INZRAK

Enhanced environmental protection inspection for efficient control of air quality monitoring and of all entities under obligation within system of greenhouse gas emission allowance trading, in order to achieve better quality of air in Republic of Croatia

REPUBLIKA HRVATSKA
MINISTARSTVO ZAŠTITE OKOLIŠA I ENERGETIKE

EKONERG

safu SREDIŠNJA AGENCIJA ZA FINANCIRANJE I UGOVARANJE

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EKONERG Energy Research and Environmental Protection Institute

INZRAK

Theme 4: Networks

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4.1 WHAT ARE THE AIR QUALITY MONITORING NETWORKS?

Air quality monitoring is carried out by organizing a network of units-stations and their allocation to a particular area.

Air quality monitoring networks are the basic unit of each air quality monitoring.

4.1 WHAT ARE THE AIR QUALITY MONITORING NETWORKS?

- From experience it is known that in a certain area, no matter how big it is, there may be significant differences in concentrations of pollutants in the air.

- Also, it is known that at the same site concentration can vary significantly over time.

- If we want to fulfil the basic target of air quality monitoring, certainty of determining the spatial and temporal distribution of pollutants in the air in a certain area has to be greater. The best way to do this is by deploying measuring instruments at the characteristic points of that area and measuring during a representative time interval

4.2 THE ORGANISATIONAL STRUCTURE

In order to protect the instruments from the weather conditions, and avoid building a large number of small laboratories, instruments will be placed in a shelter that will provide appropriate conditions for the operation of the instruments and will thus create stations for air quality monitoring. Each station will contain the instruments for the measurement of those pollutants which have to be measured.

4.2 THE ORGANISATIONAL STRUCTURE

During the measurement the instruments, often located at different locations, generate a lot of measuring data. That's why modern IT technology is used and all the instruments from all the stations are connected to a computer that accepts their measurement results and keeps them in one place in one laboratoty.

All of the above mentioned elements together make the air quality monitoring network

4.2 THE ORGANISATIONAL STRUCTURE

So, air quality monitoring networks are the measuring systems which consist of measuring stations connected to the central computer, which, with the help of a software application, communicates with stations, downloads and saves the results.

Example of a network that consists of three stations is shown in Figure 1, and the example of data flow from the station to the user in Figure 2.

