



a toxics-free future

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International Mercury Treaty Enabling Activities Program (IMEAP)

Following the signing of the Minamata Convention on Mercury (the ‘mercury treaty’) in 2013 and the release of the IPEN Minamata Declaration on Toxic Metals, IPEN expanded its Mercury-Free Campaign and developed a broad program of treaty-enabling activities to be implemented in conjunction with IPEN Participating Organizations (POs). The International Mercury Treaty Enabling Activities Program (IMEAP) is geared toward raising awareness about the mercury treaty while generating data on key thematic elements of mercury pollution to help enable countries to implement the Minamata Convention.

IPEN launched IMEAP in early 2014 and continues to mobilise resources for IPEN POs to conduct activities that support implementation of the mercury treaty¹.

The key objectives of the IPEN IMEAP are:

1. *Preparing for Treaty Ratification & Implementation:* Creating synergies between NGOs in developing countries with ongoing UN agency or government-led mercury activities and NGO priority-setting.
2. *Enabling Activities to Prepare Countries for Treaty Ratification & Implementation:* Support to NGOs to carry out national and thematic mercury treaty activities.
3. *Communication of Issues Related to Mercury and Treaty Ratification & Implementation:* Global dissemination of project results & south-south collaboration.

The following project forms part of the overall IMEAP activities and contributes to the greater global understanding of mercury pollution issues while providing information that may contribute to Minamata Initial Assessments (MIA) and raise public awareness in preparation for early ratification of the Minamata Convention on Mercury.

¹ IPEN would like to acknowledge the financial contributions from the governments of Germany, Sweden and Switzerland, and the Swedish public development co-operation aid through the Swedish Society for Nature Conservation (SSNC) and other donors. The views herein shall not necessarily be taken to reflect the official opinion of any of these donors, including SSNC or its donors.

IPEN Mercury Treaty Enabling project: Serbia

Name of the NGO: ALHem- Safer Chemicals Alternative

Date: 5 March 2015 (IMEAP: 2014 Phase)

Country: Serbia

Title of project: Serbian Response to Global Mercury Treaty

Summary

This report by Serbian NGO ALHem provides data and research into critical mercury pollution issues in Serbia as well as key policy and legislative framework gaps that must be addressed to move towards ratification of the Mercury Treaty. The report includes revelations about mercury contamination resulting from the NATO bombing of a mercury cell chlor-alkali plant in 1999 and the urgent need for remediation of the hotspot and environmental monitoring. ALHem have researched and presented key data on trends in mercury pollution in air and water in Serbia within this report and to a range of prominent stakeholders. This report provides details of their intensive stakeholder engagement activities with government institutions, professional bodies, industry representatives and CSOs with interests in mercury pollution. This activity has progressed changes in the dental industry and introduced the Serbian chlor-alkali industry to their obligations under the Mercury Treaty, which they had been unaware of. Importantly, ALHem was also able to identify a range of banned mercury-added products that remain on market shelves despite national restrictions and have liaised with regulators to address the problem. This comprehensively researched report provides numerous links and references for reading to explore mercury pollution issues in Serbia to an even greater extent.

Mercury-based products in the market

Identify the most common forms of mercury available to the public, including in products sold:

Serbia, as a candidate country for the European Union, is transposing EU legislation into national legislation and almost all mercury-added products listed in Part I of Annex A are prohibited for placing on the Serbian market (measuring devices for professionals will be prohibited on the market from 2018). However, inspection to control this prohibition is not enforced and still in discounted market stores these kinds of products could be found (e.g. ALHem found that thermometers with mercury are very common in these kind of stores and in open air markets). In addition, dental amalgam is still used in Serbia.

Imports and exports: Describe the quantities of mercury imported/exported and stored in your country and the method of estimation):

According to Serbian Custom Authorities, official statistical data records imports of mercury compounds in the previous three years at approximately 800 kg, and exports in very small quantities, approximately 5 kg. The import of dental amalgam is not so easy to determine as dental amalgam is imported under the custom tariff number 3006.40 00 00, which includes all

dental fillings. Nevertheless, one company imported dental amalgam under custom tariff number 2843.90 10 00 and imported approximately 7 tons of dental amalgam in the previous three years. In future work on mercury issues these dates should be checked with companies authorized to place dental amalgams on the Serbian market. On the website of Medicines and Medical Devices Agency of Serbia (ALIMS), ALHem found that 22 dental amalgam products are registered in Serbia.

Human Exposure to mercury

Describe the most common forms of mercury exposure in the country:

For exposure assessment of the Serbian population to mercury through all routes of exposure there is temporary knowledge and aims in the near future for more work with a focus on human health risk assessment.

Among the Serbian population, there are two possible identified routes of exposure to mercury of concern: exposure of the general population by food and by inhaled air, and professional exposure, predominantly in two chlor-alkali facilities. Through the open debate it was emphasized that it is important to identify the type of mercury that enters the body, since its different forms cause totally different adverse effects on human health (elemental, inorganic form and organic forms of mercury)².

Exposure of the general population could be estimated as acceptable, since values of emissions measured in the air in the city of Kruševac (where one chlor-alkali industry is situated) did not exceed the permitted level of 1 µg/m³. From 2003 to 2009 it was approximately up to 0,6 µg/m³. After the production was stopped, levels measured in the air did not exceed 0,22 µg/m³ (Public Health Institute Kruševac, 2013)³.

Professional exposure to mercury was estimated in a second chlor-alkali facility by Nešić et al and published in 2014⁴. Two different types of critical points, where exposure is identified, are processes of general repair and regular maintenance. Exposure during general repair exceeded permitted levels in human urine, in the 3rd week of process, and none of the values exceeded permitted levels during regular maintenance. It is necessary to improve awareness of professionals who are working in this process and who are responsible as well, to take measures of exposure prevention.

Exposure through food was based on the data about mercury concentration, body weight, and the available GEMS/Food Cluster Diets Database (FAO/WHO 2012)⁵ was used for the purpose of intake assessment. Data integration was performed using either deterministic or probabilistic modeling (Monte Carlo simulation with 100 iterations in the @RISK software). Using deterministic approach, calculated hazard indexes (HI) did not exceed values of one indicating unacceptable risk while results from probabilistic modeling imply that values of 5th, 50th and 95th percentile of the total methyl-mercury intake distribution are 0.00471, 0.0164, and 0.0659 mg/kg bw/day, respectively. Fish products are estimated to contribute the most to the total methyl-mercury intake, since their 95th percentile (0,0623 µg/kg bw/day) is 74,3% of the total intake. In the applied scenario, the total methyl-mercury intake was less than the recommended tolerable daily intake of 0,23 µg/kg bw (JECFA). Therefore, it can be concluded

² Casarett & Doull's Essentials of Toxicology, Second Edition. Eds: Klaassen C and CB Watkins. Mc Graw Hill, Canada, 2010.

³ Results form public health institute of Krusevac, 2013.

