REPUBLIKA HRVATSKA

MINISTARSTVO ZAŠTITE
OKOLIŠA I PRIRODE

Croatia's Experience in conducting Inspections of Large Combustion Plants (LCP)

SENIOR ENVIRONMENTAL INSPETOR
Robert Rocek, engineer of geology,
univ. spec. oecoing.

Podgorica, 29 September - 1 October 2014

Croatia

Area:
56.542 km^2

Population density:
75,8/km^2

Population:
4.284.889

EU Environmental Legislation

- On 1 July 2013, Republic of Croatia became the 28th member of European Union

- Member states are obliged to implement EU legislation and to fulfill EU obligations

Objective of conducting Environmental Inspection (EI):

- Verification of compliance with laws and regulations of the Republic of Croatia under the jurisdiction of EI:
  - Law on Environmental Protection (Official Gazette 80/13)
    - 52 bylaws
  - Law on Air Protection (OG 130/11)
    - 41 bylaws
  - Law on Sustainable Waste Management (OG 94/13)
    - 33 bylaws
  - Law on Protection from light pollution(OG 114/11)

As well as the EC regulation that has to be directly applied in Croatia.

- Monitoring of installations with the highest risk for the environment is planned once per year, while monitoring of installations with the lowest environmental risk is planned once in three years.
- Joint monitoring of environmental inspection and inspections authorised by other specific regulation is implemented through coordinated inspection monitoring.
- Annual plan of coordinated inspections is based on a systematic risk assessment that relevant installation represents for the environment.

Monitoring of the regulation implementation:

- Conducted by inspection control related to the implementation of regulations on environmental protection, sustainable waste management, protection of air and light pollution;
- Participate in coordinated inspections;
- Organizes and prepares recommendations for the implementation of inspection controls, and reports those coordinated systematic and thematic inspection controls;
- Carries out systematic thematic inspection controls;
- Acts in emergency cases;
- Monitors the implementation, propose changes, and participate in drafting regulations within EI.

Sanctions in case of violation of regulation:

- handled in administrative proceedings;
- participate in the preparation of indictments and criminal complaints,
- participate in the hearings at the misdemeanor and criminal courts as a witness;
- participate in the investigative procedures of offenses at the request of the legal attorney;
- provides conditions for the execution of inspection decisions and prepares execution

THERMAL POWER PLANTS

Request for the procedure of determining integrated environmental protection requirements with LPC

- Directive 2010/75/EU of the European Parliament and the Council on industrial emissions (IPPC) (OG 334, 17. 12. 2010.),
- Environmental Protection Law (OG, No. 80/13 47/14),
- Regulation on Environmental Permit (OG, No. 80/13),
- Special regulations on the protection of individual environmental components, and special regulation on individual loads, in particular Air Protection Law, and regulation on limit values for emissions from air pollutants from stationary sources (OG 117/12, 90/14)
- Regulation on information and participation of public in environmental matters (OG No. 64/08)

Air emissions from combustion plants

- Emission Limit Values (ELV) air pollutants are based on determination of BAT established by BREF documents for LCP, regulation on ELV of air pollutants from stationary sources (OG No. 117/12 i 97/13), Rulebook on the monitoring of air pollutants from stationary sources (OG No. 129/12) and the deadlines according to Annex V of the Treaty of Croatian Accession to the European Union.

What did we negotiated for the environment (Treaty of Accession):

Derogation from Article 4, paragraphs 1 and 3, the emission limit values for sulfur dioxide, nitrogen oxides and dust shall apply to devices in Croatia since January 1, 2018, from large combustion plants:

- HEP Production d.o.o., Plomin 1: steam boiler (338 MW)
- Plomin, Plomin 2: steam boiler (544 MW)
- HEP Production d.o.o. Rijeka TPP: steam boiler (800 MW)
- HEP Production d.o.o. Sisak - block 1: steam boilers 1A + 1B (548 MW)
- HEP Production d.o.o., Sisak - Block 2: steam boilers 2A + 2B (548 MW)
- HEP Production d.o.o., TE-TO Zagreb (total 828 MW)
- HEP Production d.o.o., EL-TO Zagreb (total 510 MW)
- HEP Production d.o.o., TE-TO Osijek: steam boilers K1 + K2 (total 196 MW).