4.2 THE ORGANISATIONAL STRUCTURE

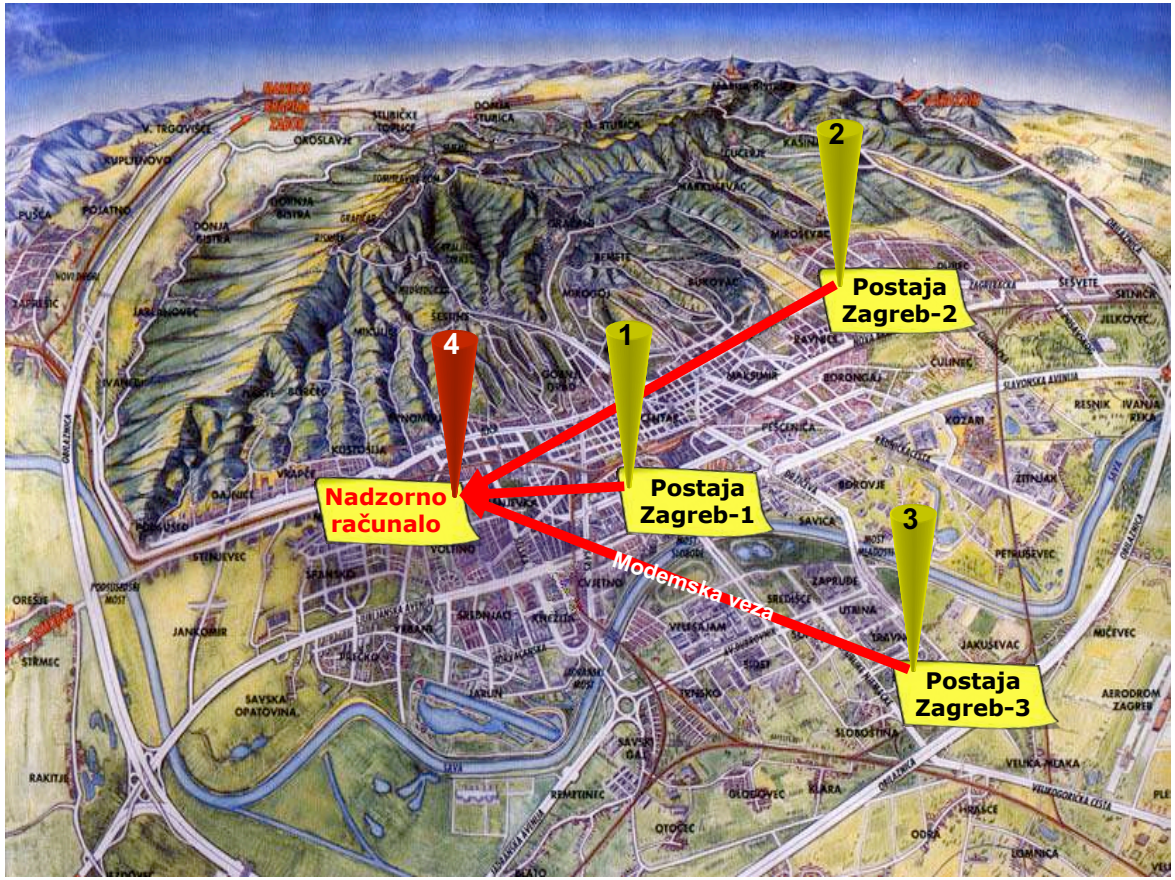

Figure 1. Air quality monitoring network

4.2 THE ORGANISATIONAL STRUCTURE

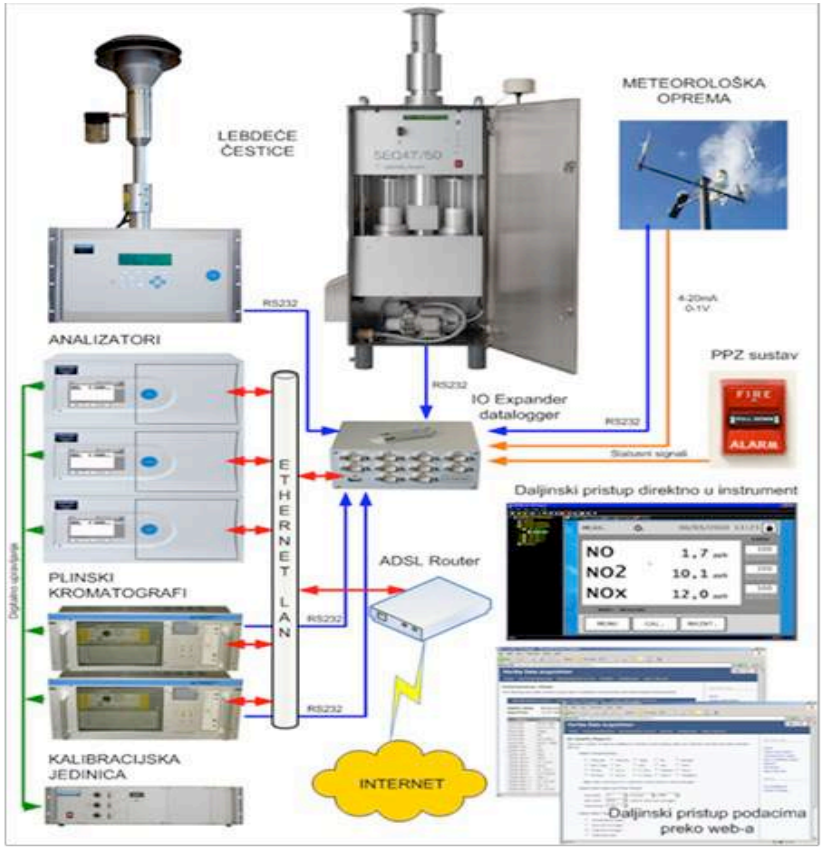

Figure 2. Example of data flow from the station to the user

4.3 AIR QUALITY MONITORING STATE NETWORK

- For the purpose of air quality monitoring in zones (table 1) and agglomerations (table 2 and fig. 3) air quality monitoring network has been established in Republic Croatia (the state network).
- The state network is an integral part of the environment monitoring and is financed from the state budget.
- Air quality data from the state network are public, they are published on the Environmental Agency's website and are used for the purposes of the air quality reports and data exchange with the EU. These data are an integral part of the ait protection information system.

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 1. The classification of the zones in the Republic of Croatia

OZNAKA ZONE	NAZIV ZONE	OBUHVAT ZONE
HR 1	Kontinentalna Hrvatska	Osječko-baranjska županija (izuzimajući aglomeraciju HR OS) Požeško-slavonska županija Virovitičko-podravska županija Vukovarsko-srijemska županija Bjelovarsko-bilogorska županija Koprivničko-križevačka županija Krapinsko-zagorska županija Međimurska županija Varaždinska županija Zagrebačka županija (izuzimajući aglomeraciju HR ZG)
HR 2	Industrijska zona	Brodsko-posavska županija Sisačko-moslavačka županija
HR 3	Lika, Gorski kotar i Primorje	Ličko-senjska županija Karlovačka županija Primorsko-goranska županija (izuzimajući aglomeraciju HR RI)
HR 4	Istra	Istarska županija
HR 5	Dalmacija	Zadarska županija Šibensko-kninska županija Splitsko-dalmatinska županija (izuzimajući aglomeraciju HR ST), Dubrovačko-neretvanska županija

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 2. Classification of agglomeration in the Republic of Croatia

OZNAKA AGLOMERACIJE	NAZIV AGLOMERACIJE	OBUHVAT AGLOMERACIJE
HR ZG	Zagreb	Grad Zagreb, Grad Dugo Selo, Grad Samobor, Grad Sveta Nedjelja, Grad Velika Gorica, Grad Zaprešić
HR OS	Osijek	Grad Osijek
HR RI	Rijeka	Grad Rijeka, Grad Bakar, Grad Kastav, Grad Kraljevica, Grad Opatija, Općina Viškovo, Općina Čavle, Općina Jelenje, Općina Kostrena, Općina Klana, Općina Matulji, Općina Lovran, Općina Omišalj
HR ST	Split	Grad Split, Grad Kaštela, Grad Solin, Grad Trogir, Općina Klis, Općina Podstrana, Općina Seget