⁴ Nesic et al. Biological monitoring of mercury workers exposed in chlor-alkali industry. Medical data 2014; 6(1): 59-62.

⁵ FAO/WHO, 2012.GEMS/Food Cluster Diets database.

that the risk of the methyl-mercury intake through fish products foods for the observed population of adults is acceptable⁶.

However, for the purpose of doctoral dissertation (Saša Janković, unpublished data)⁷ deterministic procedure, used mercury intake assessment of all food items on Serbian market, indicated that in some scenarios HIs exceeded value of 1 and some percentile of general population is exposed to higher level of Hg by food consumption.

In conclusion, according to our present knowledge, a risk of mercury exposure among the Serbian population is possible from food and from some industrial processes. Preventive measures related to food consumption should be taken to raise the awareness of the general population, at the same time as industry professional toxicologists should be responsible for the issue when workers are exposed.

For integrated health risk assessment all routes of intake should be taken into account and more data is necessary. There is potential in further collaboration based on the planned data in human biomonitoring from this research and we are expecting information with a higher level of certainty.

Human activities leading to mercury pollution

Specify the current knowledge about human activities that release mercury into the environment in your country:

There are two chlor-alkali production facilities within the country. Major emissions of mercury in the environment are from public electricity and heat production plants and production of solid fuels and other energy industries (based on coal). Emissions also arise from the use of batteries, measuring and control equipment (including laboratory and hospital equipment), electrical equipment and lighting. Other products (e.g. paints, pharmaceuticals, other medical/health devices and dental amalgams) are also a source of mercury emissions. Small combustion installations, activities for commercial and institutional heating and combustion installations for residential heating and cooking also contribute to mercury emissions into the environment.

ASGM

Describe the level of Artisanal and Small Scale Gold Mining (ASGM) in your country, including location, mercury use (if any), source of the mercury (including legal or illegal supplies) and whether the gold trade is formal or informal.

To ALHem's knowledge and from information obtained from the ministry responsible for environment in Serbia, there are not significant artisanal and small scale gold mining activities and mercury is not used for this kind of purpose.

⁶ Buha, Aleksandra, Angelina Filipovic, Jelena Dumanovic, Evica Antonijevic, Marijana Curcic, Saša Jankovic, Dragica Nikolic, and Biljana Antonijevic. "The use of @ risk software for risk assessment of mercury intake via marine food among Serbian population." *Toxicology Letters* 221 (2013): S222-S223.

⁷ Sasa Jankovic, unpublished data, Doctoral dissertation waiting permission from University, 2015.

Levels of mercury release and exposure:

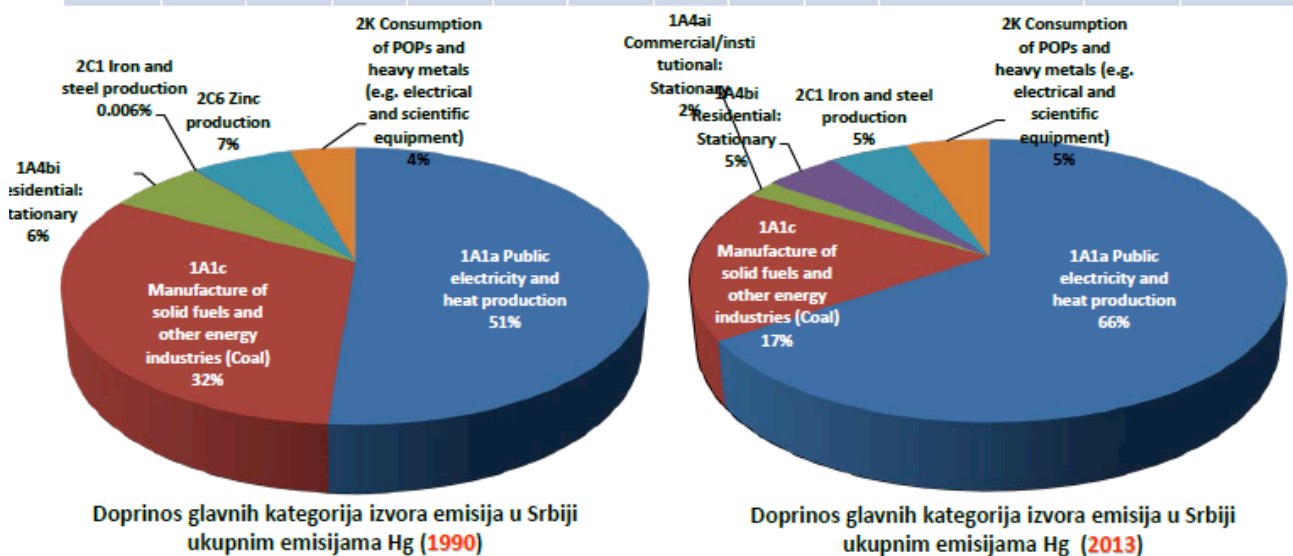
Provide information on mercury data available at the national level and indicate if this information has been derived using the UNEP Toolkit (level 1 or level 2 mercury inventories using UNEP Tool Kits or other inventory methods). Report the inferred quantity of mercury realized based on the recent inventory result if any. Describe the main exposed population groups and provide references for information sources:

Air emission data were collected according to EMEP methodology (the European Monitoring and Evaluation Programme --a scientifically based and policy driven programme under the CLRTAP for international co-operation to solve transboundary air pollution problems). The data for Serbia could be found on www.cejp.at website.

National totals for Hg (Mg/year)

EMEP/EEA air pollutant emission inventory guidebook - 2013

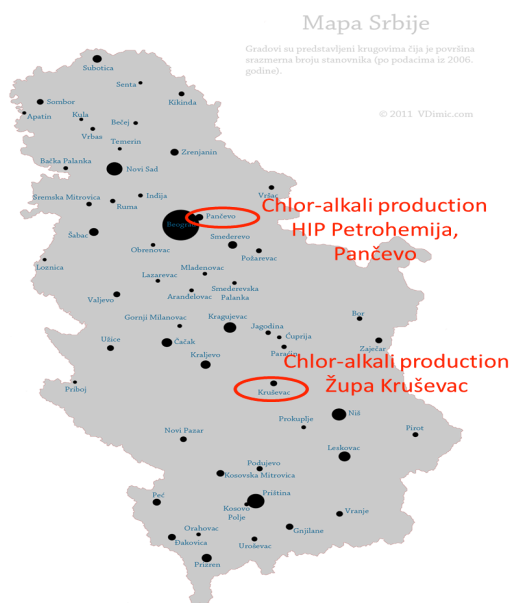
Country	base year	1990	1995	2000	2005	2010	2011	2012	2013	Hg emission reduction target (emission level base year)	Hg target met?	Exceedance by (or reduction %)
Serbia	1990	1,94	1,69	1,62	1,65	1,63	1,72	1,40	1,44	1,94	Yes	-26%



Testing the quality of surface water and groundwater under the Programme of Systematic Water Quality Testing conducted by the Agency for Environmental Protection in the Republic of Serbia is made on the basis of Art. 109 of the Water Act ("Off. Gazette of RS", no. 30/10). Data on mercury concentration in waters is given in Annex I of this report.

