

DISPERSION STUDY

For the proposed activity

“Optimization of Processing Capacities for JAVYS, a.s. Radioactive Waste Treatment and Conditioning Technologies at Jaslovské Bohunice Site”

Author: Ing. Viliam Carach, PhD.

In Hutka, on 31 May 2019

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1 Introduction

The purpose of the proposed activity “Optimization of Processing Capacities for JAVYS, a.s. Radioactive Waste Treatment and Conditioning Technologies at Jaslovské Bohunice Site” will be, among other things, the optimization of the capacities for the combustion of radioactive waste (parallel operation of combustion plants) and the expansion of the capacities for radioactive waste remelting.

All of the proposed technologies will be used for the processing and treatment of low and very low active radioactive waste generated during the decommissioning of A1 Nuclear Power Plant, which is currently in stage III. and IV. of decommissioning, the decommissioning of V1 Nuclear Power Plant (at present, in stage 2 of decommissioning), radioactive waste coming from nuclear facility operation, from the operation of nuclear power plants in Slovakia, institutional radioactive waste from various human activities such as research, medicine etc. arising out of the operation of nuclear power plants, RAWUKO (radioactive waste of unknown origin) and radioactive waste management in the framework of provided nuclear services for external foreign producers of radioactive waste. The nuclear facility “RAW Processing and Treatment Technologies” consists mainly of the so-called Bohunice RAW Treatment Centre (BSC RAO), which includes a facility for the concentration of liquid radioactive waste, a sorting facility for sorting solid radioactive waste, an incineration plant for solid, liquid radioactive waste and saturated sorbents, a facility for high-pressure compaction of solid radioactive waste, and a cementation facility for final cementing treated radioactive waste into fibre-reinforced concrete containers or alternative packaging. In addition, the nuclear facility includes bituminization lines, a cleaning station of active waste water, a line for the pre-treatment of fixed radioactive waste, a facility for remelting metal radioactive waste, decontamination and fragmentation centres, a line for the processing of contaminated cables, and other facilities for the management of radioactive waste as well as facilities and sites for the storage of radioactive waste.

The subject of the Dispersion Study is to determine the following using an immission-transmission assessment:

- *Set emission limits for air pollution sources;*
- *Determine the estimated mass flows of pollutants;*
- *Verify the sufficiency of chimney heights in order to ensure sufficient dispersion of pollutants in the vicinity of the source of the air pollution;*
- *Calculation of pollutant concentrations in the vicinity of the location of the proposed source of air pollution;*
- *Assess the level of air quality before (Variant 0) and after implementation of the proposed activity (Variant 1).*

2 Information about the Contracting Authority and the Investor

Contracting authority:

EKOS PLUS s.r.o.
Župné námestie 7
811 03 Bratislava
Reg. No. (IČO): 31 392 547

Contracting authority's representative:

Investor:

Jadrová a vyradovacia spoločnosť, a.s. (JSC)
Tomášikova 22
821 02 Bratislava
Reg. No. (IČO): 35 946 024

Investor's representative:

Ing. Martin Kovačič

JUDr. Vladimír Švigár

3 List of Source Materials and Documents

- [D1] A Plan "Optimization of Processing Capacities for JAVYS, a.s. Radioactive Waste Treatment and Conditioning Technologies at Jaslovské Bohunice Site", 01/2018
- [D2] Scope of evaluation "Optimization of Processing Capacities for JAVYS, a.s. Radioactive Waste Treatment and Conditioning Technologies at Jaslovské Bohunice Site", no. 1101/2019-1.7/zg dated 28.01.2019

4 Cited and Related General Binding Legal Regulations in the Field of Air Protection

- [1] Act No. 137/2010 Coll. on Air, as amended by Act No. 318/2012 Coll., Act No. 180/2013 Coll., Act No. 350/2015 Coll., Act No. 293/2017 Coll. and Act No. 193/2018 Coll.
- [2] Decree of the Ministry of the Environment of the Slovak Republic No. 410/2012 Coll., implementing certain provisions of Act on Air, as amended by Decree No. 270/2014 Coll., Decree No. 252/2016 Coll. and Decree No. 315/2017 Coll.
- [3] Decree of the Ministry of the Environment of the Slovak Republic No. 411/2012 Z. z. on the monitoring of emissions from stationary sources of air pollution and air quality in their vicinity, as amended by Decree No. 316/2017 Coll.
- [4] Decree of the Ministry of the Environment of the Slovak Republic No. 244/2016 Coll. on Air Quality, as amended by Decree No. 296/2017 Coll.
- [5] Decree of the Ministry of the Environment of the Slovak Republic No. 231/2013 Coll. about the information given to the European Commission, about the requirements for keeping operating records, about the data reported to the National Emission Information System and about the set of technical and operational parameters and technical and organizational measures, as amended by Decree No. 33/2017 Coll. and Decree No. 197/2018 Coll.
- [6] Information on the procedure of calculating the chimney height to ensure the conditions of dispersion of discharged pollutants and evaluation of the impact of the source on the air pollution situation in its surroundings using a mathematical model of the calculation of expected air pollution. Bulletin of the Ministry of the Environment of the Slovak Republic, Part 5/1996, including amendment to Art. 1/5 of the Bulletin of the MoE SR Part 6/1999)
- [7] Bulletin of the Ministry of the Environment of the SR Part 5 of 2008
- [8] Bulletin of the Ministry of the Environment of the SR Part 5 of 1996

5 List of Abbreviations and Symbols

Abbreviations:

EL	emission limit
MoE	Ministry of the Environment of the SR
TOC	organic matters expressed as total organic carbon
SPMs	solid polluting matters
PM	polluting matter
SAP	source of air pollution

Symbols:

m.a.s.l.	metres above sea level
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kW kilowatt

6 Location of the Proposed Activity

Region: Trnavský
District: Trnava
Municipality: Jaslovské Bohunice
Cadastral area: Bohunice
Land parcel number: 704/55, 704/54, 704/57, 704/65, 704/68, 704/96, 704/99, 704/67, 701/53,
701/37, 701/46, 704/92, 701/86
Type of land: Built-up areas and courtyards



Figure no. 1 Overall view

The buildings where the radioactive waste processing and treatment facilities are located are situated within the delimited area of JAVYS, a.s. All listed lots of land owned by the applicant are registered as built-up areas and courtyards, outside the built-up area of the municipality.

7 A Brief Description of Technical and Technological Solution

7.1 Description of operation - current status (Variant 0)

The Radioactive Waste (RAW) Processing Centre consists of the following technologies:

- RAW concentration
- RAW cementing
- RAW sorting
- RAW incineration
- RAW high-pressure compaction
- RAW bituminization PS 44 and PS100
- Discontinuous Bituminization Line (DBL)
- Waste Water Cleaning Station – operated part (WWCS)
- Metallic RAW Treatment facility (fragmentation line)
- Processing of ventilation filters
- High-capacity decontamination line
- Metallic RAW melting facility in SO34
- Line for the pre-treatment of fixed RAW in SO44/20

The operation will also include the facilities:

- Start-up and standby boiler room (NaRK) – boiler K3
- Boiler K4 LOOS
- Production facility for fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1
- Emergency generators:
 - Diesel generator Caterpillar Olympian (Structure no. 585d:V1)
 - Diesel generator Martin Power MP 1700 (Structure 32.1)
 - Diesel generator Martin Power MP 400 (Structure 713:V1)
 - Diesel generator Caterpillar 3306 (Structure n. 840:M)

7.1.1 Operation Capacity - current status (Variant 0)

Table No. 1 Operation capacity

Facility/line	Annual capacity of the facility
Concentration	750 m ³
Cementing	1 100 m ³
Sorting	50 t
Incineration	240 t
High-pressure compaction	420 t
Bituminization Lines – PS 44 and PS 100	270 m ³
Bituminization Lines – DBL	48 m ³
Circulation evaporator	1.5 m ³ /hour
Waste Water Cleaning Station	3 000 m ³ /hour
Metallic RAW Treatment facility	500 t
Processing of ventilation filters	15 t
High-capacity decontamination line	500 t
Metallic RAW melting facility	1 000 t
Fixed RAW pre-treatment line	450 t

7.2 Description of operation – new status (Variant 1)

The purpose of the proposed activity is the optimization of the assessed RAW incineration capacities, RAW high-pressure compacting, RAW melting, the relocation of the existing fragmentation and decontamination centres, supplementation of capacities for RAW storage, the work station for the treatment of el.cables from NPP V1 and a work station for the release of materials from institutional control into existing building structures in the location of the set of NF RAW PTT and NF NPP V1 facilities, or into additional buildings within them. From the point of view of the dispersion study, only the following changes are relevant as the source of ordinary pollutants:

A. Optimization of RAW incineration capacities

The optimization of RAW incineration capacities will be reached by increasing the original RAW incineration capacity of 240 t/year to 480 t/year.

B. Optimization of radioactive waste (RAW) melting capacities

The optimization of the processing capacities for metallic RAW melting capacities will be reached:

- By supplementing the new RAW melting facility with the capacity of 2t/charge using the facility within a three-shift operation
- By changing the operation of the RAW melting facility in Structure 34 with a capacity of 2t/charge from one-shift operation to three-shift operation.

In addition to the said technologies, the operator also runs other facilities in the location, which are the source of ordinary pollutants:

- *Start-up and standby boiler room (NaRK) – boiler K3*
- *Boiler K4 LOOS*
- *Production facility for fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1)*
- *Emergency generators:*
 - *Diesel generator Caterpillar Olympian (Structure no. 585d:V1)*
 - *Diesel generator Martin Power MP 1700 (Structure no. 32.1)*
 - *Diesel generator Martin Power MP 400 (Structure no. 713:V1)*
 - *Diesel generator Caterpillar 3306 (Structure no. 840:M)*

7.2.1 Operation Capacity - current status (Variant 1)

Table No. 2 Operation capacity

Facility/line	Annual capacity of the facility
Concentration	750 m ³
Cementing	1 100 m ³
Sorting	50 t
Incineration	480 t
High-pressure compaction	1 000 t
Bituminization Lines – PS 44 and PS 100	270 m ³
Bituminization Lines – DBL	48 m ³
Circulation evaporator	1.5 m ³ /hour
Waste Water Cleaning Station	3 000 m ³ /hour
Metallic RAW Treatment facility	500 t
Processing of ventilation filters	15 t
High-capacity decontamination line	500 t
Metallic RAW melting facility	4 500 t
Fixed RAW pre-treatment line	450 t
RAW storage facilities	-
Fragmentation and decontamination facilities	650 t
Work station for the treatment of el.cables	1 050 kg/hour

7.2.2 Source categorization

All the above stated RAW treatment technologies are regulated in accordance with Act No. 541/2004 Coll. on Peaceful Use of Nuclear Energy (Atomic Act) and on amendments to certain acts. For this reason, identified sources of air pollution cannot be categorized according to the Decree of the Ministry of the Environment of the Slovak Republic No. 410/2012 Coll., implementing certain provisions of the Clean Air Act.

For orientation purposes in the case of the pollutants under review and the acceptable level of their emissions, we may categorize the RAW incineration technology under Decree of the Ministry of the Environment of the Slovak Republic No. 410/2012 Coll., implementing certain provisions of the Clean Air Act, as follows:

The existing and new incineration facilities of solid RAW and liquid organic waste

5 WASTE DISPOSAL AND CREMATORIA

5.1 Waste incineration plants

a) combusting hazardous waste with projected capacity in t/d

5.1.2 Waste incineration plants

a) combusting hazardous waste with projected capacity of more than 0 and less than 10 t/d
- medium source

Existing and new melting of RAW

For the melting of metallic RAW, with respect to its nature and purpose (melting of iron and stainless steel scrap and, to a smaller extent, waste copper and aluminium in induction furnaces), it is not possible to clearly classify the source according to the Decree No. 410/2012 Coll.. For the purpose of determining the emission limits, the provisions of par. 8.1 Annex No. 7 to Decree No. 410/2012 Coll. may be applied.

Start-up and standby boiler room – Boiler K3 (Structure no. 441)

1 FUEL-ENERGY INDUSTRY

1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW

1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of 26.6 MW
- medium source

Boiler K4 LOOS (Structure no. 441) – Bituminization Line

1 FUEL-ENERGY INDUSTRY

1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW

1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of 2.78 MW
- medium source

Production of fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1

3 PRODUCTION OF NON-METALLIC MINERAL PRODUCTS

- 3.13 Industrial production of concrete, mortar or other building materials with a projected production capacity in m³/h
- 3.13 Industrial production of concrete, mortar or other building materials with a projected production capacity of less than 10 m³/h
- **minor source**

Diesel generator Caterpillar Olympian (Structure no. 585d:V1) – MTP 0.58 MW

1 FUEL-ENERGY INDUSTRY

- 1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW
- 1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of more than 0.3 MW and less than 50 MW
- **medium source**

Diesel generator Martin Power MP 1700 (Structure no. 32.1) – MTP 1.5 MW

1 FUEL-ENERGY INDUSTRY

- 1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW
- 1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of more than 0.3 MW and less than 50 MW
- **medium source**

Diesel generator Martin Power MP 400 (Structure no. 713:V1) – MTP 2 x 0.94 MW

1 FUEL-ENERGY INDUSTRY

- 1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW
- 1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of more than 0.3 MW and less than 50 MW
- **medium source**

Diesel generator Caterpillar 3306 (Structure no. 840:M) – MTP 0.28 MW

1 FUEL-ENERGY INDUSTRY

- 1.1 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input in MW
- 1.1.2 Technological systems containing combustion facilities including gas turbines and stationary internal combustion piston engines, with a total installed rated thermal input of less than 0.3 MW
- **minor source**

8 Sources of Pollutants

8.1 Sources of pollutants – current status (Variant 0)

Table No. 3 Sources of pollutants – current status

Source	Pollutant
Existing incineration plant for solid RAW and liquid organic waste (PS06)	SPMs, SO ₂ , NO _x , CO, TOC, HCl, HF, Hg, Tl, Cd, As, Ni, Cr, Co, Pb, Cu, Mn, PCDD/DF
Metallic RAW melting facility in SO34	SPMs
Start-up and standby boiler room – Boiler K3 (Structure no. 441)	SPMs, SO ₂ , NO _x , CO
Boiler K4 LOOS (Structure no. 441) - Bituminization Line	NO _x , CO
Production of fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1	SPMs
Diesel generator Caterpillar Olympian (Structure No. 585d:V1) Emergency source	EL not specified
Diesel generator Martin Power MP 1700 (Structure 32.1) Emergency source	EL not specified
Diesel generator Martin Power MP 400 -(Structure 713:V1) Emergency source	EL not specified
Diesel generator Caterpillar 3306 (Structure No. 840:M) Emergency source	EL not specified

8.2 Sources of pollutants – new status (Variant 1)

Table No. 4 Sources of pollutants – new status

Source	Pollutant
Existing incineration plant for solid RAW and liquid organic waste (PS06)	SPMs, SO ₂ , NO _x , CO, TOC, HCl, HF, Hg, Tl, Cd, As, Ni, Cr, Co, Pb, Cu, Mn, PCDD/DF
New incineration plant for solid RAW and liquid organic waste	SPMs, SO ₂ , NO _x , CO, TOC, HCl, HF, Hg, Tl, Cd, Sb, As, Ni, Cr, Co, Pb, Cu, Mn, V, PCDD/DF
Metallic RAW melting facility in SO34	SPMs
New line for RAW melting	SPMs, Cu
Start-up and standby boiler room – Boiler K3 (Structure no. 441)	SPMs, SO ₂ , NO _x , CO
Boiler K4 LOOS (obj. 441) - Bituminization Line	NO _x , CO
Production of fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1	SPMs
Diesel generator Caterpillar Olympian (Structure No. 585d:V1) Emergency source	EL not specified
Diesel generator Martin Power MP 1700 (Structure 32.1) Emergency source	EL not specified
Diesel generator Martin Power MP 400 -(Structure 713:V1) Emergency source	EL not specified
Diesel generator Caterpillar 3306 (Structure no. 840:M) Emergency source	EL not specified

9 Emissions of Pollutants

9.1 Emissions of pollutants – current status (Variant 0)

Table No. 5 Emissions of pollutants – current status

Source	Pollutant	EL [mg/m ³]	Mass flow [kg/hour]
Existing incineration plant for solid RAW and liquid organic waste (PS06)	SPMs	30	0.22*
	SO ₂	300	2.16*
	NO _x	500	3.61*
	CO	100	0.72*
	TOC	20	0.14*
	HCl	30	0.22*
	HF	2	0.01*
	Hg, Tl, Cd total	0.2	0.000865*
	As, Ni, Cr, Co total	1	0.004327*
	Pb, Cu, Mn total	5	0.021636*
	PCDD/F	0,1 ng/m ³	0.000433 mg/hour*
Metallic RAW melting facility in SO34	SPMs	5**	0.100
Start-up and standby boiler room - Boiler K3 (Structure No. 441)	SPMs	5***	0.161
	SO ₂	35***	1.124
	NO _x	150***	4.817
	CO	100***	3.211
Boiler K4 LOOS (Structure No. 441) - Bituminization Line	NO _x	200****	0.650
	CO	100****	0.325

* According to the immission-transmission assessment of the effects of the construction of "Radioactive Waste Incineration Plant" on the air quality with selected substances for the purpose of environmental impact assessment pursuant to Act No. 24/2006 Coll. (RNDr. Gabriel Szabó, Košice, 05/2013)

** According to par. 8.1, Annex No. 7 to Decree of the MoE SR No. 410/2012 Coll.

*** According to Decision No. 5158-33736/2007/Bal/370660107

**** According to par. 3.2, Part V, Annex No. 4 to Decree of the MoE SR No. 410/2012 Coll.

Note: Emissions from facilities for emergency operation (diesel generators) and of the source Production facility for fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1 are not the subject of the calculation due to their period and nature of the operation. In 2018, they were in operation from 2 to 20 hours.

9.2 Emissions of pollutants – new status (Variant 1)

Table No. 6 Emissions of pollutants – new status

Source	Pollutant	EL [mg/m ³]	Mass flow [kg/hour]
Existing incineration plant for solid RAW and liquid organic waste (PS06)	SPMs	30*	0.22
	SO ₂	300*	2.16
	NO _x	500*	3.61
	CO	100*	0.72
	TOC	20*	0.14
	HCl	30*	0.22
	HF	2*	0.01
	Hg, Tl, Cd total	0,2*	0.000865
	As, Ni, Cr, Co total	1**	0.004327
	Pb, Cu, Mn total	5	0.021636
	PCDD/DF	0,1 ng TEQ/m ³ *	0.000433 mg/hour
New incineration plant for solid RAW and liquid organic waste	SPMs	30**	0.07
	SO ₂	200**	0.48
	NO _x	400**	0.96
	CO	100**	0.24
	TOC	20**	0.048
	HCl	60**	0.144
	HF	4**	0.010
	Hg and its compounds	0.05**	0.0001
	Cd+Tl and their compounds	0.05**	0.0001
	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their compounds Σ Heavy metals	0.5**	0.0010
	PCDD/DF	0.1 ng TEQ/m ³ **	0.00024 mg/hour
Metallic RAW melting facility in SO34	SPMs	5***	0.100
New RAW melting line	SPMs	5***	0.118
	Cu	1****	0.024
Start-up and standby boiler room - Boiler K3 (Structure No. 441)	SPMs	5*****	0.161
	SO ₂	35*****	1.124
	NO _x	150*****	4.817
	CO	100*****	3.211
Boiler K4 LOOS (Structure 441) - Bituminization Line	NO _x	200*****	0.650
	CO	100*****	0.325

* According to the immission-transmission assessment of the effects of the construction of "Radioactive Waste Incineration Plant" on the air quality with selected substances for the purpose of environmental impact assessment pursuant to Act No. 24/2006 Coll. (RNDr. Gabriel Szabó, Košice, 05/2013)

** According to Part III., Annex No. 5 to Decree No. 410/2012 Coll.

*** According to par. 8.1, Annex No. 7 to Decree of the MoE SR No. 410/2012 Coll.

****Part I., Annex No. 3 to Decree No. 410/2012 Coll.

***** According to Decision No. 5158-33736/2007/Bal/370660107

***** According to par. 3.2, Part V, Annex No. 4 to Decree of the MoE SR No. 410/2012 Coll.

Note: Emissions from facilities for emergency operation (diesel generators) and of the source Production facility for fibre-concrete mixture (FCM) – FCC Production facility Structure No. 641:V1 are not the subject of the calculation due to their period and nature of the operation. In 2018, they were in operation from 2 to 20 hours.

9.3 Minimum Exhaust/Chimney Height

Table No. 7 Verification of the minimum chimney height for the new source

Source of pollutants	Pollutant	Mass flow [kg/hour]	Coef. S	Min. chimney height [m]	Real chimney height [m]
New incineration plant for solid RAW and liquid organic waste	SPMs	0.07	0.5	4.0	100
	SO ₂	0.48	0.5	4.0	
	NO _x	0.96	0.2	8.2	
	CO	0.24	10	4.0	
	TOC	0.048	0.2	4.0	
	HCl	0.144	0.1	4.0	
	HF	0.010	0.04	4.0	
	Hg and its compounds	0.0001	0.005	4.0	
	Cd+Tl and their compounds	0.0001	0.005	4.0	
	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their compounds Σ Heavy metals	0.001	0.005	4.0	
	PCDD/DF	0.00024 mg/hour	0.000000001	4.0	
Existing RAW melting line	SPMs	0.100	0.5	4.0	100
New RAW melting line	SPMs	0.118	0.5	4.0	
	Cu	0.024	0.125	4.0	

On the basis of guaranteed pollutant mass flows for new sources of air pollution, it can be concluded that the construction height of the proposed chimney is sufficient to ensure the dispersion of pollutants.

10 Meteorological Information

Generally, according to climatic classification of Slovakia (Atlas of the Slovak Republic, 2002), it can be stated that the location of Jaslovské Bohunice nuclear facilities belongs to a warm, very dry district with mild winter in a warm climate area with an average number of warm days per year 50 and more. According to long-term statistics, average temperatures in January do not fall below -3 °C and average temperatures in July are around 18 – 19°C. Average precipitation is around 650 – 700 mm. The prevailing wind direction is northwest wind and the average wind speed in the year is 3 – 4 m/s.

Table No. 8 Average wind speed – Jaslovské Bohunice station (2016 – 2018)

Year	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII	Ø
2016	2.5	3.7	3.6	3.5	2.9	2.3	3.1	2.8	1.9	3.1	3.5	3.1	3
2017	3	2.7	3.6	4.3	3	3.2	3	2.8	3.1	3.3	3.2	3.8	3.3
2018	3.2	4.6	4.1	4.5	3.3	3.7	3.5	3.4	3.2	4.1	4	3.9	3.8
Ø	3.4	3.9	4.2	3.9	3.4	3.1	3.1	2.7	3.0	2.9	3.3	3.1	3.3

Table No. 9 Wind rose – Jaslovské Bohunice station (2016 – 2018)

Year	N	NE	E	SE	S	SW	W	NW	Calm
2016	154	84	59	153	63	51	115	250	71
2017	135	74	56	137	74	66	129	256	72
2018	226	96	75	174	61	55	79	222	12
Ø	172	85	63	155	66	57	108	243	52

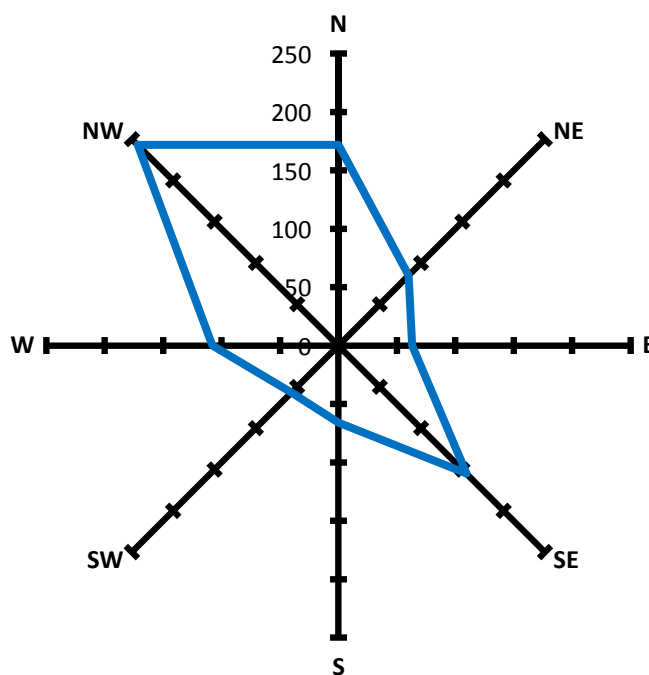


Figure No. 2 Wind rose

11 Input data for the Calculation of the Impact on the Air Pollution Situation

11.1 Current Status

Table No. 10 Calculation input data – current status (Variant 0)

Source	Pollutant	Mass flow [kg/hour] [g/s]	Chimney height [m]	Chimney diameter [m]	Flow speed [m/s]	Flue-gas temperature [°C]
Existing incineration plant for solid RAW and liquid organic waste (PS06)	PM ₁₀	0.0367	40.0	2.15	3.67	100.0
	PM _{2.5}	0.0246				
	SO ₂	0.6000				
	NO _x	1.0028				
	CO	0.2000				
	TOC	0.0389				
	HCl	0.0611				
	HF	0.0028				
	Hg and its compounds	0.0002				
	Cd+Tl and their compounds	0.0002				
	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their compounds Σ Heavy metals	0.0072				
	PCDD/DF	0.00000000012				
RAW melting facility in SO34	PM ₁₀	0.0167	100.0	2.125	9.67	80.0
	PM _{2.5}	0.0112				
Start-up and standby boiler room – Boiler K3 (Structure no. 441)	PM ₁₀	0.0268	30.0	1.1	11.89	145.0
	PM _{2.5}	0.0179				
	SO ₂	0.3122				
	NO _x	1.3380				
	CO	0.8920				
Boiler K4 LOOS (Structure 441)	NO _x	0.1806	17.0	0.5	5.82	150.0
	CO	0.0903				

Note: Solid polluting matters (SPMs) are expressed as PM₁₀ and PM_{2.5} (PM₁₀ = 0.6 * SPMs; PM_{2.5} = 0.67 * PM₁₀)

11.2 New Status

Table No. 11 Calculation input data – new status (Variant 1)

Source	Pollutant	Mass flow [kg/hour] [g/s]	Chimney height [m]	Chimney diameter [m]	Flow speed [m/s]	Flue-gas temperature [°C]
Existing incineration plant for solid RAW and liquid organic waste (P506)	PM ₁₀	0.0367	40.0	2.15	3.67	100.0
	PM _{2.5}	0.0246				
	SO ₂	0.6000				
	NO _x	1.0028				
	CO	0.2000				
	TOC	0.0389				
	HCl	0.0611				
	HF	0.0028				
	Hg and its compounds	0.0002				
	Cd+Tl and their compounds	0.0002				
	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their compounds Σ Heavy metals	0.0072				
	PCDD/DF	0.00000000012				
New incineration plant for solid RAW and liquid organic waste	PM ₁₀	0.0120	100.0	2.125	3.64	100.0
	PM _{2.5}	0.0080				
	SO ₂	0.13333				
	NO _x	0.26667				
	CO	0.06667				
	TOC	0.01333				
	HCl	0.04000				
	HF	0.00267				
	Hg and its compounds	0.00003				
	Cd+Tl and their compounds	0.00003				
	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V and their compounds Σ Heavy metals	0.00033				
	PCDD/DF	0.00000000007				
Metallic RAW melting facility in SO34	PM ₁₀	0.0167	100.0	2.125	11.51	100.0
	PM _{2.5}	0.0112				
New RAW melting line	PM ₁₀	0.0196				
	PM _{2.5}	0.0131				
	Cu	0.0065				
Start-up and standby boiler room – Boiler K3 (Structure no. 441)	PM ₁₀	0.0268	30.0	1.1	11.89	145.0
	PM _{2.5}	0.0179				
	SO ₂	0.3122				
	NO _x	1.3380				
	CO	0.8920				
Boiler K4 LOOS (Structure 441)	NO _x	0.1806	17.0	0.5	5.82	150.0
	CO	0.0903				

Note: Solid polluting matters (SPMs) are expressed as PM₁₀ and PM_{2.5} (PM₁₀ = 0.6 * SPMs; PM_{2.5} = 0.67 * PM₁₀)

List of Reference Points

Table No. 12 List of reference points

Designation	Municipality
R1 [4479; 641]	Malženice
R2 [2892; 3202]	Jaslovské Bohunice
R3 [2512; 4475]	Pederovce
R4 [2132; 5041]	Radošovce
R5 [252; 4447]	Dolné Dubové
R6 [193; 7497]	Kátlovce
R7 [3245; 8849]	Nižná
R8 [6976; 7218]	Veľké Kostoľany 1 (North)
R9 [7913; 5531]	Veľké Kostoľany 2 (South)
R10 [7428; 3766]	Pečeňady
R11 [7762; 2030]	Ratkovce
R12 [7436; 1188]	Žlkovce

The reference points have been selected at the level of the nearest point of a municipality from the source under review.

12 Brief Description of Methods Used

Model calculations of the concentrations of pollutants in the ambient air of the proposed activity were performed using a mathematical model. The air pollution was calculated using the Methodology of Air Pollution Calculation of the Ministry of the Environment of the Slovak Republic stated in the Bulletin of the Ministry of the Environment of the Slovak Republic, Volume 5 of 1996 – A Programme for Calculating Air Pollution MODIM (used version of WinMODIM 5.01). This methodology was developed on the basis of the methodology of the American Industrial Source Complex (ISC2) Dispersion Models, published by the Environmental Protection Agency (EPA) in 1992.

Input for model calculations:

- Emission flows for the pollutants under review;
- Meteorological conditions chosen for the dispersion of air pollutants;
- A network of nodal points in the area of 10 000 x 10 000 m;
- Limit values for the pollutants under review.

Output from model calculations will be compared with limit values for the protection of human health.

13 Calculation Results

13.1 Calculation Results – current status (Variant 0)

The concentrations of pollutants in reference points for the current status represent concentrations determined based on the monitoring results and mathematic modelling of the Slovak Hydrometeorological Institute for 2017 for the assessed area, and the contribution of the assessed pollution source calculated using the MODIM mathematical model for the Variant 0 – current status. On the basis of this, we expect identical concentrations of pollutants in all reference points.

