,253 employees: 148 with a University degree (mostly engineers of forestry, Department of Landscape Architecture; and other types of engineers and architects). At our disposal, we have 12 hectares of open land for plant production and 7,000 m² of the area covered by greenhouses. The Utility has been founded as a public one, to keep and maintain green areas and public sanitation facilities. We also have our own production and repair shops for the maintenance of devices located in parks for play, recreational or resting purposes. One of our prominent assignments relates to flower and decorative plant growing, and seeding.

According to the City Decree on the Maintenance of Public Green Areas, the assignment is a communal one, of special interest. The area of Belgrade is divided into:

- public green areas, which are maintained by and entrusted to Public Utility for the Maintenance of Green Areas “Zelenilo Beograd”
- forests - parks, whose maintenance is entrusted to Public Utilities “Srbijasume” and “Zelenilo Beograd”, in accordance with the Serbian Law on Forests, and
- special public green areas (within schools, business, healthcare, educational and cultural facilities; terrains for physical culture; green areas within graveyards, botanical gardens, zoos, arboretums, tree nurseries and seed plots).
maintenance of such special public green areas has been entrusted to the entities, which are using or managing them.

**ACTIVITIES OF MUNICIPALITIES IN THE PROTECTION OF THE ENVIRONMENT**

Jurisdiction of local government in the territory of Belgrade has been carried out within 17 municipalities. Numerous features among municipalities differ great deal (like terrain characteristics, urban issues, population density, purpose and utilization of the land, demographic structure, quality of the environment) and are all very heterogeneous. That is why municipal issues are grouped as: rural ones, mixed rural-urban and urban municipalities.

**Activities in the Area of Environmental Promotion**

Reading Municipality Reports on the State of The Environment in 2010, it can be noticed that each of them had carefully made yearly Plan for the protection of the environment with the content of activities. In order to raise awareness about the importance of the protection of the environment and its promotion, municipalities mark the events related to the issue. They are marked through festivals and activities in schools, preschool facilities, art workshops, through open-space programs.

Environment-related activities also encompass competition for the best-arranged and kept courtyard, street window; lectures on the green. Every specific activity had its attractive marketing name, time-table, name of the main organizer, target population and evaluation of the event.

Many educational workshops have been organized in each municipality in accordance with their specific environmental problems and priority.

**Activities related to Environmental Projects**

In 2010, projects were directed towards concrete issues: regulation of wastewaters, activities in order to diminish open-space uncontrolled landfields, recycling of plastic waste, electronic waste, importance of controlling and decreasing air pollution; establishing monitoring of the air pollution where indicated (Obrenovac, Lazarevac), making LEAP; many activities in zoological hygiene; bringing up the strategic environmental impact assessment issues to the public opinion, with the respect of given suggestions by the public (inhabitants directly engaged).
The Regional Environmental Center for Central and Eastern Europe (REC) is a non-partisan, non-advocacy, not-for-profit international organisation with a mission to assist in solving environmental problems in Central and Eastern Europe (CEE). The center fulfills this mission by promoting cooperation among non-governmental organisations, governments, businesses and other environmental stakeholders, and by supporting the free exchange of information and public participation in environmental decision-making.

The REC was established in 1990 by the United States, the European Commission and Hungary. Today, the REC is legally based on a charter signed by the governments of 28 countries and the European Commission, and on an international agreement with the government of Hungary.

The REC has its head office in Szentendre, Hungary, and country offices and field offices in 17 beneficiary countries which are: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, FYR Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia and Turkey.

Country Office Serbia
The REC is officially present in Serbia since April 1997, while the Office in Serbia and Montenegro exists since May 1998. Currently, REC office in Serbia is functioning based on the Agreement on legal status of the REC in Serbia, signed in June 2008 REC with the Government of the Republic of Serbia.

Strengthening cooperation
In recent years REC put a lot of emphasis on strengthening cooperation with partnering institutions in Republic of Serbia. In this respect, REC and Hydrometeorological Service of Serbia in 2008 have signed contract on establishing joint office to fight climate change, within the Subregional Virtual Climate Change Center for SEE. At the end of 2009 REC and Serbian Agency for Environmental Protection have signed a contract on cooperation. Number of documents which clarified ways of cooperation between REC and local communities, national parks, NGOs, educational institutions, media and other stakeholders were signed and implemented.

