Construction of 500 kV overhead line for power delivery from CCGT No. 4 to the outdoor switchgear 220/500 kV at Navoi TPP on the territory of Navbakhor district of Navoi region

Draft environmental impact statement

(DEIS)

DEVELOPED by:

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Content

Introduction

This draft "Environmental Impact Statement" (EIS) is being developed for the construction of 500 kV overhead line (OHL) for power delivery from CCGT No. 4 to 220/500 kV outdoor switchgear at Navoi TPP.

Draft EIS was developed and positive conclusion of the State Environmental Expertise No. 01-01 / 10-08 -818 from 03/05/2019 was received for the construction of two CCGT units (CCGT units No. 3, 4) of class J with total capacity of 1,300 MW at Navoi TPP JSC in 2019. (A copy of the conclusion is attached).

This draft EIS was supplemented with materials for the construction of 500 kV overhead line for power delivery from CCGT No.4 to 220/500 kV outdoor switchgear at Navoi TPP in order to accelerate the implementation of this investment project, at the request of the Japanese side.

Draft EIS was also developed earlier for the construction of 220/500 kV switchgear at Navoi TPP, and positive conclusion of the State Environmental Expertise No. 01-01/10-08-1561 of 23.07.2019 was received (A copy of the conclusion is attached).

JSC "Navoi TPP" is one of the largest power plants in the Republic of Uzbekistan and is part of the unified energy system of Central Asia, provides electricity to Navoi, Samarkand and Bukhara regions and provides heat – to Navoi region and Navoi city.

Construction of TPP began in 1960. The first turbine generator VPT-25-4 with TGM-151 boiler was launched in February 1963. The construction of the station was completed in December 1981, while Navoi TPP capacity was 1,250 MW.

In the early 2000s, there was a need to modernize the worn out equipment of the station. The service life of existing 12 power plants was 20 - 35 years, which was the reason for the continued deterioration of the technical condition of the equipment, decrease in its reliability, and, consequently, low technical and economic indicators and increase in the likelihood of accidents with possible negative consequences for the environment. In connection with that situation, a course was taken to introduce new equipment with the use of advanced fuel combustion technologies - combined-cycle plants.

In February 2013, the first combined- cycle plant with a capacity of 478 MW was commissioned, while the installed capacity of the station reached 1728 MW.

In 2014, TG-1, 2 with a capacity of 25 MW each and TG-6 with a capacity of 60 MW were decommissioned. At the end of 2014, the installed capacity of the station was 1618 MW.

In 2011, another 450 MW CCGT was designed, it was made in connection with the withdrawal from the enterprise of the physically and morally obsolete equipment of power unit No. 3 with a capacity of 150 MW (commissioned in 1964) and power unit No. 8 with a capacity

of 160 MW (commissioned in 1968). The construction of CCGT was supported by the State Ecological Expertise of the State Committee for Ecology of the Republic of Uzbekistan (Conclusion for DEIS No. 18 / 775z dated 19.05.2016). Now, construction of CCGT No. 2 has been completed and conclusion of the State Committee for Ecology of the Republic of Uzbekistan on Statement of environmental effects has been received (Conclusion No. 01-01 / 10-08-338 of February 24, 2020).

At the end of 2020, installed capacity of Navoi TPP was 1758 MW.

The construction of CCGT No. 3, 4 class J will increase the total capacity of Navoi TPP by another 1300 MW.

The implementation of this project is consistent with the "Scheme for the development of the North-Western part of the energy system of Uzbekistan for 2020-2026" developed by the Institute of Sredazenergosetproekt JSC in connection with the commissioning of new production facilities of NMMC. Grid 220 – 500 kV".

The design object belongs to the **II category of environmental impact** in accordance with the Resolution of the Cabinet of Ministers of 07.09.2020 No. 541 (medium risk, paragraph 10).

The main tasks in the development of draft EIS were:

- to assess the degree of negative impact of the designed facility on the environment;

- to conduct an environmental analysis of the design solution, while determining the types, objects and nature of the impact;

- to analyze emergency risks after commissioning of the construction object;

- to make a forecast assessment of the environmental impact of the construction object after the project implementation;

- to develop a program of measures to reduce the negative environmental impact for the period of construction and at the stage of operation of the overhead line after the project impementtion.

Assessment of the environmental impact of the construction of 500 kV overhead line -CCGT No. 4 -switchgear 220/500 kV at Navoi TPP was based on the analysis of the current state of the natural environment, projected technological equipment, identification of sources of emissions, discharges and waste at the construction and operation stages of the design object.

The calculation of the level of atmospheric air pollution by emissions during all types of construction work (earth works, painting and welding) during the construction of 500 kV overhead line from CCGT No.4 to 220/500 kV outdoor switchgear at Navoi TPP was carried out and its compliance with the requirements of the State Committee for Ecology RUz was determined.

When performing the work, they were guided by the "Regulations on the State Environmental Expertise", approved by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 541 of 07.09.2020, determining the composition and volume of the submitted section of environmental impact assessment.

1 Characteristics of the current state of the environment in the area of the construction object

1.1 *Physical, geographical and climatic conditions*

The route of 500 kV overhead line with a total length of 5.0 km begins from CCGT No. 4 and is laid through the territory of Navbahor district of Navoi region of the Republic of Uzbekistan to the outdoor switchgear of 220/500 kV at Navoi TPP (Annex 2).

Along the line, the route under construction crosses several ditches, collectors, canals, the Zerafshan River, grass land in the Zerafshan river floodplain, field, gravel, asphalt roads, including A-379 main road, agricultural lands.

The route follows the cultivated lands occupied by cotton and wheat crops.

Geographic coordinates of the corner of 500 kW overhead line:

1. 40° 09'39.82" NL   65°19'23.88" EL
2. 40° 09'56.75" NL   65°19'23.96" EL
3. 40°10'06.90" NL   65°19'36.02" EL
4. 40°10'48.83" NL   65°18'57.18" EL
5. 40°10'46.55" NL   65°19'07.64" EL
6. 40°10'05.39" NL   65°19'44.82" EL
7. 40°09'53.09" NL   65°19'28.21" EL
8. 40°09'37.69" NL   65°19'28.11" EL

The area of construction work is 30.0 hectares, of which the area of agricultural land allocation (plough-land) for the construction of 500 kV overhead line for permanent use (for supports) is 0.513 hectares, which is 57 times less than the alienation of land for temporary use.

Land allocation for temporary use (for laying temporary roads and organizing construction bases) is 29.487 hectares..

From TPP, the route goes in northeastern direction, crosses summer cottages, a road in the area of corner No. 1, turns to the north-east, then crosses industrial areas of the private sector, and then goes through agricultural fields to corner No. 2. From corner No. 2, the route turns to the north-west and passes through cultivated lands with wheat and cotton plantations, crosses irrigation ditches, field roads and through agricultural fields enters 220/500 kV outdoor switchgear at Navoi TPP.

The nearest distance to the residential development of Pakhtakor settlement from designed OHL route in the area of the switchgear connection is 450 m, which corresponds to the regulatory requirements for the establishment of sanitary protective intervals for newly designed OHLs in accordance with clause 2.23.4 of SanPiN No. 0350 -17 "Sanitary norms and rules for protection of atmospheric air in populated areas of the Republic of Uzbekistan".

During the implementation of the project, demolition of residential buildings is not expected.

During construction of 500kV OHL, it is necessary to demolish the production facilities of the private sector, which are mainly engaged in the production of building materials.

Compensation to entrepreneurs is carried out in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 911 dated November 16, 2019 "On additional measures to improve the procedure for providing compensation for the withdrawal and provision of land plots and ensuring the guarantee of property rights of individuals and legal entities".

The useful part of the waste generated during the demolition of buildings and structures is taken out by entrepreneurs for use. The remaining waste will be disposed of in accordance with the agreement between Navoi TPP and enterprise for the construction waste disposal and utilization (PF Barno). (A copy of the agreement is attached)

Tree plantations, in the form of poplars, mulberry and fruit trees are found on the territory of the crossed suburban areas, along canals, collectors and ditches crossed by the projected route.

The project provides for the maximum preservation of trees in the places of supports installation. In order to eliminate the need for additional felling, trees are supposed to be trimmed to the permissible height specified in the profiles, before the start of construction and during the operation of the overhead line.

The territory of the projected overhead line route is located in western part of the Zerafshan Valley, which is a foothill plain that rises from the west to the east with a slight slope towards the Zerafshan River. From the west, the area under consideration is bounded by the sandy spaces of the southeastern Kyzylkum, from the north- by the spurs of the Nurata ridge, from the east and south- by the spurs of the Turkestan and Zerafshan ranges, and from the south -by the Karnabchul and Karshinskaya steppes.

The location of the studied area in the internal part of the continent determines its climate: sharply continental, warm, very dry in summer and humid, relatively cold in winter, as well as significant annual and daily fluctuations in air temperature.

Mountain systems that limit the studied area from the north, east and south affect the air currents and determine the local features of the climate, and, in particular, the wind regime.

In the annual wind rose, eastern direction is predominant.

The analysis of the climatic characteristics of the design object location was carried out according to the observations of Uzhydromet under the Ministry of Emergency Situations of the Republic of Uzbekistan at the weather station in Navoi (Table 1.1., Fig.1.1).

The average annual air temperature is plus 15,9 °C.

Average monthly temperature of the coldest month (January) is plus 3,0 °C, average temperature of the hottest month (July) is plus 30,9 °C.

The average minimum temperature for the year is plus 9,2 °C, average maximum temperature is plus 22,8 °C.

The maximum temperature for the year is plus 40.0 ° C, the minimum one is minus 13,4 °C.

Table 1.1 Main climatic characteristics

Characteristic	Unit of meas.	Value
Coefficient A, depending on the temperature stratification of the atmosphere		200
Average annual temperature	°C	+ 15,9
Average maximum temperature	°C	+ 22,8
Maximum temperature	°C	+ 40,0
Average minimum temperature	°C	+ 9,2
Minimum temperature	°C	- 13,0
Average air temperature in January	°C	+ 3,0
Average air temperature in July	°C	+ 30,9
Average soil surface temperature	°C	+ 18,0
Minimum soil surface temperature	°C	- 5,0
Maximum soil surface temperature	°C	+ 69
Precipitation	mm	180,54

Characteristic	Unit of meas.	Value
Average annual frequency of wind directions by rhumb lines	%	N-3,4 NNE-2,8 NE-16,8 ENE-0,9 E-23,9 ESE-3,25 SE-13,0 SSE-0,58 S-6,6 SSW-0,58 SW-6,08 WSW-0,5 W-10,5 WNW-0,75 NW-8,9 NNW-1,08 calm – 11,8
The number of cases by gradation, %	м/с	
	0-1	41,8
	2-3	27
	4-5	10,9
	6-7	8,5
	8-9	4,6
	10-11	0,16
	12-13	4,8
	>15	0,64
Average wind speed	м/с	3,6
The highest wind speed, the excess of which is 5 %	м/с	u*=7,0

Precipitation falls all year round in Navoi, average yearly precipitation – 180,54 mm.

Monthly maximum precipitation is observed in February, minimum one falls in July.

Fogs are very rare, 10 hours a year. Most often, fogs are observed in winter months, the average frequency of fog does not exceed 0,5 %.

Average monthly relative humidity varies from 41 to 82 % during the year.

Maximum values are observed in the winter months, the minimum - in June-July.

One of the meteorological factors that determine the conditions for the dispersion of pollutants in the atmosphere is the direction and speed of the wind.

For the area under consideration, eastern (23.9%) and northeastern (16.8%) winds are

characteristic during the year (Figure 1.1.). Calm (lull) or zero wind occurs in 11.8% of cases, which contributes to the accumulation of pollutants in the surface layer of the atmosphere.

In the studied area, the average wind speeds vary from 2.7 to 5.1 m / s throughout the year. Their greatest values are in July, the smallest - in September, November, December. The average annual wind speed is 3.6 m / s, the maximum one is 30 m / s.

Navoi city as a whole is characterized by small values of average monthly wind speeds. The repeatability of winds with the speed of 0 - 1 m / s is 41.8%, which contributes to the accumulation of pollutants in the surface layer of the atmosphere. Winds with slightly higher speed (2 - 3 m / s, repeatability of 27%), serving as a cleansing factor, are most frequent from March to July. Strong winds (8 - 9 and 10 - 13 m / s) are quite rare (repeatability of 4.6 and 4.96%, respectively). Squally winds are even rarer with speeds 14-15 m/s (1,16 %), 16-17 m/s 0,6 %) and 18 -20 m/s (0,16 %).

The high recurrence of weak winds does not lead to an increase in the pollution of the city's atmosphere, since impurities accumulate mainly near Navoi TPP. Frequently repeated increased wind speeds improve the dispersion of impurities from high hot sources and transport them over long distances.

From the south, the wind blows much less often, in winter its repeatability is 8%, in summer -5,3 %. The frequency of the north-western direction of the wind blowing towards the city in winter is the smallest and amounts to 4.6%, in summer it increases to 15.6%, and the average annual rate does not exceed 8.9%.

Thus, the area of construction of the projected route is characterized by significant variability of air temperature from winter to summer, and in the summer period - during the day, which is one of the main manifestations of the sharp continentality of the climate.

Analysis of physical, geographical and climatic features of the area where the design object is located shows that high air temperatures, small amount of precipitation, and increased solar radiation contribute to environmental pollution.

1.2 *Existing sources of impact*

The projected 500 kV overhead line from CCGT No.4 to 220/500 kV outdoor switchgear at Navoi TPP with the length of 5.0 km passes through the cultivated lands of Novbakhor district of Navoi region.

The main source of environmental pollution in the area of the initial part of the projected route is Navoi TPP JSC, located in northern outskirts of Navoi industrial zone.

In the industrial zone, occupying the territory on western, south-western and southern sides of Navoi city, all industrial enterprises-giants are concentrated, which are the main sources of atmospheric pollution: enterprises of Uzgosconcern Uzstroymaterials (OJSC Kyzylkumcement), JSC Uzbekenergo (Navoi TPP JSC), Uzkhimprom Association (Navoiazot JSC, Navoi

Electrochemical Plant), Kyzylkumredmetzoloto Concern (Navoi Mining and Metallurgical Plant), Uzgoskhlopkopromsbyt (cotton ginning plant).

annual wind rose of Navoi city

Годовая роза ветров г. Навои
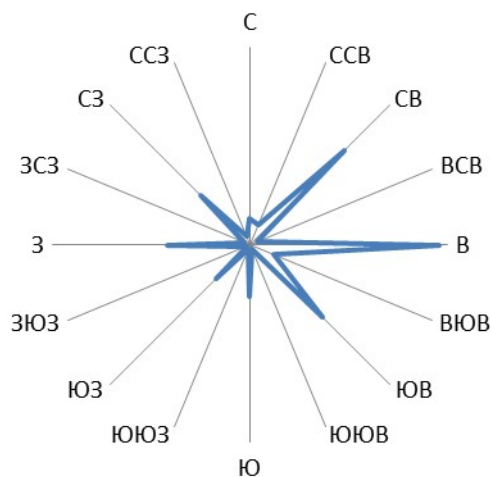
Figure 1.1

Along with large industries in the industrial zone, there are less powerful enterprises: oil depot, automobile enterprises, concrete goods plant, RCAD, RCP, ABC, meat and dairy factories, bakery products, timber trade base, container repair enterprise, including enterprises of Karmaninsky district: winery, Khleboproduct JSC, automobile operating company (AOC-22, AOC-2, Avtovaztekhobsluzhivanie), construction industry enterprises (ELUABS, MMD-2, PLD). In total, there are about 19 large facilities with more than 450 stationary sources of emissions into the environment.

According to the latest published data of Uzhydromet under the Cabinet of Ministers of the Republic of Uzbekistan, emissions from stationary sources of the city, including industrial zone enterprises, amounted to 36261 tons of harmful substances, of which: solids- 19802 tons, sulfur dioxide - 2913 tons, carbon monoxide - 5002 tons, nitrogen oxides - 2146 tons, hydrocarbons (without VOCs) - 4522 tons, volatile organic compounds - 231 tons, other gaseous and liquid compounds - 1644 tons.

The largest share of gross emissions from all stationary sources of enterprises falls on "Navoi TPP" JSC, "Kyzylkumcement" JSC and "Navoiazot" JSC.

The main harmful substances entering the atmosphere of the city from the sources of "Kyzylkumcement" JSC are dust of cement, lime and gypsum; "Navoiazot" JSC - oxides of nitrogen, carbon, ammonium nitrate, ammonia, acrylonitrile, hydrocyanic acid, ammonium sulfate. Among the emitted harmful substances of NMMC sources are ore dust, ammonia, carbon oxides, nitrogen oxides, inorganic and wood dust.

In total, 78 different harmful substances are emitted into the atmosphere of Navoi and its environs, among them, carbon monoxide, nitrogen oxides, sulfur dioxide, dust, hydrocarbons, nitrogen oxide, ammonia, ammonium nitrate, acrylonitrile, hydrocyanic acid, ammonium sulfate are many tonnage and the most typical for the city.

Motor transport is the main pollutant of the environment with carbon monoxide, hydrocarbons, all other harmful substances come mainly from sources of industrial enterprises and energy facilities.

Since in the industrial zone all large enterprises are located along the perimeter, with the dominant wind directions (eastern and northeastern), their emissions will spread in the direction opposite to the city, without reinforcing each other. With southern wind direction, TPP Navoiazot JSC and NMMC will be the main sources of impact in the vicinity of Navoi. In southwestern direction of the wind, the emissions of Kyzylkumcement JSC and NMMC form a general concentration field that covers the territory of the city.

The background that aggravates the state of the studied area is the high and hot sources of emissions of industrial enterprises and boiler houses of the central part of the city.

Emissions from vehicles, industrial enterprises, energy facilities, described above, are sources of impact on soils and plants in the area of the construction site. Harmful impurities in soil and plants come from the atmosphere with precipitation, fallout and direct absorption.

Of all the facilities under consideration, in terms of the scale of environmental impact, Navoi TPP, Navoiazot JSC, some production facilities of NMMC, Kyzylkumcement JSC should be singled out. These enterprises have powerful sources of emissions of harmful impurities, outlets of industrial effluents into surface waters, and non-utilized solid waste.

Thus, the state of the environment in the area of the location of the object under study is determined by emissions of high hot sources of enterprises of Navoi city, Navoi TPP JSC, Kyzylkumcement JSC, Navoiazot JSC, NMMC, vehicles, as well as the dusty soil surface.

The greatest anthropogenic impact on the natural environment in the construction area of the initial part of the projected route is exerted by the operating sources of Navoi TPP JSC.

1.3   Analysis of sources of environmental impact of "Navoi TPP" JSC

1.3.1   Analysis of emissions sources of harmful substances into the atmosphere

"Navoi TPP" JSC, being one of the largest power plants of the Republic of Uzbekistan, is a part of the unified energy system of Central Asia. Navoi TPP generates electricity for consumers in Navoi, Samarkand and Bukhara regions; it generates steam, hot water for heating the city of Navoi and adjacent villages.

The installed electric capacity of the station was 1758 MW for 2020.

In 2020, Navoi TPP, released into the atmospheric air 6,559.5108 tons according to SEE. The station has 72 sources of pollutant emissions. Pollutants of 34 types enter the atmosphere.

The most powerful sources of emissions are pipes of boiler units, from which 99.37% of the total gross emissions of the station are released into the atmosphere. The leading role in the rate of pollutants belongs to nitrogen dioxide – 4131,0114 t (62,077 %).

Maximum concentrations outside Navoi TPP JSC will be: nitrogen dioxide -0.2233 MAC with the set quota of 0.25 MAC; sulfur dioxide -0.2157 MAC with the established quota of 0.33 MAC; nitric oxide -0.0712 MAC with the established quota of 0.33 MAC; carbon monoxide -0.3876 MAC with the established quota of 0.5 MAC; hydrocarbons -0.3704 MAC with the established quota of 0.5 MAC. Emissions of other substances outside the boundaries of the enterprise are below the level of 0.05 MAC.

1.3.2 Water consumption and sewerage

Water at Navoi TPP is used for technical, household and drinking purposes.

Water for household and drinking purposes is used for drinking needs and recharge of the heating network, it enters TPP from the city water pipeline.

For the production needs of the station, water is taken from the Zerafshan River and spent on:

- cooling of turbine condensers;
- cooling of auxiliary equipment of turbines and power units;
- the needs of the water treatment plant (own needs and make-up of steam cycle boilers);
- production needs (watering the territory, water supply for fire-fighting, washing production facilities, etc.);
- steam supply to industrial consumers;
- condensate return.

According to SEE, the total normative and design water consumption of Navoi TPP will be: household needs (from the water supply system of IPS NMMC) - 836.885 m3 / day, 305.463 thousand m3 / year; for production needs - 2,638,587.359 m3 / day, 974,710.11 thousand m3 / year, of which: from the Zerafshan River - 2589270.959 m3 / day, 945,083.9 thousand m3 / year, from the Damkhodja water conduit - 31008 m3 / day, 11317.92 m3 / year, from the city water pipeline of IPS NMMC -50160 m3 / day, 18308.4 m3 / year.

Household wastewater disposal is carried out through its own sewerage pipeline to the treatment facilities of BWT of Navoiazot JSC on outlet No. 7 in the amount of 34.870 m3 / hour, 836.885 m3 / day, 305.463 thousand m3 / year, the volume of household water consumption.

Industrial wastewater in the amount of 2552760 m3 / day, 931757.4 thousand m3 / year is discharged into the Zarafshan River.

1.3.3 Solid waste generation and storage

Waste, generated by TPP, differ in morphology, genesis, hazard class.

Some types of waste are generated continuously; the formation of others is periodic.

Production waste is generated at TPP during the operation of chemical, electrical, boiler-turbine, fuel and transport shops, garage, repair and construction site.

When preparing feed water for power boilers at the desalting plant in the process of co-agulation with iron sulfate and filtration on mechanical filters, sludge is formed, sent to the sludge dumps and containing 85% of suspended solids, 13% of iron hydroxide, 2% of silicic acid.

When treating water for make-up of the heating system on cation exchange filters of WTP during their restoration, table salt is used, which enters the sludge collectors as solid waste.

In addition to industrial water treatment effluents, liquid sludge contains acid washings of boiler equipment, effluents after cooling of auxiliary equipment of power units and industrial stormwater sewer system. For settling the solid phase, the liquid sludge enters five sedimentation basins-sludge collectors:

Two-section sludge dump of waste water of chemical water water treatment facility and incompletely burned lime with sludge pipelines and spillways of clarified runoff in the Zeraf shan River;

Sludge dump of oiled sludge and sludge with sludge pipelines and return conduit of clarified water and pumping station of clarified water;

Ponds-evaporators of waters of acid washing of boiler equipment and washing waters of RAH.

Two-section sludge dump of waste water of chemical water treatment facility is designed unfiltered, construction height is 4.5 m, rate of slope - m=2,5.

The area along the bottom of one section is 11800 m² (sludge dump No. 1), the other - 8000 m² (sludge dump No. 2). The sludge dump is designed for the volume of 83,000 m³ of solid sludge. The water, clarified in the sludge collector, enters the mine water inlet wells, the height of which is increased by the installation of sluice gates as the sludge dump is filled with solid fractions. From the water inlet wells, water flows by gravity through a pipe with the diameter of 350 mm into the outlet channel. Now, both sections are on the verge of exhaustion. The reset technology is often violated. Due to the failure of washing equipment set (neutralization unit of water treatment facility), alkaline and acidic effluents are fed to the dump separately. The environment is aggressive. There is an uneven reaction of interaction in the places of discharge with a negative effect on the impervious screen. In reality, the sludge dump is partially filterable. Cracks and breaks are encountered in the asphalt concrete surfacing. The sections cladding does not meet the technical requirements. The dam cover has been destroyed, and it is patched by the discharge of incompletely burned lime after clarifiers.

Periodically, work is carried out to scoop out the sludge and ship it to the places allocated in the area of city dumps. In order to burry competey waste of chemical waste water treatment facilities, it is necessary to allocate about 40,000 m² of the area. Considering the presence of chemicals in the composition of the waste, their migration into soil and groundwater is possible. Periodically sedimentation basins No. 1, 2 are cleared of reeds and vegetation. At present, sludge dump No. 1 is closed for cleaning sludge, 20% of the total amount of sludge has been removed. The sludge dump No. 2 is in operation, filled to 50%.

Condensed waste enters the sludge dump of oiled sludge and sludge after installation of treatment of oily and greasy effluents. Sludge dump is designed unfiltered, two-section. The height is 14.5 m, the area of each section is 1000 m2. Capacity is 9600 m³. Now, filling of the sludge collector is about 70%.

According to the project, impervious screen of ZIO sludge dump is made of fine-grained asphalt concrete. The surface of the bottom and slopes of the pond-evaporator are treated with long-acting herbicides (douran, monuran) before lining them with asphalt concrete to avoid vegetation germination. The solid fraction is subject to combustion in the boiler furnaces. The water clarified in the sludge dump enters the mine water inlet wells, the height of which increases as the sludge dump is filled with solid fractions. From there, the clarified water returns to the cycle of effluents (sewage) treatment set through a pumping station throughput a pipe with 200 mm diameter.

Sludge containing metals (iron, nickel, copper, chromium, vanadium), as well as sulfuric, hydrochloric acids, ammonium compounds, is formed periodically during chemical cleaning of thermal equipment (steam generators) and cleaning of RAH surfaces.

Two sections of the evaporator pond according to the project are provided unfiltered with the design similar to the sludge dump of oily sludge. Evaporator ponds are located on the site that has a slope to the flood plain of the Zerafshan River. The area of one section ≈11000 m², the other - trapezoidal - 6000 m². Construction height is 1,5 m. Sections of the pond fit into the terraced relief with 1.5 m excess of the bottom of one section under the other. According to the project, the wash water is to be collected in acid washing tanks for mutual neutralization of acid and alkaline effluents. At the end of neutralization, to precipitate heavy metals ions, decomposition of hydrazine, ammonium compounds, solution should be treated with milky lime, and then dumped into the pond. Due to the toxicity of the sludge, the water component is subject to complete evaporation (according to the calculation of 101 cm per year), the sludge settles and compresses.

Estimated amount of washing water ≈43000 m³/year. Of these, the solid component ≈2000 t/year.

The chemical water treatment sludge is characterized by increased mineralization of the water solution of the chemical water treatment sludge, the total salt content is about 6000 mg /

dm³, pH - 7.8, sulfates (3939.759 mg / dm³) prevail among anions, and magnesium (657.598 mg / dm³)- among cations.

Sludge from the evaporation pond after chemical cleaning of the equipment contains less soluble substances. The total mineralization of the water extract is in the range of 300-2500 mg / dm³, pH - 7.8, prevailing anions are sulfates, the content of which is 5 times less than in the sludge from the chemical water treatment (CWT) sedimentation basins (clarifiers) (783.750 mg / dm³), among the cations - magnesium cations (141.866 mg / dm³).

Spectral analysis showed an increased content of magnesium, calcium, iron, sodium, potassium in the sludge from CWT ponds. Iron, copper, vanadium, chromium, zinc prevail in the sediment of the ponds- evaporators.

Thus, the analyses confirm addition of salts and metals formed during water softening and chemical cleaning of equipment.

Solid waste is also generated during the regeneration of used (transformer, turbine and other) oils.

Purification of used oils is carried out on the mineral oil facilities of the station itself. Contaminated oil is collected in the special tank, with volume up to 30 tons.

Regeneration is performed by passing oil through a centrifuge and silica gel filters. Purified oil is collected in another tank and returned to the technological cycle. Dirt after the centrifuge is collected in a tub and manually exported to the mineral oil facility, from there all the waste goes to the effluent treatment set with oily effluents.

Used silica gel is placed into the tub, dried in the furnace, and then returned to the process.

Non-ferrous metal waste is generated in the electrical shop, car garage, during the repair of turbine and electrical equipment. The total amount of non-ferrous scrap waste reaches 3 tons / year.

Used fluorescent lamps are generated as waste of production workshops and office premises up to 500 pcs / year, they are stored under lock and key in corrugated boxes, and as they accumulate, they are transferred for demercurization to a specialized organization.

Waste of ferrous metals is formed during repair and maintenance of vehicles, during repair of the station (replacement of sections of water tubes, superheaters, water economizers as a result of corrosion), their number is estimated as 513 tons / year, scrap of ferrous metal is scrapped to Vtorchermet.

During welding operations, electrode residues are formed.

In the car garage, used tires, used brake pads, used batteries and electrolyte are formed.

At all production sites, oily rags are formed as waste, formed during wiping of equipment and hands of personnel.

During construction work, construction rubbish is generated as solid waste. Construction waste is taken to specially designated places of the solid waste landfill, allotted by the sanitary and epidemiological surveillance bodies

Canteen waste is food waste, which is temporarily stored in a metal container and then transferred as food to pets of the staff.

At TPP, there is a medical center, the waste of which is: spent dressing material, used medical syringes and needles from them.

TPP also has its own subsidiary farm, the waste of which is manure as a product of animal activity.

Household waste is generated in all TPP divisions and consists of 47% paper, 1% wood, 1.8% leather and rubber, 0.5% bones, 4.5% metal, 29% food waste, 5% textiles, 4 , 9% glass and stones, 2% plastics. Household waste is taken to the municipal solid waste landfill in agreement with the authorities of the Central State Sanitary and Epidemiological Service.

In total, 43 types of waste are generated at TPP. Temporary storage areas are provided for all waste.

Part of this waste is regenerated or reused at the enterprise, part is exported under contracts to specialized organizations for disposal and recycling.

Table 1.2 Information on production and consumption wastes

№	Name of waste	Number of t/year
1.	Scrap of ferrous metal	1207,65
2.	Waste metal shavings	33,0
3.	Copper	179,3
4.	Zinc	18,8
5.	Lead	0,022
6.	Aluminium	1,9
7.	Bronze	1,5
8.	Brass	0,65
9.	Waste from boiler envelope	179,35
10.	Sludge from boiler cleaning	30,0
11.	Waste sludge from ChWT	3066,0
12.	Waste sludge from wastewater treatment	858372,2
13.	Waste of heat-insulating materials	27,3

14.	Sludge from river water clarification	249502,15
15.	Technical salt waste	336,9
16.	Calcium hydroxide waste	707,5
17.	Sediment from chemical cleaning	36,0
18.	Waste of oily sludge	175,2
19.	Used transformer oil	51,0
20.	Oil sludge from cleaning fuel tanks	2,0612
21.	Sludge from turbine oil cleaning	15,0
22.	Broken insulators	0,875
23.	Used engine oil	0,827
24.	Used tires	2,572
25.	Used batteries with drained electrolyte	1,691
26.	Battery acid (Spent electrolyte)	0,262
27.	Used oily filters	0,204
28.	Used air filters	0,041
29.	Used brake linings	0,324
30.	Plastic containers for paints and varnishes	0,717
31.	Waste of polyethylene bags from chemical reagents	2,896
32.	Waste of paper bags from chemical reagents	169,8
33.	Bituminous sand	2,5
34.	Oiled rags	1,5
35.	Electrode waste	0,96
36.	Slag and scale	0,44
37.	Construction rubbish	456,96
38.	Used LED lamps	5,415
39.	Worn-out overalls	5,415
40.	Spent bandaging material of the medical station	0,062
41.	Used medical syringes	0,008
41.	Wastepaper	0,6
42.	SMW	290,8
43.	food waste	1,7

	TOTAL	1114884,351

Total waste generation will amount to 1,114,884.351 tons / year. Waste disposal limits are set in the amount of 12,562,477 tons.

Thus, in the production of electricity and heat at the thermal power plant, there are sources of pollutants entering the environment in the form of emissions, discharges and solid waste.