4.3 AIR QUALITY MONITORING STATE NETWORK

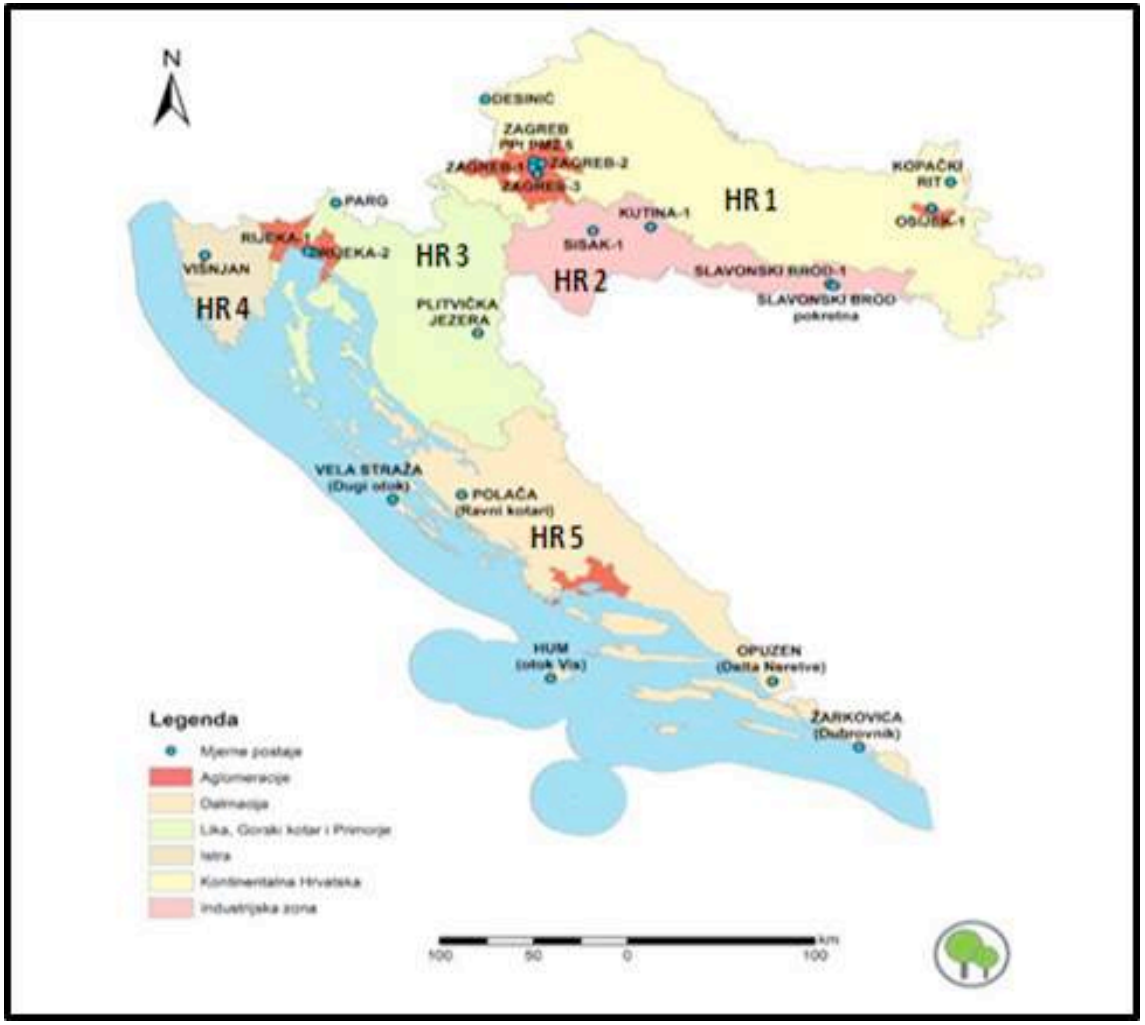

Figure 3. Zones and agglomerations for the monitoring and evaluation of air quality in the Republic of Croatia

4.3 AIR QUALITY MONITORING STATE NETWORK

The public network is designed to provide information on levels of air pollution in all zones and agglomerations.

The Regulation on the establishment of a list of measuring points for the monitoring of concentrations of certain pollutants in the air and the location of measurement stations in the national network for the continuous monitoring of air quality (Official Gazette 65/16) establishes a list of measuring locations for the monitoring of pollutants concentration in the air: sulphur dioxide, nitrogen dioxides and nitrogen oxides, PM10 and PM2,5, lead, benzene, carbon monoxide, ground-level ozone and precursors of ground-level ozone, arsenic, cadmium, mercury, nickel, benzo (a) pyrene and other polycyclic aromatic hydrocarbons in air.

This regulation also establishes the location of measuring stations in the state network for permanent monitoring of air quality in zones and agglomerations, Table 3. and Figure 4.

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 3. The location of measuring stations in the air quality monitoring state network

ZONA / AGLOMERACIJA	MJERNO MJESTO	KLASIFIKACIJA MJERNOG MJESTA	ONEČIŠĆUJUĆA TVAR
HR ZG	Zagreb-1	Prometna	NO_2; benzen; PM_{10}; BaP i PAU (BaAnt, BbF, BkF, IP, DahA) u PM_{10}; Hg; teški metali (Pb, Ni, Cd, As) u PM_{10}
	Zagreb-3	gradska pozadinska/prigradska (O_3)	O_3; NO_2; PM_{10}; BaP i PAU (BaAnt, BbF, BkF, IP, DahA) u PM_{10}; HOS-evi
	Velika Gorica*	gradska pozadinska/prigradska (O_3)	$PM_{2,5}$ uvodi se: O_3; NO_2
	Zagreb PPI PM2,5 – Ksaverska cesta*	gradska pozadinska	PPI $PM_{2,5}$; kemijski sastav $PM_{2,5}$ (Cl^-, NO^{3-}, SO_4^{2-}, Na^+, NH_4^+, K^+, Mg^{2+} i Ca^{2+}) (EC, OC)

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 3. The location of measuring stations in the air quality monitoring state network (continuation)

HR OS	Osijek-1	prometna	O_3; NO_2; benzen; PM_{10}; $PM_{2,5}$
HR RI	Rijeka-2	gradska pozadinska/prigradska (O_3)	O_3; SO_2; NO_2; PM_{10}; $PM_{2,5}$
HR ST	Split-1*	gradska pozadinska/prigradska (O_3)	SO_2; NO_2; PM_{10}; $PM_{2,5}$ uvodi se: O_3
	Kaštel Sućurac*	prigradska pozadinska	SO_2; NO_2
HR 1	Kopački rit	ruralna pozadinska	O_3; PM_{10}; $PM_{2,5}$
	Desinić	ruralna (O_3)/ruralna pozadinska	O_3; NO_2; PM_{10}
	Varaždin	prigradska	O_3; NO_2

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 3. The location of measuring stations in the air quality monitoring state network (continuation)

HR 2	Slavonski Brod-1	prigradska (O_3)/gradska pozadinska	O_3; SO_2; NO_2; $PM_{2,5}$
	Sisak-1	industrijska	Benzen; PM_{10}; BaP i PAU (BaAnt, BbF, BkF, IP, DahA) u PM_{10}; teški metali (Pb, Ni, Cd, As) u PM_{10}
	Kutina-1	prigradska (O_3)/gradska pozadinska	O_3; PM_{10}

4.3 AIR QUALITY MONITORING STATE NETWORK

Table 3. The location of measuring stations in the air quality monitoring state network (continuation)