Contacts:
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Country Office Serbia
Kosovska 17/VI
11000 Belgrade
E-mail: office@rec.rs
www.rec.rs
www.rec.org
INSTITUTE OF PUBLIC HEALTH: WHAT IT IS, WHAT IT DOES
The Institute has approximately 400 employees: 67 medical doctors of various specialties and a great number of health care associates with high school education- chemical engineers, chemists, biologists, environment protection engineers, pharmacists and programmers, who contribute to professional and scientific approach to the health and environmental protection and promotion. After a year of preparation, the Institute has accomplished a process of standardization to SRPS/ISO 9001:2001 and SRPS/ISO 14001:2004.

Center for Hygiene and Human Ecology
Multidisciplinary teams prepare, make plans and set up programs for monitoring of the environmental media: water, air and soil in urban and rural settlements. Registers, collect and evaluates data about health risk factors present in the environment, and give recommendations for preventive and mitigation measures. The Center monitors the level of communal noise.

Laboratory for Human Ecology and Ecotoxicology
Laboratory for Human Ecology and Ecotoxicology was among the first in Republic of Serbia to be accredited according to ISO 17025. Laboratory determines a large number of inorganic and organic compounds in samples of air, water, soil, sediments and biological material. IPH laboratory is one of the most advanced in the field of environmental trace analysis. Laboratory has some of the most sophisticated and advanced instrumentation on the market in accordance with EN ISO/SRPS 17025. IPH Laboratory carry out sampling and analysis, instrument calibration, maintenance and international inter-calibration.

Center for Eco-toxicology:
Deals with examination of hazardous wastes, determines characterization and categorization of it, gives recommendations for handling, and treatment of solid and liquid waste. Performs collecting, recycling, destroying and final disposal of medical waste form medical and other health institutions. Center has been appointed responsible for the function of Ecotoxicological Center for the city of Belgrade. Formed Mobile Ecotoxicological Units (MEJ) take active part in prevention, and preparedness to chemical accidents, gives measures for remediation, and sanitation.
Institute of Occupational Health in Belgrade is the national institute of Serbia. It has been founded in 1953 by Serbian Ministry of Health. Today, it is a part of the Clinical Center of Serbia, and WHO Collaborating Center in Occupational Health.

Main tasks

- Reference institution for occupational health care of working population
- Doctrinaire and methodological activities in the field of occupational health
- Occupational medical care and introduction of new methods in diagnostic, therapy and rehabilitation in the field of occupational diseases and work-related diseases
- Protection from ionizing and non-ionizing radiation in health care workers
- Scientific and research projects
- Education and training in occupational health and related fields

Organization

The main departments of the Institute are as follows:

I Center for Occupational Diseases and Toxicology
II Center for Occupational Health
III Center for assessment of fitness for work
IV Center for Occupational Health Development and International Relations
V Center for Ionizing and Non-Ionizing Radiation Protection

Employees

The total number of personnel is 149, out of which there is: 38 physicians, 21 graduates (technologists, physicists, engineers, biochemists, pharmacologists, etc.), 56 nurses, among others. Out of the total number of employees: 56 are specialists, 6 subspecialists, 12 with Ph.D. and 12 with MSc degrees.

International collaboration

The Institute has contributed to the international field by:

- Being one of the WHO collaborating center in occupational health
- Organizing eight international courses in toxicology for developing countries sponsored by WHO, Yugoslav and the Netherlands governments
- Experts from the Institute participated in the development of occupational health and specific toxicological laboratories in India, Tunisia, Algeria, Egypt, Greece and other countries worldwide
- Performing the collaboration with the Russian Federation, Germany, Sweden, Finland, Czech Republic, Poland and other countries through scientific visits, joint projects, participation at international congresses and symposia, exchange of scientific literature and other.
Institute of Public Health of Serbia „Dr Milan Jovanović Batut“ is the public health institution which performs the tasks of common concern and interest in the area of health care in the Republic of Serbia. The specific areas of health activities covered by the institute are epidemiology, hygiene and human ecology, social medicine, organization of health care and health services, health statistics and informatics, health educating etc.

The Institute is the professional and methodological, and the scientific and educational institution for the areas covered by.

As a reference professional and methodological institution, the Institute is involved in designing the health care policy the strategies, organization and health system development.

The Institute coordinates and participates in the implementation of the special health care programmers in the population, which are brought by the government of Serbia.

It also coordinates activities and development of the network of 23 regional public-health Institutes of Serbia.

Apart from other activities, the Institute is a teaching base for certain subjects at the Schools of Medicine, Dental Medicine, and Pharmacy of the University of Belgrade, Novi Sad, Nis and Kragujevac.

The Institute has about 250 employees: health workers and health co-workers, and workers of various other profiles. Out of them, 132 have university-level education among which there are 61 specialist in preventive medicine, stomatology, pharmacy, and 40 are university-level co-workers.