Table No. 13 Concentrations of pollutants in reference points – current status

Reference points	PM ₁₀ [µg/m ³]		PM _{2.5} [µg/m ³]		SO ₂ [µg/m ³]		NO ₂ [µg/m ³]	
	24hours	year	24hours	year	1hour	year	1hour	year
	EL 50 [µg/m ³]	EL 40 [µg/m ³]	EL is not determined	EL 25 (20)* [µg/m ³]	EL 350 [µg/m ³]	EL is not determined	EL 200 [µg/m ³]	EL 40 [µg/m ³]
R1 [4479; 641]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R2 [2892; 3202]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R3 [2512; 4475]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R4 [2132; 5041]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R5 [252; 4447]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R6 [193; 7497]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R7 [3245; 8849]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R8 [6976; 7218]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R9 [7913; 5531]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R10 [7428; 3766]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R11 [7762; 2030]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00
R12 [7436; 1188]	20.00	18.00	18.00	16.00	14.00	8.00	35.00	12.00

*Valid from 1.1.2020

Table No. 13 continued

Reference points	CO [µg/m ³]		TOC [µg/m ³]		HCl [µg/m ³]		HF [µg/m ³]	
	8hours	year	1hour	year	1hour	year	1hour	year
	EL 10 000 [µg/m ³]	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R2 [2892; 3202]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R3 [2512; 4475]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R4 [2132; 5041]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R5 [252; 4447]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R6 [193; 7497]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R7 [3245; 8849]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R8 [6976; 7218]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R9 [7913; 5531]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R10 [7428; 3766]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R11 [7762; 2030]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100
R12 [7436; 1180]	600.00	450.00	5.00	1.00	0.500	0.100	0.500	0.100

Table No. 13 continued

Reference values	Hg [µg/m ³]		Cu [µg/m ³]		Cd + Tl [µg/m ³]		Σ Heavy metals [µg/m ³]		PCDD/DF [ng/m ³]	
	1hour	year	1hour	year	1hour	year	1hour	year	1hour	year
	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R2 [2892; 3202]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R3 [2512; 4475]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R4 [2132; 5041]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R5 [252; 4447]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R6 [193; 7497]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R7 [3245; 8849]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R8 [6976; 7218]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R9 [7913; 5531]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R10 [7428; 3766]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R11 [7762; 2030]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05
R12 [7436; 1180]	0.010	0.005	0.010	0.005	0.010	0.005	0.100	0.050	1.00E-04	5.00E-05

Table No. 14 Concentrations of pollutants in reference points – current status (the contribution of the source only – Variant 0)

Reference points	PM ₁₀ [µg/m ³]		PM _{2.5} [µg/m ³]		SO ₂ [µg/m ³]		NO ₂ [µg/m ³]	
	24hours	year	24hours	year	1hour	year	1hour	year
	EL 50 [µg/m ³]	EL 40 [µg/m ³]	EL is not determined	EL 25 (20)* [µg/m ³]	EL 350 [µg/m ³]	EL is not determined	EL 200 [µg/m ³]	EL 40 [µg/m ³]
R1 [4479; 641]	0.1083	0.001828	0.07249	0.001224	1.2620	0.021420	1.8410	0.02676
R2 [2892; 3202]	0.1836	0.002501	0.12290	0.001675	2.1910	0.030040	2.1880	0.02389
R3 [2512; 4475]	0.2188	0.002397	0.14650	0.001605	2.6530	0.029000	2.3410	0.02022
R4 [2132; 5041]	0.1922	0.001999	0.12870	0.001339	2.3150	0.023950	2.2350	0.01844
R5 [252; 4447]	0.1148	0.000805	0.07684	0.000539	1.3640	0.009546	1.9100	0.01148
R6 [193; 7497]	0.0997	0.001172	0.06673	0.000539	1.1760	0.013890	1.8000	0.01830
R7 [3245; 8849]	0.1153	0.001151	0.07719	0.000771	1.3590	0.013530	1.8870	0.01652
R8 [6976; 7218]	0.1318	0.000948	0.08824	0.000634	1.5510	0.011150	2.0110	0.01237
R9 [7913; 5531]	0.1270	0.001342	0.08503	0.000898	1.4920	0.015680	1.9890	0.01804
R10 [7428; 3766]	0.1352	0.002554	0.09050	0.001710	1.5760	0.029640	2.0030	0.03247
R11 [7762; 2030]	0.1048	0.002209	0.07018	0.001479	1.2180	0.025630	1.8300	0.03363
R12 [7436; 1180]	0.0980	0.002046	0.06561	0.001370	1.1380	0.023780	1.7820	0.03240

*Valid from 1.1.2020

Table No. 14 continued

Reference points	CO [µg/m ³]		TOC [µg/m ³]		HCl [µg/m ³]		HF [µg/m ³]	
	8hours	year	1hour	year	1hour	year	1hour	year
	EL 10 000 [µg/m ³]	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	1.1150	0.02794	0.05421	0.0009141	0.08515	0.001436	0.00390	0.000066
R2 [2892; 3202]	1.8750	0.03691	0.09552	0.0013340	0.15000	0.002095	0.00688	0.000096
R3 [2512; 4475]	2.2220	0.03554	0.11550	0.0012890	0.18140	0.002025	0.00831	0.000093
R4 [2132; 5041]	1.9640	0.02946	0.10070	0.0010630	0.15810	0.001669	0.00725	0.000076
R5 [252; 4447]	1.1750	0.01230	0.05820	0.0004107	0.09141	0.000645	0.00419	0.000030
R6 [193; 7497]	1.0270	0.01790	0.05040	0.0005977	0.07916	0.000939	0.00363	0.000043
R7 [3245; 8849]	1.2130	0.01878	0.05823	0.0005520	0.09146	0.000867	0.00419	0.000040
R8 [6976; 7218]	1.4120	0.01550	0.06401	0.0004545	0.10050	0.000714	0.00461	0.000033
R9 [7913; 5531]	1.3550	0.02205	0.06128	0.0006332	0.09626	0.000995	0.00441	0.000046
R10 [7428; 3766]	1.4340	0.04213	0.06583	0.0011870	0.10340	0.001865	0.00474	0.000085
R11 [7762; 2030]	1.0950	0.03520	0.05148	0.0010540	0.08086	0.001656	0.00371	0.000076
R12 [7436; 1180]	1.0190	0.03203	0.04828	0.0009925	0.07583	0.001559	0.00348	0.000071

Table No. 14 continued

Reference points	Hg [µg/m ³]		Cu [µg/m ³]		Cd + Tl [µg/m ³]		Σ Heavy metals [µg/m ³]		PCDD/DF [ng/m ³]	
	1hour	year	1hour	year	1hour	year	1hour	year	1hour	year
	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	0.000279	0.0000047	*	*	0.000279	0.0000047	0.01003	0.0001692	1.67E-07	2.82E-09
R2 [2892; 3202]	0.000491	0.0000069	*	*	0.000491	0.0000069	0.17680	0.0002469	2.95E-07	4.12E-09
R3 [2512; 4475]	0.000594	0.0000066	*	*	0.000594	0.0000066	0.02138	0.0002387	3.56E-07	3.98E-09
R4 [2132; 5041]	0.000518	0.0000055	*	*	0.000518	0.0000055	0.01864	0.0001967	3.11E-07	3.28E-09
R5 [252; 4447]	0.000299	0.0000021	*	*	0.000299	0.0000021	0.01077	0.0000760	1.80E-07	1.27E-09
R6 [193; 7497]	0.000259	0.0000031	*	*	0.000259	0.0000031	0.00933	0.0001106	1.56E-07	1.84E-09
R7 [3245; 8849]	0.000299	0.0000028	*	*	0.000299	0.0000028	0.01078	0.0001022	1.80E-07	1.70E-09
R8 [6976; 7218]	0.000329	0.0000023	*	*	0.000329	0.0000023	0.01185	0.0000841	1.98E-07	1.40E-09
R9 [7913; 5531]	0.000315	0.0000033	*	*	0.000315	0.0000033	0.01134	0.0001172	1.89E-07	1.95E-09
R10 [7428; 3766]	0.000339	0.0000061	*	*	0.000339	0.0000061	0.01218	0.0002197	2.03E-07	3.66E-09
R11 [7762; 2030]	0.000265	0.0000054	*	*	0.000265	0.0000054	0.00953	0.0001951	1.59E-07	3.25E-09
R12 [7436; 1180]	0.000248	0.0000051	*	*	0.000248	0.0000051	0.00894	0.0001837	1.49E-07	3.06E-09

*Cu has not been assessed separately (the existing remelting of radioactive waste is not the source of Cu emissions, the new remelting of radioactive waste is the source of Cu emissions)

13.2 Calculation Results – new status (Variant 1)

The pollutant concentrations calculated for the new status represent values based on the current status and contribution of the assessed air pollution source within the scope of Variant 1 using the mathematical model MODIM.

Table No. 15 Concentrations of pollutants in reference points – new status

Reference points	PM ₁₀ [µg/m ³]		PM _{2.5} [µg/m ³]		SO ₂ [µg/m ³]		NO ₂ [µg/m ³]	
	24hours	year	24hours	year	1hour	year	1hour	year
	EL 50 [µg/m ³]	EL 40 [µg/m ³]	EL is not determined	EL 25 (20)* [µg/m ³]	EL 350 [µg/m ³]	EL is not determined	EL 200 [µg/m ³]	EL 40 [µg/m ³]
R1 [4479; 641]	20.038	18.001	18.026	16.000	14.161	8.003	35.145	12.002
R2 [2892; 3202]	20.061	18.001	18.041	16.001	14.250	8.003	35.160	12.002
R3 [2512; 4475]	20.069	18.001	18.046	16.001	14.280	8.003	35.154	12.001
R4 [2132; 5041]	20.062	18.001	18.041	16.000	14.253	8.003	35.154	12.001
R5 [252; 4447]	20.038	18.001	18.026	16.000	14.158	8.001	35.140	12.001
R6 [193; 7497]	20.034	18.001	18.022	16.001	14.141	8.002	35.139	12.001
R7 [3245; 8849]	20.039	18.001	18.026	16.000	14.164	8.002	35.146	12.001
R8 [6976; 7218]	20.044	18.001	18.029	16.000	14.183	8.001	35.146	12.001
R9 [7913; 5531]	20.043	18.001	18.029	16.000	14.176	8.000	35.143	12.001
R10 [7428; 3766]	20.047	18.001	18.032	16.001	14.199	8.004	35.150	12.002
R11 [7762; 2030]	20.037	18.001	18.025	16.001	14.156	8.003	35.143	12.003
R12 [7436; 1188]	20.035	18.001	18.023	16.000	14.147	8.003	35.141	12.003

*Valid from 1.1.2020

Table No. 15 Continued

Reference points	CO [µg/m ³]		TOC [µg/m ³]		HCl [µg/m ³]		HF [µg/m ³]	
	8hours	year	1hour	year	1hour	year	1hour	year
	EL 10 000 [µg/m ³]	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	600.053	450.001	5.016	1.0003	0.547	0.1008	0.503	0.10005
R2 [2892; 3202]	600.086	450.002	5.024	1.0003	0.573	0.1010	0.505	0.10007
R3 [2512; 4475]	600.088	450.002	5.028	1.0003	0.586	0.1010	0.506	0.10006
R4 [2132; 5041]	600.080	450.001	5.026	1.0003	0.579	0.1008	0.505	0.10006
R5 [252; 4447]	600.052	450.001	5.016	1.0001	0.549	0.1003	0.503	0.10002
R6 [193; 7497]	600.046	450.001	5.014	1.0002	0.543	0.1005	0.503	0.10003
R7 [3245; 8849]	600.054	450.001	5.016	1.0002	0.548	0.1005	0.503	0.10003
R8 [6976; 7218]	600.061	450.001	5.018	1.0001	0.554	0.1004	0.504	0.10003
R9 [7913; 5531]	600.058	450.001	5.018	1.0002	0.555	0.1006	0.504	0.10004
R10 [7428; 3766]	600.062	450.002	5.020	1.0004	0.561	0.1011	0.504	0.10007
R11 [7762; 2030]	600.050	450.002	5.016	1.0003	0.547	0.1010	0.503	0.10007
R12 [7436; 1180]	600.047	450.002	5.015	1.0003	0.544	0.1009	0.503	0.10006

Table No. 15 Continued

Reference points	Hg [µg/m ³]		Cu [µg/m ³]		Cd + Tl [µg/m ³]		Σ Heavy metals [µg/m ³]		PCDD/DF [ng/m ³]	
	1hour	year	1hour	year	1hour	year	1hour	year	1hour	year
	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	0.0100351	0.0050006	0.0179110	0.0051312	0.0100351	0.0050006	0.1003800	0.0500067	1.0008E-04	5.0001E-05
R2 [2892; 3202]	0.0100532	0.0050008	0.0232600	0.0051671	0.0100532	0.0050008	0.1005800	0.0500085	1.0013E-04	5.0002E-05
R3 [2512; 4475]	0.0100635	0.0050007	0.0250500	0.0051548	0.0100635	0.0050007	0.1007000	0.0500079	1.0015E-04	5.0002E-05
R4 [2132; 5041]	0.0100588	0.0050006	0.0231300	0.0051353	0.0100588	0.0050006	0.1006400	0.0500069	1.0014E-04	5.0001E-05
R5 [252; 4447]	0.0100362	0.0050003	0.0180130	0.0050551	0.0100362	0.0050003	0.1003900	0.0500028	1.0009E-04	5.0001E-05
R6 [193; 7497]	0.0100322	0.0050004	0.0169550	0.0050805	0.0100322	0.0050004	0.1003530	0.0500041	1.0008E-04	5.0001E-05
R7 [3245; 8849]	0.0100359	0.0050004	0.0180420	0.0050777	0.0100359	0.0050004	0.1003900	0.0500039	1.0008E-04	5.0001E-05
R8 [6976; 7218]	0.0100394	0.0050003	0.0192270	0.0050636	0.0100394	0.0050003	0.1004300	0.0500032	1.0009E-04	5.0001E-05
R9 [7913; 5531]	0.0100409	0.0050004	0.0190370	0.0050922	0.0100409	0.0050004	0.1004500	0.0500047	1.0010E-04	5.0001E-05
R10 [7428; 3766]	0.0100452	0.0050008	0.0198390	0.0051797	0.0100452	0.0050008	0.1005000	0.0500091	1.0011E-04	5.0002E-05
R11 [7762; 2030]	0.0100354	0.0050007	0.0176510	0.0051594	0.0100354	0.0050007	0.1003890	0.0500081	1.0008E-04	5.0002E-05
R12 [7436; 1180]	0.0100331	0.0050007	0.0171570	0.0051486	0.0100331	0.0050007	0.1003640	0.0500075	1.0008E-04	5.0002E-05

Table No. 16 Concentrations of pollutants in reference points – new status (Variant 1) – the contribution of the source only

Reference points	PM ₁₀ [µg/m ³]		PM _{2.5} [µg/m ³]		SO ₂ [µg/m ³]		NO ₂ [µg/m ³]	
	24hours	year	24hours	year	1hour	year	1hour	year
	EL 50 [µg/m ³]	EL 40 [µg/m ³]	EL is not determined	EL 25 (20)* [µg/m ³]	EL 350 [µg/m ³]	EL is not determined	EL 200 [µg/m ³]	EL 40 [µg/m ³]
R1 [4479; 641]	0.14650	0.002466	0.09805	0.001650	1.4230	0.02411	1.9860	0.028850
R2 [2892; 3202]	0.24490	0.003314	0.16380	0.002218	2.4410	0.03349	2.3480	0.025660
R3 [2512; 4475]	0.28740	0.003150	0.19230	0.002108	2.9330	0.03219	2.4950	0.021700
R4 [2132; 5041]	0.25400	0.002658	0.16990	0.001778	2.5680	0.02674	2.3890	0.019880
R5 [252; 4447]	0.15320	0.001073	0.10250	0.000718	1.5220	0.01068	2.0500	0.012360
R6 [193; 7497]	0.13320	0.001563	0.08912	0.001046	1.3170	0.01554	1.9390	0.019720
R7 [3245; 8849]	0.15440	0.001529	0.10330	0.001023	1.5230	0.01513	2.0330	0.017750
R8 [6976; 7218]	0.17540	0.001257	0.11730	0.000841	1.7340	0.01246	2.1570	0.013270
R9 [7913; 5531]	0.17010	0.001790	0.11380	0.001198	1.6680	0.01557	2.1320	0.019360
R10 [7428; 3766]	0.18260	0.003428	0.12220	0.002293	1.7750	0.03332	2.1530	0.034870
R11 [7762; 2030]	0.14180	0.002984	0.09485	0.001996	1.3740	0.02890	1.9730	0.036240
R12 [7436; 1180]	0.13270	0.002768	0.08880	0.001852	1.2850	0.02683	1.9230	0.034950

*Valid from 1.1.2020

Table No. 16 Continued

Reference points	CO [µg/m ³]		TOC [µg/m ³]		HCl [µg/m ³]		HF [µg/m ³]	
	8hours	year	1hour	year	1hour	year	1hour	year
	EL 10 000 [µg/m ³]	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	1.168	0.029	0.06994	0.0011830	0.13250	0.002244	0.007066	0.0001197
R2 [2892; 3202]	1.961	0.039	0.11940	0.0016780	0.22310	0.003128	0.011850	0.0001650
R3 [2512; 4475]	2.310	0.037	0.14380	0.0016090	0.26780	0.002984	0.014130	0.0001568
R4 [2132; 5041]	2.044	0.031	0.12680	0.0013410	0.23730	0.002505	0.012550	0.0001323
R5 [252; 4447]	1.227	0.013	0.07438	0.0005238	0.14010	0.000985	0.007442	0.0000522
R6 [193; 7497]	1.073	0.019	0.06469	0.0007628	0.12200	0.001434	0.006489	0.0000761
R7 [3245; 8849]	1.267	0.020	0.07419	0.0007113	0.13980	0.001345	0.007433	0.0000717
R8 [6976; 7218]	1.473	0.016	0.08179	0.0005849	0.15460	0.001105	0.008229	0.0000588
R9 [7913; 5531]	1.413	0.023	0.07947	0.0008224	0.15080	0.001562	0.008056	0.0000835
R10 [7428; 3766]	1.496	0.044	0.08601	0.0015560	0.16400	0.002971	0.008786	0.0001593
R11 [7762; 2030]	1.145	0.037	0.06720	0.0013810	0.12800	0.002637	0.006854	0.0001414
R12 [7436; 1180]	1.066	0.034	0.06298	0.0012970	0.11990	0.002474	0.006420	0.0001325

Table No. 16 Continued

Reference points	Hg [µg/m ³]		Cu [µg/m ³]		Cd + Tl [µg/m ³]		Σ Heavy metals [µg/m ³]		PCDD/DF [ng/m ³]	
	1hour	year	1hour	year	1hour	year	1hour	year	1hour	year
	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined	EL is not determined
R1 [4479; 641]	0.0003138	0.00000531	0.007911	0.0001312	0.0003138	0.00000531	0.01041	0.0001759	2.50E-07	4.23E-09
R2 [2892; 3202]	0.0005443	0.00000763	0.013260	0.0001671	0.0005443	0.00000763	0.01826	0.0002554	4.22E-07	5.92E-09
R3 [2512; 4475]	0.0006573	0.00000735	0.015050	0.0001548	0.0006573	0.00000735	0.02208	0.0002466	5.07E-07	5.66E-09
R4 [2132; 5041]	0.0005765	0.00000609	0.013130	0.0001353	0.0005765	0.00000609	0.01928	0.0002036	4.49E-07	4.74E-09
R5 [252; 4447]	0.0003354	0.00000237	0.008013	0.0000551	0.0003354	0.00000237	0.01116	0.0000788	2.65E-07	1.86E-09
R6 [193; 7497]	0.0002913	0.00000345	0.006955	0.0000805	0.0002913	0.00000345	0.00968	0.0001147	2.31E-07	2.71E-09
R7 [3245; 8849]	0.0003353	0.00000320	0.008042	0.0000777	0.0003353	0.00000320	0.01117	0.0001061	2.64E-07	2.54E-09
R8 [6976; 7218]	0.0003685	0.00000263	0.009227	0.0000636	0.0003685	0.00000263	0.01228	0.0000874	2.92E-07	2.09E-09
R9 [7913; 5531]	0.0003560	0.00000368	0.009037	0.0000922	0.0003560	0.00000368	0.01179	0.0001219	2.85E-07	2.95E-09
R10 [7428; 3766]	0.0003837	0.00000693	0.009839	0.0001797	0.0003837	0.00000693	0.01268	0.0002288	3.09E-07	5.60E-09
R11 [7762; 2030]	0.0003001	0.00000616	0.007651	0.0001594	0.0003001	0.00000616	0.00992	0.0002032	2.41E-07	4.97E-09
R12 [7436; 1180]	0.0002813	0.000005789	0.007157	0.0001486	0.0002813	0.000005789	0.00930	0.00019120	2.26E-07	4.66E-09

Table No. 17 General evaluation of maximum concentrations current/new status

Pollutant	Maximum short-term concentration [µg/m ³]					Average yearly concentration [µg/m ³]				
	Current status	New status	LH _k	Limit hour		Current status	New status	LH _r	Limit hour	
				Upper	Bottom				Upper	Bottom
PM ₁₀	20.000	20.069	50 (24h)	35	25	18.000	18.001	40	28	20
PM _{2.5}	18.000	18.046	-	-	-	16.000	16.001	25 (20*)	17	12
SO ₂	14.000	14.280	350 (1h)	-	-	8.000	8.004	-	-	-
NO ₂	35,000	35.160	200 (1h)	140	100	12.000	12,003	40	32	26
CO	600.000	600.088	10000 (8hrs)	7000	5000	450.000	450.002	-	-	-
TOC	5.000	5.028	-	-	-	1.000	1.0004	-	-	-
HCl	0.500	0.586	-	-	-	0.100	0.101	-	-	-
HF	0.500	0.506	-	-	-	0.100	0.10007	-	-	-
Hg	0.010	0.0101	-	-	-	0.005	0.005001	-	-	-
Cu	0.010	0.025	-	-	-	0.005	0.0052	-	-	-
Cd + Tl	0.010	0.0101	-	-	-	0.005	0.005001	-	-	-
Σ Heavy m.	0.100	0.101	-	-	-	0.050	0.05001	-	-	-
PCDD/DF	1.00E-04 ng/m ³	1.001E-04 ng/m ³	-	-	-	5.00E-05 ng/m ³	5.0002E-05 ng/m ³	-	-	-

*Valid from 1.1.2020

Assessment of the Contribution of the Source under Review

The subject of the assessment will only be the maximum values of concentrations from concentration values calculated using the mathematical model in the selected reference points for the Variant 0 and Variant 1, and their comparison with relevant short-term and the average limit value.

Solid polluting matters expressed as PM₁₀

Short-term (24-hour) limit value of PM₁₀ particles for the protection of human health **50 µg/m³**
Annual limit value of PM₁₀ particles for the protection of human health **40 µg/m³**

Current status (Variant 0)

Calculated maximum expected contribution of the source under review to daily average concentration in reference points is 0.2188 µg/m³, which is 0.438% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.002554 µg/m³, which is 0.006% of the limit value.

New status (Variant 1)

Calculated maximum expected contribution of the source under review to daily average concentration in reference points is 0.2874 µg/m³, which is 0.575% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.003428 µg/m³, which is 0.009% of the limit value.

Solid polluting matters expressed as PM_{2.5}

Short-term (24-hour) limit value of PM_{2.5} particles for the protection of human health **Is not specified**
Annual limit value of PM₁₀ particles for the protection of human health **25 µg/m³**

Current status (Variant 0)

Calculated maximum expected contribution of the source under review to daily average concentration in reference points is $0.1465 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.00171 \mu\text{g}/\text{m}^3$, which is 0.007% of the limit value.

New status (Variant 1)

Calculated maximum expected contribution of the source under review to daily average concentration in reference points is $0.1923 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.002293 \mu\text{g}/\text{m}^3$, which is 0.009 % of the limit value.

Sulphur dioxide SO_2

Short-term (1-hour) limit value of SO_2 for the protection of human health

$350 \mu\text{g}/\text{m}^3$

Annual limit value of SO_2 particles for the protection of human health

Is not specified

Current status (Variant 0)

Calculated maximum expected contribution of the source under review to maximum hourly concentrations in reference points is $2.653 \mu\text{g}/\text{m}^3$, which is 0.758% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.03004 \mu\text{g}/\text{m}^3$, the limit value is not specified.

New status (Variant 1)

Calculated maximum expected contribution of the source under review to maximum hourly concentrations in reference points is $2.933 \mu\text{g}/\text{m}^3$, which is 0.838% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.03349 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Nitrogen oxides expressed as NO_2

Short-term (1-hour) limit value of NO_2 for the protection of human health

$200 \mu\text{g}/\text{m}^3$

Annual limit value of NO_2 particles for the protection of human health

$40 \mu\text{g}/\text{m}^3$

Current status (Variant 0)

Calculated maximum expected contribution of the source under review to maximum hourly concentrations in reference points is $2.341 \mu\text{g}/\text{m}^3$, which is 1.171% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.03363 \mu\text{g}/\text{m}^3$, which is 0.084% of the limit value.

New status (Variant 1)

Calculated maximum expected contribution of the source under review to maximum hourly concentrations in reference points is $2.495 \mu\text{g}/\text{m}^3$, which is 1.248% of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.03624 \mu\text{g}/\text{m}^3$, which is 0.091% of the limit value.

Carbon monoxide CO

Short-term (8-hour) limit value for the protection of human health

10 mg/m³

Annual limit value of CO for the protection of human health

Is not specified

Current status (Variant 0)

Calculated maximum expected contribution of the source under review to maximum 8-hour concentrations in reference points is 2.222 µg/m³, which is 0.022 % of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.04213 µg/m³, the limit value is not specified.

New status (Variant 1)

Calculated maximum expected contribution of the source under review to maximum 8-hour concentrations in reference points is 2.31 µg/m³, which is 0.023 % of the limit value.

Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.04398 µg/m³, the limit value is not specified.

TOC

Short-term (1-hour) limit value of TOC for the protection of human health

Is not specified

Annual limit value of TOC for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For TOC, the "S" value is 0.2, which may be equated to the limit value of 200 µg/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 0.1155 µg/m³, which is 0.058% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.00133 µg/m³, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For TOC, the "S" value is 0.2, which may be equated to the limit value of 200 µg/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 0.1438 µg/m³, which is 0.072% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.001678 µg/m³, the limit value is not specified.

HCl

Short-term (1-hour) limit value of HCl for the protection of human health

Is not specified

Annual limit value of HCl for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For HCl, the "S" value is 0.1, which may be equated to the limit value of 100 µg/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 0.1814 µg/m³, which is 0.181% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.00210 µg/m³, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For HCl, the "S" value is 0.1, which may be equated to the limit value of $100 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.2678 \mu\text{g}/\text{m}^3$, which is 0.268% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.003128 \mu\text{g}/\text{m}^3$, the limit value is not specified.

HF

Short-term (1-hour) limit value of HF for the protection of human health

Is not specified

Annual limit value of HF for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For HF, the "S" value is 0.004, which may be equated to the limit value of $4 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.00831 \mu\text{g}/\text{m}^3$, which is 0.208% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000100 \mu\text{g}/\text{m}^3$, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For HF, the "S" value is 0.004, which may be equated to the limit value of $4 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.01413 \mu\text{g}/\text{m}^3$, which is 0.353% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000165 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Hg

Short-term (1-hour) limit value of Hg for the protection of human health

Is not specified

Annual limit value of Hg for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Hg, the "S" value is 0.005, which may be equated to the limit value of $5 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.00059 \mu\text{g}/\text{m}^3$, which is 0.012% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000007 \mu\text{g}/\text{m}^3$, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Hg, the "S" value is 0.005, which may be equated to the limit value of $5 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.000657 \mu\text{g}/\text{m}^3$, which is 0.013% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000008 \mu\text{g}/\text{m}^3$, the limit value is not

specified.

Cu

Short-term (1-hour) limit value of Cu for the protection of human health

Is not specified

Annual limit value of Cu for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Cu, the "S" value is 0.125, which may be equated to the limit value of $125 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points was not calculated for the Variant 0 as a special source of this pollutant was not identified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Cu, the "S" value is 0.125, which may be equated to the limit value of $125 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.015050 \mu\text{g}/\text{m}^3$, which is 0.012% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000180 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Cd + Tl

Short-term (1-hour) limit value of Cd + Tl for the protection of human health

Is not specified

Annual limit value of Cd + Tl for the protection of human health

Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Cd + Tl, the "S" value is 0.005, which may be equated to the limit value of $5 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.00059 \mu\text{g}/\text{m}^3$, which is 0.012% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000007 \mu\text{g}/\text{m}^3$, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding "S" values for determining the minimum chimney height. For Cd + Tl, the "S" value is 0.005, which may be equated to the limit value of $5 \mu\text{g}/\text{m}^3$. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is $0.000657 \mu\text{g}/\text{m}^3$, which is 0.013% of the "S" value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is $0.000008 \mu\text{g}/\text{m}^3$, the limit value is not specified.

Σ Heavy metals

Short-term (1-hour) limit value of Σ HM for the protection of human health	Is not specified
Annual limit value of Σ HM for the protection of human health	Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding “S” values for determining the minimum chimney height. For Σ HM, the “S” value is 0.005, which may be equated to the limit value of 5 µg/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 0.02138 µg/m³, which is 0.428% of the “S” value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.000247 µg/m³, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding “S” values for determining the minimum chimney height. For Σ HM, the “S” value is 0.005, which may be equated to the limit value of 5 µg/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 0.02208 µg/m³, which is 0.442% of the “S” value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 0.000255 µg/m³, the limit value is not specified.

PCDD/DF

Short-term (1-hour) limit value of PCDD/DF for the protection of human health	Is not specified
Annual limit value of PCDD/DF for the protection of human health	Is not specified

Current status (Variant 0)

For pollutants that do not have specified limit values, it is possible to use the corresponding “S” values for determining the minimum chimney height. For PCDD/DF, the “S” value is 0.000000001, which may be equated to the limit value of 1.0E-03 ng/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 3.56E-07 ng/m³, which is 0.036% of the “S” value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 4.12E-09 ng/m³, the limit value is not specified.

New status (Variant 1)

For pollutants that do not have specified limit values, it is possible to use the corresponding “S” values for determining the minimum chimney height. For PCDD/DF, the “S” value is 0.000000001, which may be equated to the limit value of 1.0E-03 ng/m³. Calculated maximum expected contribution of the source under review to maximum 1-hour concentrations in reference points is 5.07E-07 ng/m³, which is 0.051% of the “S” value. Calculated maximum expected contribution of the source under review to the average annual concentration in reference points is 5.92E-09 ng/m³, the limit value is not specified.

14 Graphic Representation of Model Calculations Results

The annexes of the Dispersion Study show graphical presentation of short-term and average annual concentrations of pollutants SPMs (PM₁₀, PM_{2.5}), SO₂, NO₂, CO, TOC, HCl, HF, Hg, Cu, Cd + Tl, ΣHM, PCDD/DF their areal distribution in the vicinity of the proposed activity as a **contribution of the assessed source for the Variant 0 and Variant 1**.

