

IPEN Mercury Treaty Enabling project

Report Format for Mercury Country Situation Project

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NGO: **ALHem- Safer Chemicals Alternative**

Country: **Serbia**

Title of project: **Serbian response to Global Mercury Treaty**

Relevant sections of the *IPEN NGO Introduction to Mercury Pollution to review.*

For NGOs who are to conduct a project based around this theme there is important background, guidance and treaty related information which may assist in scoping of projects. The relevant sections of the report are;

All of Section 7 through to all of Section 11 p. 39-187

Mercury in the Market:

What are the most common forms of mercury available to the public, including in products sold?

Serbia as 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 professional will be prohibited to be placed on the market from 2018). However, inspection is not enforcing controlling this prohibition and still on is discounted market stores this kind of product could be found (e.g. ALHem found that thermometers with mercury on in this kind of stores and in open' air markets are very common).

In addition, dental amalgam are still used in Serbia.

Imports and exports: What are the quantities of mercury imported/exported and stored in your country (how did you estimate this)?

According to Serbian Custom Authority, official statistic data import of mercury compound in previous three years was approximately 800 kg and export was in very small quantity approximately 5 kg. Import of dental amalgam is not so easy to determine as dental amalgam is imported under the custom tariff number 3006.40 00 00 where include are all dental fillings. Never the less one company imported dental amalgam under custom tariff number 2843.90 10 00 and imported app. 7 t of dental amalgam in previous three years. In future work on mercury issues these date should be checked with companies authorized to placed dental amalgams on Serbian market. On the website of Medicines and Medical Devices Agency of Serbia (ALIMS) ALHem found that 22 dental amalgam's product are registered in Serbia.

Mercury Exposure:

What are the most common forms of mercury exposure in the country?

Exposure assessment of Serbian population to mercury through all routes of exposure - temporary knowledge and aims for near future with focus on human health risk assessment

Among Serbian population, there are two possible identified routes of exposure to mercury of concern: exposure of general population by food and by inhaled air, and professional exposure, predominantly in two chlor-alkali facilities.

Through the open debate was emphasized that it is important to identify type of mercury that enter the body, since its different forms cause totally different adverse effects on human health (elemental, inorganic form and organic forms of mercury)¹.

Exposure of general population could be estimated as a acceptable, since values of emission measured in air of city of Kruševac where one of chlor-alkali industry is suited, did not exceed permitted level of 1 µg/m³, namely from 2003 to 2009 it was approximately up to 0,6 µg/m³. After the production was stopped levels measured in air did not exceed 0,22 µg/m³ (Public Health Institute Kruševac, 2013)².

Professional exposure to mercury was estimated in second chlor-alkali facility by Nešić et al and published in 2014³. Two different type 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 values did exceed permitted level 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 prevention.

Exposure of food was based on the data about mercury concentration, body weight, and the available GEMS/Food Cluster Diets Database (FAO/WHO 2012)⁴ 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 exceeded 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 that the risk of the methyl-mercury intake through fish products foods, for the observed population of adults is acceptable⁵.

However, for the purpose of doctoral dissertation (Saša Janković, unpublished data)⁶ deterministic procedure, used for mercury intake assessment by 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 risk of mercury exposure among Serbian population is possible from food and from some industrial

¹ Casarett & Doull's Essentials of Toxicology, Second Edition. Eds: Klaassen C and CB Watkins. Mc Graw Hill, Canada, 2010.

² Results form public health institute of Krusevac, 2013.

³ Nesic et al. Biological monitoring of mercury workers exposed in chlor-alkali industry. Medical data 2014; 6(1): 59-62.

⁴ FAO/WHO, 2012.GEMS/Food Cluster Diets database.

⁵ 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.

⁶ Sasa Jankovic, unpublished data, Doctoral dissertation waiting permission from University, 2015.

processes. Preventive measures should be taken to raise awareness of general population related with food consumption, at the same time as for industry professional toxicologists should be responsible for issue when workers are exposed.

For integrative 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 researches we are expecting information with higher level of certainty.