ELVs for existing large combustion plants using liquid fuels that are put in operation by 1 July 1987 are:

	Thermal Power, MW	ELV, mg/m^3
Sulphur oxides expressed as SO_2	>50 to 300 >300 to 500 > 500	1700 1700 – 400 (linear decrease) 400
Nitrogen oxides expressed as NO_2	>50 to 500 >500	450 400
Solid particles		50
Crbon monoxide		175

The list of operators who have the obligation of continuous measurements and incorporating AMS systems

OPERATOR OF STATIONARY SOURCE	FACILITY	AMS	PRODUCTION UNITS
Combustion devices:			
HEP-Generation d.o.o.	Plant TPP Plomin 1	steam boiler- Plomin 1	steam boiler(338 MW)
	Plant TPP Rijeka	steam boiler – TPP Rijeka	steam boiler (800 MW)
	Plant TPP E Sisak	TPP Sisak block 2, KA	steam boiler (548 MW)
		TPP Sisak block 2, KB	steam boiler(548 MW)
	Cogeneration Plant TPP-TO Zagreb	the main chimney– TPP-TO Zagreb	steam boiler K3, auxiliary boiler PK-3 and hot-water boilers VK-3, VK-4, VK-5 i VK-6 (828 MW)
	Cogeneration Plant EL-TO Zagreb	the main chimney – EL-TO Zagreb	steam boilerK6(K3), K7(K2), K8(K4) i K9(K5and hot-water boilers VK-1 i VK-3 (510 MW)
	Cogeneration Plant TPP-TO Osijek	boilers of block 45 MW TPP-TO Osijek	steam boilers WB1 i WB2 (196 MW)
TE PLOMIN d.o.o.	Plant TPP Plomin 2	steam boiler- Plomin 2	steam boiler of block 2 (544 MW)

HEP-Production d.o.o., TE Sisak

- Type: condensing power plant with two blocks - each block has two steam boilers (2x330 t / h, 540 ° C, 135bar) and one steam turbine generator (210 MW on the generator, 198 MW)
- fuel type: hard fuel oil, natural gas or combined
- total power:420 MW (2x210 MW) generator, 396 MW (2x198 MW)
- types of products: electricity, process steam

Installation permits:

- SOLUTUON of the Ministry of Environment and Nature Protection (MENP) on integrated environmental protection since 14.05.2014.
- MENP PERMIT for greenhouse gas emissions
- CONSENT of MENP for the safety report since 16.01. 2012.

Annual production of electricity by years (GWh) and the year of aggregates construction:

Annual Production	2009	2010	2011	2012	2013
Electricity	544,4 GWh	0 GWh	100 GWh	89 GWh	24 GWh
Technical steam (15 bar, 300°C)	100.335 t	99.262 t	150.399 t	113.717 t	119.713 t

- In TPP Sisak in 2009 began the construction of a gas combined-cycle cogeneration plant BLOCK C 230 MWe + 50 MWth
- The new facility consists of a gas turbine of 160 MWe with its own generator, one steam turbine power of 80 MW with a generator and boiler utilizer of the waste gases from the gas turbine.