1.4 State of atmospheric air

The state of atmospheric air in the location area of the object of economic activity is determined by the emissions of the sources listed in section 1.2 and depends on the conditions of their dispersion.

In the area under review, stationary observations of the state of atmospheric air are not carried out.

The qualitative and quantitative import (supply) of polluting chemicals entering the atmosphere together with the flue gases of Navoi TPP JSC depends on the type of used fuel. When hydrogen sulfide gas is burned, oxide and nitrogen dioxide, sulfur dioxide, carbon monoxide, benz(a)pyrene enter the atmosphere. When burning fuel oil - ash of fuel oil additionally.

In 2020, Navoi TPP, according to SEE, released 6,559.5108 tons into the atmospheric air. The station has 72 sources of pollutant emissions. Pollutants of 34 types enter the atmosphere. The most powerful sources of emissions are pipes of boiler units, from which 99.37% of the total gross emissions of the station are released into the atmosphere. The leading role in the rate of pollutants belongs to nitrogen dioxide – 4131, 0114 t (62,077 %).

The maximum concentrations outside the borders of Navoi TPP JSC will be: nitrogen dioxide -0.2233 MAC with the established quota of 0.25 MAC; sulfur dioxide -0.2157 MAC with the established quota of 0.33 MAC; nitric oxide -0.0712 MAC with the established quota of 0.33 MAC; carbon monoxide -0.3876 MAC when the established quota is 0.5 MAC; hydrocarbons -0.3704 MAC with the established quota of 0.5 MAC. Concentration of other substances emissions outside the enterprise borders is below 0.05 MAC.

Concentrations of all other pollutants meet the established requirements for the level of air pollution and do not exceed the quotas for pollutants of the relevant hazard class and enterprises located in Navoi region.

1.5 Surface water

The hydrographic network of the construction area of 500 kV OHL from CCGT No. 4 to 220/500 kV Navoi switchgear is represented by canals, small collectors, seasonal ditches, as well as the Zerafshan River.

The Zerafshan river is the largest surface watercourse in the considered area of construction of the projected overhead line route. Distance from the beginning of the projected route to the river Zerafshan, flowing from the east and north, is 300 - 320 m. The width of the river bed at the crossing point is 38 m.

In the past, the Zerafshan River was a tributary of the river Amu Darya. At present, the Zerafshan river is a continental river (drainless). Its waters are entirely used for national economic needs.

In the area of Duguli village, the river goes to the desert-sandy plain. The catchment of the mountainous part of the river is 11722 km².

The basin of the Zerafshan River stretches in the latitudinal direction from the east to the west and is limited by the Turkestan and Zerafshan ridges. The river is 750 km long.

After leaving the mountains, the river is divided into two branches: northern - Akdarya and southern - Karadarya. When entering the Zerafshan valley, the branches again merge into one channel; 60 km downstream from the confluence of the branches, the water intake of Navoi TPP is located.

The Zerafshan River is of glacial-snow feeding. It is formed by the confluence of the Matchi and Fandarya rivers.

The Zerafshan River water is used entirely for irrigation of the lands of Tajikistan, Samarkand and Bukhara regions of Uzbekistan.

The flow of the Zerafshan River is regulated largely by the Katta-Kurgan Reservoir, built in 1947, with the capacity of 500 million m³.

Four irrigation canals take water from the Zerafshan River in the section from Zaatdin to Navoi: Kanimekh, Kalkon-Ata, Casaba and Khanym with the maximum total intake up to 20 m³ / h. Residual flow (runoff) of the river Zerafshan is used to fill the Kuyumzar reservoir located below Navoi TPP. The Zerafshan River belongs to the low-water rivers in its lower course. Along the entire length of the river to Navoi city, there is an intensive intake of water. The flow of the river, like of all rivers of glacial feeding, depends on the season. Low water period (minimum runoff) occurs from October to May. In June and July there is a flood, and in August-September there is a slow decline in the water level.

To date, the water balance of the river in the annual course of time is close to long-term observations, and specifically depends on the amount of precipitation during the year.

There is a tendency towards a decrease in the value of the minimum runoff, which is associated with increased water supply intake for agricultural needs during low water season.

Chemical composition of the river Zerafshan is formed under the influence of pollution from industrial enterprises in the cities of Samarkand, Kattakurgan, Navoi, as well as from farmland. The qualitative composition of surface waters also depends on the meteorological, hydrogeological and morphological characteristics of the watercourse. In recent decades, the in-

tensive growth of industry in the region of the river Zerafshan valley, development of desert lands led to a change in the state of the river flow. Long-term observations of the chemical composition of the river water indicate a tendency to an increase in mineralization (content of sulfates, chlorides, hardness salts), which contributes to the development of mesohalobiotic (brackish) forms of organisms in aquatic biocenoses that affect the periphyton indices.

Analysis of the water condition in the Zerafshan River showed the following before wastewater discharges in Navoi and after industrial discharges of city enterprises.

The maximum water flow occurs in July - August. The maximum temperature of 24 ° C on the approach to the city was observed in June and July. The minimum water flow is observed in November, December, and October. The minimum water temperature is in January, February. With a decrease in the river flow, the mineralization and, accordingly, the content of sulfates, chlorides, carbonates, and the content of hardness salts (magnesium, calcium, sodium) sharply increases. Chemical pollution of water increases in the autumn-winter period. When approaching the city, the water contains ions of magnesium, calcium, sulfates, phenol, chromates, and iron above the permissible values. In some months, there is an increase in nitrites, metals (copper, zinc, etc.).

The water quality criterion is the Water Pollution Index (WPI). When WPI value is up to 1.0, the water is considered clean. At 4> WPI> 2.5, the water belongs to moderately polluted waters of the III quality class. In the control traverse in front of Navoi city, WPI is 8.5. This is due to the production indicators of industrial enterprises. Despite the pollution, the waters of the river Zerafshan are used for household drinking purposes in Navoi and the region, since the quality of groundwater does not meet household drinking standards. The water quality after the city of Navoi is deteriorating. The concentration of suspensions, magnesium, chlorides, sulfates, total hardness, total nitrogen increases, the content of petroleum products, iron, copper, zinc, chromium, synthetic surfactants, phenols increases slightly, the water temperature increases by 2-4 ° C with an average and maximum flow and increases up to 8-9 ° C with a minimum flow (table 1.11).

Table 1.3 Chemical composition of water of the Zerafshan river

Name of indicator	Unit of meas.	Control traverse above "Navoia-zot" JSC	Control traverse below "Navoia-zot" JSC
Oxygen	mgO2/dm^3	10,2	10,55
BOD	mgO2/dm^3	1,86	2,36
COD	mgO2/dm^3	12,59	14,32
Ammonium nitrogen	mg/dm^3	0,05	0,14
Nitrite nitrogen	mg/dm^3	0,019	0,037

Name of indicator	Unit of meas.	Control traverse above "Navoia-zot" JSC	Control traverse below "Navoia-zot" JSC
Nitrate nitrogen	mg/dm^3	1,9	2,1
Iron	mg/dm^3	0,02	0,04
Copper	µg/dm^3	1,1	1,0
Zinc	µg/dm^3	1,6	2,2
Chromium VI	µg/dm^3	1,0	1,0
Phenols	mg/dm^3	0,004	0,004
Petroleum products	mg/dm^3	0,02	0,02
Synthetic surfactants	mg/dm^3	0,0	0,0
Suspended substances	mg/dm^3	388,5	325,4
Mineralization	mg/dm^3	1234,5	1308,5

[*] According to the data of the Yearbook of surface water quality in the territory of Uzhydromet activity.

The waters of the Zerafshan River in its lower reaches are characterized by the high content of suspended particles, especially during the flood period, a large mass of garbage passes along the river, formation of which occurs due to the washing away by storm water of the rhizomes of cotton, shrubs, etc. from the plowed slopes of the river, developed for agricultural areas.

The greatest turbidity reaches 11000 to 13000 g/m³ in the spring-summer period. The smallest one is 32 g/m³ in the autumn-winter season.

Thus, the quality of the watercourse of the Zerafshan River indicates a change in its chemical composition, temperature and hydrological regimes under the influence of industrial effluents. The waters of the river near the city of Navoi exceed MAC in terms of the content of oil products, phenol, elements of heavy metals, nitrites. Salinity is increasing from year to year. The temperature rises and the flow of water decreases slightly. Navoi TPP is one of the main contributors to chemical pollution, temperature regime and hydrological characteristics of the river Zerafshan.

1.6 Soils, groundwater

The described area passes within the right bank of the Zeravshan River in geomorphological terms. This is a flat plain with a slight slope towards the river, it refers to the hungry steppe cycle of sedimentation.

The wide, spread out valley of the river Zerafshan is cut along the axial part by the modern river bed, the banks of which are well expressed morphologically by the cusps of the first and third above-floodplain terraces.

Absolute marks vary from 328.27 to 335.0. The height of the cusp of the terrace above the boundary horizon of water in the river is 6 - 7 m.

Within the area, from the surface, a stratum of Quaternary sediments is developed, underlain everywhere by continental Tertiary sediments - a stratum of interbedded sands, argillite clay, sandstones and conglomerates. Older rocks of the Paleozoic and Cretaceous spread far beyond the industrial site.

Quaternary deposits of the Hungry-Steppe complex are represented by alluvial-proluvial loams and loams of grayish-brownish color, moist, dense, plastic, macroporous, lying as a layer with thickness of 5 - 6 to 10 m or more, which decreases as it moves away from the river. Rubble soils with gravel-clay aggregate, with layers and lenses of sand, dress and less often conglomerates underlie below. Pebbles are small, mainly flat in shape, made of shales, sandstones, limestones, etc. Gravel-pebble layer reaches 20 - 25 m or more.

Mineralization of soils on average is 0.12 - 0.22%, in the horizons of increased salinity it is 0.5 - 0.6% of dry matter.

From the surface, the relief of the site is complicated by dumps of soil, crossed by shallow irrigation ditches, recesses for various hydraulic structures (sedimentation basins for various purposes).

Analysis of stock materials on the chemical composition of water extracts of soils did not reveal sharp fluctuations in their pH values (7.4-7.6), the total content of light and medium-soluble salts in the hydrochloric-acid extract ranges from 1.461 to 3.3%, gypsum - from 1,401 to 2,799%, therefore, the soils are classified as non-saline.

Hydrogeological conditions of the area are complex due to geological, climatic and agricultural factors.

The aquifer of Cretaceous-Paleogene (Upper Cretaceous-Paleocene) deposits is represented by sandstones and limestones with bands of clays and aleurolites. A group of streams of proluvial-alluvial deposits of the foothill plains with a depressive curve of structural-lithological back water. Area is with positive salt balance.

Hydrogeological conditions are characterized by the development of groundwater, confined to the Quaternary sediments of the Zerafshan river valley. Within the studied area, the type of feeding is snow-rain, and in addition, groundwater receives additional feeding due to the infiltration of irrigation water. The genetic type of the groundwater regime is irrigation-hydrological, riverine, runoff-drainage.

Since the area of the station belongs to the area of intensive development for irrigated agriculture, the fluctuation of the groundwater level is seasonal and depends on the frequency of

irrigation of crops. The maximum level is observed in the summer and it is 3 - 5 m, increasing as approaching the river.

Mineralization of groundwater is increased and varies from 3.4 to 9.2 g/dm³. Type of mineralization - sulfate-sodium.

The filtration coefficient of clay rocks varies from 0.0045 to 0.2 m / day, pebble - from 1.09 to 6.84 m / day.

The surface of the groundwater table has slight slopes; in general, it is identical to the general slope of the relief. During the period of intensive irrigation, the groundwater level rises, waters flow down to the river and are drained everywhere into the channel. With a decrease in the groundwater level, the reverse process occurs, so the groundwater in the studied area has hydraulic connection with the surface water of the river, the flow of groundwater changes depending on seasonal conditions or it wedges into the river or is fed from it.

The lithological structure of the station's territory is as follows: from the surface, fill soils with a thickness of 1 to 7 m lie and represent a conglomerate of loam, gravel, and construction rubbish. Fill soils are underlain by loams with rare inclusions of sand lenses with debris. The thickness of the layer varies from 4 to 9 m. This layer also contains sandy loam and sands with rare inclusions of gravel. Clay soils, as a rule, lie above the groundwater level.

They are underlain by gravel-pebble deposits that form an aquifer. Penetrted thickness of these deposits varies from 1.9 to 9 m. In this layer, there are lenses of conglomerates.

Groundwater in the area under consideration has an increased salt content. The dense residue ranges from 1190 to 2808 mg / dm³, less often 3602 mg / dm³. Type of mineralization is sulfate-sodium with SO_4^{2-} content up to 2164 mg/dm³. Occurrence depth of groundwater varies depending on the nature of the relief and season of the year.

The chemical composition of groundwater indicates their high mineralization and their classification as sulfate.

1.7 Soils, vegetation and fauna

The initial section of 500 kV overhead line under construction is located on light gray soils. Gray soils are gypsum bearing as they develop on the gypsum-bearing crust of weathering. Outside the territory of TPP, there are gray soils on loess-like loams and alluvial-meadow soils. The soils of the studied area are characterized by neutral and slightly alkaline environment with pH value of 7.1 - 7.6, and low humus content (1 - 2%).

Soil solutions are characterized by an excess of calcium ions, sulfates and carbonates, the latter accumulate in the long dry season and increase due to emissions and discharges from enterprises of Navoi industrial zone. In the elemental composition of the soil, not only an increased content of calcium, sulfur, but also iron is found. These elements can bind toxic substances present in industrial emissions of enterprises.

In the soils around Navoi TPP, there is an increased content of calcium, sulfur, iron, arsenic, lead, strontium and barium in comparison with the regional background – gray soils of Central Asia.

Geochemical abnormality of the listed microelements is confirmed by the growth of concentrations towards the depth, but not towards the surface, as occurs in the case of technogenic pollution. In addition, increased strontium and barium contents (from 330 to 1300 mg / kg) are parallel the increase in calcium content in horizons enriched with carbonates and sulfates at depths of 10-30 and 20-50 cm. Thus, the concentration of many elements can be associated with the carbonate alkaline barrier.

Phosphorus content in soils is low (0.15 - 0.2%), moreover, due to the strong carbonate content, it is contained mainly in the form of sparingly soluble and insoluble calcium phosphates. There is a lack of nitrogen in the soils (0.02 - 0.07%). The gross amount of calcium in irrigated gray soils reaches significant values - 2% or more. Its main part is silicates, and exchangeable and water-soluble potassium is less than 1%. The upper layers of the soil are enriched with water-soluble calcium and magnesium salts.

In the studied area, there is no clear delimitation of soil horizons due to the frequent displacement of the upper horizons during planning work during construction of communications and roads.

Mechanical impact on the soil cover in the area of the projected route is expressed in shallow hollows, which either overgrow or serve for dumping various garbage. The greatest deformation of the soil cover is observed at unorganized crossings, which contributes to the violation of the integrity and dusting of the underlying surface.

The vegetation cover in the area of 220 kV overhead line under construction is represented by ephemeroid-wormwood communities and agrocultural plantings.

Natural full-member communities of ephemeroid-wormwood communities with significant participation of bluegrass, bromegrass, annual astragalus, foxtail, and iris have been preserved in areas near limestone quarries. However, used for unorganized grazing of livestock, they are largely enriched with weed species: adraspan, cousinia, herbaceous hodgepodge.

Ephemeroid-weed-wormwood communities predominate around the driveways. Excavations are overgrown with grass-meadow groups with areas of wormwood

In the lowlands, salt marsh-meadow cenoses with tamarisk and yantak are noted, specimens of reeds are found solitary. The rest of the space is occupied by a sparse group of annual hodgepodges, indicating surface salinity of the soils.

Along the roads and canals, along the numerous fields crossed by the route under construction, there are plantings of mulberries, poplars.

Among the tree species of suburban areas and the nearby village of Methane, crossed by the projected route of the overhead line, there is a variety of gas-resistant species: white mulber-

ry, Chinese elm, Bolle's poplar and Canadian poplar, oleaster. Of the medium-gas-resistant species, ash-leaved maple and white willow are planted, of the gas-unstable species - Pennsylvanian ash, sycamore, English oak, as well as stone fruit trees - peaches, cherries, apricots are planted. In addition, there are artificial plantings of grapes, roses and other decorative flowers. Regular watering and care has a beneficial effect on the condition of the plants, although, according to the evidence of the stock materials, visual inspection revealed insignificant punctate necrosis on the leaves of trees growing on the territory of TPP, and significant necrotic areas were found in plant samples taken near Navoi TPP indicative of exposure to atmospheric pollutants

The most significant violations of the leaf surface were observed in the ash tree, sycamore, acacias in artificial plantings in the immediate vicinity of TPP. The detected areas of destruction of cell walls on both sides of the epidermis of leaves, gray granules between cells indicate the effect of gas pollution and dust on the morphological-anatomical structure of the leaves of trees, shrubs and grasses.

Analysis of stock materials also revealed that vegetation samples taken from four sides of TPP near the territory (200 - 300 m) and at a distance of 1 km and studied using the method of spectral analysis in the vegetative part of such species as annual hodgepodge and adraspan exceed cr concentrations compared to the regional level by 10 times or more, and the maximum permissible level- by 40 or more times. Significant exceedances of Cu and Ni concentrations (2 to 4 times higher than permissible) were also found.

When analyzing the samples, the following regularity was revealed: from the north and the east of TPP, the content of metals in plant samples is much higher near the territory than at a distance, and in southern and western directions, on the contrary, near the territory, the concentration of metals is lower than at a distance. The analysis allows qualifying the state of the soil and vegetation around TPP as characteristic of the zone with tense ecological situation.

There are no species of plants listed in the Red Book along the overhead line under construction.

Near the construction site, there are no lands used for nature protection and of natural - reserve fund.

Among the animals that settle near TPP, in an area characterized by significant dustiness and noise, only groups can be named that can hide from the noise exposure of the station, in the soil they are insects (winter and cotton moths, Spodoptera exigua (beet borer), spider mites) and reptiles (desert goggaz, swift lizard, water snake, Central Asian turtle), or species that can quickly leave unfavorable areas - birds (field sparrow, little turtledove, common starling, European swallow, red-rumped swallow, black swift, myna, magpie). In areas with stagnant or running water, amphibians - toads and frogs - settle. Of the mammals, house mouse, mole vole, common Bat, tamarisk gerbil, eared hedgehog, scilly shrew are found everywhere.

The modern composition of the ichthyofauna of the Zerafshan river is represented by 30 species belonging to seven families, of which the Cyprinoid fishes is the most widely represented (19 species). Six species of loaches of the Cobitidae family and by one species of the Siluridae family (sheatfishes), Poeciliidae family (live-bearers), Snakeheads, Percidae family (perches) and gudgeons were found. Ichthyofauna is represented mainly by local commercial species, however, acclimatized commercial species (white and black grass carp, tench, eastern bream, goldfish, silver carp, bighead carp, pike perch) and accidentally introduced non-commercial species (rhinogobius, Balkhash perch, spotted thick-lipped mullet, Korean and common sawbellies) are also present.

Thus, soil pollution of the area under consideration is moderate, flora and fauna pollution is permissible.

2 Social-economic conditions

Now, NAVOI TPP JSC provides electricity and heat to consumers of Navoi, Bukhara and Samarkand regions and the population of Navoi city.

It is necessary to create own sources of power regulation in order to provide reliable and continuous electricity and heat supply to enterprises, as well as to improve the environmental situation in the zone of influence of Navoi TPP. This task is solved by the construction of the third and fourth combined-gas plant of class J with the total capacity of 1300 MW.

It is planned to build 500 kV overhead line to the projected 220/500 kV outdoor switchgear at Navoi TPP in order to deliver power from CCGT No. 4.

When carrying out work on the implementation of the project for the construction of 500 kV overhead line from CCGT No. 4 to 220/500 kV switchgear at Navoi TPP, the problem of employment of the population will be solved partially, including unskilled labor, in particular, workers, dispatchers, drivers, etc. from among the local population.

Project employment is not limited to direct providing jobs. There will also be indirect income and employment of the population associated with the purchase of goods by contractors and payment for services. Also, there will be employment generated from the personal expenditures of the project staff, but its scale will be insignificant. Another side of the emerging opportunities for significant local procurement and business based on the implementation of this project is the influx of people from other parts of the region, which can provide a significant development of the local economy.

Thus, the main part of the socio-economic impacts associated with the construction of 220 kV overhead line from CCGT No. 4 at Navoi TPP to the outdoor switchgear of 220/500 kV will be positive.

Mitigation measures should be taken to minimize negative impacts, and positive impacts should be expanded. The following steps will be taken for this:

– construction work will be managed in such a way as to minimize the inevitable and short-term impacts (smoke, noise, vibration, dust, dirt, delays, accidents) of construction work on local residents and other road users;

– operations will be managed in such a way as to minimize the impact on the surrounding residents, in particular, a time limit for noisy work will be introduced to the daytime hours and a schedule for the delivery of materials will be drawn up to avoid traffic disruption.;

– local employees will be given the opportunity to learn and master new technologies;

– main equipment will be delivered from abroad.

Resettlement in connection with the planned construction is not expected.

This project implementation in conjunction with the planned construction in the region of 500 kV overhead line to the outdoor switchgear, construction of 500 kV Muruntau SS and 500 kV Navoi SS will become a reliable source of power supply for NMMC loads in full, will give a great socio-economic effect for the large industrial enterprise - NMMC, for Uchkuduk - Zerafshan electrical generation center, as well as for the whole Republic, will reduce the shortage of electricity in the Republic of Karakalpakstan, Khorezm, Bukhara and Navoi regions.

3 Environmental analysis of the design solution

3.1 *Characteristics of technical solutions*

Construction of 500 kV OHL under this project is carried out from the projected CCGT No. 4 on the territory of Navoi TPP JSC to the projected 220/500 kV outdoor switchgear at Navoi TPP.

Placement of the route on the ground, intersections with engineering structures are carried out in accordance with the current standards and will be agreed with interested organizations.

Description of the adopted technical solutions given below will be adjusted during further detailed design.

On the projected OHL, a wire of grade 3 * AC-50/27 mm^2 is adopted.

A galvanized steel rope of TK-70 brand (11.0-G-I-Zh-R-1176 (120)) in accordance with GOST 3063-80 is adopted as a lightning protection cable.

The maximum voltages in the wire are taken on the basis of the bearing capacity of the supports and foundations, the maximum stresses in the cables - based on the provision of the vertical distance between wire and the cable in the middle of the span, required by EIC.

Installation of the wire and cable will be carried out according to the tables of the erecting sag (dip).

OHL technical characteristics (supports and foundations) are determined according to the completed project of TTD (Technical Tender Documentation) and are specified during the specific design.

Material of supports of OHL 500 kV:

Anchor – angle supports – metal;

Intermediate supports– metal and reinforced concrete;

Insulators – polymeric and glass (according to TTD).

Anti-bird barriers "Ruffs" of E5A brand are installed above all supporting garlands on the traverses to protect the supporting fasteners of the wire from birds' contaminations, as well as to protect birds from electric shock.

<u>Characteristics of materials of support structures.</u>

Carbon steel of grade VSt-3 according to GOST 380-94 was accepted for metal structures.

For racks, foundations, slabs and crossbars (concrete supports), reinforced concrete on sulfate-resistant cement is used.

<u>Corrosion protection of building structures.</u>

Metal structures of supports, including supporting parts of foundations F5-USU (250), are painted with paint BT-177 according to OST 6-10-426-79 in two layers. Waterproofing of the underground part of reinforced concrete poles (at a height of up to 3.5 m from the butt), foundations, slabs and crossbars is carried out by two-layer reinforcement with crude fabric ART-4744 on oil bitumen type II. Nefras (oil solvent) "C4 -130/210" is taken as a solvent,

In order to prevent the theft of elements of metal supports, it is envisaged to weld nuts to bolt rods at three points with subsequent painting of welding sites. Welding nuts with their painting is carried out to the lower traverses of the support.

Insulation and overhead line hardware. Surge protection

Grounding devices.

Line insulation is designed based on the specific effective leakage path length $\lambda = 2.0$ cm / kV, and is performed with glass insulators.

Protection of the projected overhead lines from direct lightning strikes is carried out by suspension of two cables.

Cable fasteners are isolated, with solid grounding. Supporting fasteners are equipped with one insulator PSD70E, tension fasteners - one insulator PS120B.

Suspension clamps for wire and cable – of dead type of grades PGN-5-3 and PG-1-11, respectively. Tension clamps – compression clamps: grade NAS-500-1 - for wire AS500/26 and grade NS-70-3 - for cable.

The actual safety factors of insulators and OHL hardwae correspond to the factors, specified by EIC.

The project provides for the protection of the wire and cable from vibration with vibration dampers of the following brands: GPG-3.2-13-550 / 31 - for the wire and GPG-1.6-11-400 / 13 - for the cable in accordance with the "Vibration dampers installation sheet"

Connection of wires in spans and stubs of anchor-angle supports is carried out wth connecting clamps mounted by the method of continuous crimping (for one connection - one connecting clamp of type SAS-500-2).

Wires repair clamps of type RAS-500-5A are installed in places of damage to aluminum wires.

Connection of a cable in the spans is carried out by connecting clamps of SVS-70-3 type.

On the projected 500 kV overhead lines, all supports are grounded by vertical electrodes (in loams) and long-distance ground electrodes (in pebbles) made of round steel Ø16mm (4 beams per support) 5 and 10 m long, depending on the resistivity of the soil.

Crossing obstacles.

All intersections are made in compliance with the dimensions, required by EIC.

Crossing the Zerafshan River

In general, the hydrological conditions for laying 500 kV overhead line route are favorable, most of the intersected irrigation canals and collectors are shallow, the width of their beds does not exceed 10-15 m, the depth of their beds incision does not exceed 1.5 m.

The most difficult section of the route is the overhead line crossing over the Zerafshan River.

500 kV overhead line crossing over the Zerafshan River is located opposite CCGT № 4 site .

The right and left banks of the river are low (the height of the scap is about 3 m above the water line), without significant washoff, stacked from the surface with loams and layers of loams.

The width of the river bed at the crossing point is 38 meters. Stable channel.

The floodplain of the river before and after its crossing by its route is used as pastures for grazing.

No impact on surface waters is expected during the project implementation: crossings across the Zerafshan River and through canals are carried out in one span, without work in water protection zones.

In the course of excavation work in the immediate vicinity of the Zerafshan River, anti-subsidence measures and drainage are carried out.

Organization of operation

Repair and maintenance of the projected overhead line are carried out by the personnel of specialized teams, which are located on repair and production bases.

Technical management of the brigade personnel is carried out by the Air Force service of the National Electric Networks of Uzbekistan JSC. The overhead line will be under the operational control of the dispatcher of the South-West Regional Dispatch Service (TDS).

Repair and maintenance of the projected overhead line will be carried out by the personnel of specialized teams.

It is envisaged to create a minimum emergency stock of materials and equipment in order to perform emergency recovery work on overhead lines in accordance with the "Standards for the emergency stock of materials and equipment for overhead transmission lines 110 kV and above" (NR-34-70-002-87-regulatory document).

Organization of construction.

According to the structure of the object, design solutions and conditions of construction and installation works, this complex of structures belongs to the category of "medium complexity" of construction.

Building structures and equipment are supposed to be supplied by local manufacturers:
- metal structures (Chirchik metal structures plant);

- footrests, crossbars, reinforced concrete beams (factories of concrete goods POESI, concrete goods -1,2);

- wire, cable, fiber optical line (Tashkent);

- for the expansion of substations - equipment manufactured by "Uzelectroapparat – Electroshield" JSC.

The nearest railway station for cargo delivery is Navoi station. The construction bases are envisaged on empty land in the area of 220/500 kV outdoor switchgear.

Delivery of power grid cargo to the route is carried out by road transport, and access to the route - along field roads or off-road.

The complex of works on the construction of a power transmission line consists of stages performed sequentially:

• preparatory works:

- location of the centers of supports and the axis of the overhead lines,

- reconstruction of engineering structures on the overhead line route,

- construction of sites for supports and delivery of materials along the route;

- arrangement of temporary construction bases;

- arrangement of temporary settlements of builders on the route or organization of accommodation of workers in nearby villages;

- arrangement of temporary power supply and water supply of temporary construction bases and residential settlements from existing networks in the construction area;

- provision of communication facilities;

- ensuring fire safety of temporary construction bases, settlements of builders, foreman's sites;

• construction works:

- location of pits, earthworks,

- installation of foundations and grounding devices,

- assembly, installation, alignment and fixing of supports;

• installation works:

- rolling and connecting wires and cables, lifting them to supports, stringing and fixing them on supports,

- installation of vibration dampers and spacers, installation of hinges

- suspension of lightning protection cable, and fiber-optic cable;

•OHL start-up and commissioning.

This technology of overhead line construction provides high labor productivity, reduces the construction time of the line.

Provision of housing for builders is made at the expense of temporary residential settlements on the construction bases. All temporary buildings and structures are accepted of

mobile type in the minimum volume. Water supply of settlements with drinking water is carried out by imported water, and for technical and economic needs- from local nearest sources.

Electricity is provided to the settlements from local low-voltage lines or through the use of mobile power plants.

When performing work near existing equipment, one should be guided by the "Electrical Safety Code Rule" section 23 "Admission of personnel of construction and installation organizations to work in existing electrical installations and in the fenced-off area of the power transmission line". For this, PCW must provide for all organizational and technical measures to ensure the safety of all construction and installation works.

3.2   Identification of sources of environmental impact

Analysis of design solutions did not reveal the sources of pollutants emission into the atmosphere during the operation of 500 kV overhead line. Overhead line equipment is a source of noise and electromagnetic effects on the environment.

During construction works, the impact on the environment is determined by:

- air pollution by exhaust gases from vehicles and construction equipment used in the delivery of equipment and construction materials, during construction and installation work on the construction of supports; inorganic dust and welding aerosol, manganese compounds during welding; vapors of organic solvents, aerosols of paints and varnishes during painting work. That is, emissions are mainly carried out from mobile vehicles and fugitive sources. Parameters of sources and calculations of emissions are given in Annex 1. There are no stationary organized sources of emissions;

- noise and vibration effects of construction mechanisms;

- withdrawal of land resources for temporary use for the placement of construction structures, sites for the storage of building materials and waste generated during construction work.

According to the list of the main vehicles and mechanisms used in the construction of overhead line (Table 3.1), 11 units of basic vehicles and construction mechanisms of various carrying capacity and power running on diesel fuel and gasoline will be used for construction work related to the emission of atmospheric pollutants.

Table 3.1 The list of the main vehicles and mechanisms used in the construction of 500 kV overhead line at 220/500 kV outdoor switchgear at Navoi TPP

№	Name of vehicle (mechanism)	Fuel type	Lifting capacity (power)
1.	KRAZ truck, 1 piece.	diesel fuel	7 t
2.	Forklift, 1 pc.	diesel fuel	5 t
3.	Bulldozer, T-100,1 pc.	diesel fuel	79 kW

№	Name of vehicle (mechanism)	Fuel type	Lifting capacity (power)
4.	Mobile compressor, ZIF-55, 1 pc.	diesel fuel	35 kW
5.	Truck crane, KS-4501,1 pc.	diesel fuel	10 t
6.	Caterpillar-tracked crane, 1 pc.	diesel fuel	16 t
7.	Flusher truck, 1 pc.	petrol	6000l
8.	Drilling machine MRK-750, 1 piece	diesel fuel	79 kW
9.	Truck tractor, 1 pc	diesel fuel	15t
10.	Single-bucket crawler excavator, 1 pc.	diesel fuel	0,5 m^3
11.	Mobile power plant, 1 pc	diesel fuel	

The list of raw materials and materials, the use of which during construction work will lead to the release of pollutants into the atmosphere, is presented in Table 3.2.