Human Sources of Mercury pollution:

What is known about human activities that release mercury into the environment in your country?

There are two chlor-alkali production facility within the country. Mayor emission of mercury in environment is from public electricity and heat production plants and production of solid fuels and other energy industries (based on coal). Emission arise as well 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 problems and dental amalgams) are also a source of Hg emissions. Small combustion installations activities for commercial and institutional heating and combustion installations for residential heating and cooking contributing as well to mercury emissions into the environment.

ASGM:

Is there significant Artisanal and Small Scale Gold Mining in your country? Where is it mostly conducted? Is mercury used for that artisanal gold mining activity? Where does the mercury in ASGM come from? (Is it legally/illegally imported?) Is it traded officially or informally?)?

To the ALHem knowledge and from information obtained from the ministry responsible for environment in Serbia there are not significant Artisanal and Small Scale Gold Mining and mercury is not used for this kind of purposes.

Levels of Mercury Release and Exposure:

What data or information is recorded or available at the national level? Has this information been derived using the UNEP Toolkit (level 1 or level 2 mercury inventories using UNEP Tool Kits or other inventory methods)? What is the inferred quantity of mercury realized based on the recent inventory result if any?

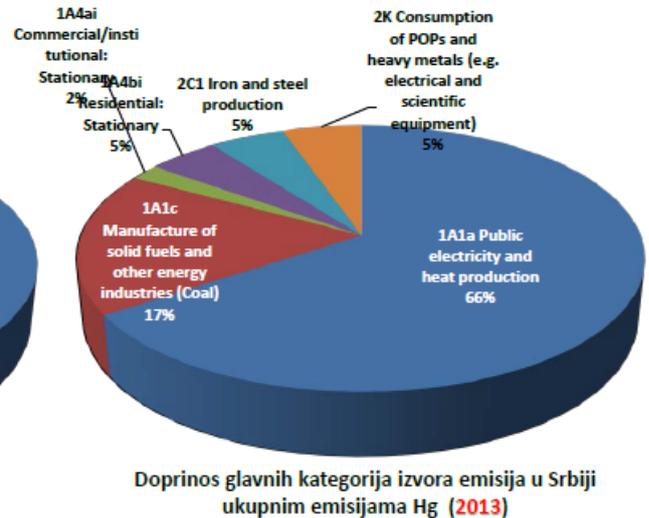
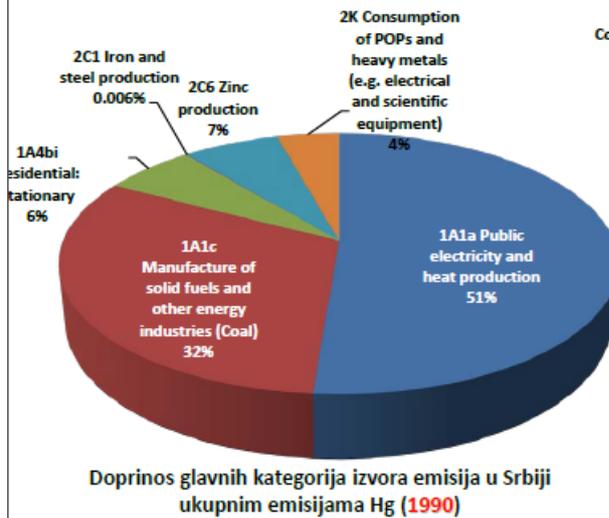
What are the main exposed population groups? Please provide the references of information sources.

Air emission data are 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). Data for Serbia could be found on www.ceip.at website.