TPP Sisak general information:

Production Units		Fuel	Rated capacity	Thermal power capacity	Year of commissioning
Concrete chimney of block A (drain Z1)	Blok A		210 MW_e		1970.
	Boiler A1	LU / PP	330 t/h (140 bar / 540°C)	274 MW_{tg}	
	Boiler A2	LU / PP	330 t/h (140 bar / 540°C)	274 MW_{tg}	
	PAT	-	210 MW_e	-	
Concrete chimney of block B (drain Z2)	Block B		210 MW_e		1976.
	Boiler B1	LU / PP	330 t/h (140 bar / 540°C)	274 MW_{tg}	
	Boiler B2	LU / PP	330 t/h (140 bar / 540°C)	274 MW_{tg}	
	PAT	-	210 MW_e	-	
Chimney of auxiliary boiler (drain Z3)	PK1	LU / PP	28 t/h (18 bar / 325°C)	23 MW_{tg}	1989.
	PK1	LU / PP	28 t/h (18 bar / 325°C)	23 MW_{tg}	1989.

Referent documents on BAT applied while determination of conditions:

Code	BREF	RDNRT
LCP BREF	Large Combustion Plants	Velika ložišta
EFS (ESB) BREF	Emissions from Storage	Emisije iz skladišta
MON BREF	General Principles of Monitoring	Opća načela praćenja (monitoring)
ICS (CS) BREF	Industrial Cooling Systems	Rashladni sustavi
ENE BREF	Energy Efficiency	Energetska učinkovitost

The monitoring of emissions from the exhaust of Z1 (a common stack of Block A) is carried out as follows:

- Every six months, measure emissions of SO_2, NO_x, CO, particulates, temperature, volume fraction, oxygen mass flow and emitted waste gases from the outlet of each boiler Block A (Boiler A 1 and A2) for every type of fuel used.

ELV for boilers A1 i A2 of block A (output Z1) are as follows:

Natural gas		until 31.12.2017
CO	mg/m^3	100
SO_2	mg/m^3	35
NO_x	mg/m^3	450
particulates	mg/m^3	5

Fuel oil		until 31. 12. 2015.	until 31. 12. 2017.
CO	mg/m^3	175	
SO_2	mg/m^3	5.100	1.700
NO_x	mg/m^3	1.350	
particulates	mg/m^3	150	

Monitoring of emissions from the drain Z2 (a common chimney for Block B) is as follows:

- When using liquid fuel from the outlet of each boiler Block B (The boiler B1 and B2), continuously monitor the emissions of SO_2, NO_x, particulate matter, oxygen content, temperature and emitted mass flow.
- CO emissions from boilers of Block B has been continuously monitored via the built-CEM system.
- When using natural gas from the outlet of each boiler continuously monitor the emissions of CO, NOx, oxygen content, temperature and emitted mass flow.
- Emissions of particulate matter and SO_2 should be monitored periodically every six months

ELV for boilers B1 and B2of block B (outlet Z2) are the as follows:

Natural gas		until 31. 12. 2017.	since 1. 1. 2018.
CO	mg/m^3	100	100
SO_2	mg/m^3	35	35
NO_x	mg/m^3	450	100*
Particulates	mg/m^3	5	5

Fuel oil		until 31. 12. 2015.	since 1. 1. 2016.	since 1. 1. 2018.
CO	mg/m^3	175	175	100
SO_2	mg/m^3	5.100	1.700	200*/**
NO_x	mg/m^3	1.200	1.200	150*/**
Particulates	mg/m^3	150	150	20*

- Results of continuous measurements (Block B) are expressed as hourly average values.
- It is considered to comply with the emission limit values if they are based on continuous measurements of the calendar year with all mean monthly values of less than ELV.
- For SO_2 and particulate matter has 97% of all tested 48 hour mean values to be less than 1.1 ELV .
- For NOx, 95% of all tested 48 hourly values of the mean values must be less than 1.1 ELV.
- When calculating the average value, measurement values obtained by participation in and unplugging a stationary source are excluded.

- The operator who possesses automatic measuring system (AMS) provides continuous data transmission in computer network information system for emissions.
- AMS is subject to annual verification and calibration .
- Measuring instruments of the continuous measurement system should be calibrated once every two years (QAL 2) and checked for their validity at least annually by licensed (accredited) laboratories.