Table 3.2 List of raw materials and materials used in the construction of 500 kV overhead line at 220/500 kV switchgear at Navoi TPP

№	Name	Unit of measurement	Quantity
	Painting works		
1.	Solvent P60	T	0,01
2.	Mastic	T	0,83
3.	Enamel PF -115	T	0,02
4.	Paint BT-177 silver	T	0,12
5.	Oil paint nitroenamel	T	0,02
	Installation of supports		
6.	Heavy concrete	M^3	4,2
7.	Sand	M^3	45
8.	Macadam	M^3	122,5
9.	Sand-gravel mixture	M^3	58,8

In total, during the construction of overhead line, 16 types of pollutants will enter the atmosphere, in the amount of 1.6384 tons, listed in Annex 1.

During construction work, 5 types of waste are generated, in the amount of 2.18 tons, listed in Annex 1, including:

– IV hazard class – 3.

– V hazard class – 2.

Sources of waste generation are:

construction work;

cleaning of temporary premises and construction sites.

Waste generated during construction work: metal waste, electrode waste (Hazard class V), paint waste, wiping cloth (oil content less than 15%, Hazard class IV), waste of mixture of heterogeneous hardened plastics (paints containers, IV), solid waste (garbage from temporary household premises, unsorted, excluding bulky waste, IV).

Waste generation rates are determined ex post. For the collection and temporary storage of waste, specially equipped places and containers are provided.

The construction organization-general contractor collects and temporarily stores solid waste and industrial waste generated during dismantling and construction work in specially equipped places with subsequent removal for disposal by specialized organizations in accordance with concluded contracts. The general contractor organization bears full responsibility for the sanitary-epidemiological and environmental situation before the customer and the inspecting authorities.

The environmental impact with the use of measures to organize the collection and disposal of waste during construction work will have a low probability.

4   Environmental Impact Analysis

4.1   Supply of pollutants

During the operation of the route of 500 kV OHL to the outdoor switchgear of 220/500 kV at Navoi TPP, there is no air pollution.

Temporary local air pollution is expected during construction work.

Calculation of pollutants emissions during construction work (Annex 1) was carried out in accordance with the requirements of the Instruction on the inventory of pollution sources and standardization of pollutants emissions into the atmosphere for enterprises of the Republic of Uzbekistan. (Reg. No. 1553 of the Ministry of Justice dated 03.01.06, Tashkent, 2006).

In total, during the construction of 500 kV OHL, 1.6384 tons / year of pollutants will enter the atmosphere.

The largest contribution to the pollutants supply during the operation of construction equipment is made by: carbon monoxide (0.6833 t / year, 41.7% of the total mass of emissions), nitrogen dioxide (0.3359 t / year, 20.5% of the total mass of emissions), Inorganic dust (0.2 t / year, 12.2% of the total mass of emissions). Supply of the remaining 13 ingredients is 25.6% of the total mass of emissions.

To determine the level of emissions impact on the atmospheric air during construction of 500 kV OHL, we calculated the concentrations of pollutants under the "Ecologist" program on the area of 3.0 x 3.0 km with the interval of 0.2 km. As the initial data, we used the technical characteristics of emission sources, meteorological characteristics and coefficients that determine the nature of dispersion of chemical substances in the atmosphere of the area of the projected route.

The results of calculating the dispersion of pollutants emissions in the atmosphere during the construction of 500 kV OHL to 220/500 kV outdoor switchgear at Navoi TPP in the form of dispersion maps are shown in Fig. (Annex)

Analysis of dispersion calculations shows that the greatest contribution to the level of atmospheric pollution is made by emissions of nitrogen dioxide, butyl acetate and ethyl acetate, the maximum concentrations of which do not exceed the quotas approved by the State Committee for Ecology of the Republic of Uzbekistan (Table 4.1).

Table 4.1 Characteristics of substances polluting the atmosphere and the level of air pollution

Name of pollutant	MAC or SRLI, mg/m^3	Hazard class (SPLI)	Established quota (in MAC proportions)	Maximum concentration in MAC proportions)	Compliance with the established quota (+, -)
1	2	3	4	5	
Carbon monoxide	5,0	4	0,5	Less than 0.05	+
Nitrogen dioxide	0,085	2	0,25	0,14	+
Inorganic dust	0,5	3	0,33	Less than 0.05	+
Hydrocarbons	1,0	4	0,5	Less than 0.05	+
Aldehydes	0,04	2	0,25	Less than 0.05	+
Soot	0,15	3	0,33	Less than 0.05	+
Benz(a)pyrene	$1*10^{-6}$	1	0,20	Less than 0.05	+
Iron oxide	0,2	3	0,33	Less than 0.05	+
Manganese oxide	0,005	2	0,25	Less than 0.05	+
Silicon oxide	0,002	3	0,33	Less than 0.05	+
Fluorides poorly soluble	0,03	2	0,25	Less than 0.05	+
Hydrogen fluoride	0,012	2	0,25	Less than 0.05	+
Ethyl alcohol	5	4	0,5	Less than 0.05	+
Butyl acetate	0,1	4	0,5	0,23	+
Ethyl acetate	0,1	4	0,5	0,12	+
Ethylene glycol acetate	1,0	3	0,33	Less than 0.05	+

Maximum concentrations of other pollutants generated by emissions during the construction of 500 kV OHL to 220/500 kV outdoor switchgear at Navoi TPP also do not exceed the quotas allowed by the State Environmental Committee of the Republic of Uzbekistan for pollutants of the corresponding hazard class and enterprises located in Navoi region.

After commissioning of 500 kV OHL route to 220/500 kV outdoor switchgear at Navoi TPP, in comparison with the existing state, the maximum concentrations of pollutants in the

atmospheric air along the entire route will remain at the same level, since the generated concentrations of pollutants are temporary, only for the period of construction.

Fall of the above ingredients on soil, plants and surface watercourses is negligible and the impact on these objects will be negligible.

4.2. Bringing acoustic noise and vibrations

Noise impact will not exceed the standard values: 45 dBA at night and 55 dBA in the daytime in residential buildings according to KMK 2.01.08-96 and 80 dBA at permanent workplaces during construction and preventive maintenance work during the operation of 500 kV OHL according to SanPiN No. 0325-16 "Sanitary Standards for Permissible Noise Levels at Workplaces."

Overhead line noise is caused by corona discharge on wires. According to the project, the wires were selected in such a way that the tension on the surface of the wire did not exceed the initial strength of the corona discharge. However, irregularities on the surface of the wire due to mechanical damage (burrs, scratches), pollution (drops of lubricant, solid particles), precipitation (drops of rain, dew, snow, etc.) lead to a local increase in the electric fields. As a result, corona discharge occurs on the overhead line wires at the voltage lower than the self-discharge voltage on clean, undamaged wires. Therefore, the noise of overhead lines can be heard in good weather, but it is especially amplified in the rain.

Expected noise level at a distance of 100 m from 500 kV OHL is 17.70 dBA, which is lower than allowable 45 dBA.

Noise protection measures are not required, because the noise level at the border of the nearest residential buildings does not exceed the permissible level according to KMK 2.01.08-96.

Noise effects during construction work will take place in three stages:

– when mixing ready-mix concrete;

– when installing supports of 500 kV overhead line.

Typical levels of expected noise at a distance of 15 m from construction equipment during the construction phase are shown in the table 4.2.

Table 4.2 Typical noise exposure during construction

Equipment	Maximum expected noise level at a distance of 15 m (dBA)
Concrete mixer	87
Cranes	86
Paint sprayers	89
Excavators	90

Equipment	Maximum expected noise level at a distance of 15 m (dBA)
Welding machines	73
Dump trucks	87

All the most noisy construction operations for the installation of supports near residential buildings, in particular, all work on the soil movement is limited to the daytime.

Thus, noise associated with construction activities will be temporary and periodic, will not exceed noise standards.

Exposure to vibrations is expected:

– when tamping the soil;
– when working jackhammers;
– when compacting concrete mix;
– when operating conveyors for moving bulk materials, such as sand.

Vibrations associated with the construction work will be temporary and periodic, vibration effects will not spread beyond the boundaries of the work site.

4.3. Effect of the magnetic field

The expected level of the maximum magnetic field strength will be 7.76 A / m, which is much lower than the permissible standards. MPL of the magnetic field strength is set depending on the presence of people in it. In accordance with hygienic requirements, eight-hour stay of personnel in the magnetic field with the strength of up to 80 A / m with total impact (on the whole body) and up to 800 A / m with local impact (on the limbs) is allowed.

Consequently, the impact of overhead line on the environment in terms of the level of magnetic field strength is within the normal range, measures to protect personnel and the population from the magnetic field created by EMF sources by overhead line wires is not required.

4.4. Electric field exposure

Construction of 500 kV overhead line is carried out in such a way that the impact of electrical voltage and current is limited by the size of the sanitary protection zone.

Maintenance personnel can be the object of exposure to electric current along the overhead line route, as well as people and animals - when removing the potential from the grounding devices when short-circuit currents and lightning flow through them.

Injury of the human body by electric current on is characterized by the cessation of the heart, respiratory system, nervous system, in extreme cases - death.

According to GOST 12.1.038 - 82, the rate of electric current passage through the human body without harmful effects on health is 0.3 mA in case of trouble-free operation of electrical equipment and 6 mA in case of emergency operation and duration of exposure more than 1.0 s.

Support designs meet the requirements of the system of occupational safety standards.

A protective grounding device is provided to ensure the safety of repair and maintenance of 500 kV overhead line.

Support designs meet the requirements of the system of occupational safety standards.

4.5. *Impact on vegetation and land*

No damage is expected to tree vegetation during the construction of the projected 500 kV overhead line, and tree felling along the entire route is not expected. Gardens and ornamental trees in roadside hedgerows, crossed by the route, are preserved. At the same time, it is assumed to trim the crowns of tall ornamental trees to comply with the necessary conditions for the intervals between the wires and trees at least 4 m. Fruit trees are not subject to pruning and uprooting during the implementation of the project, because the supports of the route are installed on the elevations of the relief before and after the territory of the crossed garden between corners No. 2 and No. 3, and the distance from dwarf varieties of fruit trees to the wires of the overhead line meets the standards.

The overhead line route does not pass through the vegetation, the value of which is determined by the reserves of valuable species of wood and medicinal plants. The route does not affect the lands occupied by valuable agricultural crops, reserves and sanctuaries. The main types of land along which the route passes are agricultural lands occupied by crops of cotton and wheat. When laying the route on arable lands, the direction of the route was chosen along the direction of cultivation of fields and along the borders of fields in order to minimize damage.

Thus, damage to woody vegetation during the construction of the projected route of 500 kV OHL is not expected.

Indicators on the areas of land allocation for the construction of 500 kV OHL are discussed in the next section when analyzing the withdrawal of natural resources. Supports will be installed mainly on agricultural lands- on the border of arable land, outside the lands of industrial enterprises, roads, irrigation and drainage network. Free areas between the fields and land boundary will be used for the equipment installation, as well as country roads. On irrigated arable land, construction work is carried out after harvesting.

The project provides for the restoration of land, withdrawn for temporary use: reclamation and restoration of the soil and vegetation layer, filling of excavations and trenches with soil, turf lining of slopes and shorings.

To preserve the most fertile upper soil layer, before the start of construction work, a set of measures is planned to be carried out for mechanical and biological reclamation. It includes the preliminary removal of the upper humus and turf layer of the soil, its storage in a small bulk

of soil near the site of construction work, and upon completion of construction work - laying it on top of the slope of the overhead line support, or embankments of existing roads as a recultivation layer. Additionally, sod grasses are sown in the loose soil around the pit.

Compensation for land alienated for permanent use will be made immediately before construction. Costs will be determined by the fact.

4.6. *Impact on relief, soil and groundwater*

Mechanical disturbance of the relief occurs during the period of construction work on the creation of pits for the foundation of the supports, during the construction of assembly platforms and temporary roads.

In conditions of flat relief along the route, the impact is assessed as minimal. The temporary formation of the pit with its subsequent filling and compaction of the soil excludes the creation of additional forms of micro- and mesorelief. The impact on the relief on the flat part of the territory is assessed as reversible. Withdrawal of soils is excluded due to the full use of soil from the pit during backfilling, leveling and returning the upper humus horizon as a recultivation layer at the site of the backfilled pit.

Slipping of the soil and a decrease in the stability of the supports are not expected, and as a result, the surcharge of the foundations and additional compaction of the soil are not provided.

Thus, on the route of 500 kV OHL (tapping site), impact on soils and groundwater is not expected.

When constructing a small shelf under a support in loess soils, the most dangerous negative processes are subsidence and erosion. Reducing the likelihood of the onset of erosion and subsidence processes on the site under the support will be facilitated by the following measures:

 – arrangement of platforms for support on the watershed;
 – arrangement of platforms for support outside of obviously eroded slopes and erosional furrows;
 – tamping of soil in the pit during backfilling.

Preservation of the fertile humus horizon and sod is the significant event. For this, before starting work on the site under the support, it is planned to remove the upper 30 cm soil horizon, in which the bulk of the roots of ephemerals and ephemeroids, turf grasses is preserved. The layer is stored in the pile along the edge of the work site, and after the installation of the foundations, backfilling of the pit and tamping of the backfill soil, it is laid on top, as a recultivation horizon. Around the section of the pit, where the maneuvers of the equipment were carried out, sod grasses are sown.

Because of the wide development of areas along 500 kV overhead line for irrigated arable land, it is envisaged to divert irrigation water filtered into the upper two-three-meter thickness from the foundations of the supports by constructing drainage trenches.

Implementation of drainage measures from the sites of installation of supports located on or near irrigated lands will prevent the development of such dangerous processes as landsliding and erosion.

In general, throughout the route, the impact on the relief, loess soils and groundwater, is permissible.

During regular inspections of the equipment of OHL along the route during its operation, it is necessary to monitor the stability of the soil, in order to identify timely the manifestation of the processes of shrinkage, landslide, erosion, and in case of detection of negative processes - immediately to carry out work to strengthen the soils.

4.7. *Impact on surface watercourses*

Where 500 kV OHL intersects floodplain and the bed of the Zerafshan River and numerous canals, the width of the watercourses is less than 100 m, which excludes the installation of intermediate supports in the floodplain-channel part. The absence of work in the floodplain-channel part of the watercourses will exclude the impact on the morphology of the channels, groundwater and surface waters, as well as on inland biocenoses and ichthyofaunal (fisheries).

The installation of overhead line supports at elevations above the maximum flood flow will reduce the likelihood of an emergency fall of the support during the passage of mudflows along the bed of the Zerafshan River.

Thus, the design solutions regarding the selection of the section for crossing the surface watercourses by 500 kV overhead line route will ensure the elimination of the impact on surface waters during construction work and safe operation of the route in the coastal zone.

4.8. *Impact on the animal world*

Along the entire length of the route, during construction work and operation of OHL, impact on some groups of animals and birds is expected. The intensity, degree and scale of the impact on certain species of fauna will differ due to differences in the ecology of habitats, food resources, and mode of life.

During the operation of 500 kV OHL, the effect of high voltage can be manifested mainly for birds that use supports for rest and, less often, for creating nests. In general, the overhead line supports are not a favorable place for birds to nest, since the high voltage electric field causes disturbances in some physiological processes.

Negative consequences for birds using overhead line supports for temporary rest arise at the moment of their takeoff and touching the wires and traverse with their wings. In this case, the birds die from an electrical discharge. This example is typical mainly for lines with of 35-500 kV voltage, in which the distance between the wires is small.

To exclude the death and illness of birds using overhead line supports for rest and construction of nests, special bird-scaring devices in the form of "ruffs", spiny three-rod tridents,

spring structures that create temporary vibrating effects, are provided on the supports. These structures are attached to the traverse belts with wire or special metal cuffs before lifting the support. Recently, special protective colored umbrellas have been adopted for execution, which are fixed over the garlands. They not only scare off birds with bright color, but also protect the garlands from contamination with droppings, which lengthens the operation of overhead lines without additional cleaning and emergency shutdowns.

Direct impacts related to the disruption of dwellings and partly to the destruction of the food base may be associated with species such as small birds, rodents, medium and small mammals.

The impact associated with the destruction of animal habitat will be limited and local, since the areas of work on the construction of pits and road shelves occupy small areas. However, when carrying out work on the construction of sites for supports and road shelves, it is necessary to bypass areas with burrows and other types of animal dwellings.

In order to reduce the impact on young animals when breeding (hatching) offspring and feeding them, construction work should be carried out in late summer and autumn.

All fauna groups are expected to be exposed to noise during construction work. The impact of noise from construction equipment will be periodic, not intense, slightly increasing after the delivery of equipment to the site. Due to the gradual increase in the volume of work associated with the arrival of equipment, noise, as a factor of concern, will allow animals to migrate to safe distance from the place of construction work.

The impact on the fish fauna of the Zerafshan River along the overhead line route is excluded due to the use of a single-span crossing, without the construction of transition supports and construction work outside the water space, at a distance of 60-100 m from the water's edge

The impact on animals of the agricultural irrigated zone is weak in intensity, since there are practically no valuable objects of wild fauna among agricultural lands. To preserve the biodiversity of animals living near irrigated land and among fields, construction work of the overhead line must be carried out in the spring, before plowing in the areas allocated for spring crops, and in the fall, before the start of agricultural work, in the areas allocated for winter culture.

5 Assessment of the impacts types determined by the withdrawal of natural resources from the environment

Commissioning of 500 kV overhead line to 220/500 kV outdoor switchgear at Navoi TPP will be accompanied by the withdrawal of land resources, natural raw materials in the form of construction materials supplied in quantities from 4.2 to 122.5 m3 according to Table 3.2, as well as oil products in the form of diesel fuel and gasoline for the operation of vehicles and construction machinery.

Alienation of land for the projected overhead line was carried out in accordance with KMK 2.10.08-97 "Norms of land allocation for electrical networks with the voltage of 0.4 - 750 kV".

The project defines the areas of land allocated for permanent use for overhead line supports and land plots provided for temporary use for the construction period, which are determined as the sum of the sites areas for the installation of supports and a strip along the overhead line route (in accordance with tables No. 1, 2 KMK)

Table 5.1 Alienation of land under the supports of the projected overhead line

Land allocation	Land allocation area, ha
for permanent use	0,513
for temporary use	29,487

Upon the expiration of the construction period, the lands assigned for temporary use are subject to return to the land user after carrying out necessary work for reclaiming disturbed lands.

The allocation area of agricultural land (arable land) for the construction of 500 kV overhead line route for permanent use (for supports) is 0.513 hectares, which is 57 times less than the alienation of land for temporary use.

The land allocation for temporary use (for the laying of temporary roads and organization of construction bases) is 29,487 hectares.

The calculation of land allocation is made on the basis of the norms of land allocation for electrical networks with the voltage of 0.4 - 750 kV according to KMK 2.10-08 -97), taking into account the distance between the supports of 300 - 350 m. Permanent allocation for the support of 500 kV is accepted from 300 to 324 m2, depending on the type of support, temporary allocation for the construction period with the strip width of 18 m: under the site for the

installation of reinforced concrete support - 0.06 hectares , metal intermediate support - 0.056 hectares, metal anchor-angle support - 0.07 hectares.

During the construction of the overhead line, a protective zone is provided in the form of a strip 60 m wide (30 m on each side of the extreme wire), within which it is prohibited to carry out any types of construction work. At the same time, it is allowed to have tree and shrub plantings with the height of 3 - 5 m with the width of the operation corridor under the overhead line of 2.5 m. The basis of the assortment of woody plants developed for these purposes is the types of local flora as the most ecologically resistant to the soil and climatic conditions of Navoi region (tamarix), as well as cultivated varieties of fruit trees and shrubs (apricot, peach, plum, apple, quince, oleaster). Agricultural techniques for soil preparation, planting fruit trees, caring for them on the overhead line route, is similar to that adopted in industrial horticulture. The specificity here consists only of the selection of an assortment of fruit trees and determining the density of their planting.

It is recommended to plant fruit orchards by the plot-by-plot mixing method, i.e. in certain areas, trees of the same species are planted when varieties are mixed in rows. Rows of fruit trees are planted along the axis of the overhead line, leaving unoccupied installation and operation corridors in the center, so that the crowns of trees along the edges of the corridor completely shield it.

The distance between the rows of trees and shrubs with small crowns (oleaster, blackthorn) is 2 m, and with wider crowns (plum-cherry plum, apple tree) - 3 m. The distance between trees and shrubs in the rows of 1-1.5 m, mixture is by alternate rows.

Thus, mainly arable lands are allocated for the construction of 500 kV overhead line. The lands, withdrawn for temporary use, are subject to reclamation: the fertile soil layer, removed during construction work, is used to construct embankments of existing roads, or is laid on top of the support slope to secure it.

At the stage of construction work, it is expected to withdraw natural resources used as building materials (gravel, sand, pebbles). The consumption of building materials is given in table 3.2.

Delivery of gravel, sand, pebbles is supposed to be by road, mainly when purchased from trade organizations.

6 Alternative design solutions

"Zero option". Refusal to implement the design solution is considered as a "zero option". This excludes:

- power delivery from CCGT №4;

- possibility to create a reliable power source for NMMC loads in full in combination with the planned construction in the region of 500 kV overhead line to Besopan SS, construction of 500 kV Muruntau Substation and 500 kV Navoi Substation;

- obtaining large socio-economic effect both for the large industrial enterprise - NMMC, for Uchkuduk - Zerafshan electric generating system (load centre), and for the whole Republic;

- possibility of reducing the shortage of electricity in the Republic of Karakalpakistan, Khorezm, Bukhara and Navoi regions.

Thus, chosen route of 220 kV overhead line to 220/500 kV outdoor switchgear at Navoi TPP has advantages in terms of environmental impact and development of emergency risks..

7 Environmental impact assessment of possible emergencies

Emergency risks during the operation of 500 kV overhead line to the outdoor switchgear of 220/500 kV at Navoi TPP are associated mainly with the fall of supports and wire breakage.

In the event of such an accident, negative environmental impacts will multiply when a support falls on the intersected roads, as a result of which damage to the gas tank of a passing car will cause fire and subsequent explosion. In this case, nitrogen, sulfur, and carbon oxides will enter the atmosphere. Their concentration within a radius of up to 0.1 km will exceed the permitted one by several times.

To prevent the occurrence of such emergencies, it is stipulated to protect the overhead line supports on the roadsides with a parapet from collisions with vehicles, to weld nuts to the bolt rods in the support nodes to a height of 10 m against acts of vandalism.

In addition, in order to reduce emergency risks, taking into account the specifics of the overhead line, in accordance with the current "Electrical installations code", high-frequency protection and emergency automation equipment is performed.

Thus, negative environmental consequences for the environment in emergency situations on 500 kV overhead line from CCGT No.4 to 220/500 kV outdoor switchgear at Navoi TPP are eliminated by using measures to strengthen the supports, observing the necessary gaps between the overhead line and utilities, using high-frequency protection equipment and Emergency control automatics.

8 Nature and types of environmental impact

By the nature of the environmental impact, the impact of high-voltage lines is characterized as mechanical and impact on the atmospheric air due to the supply of pollutants during construction work.

Construction of electric transmission lines is associated with the alienation of land, which can affect agriculture. The disordered location of OHL can disrupt the integrity of fields and forage lands.

This project provides for the allocation of land for permanent use on average 57 times less than for temporary use. The project provides for the restoration of land withdrawn for temporary use: reclamation and restoration of the soil and vegetation layer, filling of earth cuts and trenches with soil, turf lining of slopes and slants.

The projected OHL route does not pass through vegetation, the value of which is determined by the reserves of valuable species of wood and medicinal plants, and wild fauna (game animals). The route does not affect the lands occupied by valuable agricultural crops, reserves and sanctuaries. The main types of land along which the route passes are arable land, cotton crops. When laying the route on arable land, the direction of the route was chosen along the direction of cultivation of fields and along the borders of fields in order to minimize damage. The poles (supports) will be installed mainly on agricultural land (at the border of arable land), and on uncultivated land, outside the lands of industrial enterprises, roads, irrigation and drainage networks. Free areas between fields and border will be used for the installation of equipment, as well as country roads. On irrigated arable land, construction work is carried out after the harvest.

Analysis of the lands crossed by 500 kV OHL from CCGT No. 4 to the outdoor switchgear of 220/500 kV at Navoi TPP shows that the main part of the crossed lands is arable land (80%), 15% of the land falls on the share of pastures, 5 % falls on the land for the shops of building materials of entrepreneurs.

No damage is expected to tree vegetation during the laying of the projected 500 kV overhead line route to 220/500 kV outdoor switchgear: cutting of trees along the entire route is not envisaged. Ornamental trees in roadside plantings and gardens, crossed by the route, are preserved, while it is planned to trim the crown for tall trees to comply with the necessary conditions for intervals between wires and trees of at least 4 m.

The project provides for measures to restore land withdrawn for temporary use: reclamation and restoration of the soil and vegetation layer, filling of earth cuts and trenches with soil, turf lining of slopes and slants.

To preserve the most fertile upper soil layer, before the start of construction work, it is planned to carry out a set of measures for mechanical and biological reclamation.It includes the preliminary removal of the upper humus and turf layer of the soil, storing it in a small bulk of soil near the site of construction work and upon completion of construction work - laying it on top as a reclamation layer. In addition, sod grasses are overseeded in the loose soil around the pit..

Compensation for land alienated for permanent use will be made immediately before construction. Costs will be determined by the fact.

During OHL operation, exposure to atmospheric air in the form of pollutants supply is not expected. During construction work, temporary local air pollution is expected.

Pollutants are emmitted during construction work during the operation of construction vehicles and mechanisms, during painting work, when working with bulk materials.

Atmospheric air will be polluted by emissions of pollutants of 16 items, the main of which are carbon monoxide, hydrocarbons, nitrogen dioxide.

Pollutants emmissions will not change the atmosphere condition during construction work.

Impact on the atmospheric air during construction work is estimated as temporary and local.

Acoustic impact on the environment at the border of residential development during construction and installation works and operation of 500 kV overhead lines will not exceed the standard value (no more than 45 dBA at night and 55 dBA during the day at the border of residential development according to KMK 2.01.08-96) and no more than 80 dBA at permanent workplaces according to SanPiN No. 0325-16 "Sanitary norms of permissible noise at workplaces".

The levels of exposure to the electric and magnetic components of the electromagnetic fields created by 500 kV OHL are within the permissible limits.

The measures envisaged by the project exclude damaging effects of electric current for people and animals.

Thus, the impact on the atmospheric air from the sources of emissions of the construction object will not change its condition.

The impact of the object under study on the environment will significantly increase due to the addition of nitrogen dioxide, carbon monoxide and soot during fires with subsequent explosion in the event of the emergencies discussed above.

The guarantee of trouble-free operation of OHL is qualitative construction work and strict implementation of the envisaged design solutions.

Impacts on surface water bodies and groundwater, soil and vegetation are not expected.

The system of organization on construction sites of collection, temporary accumulation and movement of waste will eliminate their impact on the soil.

Thus, construction and operation of 500 kV OHL from CCGT No. 4 to the outdoor switchgear 220/500 kV at Navoi TPP are associated with an insignificant environmental impact that meets the standard values, subject to complying with environmental protection measures when choosing a route, carrying out construction and installation works and operation.

9 Measures to prevent adverse environmental impacts

The technical project provides for a number of measures to reduce the impact of the construction object on the environment, as well as to eliminate the possibility of emergency situations.

It is planned to carry out constant monitoring of the progress of construction and installation works in order to identify violations of the general requirements of nature protection: movement of construction machines and mechanisms in unidentified places, storage of structures in areas not intended for these purposes, discharge of technical oils and household waters into water bodies, destruction of grass cover.

In addition to the proposed technical solutions, it is necessary to provide special containers for the collection and temporary placement on construction sites of waste of each type generated during the construction of OHL, with subsequent export to specialized organizations and landfills of solid waste determined by sanitary and epidemiological inspection bodies.

In the areas of pits development for installation of supports, the fertile layer is removed and exported to places determined by the land user and further used to improve and restore land. The costs of these works are provided for by the resource estimate documentation.

In areas with the presence of ravines and natural pits, installation of supports is not performed.

To protect the supporting fasteners of the wire from bird contamination, as well as to protect birds from electric shock, anti-bird barriers "Ruffs" of E5A brand are installed above all supporting garlands on the traverses.

Emergency risks are eliminated by the use of protective equipment and automation during the operation of 500 kV OHL.

The project provides for protection of wires from vibration, and grounding of cable supports in accordance with the "Rules for the operation of power grids".

Hydrodedusting with the use of one watering machine is provided to reduce dusting during construction work.

All crossings through surface watercourses are carried out in one span, without the construction of supports in water protection zones and construction work at a distance of 100 m from the watercourses.

When crossing engineering structures and natural obstacles: roads, watercourses according to the required by EIC (Electrical installation code) dimensions when crossing them, it is supposed to use higher supports or perform reconstructions of the intersected overhead lines.

Thus, the environmental risk is minimized in the implementation of technical solutions and environmental measures laid down in the project.

Subject to the compliance with the listed recommendations and measures, there will be no negative effects on atmospheric air, surface and groundwater, soil, vegetation and population.

<u>Environmental quality management</u>

Implementation of the project for the construction of 500 kV overhead line requires the preparation of an Environmental Management Plan (EMP), which will ensure environmental protection. The purpose of EMP is to help organizations achieve their environmental objectives and fulfill their obligations to preserve the quality of the environment. EMP describes the methods and plans used to reduce the environmental impact, and also identifies indicators that can be used to assess the progress of EMP. Proposed EMP is general in nature, although all expected impacts have been taken into account, it is not specific to specific transmission line (TL) routes. As soon as EIA is approved, this EMP will be used then as the basis for preparation of specific EMP.

Most of the impacts associated with the construction and operation of the projected OHL will occur during construction. Therefore, EMP focuses heavily on this stage of the project. However, the recommendations for environmental management during operation are also taken into account, which are also included in EMP.

EMP serves as the basis for the implementation of mitigation measures at each stage of the project.

<u>Implementation of the environmental management plan</u>

Before starting construction work, a detailed draft of environmental conditions and mitigation measures must be approved and agreed with specialists of competent organizations.

The contractor will have primary responsibility for the proper implementation and realization of plans, measures, controls, etc. in accordance with the terms and conditions defined in the relevant permits and Environmental Management and Monitoring Plans.

During construction, the customer and the designer (designer's supervision) will monitor the implementation of the solutions defined in the project.

After commissioning, environmental control and regular maintenance should be organized by JSC "National Electric Networks of Uzbekistan".

<u>Environmental Monitoring Plan</u>

The environmental monitoring plan includes a monitoring schedule and institutional arrangements. The environmental monitoring plan will show the way of taking precautions during and after construction of OHL so that the necessary actions can be taken to correct the defects or deficiencies.

During construction monitoring will be focused on ensuring the implementation of environmental mitigation measures, and some performance indicators will be tested to record envi-

ronmental performance of the Project and conduct any remedial actions to prevent unexpected impacts. Monitoring of activities during project operation will be focused on recording environmental performance and proposing remedial measures to avoid unexpected impacts.

<u>Institutional arrangement</u>

PIU JSC National Electric Grids of Uzbekistan will be responsible for EMP overall implementation.

JSC National Electric Grids of Uzbekistan will conclude a contract with a third party for OHL construction. Other parties that will be involved in EMP implementation are the following:

Government agencies: such as the State Committee of the Republic of Uzbekistan for Ecology and Environmental Protection (Goskomekologiya), territorial environmental protection authorities (territorial administration for ecology and environmental protection of Navoi region), local government authorities and municipalities (to the extent of affection by the project). As regulatory authorities, the Authorities for Ecology and Environmental protection at various levels will implement environmental protection policies in the construction and operation of the project, and will be responsible for the implementation of laws, regulations, standards and application of environmental practices by all organizations within their respective jurisdictions.