National totals for Hg (Mg/year)

EMEP/EEA air pollutant emission inventory guidebook - 2013

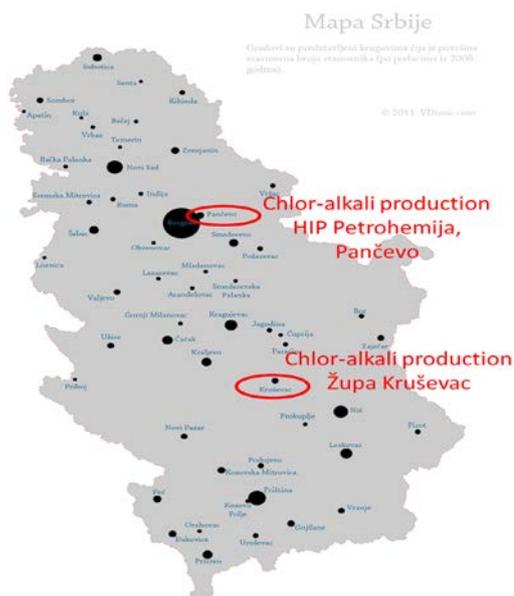
Country	Hg (Mg)	base year	1990	1995	2000	2005	2010	2011	2012	2013	Hg emission reduction target (emission level base year)	Hg target met?	Exceedance by (or reduction %)
Serbia		1990	1,94	1,69	1,62	1,65	1,63	1,72	1,40	1,44	1,94	Yes	-26%



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). Date of mercury concentration in waters is given in Annex I of this report.

Damage caused by Mercury:

What are current known or reported mercury threats? What kinds of mercury problems in the past have caused damage to the public, environment, food and/or workers? Who are the known vulnerable groups to mercury exposure? Please provide any information or reference sources.



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

One chlor-alkali production facility located is in Pančevo on the northern and damages inflicted by aerial bombing the country -HIP Petrohemija, Pančevo.

Since NATO military campaign in 1999 of the Electrolysis factory works with reduced capacity. From 34 installed mercury cells production after bombing (in 1999) until in August 2014 facility worked with only 6 cells and according to the material balance of the factory, it is an average capacity of 5% (by observing the production of chlorine). Petrohemija management board decided to stop production on August 2014 due to economic reasons. At the moment in the factory site is approximately 16 t of metallic mercury in 6 mercury cells and 483 kg mercury at the stocks. Metallic mercury from 28 cells (with approx. 3 t) after bombing is sold. Empty cells are still within the factory. Sewage sludge from production process (the electrolyte decanting process) contaminated with mercury (in ppm concentration) was disposed at engineered landfill (from 90s) in the factory. There are now 5284 t of sewage sludge contaminated with mercury in two landfills; HDPE foil is used. Plan for two landfills is to drain them and sprinkle with sulfur or some sulfide. There is not import of mercury after 1999. During bombing in 1999 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 recovered⁷. It is in third landfill and 1500 m³-contaminated materials are land filled there.



Sewage sludge from production process (the electrolyte decanting process) contaminated with mercury (in ppm concentration) was disposed at engineered landfill (from 90s) in the factory. There are now 5284 t of sewage sludge contaminated with mercury in two landfills; HDPE foils is used.

Three landfills contaminated with mercury in Petrohemija factory, 2 open landfills from the left side is for sewage sludge from production process. In 3rd (rounded with red circle) landfill are contaminated soil and other materials from damaged plant after bombing in 1999.

⁷ Balkan Task Force *Pancevo Site Report (Draft)*. Chateline: United Nation Environmental Programme, 1999
<http://www.grid.unep.ch/btf/missions/sites/pancevo.pdf>



Another sewage sludge contaminated with mercury are created by washing work wear and cleaning of working space is stored in plastic barrels and there are 62.4 t waste at the moment in factory.