HR 3	Plitvička jezera	ruralna pozadinska	PM_{10}; $PM_{2,5}$; kemijski sastav $PM_{2,5}$ (Cl^-, NO_3^-, SO_4^{2-}, Na^+, NH_4^+, K^+, Mg^{2+} i Ca^{2+}) (EC, OC)
	Parg	ruralna pozadinska	O_3
	Karlovac	prigradska	O_3; NO_2
HR 4	Višnjan	ruralna pozadinska	PM_{10}
	Pula Fižela*	prigradska	O_3; NO_2
HR 5	Hum (otok Vis)	ruralna pozadinska	O_3
	Žarkovica (Dubrovnik)	prigradska	O_3; NO_2; PM_{10}; $PM_{2,5}$

* mjerne postaje koje nisu sastavni dio državne mreže ali se koriste za potrebe razmjene podataka do uspostave

4.3 AIR QUALITY MONITORING STATE NETWORK

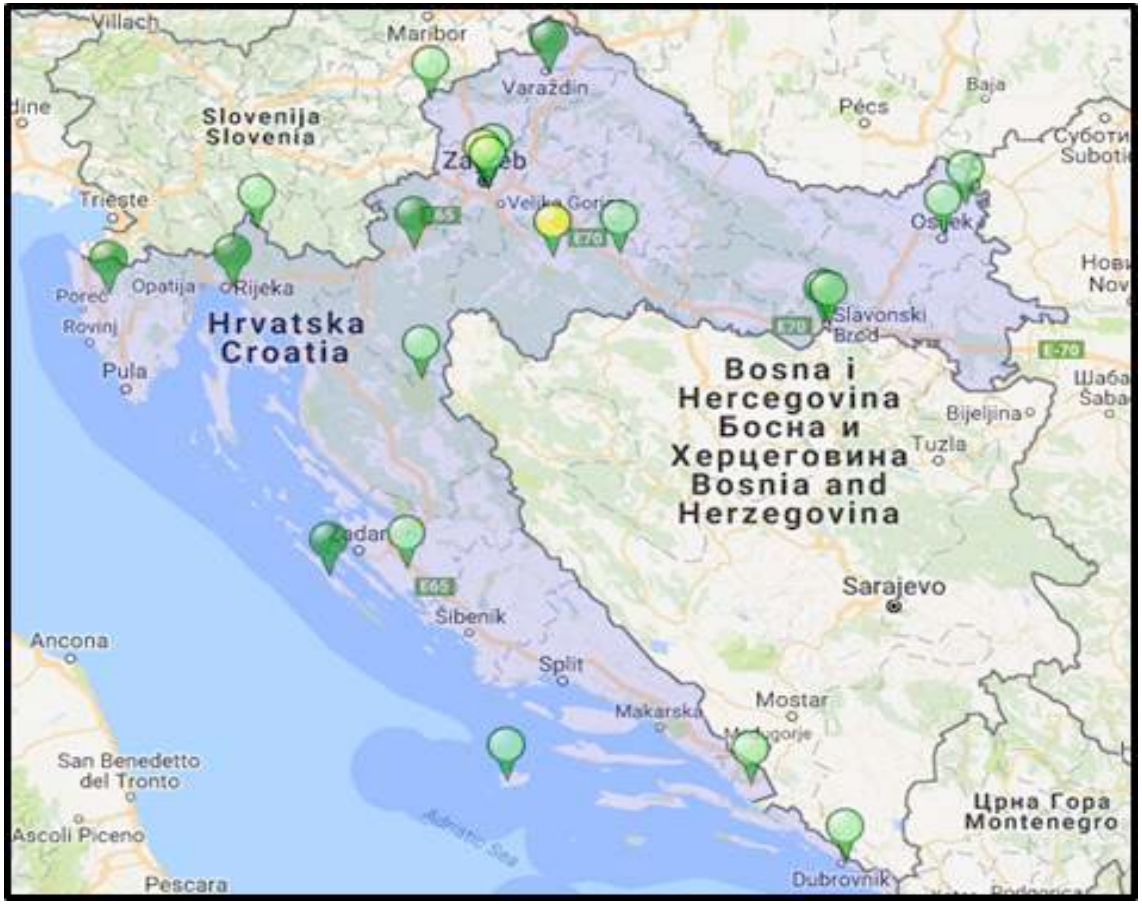

Fig. 4. Sate network for air quality monitoring without the stations from local networks that are currently being used.

4.3 AIR QUALITY MONITORING STATE NETWORK

The Air Quality Monitoring Program in the state network (Official Gazette 73/16) defines all measurements in the national network. Most measurements are already being carried out and measurements for individual pollutants will be introduced later.

The program include:

Program A air quality monitoring in the stations established in the aglomerations and

Program B air quality monitoring in the stations established in the zones.

4.3 AIR QUALITY MONITORING STATE NETWORK

The Program provides detailed measurement program for each station in the state network and pollutant list, with a measurement method for each of them. Also, locations and a measurement program for new monitoring stations in the state network that have to be built are also given.

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Articles 31., 32. and 33. of ZOZZ give the legal framework for monitoring the air quality outside of the state network at the local level.

There are three basic reasons and ways to run measurements outside the state network:

1. County, the City of Zagreb and the cities establish air quality monitoring stations in their area, if they estimate that levels of contamination are more than the prescribed limit values (GV), i.e. if they estimate there are reasonable grounds for that (in particular in the case of increased industrial development, business and industrial zone expansion and so on). Representative body of these units determines the location of air quality monitoring stations, defines the Program for measuring pollution levels and ensures the conditions for its implementation.

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

2. The polluter has to ensure air quality monitoring according to the environmental acceptability decision or the permit to the integrated environmental protection requirements or environmental permit in accordance with the Environmental Protection Law.

3. In cases where there is a suspicion, expressed by citizens' complaint, that there has been an air pollution whose quality is likely to impair human health, quality of life and / or adversely affect any environmental component, special purpose measurements or assessment of the level of contamination must be carried out. The executive body of the City of Zagreb, the city and the municipality, at the request of the environmental inspection to determine the justification of the above suspicions, is obliged to make a decision on special purposes measuring or estimating the level of contamination within eight days. If the measurement or estimation determines that no excessive contamination has occurred or excessive contamination has occurred and the polluter is not known, the costs should be paid by the units of local self-government whose decision has been taken by the executing authority.