In particular, in the structure of the State Committee of the Republic of Uzbekistan on ecology and environmental protection there is a regional committee on environmental control and project administration, and their roles and responsibilities are:

– supervision of EPA implementation;

– implementation of applicable laws, regulations and standards;

– coordination of environmental protection efforts between the concerned departments;

– inspection and supervision of construction, completion and operation of ecological structures.

Project Implementation Unit (PIU): JSC National Electric Grids of Uzbekistan is ultimately responsible for the environmental performance of the project both during construction and during operation. PIU is responsible for environmental management, being the direct management organization for managing all aspects of the project preparation and construction, but is not limited to the following specific responsibilities:

– ensuring that all relevant EMP requirements (including environmental design and mitigation measures) are properly included in the project tender documents;

– obtaining necessary permits and/or approvals, as appropriate, from the State Committee for Ecology and other relevant government agencies, with the necessary observance of the condition that all necessary permits are obtained before the start of any construction work on the project;

– ensuring understanding by contractors of their responsibilities to mitigate environmental problems associated with the construction and training their EMP personnel

– monitoring of EMP implementation by the Contractor in accordance with the environmental monitoring plan

<u>Construction Surveillance Engineers (CSE)</u>

Construction Surveillance Engineers (CSE) are responsible for supervision over the construction work on the project, and monitoring of other works and actions taken by the Contractor to ensure compliance with the specification and contractual requirements. CSE responsibilities include:

– ensuring compliance with the technical design of the project and EMP regarding mitigation and environmental protection. Construction can begin only after CSE being satisfied with environmental protection measures;

– regular monitoring of the work of the Contractor's ecologists with verification of the monitoring methodology and its results. In the event that CSE believes that the Contractor's ecologists do not fulfill their duties or do not fulfill the contractual requirements, it is necessary to instruct the Contractor(s) to replace the Contractor's ecologists.;

– instructing contractors to take measures to eliminate the consequences during determined by CSE period. If there is a violation of the contract terms or serious complaints from the public about the environmental performance of the contractor, CSE requires the contractor to correct, change or stop the work, at the same time informing the relevant agencies and the Customer;

– supervise the Contractor's activities and ensure that EMP requirements and the technical requirements of the contract are fully complied with;

– instructing the Contractor to take measures to reduce exposure and comply with EMP required procedures in case of non-compliance / discrepanciess;

– following complaint procedures.

<u>Contractor</u>

The contractor's responsibilities include, but are not limited to, the following::

– strict implementation of the measures listed in EMP;

– compliance with environmental legislation;

– work within the framework of contractual requirements and other tender conditions;

– verifying that all suppliers of building materials have valid work licenses and any necessary environmental permits;

– ensuring EMP effective implementation during construction;

– in case of non-compliance or inconsistencies regarding EMP implementation, study and proposing mitigation measures and implementing corrective measures.

<u>Documentation and regulation</u>

All environmental strategies, policies, responsibilities and procedures will be documented clearly for each contractor.

Documentation is useful information for management and staff and is preferred in the form that can be provided to third parties, such as regulators, interested citizens, or even shareholders of companies, as proof of the company's obligation to protect the environment.

10 Forecast of changes in the environment state as a result of the identified impacts

The assessment of environmental change as a result of the carried out work showed the following results:.

Atmospheric air. Commissioning of 500 kV overhead line from CCGT No. 4 to 220/500 kV outdoor switchgear at Navoi TPP will not lead to a change in the state of atmospheric air. During the operation of the newly built 500 kV overhead line, the state of the atmosphere will still be permissible.

Surface water. The surface waters state will not change, the impact on surface watercourses is not expected

Soils, vegetation. The state of soils and vegetation after the implementation of the project will not change.

Soils and groundwater. The quality of soils and groundwater will not be affected by the operation of 500 kV overhead line to 220/500 kV outdoor switchgear at Navoi TPP under normal mode. The state of groundwater will remain acceptable.

The project implementation will lead to a reduction in emergency risks during the operation of the projected power grid facility.

Conclusion

The impact assessment of the construction of 500 kV overhead line route to 220/500 kV outdoor switchgear at Navoi TPP was carried out on the basis of the analysis of the existing state of the environment, socio-economic aspects and technical solutions.

The overhead line route with total length of 5.0 km will pass through the territory of Navbakhor district of Navoi region. In general, the territory under consideration belongs to the zone with acceptable ecological situation. However, along the route, there are areas of potential environmental risk due to the intersection of utilities and proximity of residential buildings. There are no protected natural areas or preserved areas near the road under construction. The distance to the residential area meets the established regulatory requirements.

This work describes the types of impact of the construction object during operation and construction work. It is shown that the operation of overhead lines is associated with physical impact (acoustic, electromagnetic) and emergency risks. The analysis of technical solutions showed their sufficiency to prevent emergency risks by using an automated control and protection system, as well as by choosing the type of supports and technology for their installation, which makes it possible to eliminate negative consequences for the environment in the event of the development of the accident scenarios considered in draft EIS.

The impact on the atmospheric air during the operation of overhead line is not expected; during construction work, the impact is assessed as temporary and local. The project provides for mechanized soil development, installation of reinforced concrete and metal supports, painting, welding works that have a risk of negative impact on the environment. In draft EIS, technology and scope of all types of work, as well as their consequences, were assessed.

This work assesses the importation (supply) of pollutants into the environment during construction work, physical impact, withdrawal of natural resources, and a forecast of environmental changes as a result of the identified impacts is made.

The impact associated with the withdrawal of land resources is defined as permanent in the form of land allocation for supports with an area of 0.513 hectares and temporary (for laying temporary roads, organizing construction bases) with an area of 29,487 hectares.

Impact on surface waters is not expected: crossing the Zerafshan River and canals is carried out in one span, without work in water protection zones.

The system of organization of collection, temporary accumulation and movement of waste on the territory of construction sites during construction work will eliminate their impact on soils, soils, groundwater and surface water..

analysis of alternative options for the design solution showed that the proposed option of the route is optimal from the point of view of negative consequences for the environment.

In draft EIS, analysis was made of the sufficiency of the environmental protection measures envisaged by the project, preventing negative environmental impacts, in addition to the measures proposed in the technical design, a set of measures was proposed to reduce negative environmental impact of the construction of 500 kV overhead line to the outdoor 220/500 kV switchgear at Navoi TPP.

Thus, the construction of 500 kV overhead line to 220/500 kV outdoor switchgear at Navoi TPP will not lead to deterioration in the environment and is possible if the environmental protection measures proposed in the basic design and this work are observed.

List of used sources

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Annex

Annex №1

Calculation of release and emission of pollutants into the atmosphere during construction work of 500 kV overhead line at 220/500 outdoor switchgear at Navoi TPP

Source No. 1 (linear)

1.1. Emission of harmful substances during the operation of vehicles

The source of emission is vehicles (KRAZ truck, truck crane, water carriers, truck tractor and motor vehicles for transporting people) operating on the site

The following is emitted into the atmospheric air: nitrogen, oxygen, water vapor, carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, aldehydes, soot,**benz (a) pyrene.**

Emissions of toxic gases during the operation of vehicles.

Working hours of vehicles - 4 hours a day or   1040   hours per year.

The amount of exhaust gases during operation of vehicles is 208.5 kg per 1 ton of consumed fuel.

During the operation of vehicles, the consumption of diesel fuel per year is   16   tons or 15.38 kg/hour.

The calculation of the amount of exhaust gases will be:

16   *   208.5 /1000=   3.34   t/year or   3.92   m3/year

The typical composition of exhaust gases for diesel engines is shown in the table:

Components	Content,% by weight	t/year or	g/s
Nitrogen	77%	2.5687	0.6861
Oxygen	16%	0.5338	0.1426
Water vapor	2.50%	0.0834	0.0223
Carbon dioxide	4.40%	0.1468	0.0392
Carbon monoxide	0.05%	0.001668	0.0004455
Nitrogen oxides	0.0002%	0.000007	0.0000018
Hydrocarbons	0.0009%	0.000030	0.0000080
Aldehydes	0.001%	0.000033	0.0000089
Soot	0.00000001	3.9247E-08	1.0483E-08
Benz (a) pyrene	1E-12	3.9247E-12	1.0483E-12

The amount of each toxic component of the exhaust gas is determined in accordance with the formulas

MCO=   1 *   15.38 * 20 / 3600 =   0.0855   g/s   0.3200   t/year

MNOx =   4,965 *   15.38 * 2 /3600 =   0.0424   g/s   0.1589   t/year

Mald = 1,375 *   15.38 * 1 /3600 =   0.0059   g/s   0.0220   t/year

Of these, harmful substances

Components	Emissions in g/s	Emissions in t/year
Carbon monoxide	0.0859	0.3217
Nitrogen oxides	0.0424	0.1589
Hydrocarbons	0.0000080	0.0000300
Aldehydes	0.0059	0.0220
Soot	0.000000010	0.000000039
Benz (a) pyrene	0.0000000000010	0.0000000000039
Total :	**0.1342**	**0.5026**

1.2. Emission of harmful substances during planning work of sites and roads.

Emission source:

Bulldozer TY 160 - 1 unit

For planning work, a bulldozer is used that runs on diesel fuel.

During the operation of the bulldozer, inorganic dust is emitted, which is not captured. Specific dust emission during operation is taken in accordance with the methodology (Sh.5. Table 1.4.11) and is:

0.086

kg/hour.

Annual emissions are   0.024   *   1200   *3600/10^6= 0.103200   t/year

where: 0,024 -the amount of dust emitted by a unit of equipment, g / sec

      1200   - bulldozer operating time per year

1. Emissions of toxic gases during bulldozer operation.

The amount of exhaust gases during the bulldozer operation is 208.5 kg per 1 ton of consumed fuel.

During the operation of vehicles, the consumption of diesel fuel per year is   3.5   tons or

    2.9 kg/hour.

The calculation of the amount of exhaust gases will be:

  3.5   *   208.5   /1000   0.73   t/year or   0.86   m3/year

The typical composition of exhaust gases for diesel engines is shown in the table:

Components	Content,% by weight	t/year or	g/s
Nitrogen	77%	0.5619	0.1301
Oxygen	16%	0.1168	0.0270
Water vapor	2.50%	0.0182	0.0042
Carbon dioxide	4.40%	0.0321	0.0074
Carbon monoxide	0.05%	0.000365	0.0000845
Nitrogen oxides	0.0002%	0.000001	0.0000003
Hydrocarbons	0.0009%	0.000007	0.0000015
Aldehydes	0.001%	0.000007	0.0000017
Soot	0.00000001	8.58529E-09	1.98734E-09
Benz (a) pyrene	1E-12	8.58529E-13	1.98734E-13

The amount of each toxic component of the exhaust gas is determined in accordance with

MCO= 1 *	2.92	* 20 / 3600 =	0.0162	g/s	0.0700	t/year
MNOx :,965	2.92	* 2 /3600 =	0.0080	g/s	0.0348	t/year
Mald = 1,3'	2.92	* 1 /3600 =	0.0011	g/s	0.0048	t/year

Of these, harmful substances

Components	Emissions in g/s	Emissions in t/year
Inorganic dust	**0.024**	**0.103200**
Carbon monoxide	0.0163	0.0704
Nitrogen oxides	0.0080	0.0348
Hydrocarbons	0.0000015	0.0000066
Aldehydes	0.0011	0.0048
Soot	0.000000002	0.000000009
Benz (a) pyrene	0.0000000000002	0.0000000000009
Total :	**0.0493**	**0.2131**

1.3. Emission of harmful substances during the operation of drilling rig MRK-750 - 1 unit based on KAMAZ 511 truck.

Source of emission

Drilling rig MRK-750 - 1 unit based on KAMAZ 511 truck

Source date

Dust cleaning system:

none

The total operating time of all equipment for the year, G	1080	h/year
The amount of dust emitted by equipment unit according to the method, z	396	g/hour
Dust suppression efficiency in unit fractions, n	0.75	
Efficiency factor of the drilling rig	0.7	
Number of equipment units	1	units.

Dust emission during drilling operations
============================

Q = 1 * 396 *(1- 0.75) / 3600 = 0.027500 g/sec

Annual emissions based on equipment utilization factor:

M = 396 * 1080 *(1- 0.75) * 0.7 * 1 / 10^6 = 0.074844 t/year

The amount of exhaust gases during operation of vehicles is 208.5 kg per 1 ton of consumed fuel.
During the operation of the drilling rig - 1 unit diesel fuel consumption per year is 4.5 tons or
6.0 kg/hour.
The calculation of the amount of exhaust gases will be:
4.5 * 208.5 /1000 0.94 t/year or 1.10 m3/year
The typical composition of exhaust gases for diesel engines is shown in the table:

Components	Content,% by weight	t/year or	g/s
Nitrogen	77%	0.7225	0.2655
Oxygen	16%	0.1501	0.0552
Water vapor	2.50%	0.0235	0.0086
Carbon dioxide	4.40%	0.0413	0.0152
Carbon monoxide	0.05%	0.000469	0.0001724
Nitrogen oxides	0.0002%	0.000002	0.0000007
Hydrocarbons	0.0009%	0.000008	0.0000031
Aldehydes	0.001%	0.000009	0.0000034
Soot	0.00000001	1.10382E-08	4.05579E-09
Benz (a) pyrene	1E-12	1.10382E-12	4.05579E-13

The amount of each toxic component of the exhaust gas is determined in accordance with the formulas

MC(1 *	5.95	* 20	/ 3600 =	0.0331	g/s	0.1837	t/year
MN(965	5.95	* 2	/3600 =	0.0164	g/s	0.0912	t/year
Mald =	5.95	* 1	/3600 =	0.0023	g/s	0.0126	t/year

Of these, harmful substances

Components	Emissions in g/s	Emissions in t/year
Inorganic dust	0.027500	0.074844
Carbon monoxide	0.0332	0.1841
Nitrogen oxides	0.0164	0.0912
Hydrocarbons	0.0000031	0.0000084
Aldehydes	0.0023	0.0126
Soot	0.000000004	0.000000011
Benz (a) pyrene	0.0000000000004	0.0000000000011
Total :	**0.0794**	**0.3628**

1.4. Emission of harmful substances during operation of a loader excavator - 1 pc.

The source of emission is a loader excavator - 1 pc., a loader.

The following is emitted into the atmospheric air: inorganic dust, nitrogen, oxygen, water vapor, carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, aldehydes, soot, benzo (a) pyrene.

Working time - 4 hours / day or   720 ч/год.

1. Calculation of emissions of inorganic dust

Emissions at extraction and loading operations.

During the operation of the excavator, inorganic dust is emitted, mainly when loading material into a dump truck.

Dust emission objects can be described by the equation:

$$Q_2 = P_1 * P_2 * P_3 * P_4 * G * 10^6 / 3600, \quad g/s$$

Where: P_1- proportion of dust fraction in the rock is determined by washing and sieving

of average sample with the emission of dust fractions with size of 0 - 200 microns (P1 =   P1=   0.03

P_2- fraction of flying dust with a particle size of 0 - 50 microns passing into aerosol
in relation to all dust in the material (it is assumed that not all flying dust
turns into aerosol). Clarification of P2 value is carried out by sampling the dusty
air at the boundaries of the dusty object at the wind speed of 2 m / s, giving in the direction
of the sampling point (P2 = K2);   P2=   0.02

P_3- coefficient taking into account the wind speed in the area of the loader operation;   P3=   1.5

P_4- coefficient taking into account the moisture content of the material (P_4 = K P4= 0.01

G-the amount of the loaded material, t / hour.   G=   3.5

Q2 = 0.03 * 0.02 * 1.5 * 0.01 *   3.5   * 1000000 / 3600   = 0.009

M1 = 0.009 * 3600 * 720 / 1000000 = 0.0227

2.Emissions of toxic gases during excavator operation.

The amount of exhaust gases during excavator operation is 208.5 kg per 1 ton of consumed fuel.

When the excavator is operating, diesel fuel consumption per year is   5.0 tons or   6.94 kg/hour.

The calculation of the amount of exhaust gases will be:

5 * 209 /1000=   1.04   t/year or   1.23   m3/year

The typical composition of exhaust gases for diesel engines is shown in the table:

Components	Content,% by weight	t/year	g/s
Nitrogen	77%	0.802725	0.3097
Oxygen	16%	0.1668	0.0644
Water vapor	2.50%	0.0260625	0.0101
Carbon dioxide	4.40%	0.04587	0.0177
Carbon monoxide	0.05%	0.00052125	0.0002011
Nitrogen oxides	0.0002%	0.000002085	0.0000008
Hydrocarbons	0.0009%	9.3825E-06	0.0000036
Aldehydes	0.001%	0.000010425	0.0000040
Soot	0.00000001	1.22647E-08	4.73175E-09
Benz (a) pyrene	1E-12	1.22647E-12	4.73175E-13

The amount of each toxic component of the exhaust gas is determined

M_{co} = 1 * 6.94 * 20 / 3600 = 0.03858 g / s 0.1000 t/year
M_{NOx} = 4.965 * 6.94 * 2 / 3600 = 0.01916 g / s 0.0497 t/year
M_{ald} = 1.375 * 6.94 * 1 / 3600 = 0.00265 g / s 0.0069 t/year

Of these, harmful substances

Components	Emissions in g / s	Emissions in t / year
Inorganic dust	0.009	0.0227
Carbon monoxide	0.0388	0.1005
Nitrogen oxides	0.0192	0.0497
Hydrocarbons	0.0000036	0.0000094
Aldehydes	0.0027	0.0069
Soot	0.000000005	0.000000012
Benz (a) pyrene	0.0000000000005	0.0000000000012
Итого :	**0.0693**	**0.1797**

1.5. Emission of harmful substances during electric welding.

Calculation of emissions of harmful substances in the performance of electric welding works is carried out according to the formula:

$$M = K * q * 10^{-6} \text{ t/year}$$
$$M = K * q / T / 3600 \text{ g/sec}$$

Where: K – specific indicator of formation of harmful substances, g/kg

q – Mass of consumable materials, kg / year

T – duration of work, year.

2. The source of emission is electric welding machines.

3. Welding machine works – 508 hours per year.

For electric welding, UONI electrodes are used – 13/55.

Calculation of emissions of harmful substances is made according to formulas 3.1. and 3.2. (Sh. 5)

№	Electrode type	Name of the emitted substance	specific emission K g/kg	Material consumption, q kg. per year	Working hours, T hour per year	Emissions g/sec	t/year
1	UONI-13/55	Iron oxide	14,90	500	508	0,0081	0,0074
		Manganese oxide	1,09			0,0006	0,0005
		Silicon oxide	1,0			0,0005	0,0005
		Poorly soluble fluorides	1,0			0,0005	0,0005
		Hydrogen fluoride	1,26			0,0007	0,0006
		Nitrogen oxides	2,7			0,0015	0,0013
		Carbon monoxide	13,3			0,0073	0,0066
Total:						**0,0192**	**0,0174**

1.6. Emission of harmful substances during painting work.

Ethyl alcohol, butyl acetate, ethyl acetate, ethylene glycol acetate will be released into the atmospheric air.

The average operating time of paint guns is 256 hours per year.

Metal structures of supports, including supporting parts of foundations F5-USU (250), are painted. For the convenience of calculating pollutant emissions, the results are summarized in one source.

For the calculation, the actual data of paint consumption and working hours of house painters were used. There is no equipment for trapping and neutralizing harmful substances (gas cleaning). Painting is carried out pneumatically. The amount of paint aerosol (M_a) in tons emitted into the atmospheric air in the absence of gas cleaning when applying paint and varnish material to the product is determined by the formula:

$$M_a = M_T * f_a * f_T * 10^{-4}, \text{ т/год}$$

where: M_T – mass of paint and varnish material used for coating, t / year.

f_a – proportion of paint and varnish material lost as aerosol, %

f_T – proportion of the solid component in the paint and varnish material, %

Source data are presented in table № 5.3.1.

The amount of paint aerosol emitted into the atmosphere per unit of time (g / s) is calculated by the formula:

$$Ga = 0,56 * M_к * f_a * f_т * 10^{-4}, g/s$$

where: $M_к$ – weight of paint and varnish material used 30 min before the of coating process, kg.

Emission of the individual pollutant contained in the volatile part of the paint and varnish material (in the absence of gas cleaning) during coating (Gc) is determined by the formula:

$$Mo = Mт * f_p * fp.o * fk * 10^{-6}, t/year$$
$$Ga = 0,56 * M_к * f_к * f_т * 10^{-4}, g/s$$
$$Mc = M_т * f_p * f_{p.c} * fk * 10^{-6}, t/year$$
$$Ga = 0,56 * M_к * f_к * f_p * 10^{-4}, g/s$$

where: $Mт$ - weight of paint and varnish material used for coating, t/year.

$M_к$ - weight of paint and varnish material used 30 min before the of coating process, kg.

f_p - share of volatile part as a percentage of the total mass of paint and varnish material

$f_{p.o}$ - proportion of volatile solvents from their total content in the paint and varnish material during coating, %

$f_{p.c}$- proportion of volatile solvents from their total content in the paint and varnish material (pvm) during drying, %

f_k - proportion of the pollutant content in the volatile part of the paint material, %

$f_т$ - proportion of the solid component in the paint and varnish material, %

The results of calculations are presented in table № 5.3.1.

Source data

Paint brand	Working time, h / year	Quantity of paint and varnish materials consumed per year, t.Mt	Quantity of paint and varnish materials spent for 30 min. of application, kg. Mk	Share of volatile part, % of total mass of PVM (fp)	Proportion of solid component (fт), %	Proportion of paint lost in the form of aerosol (fa) %	Proportion of solvent emitted during painting (fp.o), %	Proportion of solvent emitted during drying (fp.c), %
Mastic, Enamel PF-115, oil paint nitroenamel, BT-177 silver	256	1	0,975	61	39	30	25	75

Calculation of emissions

Paint brand	Harmful substance	Content in PVM (fa) and	Maximum one-time emission, G g/sec	Gross emission M, t/year

			when applying PVM, Mo	When drying, Mc	when applying PVM, Mo	When drying, Mc
Mastic, Enamel PF-115, oil paint nitroenamel, BT-177 silver	Spray paint	30	0,0655		0,0585	
	Ethyl alcohol	7	0,0298	0,0466	0,0053	0,016
	Butyl acetate	53	0,226	0,353	0,04	0,121
	Ethyl acetate	20	0,085	0,133	0,0152	0,0458
	Ethylene glycol acetate	20	0,085	0,133	0,0152	0,0458

Composition of spray paint: Ethyl alcohol 7 % - 0,0046 g/sec, 0,0041 t/year, butyl acetate 53 % - 0,0347 g/sec, 0,031 t/year, ethyl acetate 20 % - 0,0131 g/sec, 0,0117 t/year, ethylene glycol acetate 20% - 0,0131, 0,0117 t/year.

In total, the source emits harmful substances

Harmful substance	Maximum one-time emission, G, g/sec.	Gross emission, M, t/year
Ethyl alcohol	0,081	0,0254
Butyl acetate	0,6137	0,192
Ethyl acetate	0,2311	0,0727
Ethylene glycol acetate	0,2311	0,0727
Total:	**1,157**	**0,3628**

The total amount of emissions during construction of 500 kV OHL to 220/500 kV switchgear at Navoi TPP

Harmful substance	Maximum one-time emission, G, g/sec.	Gross emission, M, t/year	
Carbon monoxide	0,1815	0,6833	41,7053
Nitrogen oxides	0,0875	0,3359	20,5017
Inorganic dust	0,0605	0,2	12,207
Hydrocarbons	0,0000162	0,0000544	0,00332
Aldehydes	0,012	0,0463	2,82593
Soot	0,00000002	0,00000005	3,1E-06
Benz(a)pyrene	0,000000000002	0,000000000004	2,4E-10
Iron oxide	0,0081	0,0074	0,45166
Manganese oxide	0,0006	0,0005	0,03052
Silicon oxide	0,0005	0,0005	0,03052
Poorly soluble fluorides	0,0005	0,0005	0,03052
Hydrogen fluoride	0,0007	0,0006	0,03662
Ethyl alcohol	0,081	0,0254	1,55029
Butyl acetate	0,6137	0,192	11,7188
Ethyl acetate	0,2311	0,0727	4,43726
Ethylene glycol acetate	0,2311	0,0727	4,43726
Total:	**1,5088**	**1,6384**	

Ситуационная ката схема трасса ВЛ 500 кВ от ПГУ № 4 до выносного ОРУ 220/500 кВ при Навоийской ТЭС

М и р з а м у м и н

С

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Э т а к с а р а й

**Выносное ОРУ
220/500 кВ
Навоийской ТЭС**

П а х т а к о р

450м

т а н

У р г е н ч

ОЛ-НС Коннтех

110 кВ

Л-2 35 кВ

110 кВ

Л-Я-Курган 110 кВ

Наввбахорский район

Карманинский район

Наввбахорский район

Карманинский район

ов

до

ПГУ 3,4

**Навоийская
ТЭС** Руководитель предприятия

ые обозначения

Раннее выполненный отвод земли для
строительства ВЛ 220 кВ "НТЭС-Химил-4

территория необходимая для проложения трасс выдачи
мощности ПГУ-3 Навои ТЭС - Выносное ОРУ Навоийской ТЭС

территория необходимая для строительства
выносного ОРУ Навоийской ТЭС

территория необходимая для проложения трасс выдачи инспектор
ПГУ-4 Навои ТЭС - Выносное ОРУ Навоийской ТЭС

Участки необходимого сноса строений

Государственный инспектор

Подписи подтверждаю

№ 3869-370-01-т.1-2

Выносное ОРУ 220/500 кВ Навоийской ТЭС.
Заводка ВЛ 220/500 кВ на выносное ОРУ 220/500 кВ Навоийской ТЭС

			Стадия	Лист	Листов
ГИП ВЛ	Дробова А.Г.				
ГИП ПС	Гуланов Ф.Ф.	Материалы выбора и согласований	130	1	1
Нач.ОИЗ	Асанов Р.Р.				
Вед.спец.	Зохаров А.А.	Схема участков сноса строений и территории запрета застройки			
		М 1:10000		АО «SREDAZENERGOSETPROEKT	

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                -----------------------------------------------------------------
                                       <<VARSA-RADUGA>>
     INITIAL DATA

    Meteorological characteristics and coefficients
    Defining the conditions of pollutants dissemination in atmosphere
Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
                                          Table 1
                -----------------------------------------------------------------
: Number of sources                                :      1 :
: Number of considered hazardous substances        :     16 :
: Number of summation groups                       :      0 :
: Average maximum temperature of outdoor air       :   39.5 :
: of the hottest month of the year                 :        :
: Average maximum temperature of outdoor air       :   -4.0 :
: of the coolest month of the year                 :        :
: Coefficient depending on atmosphere stratification :  200 :
: Wind speed the occurrence of excess of which     :      8 :
: is 5 % (m/s)                          :        :
                -----------------------------------------------------------------
```

```
----------------------------------------------------------------------------------------------------
                                       <<VARSA-RADUGA>>
      PARAMETERS OF SOURCES

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Table 7 Page 1
----------------------------------------------------------------------------------------------------
```

| Code | Height of point: or width: of planar | Diameter: of planar | Parameters of air-gas mixture | | | Coordinates | | | | Angle between: OX axis and: direction to north | Coeff. of relief accounting |
| | | | Speed | Volume | Tempe-rature | Of point, origin: of linear/center line of planar | End of linear or center line of planar | | | | |
H of source	H(m)	D	W(m/s)	V(m³/s)	T	X1(m)	Y1(m)	X2(m)	Y2(m)	C(degr.)	PH
01	4.0	0.00	2.4000	0.0000	28.5	1500	1600	–	–	90	1.00

```
----------------------------------------------------------------------------------------------------
                                       <<VARSA-RADUGA>>
    CHARACTERISTICS OF EMISSIONS

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Table 8  Page 1
----------------------------------------------------------------------------------------------------
```

Substance code	Substance name(digit number)	MAC(mg/m³)	Sinking coeff.	Number of sources	ton/year	g/s
38	Carbon oxide	5.000000	–	1	0.6833	0.181500

H of source	Emissions g/s	mg/m³	ton/year	Sinking coefficient	H of source	Emissions g/s	g/m³	ton/year	Sinking coefficient
01	0.181500	38996988.1	0.6833	1.0					

Substance code	Substance name (digit number)	MAC(mg/m³)	Sinking coeff.	Number of sources	ton/year	g/s
34	Nitrogen oxides	0.085000	–	1	0.3359	0.087500

H of source	Emissions g/s	mg/m³	ton/year	Sinking coefficient	H of source	Emissions g/s	g/m³	ton/year	Sinking coefficient
01	0.087500	18800200.9	0.3359	1.0					

Substance code	Substance name(digit number)	MAC(mg/m³)	Sinking coeff.	Number of sources	ton/year	g/s
114	Inorganic dust	0.500000	–	1	0.2000	0.060500

H of source	Emissions g/s	mg/m³	ton/year	Sinking coefficient	H of source	Emissions g/s	g/m³	ton/year	Sinking coefficient
01	0.060500	12998996.0	0.2000	3.0					

Substance code	Substance name(digit number)	MAC(mg/m³)	Sinking coeff.	Number of sources	ton/year	g/s
118	Hydrocarbons	1.000000	–	1	0.0001	0.000016

H of source	Emissions g/s	mg/m³	ton/year	Sinking coefficient	H of source	Emissions g/s	g/m³	ton/year	Sinking coefficient
01	0.000016	3480.7	0.0001	1.0					

Substance code	Substance name(digit number)	MAC(mg/m³)	Sinking coeff.	Number of sources	ton/year	g/s
104	Aldehydes	0.040000	–	1	0.0463	0.012000

H of source	Emissions g/s	mg/m³	ton/year	Sinking coefficient	H of source	Emissions g/s	g/m³	ton/year	Sinking coefficient
01	0.012000	2578313.3	0.0463	1.0					