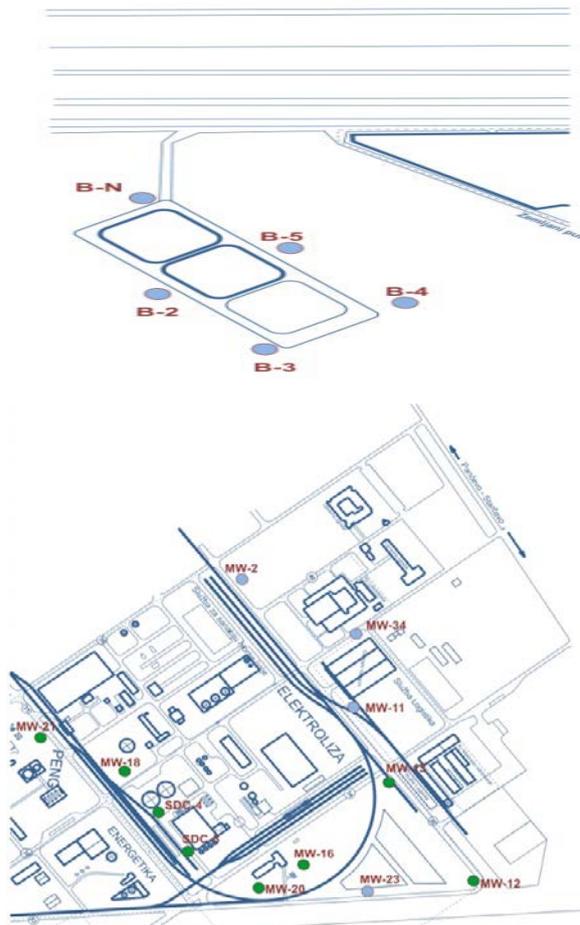
Precise mercury concentration in this waste could not be determined (approximate 15-20%). This kind of waste are planned to be send for further treatment (according to information from Petrohemija).

Historically, this kind of sludge was sent to treatment in Idrija Mercury Mine in Slovenia and as Mercury Mine is closed and new solution need to be found for existing 62,4 t of waste.

The factory electrolysis is performed 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 transform 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 release in 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 concentration 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 presence of possible pollutions, 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 battery 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 contamination⁸, it may be concluded that all obtained values are below the detection limits, or significantly lower than values which may indicate to 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 have not received information from another chlor-alkali factory Župa in Kruševac. Ministry insisted several times without any response from factory. According to information from the Ministry responsible form environmental protection, the chlorine production in chlor-alkali production stopped several years ago because of privatization problems. Now they are waiting if they will be sold to another owner.

Laws currently Regulating Mercury:

Are there laws limiting or banning the use of mercury in specific practices, processes and/or products in your country?

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 prohibition from EU legislation is the same in national legislation such as prohibition legislation dealing with chemicals but other legislation is not up to date e.g. prohibition that relate to electric and electronic product. There are national plans in line with National program on transposition of EU Acquis to update this regulation. In addition, Serbian legislation related to cosmetic is not in line with EU legislation.

⁸ according to 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

As in the EU legislation, these restrictions are relating to placing on the 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 ≤ 1500 mm) with mercury content exceeding 5 mg per lamp (c) long length (> 1500 mm) with mercury content exceeding 13 mg per	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)

lamp	
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 are as well other legislation which regulate mercury emission 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 these legislation is as well 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 to Deal with Mercury:

What priority action on mercury has the government taken to reduce mercury exposure?

Serbia has ratified the Protocol on Heavy Metals and conduct transposition of EU legislation dealing with mercury management as well is implementing these legislations. In addition National action plan for implementation and ratification of the protocol on heavy metals is developed. 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 use of dental amalgam (dental amalgam can be used in staying molars in cases where it is clear that this material will last longer).

Storage:

Does your country currently have any capacity for interim or longterm storage of mercury and mercury compounds?

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 factories site. There are two chlor-alkali production facility in the country. Both factories stopped chlor-alkali production and more information is included in response related to "Damage caused by Mercury".

Mercury wastes:

How are mercury wastes currently managed? Are the wastes treated or exported? Does your country have a threshold value to define 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 have not transposed EU Regulation 1102/2008 where 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 in national legislation is not regulated what was allowed techniques for metallic mercury temporary and permanent disposal, how this storages should be control and other specific measures for mercury waste regulated in this EU Regulation.

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

Hazardous waste can be temporarily stored at the site of the manufacturer or owner of the period of 12 months. The import of hazardous waste in the Republic

of Serbia, and waste containing mercury or mercury compounds (listed as hazardous waste) is prohibited and 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 a 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 metal⁹

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

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

⁹ 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).