15 Conclusion

The purpose of the Dispersion Study was to determine, by means of a mathematical model, the impact of the proposed activity “Optimization of Processing Capacities for JAVYS, a.s. Radioactive Waste Treatment and Conditioning Technologies at Jaslovské Bohunice Site” on the air quality in the vicinity of the assessed source.

The Dispersion Study has been prepared for

- Current status (Variant 0)
- New status (Variant 1)
 - A. *Optimization of the radioactive waste incineration capacity,*
 - B. *Extension of radioactive waste melting capacities.*

The current status was represented by the pollutant sources in the evaluated source without the implementation of the proposed activity - Variant 0; the new status was represented by the pollutant sources for the current status and the pollutant sources in the proposed activity marked as Variant 1.

The concentrations of pollutants in reference points for the current status represent concentrations determined based on the monitoring results and mathematic modelling of the Slovak Hydrometeorological Institute for 2017 for the assessed area, and the contribution of the assessed pollution source calculated using the MODIM mathematical model for the Variant 0 – current status.

Based on the input construction-technical data about air pollution sources, expected pollutant mass flows and meteorological data, the forecasted concentrations at selected reference points were calculated using the mathematical model.

The concentrations of pollutants calculated for the new status represent values based on the current status and the contribution of the assessed air pollution source within the scope of Variant 1 using the MODIM mathematical model.

The mathematical calculations for the mass flow of pollutants were performed assuming standard operating volume flows of combustion air exhausts and meeting the limits set by legislation, i.e. the expected maximum emissions for the standard operation of all operator's air pollution sources simultaneously. From the point of view of meteorological conditions, the calculations were carried out for atmosphere stability class C (slightly labile) for all wind speed classes. This condition can be considered the most unfavourable from the point of view of modelling in terms of the amount and dispersion of pollutants in the vicinity of the assessed source of air pollution. The concentrations of pollutants (maximum short-term and average annual) were calculated in the reference points, which were determined at the level of surrounding municipalities at a place closest to the source under review. Detailed results for each reference point are given in Chapters 13.1 and 13.2 including their

statistics.

Based on the comparison of model calculations of pollutant concentrations for the current status (Variant 0) and the new status (Variant 1) with the current level of air quality, or short-term and long-term limit values, it can be concluded that the proposed activity in the proposed composition and expected mode of operation does not have a significant impact on air quality in the assessed area.

The Variant 1 in the proposed solution will not cause any significant deterioration of the existing air quality in the assessed area.

Ing. Viliam Carach, PhD.

Annexes

Annex No. 1 Reference Points

Current status (Variant 0)

Annex No. 2 Maximum short-term PM₁₀ concentrations – current status

Annex No. 3 Average annual PM₁₀ concentrations – current status

Annex No. 4 Maximum short-term PM_{2.5} concentrations – current status

Annex No. 5 Average annual PM_{2.5} concentrations – current status

Annex No. 6 Maximum short-term SO₂ concentrations – current status

Annex No. 7 Average annual SO₂ concentrations – current status

Annex No. 8 Maximum short-term NO₂ concentrations – current status

Annex No. 9 Average annual NO₂ concentrations – current status

Annex No. 10 Maximum short-term CO concentrations – current status

Annex No. 11 Average annual CO concentrations – current status

Annex No. 12 Maximum short-term TOC concentrations – current status

Annex No. 13 Average annual TOC concentrations – current status

Annex No. 14 Maximum short-term HCl concentrations – current status

Annex No. 15 Average annual HCl concentrations – current status

Annex No. 16 Maximum short-term HF concentrations – current status

Annex No. 17 Average annual HF concentrations – current status

Annex No. 18 Maximum short-term Hg concentrations – current status

Annex No. 19 Average annual Hg concentrations – current status

Annex No. 20 Maximum short-term Cd + Tl concentrations – current status

Annex No. 21 Average annual Cd + Tl concentrations – current status

Annex No. 22 Maximum short-term Σ HM concentrations – current status

Annex No. 23 Average annual Σ HM concentrations – current status

Annex No. 24 Maximum short-term PCDD/DF concentrations – current status

Annex No. 25 Average annual PCDD/DF concentrations – current status

New status (Variant 1)

Annex No. 26 Maximum short-term PM₁₀ concentrations – new status
Annex No. 27 Average annual PM₁₀ concentrations – new status

Annex No. 28 Maximum short-term PM_{2.5} concentrations – new status
Annex No. 29 Average annual PM_{2.5} concentrations – new status

Annex No. 30 Maximum short-term SO₂ concentrations – new status
Annex No. 31 Average annual SO₂ concentrations – new status

Annex No. 32 Maximum short-term NO₂ concentrations – new status
Annex No. 33 Average annual NO₂ concentrations – new status

Annex No. 34 Maximum short-term CO concentrations – new status
Annex No. 35 Average annual CO concentrations – new status

Annex No. 36 Maximum short-term TOC concentrations – new status
Annex No. 37 Average annual TOC concentrations – new status

Annex No. 38 Maximum short-term HCl concentrations – new status
Annex No. 39 Average annual HCl concentrations – new status

Annex No. 40 Maximum short-term HF concentrations – new status
Annex No. 41 Average annual HF concentrations – new status

Annex No. 42 Maximum short-term Hg concentrations – new status
Annex No. 43 Average annual Hg concentrations – new status

Annex No. 44 Maximum short-term Cu concentrations – new status
Annex No. 45 Average annual Cu concentrations – new status

Annex No. 46 Maximum short-term Cd + Tl concentrations – new status
Annex No. 47 Average annual Cd + Tl concentrations – new status

Annex No. 48 Maximum short-term Σ HM concentrations – new status
Annex No. 49 Average annual Σ HM concentrations – new status

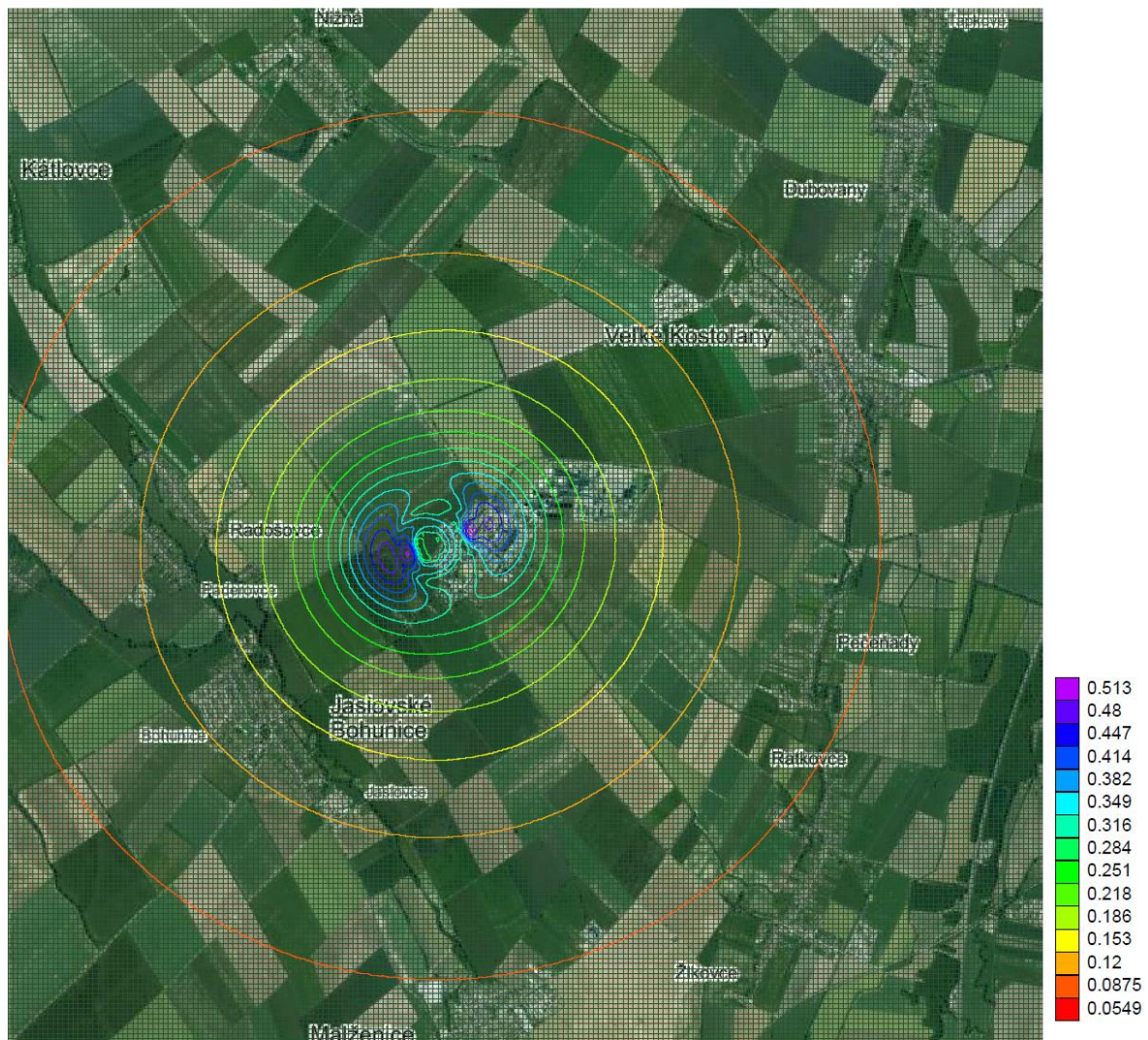
Annex No. 50 Maximum short-term PCDD/DF concentrations – new status
Annex No. 51 Average annual PCDD/DF concentrations – new status

Annex No. 1 Reference Points



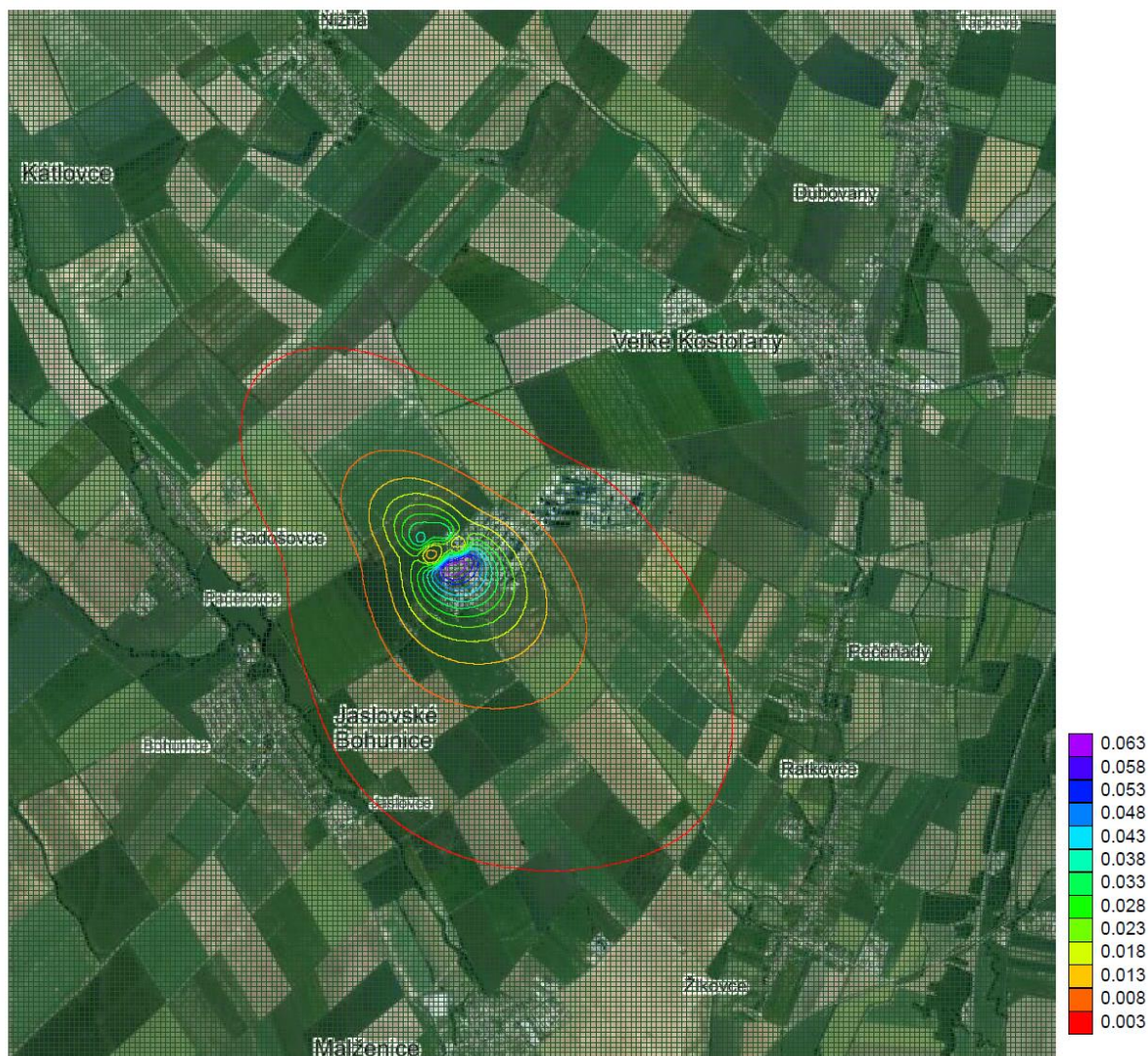
Annex No. 2 Maximum short-term PM_{10} concentrations – current status

Variant 0 - PM_{10}



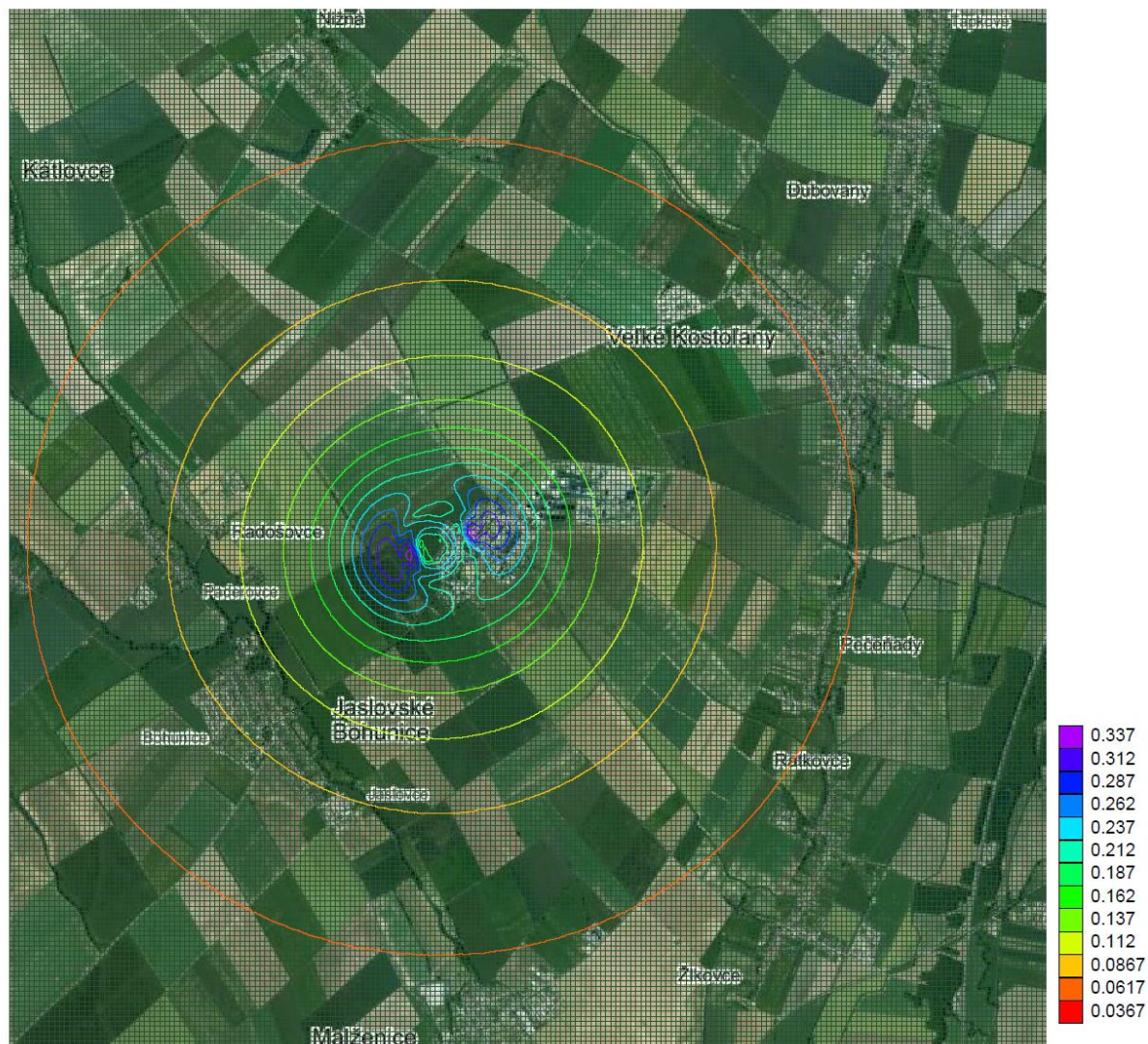
Annex No. 3 Average annual PM_{10} concentrations – current status

Variant 0 - PM_{10}



Annex No. 4 Maximum short-term $PM_{2.5}$ concentrations – current status

Variant 0 - $PM_{2.5}$



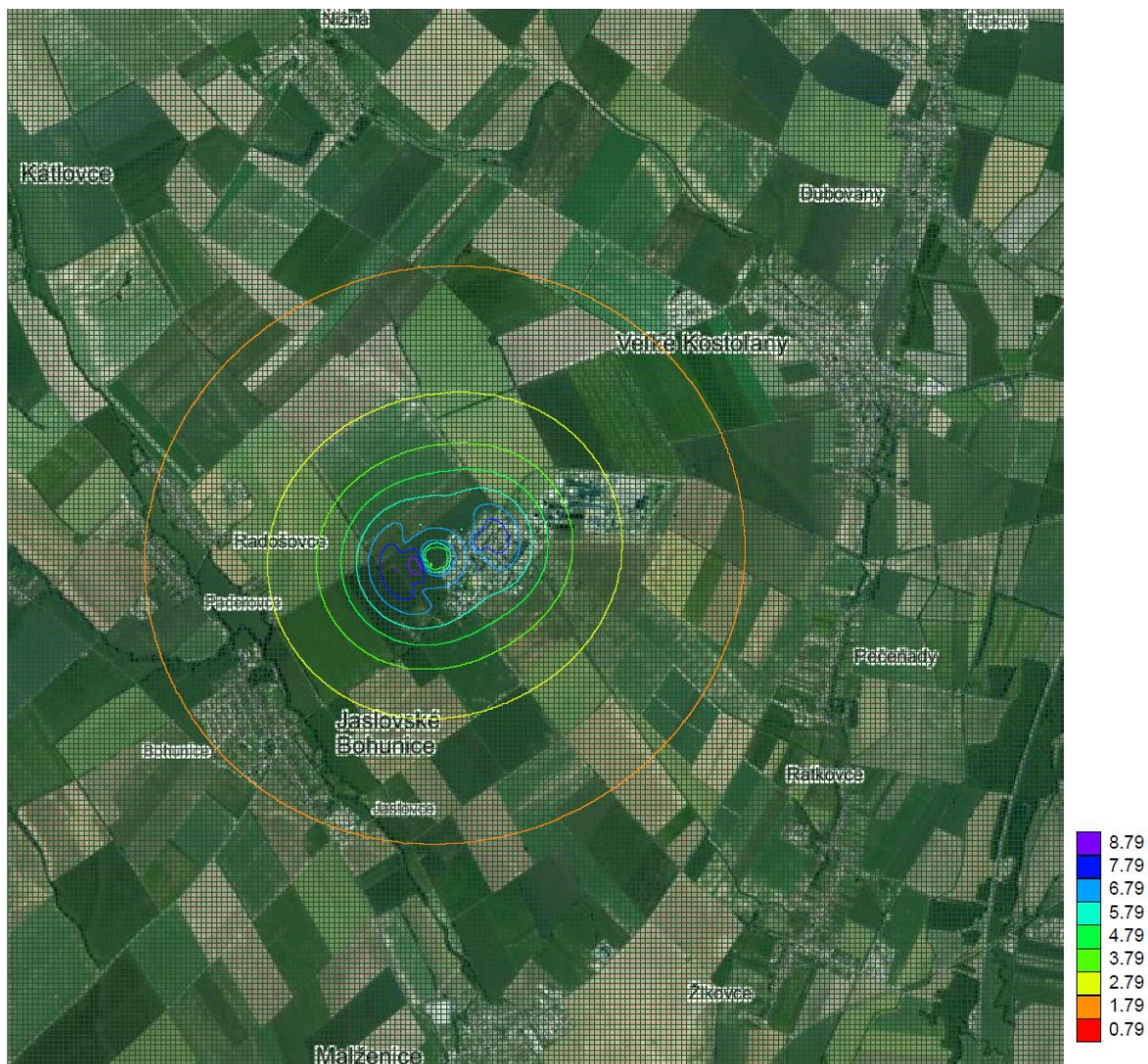
Annex No. 5 Average annual $PM_{2.5}$ concentrations – current status

Variant 0 - $PM_{2.5}$



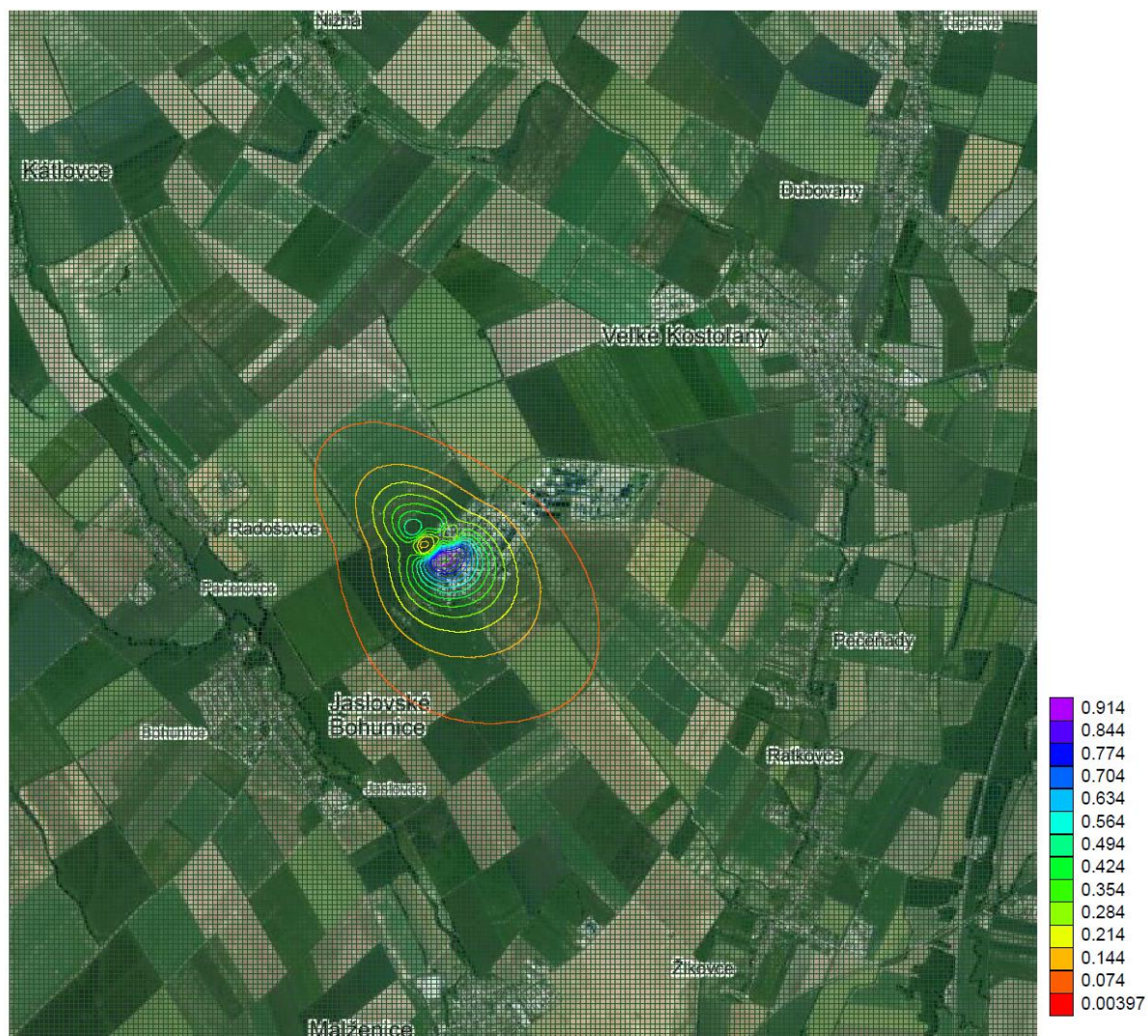
Annex No. 6 Maximum short-term SO₂ concentrations – current status

Variant 0 - SO₂



Annex No. 7 Average annual SO₂ concentrations – current status

Variant 0 - SO₂



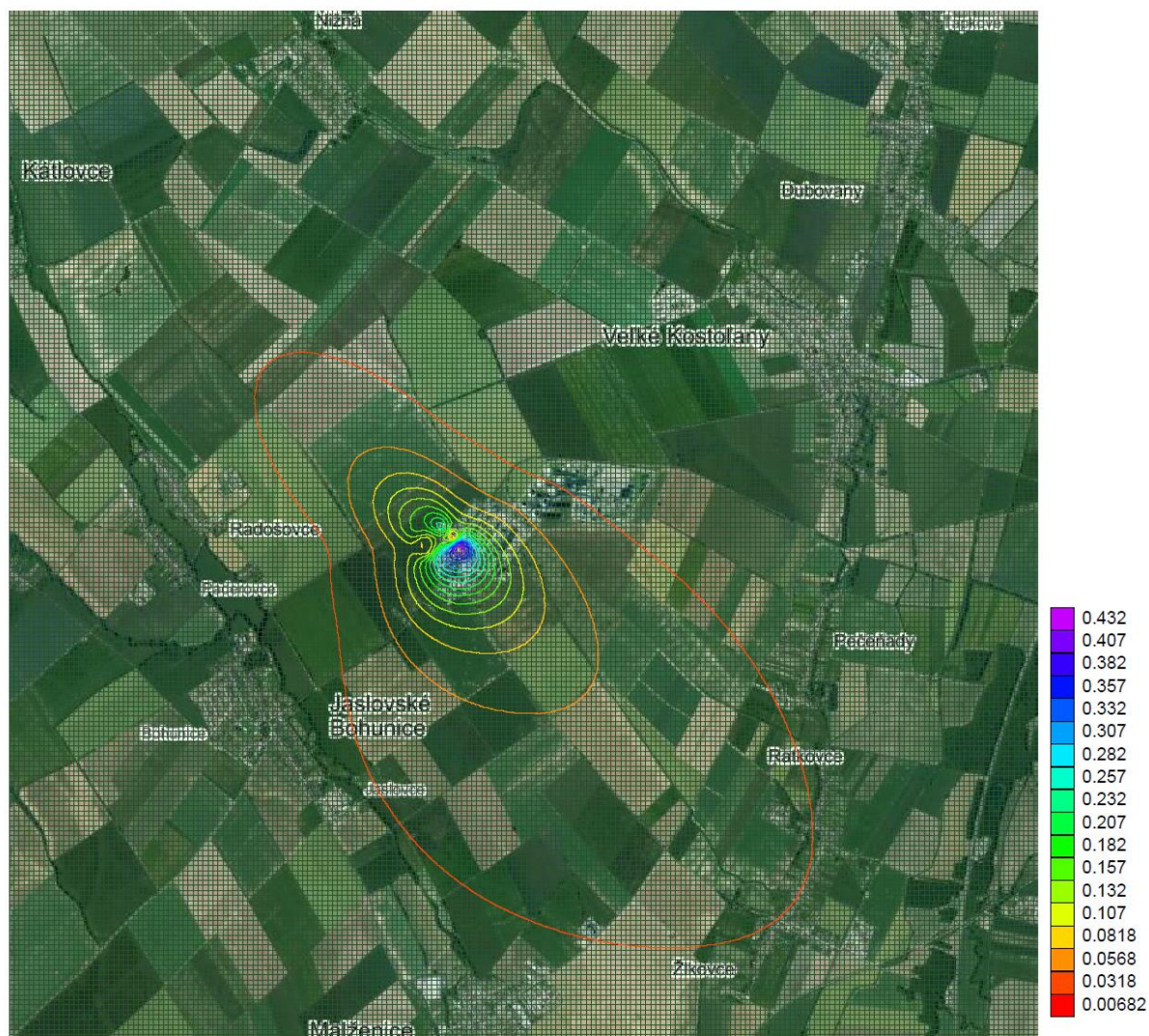
Annex No. 8 Maximum short-term NO_2 concentrations – current status