Possible damage caused by mercury

Describe current known or reported mercury threats. Provide information on the kinds of mercury problems in the past have caused damage to the public, environment, food and/or workers. Identify the known population sub-groups vulnerable to mercury exposure. Please provide any information or reference sources:



There are two chlor-alkali production facilities in the country. Both factories have stopped chlor-alkali production.

One chlor-alkali production facility located is in Pančevo in the north, and damage was inflicted to it by aerial bombing of the country (HIP Petrohemija, Pančevo). Since the NATO military campaign in 1999, the electrolysis factory works with reduced capacity. From 34 installed mercury cells production before bombing in 1999, production was reduced to only 6 cells post-bombing until August 2014. According to the material balance of the factory, it was operating at an average capacity of 5% (by observing the production of chlorine). The Petrohemija management board decided to stop production in August 2014 due to economic reasons. At the moment at the factory site there are approximately 16 t of metallic mercury in 6 mercury cells and 483 kg mercury in stocks.

Metallic mercury from 28 cells (approx. 3 t) was sold after the bombing. Empty cells are still within the factory. Sewage sludge from the production process (the electrolyte decanting process) contaminated with mercury (in ppm concentration) was disposed of at an engineered landfill (from the '90s) in the factory. There are now 5284 t of sewage sludge contaminated with mercury in two landfills; HDPE liner is used. Plans for the two landfills is to drain them and sprinkle with sulfur or some sulfide to reduce leaching of mercury. There was no import of mercury after 1999. During the bombing in 1999, the chlor-alkali plant in Pančevo was heavily damaged and released metallic mercury into environment. Metallic mercury was spilled on the surface of the site and some portion leaked into the waste channel. Most of the material that was spilled onto the soil was recovered⁸. It is in a third landfill and 1500 m³-contaminated materials are landfilled there.

⁸ Balkan Task Force *Pancevo Site Report (Draft)*. Chateline: United Nation Environmental Programme, 1999 <http://www.grid.unep.ch/btf/missions/sites/pancevo.pdf>



Sewage sludge from the production process (the electrolyte decanting process) contaminated with mercury (in ppm concentration) was disposed of at an engineered landfill (from the '90s) in the factory. There are now 5284 t of sewage sludge contaminated with mercury in two landfills; HDPE liners are used.

There are three landfills contaminated with mercury in the Petrohemija factory- the two open landfills on the left side are for sewage sludge from the production process. The third (red circle) landfill is contaminated soil and other materials from the damaged plant after the bombing in 1999.



Sewage sludge contaminated with mercury was created by washing work wear and cleaning of the working space is stored in plastic barrels and there are 62.4 t of waste at the moment in the factory. The precise mercury concentration in this waste could not be determined (approximate 15-20%). This kind of waste is planned to be sent for further treatment (according to information from Petrohemija).

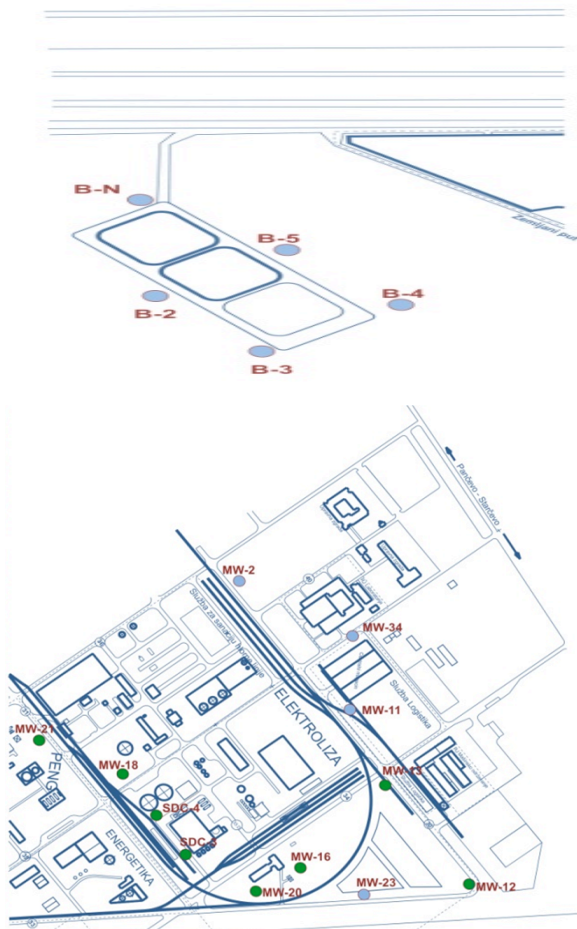
Historically, this kind of sludge was sent to treatment in the Idrija Mercury Mine in Slovenia, but as the mercury mine is closed a new solution needs to be found for the existing 62,4 t of waste.

The factory electrolysis is performed with pretreatment of waste water by adjusting the pH by hydrochloric acid, removing of free chlorine with sodium sulfate, and removing of mercury with sodium sulfide that transforms mercury in mercury sulfide. Treated wastewater is then sent for further processing in the factory for water treatment and discharges into the recipient - the river Danube.

Measurement of mercury released in the water is done six times a year in accordance with the regulations on the method and the minimum number of wastewater quality testing. The measured concentrations of mercury in wastewater are below the prescribed emission limit values in accordance with the regulation on limit values for priority and priority hazardous substances polluting surface waters and deadlines for reaching thereof: "Official Gazette of the RS", No 24/2014.

In order to estimate the presence of possible pollution, which may be produced during production cycles and waste disposal procedures, as well as for the purpose of monitoring effects of remediation works and possible migration of pollution created during the NATO bombing, samples were taken for laboratory tests from twelve piezometers located within the boundary limits of HIP-Petrohemija. For checking non-permeability of the dumping place used

for disposal of mercury-contaminated waste, and for estimation of possible impact of processing waters to quality of ground waters, samples were taken and laboratory tests performed for waters from two piezometers (B-4 i B-5) located in close proximity of the stated dump. For the purpose of checking non-permeability of the sludge dump, and estimation of possible impact of processing waters to ground waters quality, samples were taken and laboratory tests performed for waters from four piezometers (PD-1, PD-2, PD-3, PD-4) located in close proximity of the stated dump.



On the basis of the results obtained from ground waters samples testing, and comparison of the obtained results with the remediation values and values indicated significant contamination⁹, it may be concluded that all obtained values are below the detection limits, or significantly lower than values which may indicate substantive contamination. Only values of mercury concentration in the samples of waters taken from piezometers MW- 13, MW-12, MW-23, MW-16, MW-20, SDC-3 i SDC-4, are larger than remediation values predicted by the Regulation.