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

If excessive air pollution is determined by measurement or estimation, and the polluter is known, the cost of measurement or estimation should be paid by the polluter. If the executive body of the City of Zagreb, the city and the municipalities does not make a decision, the Ministry shall provide measurements of special purpose or assessment of the pollution level at the expense and responsibility of the local self-government unit whose executive body has not made a decision.

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

All the measurements which are performed from the reasons mentioned above must be carried out in accordance with the regulations on the air quality monitoring by the testing laboratory with permission from the Ministry for air quality monitoring for those pollutants that will be measured on a local area network. The engagement testing laboratories shall submit original and validated air quality monitoring data and report on pollution levels and air quality assessment to the competent county administrative authority of the County, City of Zagreb and the city by March 31 of the current year for the previous calendar year and the competent authority shall submit the same data in the Agency until April 30 of the same year.

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Only automatic stations that use the reference methods are shown for all zones and agglomerations except for the agglomeration HR-ZG which includes the stations with sampling methods also (manual methods).

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 4. Local networks and HR-ZG agglomeration stations

R B	IME POSTAJE	Z/A	R/A	LOKACIJA	ONEČIŠĆUJUĆE TVARI KOJE SE MJERE REFERENTNIM METODAMA
1	Đorđićeva ulica	HR-ZG	R	Zagreb	PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima, $PM_{2,5}$
2	Ksaverska cesta	HR-ZG	A	Zagreb	PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima, sulfati, nitrati, kloridi u PM_{10}, BaP u PM_{10}, $PM_{2,5}$ čestice,
3	Peščenica	HR-ZG	R	Zagreb	PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima,
4	Prilaz baruna Filipovića	HR-ZG	R	Zagreb	PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima,
5	Siget	HR-ZG	A	Zagreb	NO_2, ozon, PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima, $PM_{2,5}$

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 4. Local networks and HR-ZG agglomeration stations (continuation)

6	Susedgrad	HR-ZG	R	Zagreb	PM_{10} i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima,
7	Mirogojska16	HR-ZG	A	Zagreb	SO_2, NO_2, CO, O_3, PM_{10}, benzen
8	Jakuševac	HR-ZG	A	Zagreb	H_2S, PM_{10} čestice, NH_3 merkaptani
9	Vrhovec	HR-ZG	A	Zagreb	NO_2
10	Bijenik	HR-ZG	A	Zagreb	SO_2, PM_{10}
11	MZLZ	HR-ZG	A	V. Gorica	CO, NO2, PM10, O3, PM10 i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn i BaP u njima

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Figure 5. The position of local networks and HR-ZG agglomeration stations

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 5. Local networks and stations in the Sisak-Moslavina county

R B	IME POSTAJE	Z/A	R/A	LOKACIJA	ONEČIŠĆUJUĆE TVARI KOJE SE MJERE REFERENRTNIM METODAMA
12	KT-2 Vatrogasni dom	HR-2	A	Kutina	SO_2, NO_2, NH_3, H_2S,
13	AMP Sisak 2	HR-2	A	Sisak	SO_2, NO_2, H_2S, CO, PM_{10}, PM_{10} (grav.) (Pb, Mn, Cd, Ni, As u PM_{10})
14	AMP Sisak 3	HR-2	A	Sisak	SO_2, NO_2, H_2S, PM_{10} , CO, benzen

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

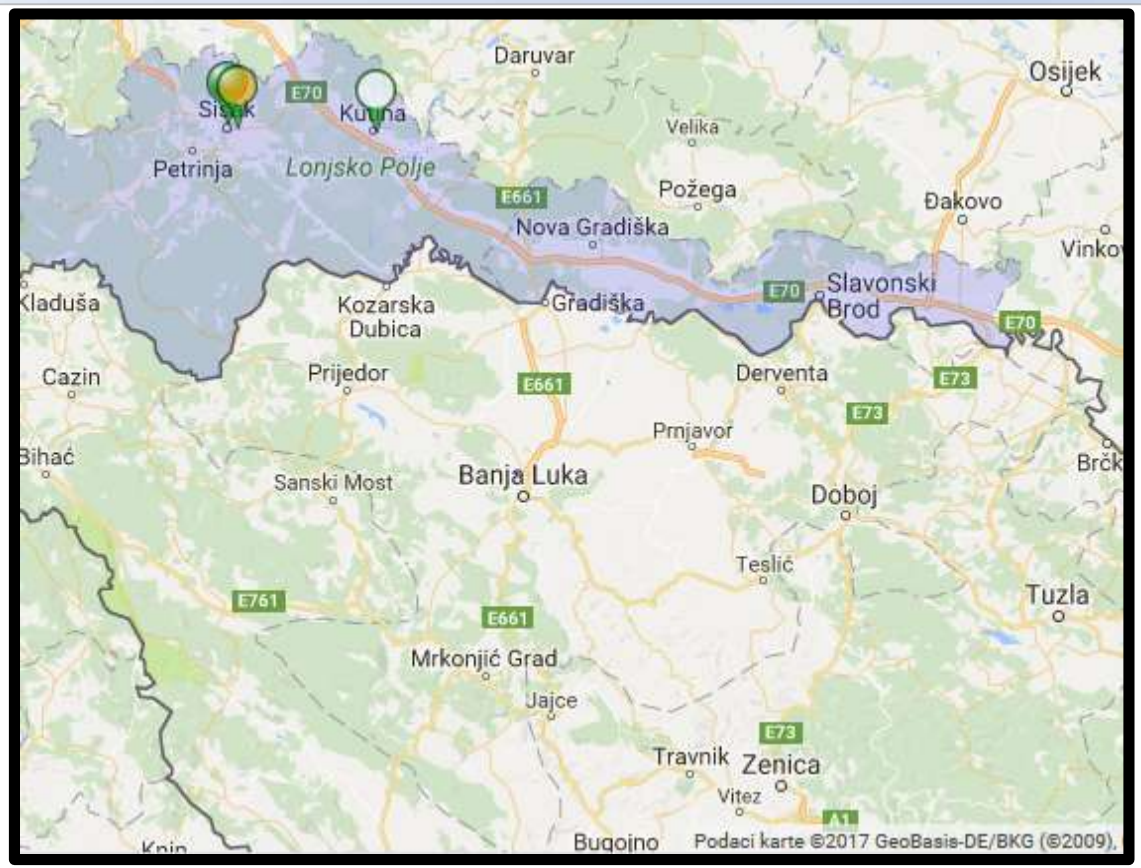

Figure 6. The position of local networks and stations in Sisak-Moslavina county

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 6. Local networks and stations in Istrian County