Variant 0 - NO_2



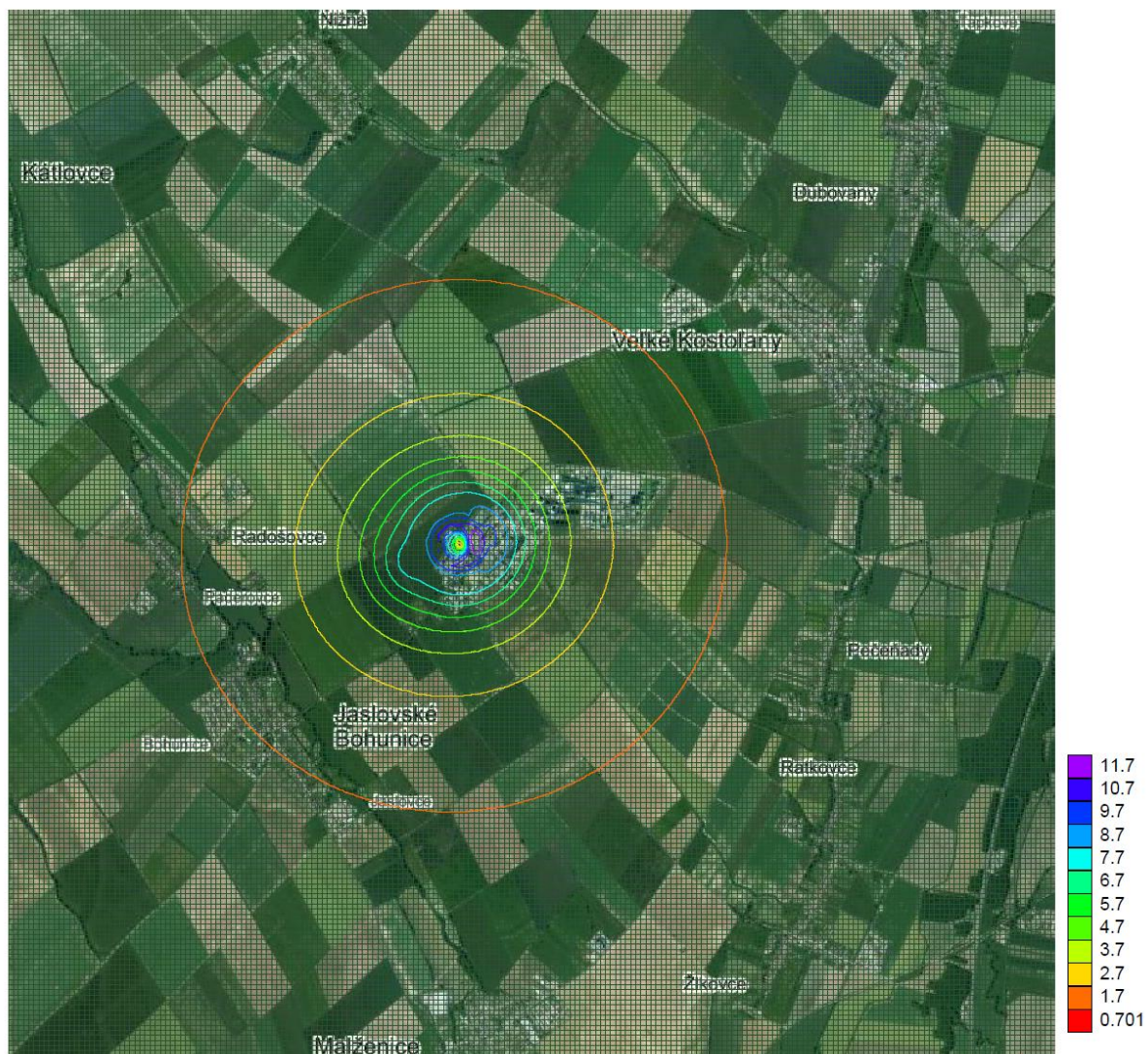
Annex No. 9 Average annual NO_2 concentrations – current status

Variant 0 - NO_2



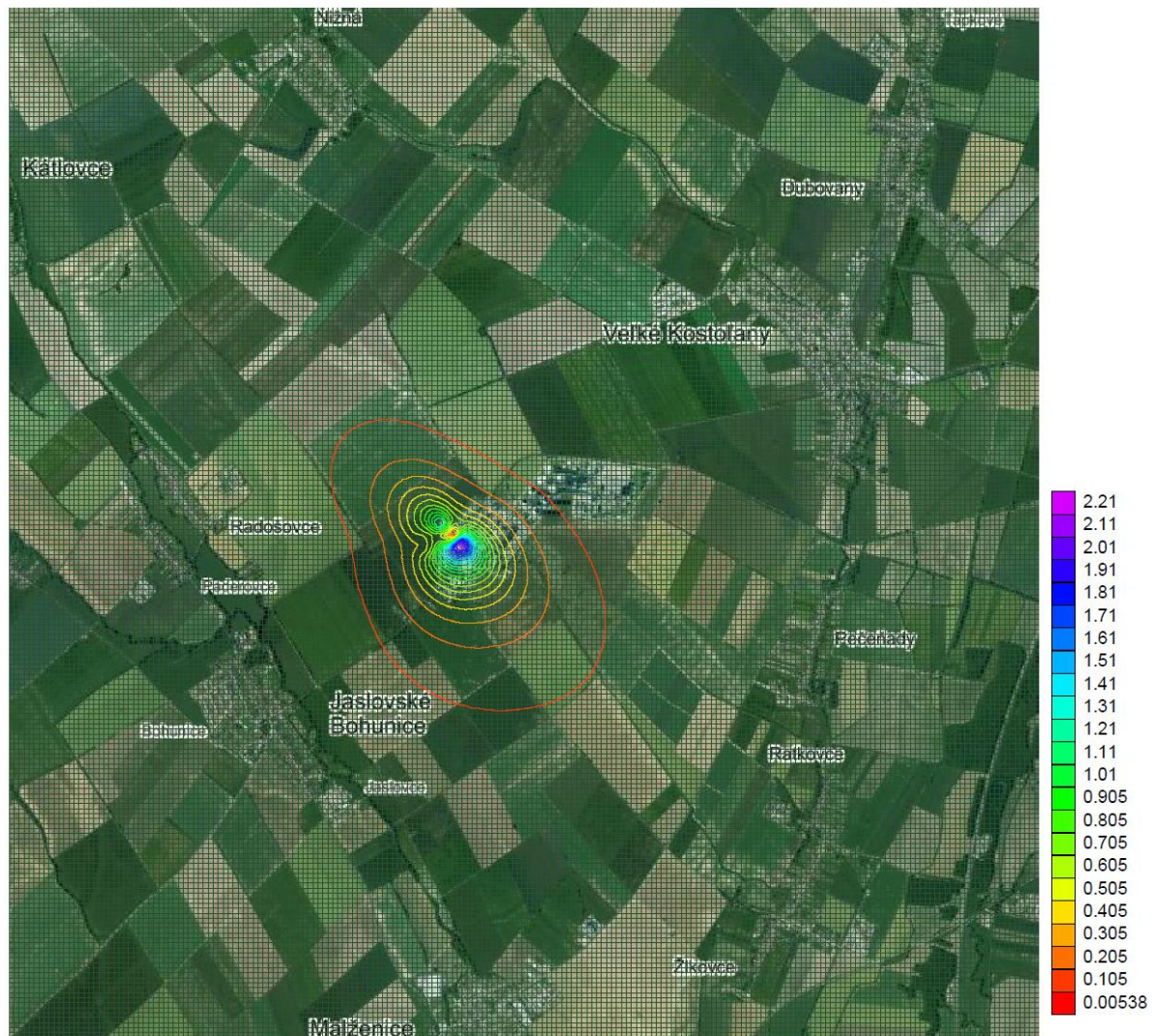
Annex No. 10 Maximum short-term CO concentrations – current status

Variant 0 - CO



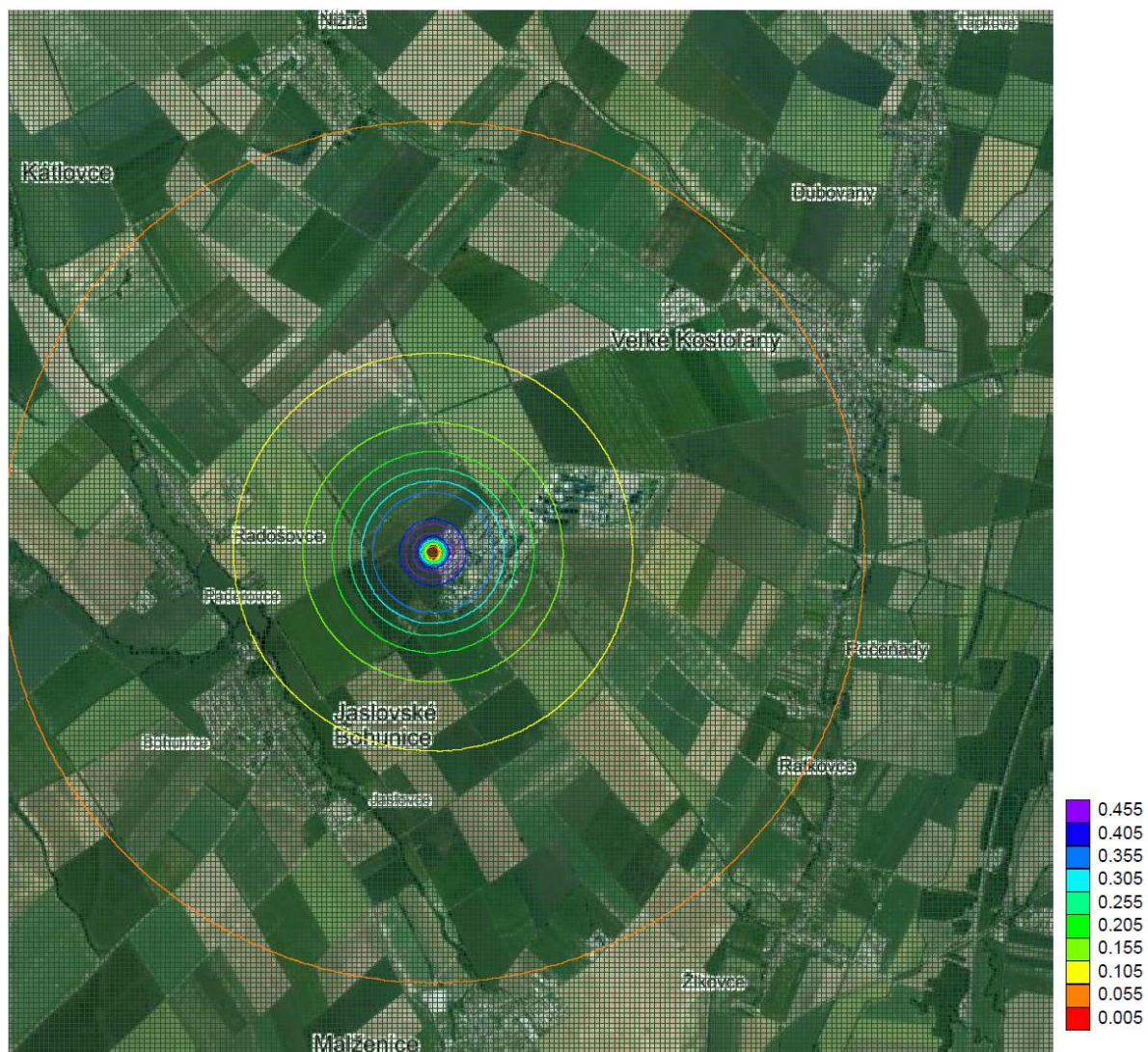
Annex No. 11 Average annual CO concentrations – current status

Variant 0 - CO



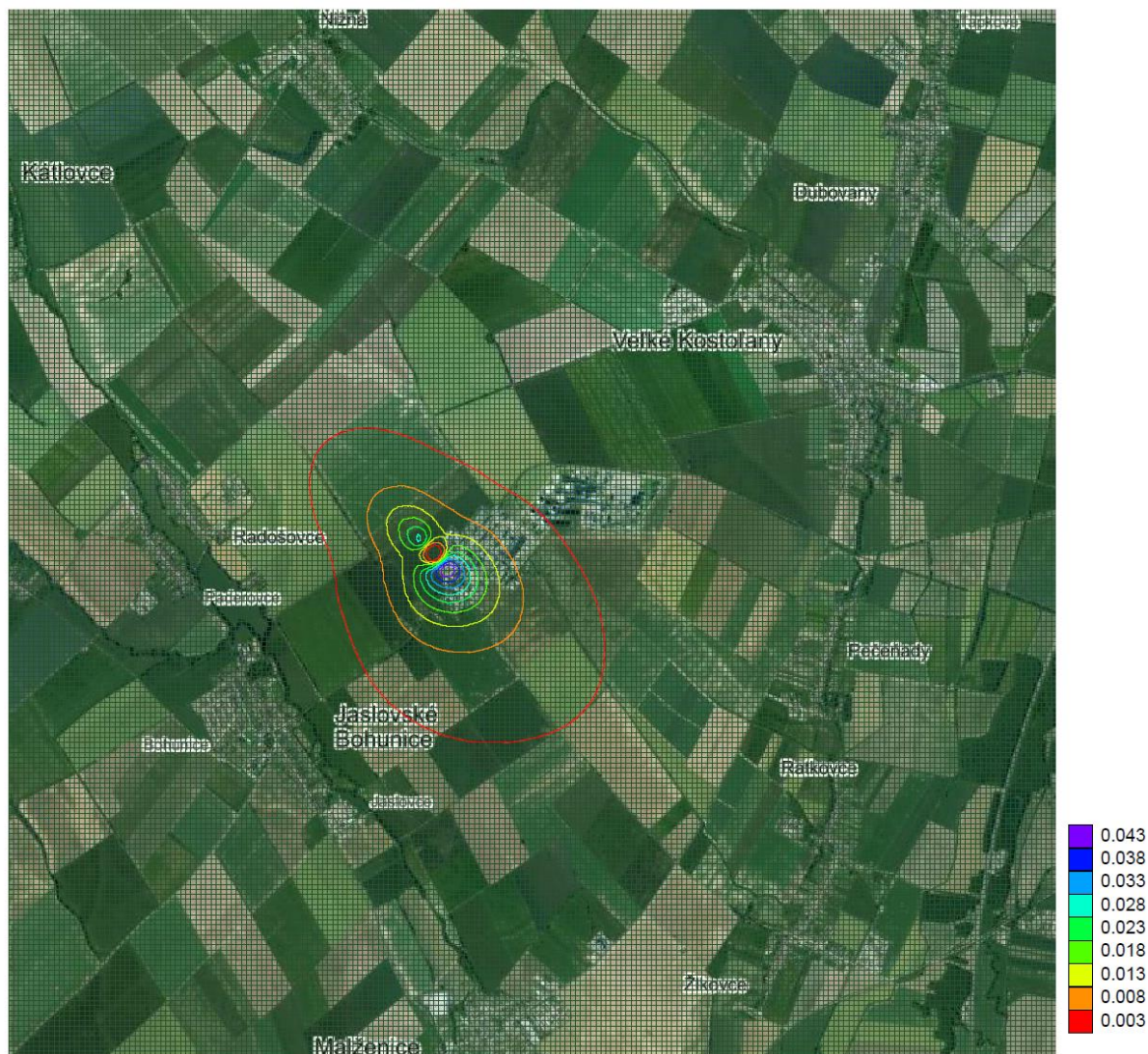
Annex No. 12 Maximum short-term TOC concentrations – current status

Variant 0 - TOC



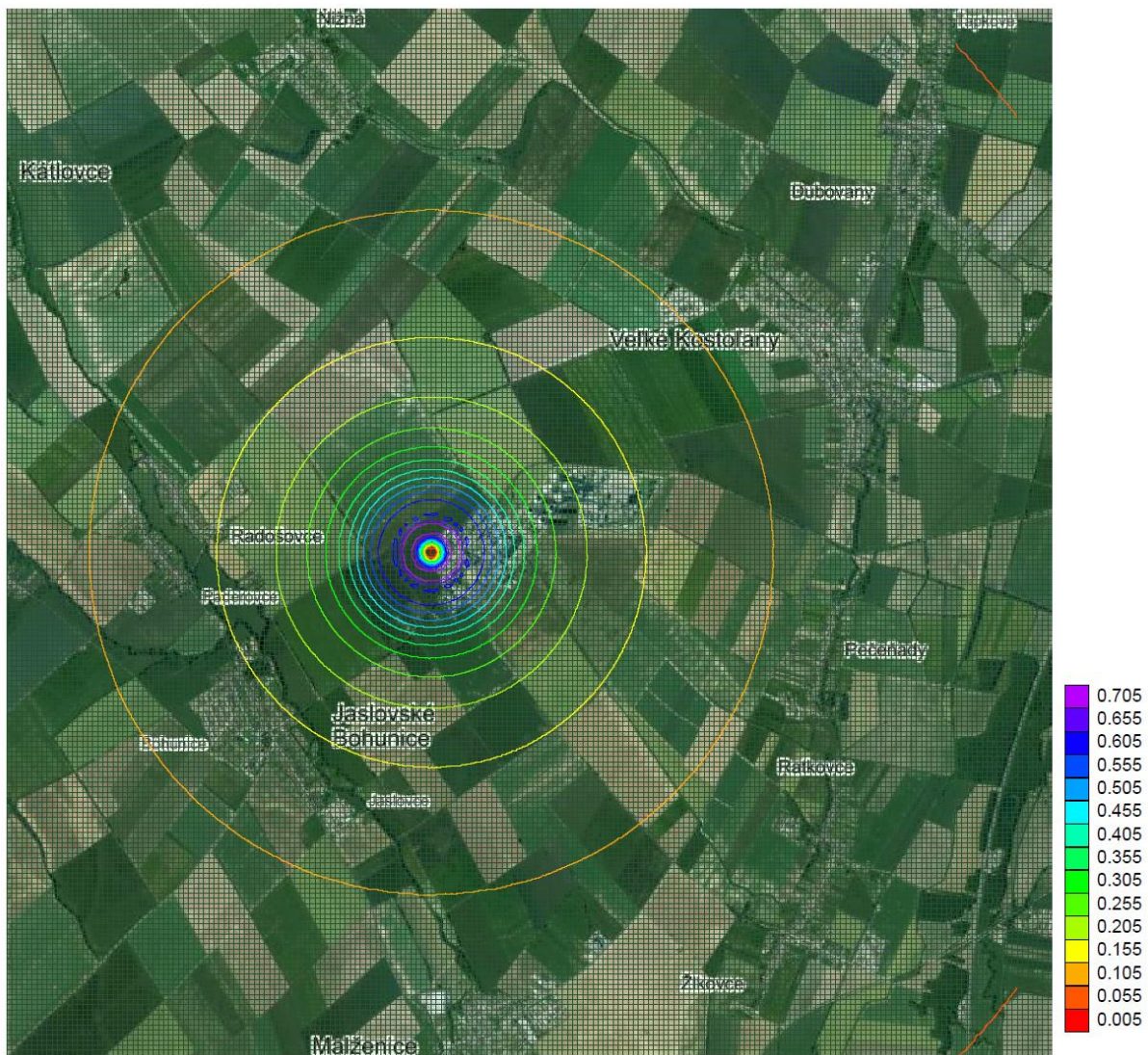
Annex No. 13 Average annual TOC concentrations – current status

Variant 0 - TOC



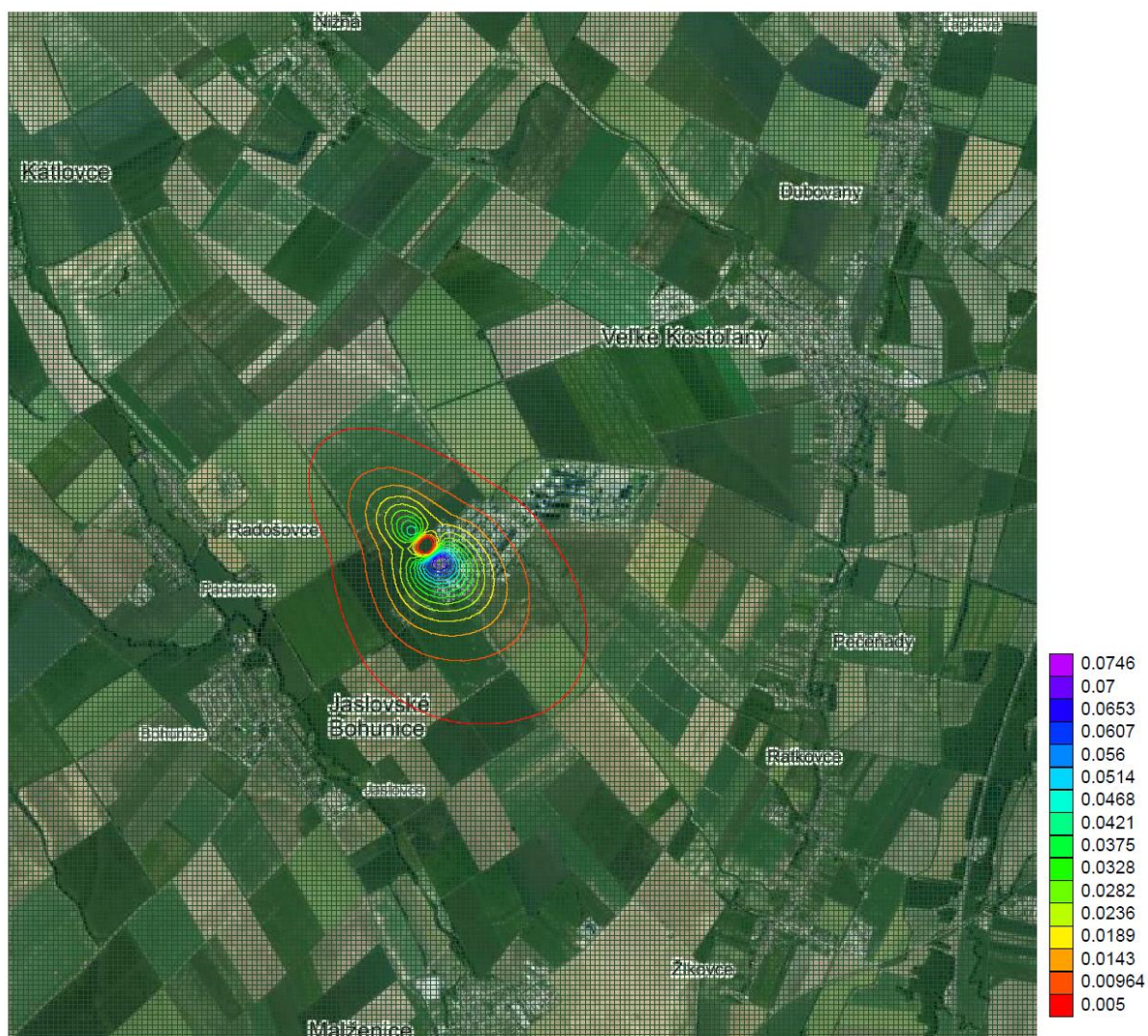
Annex No. 14 Maximum short-term HCl concentrations – current status

Variant 0 - HCl



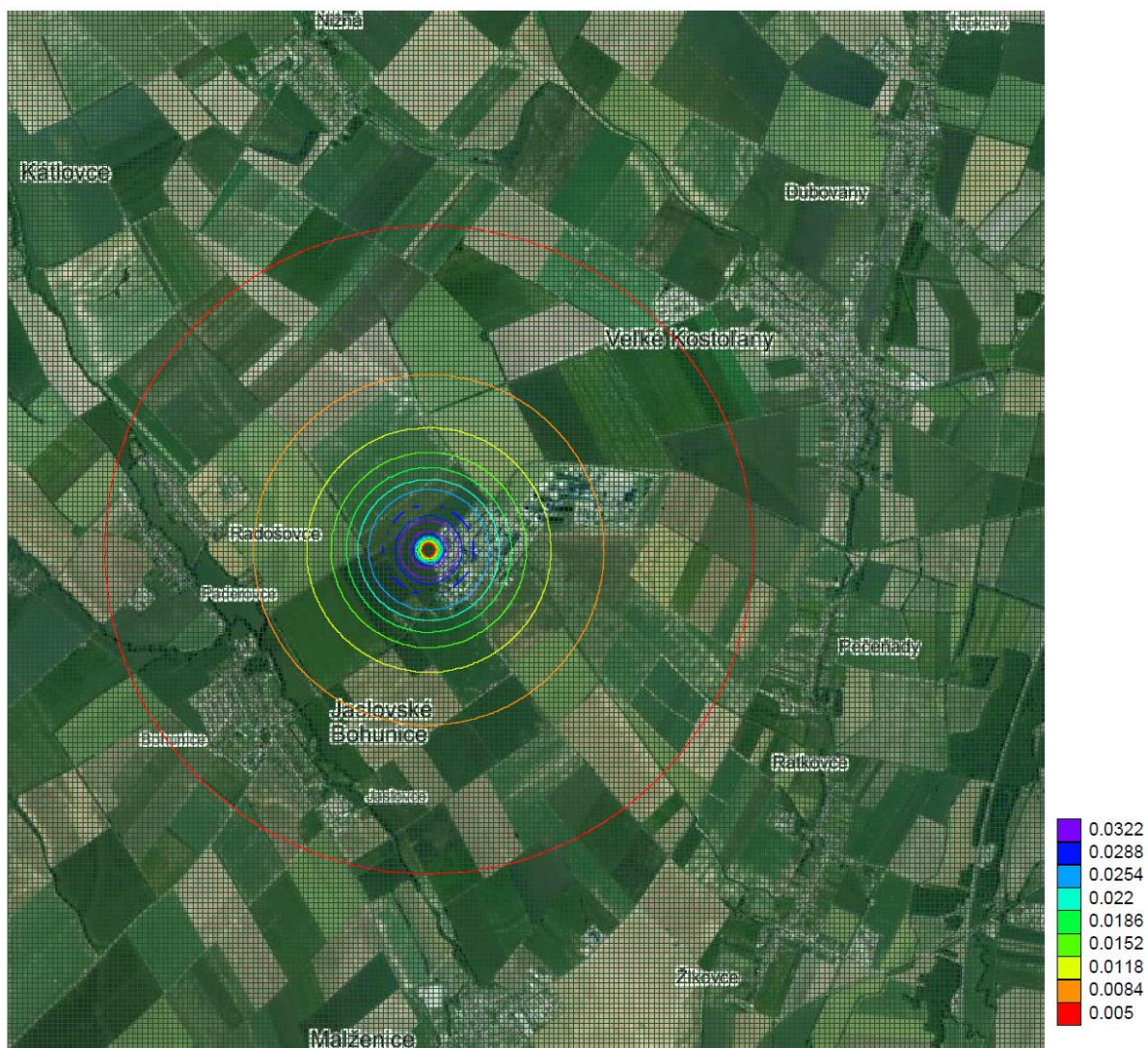
Annex No. 15 Average annual HCl concentrations – current status

Variant 0 - HCl



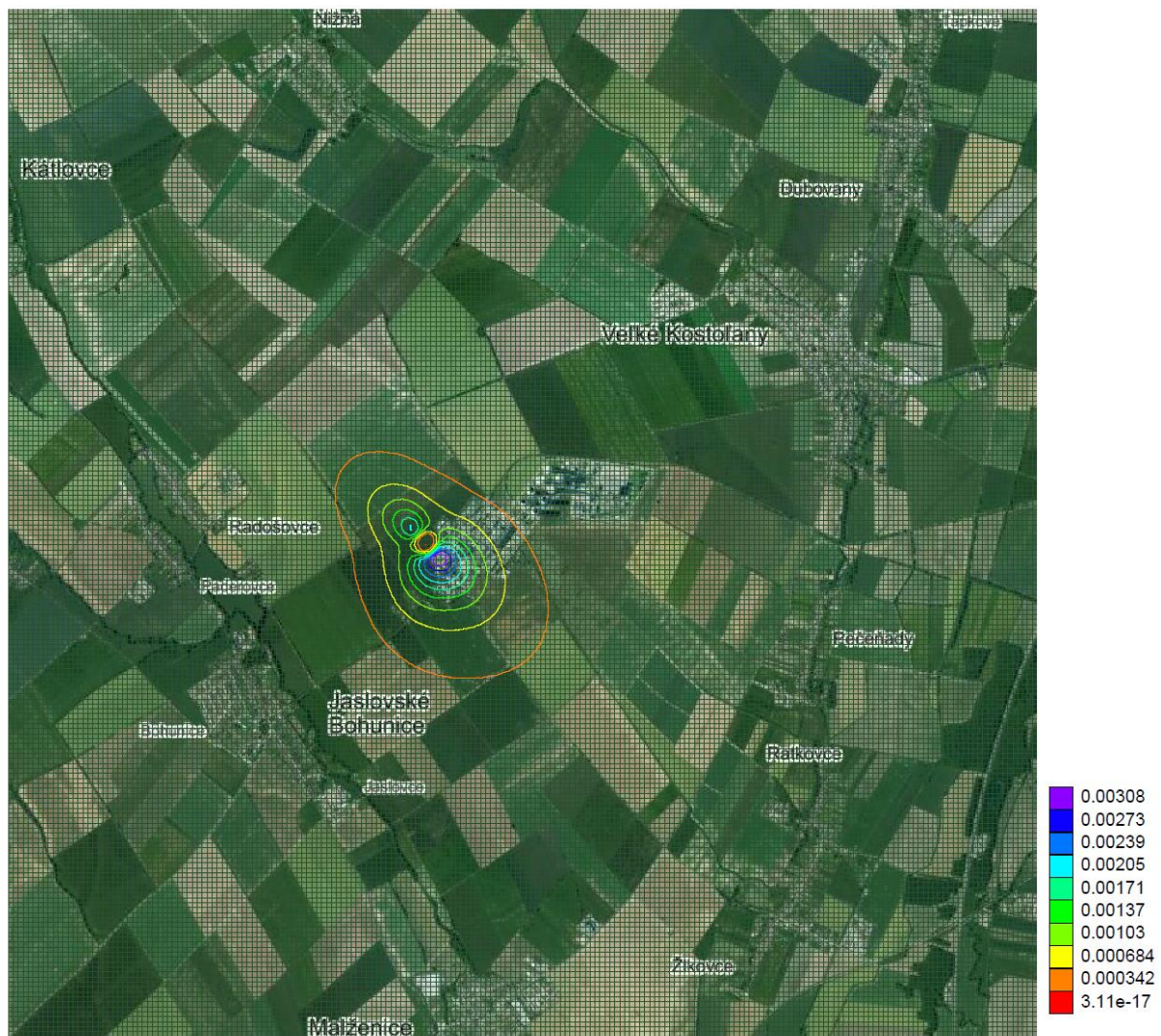
Annex No. 16 Maximum short-term HF concentrations – current status