During the project implementation period, we did not receive information from another chlor-alkali factory Župa in Kruševac. The Ministry insisted several times without any response from the factory. According to information from the Ministry responsible for environmental protection, the chlorine production in chlor-alkali production stopped several years ago because of privatization problems. Now they are waiting to see if it will be sold to another owner.

Laws currently regulating mercury:

Define any laws limiting or banning the use of mercury in specific practices, processes and/or products in your country (if any):

Serbia is transposing EU legislation related to chemicals, waste (including rules on allowed content of mercury in batteries and accumulators, on electrical and electronic equipment, end-of-life vehicles as well as rules on safe management of this waste streams), biocides and pesticides and cosmetics. Some of the prohibitions from the EU legislation is the same in

⁹ according to the Regulation relating to the Program of systematic ground quality monitoring, what are indicators for risk assessment of soil degradation and methodology for preparing remediation programs, "Official gazette", no. 88/10

national legislation (such as prohibition legislation dealing with chemicals), but other legislation is not up to date, e.g. prohibition that relates to electrical and electronic products. There are national plans in line with national program on transposition of EU Acquis to update this regulation. In addition, Serbian legislation related to cosmetics is not in line with EU legislation. As in the EU legislation, these restrictions relate to placing on the domestic market (including import) and not on prohibition of manufacturing and export (with exception of cosmetic soap and pesticides with mercury).

Minamata Convention Article 4	Serbian legislation where prohibition is prescribed
Batteries, except for button zinc silver oxide batteries with a mercury content < 2%, button zinc air batteries with a mercury content < 2%	Law on Waste Management (“Official Gazette of the RS”, No 36/09) and Rulebook on management of used batteries and accumulators (“Official Gazette of the RS”, No 86/10). Directive 2006/66/EC on batteries and accumulators has been partially transposed. Directive 2013/56/EU on batteries and accumulators and waste batteries and accumulators has not been transposed to the national legislation
Switches and relays, except very high accuracy capacitance and loss measurement bridges and high frequency radio frequency switches and relays in monitoring and control instruments with a maximum mercury content of 20 mg per bridge, switch or relay	Law on Waste Management (“Official Gazette of the RS”, No 36/09) and Rulebook on list of electrical and electronic products, measures restricting or prohibiting the use of electrical and electronic equipment containing hazardous substances, the manner and procedure for management of waste originating from electrical and electronic products (“Official Gazette of the RS”, No 99/10)
High pressure mercury vapor lamps (HPMV) for general lighting purposes	Law on Waste Management (“Official Gazette of the RS”, No 36/09) and Rulebook on list of electrical and electronic products, measures restricting or prohibiting the use of electrical and electronic equipment containing hazardous substances, the manner and procedure for management of waste originating from electrical and electronic products (“Official Gazette of the RS”, No 99/10)
Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for electronic displays: (a) short length (≤ 500 mm) with mercury content exceeding 3.5mg per lamp (b) medium length (> 500 mm and $\leq 1\,500$ mm) with mercury content exceeding 5 mg per lamp (c) long length ($> 1\,500$ mm) with mercury content exceeding 13 mg per lamp	Law on Waste Management (“Official Gazette of the RS”, No 36/09) and Rulebook on list of electrical and electronic products, measures restricting or prohibiting the use of electrical and electronic equipment containing hazardous substances, the manner and procedure for management of waste originating from electrical and electronic products (“Official Gazette of the RS”, No 99/10)

Pesticides, biocides and topical antiseptics	Mercury and mercury compounds are not approved as active substances for plant protection products or biocides under EU legislation. Serbia is taking over these lists.
The following non-electronic measuring devices except non-electronic measuring devices installed in large-scale equipment or those used for high precision measurement, where no suitable mercury-free alternative is available: (a) barometers; (b) hygrometers; (c) manometers; (d) thermometers; (e) sphygmomanometers	Law on Chemicals ("Official Gazette of the RS", number 36/09, 88/10, 92/11 and 93/12) Rulebook on Bans and Restrictions of Production, Placing on the Market and Use of Chemicals that Pose an Unacceptable Risk to Human Health and Environment ("Official Gazette of the RS", number 90/13), Rulebook on Import and Export of Certain Hazardous Chemicals ("Official Gazette of the RS", number 89/10 and 15/13) (transposing annex XVII of REACH Regulation)
Minamata Convention Article 5	Serbian legislation
Restricting the use of mercury in the processes listed in part II of Annex B: polyurethane	Polyurethane (PUR): Rulebook on Import and Export of Certain Hazardous Chemicals ("Official Gazette of the RS", number 89/10 and 15/13) (transposing annex XVII of REACH Regulation) stipulates that the five hitherto most used phenyl-Hg catalysts may not be manufactured, used or placed on the market, if the concentration of mercury in the mixtures is equal to or greater than 0.01% by weight, with effect from October 2017.
Restricting the use of mercury in the processes listed in Annex B: Chlor-alkali production, acetaldehyde production in which mercury or mercury compounds are used as a catalyst, VCM, Na/K-methylate/ethylate, polyurethane	Law on Integrated Environmental Pollution Prevention and Control ("Official Gazette of the RS", 135/04) transposed Directive 96/61/EC (IPPC Directive) and accepting EU BREF and recommendation for BAT such as BREF for production of chlor-alkali "The mercury cell technique cannot be considered BAT under any circumstances."

There is other legislation which regulates mercury emissions to air- Law on Air Protection (Official Gazette of the RS, No 36/09 and 10/13), Regulation on emission limit values of pollutants into the air (Official Gazette of the RS, No 1/10 and 6/11) and The Regulation on monitoring conditions and air quality requirements (Official Gazette of the RS, No 11/10 and 75/10).

Release of mercury to water is regulated in legislation given in annex I of this report. Among this legislation is a Law on Ratification of the Protocol on Heavy Metals to the Convention on the cross-border long-range air pollution (Official Gazette of the RS - International Treaties, 1/2012).

Efforts in your country to deal with mercury

Specify any priority action on mercury that the government taken to reduce mercury exposure:

Serbia has ratified the Protocol on Heavy Metals and is conducting transposition of EU legislation dealing with mercury management as well as implementing these legislations. In addition, a national action plan for implementation and ratification of the Protocol on Heavy Metals has been developed. The Serbian environmental protection agency is collecting data on mercury. In the reference to dental amalgam use, there are action plans for prevention of caries and protocols for the use of dental amalgam (dental amalgam can be used in molars in cases where it is clear that this material will last longer).

Storage

Report the current capacity for interim or long term storage of mercury and mercury compounds in your country:

There is not long-term storage of mercury and mercury compounds in the country. Interim storages of metallic mercury, sewage sludge contaminated with mercury and other mercury-contaminated materials (mainly soil) are within the factory sites. There are two chlor-alkali production facilities in the country. Both factories stopped chlor-alkali production and more information is included in the section related to "Damage caused by mercury".