R B	IME POSTAJE	Z/A	R/A	LOKACIJA	ONEČIŠĆUJUĆE TVARI KOJE SE MJERE REFERENRTNIM METODAMA
15	Fižela	HR-4	A	Pula	NO2, ozon, PM10 i metali Pb, Mn, Cd, As, Ni, Cu, Fe, Zn u njima, PM2,5
16	Koromačno	HR-4	A	Koromačno	SO_2, NO_2, PM_{10}
17	Ripenda	HR-4	A	Ripenda	SO2, NO2, PM10, O3
18	Sv. Katarina	HR-4	A	Sv Katarina	SO_2, NO_2, O_3
19	Plomin	HR-4	A	Plomin	SO_2, NO_2
20	Klavar	HR-4	A	Klavar	PM_{10}
21	Zajci	HR-4	A	Pićan,	SO_2, CO, H_2S i PM_{10}
22	Čambarelići	HR-4	A	Pićan	SO_2, H_2S, PM_{10}

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

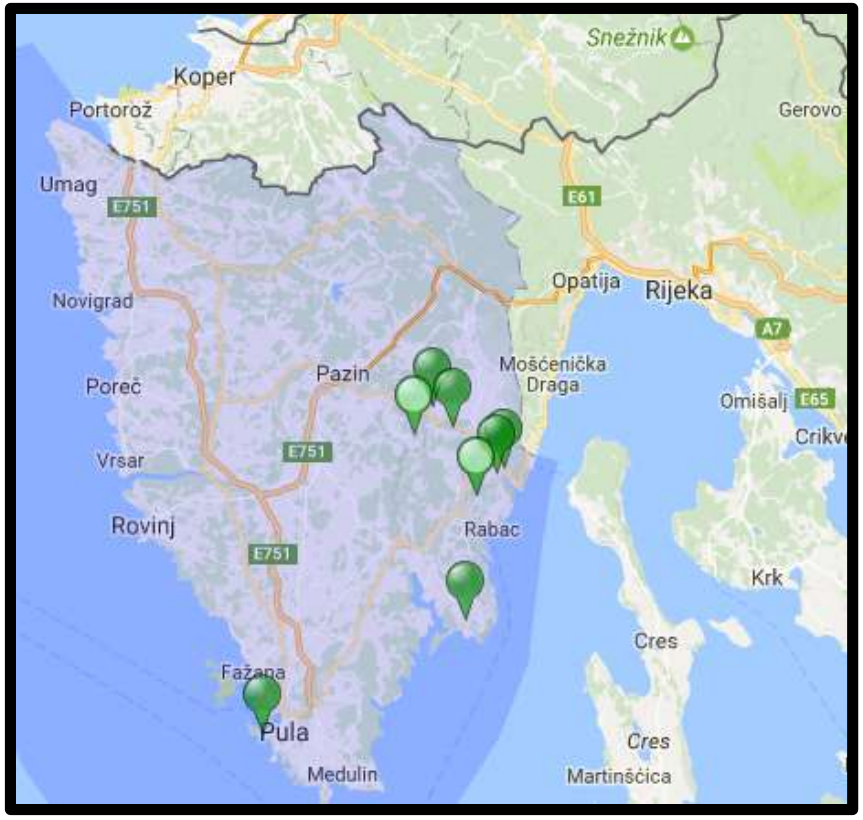

Figure 7. The position of local networks and stations of the Istrian County

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 7. Local networks and stations in HR-RI agglomeration

R B	IME POSTAJE	Z/A	R/A	LOKACIJA	ONEČIŠĆUJUĆE TVARI KOJE SE MJERE REFERENRTNIM METODAMA
23	Opatija - Gorovo	HR-RI	A	Opatija	O_3
24	Urinj	HR-RI	A	Urinj, Općina Kostrena	SO_2, NO_2, NH_3, H_2S, CO, PM_{10}, $PM_{2,5}$, benzen, Pb/Cd/Ni u PM_{10}, EM, MM, DMS, DMDS,
25	Vrh Martinšćice	HR-RI	A	Vrh Martinšćice	H_2S, CO , PM_{10}, benzen,
26	Paveki	HR-RI	A	Paveki, Općina Kostrena	SO_2, NO_2, O_3, H_2S, CO, PM_{10}, $PM_{2,5}$, benzen, Pb/Cd/Ni u PM_{10}, EM, MM, DMS, DMDS
27	Krasica-Urinj	HR-RI	A	Krasica, Grad Bakar	SO_2, NO_2, O_3, H_2S, CO, PM_{10}, $PM_{2,5}$, benzen

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 7. Local networks and stations in HR-RI agglomeration (continuation)

28	Bakar	HR-RI	A	Grad Bakar	PM_{10}
29	Martinšćica	HR-RI	A	Kostrena	PM_{10} i sadržaj metala (Pb, Cd),
30	Viševac	HR-RI	A	Viškovo	NH_3, H_2S, PM_{10}, CH4
31	Marišćina, Monitoring CZGO „Marišćina“	HR-RI	A	Viškovo	SO_2, H_2S, NO_2, O_3 , NH_3, PM_{10}, CO, benzen
32	Krešimirova ulica	HR-RI	A	Rijeka	SO_2, NO_2, O_3, NH_3, PM_{10}, Pb, Cd, PAU u PM_{10}