```
----------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:     ton/year:    g/s      :
:--------------------------------------------------------------------------------------------------
:    57     Carbon black                    0.150000       -             1                  0.0000 :   0.000000:
:
:--------------------------------------------------------------------------------------------------
:         E m i s s i o n s             :      Sinking :         E m i s s i o n s       :    Sinking      :
: H of source: g/s     : mg/m³:   ton/year: coefficient     H of source: g/s :   g/m³: ton/year: coefficient ----------
--------------------------------------------------------------------------
    01   0.000000       0.2   0.0000  2.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year:   g/s  :
:--------------------------------------------------------------------------------------------------
:   108       Benzopyrene                 0.000010       -             1                  0.0000 : 0.000000:
:--------------------------------------------------------------------------------------------------
:              E m i s s i o n s        :   Sinking :         E m i s s i o n s      :    Sinking  :
: H of source: g/s    : mg/m³:    ton/year:      coefficient     H of source: g/s : g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01        0.000000      0.2      0.0000         1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year: g/s     c     :
:--------------------------------------------------------------------------------------------------
:    86        Ferric oxide              0.200000       -      1                      0.0074 :    0.008100:
:--------------------------------------------------------------------------------------------------
:     E m i s s i o n s          :        Sinking :        E m i s s i o n s       :    Sinking   :
: H of source:  g/s :   mg/m³:     ton/year: coefficient     H of source:  g/s : g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01       0.008100 1740361.5  0.0074    1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year: g/s     :
:--------------------------------------------------------------------------------------------------
:   121      Manganous oxide 0.005000       -             1              0.0005    :   0.000600:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s       : Sinking :         E m i s s i o n s       :    Sinking    :
: H of source: g/s     : mg/m³:   ton/year: coefficient     H of source: g/s :  g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01     0.000600   128915.7     0.0005         1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year: g/s     c     :
:--------------------------------------------------------------------------------------------------
:   119      Silicon oxide 0.002000       -             1              0.0005    :   0.000500:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s       :  Sinking :         E m i s s i o n s  :         Sinking    :
: H of source: g/s     : mg/m³:   ton/year:      coefficient     H of source:  g/s : g/m³: ton/year: coefficient
    01   0.000500   107429.7  0.0005  1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year:   g/s     :
:--------------------------------------------------------------------------------------------------
:    65     Fluorides badly dissolvable      0.030000       -             1                  0.0005   : 0.000500 :
:--------------------------------------------------------------------------------------------------
:                E m i s s i o n s        :   Sinking :         E m i s s i o n s :          Sinking   :
: H of source: g/s     : mg/m³:   ton/year:      coefficient     H of source:  g/s : g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01   0.000500   107429.7  0.0005  1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year:    g/s    :
:--------------------------------------------------------------------------------------------------
:   120      Anhydrous hydrogen fluoride 0.012000              -             1              0.0006   :  0.000700:
:--------------------------------------------------------------------------------------------------
:                E m i s s i o n s        :   Sinking :         E m i s s i o n s :          Sinking    :
: H of source:  g/s :   mg/m³:    ton/year:      coefficient     H of source:  g/s : g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01   0.000700   150401.6  0.0006  1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year:    g/s      :
:--------------------------------------------------------------------------------------------------
:    31     Ethyl alcohol                   5.000000       -             1                  0.0254   : 0.081000:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s         :     Sinking :         E m i s s i o n s       :
Sinking   :H of source:   g/s  : mg/m³:    ton/year:        coefficient      H of source: g/s :  g/m³: ton/year:
coefficient
--------------------------------------------------------------------------
    01     0.081000   17403614.5   0.0254         1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year: g/s     :
:--------------------------------------------------------------------------------------------------
:   130      Butyl acetate 0.100000          -             1              0.1920    :   0.613700:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s       :     Sinking :         E m i s s i o n s        : Sinking    ::
H of source:   g/s   :   mg/m³:    ton/year:      coefficient     H of source: g/s :  g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01  0.61370013185923    7.4     0.1920        1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year: g/s     :
:--------------------------------------------------------------------------------------------------
:   132      Ethyl acetate                 0.100000       -             1                  0.0727   :   0.231100:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s         :     Sinking :         E m i s s i o n s       :    Sinking     ::
H of source: g/s   : mg/m³:   ton/year:      coefficient     H of source: g/s :  g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01  0.231100   49654016.2     0.0727         1.0
--------------------------------------------------------------------------------------------------
: Substance code:Substance name(digit number):MAC(mg/m³):Sinking coeff.: Number of sources:    ton/year:   g/s      :
:--------------------------------------------------------------------------------------------------
:   138      Ethylene glycol acetate     1.000000       -             1                  0.0727   : 0.231100:
:
:--------------------------------------------------------------------------------------------------
:        :         E m i s s i o n s         :   Sinking :         E m i s s i o n s :          Sinking    :
: H of source: g/s     : mg/m³:   ton/year:      coefficient     H of source:  g/s : g/m³: ton/year: coefficient
--------------------------------------------------------------------------
    01     0.231100   49654016.2   0.0727         1.0

----------------------------------------------------------------------------------------------------
```

```
      -------------------------------------------------------------------------------------------------------------
                                                   <<VARSA-RADUGA>>
               CHARACTERISTICS OF CONCENTRATION FIELD


                                     Selection of dangerous wind direction
                                     Selection of dangerous wind direction out of speeds: automatic
                                     Without background
               Symbolic notations:
      (X,Y) - point coordinates in meters
      QH    - concentration in point in MAC fractions
      HB    - wind direction in degrees
      U     - wind speed  m/s
      Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
      Substance: Carbon oxide                                                          Table 12 Page  1
      -------------------------------------------------------------------------------------------------------------
      :Y=   3000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0015019: 0.0017558: 0.0020122: 0.0019761: 0.0017577: 0.0015664: 0.0013863: 0.0013379: 0.0012173:
      : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 : 93- 0.5 : 81- 0.5 : 70- 0.5 : 60- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   3000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0011241: 0.0010564:0.000998858:0.000917168:0.000859566:0.000820192:0.000761231:
      : HB-U : 52- 0.5 : 45- 0.5 : 40- 0.5 : 35- 0.5 : 32- 0.5 : 28- 0.5 : 26- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0016769: 0.0021315: 0.0027271: 0.0027592: 0.0021604: 0.0018234: 0.0015579: 0.0014093: 0.0013072:
      : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 : 94- 0.5 : 79- 0.5 : 65- 0.5 : 54- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0011929: 0.0011241: 0.0010698: 0.0010073:0.000934043:0.000829678:0.000795073:
      : HB-U : 45- 0.5 : 38- 0.5 : 33- 0.5 : 29- 0.5 : 26- 0.5 : 23- 0.5 : 21- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0017740: 0.0023620: 0.0039318: 0.0057609: 0.0029345: 0.0022318: 0.0017677: 0.0014866: 0.0013798:
      : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 : 95- 0.5 : 75- 0.5 : 58- 0.5 : 45- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0013072: 0.0012173: 0.0011338: 0.0010589:0.000982592:0.000867536:0.000824841:
      : HB-U : 36- 0.5 : 30- 0.5 : 26- 0.5 : 22- 0.5 : 20- 0.5 : 17- 0.5 : 16- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0017047: 0.0021206: 0.0028825: 0.0058682: 0.0060788: 0.0032578: 0.0020664: 0.0016978: 0.0014866:
      : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 : 98- 0.5 : 67- 0.5 : 45- 0.5 : 32- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0014093: 0.0013379: 0.0012135: 0.0011118: 0.0010277:0.000898354:0.000848761:
      : HB-U : 25- 0.5 : 20- 0.5 : 17- 0.5 : 15- 0.5 : 13- 0.5 : 11- 0.5 : 10- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0015535: 0.0017960: 0.0022035: 0.0030977: 0.0066578: 0.0072211: 0.0030979: 0.0020664: 0.0017677:
      : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 : 45- 0.5 : 23- 0.5 : 15- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0015579: 0.0013863: 0.0012932: 0.0011935: 0.0010797:0.000978426:0.000864007:
      : HB-U : 11- 0.5 : 9- 0.5 : 7- 0.5 : 6- 0.5 : 6- 0.5 : 5- 0.5 : 4- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0014169: 0.0015837: 0.0017981: 0.0022065: 0.0031929: 0.0049846: 0.0072211: 0.0032578: 0.0022318:
      : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   2000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0018234: 0.0015664: 0.0013933: 0.0012326: 0.0011135:0.000986992:0.000869535:
      : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0012880: 0.0014140: 0.0015393: 0.0016855: 0.0020177: 0.0031929: 0.0066578: 0.0060788: 0.0029345:
      : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0021604: 0.0017577: 0.0014771: 0.0012860: 0.0011336:0.000980455:0.000895023:
      : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0012154: 0.0013033: 0.0013980: 0.0015021: 0.0016855: 0.0022065: 0.0030977: 0.0058682: 0.0057609:
      : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0027592: 0.0019761: 0.0015783: 0.0013280: 0.0011347: 0.0010241:0.000895866:
      : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0011313: 0.0011936: 0.0012934: 0.0013908: 0.0015393: 0.0017981: 0.0022035: 0.0028825: 0.0039318:
      : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0027271: 0.0020122: 0.0015644: 0.0013341: 0.0011391:0.000988333:0.000861833:
      : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0010627: 0.0011384: 0.0011936: 0.0013033: 0.0014140: 0.0015837: 0.0017960: 0.0021206: 0.0023620:
      : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0021315: 0.0017558: 0.0014779: 0.0012344: 0.0010736:0.000973263:0.000854628:
      : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
      :  QH : 0.0010161: 0.0010627: 0.0011313: 0.0012154: 0.0012880: 0.0014169: 0.0015535: 0.0017047: 0.0017740:
      : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
      -------------------------------------------------------------------------------------------------------------
      :Y=   1000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
      :  QH : 0.0016769: 0.0015019: 0.0013157: 0.0011607: 0.0010291:0.000908252:0.000807124:
      : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
--------------------------------------------------------------------------------------------
:Y=     800 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000919311:0.000991725:  0.0010470:  0.0011291:  0.0011929:  0.0012334:  0.0013328:  0.0014316:  0.0014373:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     800 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :  0.0013903:  0.0012997:  0.0011720:  0.0010558:0.000942070:0.000842427:0.000752633:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     600 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000888867:0.000927845:0.000961785:  0.0010460:  0.0011247:  0.0011521:  0.0012061:  0.0012140:  0.0012205:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     600 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :  0.0011855:  0.0011392:  0.0010467:0.000949235:0.000858832:0.000778695:0.000688829:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     400 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000820179:0.000861683:0.000900032:0.000941468:0.000973202:  0.0010185:  0.0010578:  0.0010705:  0.0010883:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     400 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :  0.0010387:  0.0010052:0.000928154:0.000853271:0.000783092:0.000702880:0.000637135:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     200 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000763432:0.000817399:0.000830838:0.000886564:0.000909824:0.000922592:0.000923217:0.000946965:0.000944685:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
--------------------------------------------------------------------------------------------
:Y=     200 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000899457:0.000883370:0.000826814:0.000768650:0.000698418:0.000640204:0.000571061:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
--------------------------------------------------------------------------------------------
:Y=       0 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000691035:0.000731727:0.000767462:0.000793847:0.000805090:0.000811964:0.000839297:0.000825490:0.000822678:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
--------------------------------------------------------------------------------------------
:Y=       0 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000823148:0.000784148:0.000732388:0.000678021:0.000631103:0.000567056:0.000504006:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
--------------------------------------------------------------------------------------------
```

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-----------------------------------------------------------------------------------------------------------------------
                                              <<VARSA-RADUGA>>
          CHARACTERISTICS OF CONCENTRATION FIELD


                                    Selection of dangerous wind direction
                                    Selection of dangerous wind direction out of speeds: automatic
                                    Without background
          Symbolic notations:
X,Y) - point coordinates in meters
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance: Nitrogen oxides                                                           Table 12 Page  1
-----------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0301688: 0.0352686: 0.0404201: 0.0396935: 0.0353065: 0.0314649: 0.0278460: 0.0268738: 0.0244530:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0225804: 0.0212196: 0.0200643: 0.0184234: 0.0172663: 0.0164754: 0.0152910:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0336838: 0.0428159: 0.0547808: 0.0554241: 0.0433971: 0.0366270: 0.0312946: 0.0283083: 0.0262582:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0239626: 0.0225804: 0.0214888: 0.0202344: 0.0187623: 0.0166659: 0.0159708:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0356352: 0.0474467: 0.0789788: 0.1157202: 0.0589467: 0.0448300: 0.0355084: 0.0298622: 0.0277173:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0262582: 0.0244530: 0.0227742: 0.0212699: 0.0197376: 0.0174264: 0.0165688:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0342432: 0.0425979: 0.0579017: 0.1178769: 0.1221072: 0.0654411: 0.0415081: 0.0341036: 0.0298622:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0283083: 0.0268738: 0.0243761: 0.0223329: 0.0206443: 0.0180455: 0.0170493:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0312054: 0.0360769: 0.0442617: 0.0622235: 0.1337363: 0.1450522: 0.0622280: 0.0415081: 0.0355084:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0312946: 0.0278460: 0.0259762: 0.0239748: 0.0216878: 0.0196539: 0.0173555:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0284625: 0.0318128: 0.0361193: 0.0443226: 0.0641371: 0.1001268: 0.1450522: 0.0654411: 0.0448300:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0366270: 0.0314649: 0.0279871: 0.0247589: 0.0223668: 0.0198259: 0.0174666:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0258732: 0.0284025: 0.0309197: 0.0338575: 0.0405305: 0.0641371: 0.1337363: 0.1221072: 0.0589467:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0433971: 0.0353065: 0.0296703: 0.0258315: 0.0227700: 0.0196946: 0.0179785:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0244140: 0.0261796: 0.0280812: 0.0301729: 0.0338575: 0.0443226: 0.0622235: 0.1178769: 0.1157202:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0554241: 0.0396935: 0.0317042: 0.0266767: 0.0227931: 0.0205708: 0.0179955:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0227242: 0.0239763: 0.0259809: 0.0279369: 0.0309197: 0.0361193: 0.0442617: 0.0579017: 0.0789788:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0547808: 0.0404201: 0.0314241: 0.0267981: 0.0228809: 0.0198529: 0.0173119:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0213471: 0.0228672: 0.0239763: 0.0261796: 0.0284025: 0.0318128: 0.0360769: 0.0425979: 0.0474467:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0428159: 0.0352686: 0.0296878: 0.0247958: 0.0215650: 0.0195502: 0.0171671:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=     0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0204113: 0.0213471: 0.0227242: 0.0244140: 0.0258732: 0.0284625: 0.0312054: 0.0342432: 0.0356352:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
-----------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=  1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0336838: 0.0301688: 0.0264289: 0.0233158: 0.0206709: 0.0182443: 0.0162129:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
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------------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0184664: 0.0199210: 0.0210313: 0.0226797: 0.0239627: 0.0247766: 0.0267716: 0.0287574: 0.0288707:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0279269: 0.0261071: 0.0235423: 0.0212087: 0.0189236: 0.0169220: 0.0151183:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0178549: 0.0186378: 0.0193196: 0.0210109: 0.0225923: 0.0231423: 0.0242274: 0.0243849: 0.0245171:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0238134: 0.0228826: 0.0210251: 0.0190675: 0.0172516: 0.0156418: 0.0138367:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0164751: 0.0173088: 0.0180792: 0.0189115: 0.0195489: 0.0204591: 0.0212481: 0.0215034: 0.0218616:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0208653: 0.0201925: 0.0186440: 0.0171399: 0.0157301: 0.0141189: 0.0127983:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0153352: 0.0164193: 0.0166892: 0.0178086: 0.0182759: 0.0185323: 0.0185449: 0.0190219: 0.0189761:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0180676: 0.0177445: 0.0166084: 0.0154401: 0.0140293: 0.0128599: 0.0114710:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0138810: 0.0146984: 0.0154162: 0.0159462: 0.0161720: 0.0163101: 0.0168591: 0.0165818: 0.0165253:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0165348: 0.0157514: 0.0147117: 0.0136196: 0.0126771: 0.0113906: 0.0101241:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
------------------------------------------------------------------------------------------------------------
```

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--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
        CHARACTERISTICS OF CONCENTRATION FIELD


                                    Selection of dangerous wind direction
                                    Selection of dangerous wind direction out of speeds: automatic
                                    Without background
        Symbolic notations:
(X,Y) - point coordinates in meters
 QH   - concentration in point in MAC fractions
 HB   - wind direction in degrees
 U    - wind speed  m/s

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance: Inorganic dust                                                   Table 12 Page  1
--------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0015860: 0.0020676: 0.0025825: 0.0026276: 0.0023469: 0.0020861: 0.0018192: 0.0017059: 0.0014732:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0012523: 0.0010426:0.000872584:0.000712166:0.000595211:0.000508691:0.000426339:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0019330: 0.0028045: 0.0040047: 0.0041595: 0.0032101: 0.0027061: 0.0022878: 0.0020013: 0.0017503:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0014825: 0.0012523: 0.0010327:0.000847786:0.000692821:0.000545776:0.000468122:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0021665: 0.0033198: 0.0062394: 0.0101086: 0.0047807: 0.0036536: 0.0028997: 0.0023501: 0.0020252:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0017503: 0.0014732: 0.0011931:0.000962542:0.000776534:0.000600851:0.000506942:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0021382: 0.0030099: 0.0045304: 0.0105378: 0.0112030: 0.0056623: 0.0037360: 0.0029347: 0.0023501:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0020013: 0.0017059: 0.0013578: 0.0010743:0.000856103:0.000648776:0.000538765:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0019427: 0.0025269: 0.0034398: 0.0051900: 0.0125839: 0.0160107: 0.0053828: 0.0037360: 0.0028997:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 0.5 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0022878: 0.0018192: 0.0014984: 0.0012007:0.000932226:0.000728624:0.000561455:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0017662: 0.0022163: 0.0028044: 0.0038122: 0.0056776: 0.0175501: 0.0160107: 0.0056623: 0.0036536:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 1.1 : 342- 0.5 : 352- 0.5 : 355- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0027061: 0.0020861: 0.0016360: 0.0012659:0.000976115:0.000745971:0.000571320:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0015675: 0.0019431: 0.0023584: 0.0028732: 0.0036375: 0.0056776: 0.0125839: 0.0112030: 0.0047807:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0032101: 0.0023469: 0.0017406: 0.0013113:0.000999740:0.000739459:0.000592725:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0014238: 0.0017120: 0.0020334: 0.0024016: 0.0028732: 0.0038122: 0.0051900: 0.0105378: 0.0101086:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0041595: 0.0026276: 0.0018345: 0.0013376:0.000985694:0.000758936:0.000585487:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0012314: 0.0014757: 0.0017438: 0.0020234: 0.0023584: 0.0028044: 0.0034398: 0.0045304: 0.0062394:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0040047: 0.0025825: 0.0017357: 0.0012922:0.000949270:0.000706558:0.000552461:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0010429: 0.0012765: 0.0014757: 0.0017120: 0.0019431: 0.0022163: 0.0025269: 0.0030099: 0.0033198:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0028045: 0.0020676: 0.0015416: 0.0011184:0.000840289:0.000674032:0.000535477:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH :0.000892296: 0.0010429: 0.0012314: 0.0014238: 0.0015675: 0.0017662: 0.0019427: 0.0021382: 0.0021665:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0019330: 0.0015860: 0.0012435:0.000968363:0.000758423:0.000599902:0.000486353:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
--------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000722080:0.000854399:0.000982626:  0.0011464:  0.0012625:  0.0013423:  0.0014692:  0.0015619:  0.0015330:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0013975:  0.0012147:0.000989128:0.000798369:0.000642706:0.000526841:0.000436112:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000625386:0.000706076:0.000786937:0.000910258:  0.0010288:  0.0010873:  0.0011468:  0.0011465:  0.0011177:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0010357:0.000929341:0.000784597:0.000651997:0.000546281:0.000459002:0.000382438:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000519696:0.000583083:0.000647044:0.000713105:0.000767676:0.000819578:0.000862164:0.000869286:0.000859587:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000781689:0.000716352:0.000624884:0.000539646:0.000463864:0.000398399:0.000338574:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000436446:0.000495538:0.000530776:0.000589148:0.000624508:0.000645924:0.000649801:0.000665104:0.000645110:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000597687:0.000569491:0.000508710:0.000449571:0.000394756:0.000341265:0.000298983:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000369929:0.000405336:0.000438951:0.000468333:0.000490164:0.000503208:0.000527673:0.000517896:0.000507492:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
--------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000499557:0.000460966:0.000419342:0.000372606:0.000333314:0.000296886:0.000263876:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
--------------------------------------------------------------------------------------------------
```

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------------------------------------------------------------------------------------------------------------------
                                           <<VARSA-RADUGA>>
CHARACTERISTICS OF CONCENTRATION FIELD

                              Selection of dangerous wind direction
                              Selection of dangerous wind direction out of speeds: automatic
                              Without background
        Symbolic notations:
X,Y) - point coordinates in meters
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s
Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
          Substance: Hydrocarbons                                                    Table 12 Page  1
------------------------------------------------------------------------------------------------------------------
:Y=    3000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000670:0.000000784:0.000000898:0.000000882:0.000000784:0.000000699:0.000000619:0.000000597:0.000000543:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    3000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000502:0.000000471:0.000000446:0.000000409:0.000000384:0.000000366:0.000000340:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2800 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000748:0.000000951:0.000001217:0.000001231:0.000000964:0.000000814:0.000000695:0.000000629:0.000000583:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2800 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000532:0.000000502:0.000000477:0.000000450:0.000000417:0.000000370:0.000000355:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2600 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000792:0.000001054:0.000001755:0.000002571:0.000001310:0.000000996:0.000000789:0.000000663:0.000000616:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2600 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000583:0.000000543:0.000000506:0.000000473:0.000000439:0.000000387:0.000000368:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2400 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000761:0.000000946:0.000001286:0.000002619:0.000002713:0.000001454:0.000000922:0.000000758:0.000000663:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2400 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000629:0.000000597:0.000000542:0.000000496:0.000000459:0.000000401:0.000000379:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2200 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000693:0.000000802:0.000000983:0.000001382:0.000002971:0.000003223:0.000001383:0.000000922:0.000000789:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2200 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000695:0.000000619:0.000000577:0.000000533:0.000000482:0.000000437:0.000000386:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000632:0.000000707:0.000000802:0.000000985:0.000001425:0.000002225:0.000003223:0.000001454:0.000000996:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    2000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000814:0.000000699:0.000000622:0.000000550:0.000000497:0.000000440:0.000000388:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1800 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000575:0.000000631:0.000000687:0.000000752:0.000000900:0.000001425:0.000002971:0.000002713:0.000001310:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1800 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000964:0.000000784:0.000000659:0.000000574:0.000000506:0.000000438:0.000000399:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1600 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000542:0.000000582:0.000000624:0.000000670:0.000000752:0.000000985:0.000001382:0.000002619:0.000002571:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1600 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000001231:0.000000882:0.000000704:0.000000593:0.000000506:0.000000457:0.000000400:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1400 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000505:0.000000533:0.000000577:0.000000621:0.000000687:0.000000802:0.000000983:0.000001286:0.000001755:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1400 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000001217:0.000000898:0.000000698:0.000000595:0.000000508:0.000000441:0.000000385:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1200 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000474:0.000000508:0.000000533:0.000000582:0.000000631:0.000000707:0.000000802:0.000000946:0.000001054:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1200 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000951:0.000000784:0.000000660:0.000000551:0.000000479:0.000000434:0.000000381:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:   QH :0.000000453:0.000000474:0.000000505:0.000000542:0.000000575:0.000000632:0.000000693:0.000000761:0.000000792:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    1000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:   QH :0.000000748:0.000000670:0.000000587:0.000000518:0.000000459:0.000000405:0.000000360:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
----------------------------------------------------------------------------------------------------------------
:Y=    800 X=      0  X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000000410:0.000000443:0.000000467:0.000000504:0.000000532:0.000000550:0.000000595:0.000000639:0.000000641:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000000620:0.000000580:0.000000523:0.000000471:0.000000420:0.000000376:0.000000336:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0  X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000000397:0.000000414:0.000000429:0.000000467:0.000000502:0.000000514:0.000000538:0.000000542:0.000000545:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000000529:0.000000508:0.000000467:0.000000424:0.000000383:0.000000348:0.000000307:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0  X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000000366:0.000000385:0.000000402:0.000000420:0.000000434:0.000000455:0.000000472:0.000000478:0.000000486:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000000464:0.000000449:0.000000414:0.000000381:0.000000349:0.000000314:0.000000284:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0  X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000000341:0.000000365:0.000000371:0.000000396:0.000000406:0.000000412:0.000000412:0.000000423:0.000000422:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000000401:0.000000394:0.000000369:0.000000343:0.000000312:0.000000286:0.000000255:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0  X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:    QH :0.000000308:0.000000327:0.000000343:0.000000354:0.000000359:0.000000362:0.000000375:0.000000368:0.000000367:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
----------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:    QH :0.000000367:0.000000350:0.000000327:0.000000303:0.000000282:0.000000253:0.000000225:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
----------------------------------------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------------------------------------------
                                           <<VARSA-RADUGA>>
          CHARACTERISTICS OF CONCENTRATION FIELD

                                   Selection of dangerous wind direction
                                   Selection of dangerous wind direction out of speeds: automatic
                                   Without background
          Symbolic notations:
     (X,Y) - point coordinates in meters
     QH    - concentration in point in MAC fractions
     HB    - wind direction in degrees
     U     - wind speed  m/s

     Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
               Substance:Aldehydes                                                        Table 12 Page  1
     ----------------------------------------------------------------------------------------------------------------
     :Y=   3000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0099299: 0.0116084: 0.0133040: 0.0130648: 0.0116209: 0.0103565: 0.0091653: 0.0088453: 0.0080485:
     : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   3000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0074322: 0.0069843: 0.0066040: 0.0060639: 0.0056831: 0.0054228: 0.0050329:
     : HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0110868: 0.0140925: 0.0180307: 0.0182424: 0.0142838: 0.0120555: 0.0103004: 0.0093175: 0.0086427:
     : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0078871: 0.0074322: 0.0070729: 0.0066600: 0.0061755: 0.0054855: 0.0052567:
     : HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0117291: 0.0156167: 0.0259953: 0.0380885: 0.0194019: 0.0147555: 0.0116873: 0.0098289: 0.0091230:
     : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0086427: 0.0080485: 0.0074960: 0.0070008: 0.0064965: 0.0057358: 0.0054535:
     : HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0112709: 0.0140208: 0.0190579: 0.0387983: 0.0401907: 0.0215395: 0.0136621: 0.0112250: 0.0098289:
     : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0093175: 0.0088453: 0.0080232: 0.0073507: 0.0067949: 0.0059395: 0.0056116:
     : HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0102710: 0.0118745: 0.0145684: 0.0204804: 0.0440184: 0.0477429: 0.0204819: 0.0136621: 0.0116873:
     : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0103004: 0.0091653: 0.0085499: 0.0078911: 0.0071384: 0.0064689: 0.0057124:
     : HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0093682: 0.0104709: 0.0118884: 0.0145885: 0.0211103: 0.0329560: 0.0477429: 0.0215395: 0.0147555:
     : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   2000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0120555: 0.0103565: 0.0092118: 0.0081492: 0.0073619: 0.0065256: 0.0057490:
     : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0085160: 0.0093485: 0.0101770: 0.0111440: 0.0133403: 0.0211103: 0.0440184: 0.0401907: 0.0194019:
     : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0142838: 0.0116209: 0.0097658: 0.0085023: 0.0074946: 0.0064823: 0.0059175:
     : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0080357: 0.0086168: 0.0092427: 0.0099312: 0.0111440: 0.0145885: 0.0204804: 0.0387983: 0.0380885:
     : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0182424: 0.0130648: 0.0104352: 0.0087804: 0.0075022: 0.0067707: 0.0059231:
     : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0074795: 0.0078916: 0.0085514: 0.0091952: 0.0101770: 0.0118884: 0.0145684: 0.0190579: 0.0259953:
     : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0180307: 0.0133040: 0.0103430: 0.0088204: 0.0075311: 0.0065344: 0.0056981:
     : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0070263: 0.0075266: 0.0078916: 0.0086168: 0.0093485: 0.0104709: 0.0118745: 0.0140208: 0.0156167:
     : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0140925: 0.0116084: 0.0097715: 0.0081613: 0.0070980: 0.0064348: 0.0056504:
     : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
     :  QH : 0.0067182: 0.0070263: 0.0074795: 0.0080357: 0.0085160: 0.0093682: 0.0102710: 0.0112709: 0.0117291:
     : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
     ----------------------------------------------------------------------------------------------------------------
     :Y=   1000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
     :  QH : 0.0110868: 0.0099299: 0.0086989: 0.0076742: 0.0068037: 0.0060050: 0.0053364:
     : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
-------------------------------------------------------------------------------------------------------------
:Y=     800 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0060781:  0.0065569:  0.0069223:  0.0074649:  0.0078872:  0.0081550:  0.0088117:  0.0094653:  0.0095026:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     800 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0091919:  0.0085930:  0.0077488:  0.0069807:  0.0062286:  0.0055698:  0.0049761:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     600 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0058768:  0.0061345:  0.0063589:  0.0069156:  0.0074361:  0.0076171:  0.0079743:  0.0080261:  0.0080696:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     600 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0078380:  0.0075316:  0.0069203:  0.0062759:  0.0056782:  0.0051484:  0.0045542:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     400 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0054227:  0.0056971:  0.0059506:  0.0062246:  0.0064344:  0.0067340:  0.0069936:  0.0070777:  0.0071956:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     400 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0068677:  0.0066462:  0.0061366:  0.0056415:  0.0051775:  0.0046471:  0.0042125:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     200 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0050475:  0.0054043:  0.0054931:  0.0058616:  0.0060154:  0.0060998:  0.0061039:  0.0062609:  0.0062458:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=     200 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0059468:  0.0058405:  0.0054665:  0.0050820:  0.0046176:  0.0042328:  0.0037756:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=       0 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0045688:  0.0048379:  0.0050741:  0.0052486:  0.0053229:  0.0053684:  0.0055491:  0.0054578:  0.0054392:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
-------------------------------------------------------------------------------------------------------------
:Y=       0 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0054423:  0.0051844:  0.0048422:  0.0044828:  0.0041726:  0.0037491:  0.0033323:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
-------------------------------------------------------------------------------------------------------------
```

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--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
CHARACTERISTICS OF CONCENTRATION FIELD