Mercury wastes:

Explain how mercury wastes are currently managed in your country including domestic treatment or export. If your country has a threshold value or other means to define mercury waste, provide information on the method used. Describe the technologies currently available in your country to manage mercury waste:

Law of Waste Management ("Official Gazette" no. 36/09 and 88/10) prescribes that the waste could be stored in locations that are technically equipped for the temporary storage at the site of the manufacturer or owner of waste, collection centers, transfer stations and other locations.

Serbia has not transposed EU Regulation 1102/2008 where it is regulated that mercury from chlor-alkali production, primary mining, cleaning of natural gas and non-ferrous mining and smelting operations are considering as waste. Also, what are allowed techniques for metallic mercury temporary and permanent disposal, how this storage should be controlled, or other specific measures for mercury waste regulated under this EU Regulation are not regulated in national legislation.

On the other side, Serbia regulated all other measures related to hazardous waste from EU legislation. In addition, in the national legislation there are regulations on how to deal with electric and electronic waste, battery waste and end-of life vehicles that are dealing with products containing mercury. Legislation on this specific waste stream is transposed from relevant EU legislation. Owners of used batteries (legal entities- not consumers) are obliged to deliver them to legal entities that have a license (issued by the ministry) for batteries handling, storage and treatment. The same principle is applied for end-of-life vehicles and electric and electronic equipment. Legal entities collecting this kind of waste stream should be licensed.

Hazardous waste can be temporarily stored at the site of the manufacturer or owner for a period of 12 months. The import of hazardous waste into the Republic of Serbia, and waste containing mercury or mercury compounds (listed as hazardous waste), is prohibited, although

export and transit is allowed. Transit and export is controlled with approvals and permits for cross-border movement of waste containing mercury and subject to the observance of all provisions of international treaties, conventions and regulations on the transboundary movement of hazardous waste, and in accordance with paragraph (10) of the preamble to the aforementioned Regulation.

The lists of waste suitable for transboundary movement of waste, mercury and mercury compounds carry national, Basel, European and international labels and catalog numbers of waste. These labels are established by testing laboratories using sampling methods laid down by Serbian standards, internationally recognized standards or other applicable documented methods and characterization of waste for the purpose of classification for transboundary movement of waste treatment or disposal.

Quantity of produced waste that contain mercury or heavy metal¹⁰

Index number		Quantity of waste produced (t)		
		2011.	2012.	2013.
06 03 13*	WASTES FROM INORGANIC CHEMICAL PROCESSES - wastes from the manufacture, formulation, supply and use of salts and their solutions and metallic oxides solid salts and solutions containing heavy metals	80	80	/
06 03 15*	WASTES FROM INORGANIC CHEMICAL PROCESSES - metallic oxides containing heavy metals	/	/	0.5
06 04 04*	WASTES FROM INORGANIC CHEMICAL PROCESSES - wastes containing mercury	0.6	185	/
10 11 11*	- wastes from manufacture of glass and glass products - waste glass in small particles and glass powder containing heavy metals (for example from cathode ray tubes)	53.4	/	/
10 12 11*	- wastes from manufacture of ceramic goods, bricks, tiles and construction products - wastes from glazing containing heavy metals	6	6	19.73
16 01 08*	end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance - components containing mercury	/	0.61	0.09
20 01 21*	MUNICIPAL WASTES - fluorescent tubes and other mercury-containing waste	8.52	17.89	32.01

Quantity of treated waste that contain mercury or heavy metal

¹⁰ The data were obtained in accordance with the legislation under which the annual reports should be submitted to the Agency for Environmental Protection - Regulations on the methodology for the preparation of national and local register of pollution sources, as well as the methodology for the species, methods and deadlines for data collection ("Official Gazette of RS" no. 91/2010 and 10/2013) and the Regulations on the form of daily records and annual reports on waste with instructions for its completion (Official Gazette of RS, no. 95/2010).

Index number		Quantity of treated waste (t)		
		2011.	2012.	2013.
06 03 13*	WASTES FROM INORGANIC CHEMICAL PROCESSES - wastes from the manufacture, formulation, supply and use of salts and their solutions and metallic oxides solid salts and solutions containing heavy metals			0.42
10 11 11*	wastes from manufacture of glass and glass products - waste glass in small particles and glass powder containing heavy metals (for example from cathode ray tubes)			0.23
10 12 11*	- wastes from manufacture of ceramic goods, bricks, tiles and construction products - wastes from glazing containing heavy metals	44	0.5	
20 01 21*	MUNICIPAL WASTES - fluorescent tubes and other mercury-containing waste	51	81	78.67

Ratification of the Mercury Treaty:

Describe the forces (economic, environmental, social) that support and oppose ratification. Outline the public participation consultation process (direct or indirect via parliament, senate etc.) leading to ratification. Report whether the level of public awareness about the treaty process is High, Medium, Low or Very Low. Identify the key barriers to ratification that you have encountered:

Serbia ratified the UNECE 1998 Aarhus Protocol on Heavy Metals. The country, as an EU candidate country, already has legislation related to mercury on similar level as EU countries (or soon will be transposed from EU legislation). Serbia is waiting for EU ratification of the Minamata Convention and Serbia will change national legislation when the EU changes their obligation because of the ratification process and acceptance of obligations from the text of Convention.

Public participation in the consultation process is obligatory for the adoption of laws for ratification of any convention. In addition, the Ministry with responsibility is planning to apply for an enabling project for assistance in Minamata Convention ratification. Within this project, the Ministry is planning to involve the public in order to meet the public participation component. Currently, the level of public awareness of the treaty process is low.

Project outcome and engagement of and impact on target groups

Report your engagement with the target groups and the result of the activity on the target groups:

An important part of the Project was support from the Ministry's Department for Chemicals, in mobilization of other Ministry Departments and other relevant governmental authorities. The Department for Chemicals initiated and sent official letters requesting data from other relevant authorities (e.g. obtaining data on import and export from the custom authorities and data on air emission).

ALHem involved, as a target group, the government inspectors and informed them about the situation related to products containing mercury available on the Serbian market. ALHem observed that products that contained mercury which are prohibited by national legislation are still on the market. In addition, ALHem learned from the process that, for example, there is

legislation regulating obligations for new dental offices to have dental amalgam separators while old dental offices can have them until 2030. ALHem discussed measures necessary to be taken and costs of its implementation with the department responsible for water. The department responsible for water will work on new legislation in this field, and will consider revising legislation about existing dental offices to have separators earlier than 2030.

Information about obligations from the Minamata Convention (MC) related to dental amalgam was shared with the Faculty for Dental Medicine. A Professor from the Faculty for Dental Medicine in Belgrade welcomed information obtained from the stakeholder event and the brochure and invited ALHem to present and share this information with Faculty for Dental Medicine students and professors.