Variant 0 - HF



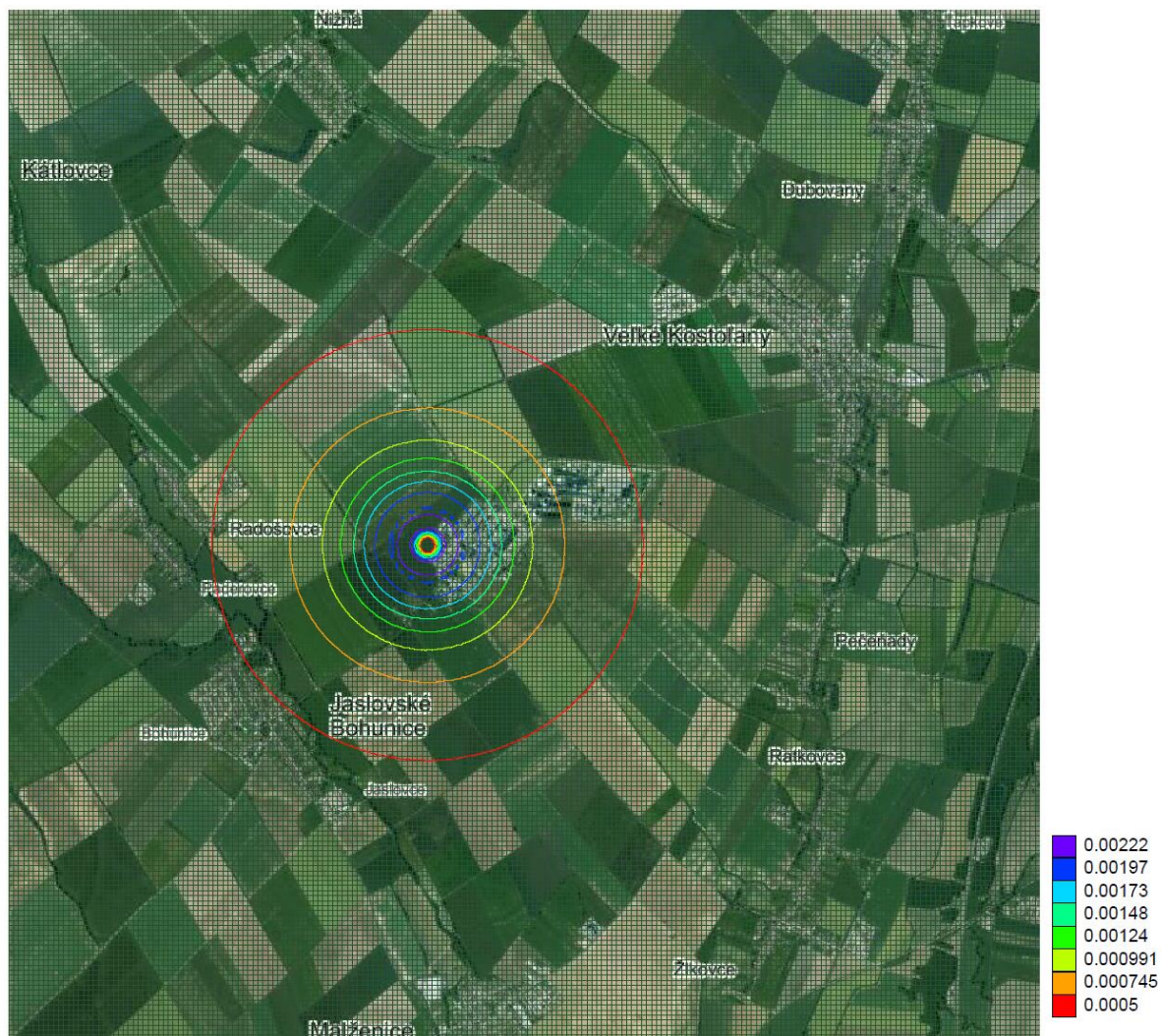
Annex No. 17 Average annual HF concentrations – current status

Variant 0 - HF



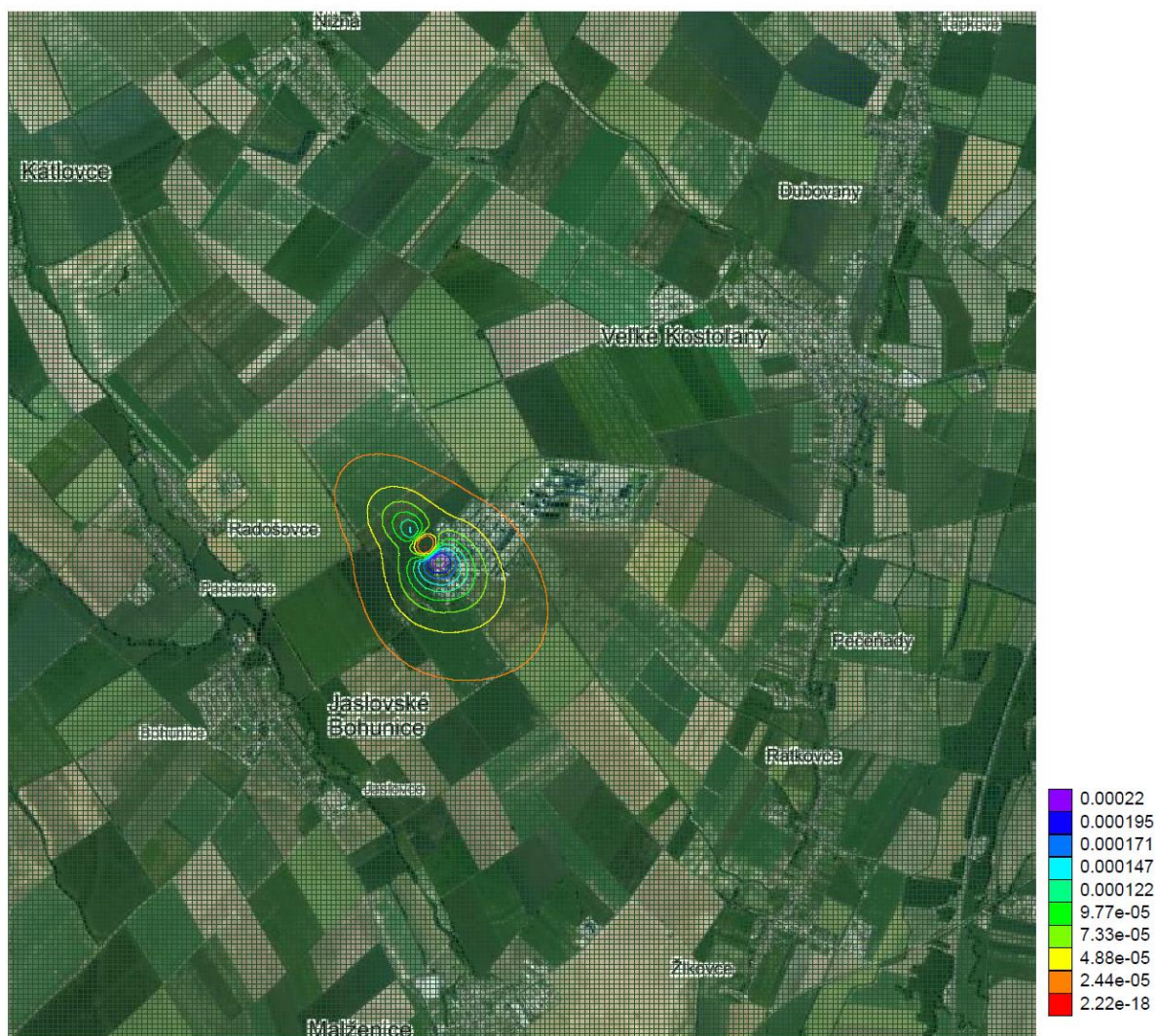
Annex No. 18 Maximum short-term Hg concentrations – current status

Variant 0 - Hg



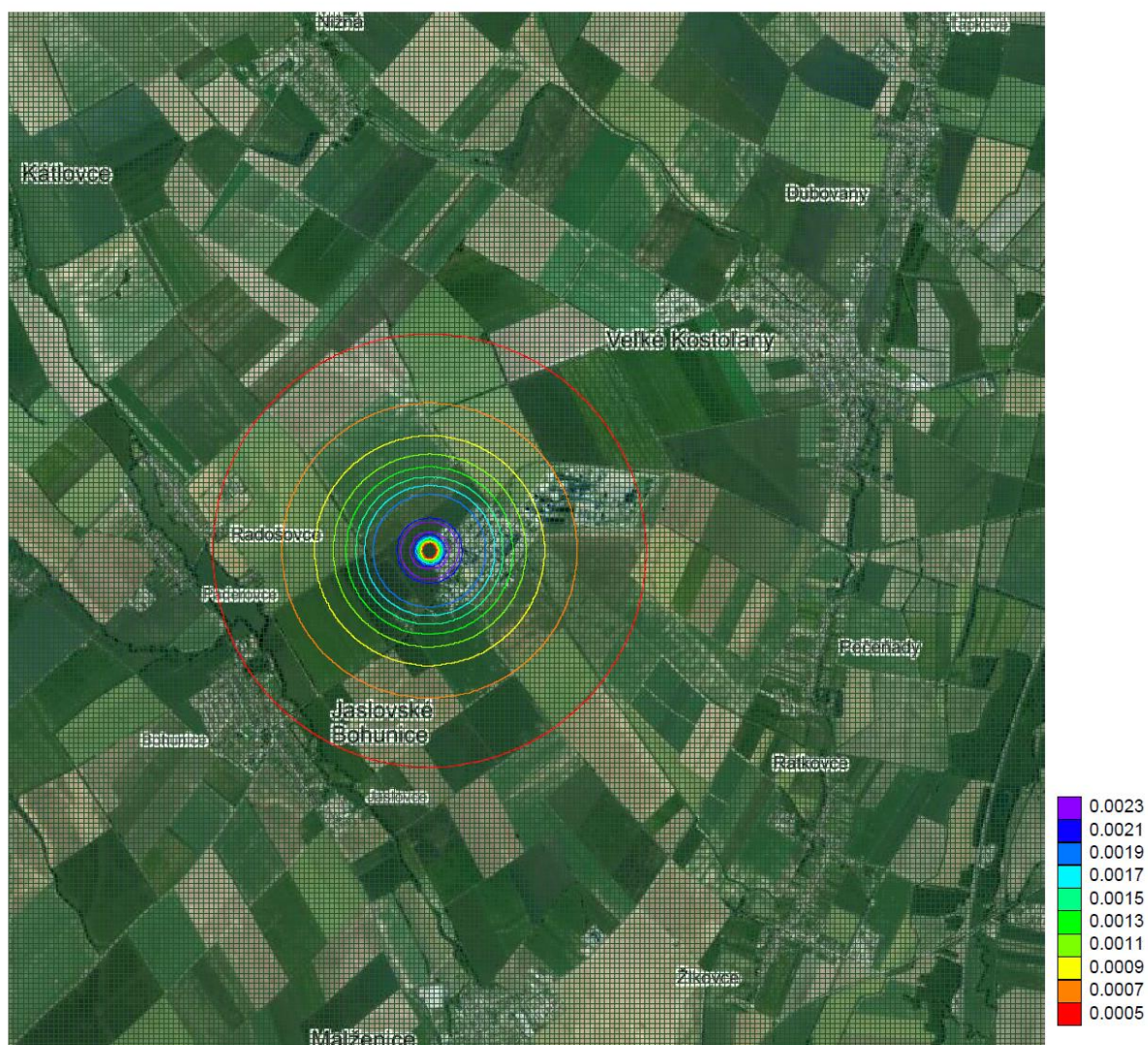
Annex No. 19 Average annual Hg concentrations – current status

Variant 0 - Hg



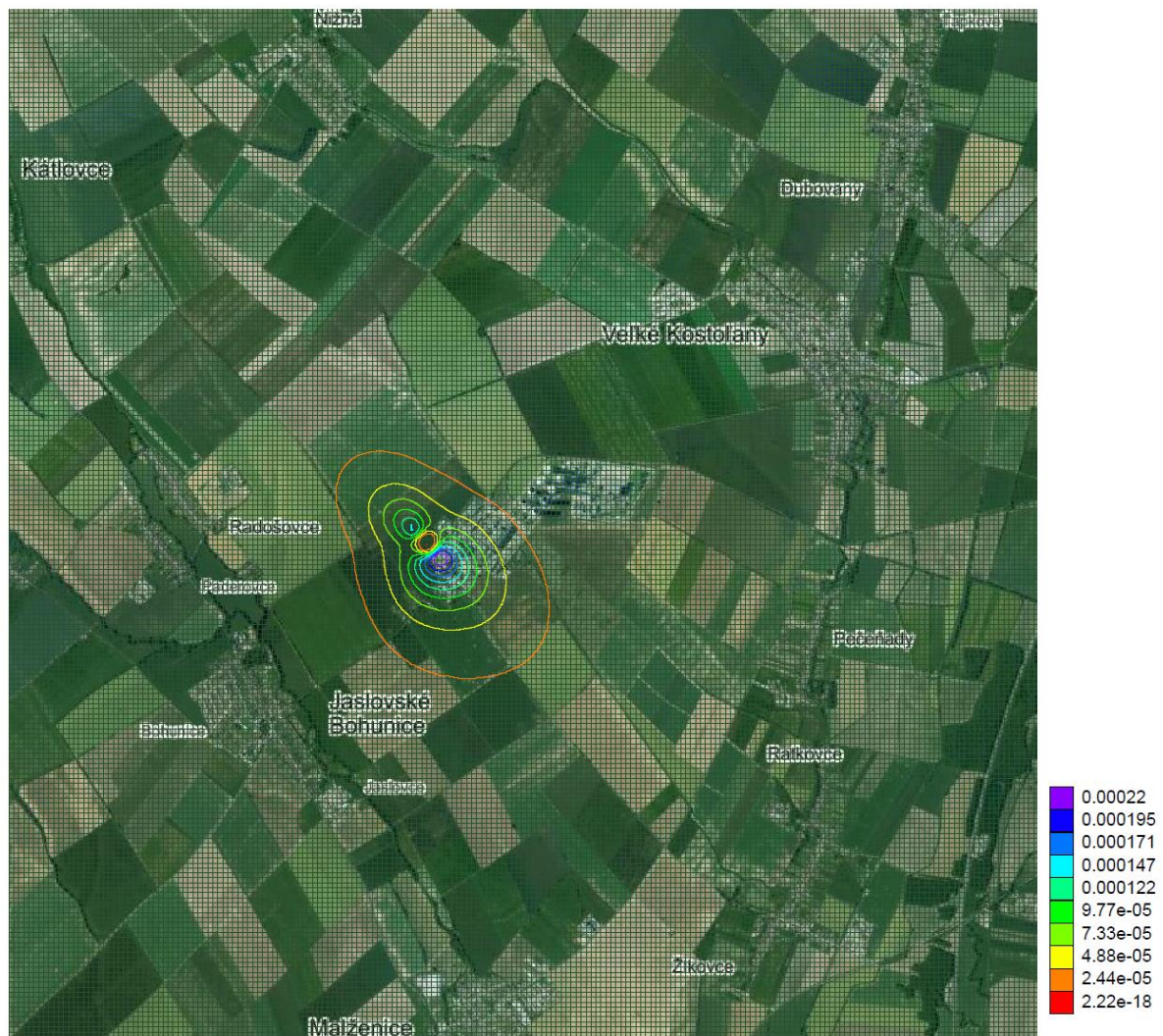
Annex No. 20 Maximum short-term Cd + Tl concentrations – current status

Variant 0 - Cd+Tl



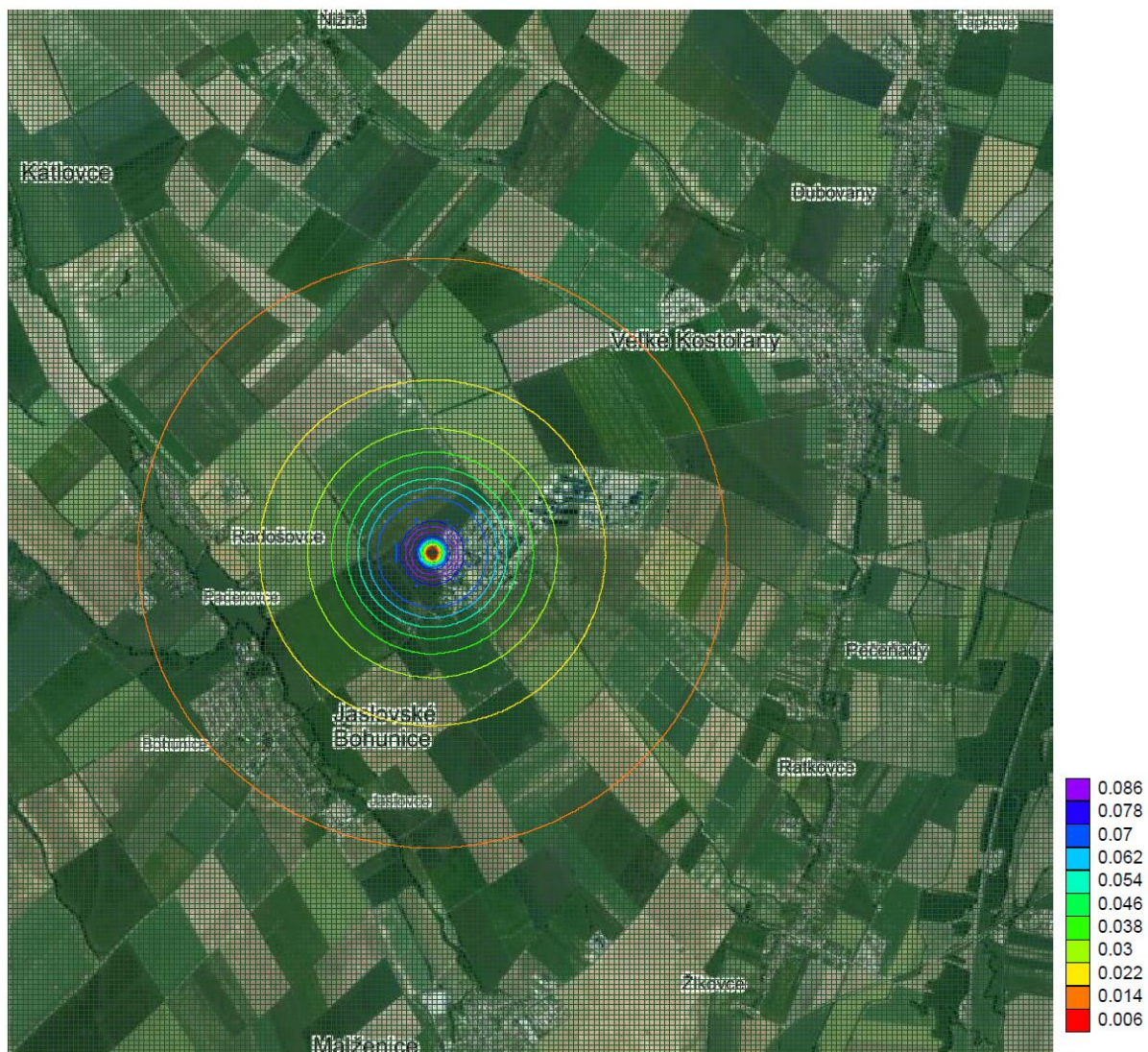
Annex No. 21 Average annual Cd + Tl concentrations – current status

Variant 0 - Cd+Tl



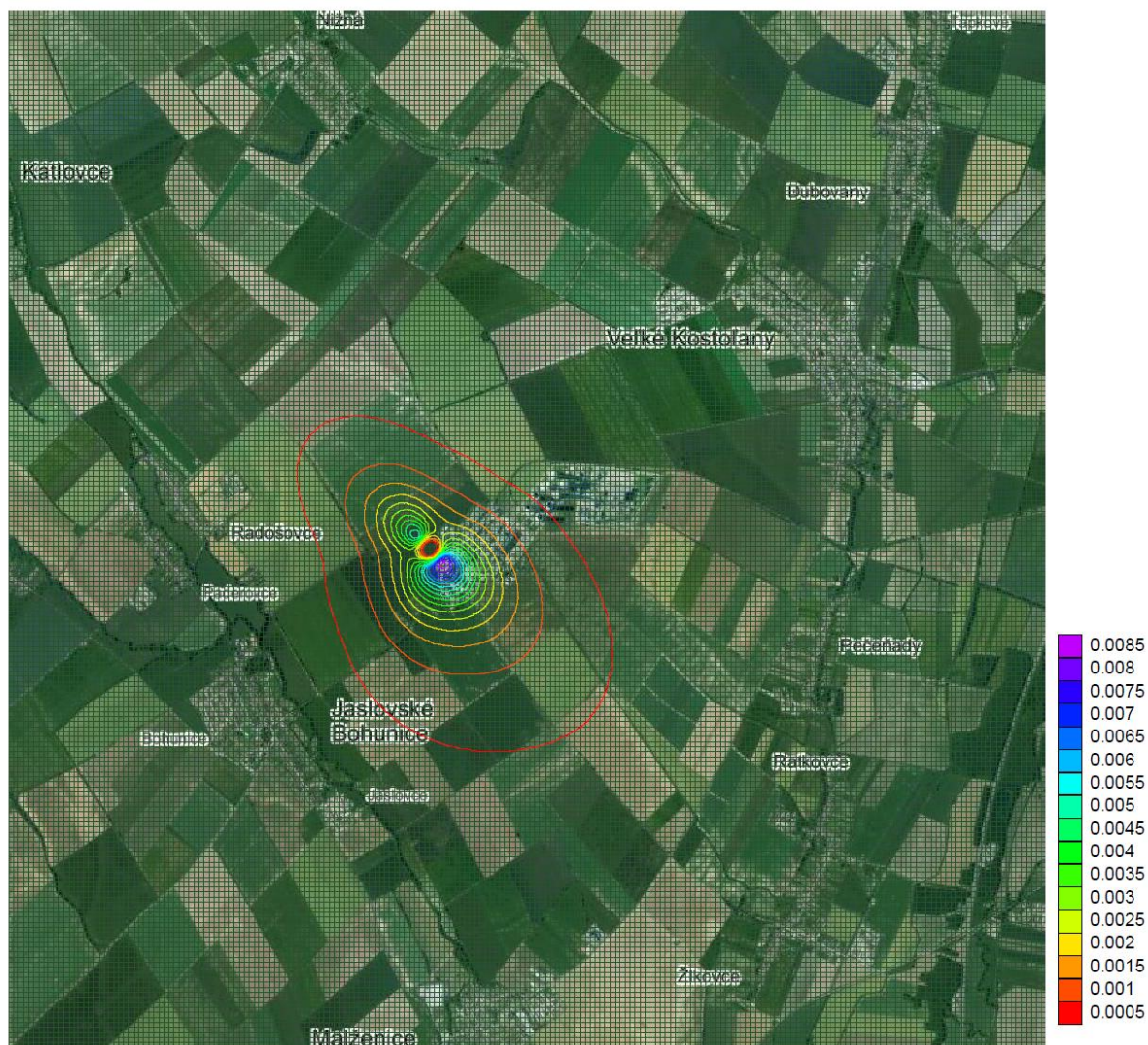
Annex No. 22 Maximum short-term Σ HM concentrations – current status

Variant 0 - Suma $\check{T}K$



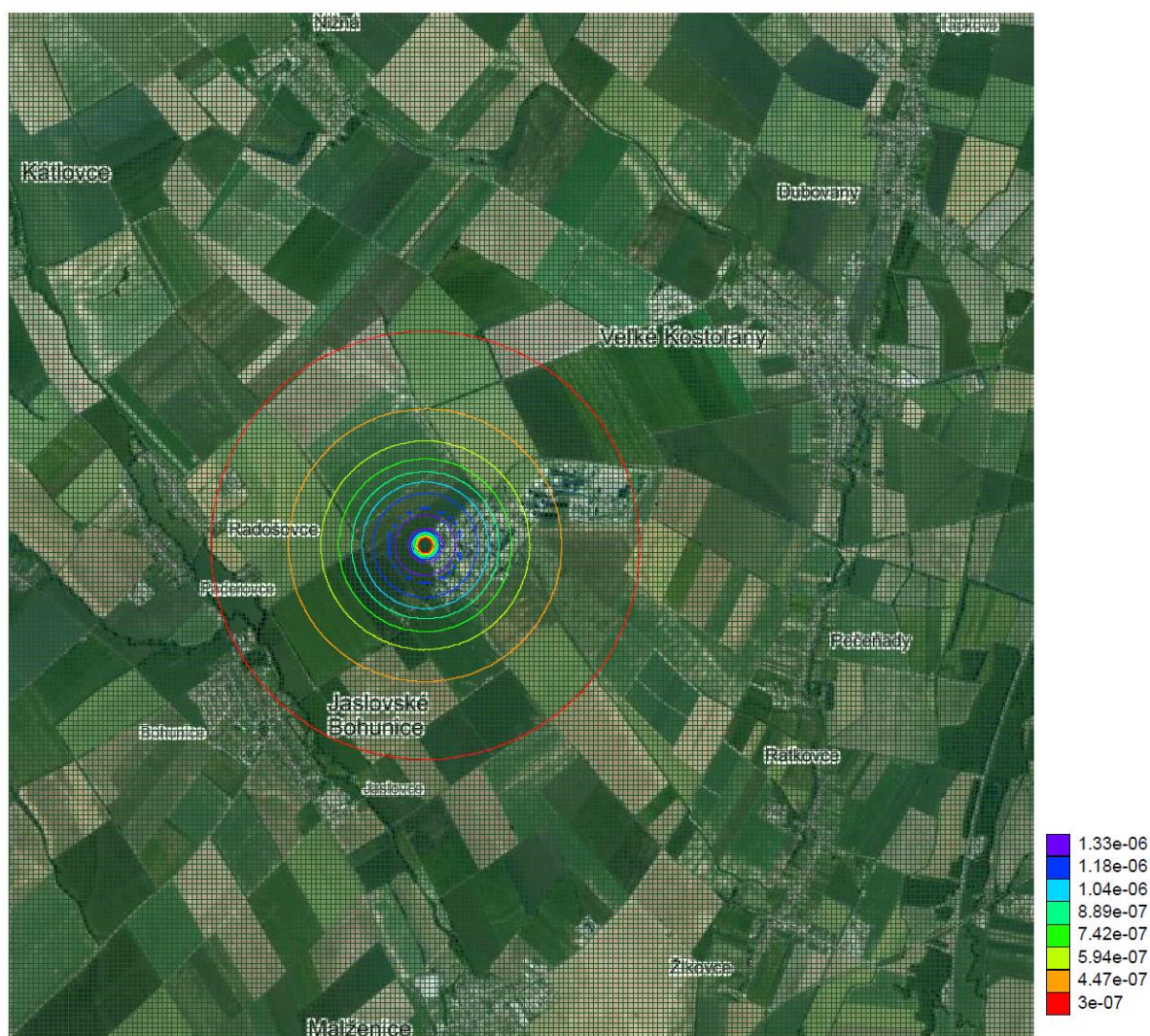
Annex No. 23 Average annual Σ HM concentrations – current status