                              Selection of dangerous wind direction
                              Selection of dangerous wind direction out of speeds: automatic
                              Without background
        Symbolic notations:
(X,Y) - point coordinates in meters
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s
Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
          Substance:Carbon black                                                    Table 12 Page  1
--------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000001:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000001:0.000000001:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000001:0.000000001:0.000000000:0.000000000:0.000000000:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 0.5 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000001:0.000000001:0.000000000:0.000000000:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.9 : 342- 0.5 : 352- 0.5 : 355- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000001:0.000000001:0.000000000:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000001:0.000000001:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
--------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
----------------------------------------------------------------------------------------------------
:Y=    800 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    800 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    600 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    600 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    400 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    400 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    200 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    200 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=      0 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=      0 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:0.000000000:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
----------------------------------------------------------------------------------------------------
```

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---------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
         CHARACTERISTICS OF CONCENTRATION FIELD


                                  Selection of dangerous wind direction
                                  Selection of dangerous wind direction out of speeds: automatic
                                  Without background
         Symbolic notations:
    (X,Y) - point coordinates in meters
    QH    - concentration in point in MAC fractions
    HB    - wind direction in degrees
    U     - wind speed  m/s

    Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
              Substance:Benzopyrene                                                    Table 12 Page  1
    ---------------------------------------------------------------------------------------------------------------
    :Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000004137:0.000004837:0.000005543:0.000005444:0.000004842:0.000004315:0.000003819:0.000003686:0.000003354:
    : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000003097:0.000002910:0.000002752:0.000002527:0.000002368:0.000002259:0.000002097:
    : HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000004619:0.000005872:0.000007513:0.000007601:0.000005952:0.000005023:0.000004292:0.000003882:0.000003601:
    : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000003286:0.000003097:0.000002947:0.000002775:0.000002573:0.000002286:0.000002190:
    : HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000004887:0.000006507:0.000010831:0.000015870:0.000008084:0.000006148:0.000004870:0.000004095:0.000003801:
    : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000003601:0.000003354:0.000003123:0.000002917:0.000002707:0.000002390:0.000002272:
    : HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000004696:0.000005842:0.000007941:0.000016166:0.000016746:0.000008975:0.000005693:0.000004677:0.000004095:
    : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000003882:0.000003686:0.000003343:0.000003063:0.000002831:0.000002475:0.000002338:
    : HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000004280:0.000004948:0.000006070:0.000008534:0.000018341:0.000019893:0.000008534:0.000005693:0.000004870:
    : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000004292:0.000003819:0.000003562:0.000003288:0.000002974:0.000002695:0.000002380:
    : HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000003903:0.000004363:0.000004954:0.000006079:0.000008796:0.000013732:0.000019893:0.000008975:0.000006148:
    : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000005023:0.000004315:0.000003838:0.000003396:0.000003067:0.000002719:0.000002395:
    : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000003548:0.000003895:0.000004240:0.000004643:0.000005558:0.000008796:0.000018341:0.000016746:0.000008084:
    : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000005952:0.000004842:0.000004069:0.000003543:0.000003123:0.000002701:0.000002466:
    : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000003348:0.000003590:0.000003851:0.000004138:0.000004643:0.000006079:0.000008534:0.000016166:0.000015870:
    : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000007601:0.000005444:0.000004348:0.000003659:0.000003126:0.000002821:0.000002468:
    : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000003116:0.000003288:0.000003563:0.000003831:0.000004240:0.000004954:0.000006070:0.000007941:0.000010831:
    : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000007513:0.000005543:0.000004310:0.000003675:0.000003138:0.000002723:0.000002374:
    : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000002928:0.000003136:0.000003288:0.000003590:0.000003895:0.000004363:0.000004948:0.000005842:0.000006507:
    : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000005872:0.000004837:0.000004071:0.000003401:0.000002957:0.000002681:0.000002354:
    : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH :0.000002799:0.000002928:0.000003116:0.000003348:0.000003548:0.000003903:0.000004280:0.000004696:0.000004887:
    : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
    ---------------------------------------------------------------------------------------------------------------
    :Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH :0.000004619:0.000004137:0.000003625:0.000003198:0.000002835:0.000002502:0.000002223:
    : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
---------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000002533:0.000002732:0.000002884:0.000003110:0.000003286:0.000003398:0.000003672:0.000003944:0.000003959:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000003830:0.000003580:0.000003229:0.000002909:0.000002595:0.000002321:0.000002073:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000002449:0.000002556:0.000002650:0.000002881:0.000003098:0.000003174:0.000003323:0.000003344:0.000003362:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000003266:0.000003138:0.000002883:0.000002615:0.000002366:0.000002145:0.000001898:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000002259:0.000002374:0.000002479:0.000002594:0.000002681:0.000002806:0.000002914:0.000002949:0.000002998:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000002862:0.000002769:0.000002557:0.000002351:0.000002157:0.000001936:0.000001755:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000002103:0.000002252:0.000002289:0.000002442:0.000002506:0.000002542:0.000002543:0.000002609:0.000002602:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000002478:0.000002434:0.000002278:0.000002117:0.000001924:0.000001764:0.000001573:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :0.000001904:0.000002016:0.000002114:0.000002187:0.000002218:0.000002237:0.000002312:0.000002274:0.000002266:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
---------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :0.000002268:0.000002160:0.000002018:0.000001868:0.000001739:0.000001562:0.000001388:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
---------------------------------------------------------------------------------------------------------
```

```
 --------------------------------------------------------------------------------------------------------------------------------
                                             <<VARSA-RADUGA>>
CHARACTERISTICS OF CONCENTRATION FIELD


                              Selection of dangerous wind direction
                              Selection of dangerous wind direction out of speeds: automatic
                              Without background
         Symbolic notations:
(X,Y) - point coordinates in meters
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s
Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
             Substance:Ferric oxide                                                          Table 12 Page  1
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0016757: 0.0019589: 0.0022450: 0.0022047: 0.0019610: 0.0017477: 0.0015466: 0.0014926: 0.0013582:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0012542: 0.0011786: 0.0011144:  0.0010233:0.000959020:0.000915090:0.000849307:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0018709: 0.0023781: 0.0030427: 0.0030784: 0.0024104: 0.0020344: 0.0017382: 0.0015723: 0.0014585:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0013309: 0.0012542: 0.0011936:  0.0011239:  0.0010421:0.000925674:0.000887065:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0019793: 0.0026353: 0.0043867: 0.0064274: 0.0032741: 0.0024900: 0.0019722: 0.0016586: 0.0015395:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0014585: 0.0013582: 0.0012649:  0.0011814:  0.0010963:0.000967913:0.000920278:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0019020: 0.0023660: 0.0032160: 0.0065472: 0.0067822: 0.0036348: 0.0023055: 0.0018942: 0.0016586:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0015723: 0.0014926: 0.0013539:  0.0012404:  0.0011466:  0.0010023:0.000946964:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0017332: 0.0020038: 0.0024584: 0.0034561: 0.0074281: 0.0080566: 0.0034563: 0.0023055: 0.0019722:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0017382: 0.0015466: 0.0014428:  0.0013316:  0.0012046:  0.0010916:0.000963974:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0015809: 0.0017670: 0.0020062: 0.0024618: 0.0035624: 0.0055613: 0.0080566: 0.0036348: 0.0024900:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0020344: 0.0017477: 0.0015545:  0.0013752:  0.0012423:  0.0011012:0.000970142:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0014371: 0.0015776: 0.0017174: 0.0018805: 0.0022512: 0.0035624: 0.0074281: 0.0067822: 0.0032741:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0024104: 0.0019610: 0.0016480:  0.0014348:  0.0012647:  0.0010939:0.000998579:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0013560: 0.0014541: 0.0015597: 0.0016759: 0.0018805: 0.0024618: 0.0034561: 0.0065472: 0.0064274:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0030784: 0.0022047: 0.0017609:  0.0014817:  0.0012660:  0.0011426:0.000999520:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0012622: 0.0013317: 0.0014431: 0.0015517: 0.0017174: 0.0020062: 0.0024584: 0.0032160: 0.0043867:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0030427: 0.0022450: 0.0017454:  0.0014884:  0.0012709:  0.0011027:0.000961550:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0011857: 0.0012701: 0.0013317: 0.0014541: 0.0015776: 0.0017670: 0.0020038: 0.0023660: 0.0026353:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0023781: 0.0019589: 0.0016489:  0.0013772:  0.0011978:  0.0010859:0.000953511:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0  X=     200  X=     400  X=     600  X=     800  X=    1000  X=    1200  X=    1400  X=    1600
:  QH : 0.0011337: 0.0011857: 0.0012622: 0.0013560: 0.0014371: 0.0015809: 0.0017332: 0.0019020: 0.0019793:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
 --------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800  X=    2000  X=    2200  X=    2400  X=    2600  X=    2800  X=    3000
:  QH : 0.0018709: 0.0016757: 0.0014679:  0.0012950:  0.0011481:  0.0010133:0.000900510:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
-------------------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :  0.0010257:  0.0011065:  0.0011681:  0.0012597:  0.0013310:  0.0013762:  0.0014870:  0.0015973:  0.0016036:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :  0.0015511:  0.0014501:  0.0013076:  0.0011780:  0.0010511:0.000939897:0.000839715:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000991711:  0.0010352:  0.0010731:  0.0011670:  0.0012548:  0.0012854:  0.0013457:  0.0013544:  0.0013618:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :  0.0013227:  0.0012710:  0.0011678:  0.0010591:0.000958201:0.000868792:0.000768528:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000915076:0.000961382:  0.0010042:  0.0010504:  0.0010858:  0.0011364:  0.0011802:  0.0011944:  0.0012143:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :  0.0011589:  0.0011215:  0.0010355:0.000951997:0.000873697:0.000784205:0.000710853:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000851763:0.000911975:0.000926968:0.000989142:  0.0010151:  0.0010293:  0.0010300:  0.0010565:  0.0010540:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :  0.0010035:0.000985578:0.000922478:0.000857585:0.000779227:0.000714277:0.000637135:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000770990:0.000816389:0.000856259:0.000885698:0.000898241:0.000905911:0.000936405:0.000921001:0.000917864:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
-------------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000918389:0.000874875:0.000817127:0.000756469:0.000704123:0.000632665:0.000562321:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
-------------------------------------------------------------------------------------------------------------------
```

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----------------------------------------------------------------------------------------------------------------------------------
                                               <<VARSA-RADUGA>>
          CHARACTERISTICS OF CONCENTRATION FIELD


                                 Selection of dangerous wind direction
                                 Selection of dangerous wind direction out of speeds: automatic
                                 Without background
          Symbolic notations:
     (X,Y) - point coordinates in meters
     QH    - concentration in point in MAC fractions
     HB    - wind direction in degrees
     U     - wind speed  m/s

     Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
                Substance:Manganous oxide                                                      Table 12 Page  1
----------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0049649: 0.0058042: 0.0066520: 0.0065324: 0.0058104: 0.0051782: 0.0045827: 0.0044227: 0.0040243:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 : 93- 0.5  : 81- 0.5  : 70- 0.5  : 60- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0037161: 0.0034921: 0.0033020: 0.0030320: 0.0028415: 0.0027114: 0.0025165:
: HB-U : 52- 0.5  : 45- 0.5  : 40- 0.5  : 35- 0.5  : 32- 0.5  : 28- 0.5  : 26- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0055434: 0.0070463: 0.0090153: 0.0091212: 0.0071419: 0.0060278: 0.0051502: 0.0046587: 0.0043214:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 : 94- 0.5  : 79- 0.5  : 65- 0.5  : 54- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0039436: 0.0037161: 0.0035364: 0.0033300: 0.0030877: 0.0027427: 0.0026283:
: HB-U : 45- 0.5  : 38- 0.5  : 33- 0.5  : 29- 0.5  : 26- 0.5  : 23- 0.5  : 21- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0058645: 0.0078084: 0.0129977: 0.0190442: 0.0097009: 0.0073777: 0.0058437: 0.0049145: 0.0045615:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 : 95- 0.5  : 75- 0.5  : 58- 0.5  : 45- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0043214: 0.0040243: 0.0037480: 0.0035004: 0.0032482: 0.0028679: 0.0027267:
: HB-U : 36- 0.5  : 30- 0.5  : 26- 0.5  : 22- 0.5  : 20- 0.5  : 17- 0.5  : 16- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0056354: 0.0070104: 0.0095290: 0.0193992: 0.0200954: 0.0107697: 0.0068311: 0.0056125: 0.0049145:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 : 98- 0.5  : 67- 0.5  : 45- 0.5  : 32- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0046587: 0.0044227: 0.0040116: 0.0036754: 0.0033975: 0.0029698: 0.0028058:
: HB-U : 25- 0.5  : 20- 0.5  : 17- 0.5  : 15- 0.5  : 13- 0.5  : 11- 0.5  : 10- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0051355: 0.0059372: 0.0072842: 0.0102402: 0.0220092: 0.0238715: 0.0102410: 0.0068311: 0.0058437:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 : 45- 0.5  : 23- 0.5  : 15- 0.5  :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0051502: 0.0045827: 0.0042749: 0.0039456: 0.0035692: 0.0032345: 0.0028562:
: HB-U : 11- 0.5  : 9- 0.5   : 7- 0.5   : 6- 0.5   : 6- 0.5   : 5- 0.5   : 4- 0.5   :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0046841: 0.0052355: 0.0059442: 0.0072942: 0.0105551: 0.0164780: 0.0238715: 0.0107697: 0.0073777:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0060278: 0.0051782: 0.0046059: 0.0040746: 0.0036809: 0.0032628: 0.0028745:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0042580: 0.0046742: 0.0050885: 0.0055720: 0.0066702: 0.0105551: 0.0220092: 0.0200954: 0.0097009:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0071419: 0.0058104: 0.0048829: 0.0042511: 0.0037473: 0.0032412: 0.0029588:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0040178: 0.0043084: 0.0046214: 0.0049656: 0.0055720: 0.0072942: 0.0102402: 0.0193992: 0.0190442:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0091212: 0.0065324: 0.0052176: 0.0043902: 0.0037511: 0.0033854: 0.0029615:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0037398: 0.0039458: 0.0042757: 0.0045976: 0.0050885: 0.0059442: 0.0072842: 0.0095290: 0.0129977:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0090153: 0.0066520: 0.0051715: 0.0044102: 0.0037655: 0.0032672: 0.0028490:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0035131: 0.0037633: 0.0039458: 0.0043084: 0.0046742: 0.0052355: 0.0059372: 0.0070104: 0.0078084:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0070463: 0.0058042: 0.0048858: 0.0040807: 0.0035490: 0.0032174: 0.0028252:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0033591: 0.0035131: 0.0037398: 0.0040178: 0.0042580: 0.0046841: 0.0051355: 0.0056354: 0.0058645:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
----------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0055434: 0.0049649: 0.0043494: 0.0038371: 0.0034018: 0.0030025: 0.0026682:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

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------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0030390: 0.0032784: 0.0034612: 0.0037324: 0.0039436: 0.0040775: 0.0044058: 0.0047326: 0.0047513:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0045960: 0.0042965: 0.0038744: 0.0034903: 0.0031143: 0.0027849: 0.0024880:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0029384: 0.0030673: 0.0031795: 0.0034578: 0.0037181: 0.0038086: 0.0039871: 0.0040131: 0.0040348:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0039190: 0.0037658: 0.0034601: 0.0031380: 0.0028391: 0.0025742: 0.0022771:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0027113: 0.0028485: 0.0029753: 0.0031123: 0.0032172: 0.0033670: 0.0034968: 0.0035388: 0.0035978:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0034338: 0.0033231: 0.0030683: 0.0028207: 0.0025887: 0.0023236: 0.0021062:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0025237: 0.0027021: 0.0027466: 0.0029308: 0.0030077: 0.0030499: 0.0030520: 0.0031305: 0.0031229:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0029734: 0.0029202: 0.0027333: 0.0025410: 0.0023088: 0.0021164: 0.0018878:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0022844: 0.0024189: 0.0025371: 0.0026243: 0.0026615: 0.0026842: 0.0027745: 0.0027289: 0.0027196:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0027212: 0.0025922: 0.0024211: 0.0022414: 0.0020863: 0.0018746: 0.0016661:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
------------------------------------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------------------------------------------------
                                              <<VARSA-RADUGA>>
        CHARACTERISTICS OF CONCENTRATION FIELD


                                    Selection of dangerous wind direction
                                    Selection of dangerous wind direction out of speeds: automatic
                                    Without background
        Symbolic notations:
(X,Y) - point coordinates in meters
 QH    - concentration in point in MAC fractions
 HB    - wind direction in degrees
 U     - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
           Substance: Silicon oxide                                                     Table 12 Page  1
-------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0103436: 0.0120921: 0.0138583: 0.0136092: 0.0121051: 0.0107880: 0.0095472: 0.0092139: 0.0083839:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0077418: 0.0072753: 0.0068792: 0.0063166: 0.0059199: 0.0056487: 0.0052426:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0115487: 0.0146797: 0.0187820: 0.0190025: 0.0148790: 0.0125578: 0.0107296: 0.0097057: 0.0090028:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0082157: 0.0077418: 0.0073676: 0.0069375: 0.0064328: 0.0057140: 0.0054757:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0122178: 0.0162674: 0.0270785: 0.0396755: 0.0202103: 0.0153703: 0.0121743: 0.0102385: 0.0095031:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0090028: 0.0083839: 0.0078083: 0.0072925: 0.0067672: 0.0059748: 0.0056807:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0117405: 0.0146050: 0.0198520: 0.0404149: 0.0418653: 0.0224369: 0.0142314: 0.0116927: 0.0102385:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0097057: 0.0092139: 0.0083575: 0.0076570: 0.0070781: 0.0061870: 0.0058455:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0106990: 0.0123692: 0.0151754: 0.0213338: 0.0458525: 0.0497322: 0.0213353: 0.0142314: 0.0121743:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0107296: 0.0095472: 0.0089061: 0.0082199: 0.0074358: 0.0067385: 0.0059505:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0097586: 0.0109072: 0.0123838: 0.0151963: 0.0219899: 0.0343292: 0.0497322: 0.0224369: 0.0153703:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0125578: 0.0107880: 0.0095956: 0.0084888: 0.0076686: 0.0067975: 0.0059885:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0088708: 0.0097380: 0.0106011: 0.0116083: 0.0138962: 0.0219899: 0.0458525: 0.0418653: 0.0202103:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0148790: 0.0121051: 0.0101727: 0.0088565: 0.0078068: 0.0067524: 0.0061641:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0083705: 0.0089759: 0.0096278: 0.0103450: 0.0116083: 0.0151963: 0.0213338: 0.0404149: 0.0396755:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0190025: 0.0136092: 0.0108700: 0.0091463: 0.0078148: 0.0070528: 0.0061699:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0077912: 0.0082205: 0.0089077: 0.0095783: 0.0106011: 0.0123838: 0.0151754: 0.0198520: 0.0270785:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0187820: 0.0138583: 0.0107740: 0.0091879: 0.0078449: 0.0068067: 0.0059355:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0073190: 0.0078402: 0.0082205: 0.0089759: 0.0097380: 0.0109072: 0.0123692: 0.0146050: 0.0162674:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0146797: 0.0120921: 0.0101787: 0.0085014: 0.0073937: 0.0067029: 0.0058859:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:  QH : 0.0069982: 0.0073190: 0.0077912: 0.0083705: 0.0088708: 0.0097586: 0.0106990: 0.0117405: 0.0122178:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
-------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:  QH : 0.0115487: 0.0103436: 0.0090613: 0.0079940: 0.0070872: 0.0062552: 0.0055587:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
-------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0063313:  0.0068301:  0.0072107:  0.0077759:  0.0082158:  0.0084948:  0.0091788:  0.0098597:  0.0098985:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0095749:  0.0089510:  0.0080717:  0.0072715:  0.0064881:  0.0058018:  0.0051834:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0061217:  0.0063901:  0.0066239:  0.0072037:  0.0077459:  0.0079345:  0.0083065:  0.0083605:  0.0084059:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0081646:  0.0078455:  0.0072086:  0.0065374:  0.0059148:  0.0053629:  0.0047440:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0056486:  0.0059345:  0.0061986:  0.0064839:  0.0067025:  0.0070146:  0.0072850:  0.0073726:  0.0074954:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0071538:  0.0069231:  0.0063922:  0.0058765:  0.0053932:  0.0048408:  0.0043880:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0052578:  0.0056295:  0.0057220:  0.0061058:  0.0062660:  0.0063539:  0.0063582:  0.0065218:  0.0065061:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0061946:  0.0060838:  0.0056943:  0.0052937:  0.0048100:  0.0044091:  0.0039329:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0047592:  0.0050394:  0.0052855:  0.0054673:  0.0055447:  0.0055920:  0.0057803:  0.0056852:  0.0056658:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
-------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0056691:  0.0054005:  0.0050440:  0.0046696:  0.0043464:  0.0039053:  0.0034711:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
-------------------------------------------------------------------------------------------------------
```

```
----------------------------------------------------------------------------------------------------------------------
                                         <<VARSA-RADUGA>>
        CHARACTERISTICS OF CONCENTRATION FIELD


                                  Selection of dangerous wind direction
                                  Selection of dangerous wind direction out of speeds: automatic
                                  Without background
         Symbolic notations:
 (X,Y) - point coordinates in meters
 QH    - concentration in point in MAC fractions
 HB    - wind direction in degrees
 U     - wind speed  m/s

 Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
            Substance:Fluorides badly dissolvable                                        Table 12 Page  1
---------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000689574:0.000806139:0.000923888:0.000907281:0.000807006:0.000719198:0.000636481:0.000614257:0.000558926:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000516123:0.000485020:0.000458613:0.000421106:0.000394658:0.000376580:0.000349509:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000769916:0.000978649:  0.0012521:  0.0012668:0.000991933:0.000837189:0.000715305:0.000647048:0.000600188:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000547716:0.000516123:0.000491173:0.000462500:0.000428853:0.000380936:0.000365047:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000814519:  0.0010845:  0.0018052:  0.0026450:  0.0013474:  0.0010247:0.000811620:0.000682565:0.000633539:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000600188:0.000558926:0.000520552:0.000486169:0.000451144:0.000398318:0.000378715:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000782701:0.000973667:  0.0013235:  0.0026943:  0.0027910:  0.0014958:0.000948758:0.000779511:0.000682565:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000647048:0.000614257:0.000557168:0.000510466:0.000471870:0.000412468:0.000389697:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000713267:0.000824615:  0.0010117:  0.0014223:  0.0030568:  0.0033155:  0.0014224:0.000948758:0.000811620:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000715305:0.000636481:0.000593741:0.000547996:0.000495722:0.000449231:0.000396697:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000650572:0.000727149:0.000825584:  0.0010131:  0.0014660:  0.0022886:  0.0033155:  0.0014958:  0.0010247:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000837189:0.000719198:0.000639705:0.000565917:0.000511241:0.000453164:0.000399235:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000591388:0.000649199:0.000706737:0.000773886:0.000926412:  0.0014660:  0.0030568:  0.0027910:  0.0013474:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000991933:0.000807006:0.000678178:0.000590434:0.000520457:0.000450163:0.000410938:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000558034:0.000598392:0.000641857:0.000689666:0.000773886:  0.0010131:  0.0014223:  0.0026943:  0.0026450:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :  0.0012668:0.000907281:0.000724666:0.000609753:0.000520984:0.000470190:0.000411325:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000519411:0.000548030:0.000593850:0.000638557:0.000706737:0.000825584:  0.0010117:  0.0013235:  0.0018052:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :  0.0012521:0.000923888:0.000718264:0.000612529:0.000522991:0.000453780:0.000395699:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000487935:0.000522680:0.000548030:0.000598392:0.000649199:0.000727149:0.000824615:0.000973667:  0.0010845:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000978649:0.000806139:0.000678579:0.000566760:0.000492915:0.000446861:0.000392391:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
:   QH :0.000466543:0.000487935:0.000519411:0.000558034:0.000591388:0.000650572:0.000713267:0.000782701:0.000814519:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
---------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
:   QH :0.000769916:0.000689574:0.000604089:0.000532932:0.000472478:0.000417012:0.000370580:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
----------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000422090:0.000455337:0.000480715:0.000518393:0.000547719:0.000566322:0.000611923:0.000657311:0.000659902:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000638329:0.000596733:0.000538110:0.000484770:0.000432539:0.000386789:0.000345562:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000408112:0.000426008:0.000441591:0.000480249:0.000516396:0.000528967:0.000553769:0.000557370:0.000560391:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000544306:0.000523030:0.000480575:0.000435829:0.000394321:0.000357528:0.000316267:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000376575:0.000395630:0.000413238:0.000432262:0.000446833:0.000467637:0.000485670:0.000491506:0.000499693:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000476922:0.000461543:0.000426150:0.000391768:0.000359546:0.000322718:0.000292532:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000350520:0.000375298:0.000381468:0.000407054:0.000417734:0.000423596:0.000423883:0.000434786:0.000433740:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000412974:0.000405588:0.000379621:0.000352916:0.000320669:0.000293941:0.000262195:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000317280:0.000335963:0.000352370:0.000364485:0.000369646:0.000372803:0.000385352:0.000379013:0.000377722:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
----------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000377938:0.000360031:0.000336266:0.000311304:0.000289762:0.000260356:0.000231408:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
----------------------------------------------------------------------------------------------------
```

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---------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
          CHARACTERISTICS OF CONCENTRATION FIELD


                                    Selection of dangerous wind direction
                                    Selection of dangerous wind direction out of speeds: automatic
                                    Without background
          Symbolic notations:
    (X,Y) - point coordinates in meters
    QH    - concentration in point in MAC fractions
    HB    - wind direction in degrees
    U     - wind speed  m/s

    Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
               Substance:Anhydrous hydrogen fluoride                                      Table 12 Page  1
    -----------------------------------------------------------------------------------------------------------------
    :Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0024135: 0.0028215: 0.0032336: 0.0031755: 0.0028245: 0.0025172: 0.0022277: 0.0021499: 0.0019562:
    : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0018064: 0.0016976: 0.0016051: 0.0014739: 0.0013813: 0.0013180: 0.0012233:
    : HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0026947: 0.0034253: 0.0043825: 0.0044339: 0.0034718: 0.0029302: 0.0025036: 0.0022647: 0.0021007:
    : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0019170: 0.0018064: 0.0017191: 0.0016188: 0.0015010: 0.0013333: 0.0012777:
    : HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0028508: 0.0037957: 0.0063183: 0.0092576: 0.0047157: 0.0035864: 0.0028407: 0.0023890: 0.0022174:
    : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0021007: 0.0019562: 0.0018219: 0.0017016: 0.0015790: 0.0013941: 0.0013255:
    : HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0027395: 0.0034078: 0.0046321: 0.0094302: 0.0097686: 0.0052353: 0.0033207: 0.0027283: 0.0023890:
    : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0022647: 0.0021499: 0.0019501: 0.0017866: 0.0016515: 0.0014436: 0.0013639:
    : HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0024964: 0.0028862: 0.0035409: 0.0049779: 0.0106989: 0.0116042: 0.0049782: 0.0033207: 0.0028407:
    : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0025036: 0.0022277: 0.0020781: 0.0019180: 0.0017350: 0.0015723: 0.0013884:
    : HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0022770: 0.0025450: 0.0028895: 0.0035458: 0.0051310: 0.0080101: 0.0116042: 0.0052353: 0.0035864:
    : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0029302: 0.0025172: 0.0022390: 0.0019807: 0.0017893: 0.0015861: 0.0013973:
    : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0020699: 0.0022722: 0.0024736: 0.0027086: 0.0032424: 0.0051310: 0.0106989: 0.0097686: 0.0047157:
    : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0034718: 0.0028245: 0.0023736: 0.0020665: 0.0018216: 0.0015756: 0.0014383:
    : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0019531: 0.0020944: 0.0022465: 0.0024138: 0.0027086: 0.0035458: 0.0049779: 0.0094302: 0.0092576:
    : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0044339: 0.0031755: 0.0025363: 0.0021341: 0.0018234: 0.0016457: 0.0014396:
    : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0018179: 0.0019181: 0.0020785: 0.0022349: 0.0024736: 0.0028895: 0.0035409: 0.0046321: 0.0063183:
    : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0043825: 0.0032336: 0.0025139: 0.0021439: 0.0018305: 0.0015882: 0.0013849:
    : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0017078: 0.0018294: 0.0019181: 0.0020944: 0.0022722: 0.0025450: 0.0028862: 0.0034078: 0.0037957:
    : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0034253: 0.0028215: 0.0023750: 0.0019837: 0.0017252: 0.0015640: 0.0013734:
    : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
    :  QH : 0.0016329: 0.0017078: 0.0018179: 0.0019531: 0.0020699: 0.0022770: 0.0024964: 0.0027395: 0.0028508:
    : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
    -----------------------------------------------------------------------------------------------------------------
    :Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
    :  QH : 0.0026947: 0.0024135: 0.0021143: 0.0018653: 0.0016537: 0.0014595: 0.0012970:
    : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

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-------------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0014773: 0.0015937: 0.0016825: 0.0018144: 0.0019170: 0.0019821: 0.0021417: 0.0023006: 0.0023097:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0022342: 0.0020886: 0.0018834: 0.0016967: 0.0015139: 0.0013538: 0.0012095:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0014284: 0.0014910: 0.0015456: 0.0016809: 0.0018074: 0.0018514: 0.0019382: 0.0019508: 0.0019614:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0019051: 0.0018306: 0.0016820: 0.0015254: 0.0013801: 0.0012513: 0.0011069:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0013180: 0.0013847: 0.0014463: 0.0015129: 0.0015639: 0.0016367: 0.0016998: 0.0017203: 0.0017489:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0016692: 0.0016154: 0.0014915: 0.0013712: 0.0012584: 0.0011295: 0.0010239:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0012268: 0.0013135: 0.0013351: 0.0014247: 0.0014621: 0.0014826: 0.0014836: 0.0015218: 0.0015181:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0014454: 0.0014196: 0.0013287: 0.0012352: 0.0011223: 0.0010288:0.000917684:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH :  0.0011105: 0.0011759: 0.0012333: 0.0012757: 0.0012938: 0.0013048: 0.0013487: 0.0013265: 0.0013220:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
-------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH :  0.0013228: 0.0012601: 0.0011769: 0.0010896: 0.0010142:0.000911247:0.000809928:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
-------------------------------------------------------------------------------------------------------------
```

```
 ----------------------------------------------------------------------------------------------------------------
 CHARACTERISTICS OF CONCENTRATION FIELD

                            Selection of dangerous wind direction
                            Selection of dangerous wind direction out of speeds: automatic
                            Without background
        Symbolic notations:
 (X,Y) - point coordinates in meters
 QH    - concentration in point in MAC fractions
 HB    - wind direction in degrees
 U     - wind speed  m/s
 Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
            Substance:Ethyl alcohol                                                    Table 12 Page  1
 ----------------------------------------------------------------------------------------------------------------
 :Y=   3000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000670265:0.000783568:0.000898019:0.000881877:0.000784410:0.000699061:0.000618659:0.000597058:0.000543276:
 : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   3000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000501672:0.000471439:0.000445772:0.000409315:0.000383608:0.000366036:0.000339723:
 : HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000748358:0.000951247: 0.0012171: 0.0012314:0.000964159:0.000813748:0.000695277:0.000628930:0.000583383:
 : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000532380:0.000501672:0.000477421:0.000449550:0.000416845:0.000370270:0.000354826:
 : HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000791712: 0.0010541: 0.0017547: 0.0025710: 0.0013096:0.000995994:0.000788895:0.000663454:0.000615800:
 : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000583383:0.000543276:0.000505977:0.000472556:0.000438512:0.000387165:0.000368111:
 : HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000760785:0.000946405: 0.0012864: 0.0026189: 0.0027129: 0.0014539:0.000922192:0.000757684:0.000663454:
 : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000628930:0.000597058:0.000541568:0.000496172:0.000458658:0.000400919:0.000378786:
 : HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000693295:0.000801526:0.000983368: 0.0013824: 0.0029712: 0.0032226: 0.0013825:0.000922192:0.000788895:
 : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000695277:0.000618659:0.000577116:0.000532652:0.000481842:0.000436653:0.000385590:
 : HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000632356:0.000706789:0.000802467:0.000984721: 0.0014249: 0.0022245: 0.0032226: 0.0014539:0.000995994:
 : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   2000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000813748:0.000699061:0.000621793:0.000550071:0.000496926:0.000440476:0.000388057:
 : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1800 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000574829:0.000631021:0.000686948:0.000752217:0.000900472: 0.0014249: 0.0029712: 0.0027129: 0.0013096:
 : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1800 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000964159:0.000784410:0.000659189:0.000573902:0.000505884:0.000437559:0.000399432:
 : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1600 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000542409:0.000581637:0.000623885:0.000670355:0.000752217:0.000984721: 0.0013824: 0.0026189: 0.0025710:
 : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1600 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH : 0.0012314:0.000881877:0.000704376:0.000592680:0.000506397:0.000457024:0.000399808:
 : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1400 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000504867:0.000532685:0.000577222:0.000620677:0.000686948:0.000802467:0.000983368: 0.0012864: 0.0017547:
 : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1400 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH : 0.0012171:0.000898019:0.000698153:0.000595378:0.000508347:0.000441074:0.000384620:
 : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1200 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000474272:0.000508045:0.000532685:0.000581637:0.000631021:0.000706789:0.000801526:0.000946405: 0.0010541:
 : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1200 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000951247:0.000783568:0.000659578:0.000550891:0.000479113:0.000434349:0.000381404:
 : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1000 X=      0  X=    200  X=    400  X=    600  X=    800  X=   1000  X=   1200  X=   1400  X=   1600
 :   QH :0.000453480:0.000474272:0.000504867:0.000542409:0.000574829:0.000632356:0.000693295:0.000760785:0.000791712:
 : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
 ----------------------------------------------------------------------------------------------------------------
 :Y=   1000 X=   1800  X=   2000  X=   2200  X=   2400  X=   2600  X=   2800  X=   3000
 :   QH :0.000748358:0.000670265:0.000587175:0.000518010:0.000459249:0.000405336:0.000360204:
 : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :


 ----------------------------------------------------------------------------------------------------------------
```

```
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000410271:0.000442588:0.000467255:0.000503878:0.000532383:0.000550465:0.000594789:0.000638907:0.000641425:
: HB-U : 230- 0.5  : 236- 0.5  : 243- 0.5  : 250- 0.5  : 259- 0.5  : 268- 0.5  : 277- 0.5  : 286- 0.5  : 294- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000620456:0.000580024:0.000523043:0.000471196:0.000420428:0.000375959:0.000335886:
: HB-U : 301- 0.5  : 307- 0.5  : 313- 0.5  : 317- 0.5  : 321- 0.5  : 324- 0.5  : 327- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000396684:0.000414079:0.000429226:0.000466802:0.000501937:0.000514156:0.000538263:0.000541763:0.000544700:
: HB-U : 234- 0.5  : 240- 0.5  : 246- 0.5  : 253- 0.5  : 260- 0.5  : 268- 0.5  : 276- 0.5  : 284- 0.5  : 291- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000529065:0.000508386:0.000467119:0.000423626:0.000383280:0.000347517:0.000307411:
: HB-U : 297- 0.5  : 303- 0.5  : 308- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  : 323- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000366030:0.000384553:0.000401667:0.000420159:0.000434322:0.000454543:0.000472071:0.000477744:0.000485702:
: HB-U : 238- 0.5  : 243- 0.5  : 248- 0.5  : 255- 0.5  : 261- 0.5  : 268- 0.5  : 275- 0.5  : 282- 0.5  : 288- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000463568:0.000448620:0.000414217:0.000380799:0.000349479:0.000313682:0.000284341:
: HB-U : 294- 0.5  : 300- 0.5  : 305- 0.5  : 309- 0.5  : 313- 0.5  : 317- 0.5  : 320- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000340705:0.000364790:0.000370787:0.000395657:0.000406037:0.000411735:0.000412014:0.000422612:0.000421595:
: HB-U : 240- 0.5  : 245- 0.5  : 251- 0.5  : 256- 0.5  : 262- 0.5  : 268- 0.5  : 275- 0.5  : 281- 0.5  : 287- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000401411:0.000394231:0.000368991:0.000343034:0.000311691:0.000285711:0.000254854:
: HB-U : 292- 0.5  : 297- 0.5  : 302- 0.5  : 306- 0.5  : 310- 0.5  : 313- 0.5  : 317- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH :0.000308396:0.000326556:0.000342503:0.000354279:0.000359296:0.000362364:0.000374562:0.000368401:0.000367146:
: HB-U : 243- 0.5  : 247- 0.5  : 252- 0.5  : 258- 0.5  : 263- 0.5  : 269- 0.5  : 274- 0.5  : 280- 0.5  : 285- 0.5  :
----------------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH :0.000367355:0.000349950:0.000326851:0.000302588:0.000281649:0.000253066:0.000224928:
: HB-U : 290- 0.5  : 295- 0.5  : 299- 0.5  : 303- 0.5  : 307- 0.5  : 310- 0.5  : 314- 0.5  :
----------------------------------------------------------------------------------------------------------------------
```

```
                                              --------------------------------------------------------------------------------------------------------------
                                                                      <<VARSA-RADUGA>>
              CHARACTERISTICS OF CONCENTRATION FIELD


                                         Selection of dangerous wind direction
                                         Selection of dangerous wind direction out of speeds: automatic
                                         Without background
          Symbolic notations:
     (X,Y) - point coordinates in meters
     QH    - concentration in point in MAC fractions
     HB    - wind direction in degrees
     U     - wind speed  m/s

     Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
               Substance:Butyl acetate                                                            Table 12 Page  1
     ---------------------------------------------------------------------------------------------------------------
     :Y=    3000 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0479084: 0.0560069: 0.0641875: 0.0630338: 0.0560671: 0.0499666: 0.0442198: 0.0426758: 0.0388317:
     : HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    3000 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0358579: 0.0336970: 0.0318623: 0.0292565: 0.0274191: 0.0261631: 0.0242823:
     : HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0534903: 0.0679921: 0.0869924: 0.0880141: 0.0689150: 0.0581641: 0.0496962: 0.0449539: 0.0416984:
     : HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0380528: 0.0358579: 0.0341245: 0.0321324: 0.0297948: 0.0264657: 0.0253618:
     : HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0565891: 0.0753458: 0.1254192: 0.1837649: 0.0936080: 0.0711905: 0.0563877: 0.0474216: 0.0440154:
     : HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0416984: 0.0388317: 0.0361656: 0.0337768: 0.0313434: 0.0276733: 0.0263114:
     : HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0543785: 0.0676460: 0.0919486: 0.1871898: 0.1939075: 0.1039211: 0.0659154: 0.0541569: 0.0474216:
     : HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0449539: 0.0426758: 0.0387095: 0.0354648: 0.0327834: 0.0286564: 0.0270744:
     : HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0495545: 0.0572905: 0.0702880: 0.0988116: 0.2123747: 0.2303445: 0.0988187: 0.0659154: 0.0563877:
     : HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0496962: 0.0442198: 0.0412504: 0.0380723: 0.0344405: 0.0312106: 0.0275607:
     : HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2000 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0451988: 0.0505190: 0.0573578: 0.0703847: 0.1018504: 0.1590025: 0.2303445: 0.1039211: 0.0711905:
     : HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    2000 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0581641: 0.0499666: 0.0444438: 0.0393173: 0.0355187: 0.0314838: 0.0277371:
     : HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1800 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0410869: 0.0451034: 0.0491009: 0.0537661: 0.0643629: 0.1018504: 0.2123747: 0.1939075: 0.0936080:
     : HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1800 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0689150: 0.0560671: 0.0471167: 0.0410207: 0.0361590: 0.0312753: 0.0285501:
     : HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1600 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0387697: 0.0415736: 0.0445933: 0.0479149: 0.0537661: 0.0703847: 0.0988116: 0.1871898: 0.1837649:
     : HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1600 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0880141: 0.0630338: 0.0503465: 0.0423629: 0.0361956: 0.0326667: 0.0285770:
     : HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1400 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0360863: 0.0380747: 0.0412580: 0.0443640: 0.0491009: 0.0573578: 0.0702880: 0.0919486: 0.1254192:
     : HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1400 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0869924: 0.0641875: 0.0499017: 0.0425557: 0.0363351: 0.0315266: 0.0274914:
     : HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1200 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0338995: 0.0363134: 0.0380747: 0.0415736: 0.0451034: 0.0505190: 0.0572905: 0.0676460: 0.0753458:
     : HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1200 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0679921: 0.0560069: 0.0471446: 0.0393759: 0.0342455: 0.0310459: 0.0272616:
     : HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1000 X=      0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
     :  QH : 0.0324133: 0.0338995: 0.0360863: 0.0387697: 0.0410869: 0.0451988: 0.0495545: 0.0543785: 0.0565891:
     : HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
     ---------------------------------------------------------------------------------------------------------------
     :Y=    1000 X=   1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
     :  QH : 0.0534903: 0.0479084: 0.0419694: 0.0370257: 0.0328256: 0.0289721: 0.0257462:
     : HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

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------------------------------------------------------------------------------------------------------------------
:Y=    800 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH : 0.0293249: 0.0316348: 0.0333979: 0.0360156: 0.0380530: 0.0393455: 0.0425136: 0.0456670: 0.0458470:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    800 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH : 0.0443482: 0.0414583: 0.0373855: 0.0336796: 0.0300509: 0.0268724: 0.0240081:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    600 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH : 0.0283537: 0.0295971: 0.0306797: 0.0333656: 0.0358769: 0.0367503: 0.0384734: 0.0387235: 0.0389335:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    600 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH : 0.0378159: 0.0363378: 0.0333882: 0.0302794: 0.0273957: 0.0248394: 0.0219728:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    400 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH : 0.0261627: 0.0274866: 0.0287099: 0.0300316: 0.0310439: 0.0324893: 0.0337421: 0.0341476: 0.0347164:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    400 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH : 0.0331344: 0.0320659: 0.0296069: 0.0272183: 0.0249796: 0.0224210: 0.0203238:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    200 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH : 0.0243525: 0.0260740: 0.0265027: 0.0282803: 0.0290223: 0.0294295: 0.0294495: 0.0302070: 0.0301343:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=    200 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH : 0.0286915: 0.0281784: 0.0263743: 0.0245190: 0.0222787: 0.0204217: 0.0182161:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=      0 X=       0   X=     200   X=     400   X=     600   X=     800   X=    1000   X=    1200   X=    1400   X=    1600
:   QH : 0.0220432: 0.0233412: 0.0244811: 0.0253227: 0.0256814: 0.0259007: 0.0267725: 0.0263321: 0.0262424:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
------------------------------------------------------------------------------------------------------------------
:Y=      0 X=    1800   X=    2000   X=    2200   X=    2400   X=    2600   X=    2800   X=    3000
:   QH : 0.0262574: 0.0250133: 0.0233623: 0.0216280: 0.0201314: 0.0180884: 0.0160772:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
------------------------------------------------------------------------------------------------------------------
```