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

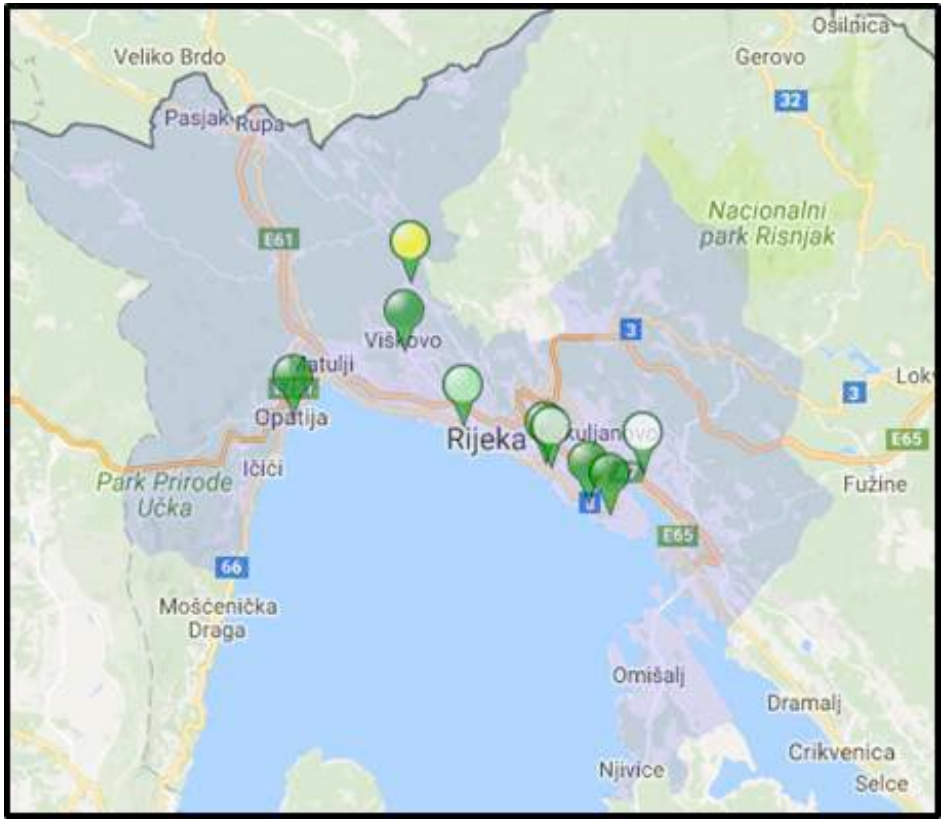

Figure 8. The position of local networks and stations in HR-RI agglomeration

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

Table 8. Local networks and stations in HR-ST agglomeration

R B	IME POSTAJE	Z/A	R/A	LOKACIJA	ONEČIŠĆUJUĆE TVARI KOJE SE MJERE REFERENRTNIM METODAMA
33	AMS 1 – Kaštel Sućurac	HR-ST	A	Kaštel Sućurac, Grad Kaštela	SO_2, NO_2, PM10, Pb, Cd, PAU u PM_{10}
34	AMS 2 – Sv. Kajo	HR-ST	A	Sv. Kajo, Grad Solin	SO_2, NO_2, PM10, Pb, Cd, PAU u PM_{10}
35	AMS 3 – Split-centar	HR-ST	A	Split	SO_2, NO_2, PM10, Pb, Cd, PAU u PM10
36	AMS Karepovac	HR-5	A	Karepovac	SO_2, NO_2, NH_3, H_2S, PM10, Pb, Cd, PAU u PM_{10}

Z/A – zona ili aglomeracija
R/A – ručne ili automatske metode

4.4 LOCAL NETWORK FOR AIR QUALITY MONITORING

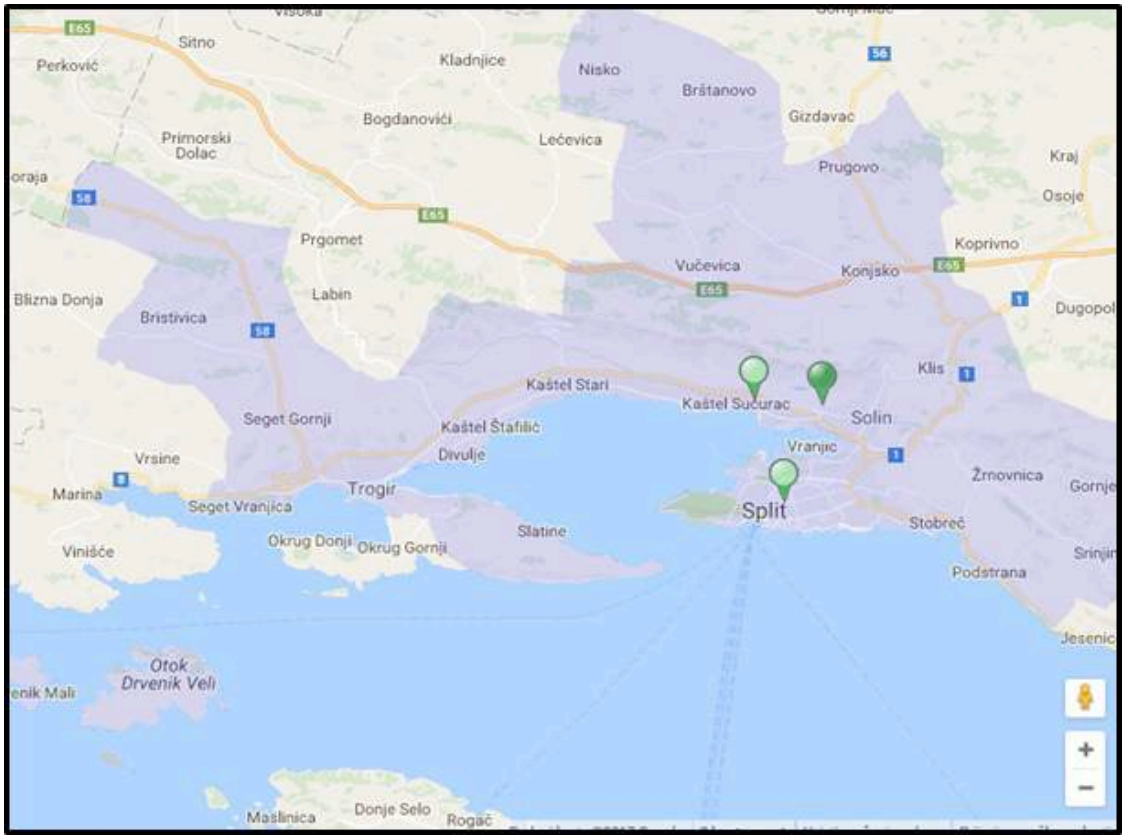

Figure 9. The position of local networks and stations in HR-ST agglomeration

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

Measures of special purpose must be carried out or it is necessary to estimate the level of pollution in cases where there is a suspicion expressed by citizens' complaint that air is contaminated so much that it can disturb human health, quality of life and / or have adverse effects on any environmental component. The executive body of the City of Zagreb, the city and the municipality, at the request of the environmental inspection to determine the justification of the above suspicion, is obliged to make a decision on the measurement of the special purpose or the assessment of the level of pollution within eight days.