Variant 0 - Suma $\check{T}K$



Annex No. 24 Maximum short-term PCDD/DF concentrations – current status

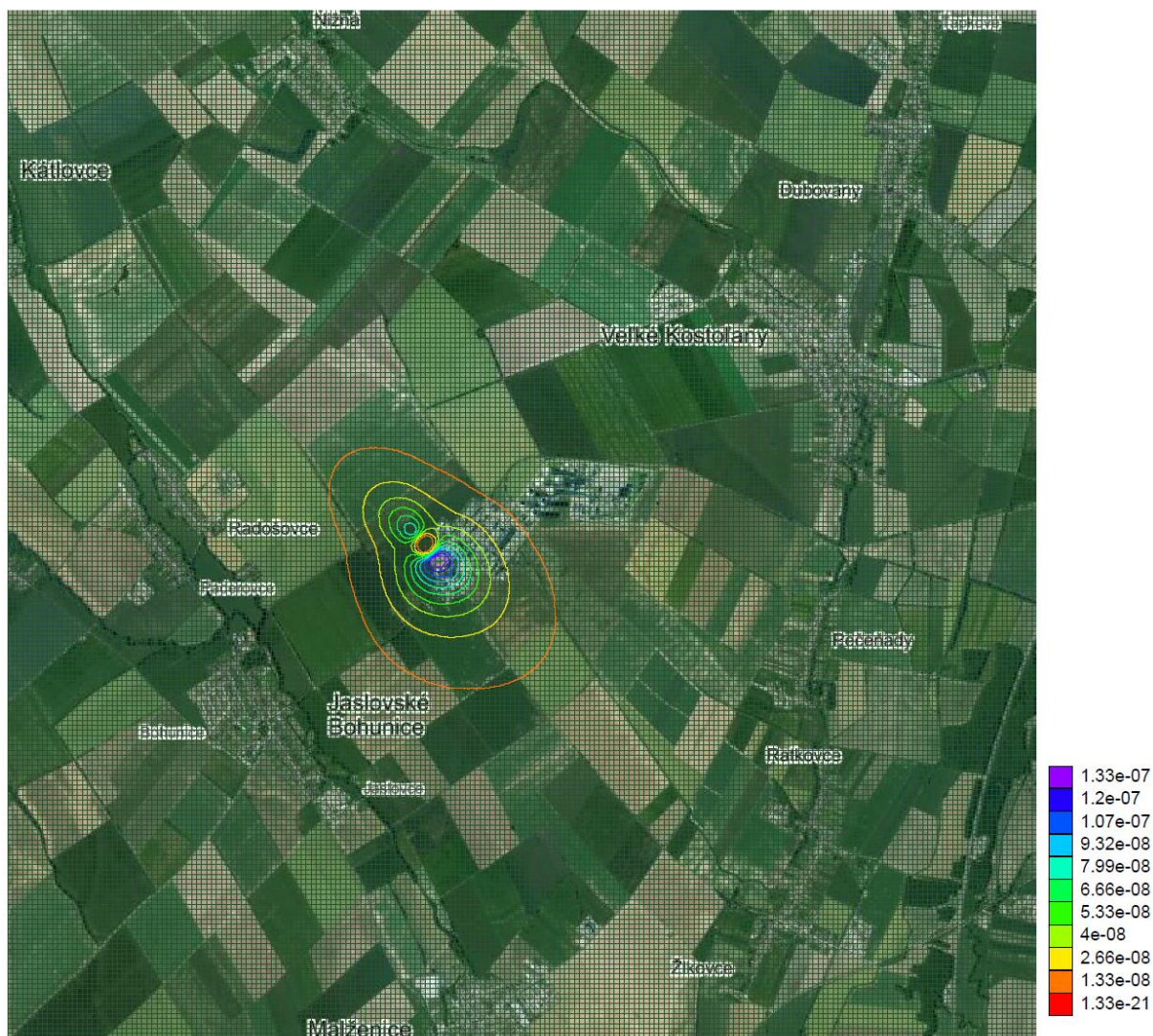
Variant 0 - PCDD/DF



Note: Concentrations expressed in ng/m^3

Annex No. 25 Average annual PCDD/DF concentrations – current status

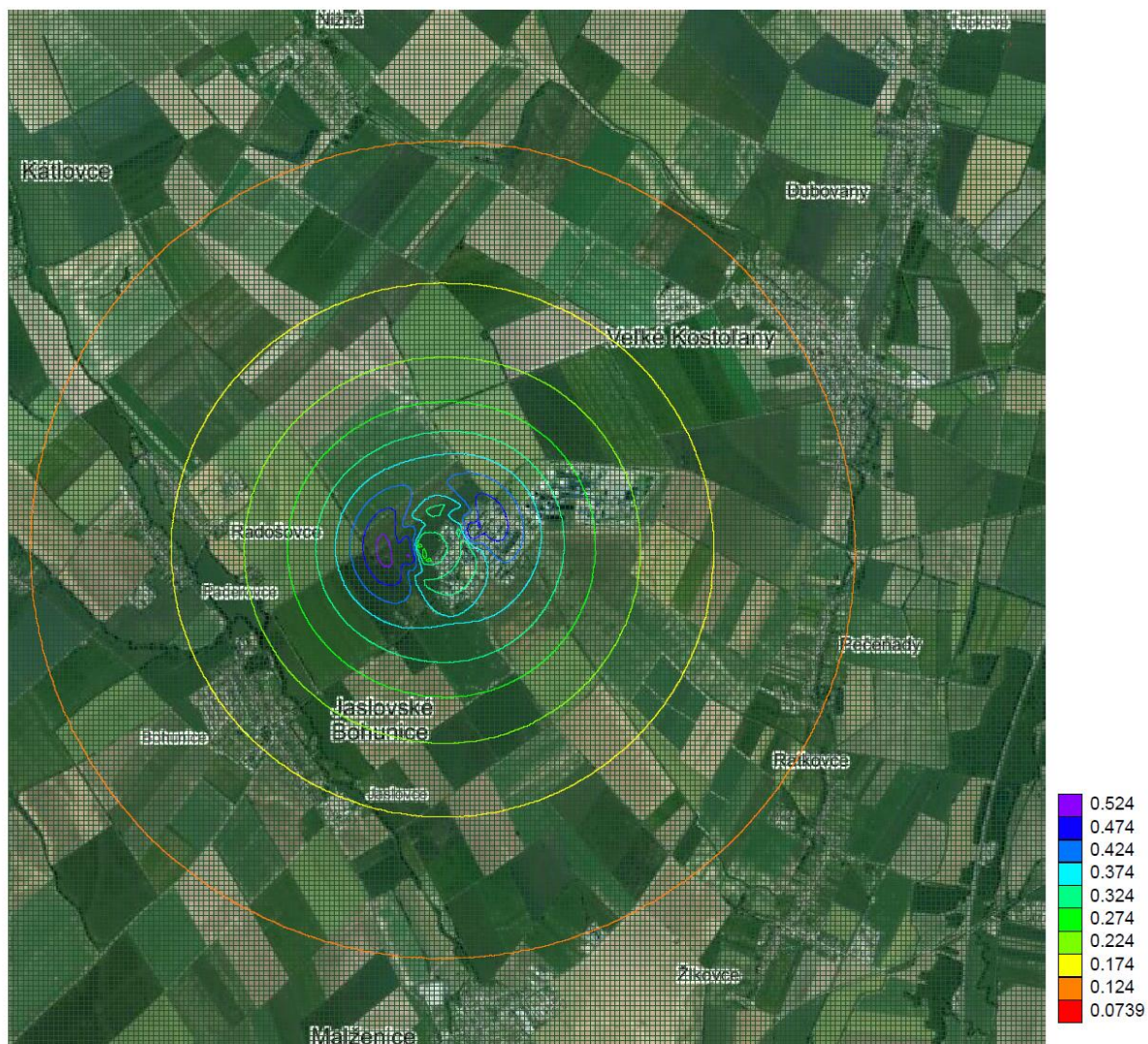
Variant 0 - PCDD/DF



Note: Concentrations expressed in ng/m^3

Annex No. 26 Maximum short-term PM_{10} concentrations – new status

Variant 1 - PM_{10}



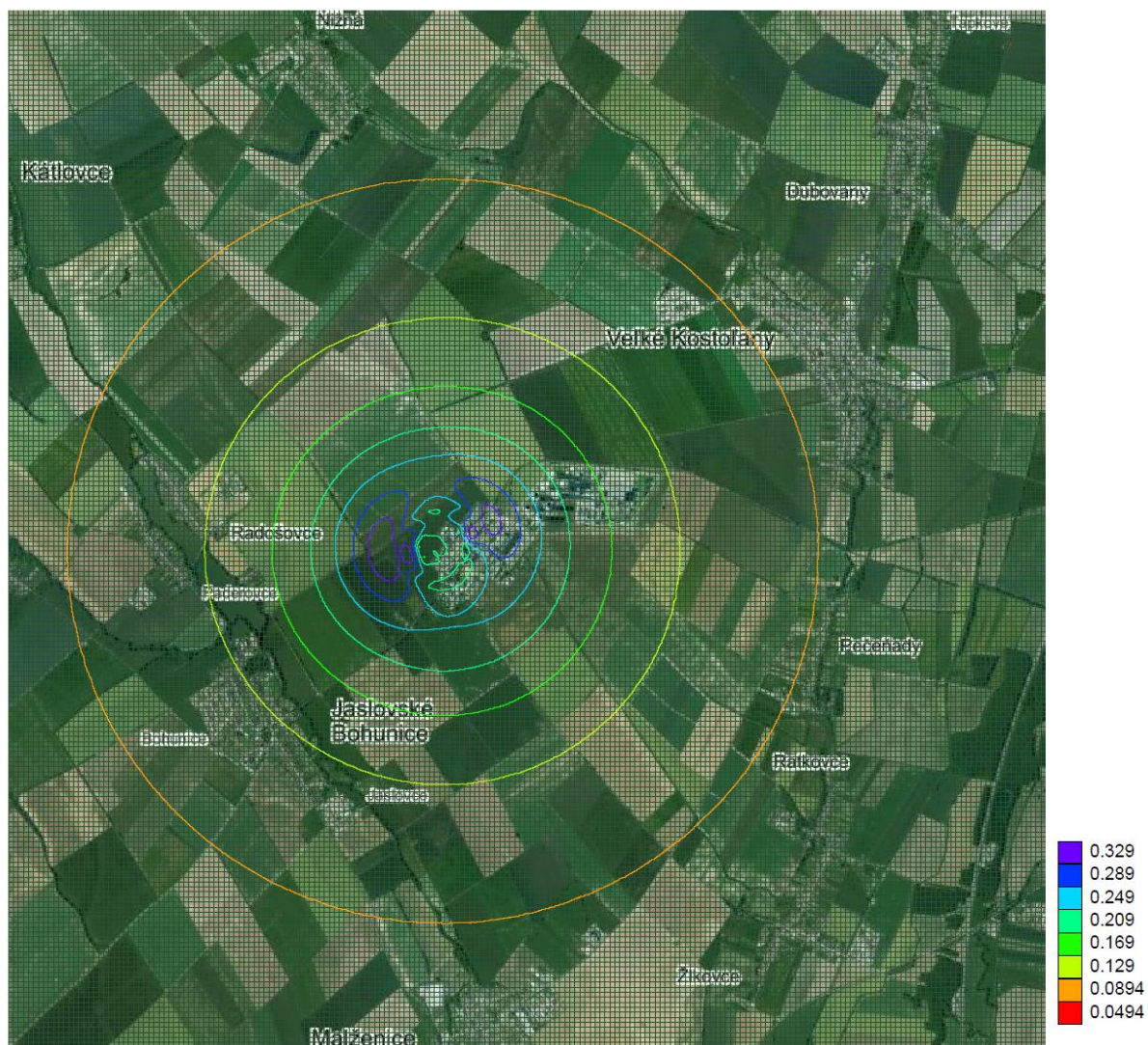
Annex No. 27 Average annual PM_{10} concentrations – new status

Variant 1 - PM_{10}



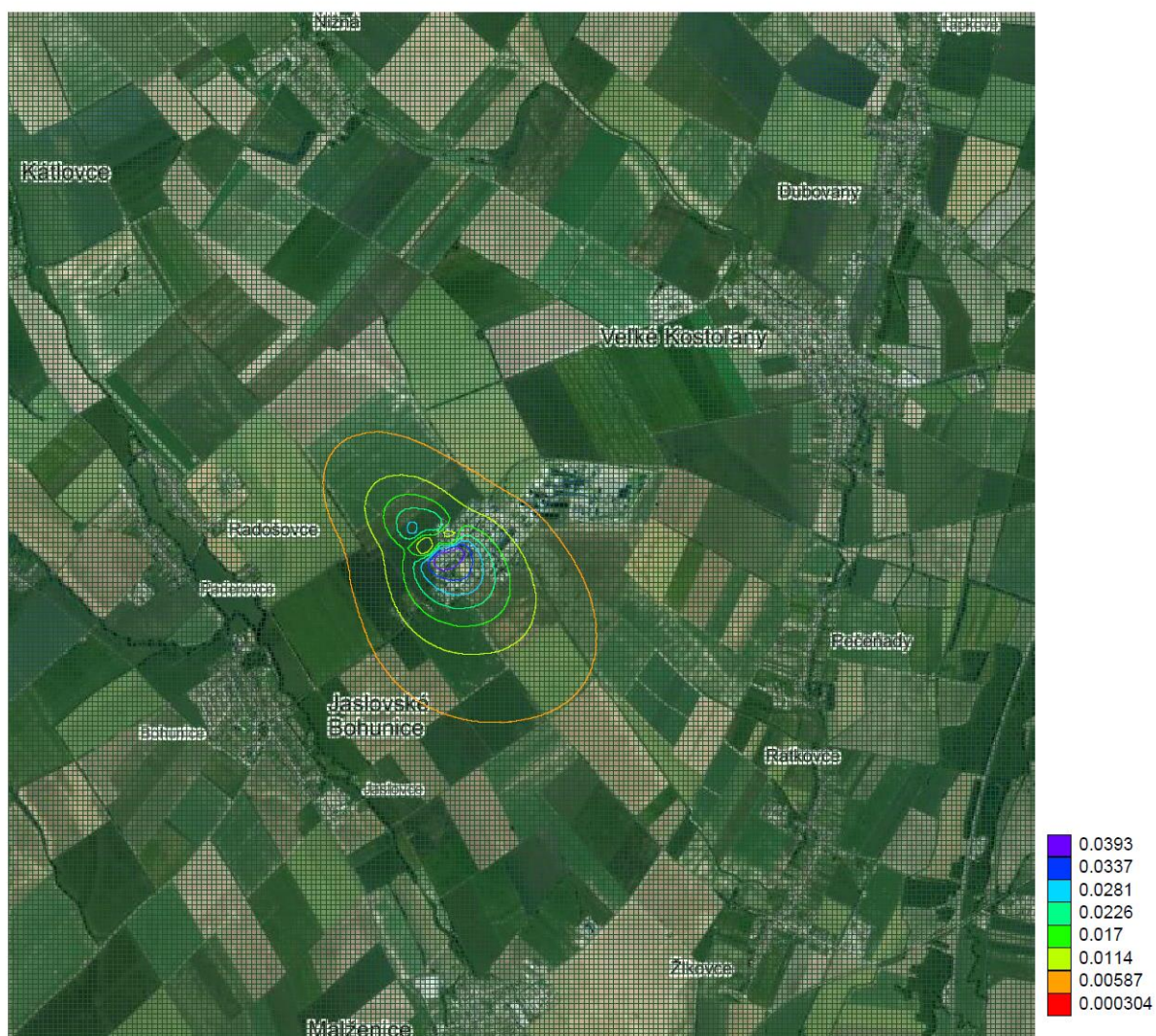
Annex No. 28 Maximum short-term PM_{2.5} concentrations – new status

Variant 1 - PM_{2.5}



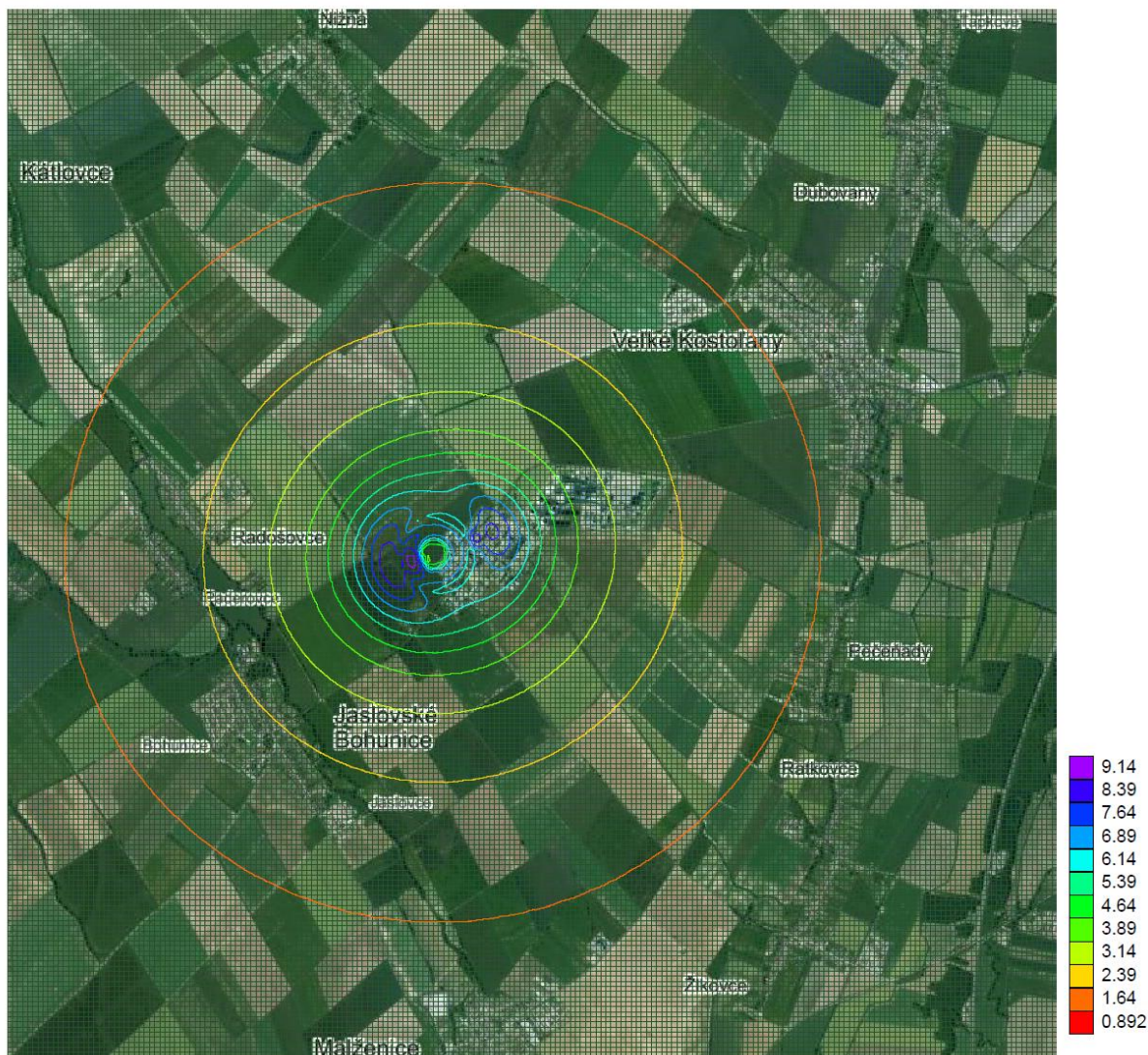
Annex No. 29 Average annual $PM_{2.5}$ concentrations – new status

Variant 1 - $PM_{2.5}$



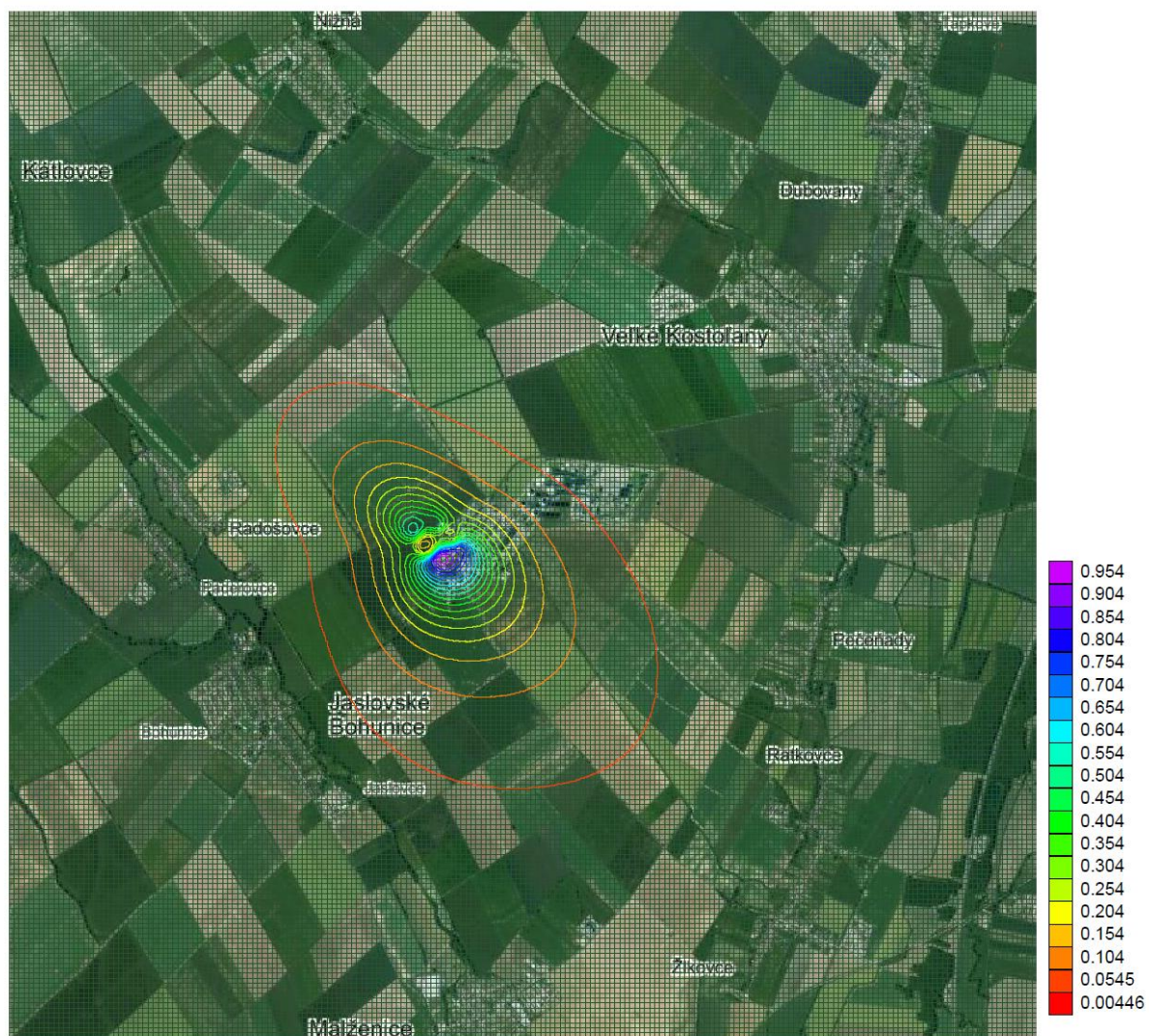
Annex No. 30 Maximum short-term SO₂ concentrations – new status

Variant 1 - SO₂



Annex No. 31 Average annual SO₂ concentrations – new status

Variant 1 - SO₂



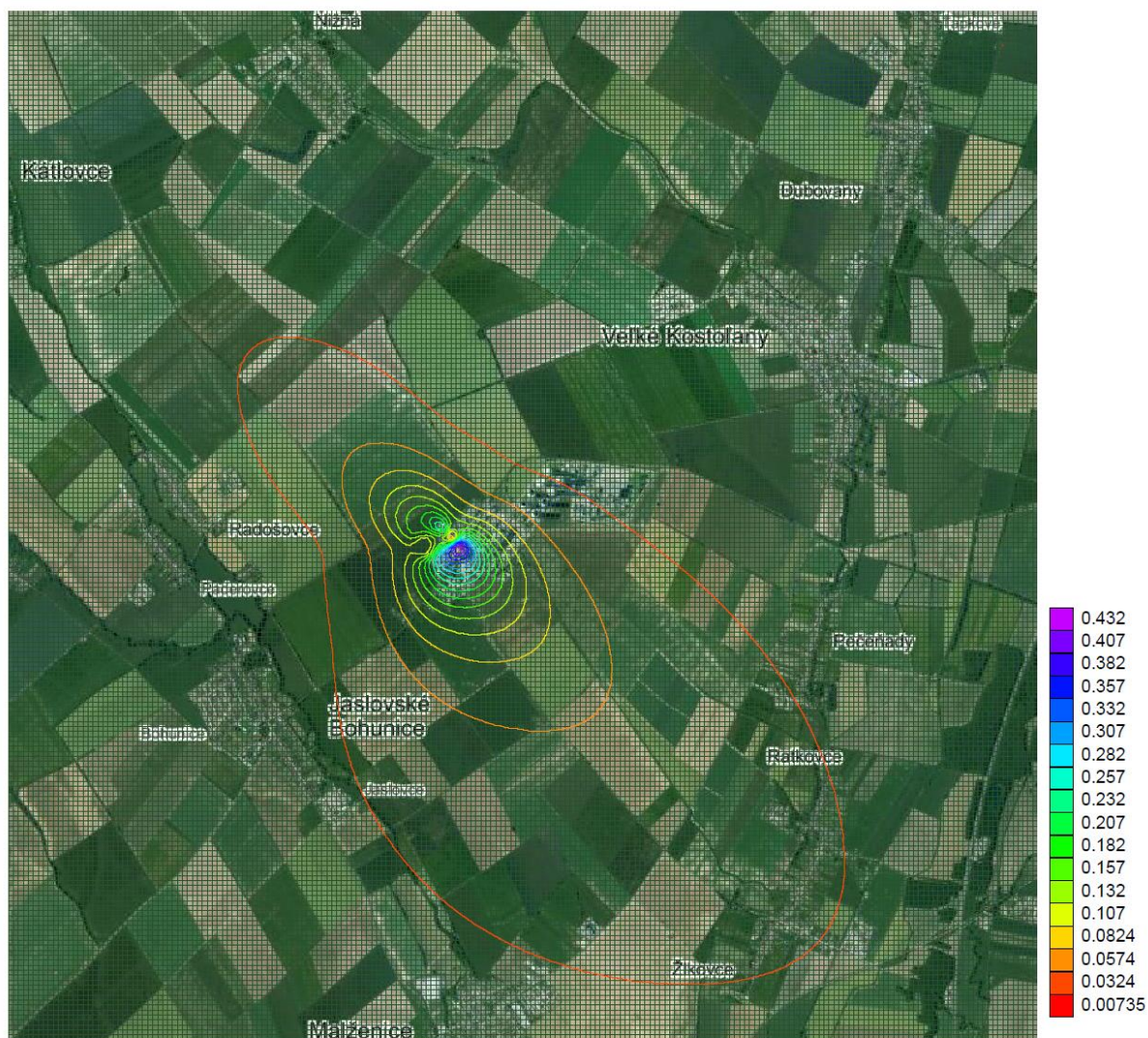
Annex No. 32 Maximum short-term NO₂ concentrations – new status

Variant 1 - NO₂



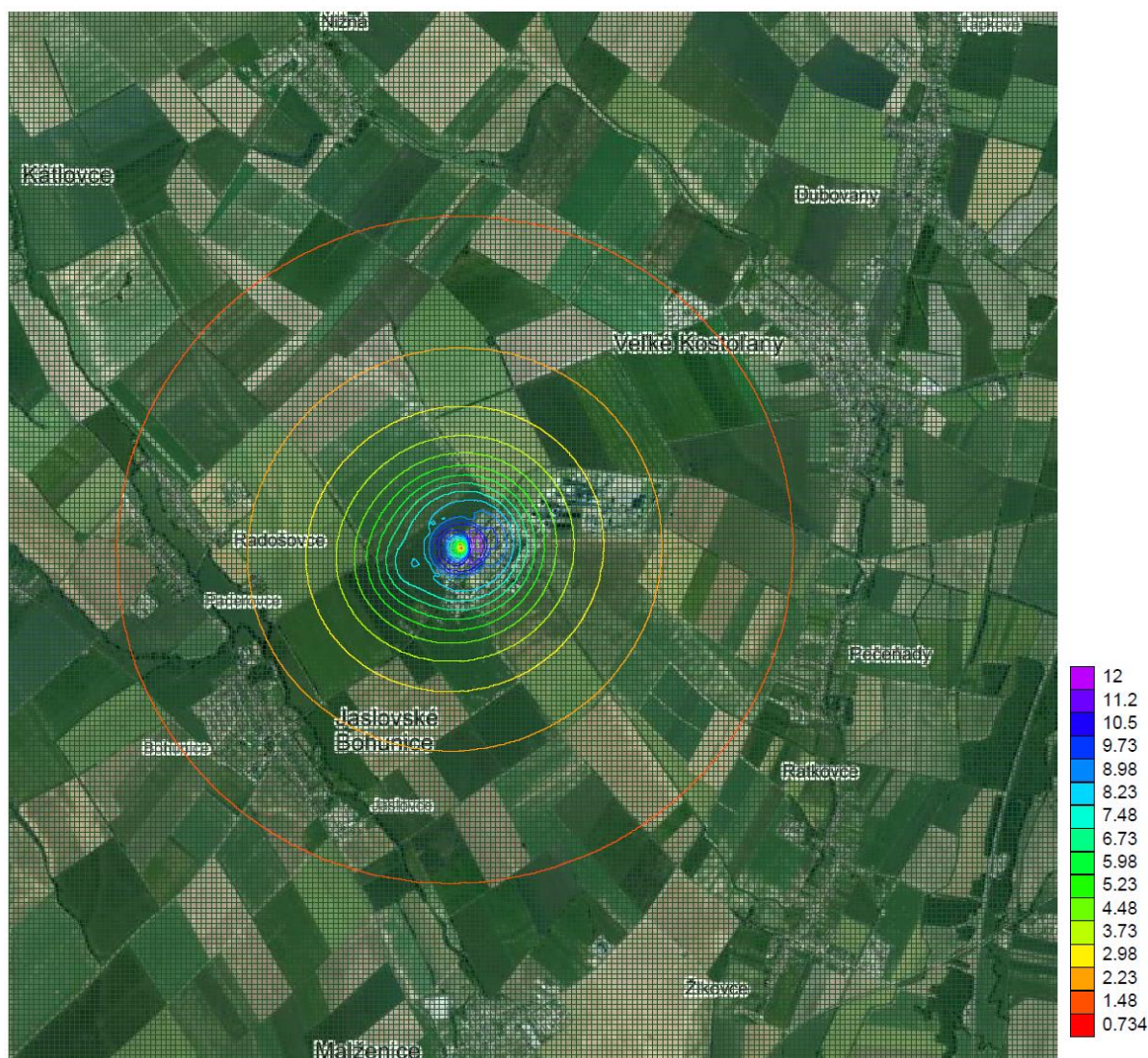
Annex No. 33 Average annual NO_2 concentrations – new status

Variant 1 - NO_2



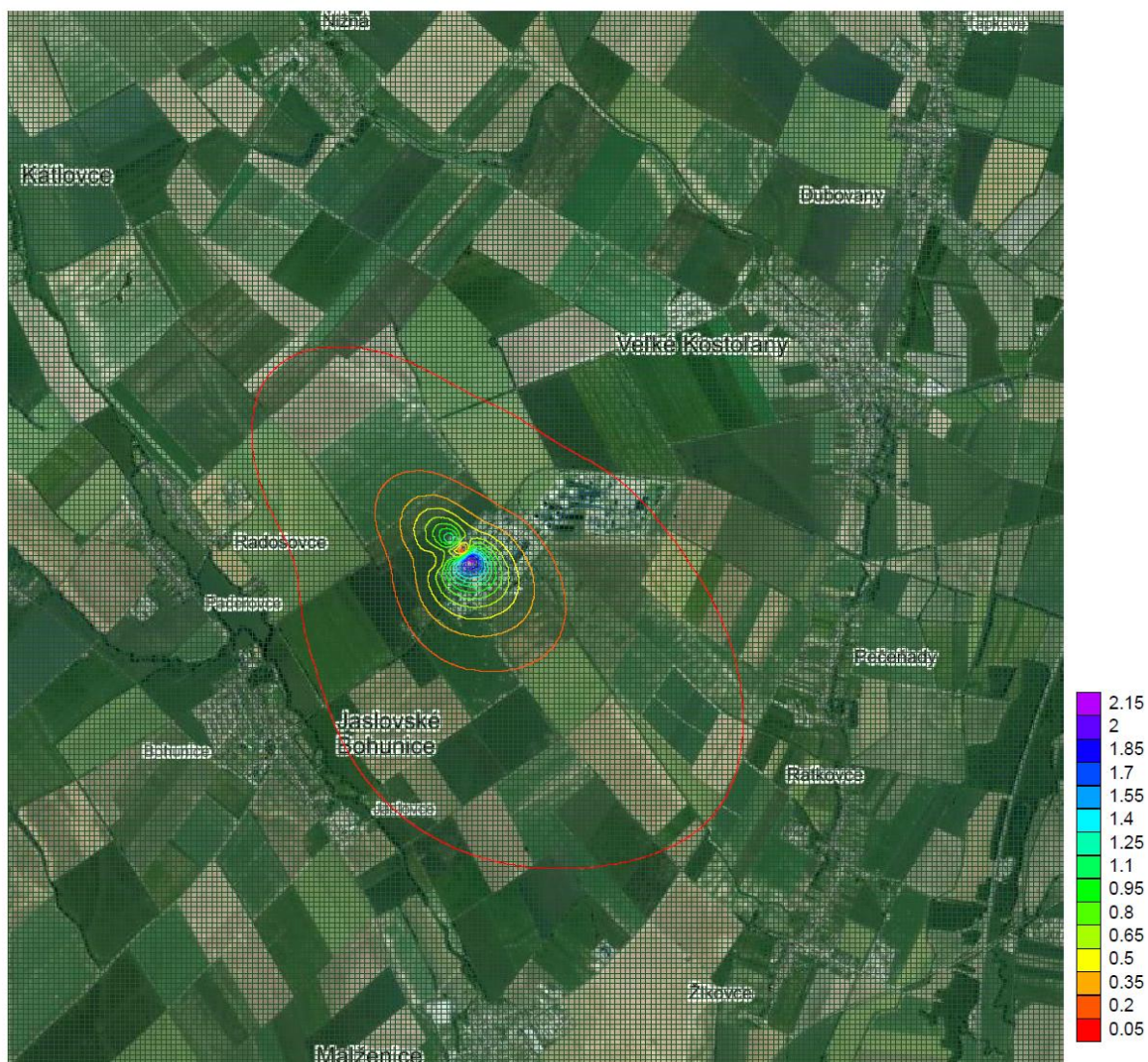
Annex No. 34 Maximum short-term CO concentrations – new status