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 -------------------------------------------------------------------------------------------------------------------------------
                                             <<VARSA-RADUGA>>
CHARACTERISTICS OF CONCENTRATION FIELD


                                   Selection of dangerous wind direction
                                   Selection of dangerous wind direction out of speeds: automatic
                                   Without background
        Symbolic notations:
(X,Y) - point coordinates in meters
 QH    - concentration in point in MAC fractions
 HB    - wind direction in degrees
 U     - wind speed  m/s
Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
          Substance:Ethyl acetate                                                           Table 12 Page  1
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0251622: 0.0294156: 0.0337122: 0.0331062: 0.0294472: 0.0262432: 0.0232248: 0.0224139: 0.0203949:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 :  93- 0.5 :  81- 0.5 :  70- 0.5 :  60- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   3000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0188331: 0.0176981: 0.0167345: 0.0153659: 0.0144009: 0.0137412: 0.0127534:
: HB-U :  52- 0.5 :  45- 0.5 :  40- 0.5 :  35- 0.5 :  32- 0.5 :  28- 0.5 :  26- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0280938: 0.0357104: 0.0456896: 0.0462262: 0.0361951: 0.0305486: 0.0261011: 0.0236104: 0.0219006:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 :  94- 0.5 :  79- 0.5 :  65- 0.5 :  54- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0199859: 0.0188331: 0.0179227: 0.0168764: 0.0156486: 0.0139002: 0.0133204:
: HB-U :  45- 0.5 :  38- 0.5 :  33- 0.5 :  29- 0.5 :  26- 0.5 :  23- 0.5 :  21- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0297214: 0.0395727: 0.0658719: 0.0965158: 0.0491642: 0.0373902: 0.0296156: 0.0249065: 0.0231175:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 :  95- 0.5 :  75- 0.5 :  58- 0.5 :  45- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0219006: 0.0203949: 0.0189947: 0.0177400: 0.0164620: 0.0145344: 0.0138191:
: HB-U :  36- 0.5 :  30- 0.5 :  26- 0.5 :  22- 0.5 :  20- 0.5 :  17- 0.5 :  16- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0285603: 0.0355286: 0.0482927: 0.0983147: 0.1018429: 0.0545808: 0.0346197: 0.0284439: 0.0249065:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 :  98- 0.5 :  67- 0.5 :  45- 0.5 :  32- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0236104: 0.0224139: 0.0203308: 0.0186266: 0.0172183: 0.0150507: 0.0142198:
: HB-U :  25- 0.5 :  20- 0.5 :  17- 0.5 :  15- 0.5 :  13- 0.5 :  11- 0.5 :  10- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0260267: 0.0300898: 0.0369162: 0.0518972: 0.1115421: 0.1209801: 0.0519010: 0.0346197: 0.0296156:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 :  45- 0.5 :  23- 0.5 :  15- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0261011: 0.0232248: 0.0216653: 0.0199961: 0.0180886: 0.0163922: 0.0144753:
: HB-U :  11- 0.5 :   9- 0.5 :   7- 0.5 :   6- 0.5 :   6- 0.5 :   5- 0.5 :   4- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0237390: 0.0265333: 0.0301251: 0.0369670: 0.0534932: 0.0835103: 0.1209801: 0.0545808: 0.0373902:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   2000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0305486: 0.0262432: 0.0233425: 0.0206500: 0.0186549: 0.0165357: 0.0145679:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0215794: 0.0236889: 0.0257885: 0.0282387: 0.0338043: 0.0534932: 0.1115421: 0.1018429: 0.0491642:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0361951: 0.0294472: 0.0247464: 0.0215446: 0.0189912: 0.0164262: 0.0149949:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0203624: 0.0218350: 0.0234210: 0.0251656: 0.0282387: 0.0369670: 0.0518972: 0.0983147: 0.0965158:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0462262: 0.0331062: 0.0264427: 0.0222496: 0.0190104: 0.0171570: 0.0150090:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0189530: 0.0199973: 0.0216693: 0.0233006: 0.0257885: 0.0301251: 0.0369162: 0.0482927: 0.0658719:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0456896: 0.0337122: 0.0262091: 0.0223509: 0.0190837: 0.0165582: 0.0144389:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0178045: 0.0190723: 0.0199973: 0.0218350: 0.0236889: 0.0265333: 0.0300898: 0.0355286: 0.0395727:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0357104: 0.0294156: 0.0247610: 0.0206808: 0.0179862: 0.0163057: 0.0143182:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0170239: 0.0178045: 0.0189530: 0.0203624: 0.0215794: 0.0237390: 0.0260267: 0.0285603: 0.0297214:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
 -------------------------------------------------------------------------------------------------------------------------------
:Y=   1000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0280938: 0.0251622: 0.0220429: 0.0194464: 0.0172405: 0.0152165: 0.0135223:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

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------------------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0154018: 0.0166150: 0.0175411: 0.0189159: 0.0199860: 0.0206648: 0.0223287: 0.0239849: 0.0240795:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0232923: 0.0217745: 0.0196354: 0.0176890: 0.0157831: 0.0141137: 0.0126094:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0148918: 0.0155448: 0.0161134: 0.0175240: 0.0188430: 0.0193017: 0.0202067: 0.0203381: 0.0204484:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0198614: 0.0190851: 0.0175359: 0.0159032: 0.0143886: 0.0130460: 0.0115404:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0137410: 0.0144363: 0.0150788: 0.0157730: 0.0163047: 0.0170638: 0.0177218: 0.0179348: 0.0182335:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0174026: 0.0168415: 0.0155500: 0.0142954: 0.0131197: 0.0117758: 0.0106743:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0127903: 0.0136944: 0.0139196: 0.0148532: 0.0152429: 0.0154568: 0.0154673: 0.0158651: 0.0158269:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0150692: 0.0147997: 0.0138522: 0.0128777: 0.0117011: 0.0107258: 0.0095674:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0115774: 0.0122591: 0.0128578: 0.0132999: 0.0134882: 0.0136034: 0.0140613: 0.0138300: 0.0137829:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
------------------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0137907: 0.0131373: 0.0122702: 0.0113593: 0.0105733: 0.0095003: 0.0084440:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
------------------------------------------------------------------------------------------------------------
```

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 ----------------------------------------------------------------------------------------------------------------------
                                             <<VARSA-RADUGA>>
CHARACTERISTICS OF CONCENTRATION FIELD

                                   Selection of dangerous wind direction
                                   Selection of dangerous wind direction out of speeds: automatic
                                   Without background
        Symbolic notations:
(X,Y) - point coordinates in meters
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s
Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
          Substance:Ethylene glycol acetate                                            Table 12 Page  1
 ----------------------------------------------------------------------------------------------------------------------
:Y=    3000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0073551: 0.0085984: 0.0098543: 0.0096772: 0.0086077: 0.0076711: 0.0067888: 0.0065518: 0.0059616:
: HB-U : 138- 0.5 : 132- 0.5 : 124- 0.5 : 115- 0.5 : 105- 0.5 : 93- 0.5  : 81- 0.5  : 70- 0.5  : 60- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    3000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0055050: 0.0051733: 0.0048916: 0.0044916: 0.0042095: 0.0040167: 0.0037279:
: HB-U : 52- 0.5  : 45- 0.5  : 40- 0.5  : 35- 0.5  : 32- 0.5  : 28- 0.5  : 26- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0082120: 0.0104384: 0.0133554: 0.0135123: 0.0105801: 0.0089296: 0.0076296: 0.0069015: 0.0064017:
: HB-U : 144- 0.5 : 139- 0.5 : 131- 0.5 : 121- 0.5 : 108- 0.5 : 94- 0.5  : 79- 0.5  : 65- 0.5  : 54- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0058420: 0.0055050: 0.0052389: 0.0049331: 0.0045742: 0.0040631: 0.0038937:
: HB-U : 45- 0.5  : 38- 0.5  : 33- 0.5  : 29- 0.5  : 26- 0.5  : 23- 0.5  : 21- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0086878: 0.0115674: 0.0192549: 0.0282123: 0.0143711: 0.0109295: 0.0086569: 0.0072803: 0.0067574:
: HB-U : 152- 0.5 : 147- 0.5 : 140- 0.5 : 129- 0.5 : 114- 0.5 : 95- 0.5  : 75- 0.5  : 58- 0.5  : 45- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0064017: 0.0059616: 0.0055523: 0.0051855: 0.0048120: 0.0042485: 0.0040394:
: HB-U : 36- 0.5  : 30- 0.5  : 26- 0.5  : 22- 0.5  : 20- 0.5  : 17- 0.5  : 16- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0083484: 0.0103853: 0.0141163: 0.0287381: 0.0297695: 0.0159544: 0.0101196: 0.0083144: 0.0072803:
: HB-U : 162- 0.5 : 158- 0.5 : 152- 0.5 : 142- 0.5 : 126- 0.5 : 98- 0.5  : 67- 0.5  : 45- 0.5  : 32- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0069015: 0.0065518: 0.0059428: 0.0054447: 0.0050330: 0.0043994: 0.0041566:
: HB-U : 25- 0.5  : 20- 0.5  : 17- 0.5  : 15- 0.5  : 13- 0.5  : 11- 0.5  : 10- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0076078: 0.0087955: 0.0107909: 0.0151700: 0.0326046: 0.0353634: 0.0151710: 0.0101196: 0.0086569:
: HB-U : 172- 0.5 : 170- 0.5 : 167- 0.5 : 162- 0.5 : 149- 0.5 : 108- 1.1 : 45- 0.5  : 23- 0.5  : 15- 0.5  :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0076296: 0.0067888: 0.0063329: 0.0058450: 0.0052874: 0.0047916: 0.0042312:
: HB-U : 11- 0.5  : 9- 0.5   : 7- 0.5   : 6- 0.5   : 6- 0.5   : 5- 0.5   : 4- 0.5   :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0069391: 0.0077559: 0.0088058: 0.0108057: 0.0156365: 0.0244107: 0.0353634: 0.0159544: 0.0109295:
: HB-U : 183- 0.5 : 183- 0.5 : 184- 0.5 : 186- 0.5 : 191- 0.5 : 225- 0.8 : 342- 1.1 : 352- 0.5 : 355- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    2000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0089296: 0.0076711: 0.0068232: 0.0060362: 0.0054530: 0.0048335: 0.0042583:
: HB-U : 356- 0.5 : 357- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 358- 0.5 : 359- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0063078: 0.0069245: 0.0075382: 0.0082544: 0.0098812: 0.0156365: 0.0326046: 0.0297695: 0.0143711:
: HB-U : 193- 0.5 : 196- 0.5 : 201- 0.5 : 209- 0.5 : 225- 0.5 : 259- 0.5 : 301- 0.5 : 324- 0.5 : 336- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0105801: 0.0086077: 0.0072335: 0.0062977: 0.0055513: 0.0048015: 0.0043831:
: HB-U : 342- 0.5 : 345- 0.5 : 348- 0.5 : 350- 0.5 : 351- 0.5 : 352- 0.5 : 353- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0059521: 0.0063825: 0.0068461: 0.0073561: 0.0082544: 0.0108057: 0.0151700: 0.0287381: 0.0282123:
: HB-U : 203- 0.5 : 208- 0.5 : 215- 0.5 : 225- 0.5 : 241- 0.5 : 264- 0.5 : 288- 0.5 : 308- 0.5 : 321- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0135123: 0.0096772: 0.0077294: 0.0065037: 0.0055569: 0.0050151: 0.0043873:
: HB-U : 329- 0.5 : 335- 0.5 : 339- 0.5 : 342- 0.5 : 344- 0.5 : 346- 0.5 : 347- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0055401: 0.0058454: 0.0063341: 0.0068109: 0.0075382: 0.0088058: 0.0107909: 0.0141163: 0.0192549:
: HB-U : 212- 0.5 : 217- 0.5 : 225- 0.5 : 235- 0.5 : 249- 0.5 : 266- 0.5 : 283- 0.5 : 298- 0.5 : 310- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0133554: 0.0098543: 0.0076611: 0.0065333: 0.0055783: 0.0048401: 0.0042206:
: HB-U : 319- 0.5 : 326- 0.5 : 331- 0.5 : 334- 0.5 : 337- 0.5 : 340- 0.5 : 342- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0052044: 0.0055750: 0.0058454: 0.0063825: 0.0069245: 0.0077559: 0.0087955: 0.0103853: 0.0115674:
: HB-U : 219- 0.5 : 225- 0.5 : 233- 0.5 : 242- 0.5 : 254- 0.5 : 267- 0.5 : 280- 0.5 : 292- 0.5 : 303- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0104384: 0.0085984: 0.0072378: 0.0060452: 0.0052575: 0.0047663: 0.0041853:
: HB-U : 311- 0.5 : 318- 0.5 : 324- 0.5 : 328- 0.5 : 331- 0.5 : 334- 0.5 : 336- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1000 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0049762: 0.0052044: 0.0055401: 0.0059521: 0.0063078: 0.0069391: 0.0076078: 0.0083484: 0.0086878:
: HB-U : 225- 0.5 : 231- 0.5 : 238- 0.5 : 247- 0.5 : 257- 0.5 : 267- 0.5 : 278- 0.5 : 288- 0.5 : 298- 0.5 :
 ----------------------------------------------------------------------------------------------------------------------
:Y=    1000 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0082120: 0.0073551: 0.0064433: 0.0056843: 0.0050395: 0.0044479: 0.0039527:
: HB-U : 306- 0.5 : 312- 0.5 : 318- 0.5 : 322- 0.5 : 326- 0.5 : 329- 0.5 : 332- 0.5 :
```

```
----------------------------------------------------------------------------------------------------
:Y=    800 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0045021: 0.0048567: 0.0051274: 0.0055293: 0.0058421: 0.0060405: 0.0065269: 0.0070110: 0.0070386:
: HB-U : 230- 0.5 : 236- 0.5 : 243- 0.5 : 250- 0.5 : 259- 0.5 : 268- 0.5 : 277- 0.5 : 286- 0.5 : 294- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    800 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0068085: 0.0063648: 0.0057396: 0.0051706: 0.0046135: 0.0041256: 0.0036858:
: HB-U : 301- 0.5 : 307- 0.5 : 313- 0.5 : 317- 0.5 : 321- 0.5 : 324- 0.5 : 327- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    600 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0043530: 0.0045439: 0.0047101: 0.0051224: 0.0055080: 0.0056420: 0.0059066: 0.0059450: 0.0059772:
: HB-U : 234- 0.5 : 240- 0.5 : 246- 0.5 : 253- 0.5 : 260- 0.5 : 268- 0.5 : 276- 0.5 : 284- 0.5 : 291- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    600 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0058056: 0.0055787: 0.0051259: 0.0046486: 0.0042059: 0.0038134: 0.0033734:
: HB-U : 297- 0.5 : 303- 0.5 : 308- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 : 323- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    400 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:  QH : 0.0040166: 0.0042199: 0.0044077: 0.0046106: 0.0047660: 0.0049879: 0.0051802: 0.0052425: 0.0053298:
: HB-U : 238- 0.5 : 243- 0.5 : 248- 0.5 : 255- 0.5 : 261- 0.5 : 268- 0.5 : 275- 0.5 : 282- 0.5 : 288- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    400 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:  QH : 0.0050869: 0.0049229: 0.0045454: 0.0041787: 0.0038350: 0.0034422: 0.0031202:
: HB-U : 294- 0.5 : 300- 0.5 : 305- 0.5 : 309- 0.5 : 313- 0.5 : 317- 0.5 : 320- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    200 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0037387: 0.0040030: 0.0040688: 0.0043417: 0.0044556: 0.0045181: 0.0045212: 0.0046375: 0.0046263:
: HB-U : 240- 0.5 : 245- 0.5 : 251- 0.5 : 256- 0.5 : 262- 0.5 : 268- 0.5 : 275- 0.5 : 281- 0.5 : 287- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=    200 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0044048: 0.0043261: 0.0040491: 0.0037643: 0.0034203: 0.0031352: 0.0027966:
: HB-U : 292- 0.5 : 297- 0.5 : 302- 0.5 : 306- 0.5 : 310- 0.5 : 313- 0.5 : 317- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=      0 X=      0   X=    200   X=    400   X=    600   X=    800   X=   1000   X=   1200   X=   1400   X=   1600
:   QH : 0.0033842: 0.0035834: 0.0037584: 0.0038876: 0.0039427: 0.0039764: 0.0041102: 0.0040426: 0.0040288:
: HB-U : 243- 0.5 : 247- 0.5 : 252- 0.5 : 258- 0.5 : 263- 0.5 : 269- 0.5 : 274- 0.5 : 280- 0.5 : 285- 0.5 :
----------------------------------------------------------------------------------------------------
:Y=      0 X=   1800   X=   2000   X=   2200   X=   2400   X=   2600   X=   2800   X=   3000
:   QH : 0.0040311: 0.0038401: 0.0035867: 0.0033204: 0.0030907: 0.0027770: 0.0024682:
: HB-U : 290- 0.5 : 295- 0.5 : 299- 0.5 : 303- 0.5 : 307- 0.5 : 310- 0.5 : 314- 0.5 :
----------------------------------------------------------------------------------------------------
```

                         <<VARSA-RADUGA>> CHARACTERISTICS OF CONCENTRATION FIELD

        HIGHEST CONCENTRATIONS
(X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s
Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Carbone oxide   Table 13 Page 1

```
----------------------------------------------------------------------------------------------------
:  QH    :   X  :   Y  : HB : U :Number : Contrib.: Number:  Contrib.:Number: Contrib: Number : Contrib.:
                                 of source       of source        of source       of source:
----------------------------------------------------------------------------------------------------
:  0.007221   1000    2200   108   1.1     01    0.007221
:  0.007221   1200    2000   342   1.1     01    0.007221
:  0.006658   1200    1800   301   0.5     01    0.006658
:  0.006658    800    2200   149   0.5     01    0.006658
:  0.006079    800    2400   126   0.5     01    0.006079
:  0.006079   1400    1800   324   0.5     01    0.006079
:  0.005868    600    2400   142   0.5     01    0.005868
:  0.005868   1400    1600   308   0.5     01    0.005868
:  0.005761   1600    1600   321   0.5     01    0.005761
:  0.005761    600    2600   129   0.5     01    0.005761
----------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0005040064   0.0072211141
----------------------------------------------------------------------------------------------------
```

                                        <<VARSA-RADUGA>>

        HIGHEST CONCENTRATIONS
(X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s
Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Nitrogen oxides   Table 13 Page 1

```
----------------------------------------------------------------------------------------------------
:  QH    :   X  :   Y  : HB : U :Number : Contrib.: Number:  Contrib.:Number: Contrib: Number : Contrib.:
                                 of source       of source        of source       of source:
----------------------------------------------------------------------------------------------------
:  0.145052   1000    2200   108   1.1     01    0.145052
:  0.145052   1200    2000   342   1.1     01    0.145052
:  0.133736   1200    1800   301   0.5     01    0.133736
:  0.133736    800    2200   149   0.5     01    0.133736
:  0.122107    800    2400   126   0.5     01    0.122107
:  0.122107   1400    1800   324   0.5     01    0.122107
:  0.117877    600    2400   142   0.5     01    0.117877
:  0.117877   1400    1600   308   0.5     01    0.117877
:  0.115720   1600    1600   321   0.5     01    0.115720
:  0.115720    600    2600   129   0.5     01    0.115720
----------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0101240958   0.1450522236
----------------------------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
         HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s
Object:  High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Inorganic dust                                                            Table 13 Page  1
--------------------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source          of source          of source         of source:
--------------------------------------------------------------------------------------------------------------------
:  0.017550   1000    2000  225   1.1     01    0.017550
:  0.016011   1000    2200  108   0.5     01    0.016011
:  0.016011   1200    2000  342   0.5     01    0.016011
:  0.012584   1200    1800  301   0.5     01    0.012584
:  0.012584    800    2200  149   0.5     01    0.012584
:  0.011203    800    2400  126   0.5     01    0.011203
:  0.011203   1400    1800  324   0.5     01    0.011203
:  0.010538    600    2400  142   0.5     01    0.010538
:  0.010538   1400    1600  308   0.5     01    0.010538
:  0.010109   1600    1600  321   0.5     01    0.010109
--------------------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0002638758   0.0175501041
--------------------------------------------------------------------------------------------------------------------


--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
                  HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Hydrocarbones                                                              Table 13 Page  1-
--------------------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source          of source          of source         of source:
--------------------------------------------------------------------------------------------------------------------
:0.000003223   1000    2200  108   1.1     01    0.000003
:0.000003223   1200    2000  342   1.1     01    0.000003
:0.000002971   1200    1800  301   0.5     01    0.000003
:0.000002971    800    2200  149   0.5     01    0.000003
:0.000002713   1400    1800  324   0.5     01    0.000003
:0.000002713    800    2400  126   0.5     01    0.000003
:0.000002619    600    2400  142   0.5     01    0.000003
:0.000002619   1400    1600  308   0.5     01    0.000003
:0.000002571   1600    1600  321   0.5     01    0.000003
:0.000002571    600    2600  129   0.5     01    0.000003
--------------------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0000002249   0.0000032226
--------------------------------------------------------------------------------------------------------------------


--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
                  HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
 Substance:Aldehydes                                                                 Table 13 Page  1
--------------------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source          of source          of source         of source:
--------------------------------------------------------------------------------------------------------------------
:  0.047743   1000    2200  108   1.1     01    0.047743
:  0.047743   1200    2000  342   1.1     01    0.047743
:  0.044018   1200    1800  301   0.5     01    0.044018
:  0.044018    800    2200  149   0.5     01    0.044018
:  0.040191    800    2400  126   0.5     01    0.040191
:  0.040191   1400    1800  324   0.5     01    0.040191
:  0.038798    600    2400  142   0.5     01    0.038798
:  0.038798   1400    1600  308   0.5     01    0.038798
:  0.038088   1600    1600  321   0.5     01    0.038088
:  0.038088    600    2600  129   0.5     01    0.038088
--------------------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0033322738   0.0477429033
--------------------------------------------------------------------------------------------------------------------


--------------------------------------------------------------------------------------------------------------------
                                            <<VARSA-RADUGA>>
                  HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:   High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Subject:Carbon black                                                                 Table 13 Page  1
--------------------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source          of source          of source         of source:
--------------------------------------------------------------------------------------------------------------------
:0.000000001   1000    2200  108   0.5     01    0.000000
:0.000000001   1200    2000  342   0.5     01    0.000000
:0.000000001   1000    2000  225   0.9     01    0.000000
```

```
:0.000000001   1200   1800   301   0.5   01   0.000000
:0.000000001    800   2200   149   0.5   01   0.000000
:0.000000001    800   2400   126   0.5   01   0.000000
:0.000000001   1400   1800   324   0.5   01   0.000000
:0.000000001    600   2400   142   0.5   01   0.000000
:0.000000001   1400   1600   308   0.5   01   0.000000
:0.000000001   1600   1600   321   0.5   01   0.000000
-------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0000000000   0.0000000014
-------------------------------------------------------------------------------------------------------
```

<<VARSA-RADUGA>>
              HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s

Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance :Benzopyrene   Table 13 Page 1