The Department for Integrated Pollution Control as well as the Department for Air Protection, in its capacity as Focal Point for UNECE Protocol on Heavy Metals, was informed about obligations from the Minamata Convention related to air protection. In addition, they welcomed information they obtained from ALHem's presentation on EU consideration on future MC implementation.

Petrohemija recently (in August 2014) stopped its chlor-alkali production and for them it was important to obtain information that metallic mercury from this facility is considered as waste according to MC and EU legislation. Also it was important for them to obtain information about the appropriate way for mercury waste handling and disposal according to EU legislation and the cost of such operations.

For Ministry representatives it was a good opportunity to consult about the considerations of stakeholders about possible priority actions for future MC implementation and how to deal with past and current mercury problems that have caused damage to the public, environment, food and/or workers.

Stakeholders agreed that this initial assessment of the situation related to mercury within the country would serve as a good basis for the preparation of a future project proposal related to MC implementation. In addition, the Pharmaceutical Faculty Department for Toxicology announced that they would start a new bilateral project with the Slovenian Institute "Josef Stefan" from Ljubljana related to risk from mercury in food. Results of this project will certainly assist the Ministry in future implementation activities.

For stakeholders that were identified during the Project, but where not able to attend the presentation, ALHem will send the printed brochure and presentations will be available on the ALHem website.

Impact on target policies

Specify the target policies you sought to impact upon and the result of the activity on the target policies:

The target policy of project activities was to inform stakeholders about the reasons for the Minamata Convention and obligations that are prescribed in the Convention. Before implementation of this project, only the Department for Chemicals (within the Ministry of Environment) was responsible for and involved in the negotiation process and was familiar with the Convention obligations, but this Convention is tackling many other sectors responsible for implementation of the Treaty requirements. In addition, chlor-alkali production plants in Serbia were not informed about obligations for this kind of facility under Minamata Convention and EU legislation. That was the reason we decided to involve these kinds of stakeholders in consultation process prior to ratification process. In addition in this process, we learned from

stakeholders about the situation in the field as possible starting points for what will be focus of future implementing activities.

For the government in the Republic of Serbia it is also important to know the European Union plans for ratification and implementation of Minamata Convention. That is the reason ALHem presented to stakeholders details on the situation in European Union within the current regulatory framework of every aspect regulated by the Minamata Convention (in regulating the products from Article 4 of MC, processes in Article 5, control of air emission and release to the water for Articles 8 and 9 as well as other obligations prescribed in the MC).

For Serbian stakeholders it was also very important to prepare a preliminary assessment of national legislation already regulating mercury. ALHem also chose to prepare a brochure on the content of Minamata Convention that should be used for further activities within the country as well as within the region. In addition, the presentations made for the purpose of the stakeholders' event are publicly available and can be valuable sources of information.

ALHem also explained the reasons why MC is so important because of properties of mercury and global emissions and releases to water. We also showed on the map from the Global Emission Report (UNEP 2010) what the situation is related to air emissions and depositions of mercury and underlined the reasons why it is important for Serbia not just to ratify the Convention but also to be active on the international level supporting ratification and implementation in other countries. With these activities, ALHem emphasized discussion related to chlor-alkali production as we have two facilities within the country.

Outreach to Stakeholders

Identify the stakeholders and sectors that were engaged in this activity, and estimate the potential to follow-up and advance the relationships with these stakeholders:

The Ministry of Environment (departments: for Chemicals, Waters, Air Protection, IPPC, EU integrations and international cooperation, Waste (they did not participate in the stakeholders' event but obtained brochures and presentations), Environmental Inspections, Faculty of Dental Medicine, Faculty of Pharmaceuticals (Toxicology Department), Faculty of Technology), chlor-alkali facilities, UNDP Office in Belgrade, Serbian Environmental Protection Agency, and national consultants.

Stakeholders present at stakeholders' event were very satisfied with the information obtained and in the brochure. They found reports from this the project useful as well, and ALHem as a knowledgeable and reliable partner.

The Faculty of Dental Medicine invited ALHem to present and share this information with its professors and students.

ALHem is invited to visit the petrochemical industry "Petrohemija" and to assess the situation related to mercury.

Deliverables, outputs and/or products

List the types of outputs from the activity, including report or information materials:

- Brochure: Međunarodna konvencija o živi: razlozi za međunarodno regulisanje žive i sadržaj međunarodne konvencije (Minamata konvencija) (International Convention on Mercury: reasons for international mercury legislation and content of international convention (Minamata Convention))

<http://www.alhem.rs/wp-content/uploads/2015/02/Publikacija-o-Konvenciji-o-zivi-Valentina-Mart-V8.pdf>

- Information available on ALHem web site <http://www.alhem.rs/2015/02/odgovor-srbije-na-globalni-sporazum-o-zivi-novi-projekat-alhem-a/>
- Presentations available on ALHem web site <http://www.alhem.rs/2015/02/odgovor-srbije-na-globalni-sporazum-o-zivi-novi-projekat-alhem-a/>
- This report will be also available on ALHem web site

Communication Efforts: Describe efforts to communicate this activity to the media and/or general public.

The materials listed above are intended for public use.

Some photographs from stakeholders event are included:



Communication with National or Local Authorities

If you communicated, coordinated or shared the results of your Activity with your National Mercury Treaty Focal Point, or any other national or local authority related to mercury management, please describe how this happened:

ALhem had day-to-day communication with the National Focal Point during project implementation. From the project preparation phase, ALhem contacted the Ministry and in the beginning of the project obtained official support for the project implementation.

Mercury Treaty Focal Point: Provide the name and contact details of your National Mercury Treaty Focal Point.

Ms. Sonja Roglic
Head of Department for Chemicals
Ministry of Agriculture and Environmental Protection
Ruze Jouanovica 27A
Belgrade 11000
Serbia
Tel: +381117155203
Email: sonja.roglic@eko.minpolj.gov.rs

Person in charge for this Project from Ministry side:
Mr. Ivan Djurickovic
Department for Chemicals
Ministry of Agriculture and Environmental Protection
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Belgrade 11000
Serbia
Tel: +381117155229
Email: ivan.djurickovic@eko.minpolj.gov.rs

Recommendations on reducing and eliminating human sources of mercury from a public interest, NGO perspective:

- Remediation process of chlor-alkali facility and disposal of metallic mercury disposal. In one of these facilities there are three dumps with mercury waste and a follow-up should be conducted to assess the situation with underground waters and soils surrounding these dumps;
- To follow-up how prohibited products that are controlled by inspections are on the market;
- To be involved in education and policy development for dental amalgam use;
- Monitoring government activities related to ratification and implementation of the Minamata Convention.

What, if anything, changed from the original plans and why?

All activities were implemented as was planned. On the other side, ALHem would like some stakeholders to be more involved (example: Waste Department within Environment Ministry). A second problem was that the Ministry, because of some procedural problems, did not send official invitations to some stakeholders for the workshop on time. This was not a problem related to the Department for Chemicals, but with Ministry management.