Variant 1 - CO



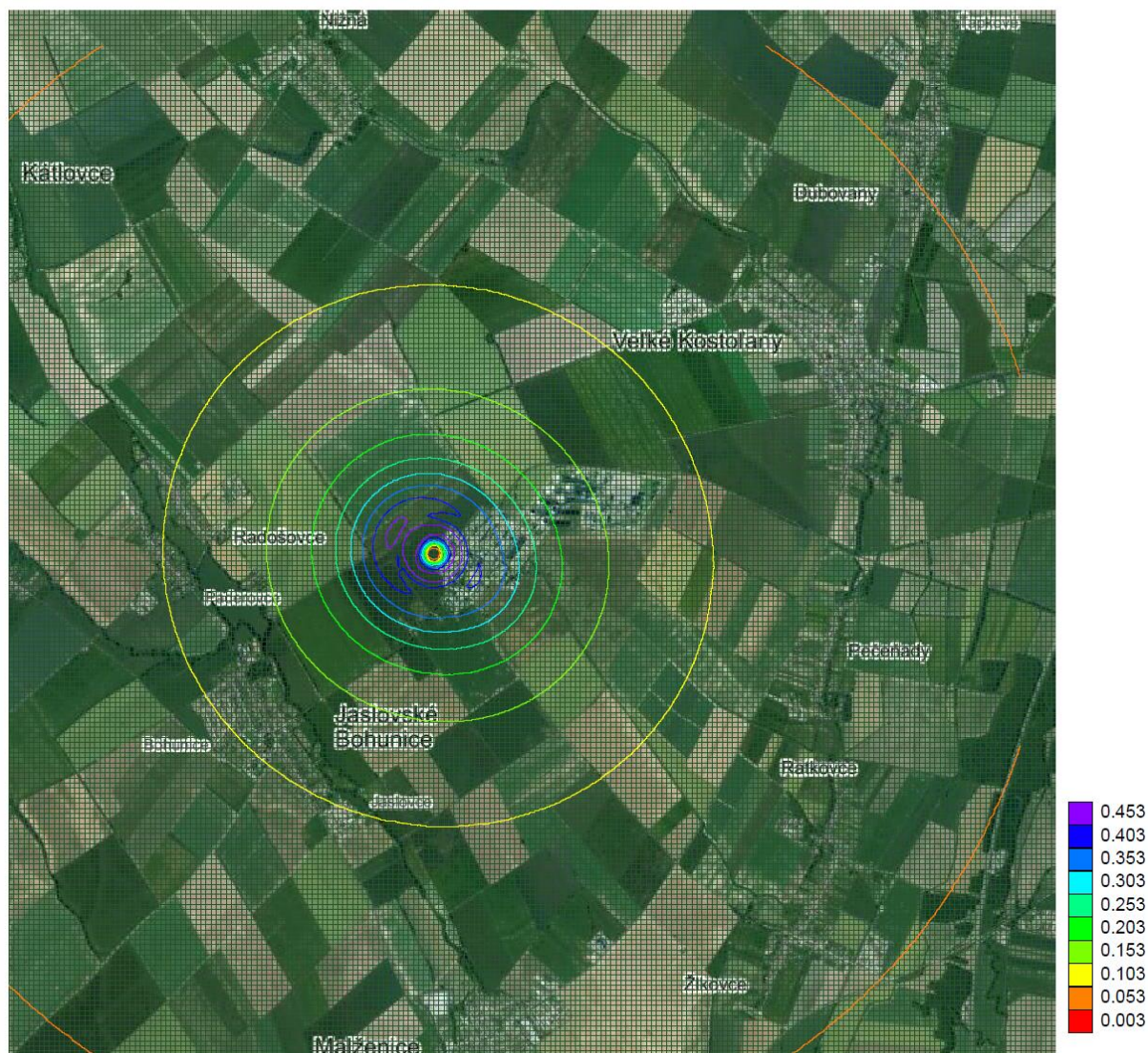
Annex No. 35 Average annual CO concentrations – new status

Variant 1 - CO



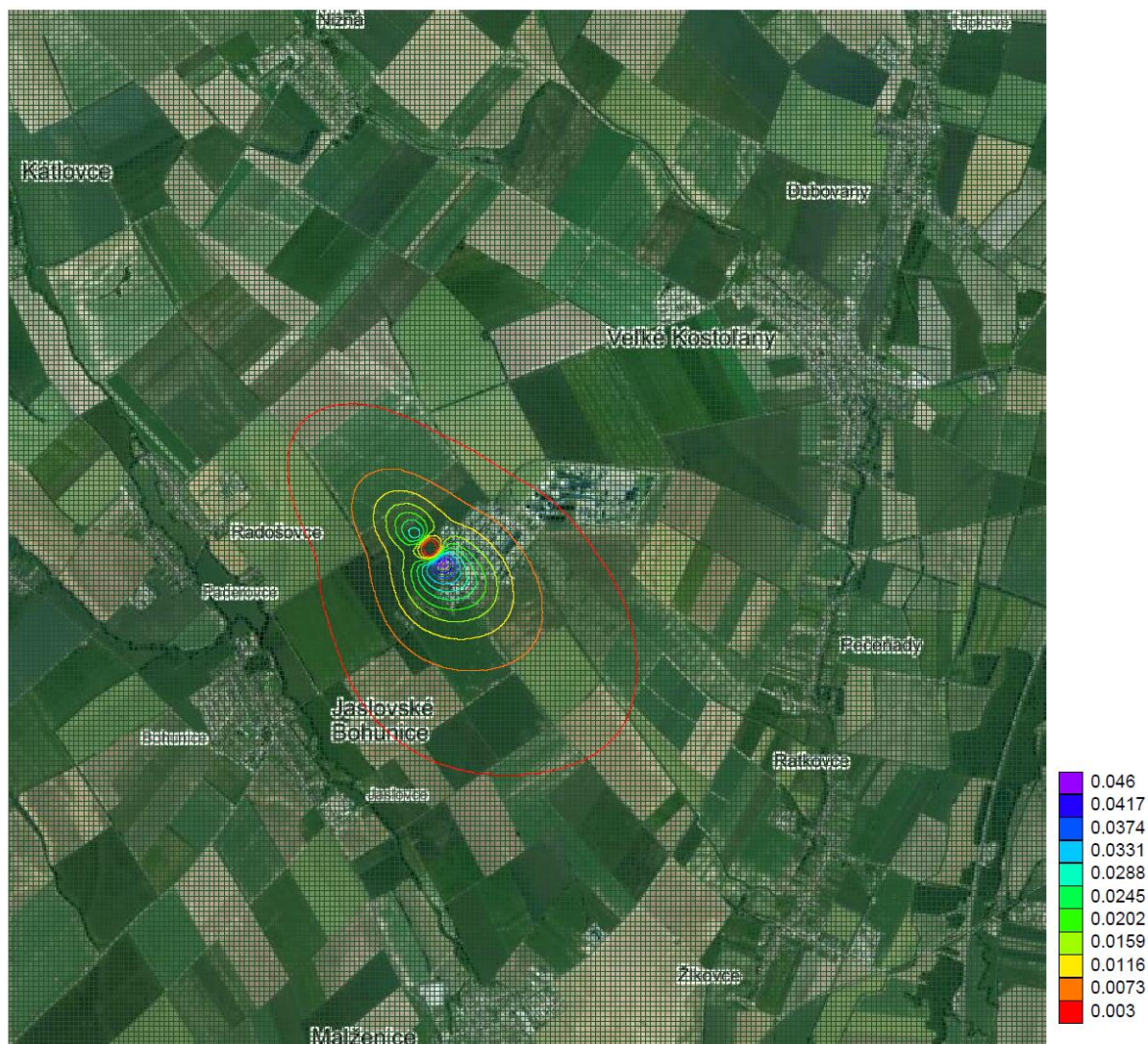
Annex No. 36 Maximum short-term TOC concentrations – new status

Variant 1 - TOC



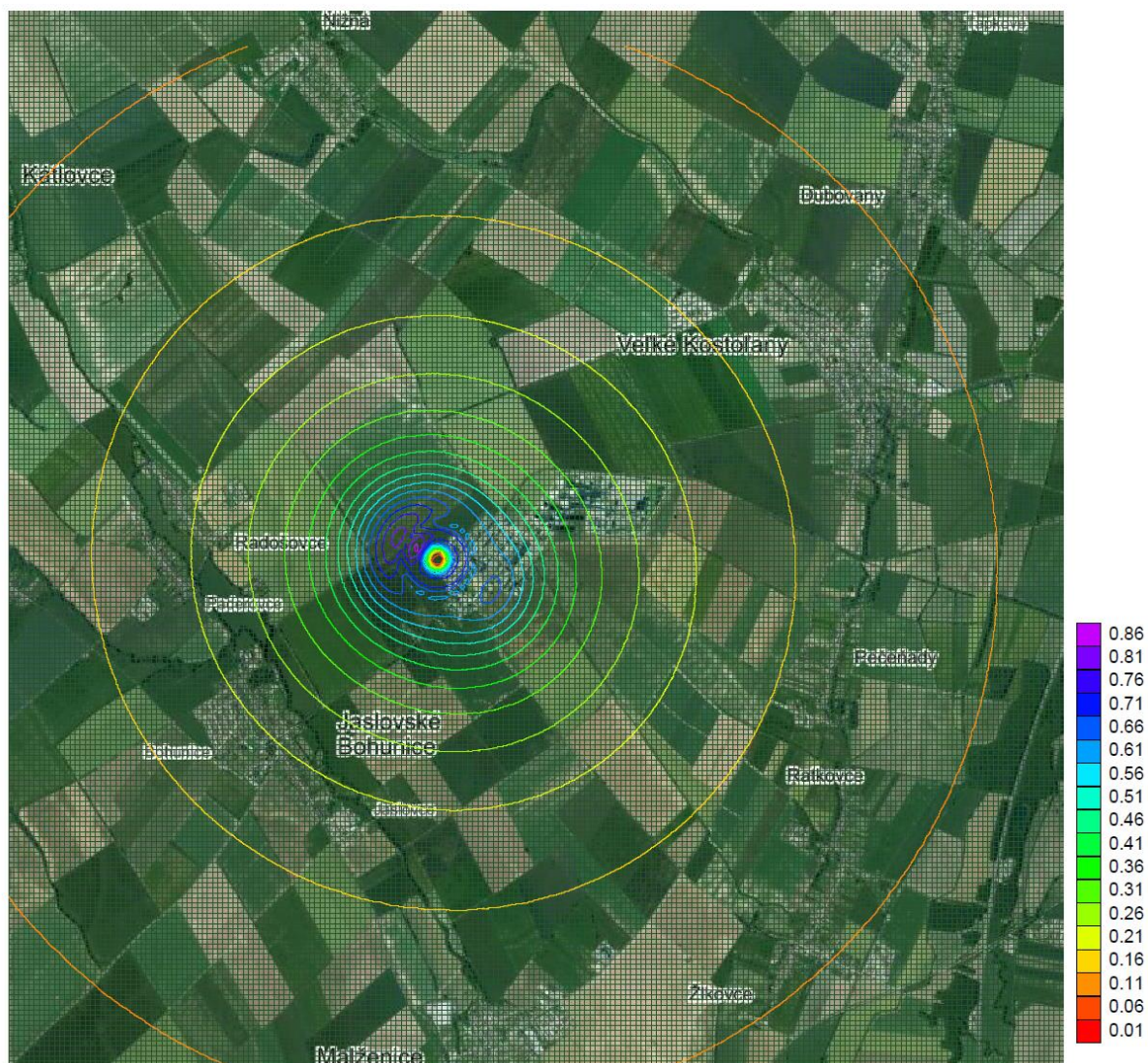
Annex No. 37 Average annual TOC concentrations – new status

Variant 1 - TOC



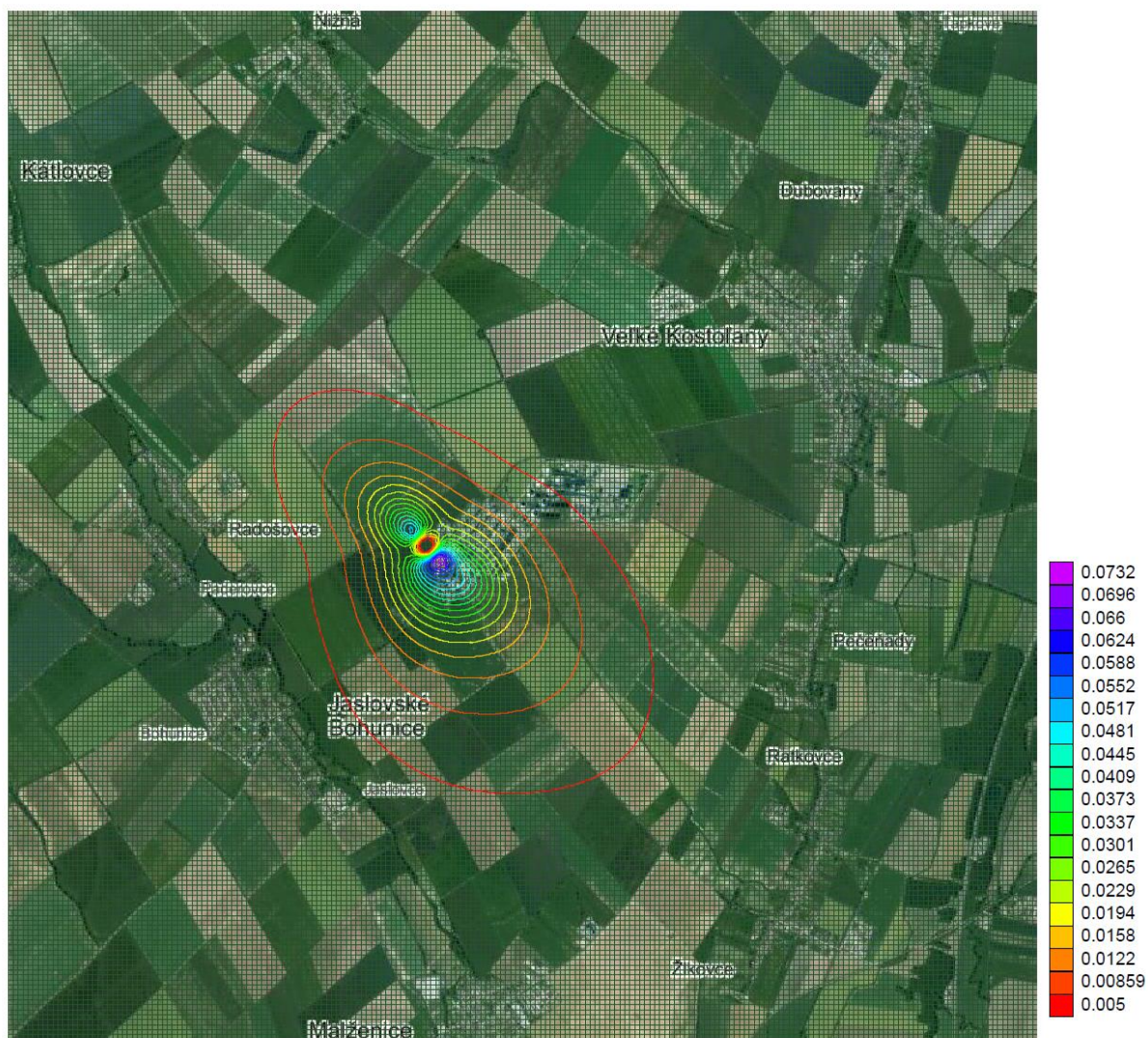
Annex No. 38 Maximum short-term HCl concentrations – new status

Variant 1 - HCl



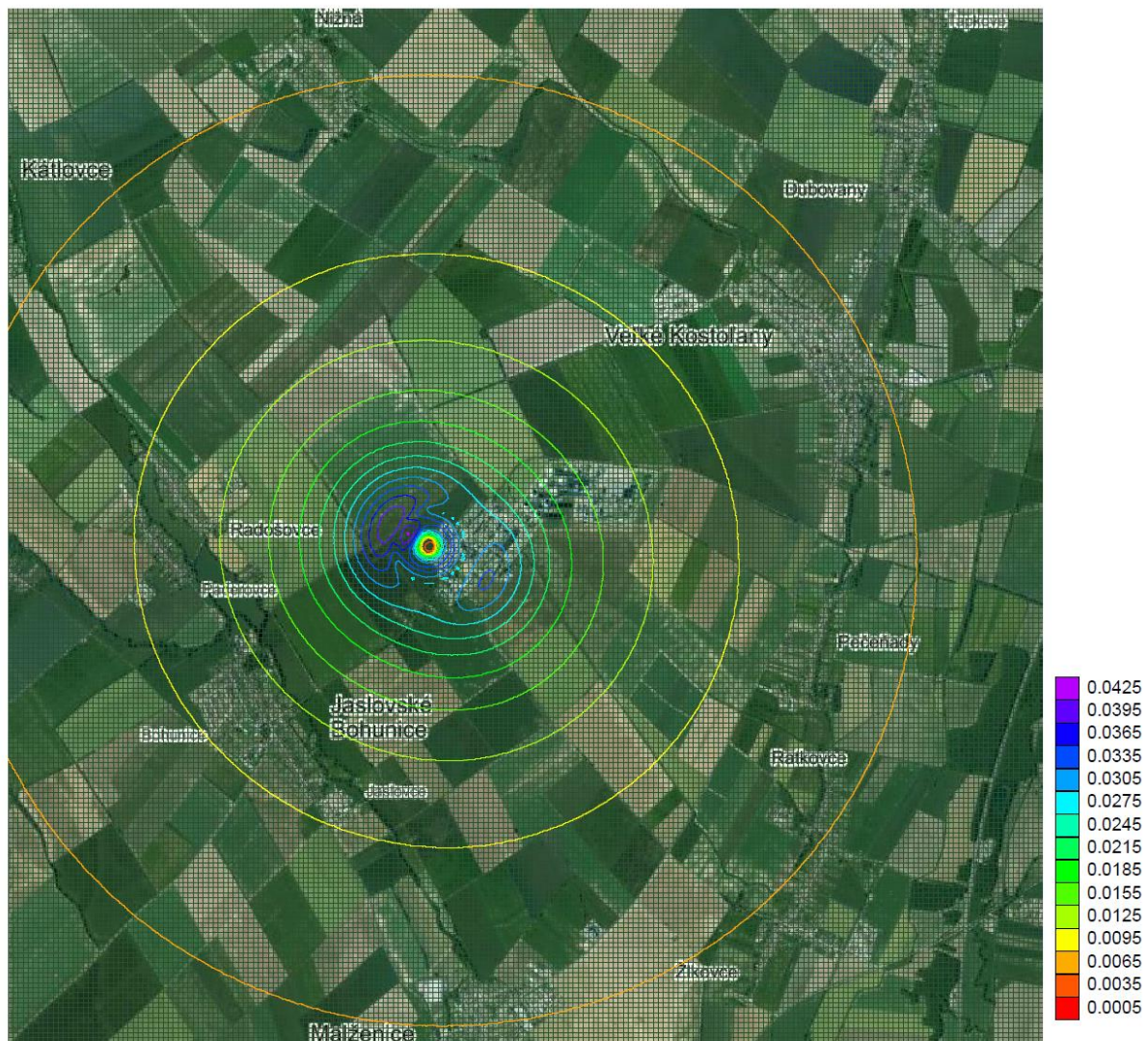
Annex No. 39 Average annual HCl concentrations – new status

Variant 1 - HCl



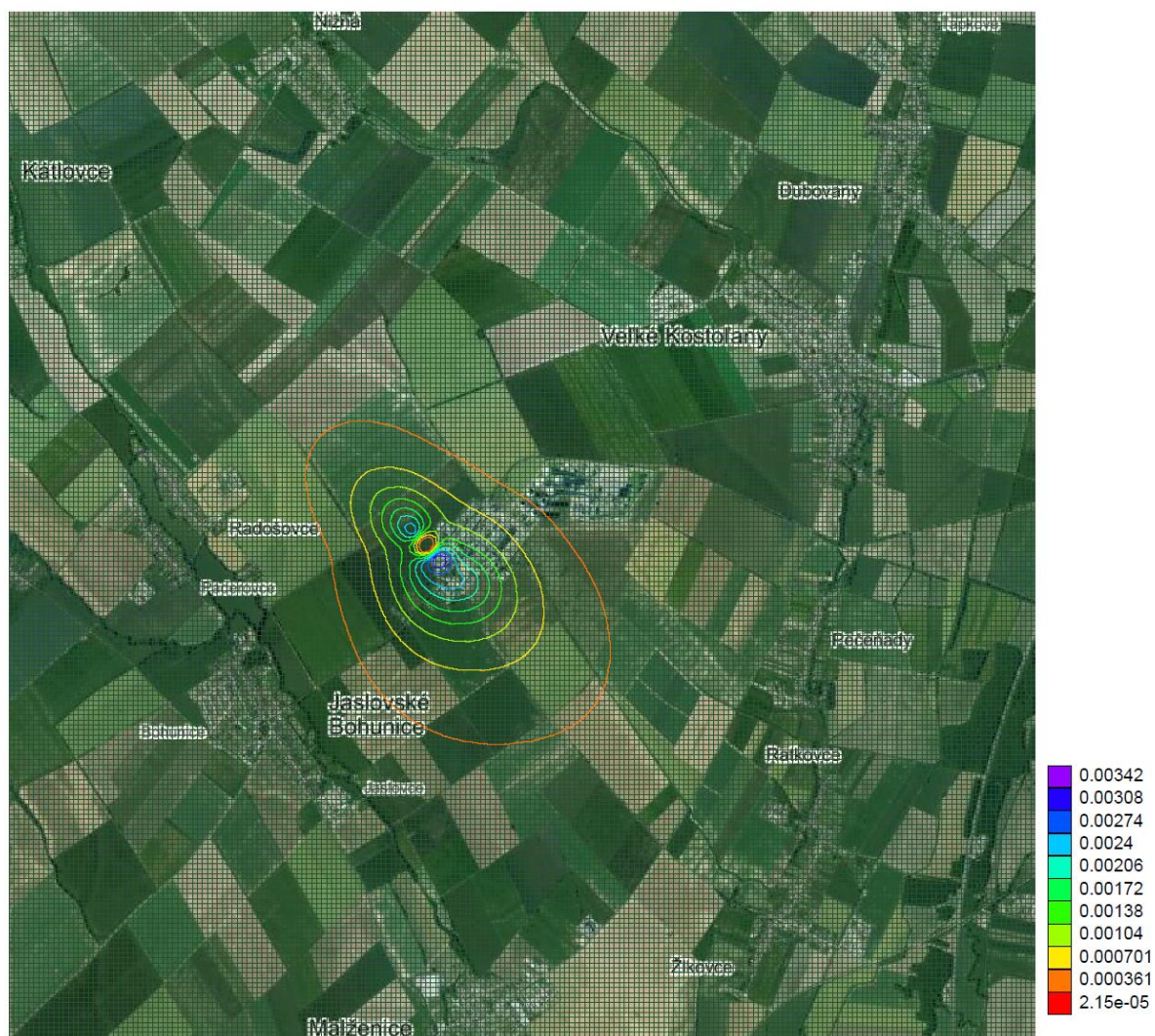
Annex No. 40 Maximum short-term HF concentrations – new status

Variant 1 - HF



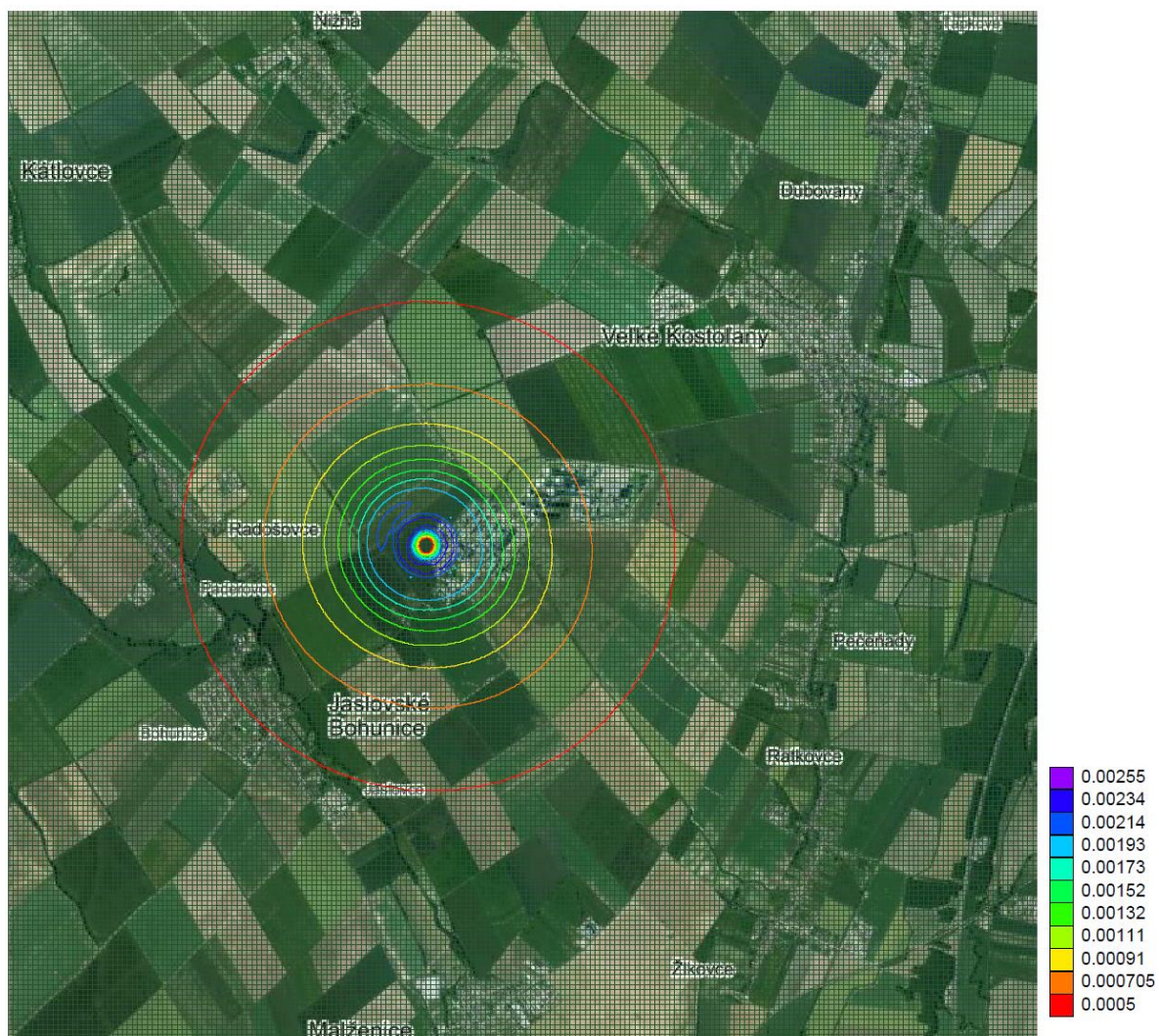
Annex No. 41 Average annual HF concentrations – new status

Variant 1 - HF



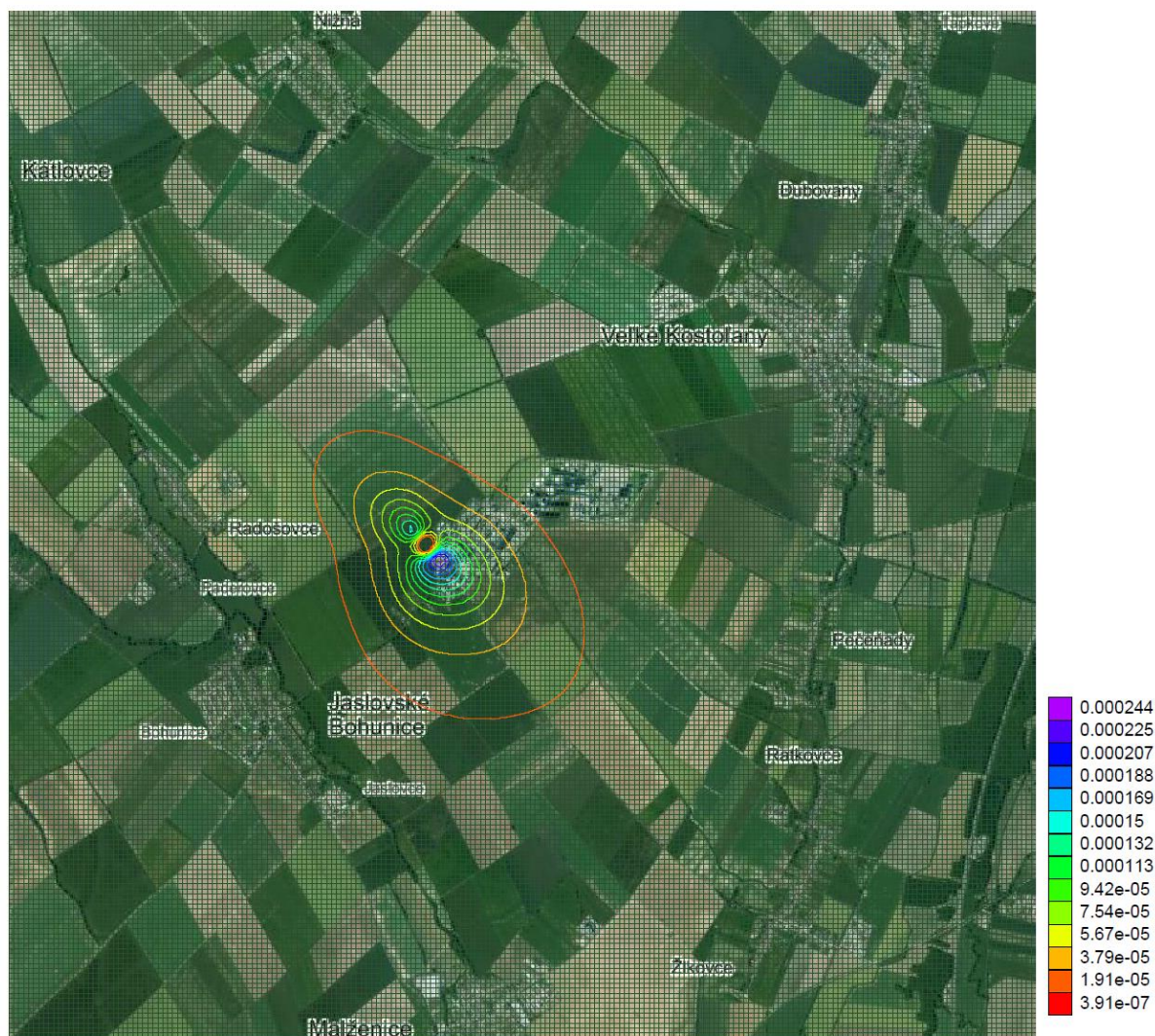
Annex No. 42 Maximum short-term Hg concentrations – new status