- **The results of continuous measurements (block B) of water are reported each day / two-day, monthly and yearly.**

http://rizicna.azo.hr/iszo/stacion/

RESULTS OF THE ANALYSIS OF THE CONTINUOUS MEASUREMENTS

Br.	OPERATER OF STATIONARY SOURCES	PRODUCTION UNIT	DOES NOT MEET THE CRITERION FOR ELV REGARDING:
1.	HEP-Production d.o.o. - Plant TPP - TO Osijek	Steam boiler 1, 98 MW Steam boiler 2, 98 MW	particles
2.	HEP-Production d.o.o. - Plant TPP - TO Zagreb	Steam boiler K3, 384 MW Steam boiler PK3, 58 MW Hot-water boiler VK3, 64 MW Hot-water boiler VK4, 64 MW Hot-water boiler VK5, 129 MW Hot-water boiler VK6, 129 MW	SO_2 i CO


CO_2

Regulations of taxpayers obtaining permits for greenhouse gas emissions

- Air Protection Law (OG 130/11, 47/14);
- Regulation on emissions trading of greenhouse gas (OG 69/12);
- Regulation on unit charges, corrective coefficients and detailed criteria and standards for determining the charge for emissions into the environment of carbon dioxide (OG 73/07, 48/09);
- Guide on the method and terms for calculation and payment of compensation to the emission of carbon dioxide into the environment (OG 77/07);
- Regulations on the use of the Registry of the European Union (OG 4.13);
- Regulations on monitoring, reporting and verification reports on greenhouse gas emissions and aircraft in the period starting 1 January 2013 (OG77/13).

Greenhouse gas emissions

- Source of greenhouse gas emissions (fuel type);
- Permits for greenhouse gas emissions;
- The annual quota of emissions in tons of CO_2 1,696,777 t;
- Data on greenhouse gas emissions in the Register of Environmental Pollution;
- Emissions reported in the Register of environmental contamination suits the verified emissions ;
- The emission report verified by an authorized person – verifier;
- Verified report confirmed by the Agency for Environmental Protection (AEP).

Emission Trading System (ETS)

- An account with the Union Registry;
- Paid fee for AEP for the operating costs of opening and maintaining;
- Decision for free emission units;
- The Register of the Union submitted emission allowances in the amount corresponding to the verified emissions.

OBLIGATIONS OF PUBLIC AND AUTHORITIES REPORTING

- Activity report of completed periodic measurements as well as an annual report on the continuous measurement submit to the Environmental Protection Agency by 31 March in paper and electronic form.
- Data on air emissions (Pollutant Emission Register), which leads the Environmental Protection Agency by March 1
- In the case that block B works less than 1,500 hours per year and the use of milder limit values for emissions into the air to liquid fuel (ELV for SO_2 400 mg/m³, NOx 400 mg/m³) from 1 January 2018, it is required to provide data on every year for the past calendar year the annual number of hours of work.
- For all generated waste, it is necessary to keep records of the waste flow and provide data on the prescribed form in the EPR by 1 March for the preceding calendar year.

Fees paid to the fund of Environmental Protection and Energy Efficiency

- Environmental pollution charges: charges on emissions into the environment:
  - CO_2 emission charge to the Fund's
  - nitrogen oxides expressed as nitrogen dioxide (NO_2)
  - sulfur oxides as sulfur dioxide
- Fees for burdening the environment with waste:
  - benefits to non-hazardous industrial (industrial) waste,
  - fees on hazardous waste.

Thank you for attention!

Ministry of Environmental and Nature Protection
MINISTARSTVO ZAŠTITE OKOLIŠA I PRIRODE

SENIOR INSPECTOR OF ENVIRONMENTAL PROTECTION
Robert Rocek,eng. geology,
univ. spec. oecoing.
mob: 00385 91 2877179
tel: 00385 42 301-684
e-mail: robert.rocek@mzopu.hr