Initially in the development of the project proposal there was not such a huge emphasis on presenting to the stakeholders the situation in the EU related to implementation and ratification of the MC; however, ALHem recognized that this information was important for industry and government representatives.

Resources on mercury: Please list websites, databases, reports, academic researchers, laboratories, etc. that you are familiar with

Websites:

1. <http://www.envpl.ipb.ac.rs/> the Environmental Physics Laboratory, Institute of Physics | University of Belgrade | Serbia dealing with biomonitoring of heavy metals in the air

Databases:

1. <http://www.sepa.gov.rs/> Agency for Environmental Protection- According to the Law on Ministries (Official Gazette of the RS No 72/2012,76/2013 and 44/2014) the Agency for Environmental Protection is responsible for the public administration affairs relating to: development, harmonization and management of the national information system for environmental protection (monitoring the status of the environmental factors through environmental indicators; the register of pollutants, etc.); implementation of state monitoring of air and water quality, including the implementation of the prescribed and agreed program for air quality, surface water and ground water of first and precipitation; Manage National Laboratory; collection and compilation of environmental data, processing and preparation of the reports on the state of the environment.

Reports:

1. Report on the State of the Environment in the Republic of Serbia, Ministry of Energy, Development and Environmental Protection, 2012
2. National action plan for ratification and implementation of the Protocol on Heavy Metals, Protocol on Persistent Organic Pollutants and Gothenburg Protocol to the Convention on Long-Range Transboundary Air Pollution, 2010
3. Report on the status of the land in the Republic of Serbia for 2012, Serbian Environmental Protection Agency
4. Environmental quality of the City of Belgrade in 2012
5. Results of testing the quality of surface and groundwater for 2013, Serbian Environmental Agency

Scientific reports:

1. Petrographic, geochemical and physical-chemical characteristics of coal, the Kolubara coal basin, study, Institute of General and Physical Chemistry, Belgrade June 2006
2. Nestic et al. Biological monitoring of mercury workers exposed in chlor-alkali industry. Medical data 2014; 6(1): 59-62.
3. Buha, Aleksandra, Angelina Filipovic, Jelena Dumanovic, Evica Antonijevic, Marijana Curcic, Saša Jankovic, Dragica Nikolic, and Biljana Antonijevic. "The use of @ risk software for risk assessment of mercury in take via marine food among Serbian population." Toxicology Letters 221 (2013): S222-S223.
4. Snežana R. Štrbac, The Content and Mobility of Heavy Metals and Organic Compounds in the Ecosystem of the Tisza River Doctoral Dissertation, University of Belgrade, Multidisciplinary studies

5. Determination of Heavy Metal Deposition in The County Of Obrenovac (Serbia) Using Mosses As Bioindicators. Iii. Copper (Cu), Iron (Fe) and Mercury (Hg). Sabovljević¹, V. Vukojević¹, Aneta Sabovljević¹, Nevena Mihajlović², Gordana Dražić², And Ž. Vučinić³
 1-Institute of Botany, Faculty of Biology, University of Belgrade, 11000 Belgrade, Serbia;
 2-Institute for Nuclear Energy Application — INEP, 11080, Belgrade-Zemun, Serbia; 3-Center for Multidisciplinary Studies, University of Belgrade, 11000 Belgrade, Serbia
6. Antonijević, B., S. Janković, M. Curčić, K. Durgo, E. Stokić, B. Srdić, and D. Tomic-Naglić. "Risk characterization for mercury, dichlorodiphenyltrichloroethane and polychlorinated biphenyls associated with fish consumption in Serbia." *Food and Chemical Toxicology* 49, no. 10 (2011): 2586-2593.
7. Saša, Janković, Antonijević Biljana, Ćurčić Marijana, Radičević Tatjana, Stefanović Srđan, Nikolić Dragica, and Ćupić Vitomir. "Assessment of mercury intake associated with fish consumption in Serbia." *Tehnologija mesa* 53, no. 1 (2012): 56-61.

Academic researchers:

1. Department of toxicology "Akademik Danilo Soldatović" University of Belgrade - Faculty of Pharmacy
2. National Poison Control Center Military Medical Academy, Crnotravska 17 11000 Beograd
3. University in Belgrade - Faculty of Dental Medicine
 Clinic for Pediatric and Preventive Dentistry, Dr Subotića 7
 Amalgam use in dental fillings in children and general materials for dental fillings
4. Faculty of Dental Medicine in Pančevo, Žarka Zrenjanina 179, 26000 Pančevo
5. Military Medical Academy, Department of Dental Medicine, Crnotravska 17 11000 Beograd

Accredited laboratories for mercury measurement:

1. City Institute of Public Health of Belgrade¹¹, Belgrade Bulevar Despota Stefana
 Mercury in food, water, consumer products, waste, soil and sediments
2. Institute for meat hygiene and technology
 Laboratory for residue analysis and feed, Belgrade, Kaćanskog 13
 Mercury in food
3. Institute for occupational safety, Research laboratory, Novi Sad Školska 3
 Air quality- mercury emission, concentration of mercury in work environment, water, waste, soil and sediment, food
4. JUGOINSPEKT DOO Novi Sad, Central Laboratory, Laboratory for testing of petroleum and chemical products, textiles, leather and footwear
 Chemicals, chemical products, cosmetics - including fertilizers and colors
5. Institute of General and Physical Chemistry AD testing laboratory, research and development, Belgrade
 Studentski trg 12-16
 Mercury in water, waste and solid fuel

Authorized entities to measure mercury emissions from stationary sources of pollution:

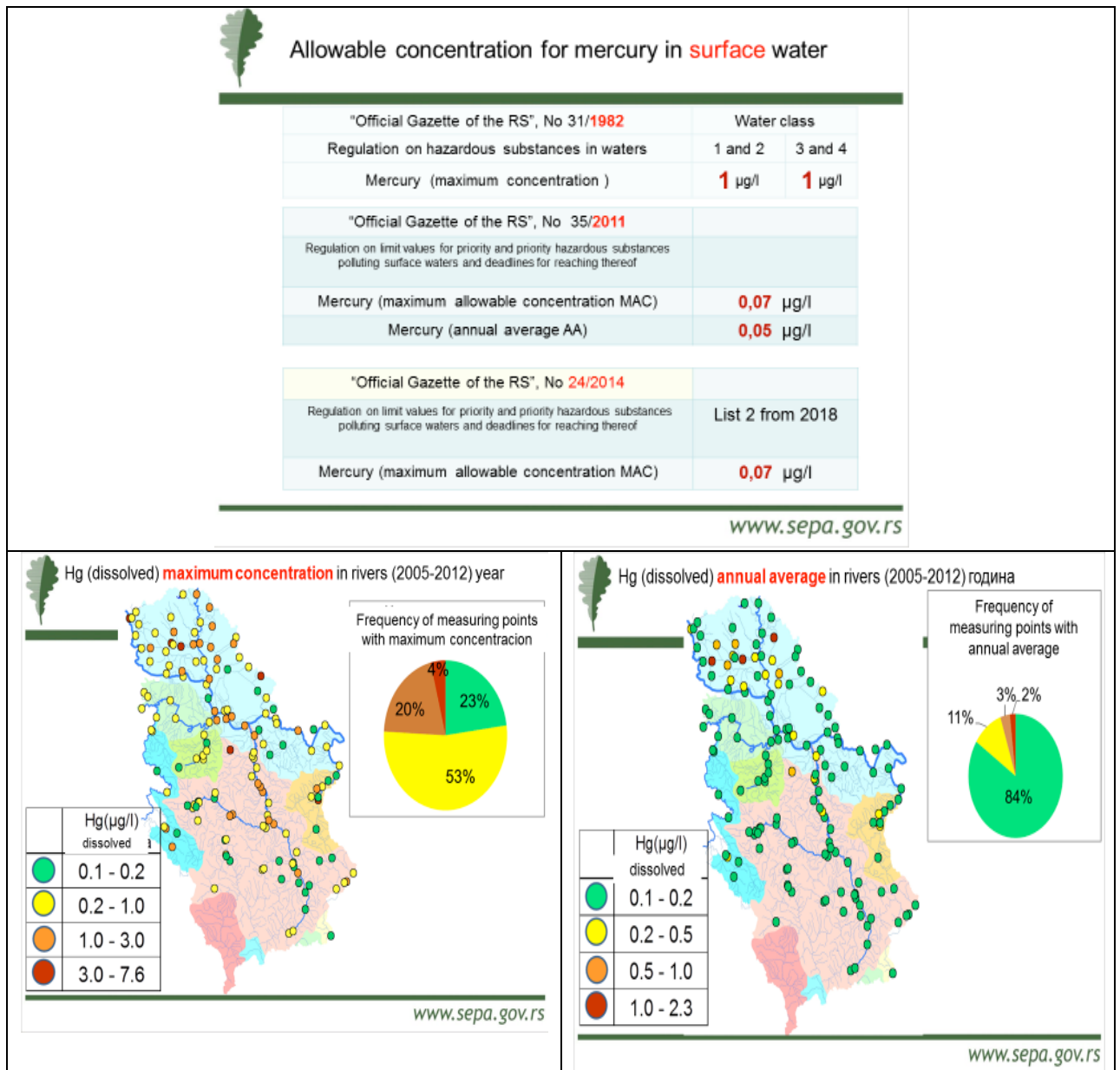
¹¹ Almost all of a total 23 Public health institutes in Serbia are accredited to measure mercury in water, food and consumer products

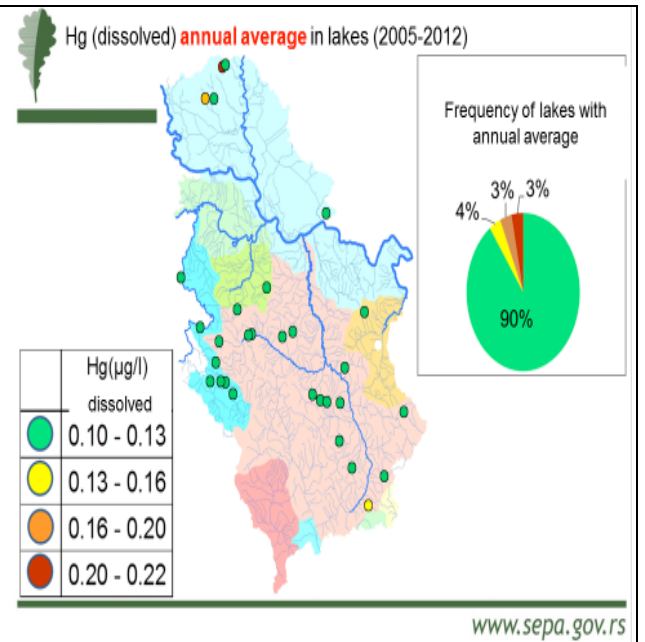
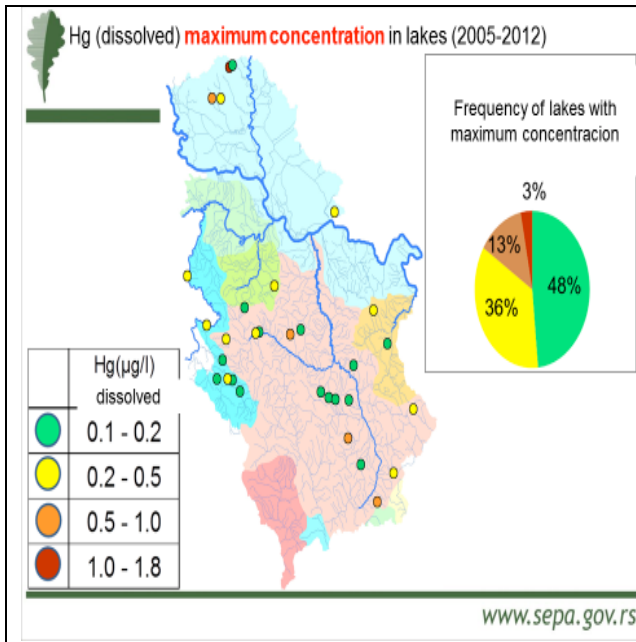
1. SP lab, Bečej
2. Institute Vatrogas, Novi Sad
3. Institute for Occupational Safety and Health, Novi Sad
4. Aerolab, Belgrade (for sampling)
5. Institute for Security and Preventive Engineering, Novi Sad
6. Anahem, Belgrade

Authorized legal entities for measuring mercury in air- air quality:

1. Department of Public Health Pančevo
2. Institute for Occupational Safety and Health, Novi Sad
3. SP lab, Bečej
4. Vatrogas Institute, Novi Sad
5. Institute for Public Health Čačak
6. Institute for Public Health Kikinda
7. Institute for Security and Preventive Engineering, Novi Sad
8. Public Health Institute Niš

Annex I
Water quality- mercury





Mercury limit values in underground waters

<p>"Official Gazette of the RS", No 50/2014</p> <p>Regulation on limit values of polluting substances in surface and ground waters and sediment and on deadlines for reaching thereof</p> <p>Mercury</p>	<p>List 1 Basic level (zero)</p> <p>----- µg/l</p>
<p>"Official Gazette of the RS", No 88/2010</p> <p>Regulation on the program land quality monitoring system, indicators for risk assessment of land degradation and methodology for remediation program</p> <p>Mercury (dissolved) (average concentration in 100m³)</p>	<p>Annex 2. Remediation value hazardous substances concentration and values indicate significant contamination of underground waters</p> <p>0,3 µg/l</p>

Statistic are given for detection limit LOD=0,1 µg/l

www.sepa.gov.rs