Ratification of the Mercury Treaty

What forces (economic, environmental, social) support and oppose it? What is the public participation consultation process (direct or indirect via parliament, senate etc.)? What is the level of public awareness of the treaty process (use qualitative measurement such as: High, Medium, Low, Very Low)? What are the key barriers to ratification that you have been able to identify?

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

Public participation in consultation process is obligatory with in the adoption of law for ratification of any convention. In addition, Ministry in charge is planning to apply for an enabling project for assistance in Minamata convention ratification. Within this project, Ministry is planning to involve public having in order to have public participation component. Now the level of public awareness of the treaty process is on a low level.

Project Outcome:

Describe the activity conducted:

Engagement of and impact on Target Groups: How did you engage the target groups and what was the result of the activity on the target groups?

Important part of the Project was support from Ministry's Department for chemicals, in mobilization of other Ministry Departments and other relevant Governmental authorities. Department for chemicals initiated and send 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 inform them about situation related to product containing mercury available on 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, legislation regulating obligations for new dental offices to have dental amalgam separators and old dental offices to have them until 2030. ALHem discussed with Department responsible for waters about measures necessary to be taken and cost of its implementation. Department responsible for waters will work on a new legislative in this field, and will consider revising legislative about existing dental offices to have separator earlier then 2030.

Information about obligations from MC related to dental amalgam are shared with Faculty for Dental Medicine. Professor from Faculty for Dental Medicine in Belgrade very welcomed information obtained from stakeholder event and brochure and invited ALHem to present and share this information with Faculty for Dental Medicine students and professors.

Department for integrated pollution control as well as Department for air protection, in is capacity of focal point for UNECE Protocol on Heavy Metal was

informed about obligation from Minamata Convention related to air protection. In addition, they welcomed information they obtained from ALHem presentation on EU consideration on future MC implementation.

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

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

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

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

Impact on target policies: What is the target policy and the result of the activity on the target policy?

The target policy of project activities was to inform stakeholders about reasons for the Minamata convention and obligations which are prescribed in the Convention. Before implementation of this the Project only Department for chemicals responsible with in the Ministry in charge of environment was involved in negotiation process and familiar about obligations, but this the Convention is tackling many other sector responsible for implementation of this convention. In addition, chlor-alkali production plans in Serbia where not informed about obligations for this kind of facility under Minamata Convention and EU legislation. That was the reason why we decided to involve this kind of stakeholders in consultation process prior ratification process. In addition in this process, we learned from stakeholders about the situation in the field as possible starting point what will be focus of future implementing activities.

For the government in the Republic of Serbia is, also important, what are European Union plans for ratification and implementation of Minamata Convention. That is reason why ALHem presented to stakeholders details on situation in European union in current regulatory framework of every aspect regulated by Minamata convention (in regulating product 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 MC).

For Serbian stakeholders was also very important to prepare preliminary assessment of national legislation already regulating mercury. ALHem also choose to prepare brochure on the content of Minamata Convention that should be used for further activities within the country as well within the region. In

addition, presentation made for purpose of stakeholders' event are publicly available and can be valuable source of information.

ALHem also explained the reasons why MC is so important because of properties of Mercury and global emission and release to water. We also showed on the map from UNEP global emission report for 2010 what is the situation related to air emissions and depositions of mercury and underline reason why is important for Serbia not just to ratified Convention but also to be active on the international level and supporting ratification and implementation in other countries. With these activities, ALHem emphasized discussion related to chlor-alkali production as we have two facilities with in country.

Outreach to Stakeholders: What stakeholders and sectors were engaged in this activity, and is there a potential to follow-up to advance the relationships with these stakeholders?

Ministry in charge of environment (departments: for Chemicals, Waters, Air protection, IPPC, EU integrations and international cooperation, Waste department (they did not participate on 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, national consultants.

Stakeholders present at stakeholders' event where very satisfied with information obtained and in the brochure. They found report from this the Project useful as well ALHem as knowledgeable and reliable partner.

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

ALHem is invited to visit Petrochemical industry "Petrohemija" and to assess 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. Please include media coverage and/or photos or visuals.

According to the Project activities, media coverage were not planed. This was initial consultations with Ministry and open dialog of government and industry representatives.