Variant 1 - Hg



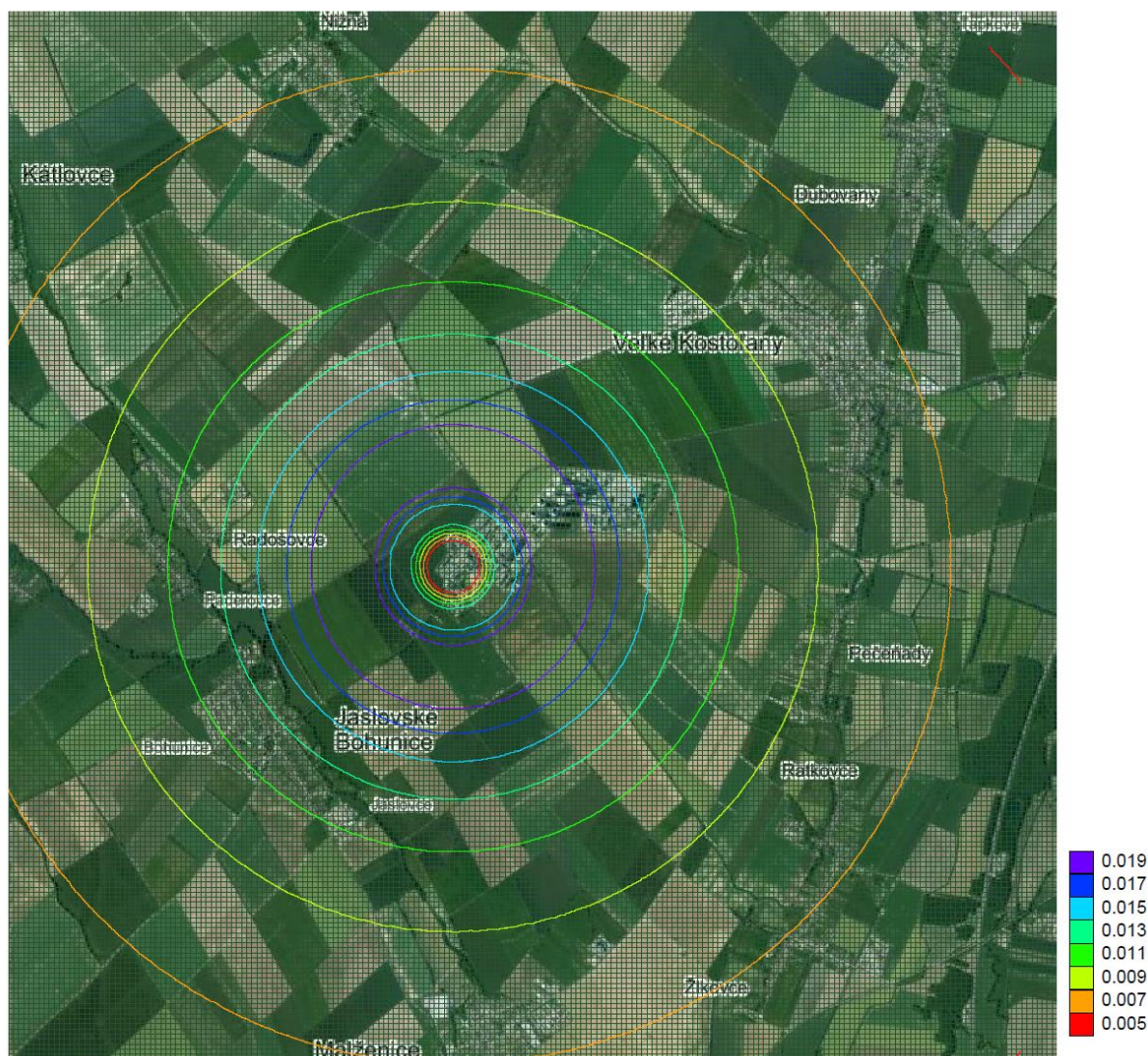
Annex No. 43 Average annual Hg concentrations – new status

Variant 1 - Hg



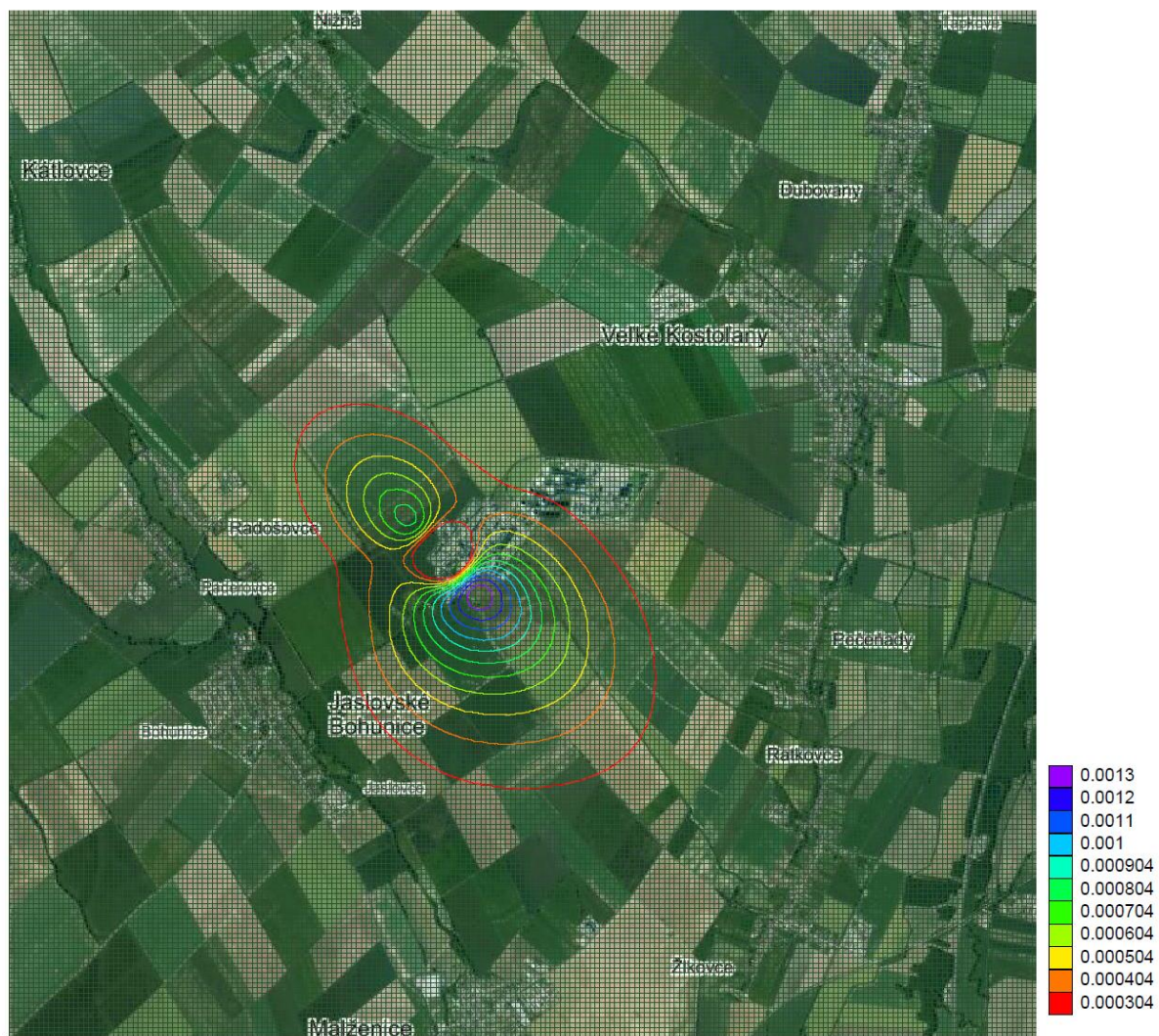
Annex No. 44 Maximum short-term Cu concentrations – new status

Variant 1 - Cu



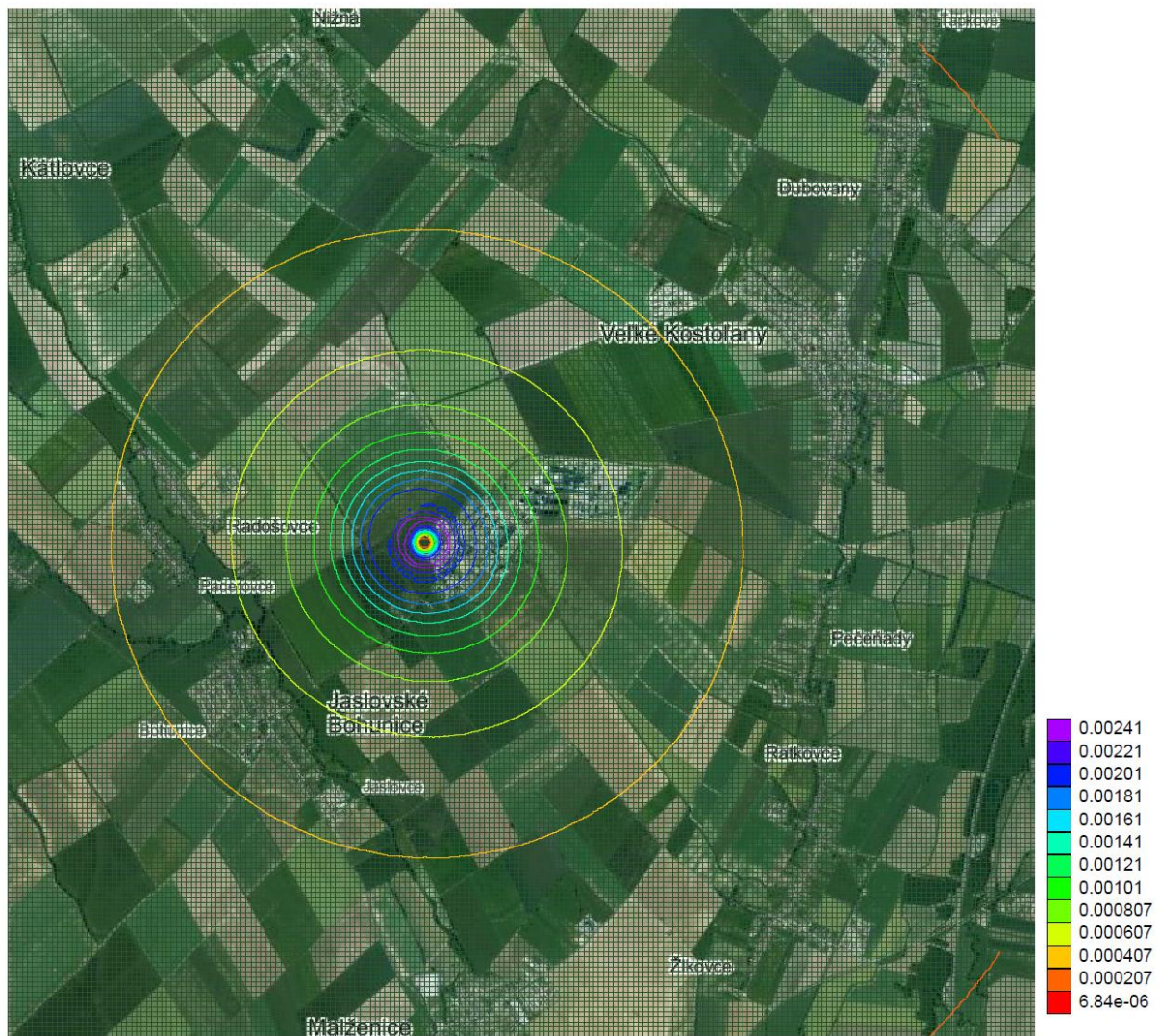
Annex No. 45 Average annual Cu concentrations – new status

Variant 1 - Cu



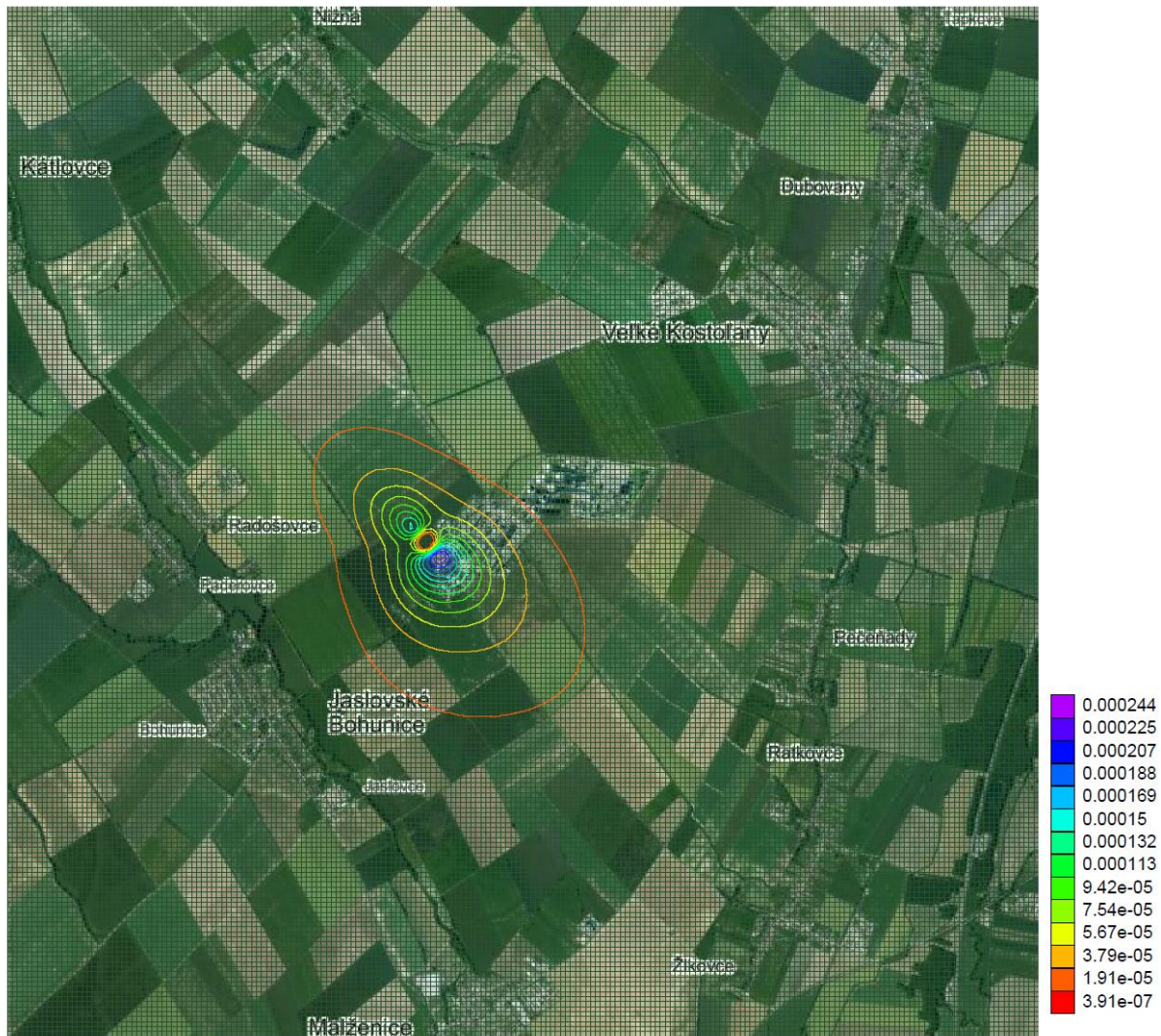
Annex No. 46 Maximum short-term Cd + Tl concentrations – new status

Variant 1 - Cd+Tl



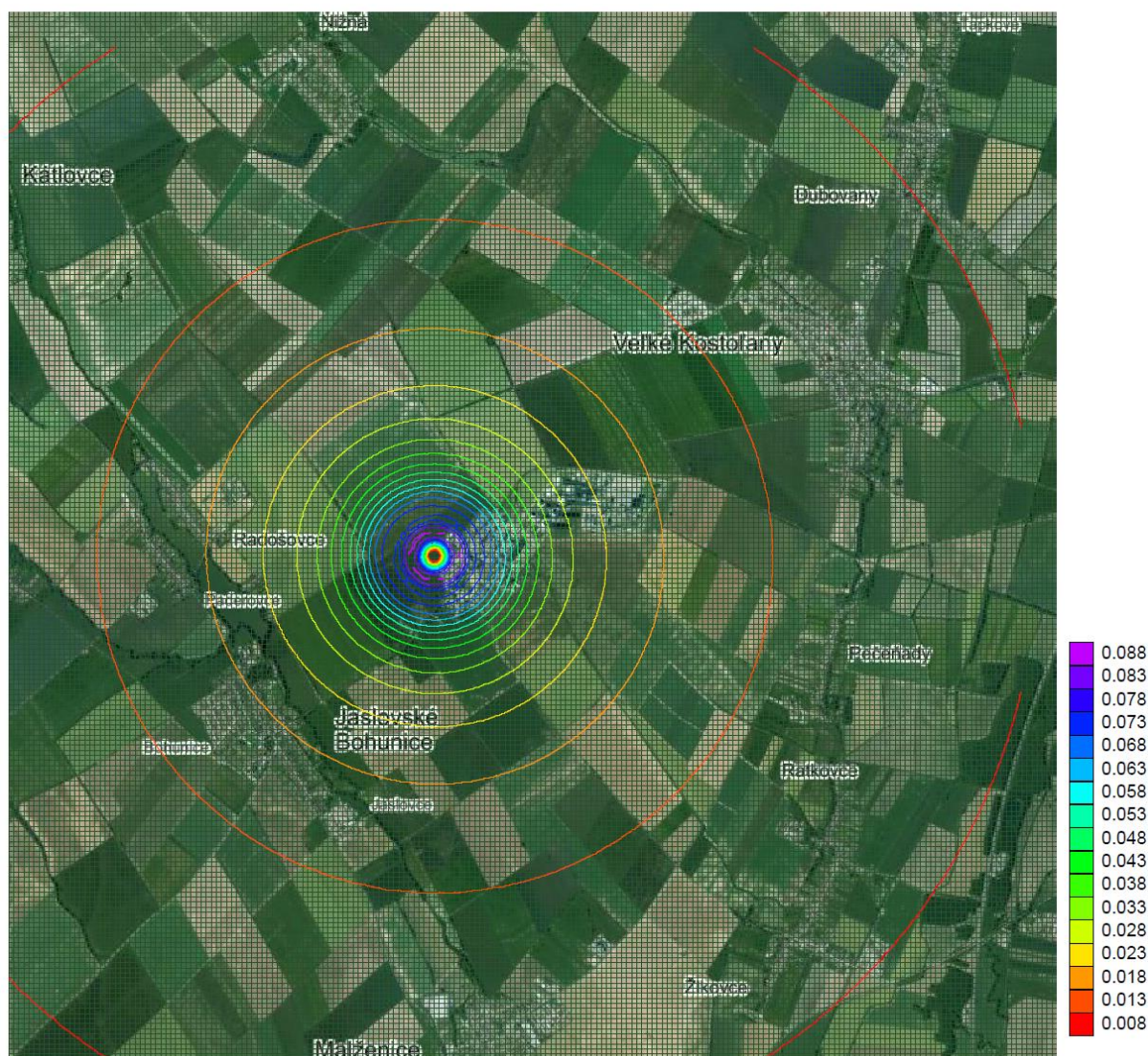
Annex No. 47 Average annual Cd + Tl concentrations – new status

Variant 1 - Cd+Tl



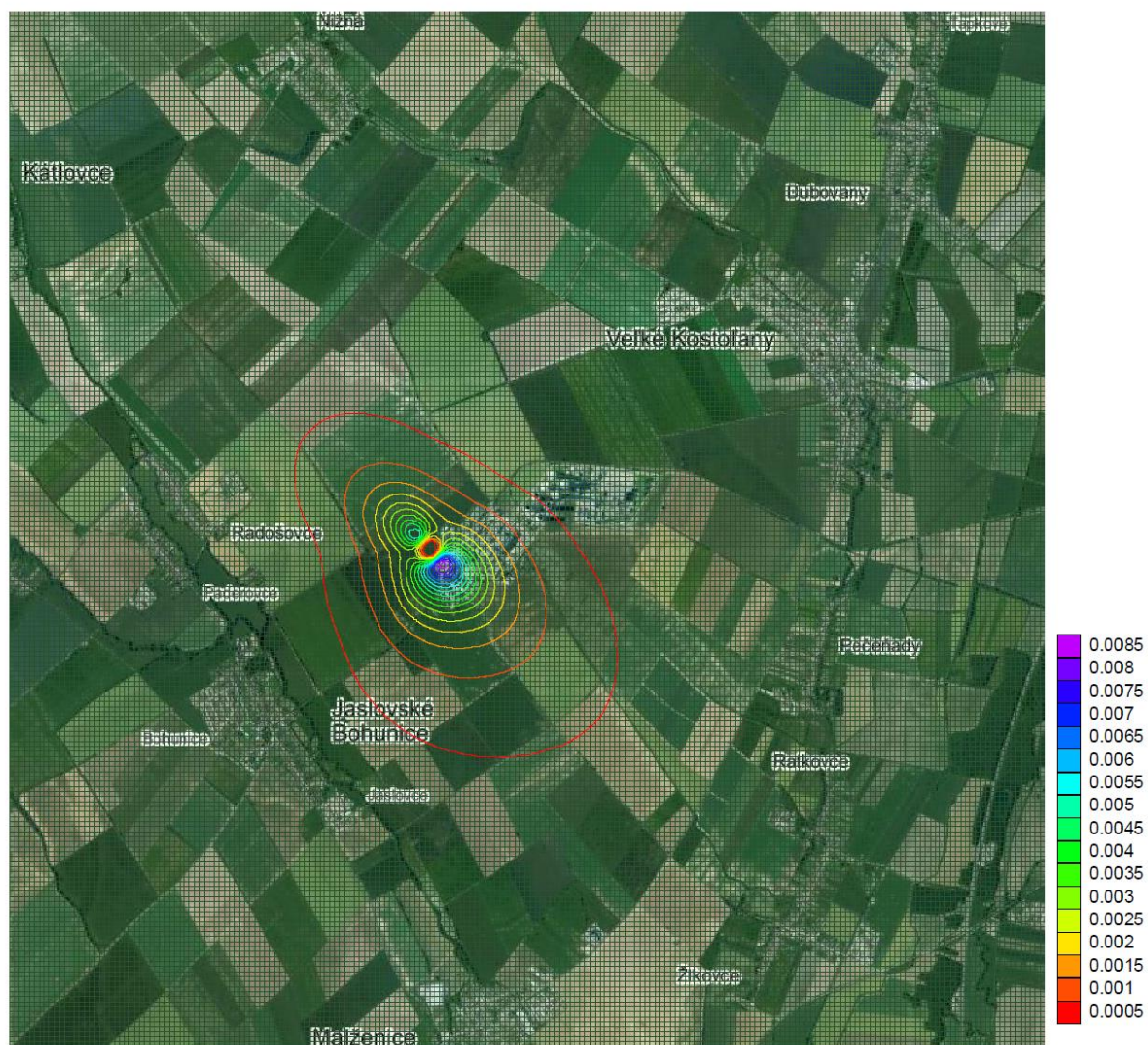
Annex No. 48 Maximum short-term Σ HM concentrations – new status

Variant 1 - Suma $\dot{T}K$



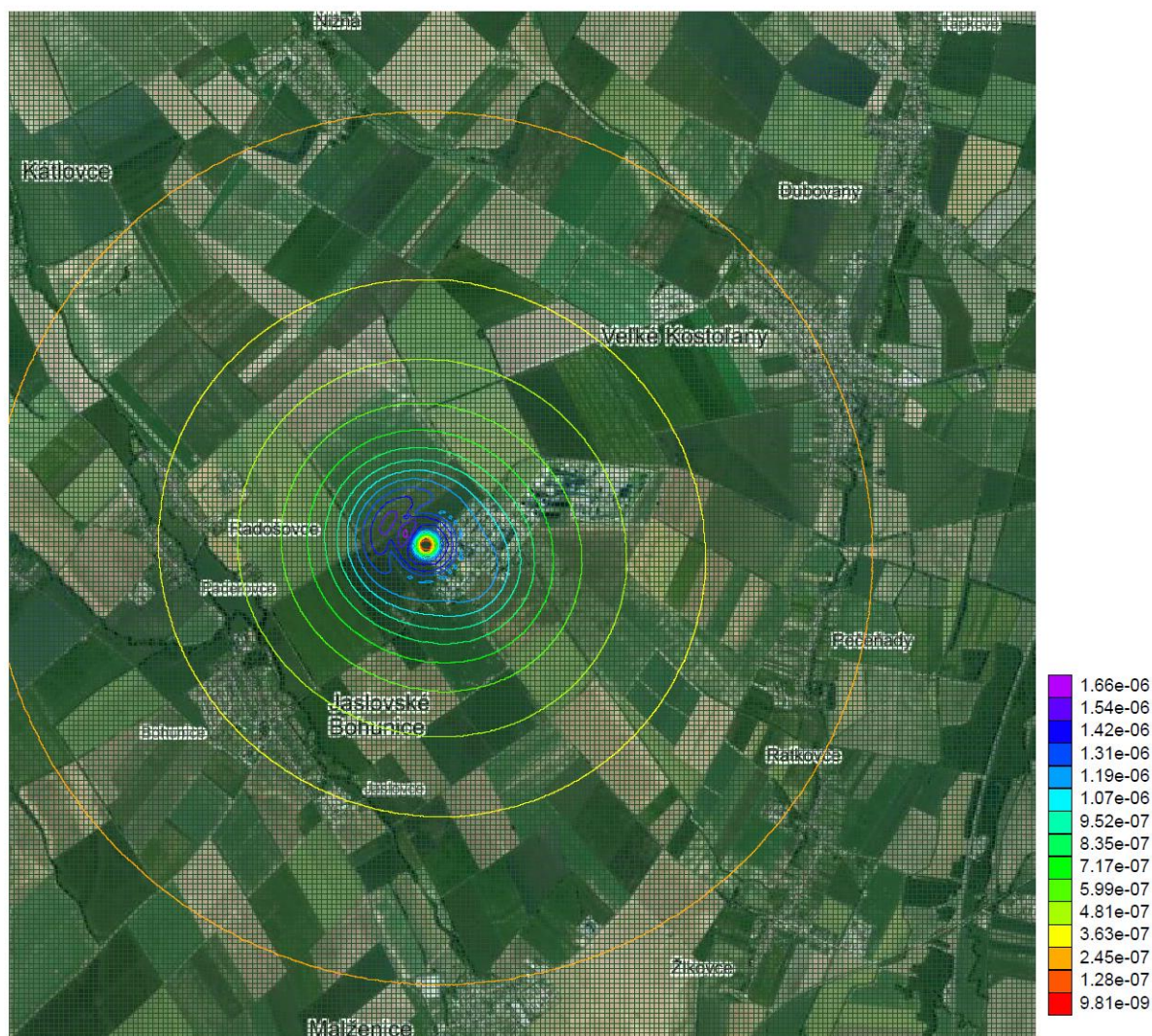
Annex No. 49 Average annual Σ HM concentrations – new status

Variant 1 - Suma $\check{T}K$



Annex No. 50 Maximum short-term PCDD/DF concentrations – new status

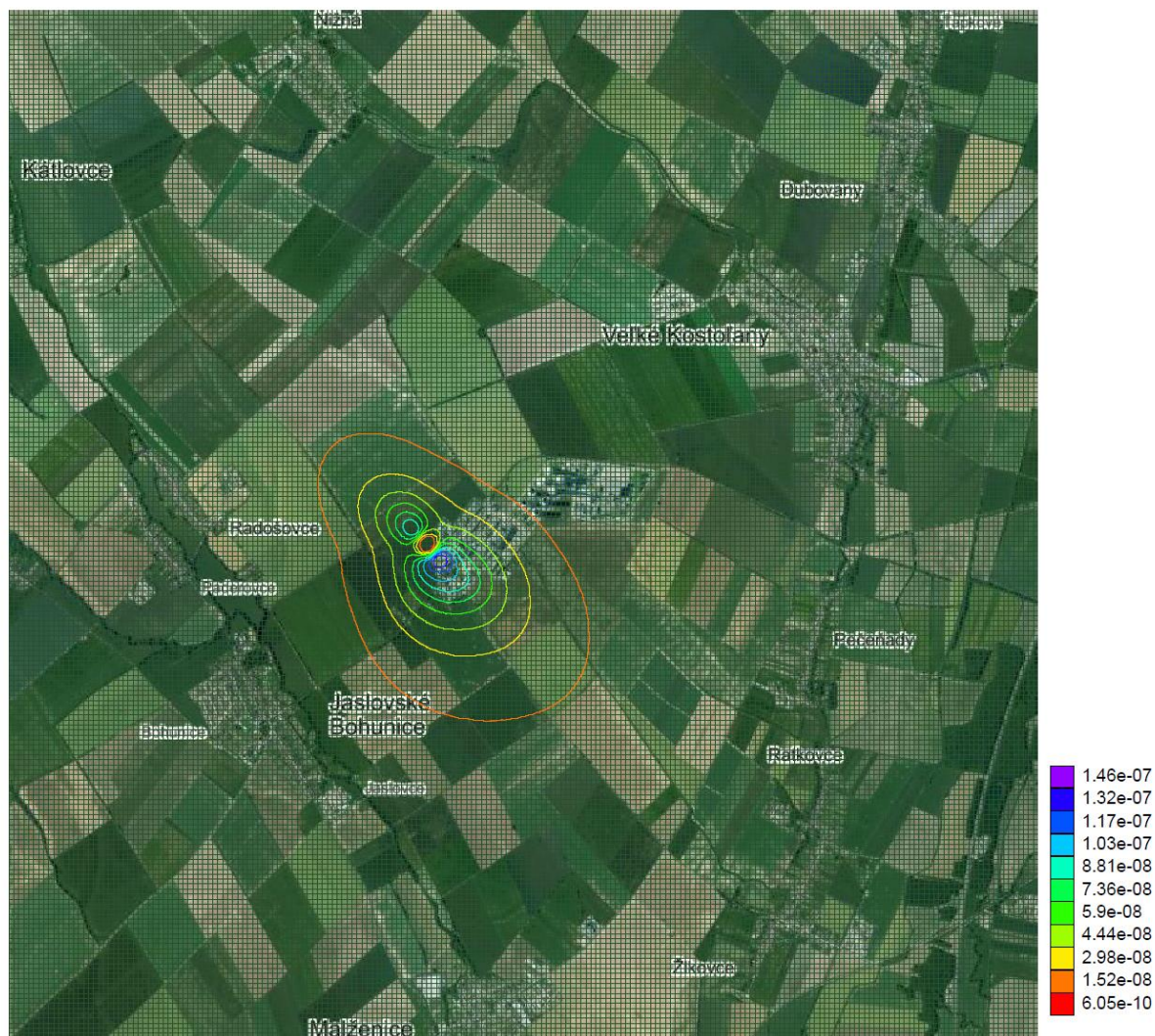
Variant 1 - PCDD/DF



Note: Concentrations expressed in ng/m³

Annex No. 51 Average annual PCDD/DF concentrations – new status

Variant 1 - PCDD/DF



Note: Concentrations expressed in ng/m^3