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

These measurements are carried out after inspection supervision establishes a grounded suspicion of excessive pollution after the alert of the citizen.
The most common examples are the spread of unpleasant smells from a known or unknown source

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

Most often JLS or inspectors require:

- hydrogen sulphide
- Mercaptans
- Ammonia
- PM10

The first two can smell at concentrations of just a few ppb and can endanger the quality of life.

Unfortunately they are not the only "smelly" ...

PM10 is a pollutant that currently most endangers human health at the global level.

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

Complaints / complaints from citizens on unpleasant odors are common. If it's just about to, though it does look dramatic, there's no place to panic. All three substances are acutely toxic only at concentrations of 1000x higher than those causing stench.
Then the citizens can no longer smell them.
Eg. (lowest-adverse-effect level - LOAEL) The lowest concentration causing adverse effect for H2S is 15000 µg / m3 when it can cause eyes irritation (GV) and GV is 7 and 5 µg / m3.

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

In these measurements, attention should be paid to the quality of data.

	Sumporov dioksid, dušikov dioksid i dušikovi oksidi i ugljikov monoksid sumporovodik amonijak	Benzen merkaptani	Lebdeće čestice (PM_{10}/$PM_{2,5}$) i olovo	Prizemni ozon i s njim povezani NO i NO_2
Mjerenja na stalnim mjernim mjestima[1]:				
Nesigurnost	15%	25%	25%	15%
Minimalni obuhvat podataka	90%	90%	90%	90% tijekom ljeta 75% tijekom zime
Minimalna vremenska pokrivenost:				
– gradsko pozadinsko i prometno mjerno mjesto	–	35%[2]	–	–
– industrijsko mjerno mjesto	–	90%	–	–
Indikativna mjerenja:				
-nesigurnost	25%	30%	50%	30%
– minimalni obuhvat podataka	90%	90%	90%	90%
– minimalna vremenska pokrivenost	14%[4]	14%[3]	14%[4]	> 10% tijekom ljeta

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

(4) One measurement a week at random uniformly distributed over the year, or eight weeks measurement distributed over the year.

2 weeks of measurements in each season!

NOVI PRAVILNIK O PRAĆENJU KVALITETE ZRAKA 7/2017	Sumporov dioksid, dušikov dioksid i dušikovi oksidi i ugljikov monoksid sumporovodik amonijak	Benzen merkaptani	Lebdeće čestice (PM10/PM2,5) i olovo	Prizemni ozon i s njim povezani NO i NO2
Mjerenja na stalnim mjernim mjestima(1):				
Nesigurnost	15%	25%	25%	15%
Minimalni obuhvat podataka	90%	90%	90%	90% tijekom ljeta 75% tijekom zime
Minimalna vremenska pokrivenost:				
– gradsko pozadinsko i prometno mjerno mjesto	–	35% (2)	–	–
– industrijsko mjerno mjesto	–	90%	–	–
Indikativna mjerenja:				
-nesigurnost	25%	30%	50%	30%
– minimalni obuhvat podataka	90%	90%	90%	90%
– minimalna vremenska pokrivenost	14% (4)	14% (3)	14% (4)	> 10% tijekom ljeta

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

It is essential to respect these goals because otherwise it is possible to make a completely wrong assessment of air quality.

Study of a sample example
Case study - "MEASUREMENTS of NH3, H2S and MERCAPTANs in the Republic of Croatia legislation and practice"

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

PM10 is often measured. Attention should be paid here to the methods. It is best if the measurements are performed by a reference method (gravimetry).
- beta beam attenuation - lower
- optical methods - more

It is imperative to make a "study of equivalence"

Case study - "THE EFFECT OF APPLICATION OF ECVIVALENCY CORRECTION FUNCTIONS TO EXCEEDING THE LIMIT VALUES FOR PM10 IN THE STATE NETWORK FOR AIR QUALITY MONITORING "

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

How to interpret this data-PERCENTILES

$$\text{PERCENTILE} = \frac{DBP}{MPV}$$

MVP-maximum time coverage () 365 days, 8760 hours
DBP - permitted number of exceedances of the limit values for the pollutant

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

On the example of PM10: Limit Values 50 µg/m3, DBP 35 days

$$\text{PERCENTILE} = \frac{365}{365-35} = 0,904\ (90,4\%\ percentile)$$

If the analysis of the data set to 90.4% percentile indicates a number greater than 50 it means that in the full set of data (365) there were at least 36 values> of the limit values (50). This means that in case of measurements over the year DBP exceeded.

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

O. T.	PM10	SO2	NO2	H2S	R-SH	NH3
MVP	365	365	8760	365	365	365
MVP - DBP	330	362	8742	358	358	358
PERCENTIL	0,904	0,992	0,998	0,981	0,981	0,981
Ne smije preći	50	125	200	5	30	100

An example for afternoon.

4.5 MEASUREMENTS OF SPECIAL PURPOSE (INDUSTRIAL NETWORKS)

It is also necessary to be very careful when assessing sources of pollution especially for PM10 in the continental part of the Croatia.
Is mandatory to make a "study of equivalence„

Case study

"ANALYSIS OF THE IMPACT OF THE ZAGREB INTERNATIONAL AIRPORT ON AIR QUALITY„

„THE ANALYSIS OF THE IMPACT OF WASTE LANDFILL PRUDINEC/JAKUŠEVAC ON AIR QUALITY IN THE VILLAGE OF JAKUŠEVAC"

EKONERG Energy Research and Environmental Protection Institute

INZRAK

THANK YOU FOR YOUR ATTENTION

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