Some photographs from stakeholders event are included



Communication with National or Local Authorities: Did you communicate, coordinate or share the results of your Activity you're your National Mercury Treaty Focal Point, or any other national or local authority related to mercury management? If so, please describe how this happened.

ALhem had day-to-day communication with National focal point during Project implementation. From Project preparation phase, ALHem contacted 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.

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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
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Ministry of Agriculture and Environmental Protection
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Email: ivan.djurickovic@eko.minpolj.gov.rs

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

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

- **Decomposition process of chlor-alkali facility and disposal of metallic mercury disposal. In one of this, facilities there are three dumps with mercury waste and should be done follow-up what is situation with underground waters and soils surrounding this dumps;**
- **To follow up how prohibited product on the market are controlled by Inspections;**
- **To be involved in education and policy development for dental amalgams use;**
- **Monitoring Government activities related to ratification and implementation of Minamata Convention.**

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

All activates where implemented as was planned. On other, side ALHem would like some stakeholders to be more involved (example: Waste Department with in Ministry). Second problem was that Ministry because of some procedural problems did not send official invitation to some stakeholders for the workshop on time. This was not a problem related to Department for chemicals but with Ministry mana

Initially in development of the Project proposal there was not so huge emphasis to present to the stakeholders situation in the EU related to implementation and ratification MC, however ALHem recognized that this information where important for industry and government representatives.

ALHem limited planed financial sources for one national expert and used this financial sources - Funds for technical support of project (accountant service).

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. Srđić, 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 Belgrade¹⁰, Belgrade Bulevar Despota Stefana
Mercury in food, water, consumer products, waste, soli 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 Hg 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
Hg in water, waste and solid fuel

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

1. SP lab, Bečej

¹⁰ Almost all of a total 23 Public health institutes in Serbia are accredited to measure mercury in water, food and consumer products

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 Hg 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

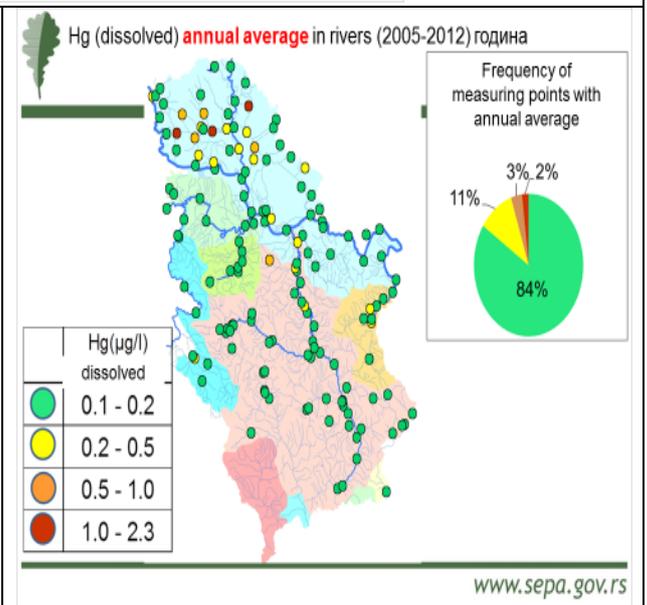
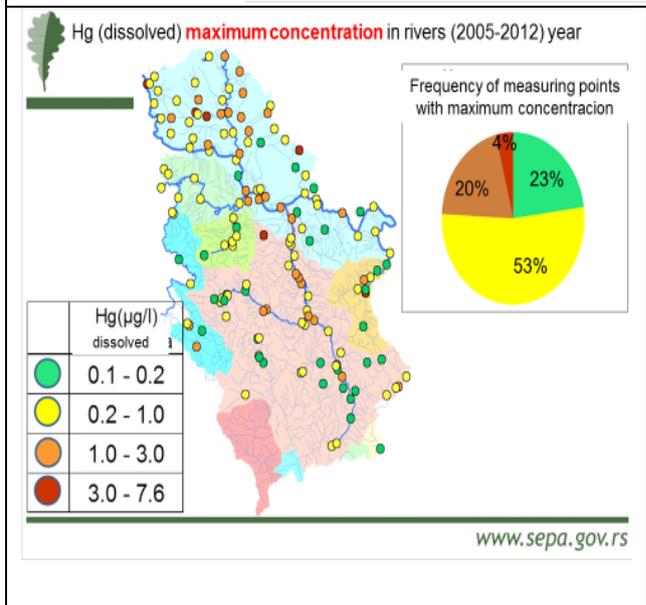
Annex I

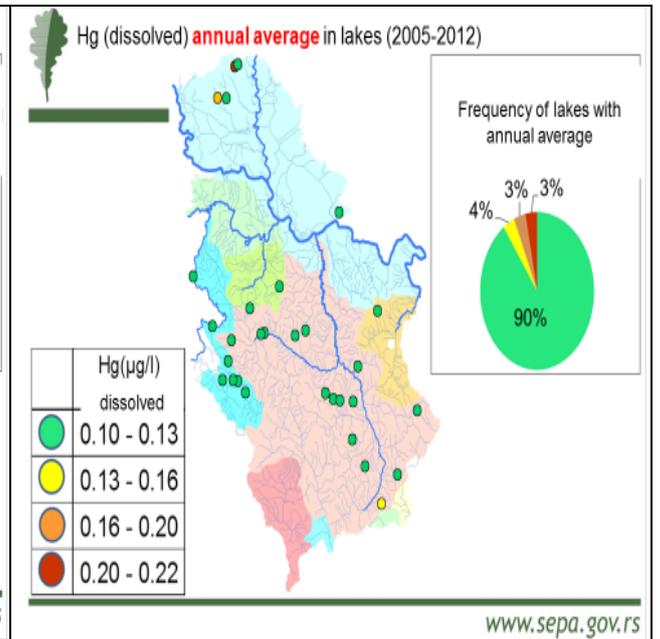
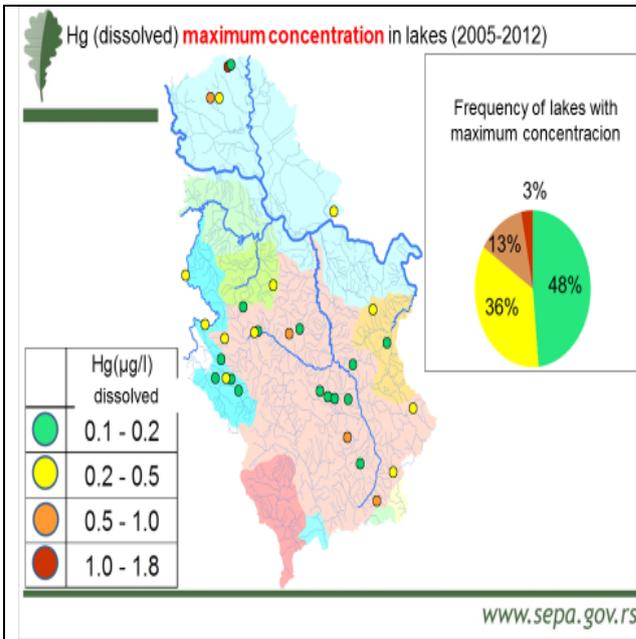
Water quality- mercury

Allowable concentration for mercury in surface water

"Official Gazette of the RS", No 31/1982	Water class	
Regulation on hazardous substances in waters	1 and 2	3 and 4
Mercury (maximum concentration)	1 µg/l	1 µg/l
"Official Gazette of the RS", No 35/2011		
Regulation on limit values for priority and priority hazardous substances polluting surface waters and deadlines for reaching thereof		
Mercury (maximum allowable concentration MAC)	0,07 µg/l	
Mercury (annual average AA)	0,05 µg/l	
"Official Gazette of the RS", No 24/2014		
Regulation on limit values for priority and priority hazardous substances polluting surface waters and deadlines for reaching thereof		
	List 2 from 2018	
Mercury (maximum allowable concentration MAC)	0,07 µg/l	

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Mercury limit values in **underground** waters

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

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