QH	X	Y	HB	U	Number of source	Contrib.	Number of source	Contrib.	Number of source	Contrib	Number of source	Contrib.
:0.000019893	1000	2200	108	1.1	01	0.000020						
:0.000019893	1200	2000	342	1.1	01	0.000020						
:0.000018341	1200	1800	301	0.5	01	0.000018						
:0.000018341	800	2200	149	0.5	01	0.000018						
:0.000016746	800	2400	126	0.5	01	0.000017						
:0.000016746	1400	1800	324	0.5	01	0.000017						
:0.000016166	600	2400	142	0.5	01	0.000016						
:0.000016166	1400	1600	308	0.5	01	0.000016						
:0.000015870	1600	1600	321	0.5	01	0.000016						
:0.000015870	600	2600	129	0.5	01	0.000016						

```
-------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0000013884   0.0000198929
-------------------------------------------------------------------------------------------------------
```

<<VARSA-RADUGA>>
              HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s
Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Ferric oxide   Table 13 Page 1

QH	X	Y	HB	U	Number of source	Contrib.	Number of source	Contrib.	Number of source	Contrib	Number of source	Contrib.
0.008057	1000	2200	108	1.1	01	0.008057						
0.008057	1200	2000	342	1.1	01	0.008057						
0.007428	1200	1800	301	0.5	01	0.007428						
0.007428	800	2200	149	0.5	01	0.007428						
0.006782	800	2400	126	0.5	01	0.006782						
0.006782	1400	1800	324	0.5	01	0.006782						
0.006547	600	2400	142	0.5	01	0.006547						
0.006547	1400	1600	308	0.5	01	0.006547						
0.006427	1600	1600	321	0.5	01	0.006427						
0.006427	600	2600	129	0.5	01	0.006427						

```
-------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0005623212   0.0080566149
-------------------------------------------------------------------------------------------------------
```

<<VARSA-RADUGA>>
              HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s

Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Manganous oxide   Table 13 Page 1

QH	X	Y	HB	U	Number of source	Contrib.	Number of source	Contrib.	Number of source	Contrib	Number of source	Contrib.
0.023871	1000	2200	108	1.1	01	0.023871						
0.023871	1200	2000	342	1.1	01	0.023871						
0.022009	1200	1800	301	0.5	01	0.022009						
0.022009	800	2200	149	0.5	01	0.022009						
0.020095	800	2400	126	0.5	01	0.020095						
0.020095	1400	1800	324	0.5	01	0.020095						
0.019399	600	2400	142	0.5	01	0.019399						
0.019399	1400	1600	308	0.5	01	0.019399						
0.019044	1600	1600	321	0.5	01	0.019044						
0.019044	600	2600	129	0.5	01	0.019044						

```
-------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0016661369   0.0238714517
-------------------------------------------------------------------------------------------------------
```

<<VARSA-RADUGA>>
              HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U   - wind speed m/s
Object: High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Silicon oxide   Table 13 Page 1

QH	X	Y	HB	U	Number of source	Contrib.	Number:	Contrib.	Number:	Contrib:	Number	Contrib.

```
-----------------------------------------------------------------------------------------------------------
:   0.049732    1000    2200   108   1.1   01    0.049732
:   0.049732    1200    2000   342   1.1   01    0.049732
:   0.045852    1200    1800   301   0.5   01    0.045852
:   0.045852     800    2200   149   0.5   01    0.045852
:   0.041865     800    2400   126   0.5   01    0.041865
:   0.041865    1400    1800   324   0.5   01    0.041865
:   0.040415     600    2400   142   0.5   01    0.040415
:   0.040415    1400    1600   308   0.5   01    0.040415
:   0.039675    1600    1600   321   0.5   01    0.039675
:   0.039675     600    2600   129   0.5   01    0.039675
-----------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0034711185   0.0497321910
-----------------------------------------------------------------------------------------------------------


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                                  <<VARSA-RADUGA>>
                 HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Fluorides badly dissolved                                              Table 13 Page  1
-----------------------------------------------------------------------------------------------------------
:   QH    :    X   :    Y   : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                        of source      of source         of source      of source:
-----------------------------------------------------------------------------------------------------------
:   0.003315    1000    2200   108   1.1   01    0.003315
:   0.003315    1200    2000   342   1.1   01    0.003315
:   0.003057    1200    1800   301   0.5   01    0.003057
:   0.003057     800    2200   149   0.5   01    0.003057
:   0.002791     800    2400   126   0.5   01    0.002791
:   0.002791    1400    1800   324   0.5   01    0.002791
:   0.002694     600    2400   142   0.5   01    0.002694
:   0.002694    1400    1600   308   0.5   01    0.002694
:   0.002645    1600    1600   321   0.5   01    0.002645
:   0.002645     600    2600   129   0.5   01    0.002645
-----------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0002314079   0.0033154794
-----------------------------------------------------------------------------------------------------------


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                                  <<VARSA-RADUGA>>
                 HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Anhydrous hydrogen fluoride                                            Table 13 Page  1
-----------------------------------------------------------------------------------------------------------
:   QH    :    X   :    Y   : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                        of source      of source         of source      of source:
-----------------------------------------------------------------------------------------------------------
:   0.011604    1000    2200   108   1.1   01    0.011604
:   0.011604    1200    2000   342   1.1   01    0.011604
:   0.010699    1200    1800   301   0.5   01    0.010699
:   0.010699     800    2200   149   0.5   01    0.010699
:   0.009769     800    2400   126   0.5   01    0.009769
:   0.009769    1400    1800   324   0.5   01    0.009769
:   0.009430     600    2400   142   0.5   01    0.009430
:   0.009430    1400    1600   308   0.5   01    0.009430
:   0.009258    1600    1600   321   0.5   01    0.009258
:   0.009258     600    2600   129   0.5   01    0.009258
-----------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0008099277   0.0116041779
-----------------------------------------------------------------------------------------------------------


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                                  <<VARSA-RADUGA>>
                 HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Ethyl alcohol                                                          Table 13 Page  1
-----------------------------------------------------------------------------------------------------------
:   QH    :    X   :    Y   : HB :  U  :Number : Contrib.: Number:   Contrib.:Number:  Contrib: Number : Contrib.:
                                        of source      of source         of source      of source:
-----------------------------------------------------------------------------------------------------------
:   0.003223    1000    2200   108   1.1   01    0.003223
:   0.003223    1200    2000   342   1.1   01    0.003223
:   0.002971    1200    1800   301   0.5   01    0.002971
:   0.002971     800    2200   149   0.5   01    0.002971
:   0.002713     800    2400   126   0.5   01    0.002713
:   0.002713    1400    1800   324   0.5   01    0.002713
:   0.002619     600    2400   142   0.5   01    0.002619
:   0.002619    1400    1600   308   0.5   01    0.002619
:   0.002571    1600    1600   321   0.5   01    0.002571
:   0.002571     600    2600   129   0.5   01    0.002571
-----------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0002249285   0.0032226460
-----------------------------------------------------------------------------------------------------------
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                              <<VARSA-RADUGA>>


                        HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Butyl acetate                                                    Table 13 Page  1
--------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:  Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source         of source         of source       of source
:
--------------------------------------------------------------------------------------------------------
:  0.230344    1000   2200  108   1.1     01    0.230344
:  0.230344    1200   2000  342   1.1     01    0.230344
:  0.212375    1200   1800  301   0.5     01    0.212375
:  0.212375     800   2200  149   0.5     01    0.212375
:  0.193908     800   2400  126   0.5     01    0.193908
:  0.193908    1400   1800  324   0.5     01    0.193908
:  0.187190     600   2400  142   0.5     01    0.187190
:  0.187190    1400   1600  308   0.5     01    0.187190
:  0.183765    1600   1600  321   0.5     01    0.183765
:  0.183765     600   2600  129   0.5     01    0.183765
--------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0160771732   0.2303444950
--------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------
                              <<VARSA-RADUGA>>
                        HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH    - concentration in point in MAC fractions
HB    - wind direction in degrees
U     - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Subject:Ethyl acetate                                                      Table 13 Page  1
--------------------------------------------------------------------------------------------------------
  QH       X   :    Y  : HB :   U  :Number : Contrib.: Number:  Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source         of source         of source       of source
--------------------------------------------------------------------------------------------------------
: 0.120980    1000   2200  108   1.1     01    0.120980
: 0.120980    1200   2000  342   1.1     01    0.120980
: 0.111542    1200   1800  301   0.5     01    0.111542
: 0.111542     800   2200  149   0.5     01    0.111542
: 0.101843     800   2400  126   0.5     01    0.101843
: 0.101843    1400   1800  324   0.5     01    0.101843
: 0.098315     600   2400  142   0.5     01    0.098315
: 0.098315    1400   1600  308   0.5     01    0.098315
: 0.096516    1600   1600  321   0.5     01    0.096516
: 0.096516     600   2600  129   0.5     01    0.096516
--------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0084439526   0.1209800982
--------------------------------------------------------------------------------------------------------
--------------------------------------------------------------------------------------------------------------
                              <<VARSA-RADUGA>>
                        HIGHEST CONCENTRATIONS
X,Y) - point coordinates
QH   - concentration in point in MAC fractions
HB   - wind direction in degrees
U    - wind speed  m/s

Object:    High voltage line 500 kV from CCGT unit №4 to outdoor remote switchgear 220/500 kV at Navoi TPS
Substance:Ethylene glycol acetate                                          Table 13 Page  1
--------------------------------------------------------------------------------------------------------
:   QH    :   X  :   Y  : HB :  U  :Number : Contrib.: Number:  Contrib.:Number:  Contrib: Number : Contrib.:
                                    of source         of source         of source       of source
--------------------------------------------------- -----------------------------------------------------
:  0.035363    1000   2200  108   1.1     01     0.035363
:  0.035363    1200   2000  342   1.1     01     0.035363
:  0.032605    1200   1800  301   0.5     01     0.032605
:  0.032605     800   2200  149   0.5     01     0.032605
:  0.029769     800   2400  126   0.5     01     0.029769
:  0.029769    1400   1800  324   0.5     01     0.029769
:  0.028738     600   2400  142   0.5     01      0.028738
:  0.028738    1400   1600  308   0.5     01     0.028738
:  0.028212    1600   1600  321   0.5     01     0.028212
:  0.028212     600   2600  129   0.5     01     0.028212
--------------------------------------------------------------------------------------------------------
Minimum and maximum concentration in points of calculation:   0.0024682323   0.0353634133
--------------------------------------------------------------------------------------------------------
```

Water consumption and sewerage.

Household drinking water is imported on a mobile tank with volume of 3 m^3, comes from water supply sources of Navoi TPP.

Imported industrial water will come from the nearest canal.

There are no process effluents

Estimated calculation of water consumption for household needs was carried out according to **KMK 2.04.01-98**.

Water consumption per employee is 25 l / day.

$$25 \text{ l/day} * 20 \text{ workers.} = 500 \text{ l/day.}$$

According to the project, the number of working days is 180 days per year.

180 * 500 = 90000 l/year, or 90 m3/year

Water consumption for <u>floor washing</u>

The area of the cleaned premises is 70 m^2. **According to KMK 2.04.01-98** water consumption for washing floors per 1m^2 is 1 l or:

70 x 180 x 1,0 = 12600 l/year / 1000 = 12,6 m^3/year.

Total drinking water consumption 90 + 12,6 = 102,6 m^3/year.

Discharge of household wastewater is carried out in a concreted bitumen insulated cesspool.

In the course of accumulation and disinfection, in agreement with the SES (Service for Sanitary and Epidemiological Welfare and Public Health) wastewater is transported by sewage trucks to the well of Navoi TPP (emission No. 7).

Calculation of the required amount of process technical water for dust suppression on the created sites and access roads.

Name	Water consumption		
	Hourly, m^3	Daily, m^3	Monthly, m^3
	1,0	3,0	66,0

Watering is carried out mainly from April to October, i.e. 6 months a year. Thus, the annual consumption of technical water will be:

$$66,0 * 6 = 396 \text{ m}^3 \text{/year}$$

Total consumption of technical water is: 396 m^3/year.

Total water consumption of the site will be:

Q$_{total}$= 396 $_{tech.water.}$ +102,6 $_{drinking\ water}$=498,6 m^3/year

Waste generation.

Scrap of ferrous metals.

In the process of replacing parts of equipment and mechanisms, about 1.0 ton of black scrap metal is formed (unsuitable metal pieces and parts of equipment, cable, fittings, etc.)

Ferrous scrap metal - waste of **hazard class 5**, is temporarily placed on specially designated areas of 10 m^2, then sent to Navoi TPP. Permanently, centrally delivered to "Vtorchermet".

Waste of electrodes (stub)

During electric arc welding, unspent pieces of electrodes (stubs) remain.

When welding, on average, 0.5 t / year of electrodes are used and the specific rate of waste formation according to regulatory documents will be 12% of the used material. Then 0.5 * 12/100 = 0.06 t / year of electrode waste (stubs) are formed.

Waste of electrodes (stubs) - waste of hazard class 5, is temporarily placed in special metal container with volume of 1.0 m3, then sent to Navoi TPP. Permanently, centrally delivered to "Vtorchermet".

Tare for paint and varnish materials

According to the "Customer", on average, 1.0 ton of paints and varnishes is consumed. The enterprise uses 40 cans of paint, 25 kg each. On average, the weight of one container for cans of paint, 25 kg each, is 1.0 kg, i.e. : 40 * 1.0 / 1000 = 0.04 tons of containers from paint and varnish materials.

Containers for paints and varnishes - waste **of hazard class 4,** are temporarily placed on specially designated areas of 5 m^2, then sent to Navoi TPP. They are delivered constantly Vtorchermet.

Oiled rags

At the enterprise, when wiping oil spills, parts of equipment supplied for repair and during the operation of equipment, an average of 0.08 ton of oiled rags is formed, which can be taken as the rate of waste formation, i.e.: M = 0.08 t / year.

Oiled rags - waste of **hazard class 4,** are temporarily placed in a special container V = 1.5 m3. They are constantly exported to Navoi TPP and burned down at the plant's boiler house

Household garbage.

Solid household waste from the life of workers consists of waste paper, food waste and other garbage.

According to the norms for the generation of household waste for industrial enterprises established by public utilities and SanPiN No. 0069 - 96, the standard for the generation of household waste per year per employee is 50 kg.

The norm of household waste generation is calculated by the formula:

N hous. = n x p / 1000 t / year.

where: n – household waste generation rate per employee

p – number of employees - 20 people.

N hous. = 50 x 20 / 1000 = 1,0 t / year.

Household garbage - waste of 4 hazard class, is collected in the container V = 1.0 м^3, as it accumulates, it is transported to the landfill of solid waste in Navbakhor region.

The total waste generated at the work site will be:
0,08+1,0+0,06+0,04+1,0=2,18 t / year

Disposal of construction waste during the demolition of buildings and structures

During the construction of 500kV OHL, it is necessary to demolish the production facilities of the private sector, which are mainly engaged in the production of building materials.

Compensation to entrepreneurs is carried out in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 911 dated November 16, 2019 "On additional measures to improve the procedure for providing compensation for the withdrawal and provision of land plots and ensuring the guarantee of property rights of individuals and legal entities."

Waste generated during the demolition of buildings and structures of private sector facilities - (construction waste) - is temporarily located at sites where demolition of buildings is carried out and a useful (usable) part - bricks, breeze blocks, slab, wood, etc. sorted for future use.

Unsuitable part of construction waste - scrap brick, sand, pieces of concrete and stone is placed in the landfill for construction waste of PF "Barno" under the contract. (A copy of the agreement is attached).

The amount of generated waste is determined on actual basis, before the demolition of the building and structure. At that, the amount of generated waste is not given in this project.

PROTOCOL
of the public hearing on the project in connection with the plan by the JSC "SAESP" to build a 5-kilometer 500 kW high-voltage overhead transmission line, towards the open distribution facility in Navbahor district in connection with the construction of the fourth steam and gas plant on the basis of the investment project in JSC "Navoi TPP".

04.29.2021		Navbahor district.
The acting chairman:	Director of Capital Construction of JSC "Navoi TPP"	T.G.Nazarov
	Deputy Mayor of Navbahor district	U.Nazarov
	Specialist in construction materials	A.Xujaev
	Specialist in agriculture and water management	B.Ergashev
	Head of the department of the cadastral agency of Navbahor district	Sh.Isokov
	Specialist of the department of cadastral agency of Navbahor district	I.Bobomurodov
	Specialist of the department of cadastral agency of Navbahor district	R.Isakov
	Director of "ECO PROM PROEKT" LLC	A.Xaydarov
	Ecological engineer of "ECO PROM PROEKT" LLC	B.Ruziev
	Specialist of of JSC "Navoi TPP" LAOG	Sh.Dostov
	Head of "Agramir" LLC	M.Abdullaev
	Limited Liability Company, entrepreneurs and residents of Navbahor district subjected by the relocation project	6 citizens

AGENDA:
1. Implementation of the Investment Project "On the expansion of Navoi TPP through the construction of a 650 MW steam and gas plant."
2. Results of research work carried out by JISA specialists on the project and site selection.
3. The procedure of payment of the "Matrix compensation payments" on the types of compensation.
4. Information on the procedure for the development of materials "Environmental Impact Assessment" (PZVOS) and the impact of the object on the environment.
5. Questions and answers about the information that is regularly provided on the Internet.
6. Questions and answers on various land and area issues.

The meeting was declared open by the Director of Capital Construction of JSC "Navoi TPP" TG Nazarov, who introduced the participants of the meeting and read out the agenda.

On the first item of the agenda, the director of capital construction of JSC "Navoi TPP" TG Nazarov continued that SAESP JSC designed a 5-kilometer 500 kV high-voltage open switchgear in Navbahor district in connection with the construction of the fourth steam and gas plant on the basis of the investment project in JSC "Navoi TPP" in accordance with the Resolution of the President of the Republic of Uzbekistan No. PK-4563 dated 09.01.2020. Informing about the important relevance of the project for our people, he further noted that a visit to the station was organized for the staff of the Japanese agency JISA on the implementation of the project, and that data collection to study the prospects of the project has been made, and that he explained that the generated electricity and heat will allow the giant enterprises to operate at full capacity while maintaining the economy of our country at a high level.

He also noted that the meeting is held to ensure the implementation of the Resolution No 541 of the Cabinet of Ministers of the Republic of Uzbekistan dated September 7, 2020 "On further improving the mechanism of environmental impact assessment."

He also said that with the implementation of the project, more than 350 employees will have jobs.

On the second item on the agenda, the director of capital construction of JSC "Navoi TPP" TG Nazarov continued, noting that the selection of land for construction has been completed, and the area of Pakhtakor farm in Navbahor district has been selected.

The initial feasibility study for this project (PTEO) was developed by the Institute of JSC "Issiklikelektroloyiha" and provided information on the positive opinion of the relevant government agencies on the project.

On the third item on the agenda, the Director of Capital Construction of JSC "IES" TG Nazarov continued the meeting with the staff of the Japanese agency "JISA" on the problems and losses to be paid to farms and manufacturing enterprises. informed that negotiations were underway.

He said that a "Matrix of Compensation Payments" has been developed together with the staff of JISA and the staff of JSC "TPP" of the Republic of Uzbekistan. The matrix is based on the legislation of Japan and the Republic of Uzbekistan, and the instructions of the President of Uzbekistan on the timely implementation of investment programs, and in order to implement the decisions of the Cabinet of Ministers in a timely manner, it was noted that this will be done

in accordance with the approved Regulation of the Cabinet of Ministers of the Republic of Uzbekistan dated November 16, 2019 No 911 "On measures to ensure property rights of individuals and legal entities and confiscation of land."

Today, it was announced that appraisers have been selected for re-evaluation.

U. Nazarov, Deputy Mayor of Navbakhor District, continued the discussion and said that the "Matrix of Compensation Payments" had been studied and approved by the Hokimiyat (city council at the city hall). It was explained that the construction, housing and trees at each facility were calculated by the appraiser at market prices, and the damage was transferred by JSC "Navoi TPP" to the account number of the owner. It was explained that the process of land allocation will be carried out in accordance with the requirements of Resolution No. 911.

On the fourth item on the agenda, the director of "ECO PROM PROEKT" LLC A.Khaydarov answered all the questions on the development of materials "Environmental Impact Assessment" (PZVOS). He stated that the project would be implemented in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated September 7, 2020 No. 541 "On further improvement of the mechanism of environmental impact assessment", preparation on the basis of the decision that the impact of the activity of the object on the environment and the surrounding population is minimal, and also, according to preliminary data, the distance to the nearest settlement (Pakhtakor mahalla) is 400-500 m.

Also, ecological engineer B.Ruziev of "ECO PROM PROEKT" LLC stated that the purpose of the development of PZVOS was to report on the impact of the transmission line on the population. According to him, the project will include technical and fire safety measures to prevent accidents, the absence of trees due to the availability of arable land, reclamation of lands damaged during construction, the creation of a special concrete area for temporary storage of construction equipment and burning them such as environmental measures will be included in the project.

On the fourth item on agenda, the director of capital construction of JSC "IES" TG Nazarov said that all information will be provided via the Internet and recommended to visit the site (on this site: Hies.UZ).

The meeting was rich in feedback. Representatives of the district administration, the chairman of the mahalla and representatives of design companies answered the questions of the population and farms.

On the issue on the agenda, the meeting
DECIDES:

1. Construction of 5 km 500 kV overhead power transmission line by JSC "SAESP" to the open distribution facility in Navbahor district in connection with the construction of the fourth steam and gas unit on the basis of the investment project in JSC "Navoi TPP", Production organizations, farms and LLC in Navbahor district have agreed to implement the investment project.

2. Khokimiyat (city council) of Navbahor district approved measures to provide practical assistance in the preparation of construction and other project works.

3. To implement the matrix project in full by the khokimiyat of Navbahor district and JSC "Navoi TPP".

4. Taking into account the consent of all participants of the meeting to the construction of the transmission line, to develop materials "Environmental Impact Assessment" (PZVOS) and in the prescribed manner to obtain the conclusion of the State Environmental Expertise.

5. Organize data transmission via the Internet.

No other questions were found by participants.

Khokimiyat of Navbahor district, management of JSC "Navoi TPP" and LLC "ECO PROM PROEKT" answered all questions. There are no open questions.

Formalizing the protocol: signature Sh.O.Dostov.

Director of Capital Construction of JSC "Navoi TPP"	signiture	T.G.Nazarov
Deputy Hokim of Navbahor district	signiture	U.Nazarov
Specialist in construction materials	signiture	A.Xujaev
Specialist in agriculture and water management	signiture	B.Ergashev
Head of the department of the cadastral agency of Navbahor district	signiture	Sh.Isokov
Specialist of the department of cadastral agency of Navbahor district	signiture	I.Bobomurodov
Navbahor district cadastre agency department specialist	signiture	R.Isakov
Director of "ECO PROM PROEKT" LLC	signiture	A.Xaydarov
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STATE ECOLOGY AND ENVIRONMENT PROTECTION COMMITTEE OF THE REPUBLIC OF UZBEKISTAN

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May 3, 2019   No. 01-01/10-08-818   city of Tashkent

CONCLUSION

On the state environmental expert examination

For: Environmental assessment of the construction of the two J class combined cycle gas turbine units (No. 3 and 4) with a total capacity of 1300 MW at the Navoi TPP JSC located in the Karmana district of Navoi region (draft EIS).

Customer: Navoi TPP JSC

TIN: 201169179

Category: I, clause 35, Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 949 dated 21.11.2018.

Developer: Teploelektroproekt LLC

Expert: Jdanov A.V.

To Director for Capital Construction
of Navoi TPP JSC
T. G. Nazarov

CC: Ecology and Environment Protection
Department of Navoi region

The materials of the first stage of environmental assessment of construction of the two J class combined cycle gas turbine units (No. 3 and 4) with a total capacity of 1300 MW at the Navoi TPP JSC located in the Karmana district of Navoi region were submitted for the state environmental expert examination.

The main manufacturing activities of the TPP are production of power energy intended for meeting the needs of the public economy of the Republic of Uzbekistan. The Navoi TPP JSC is one of the largest power plants of the Republic of Uzbekistan, it supplies power to Navoi, Samarkand, Bukhara regions, as well as heat to the city of Navoi and Navoi region.

The Navoi TPP JSC was built during 1960-1981 with a capacity of 1250 MW.

In early 2000s, the necessity appeared to modernize the outdated equipment of the plant. The operation period of 12 power units of the TPP was 20-35 years which caused continued deterioration of the process state of equipment, reduction in its durability and, as a consequence, deterioration of technical and economic performance indicators of the TPP, increased number of accidents with possible adverse environmental effects.

In February 2013, the first combined cycle gas turbine unit with a capacity of 478 MW was put into operation, meanwhile the installed capacity of the plant reached 1728 MW.

In 2014, TG-1, 2 were taken out of operation with a capacity of 25MW each, including TG-6 with a capacity of 60 MW, at the end of 2014, the installed capacity of the plant reached 1618 MW.

In 2011, one more CCGT unit with a capacity of 450 MW was designed which commissioning envisaged to deactivate boilers No. 3 and 8. The construction of CCGT unit No. 2 is being currently completed.

At the end of 2018, the installed capacity of the Navoi TPP amounted to 1618 MW.

The construction of J class CCGT units No. 3 and 4 being considered in the draft will allow increasing the total capacity of the Navoi TPP JSC by 1300 MW, reducing operating costs, increasing the efficiency of energy transformation and reliability of supplying power to consumers, improving the environmental situation in the plant affected area.

The introduced J class CCGT units with a capacity of 650 MW have high KPI of power generation (above 60%), low specific consumption of conditional fuel for power release – 215 g/kW*h (specific consumption of conditional fuel for the Navoi TPP JSC at the end of 2018 was 381,24 g/kW*h).

The main environmental advantage of the project implementation is the reduction of maximum concentrations of pollutants in the ground-level air atmosphere created by emissions from the Navoi TPP JSC by 4,3 times as compared to the existing situation, with the achievement of the established standards of the atmospheric pollution level. Commissioning of two CCTG units No. 3 and 4 with a total capacity of 1300 MW in addition to operating CCGT unit No. 1 with a capacity of 478 MW and CCGT unit No. 2 with a capacity of 450 MW being under construction, with the deactivation of outdated and process equipment (boilers TGM-94 No. 3, 4; boilers TGM-84 No.5, 7; boilers TGM-94 No. 8, 9; boiler TGM-84 No. 10; boilers TGME-206 No. 11, 12; a peak boiler house) will result in improvement of the environmental situation in the plant affected area – such as reduction of gross TPP emissions by 1070,3209 t/year.

The Navoi TPP JSC occupies an area of 100 ha at: Navoi region, Karmana district, Yangi Arik KFY located 6 km to the north-west of Navoi city.

The site for the construction of two new power units of CCGT No. 3 and 4 with a total capacity of 1330 MW is designated in the eastern part of the Navoi TPP area. Partly on the lands currently occupied by hyrdrotechnical structures (sediment tanks), partly on the lands adjacent to the TPP area used for cottage houses and gardens, as well as those occupied by military post structures and access roads.

The construction of the two 2 new power units of CCGT No. 3 and 4 will require a site with an area of 22,9 ha, of which 8,6 ha are in the existing territory of the enterprise, and 14 ha are an additional area.

The borders of the site of the suggested construction are: in the west – territory of the Navoi TPP, on the east – Zerafshan river, in the north – deserted cottage house plots, in the south – auxiliary structures of the TPP.

A distance to the residential area located in the south-east of the construction site of CCGT units No. 3, 4 is 400 meters, a distance from the nearest residential area to the chimneys will be 550 m which is compliant with the requirements of SanPiN No. 0350-17 "Sanitary standards and rules for protection of the atmospheric air in populated areas of the Republic of Uzbekistan".

The size of the water protected area of the Zerafshan river, in the area of construction of additional CCGT units, according to Resolution of the Cabinet of Ministers No. 174 dated 07.04.1992 "Regulations on water protected areas of water reservoirs and other water bodies, rivers and main channels and collectors, as well as sources of potable and household water supply for medical, cultural and recreational purposes in the Republic of Uzbekistan" has been established as 300 m on the basis of 162 m3/sec water consumption in the river.

The TPP territory is located in the western part of the Zerafshan valley representing a foothill plain enhancing from west to east with a slight slope towards the river Zerafshan. The

mountain systems restricting the area being investigated in the north, east and south impact the air currents and stipulate local features of the climate, and wind regime in particular.

In the annual wind rose, the eastern direction is predominant with which emissions from the Navoi TPP and other large-scale enterprises of the industrial area are distributed towards opposite the city, i.e. the industrial site of the plant is located taking the wind rose into account.

The Navoi TPP JSC is located on the third right bank terrace rising above the floodplain of the Zerafshan river, it is a flat plain with a slight slope towards the river, is classified as the Golodnosteppe cycle of sediment accumulation. Within the area, a layer of quaternary sediments underlain by continental tertiary sediments is developed from above the surface.

The hydrological conditions are characterized by groundwater development as confined to the quaternary sediments of the Zerafshan river valley. The maximum level of groundwater is observed in summer and is 3-5 m, is increased as it approaches the river. Groundwater mineralization increased from 3,4 to 9,2 g/dm3, the type of mineralization is sulfate and sodium based. In the plant territory there is a network of piezometric wells, and observations are conducted over the level of groundwater and their composition.

The soils observed in the TPP territory are light serozem distinguished by a weakly alkaline environment, high content of humus, increased content of calcium, sulfur, iron.

The vegetative cover in the TPP area is represented by the ephemeroid and absinthial communities and agricultural plantings in the plant area.

At the site allocated for the construction there are green plantings to cut in the process of works preparatory for the construction. According to the site investigation, 536 units of trees are to be cut (204 pcs. of junipers, 48 pcs. of planes, 60 pcs. of apricot trees, 45 pcs. of elm trees, 34 pcs. of poplars, 4 pcs. of cherry plum trees, 130 pcs. of apple trees, 2 pcs. of mulberry trees, 3 pcs. of pomegranate trees, 6 pcs. of willows).

In accordance with Resolution of the Cabinet of Ministers No. 290 "Regulations on the procedure for using vegetation facilities and passing through permitting procedures in the field of using vegetation facilities" dated 20.10.2014, the process of further design requires obtaining a permit to cut wooden and shrub plantings in the area of construction.

Among animals settling nearby the TPP, in the area distinguished by significant dustiness and noise may be only groups that can hide from noise impacts of the plant – insects in the soil and reptiles, or those species that can quickly leave unfavorable areas – such as birds.

The installed electrical capacity of the plant at the end of 2018 is 1618 MW.

The TPP operates five turbine generators: 2Kh R-50-130 (with an installed capacity of 100 thousand kW*h), 2Kh K-160-130 (with an installed capacity of 320 thousand kW*h), 2Kh PVK-150-130 (with an installed capacity of 300 thousand kW*h), 2Kh K-210-130 (with an installed capacity of 420 thousand kW*h), CCGT unit-478 (with an installed capacity of 478 thousand kW*h).

The plant consists of cogeneration and condensation parts. The condensation part operates according to the block-based principle.

The Navoi TPP JSC has two power units of 210 MW each in its composition, including two power units of 150 MW each, two power units of 160 MW each, TPP-140 with a capacity of 100 MW, a combined cycle gas turbine unit with a capacity of 478 MW.

The Navoi TPP JCS operates the following boiler units: TGM-151 (2 pcs.), TGM-94 (4 pcs.), TGM-84 (4 pcs.), TGME-206 (2 pcs.).

TKZ oil gas burners of vortex type are installed on all boilers.

In 2018, power production amounted to 8207,5 million kW*h, while it was planned to produce 8584,1 million kW*h; the release of thermal energy amounted to 2106,7 thousand Gcal, while it was planned to produce 1867 thousand Gcal.

The boiler units used at the enterprise are the main sources of emissions of the enterprise in question. When operating the equipment on gas fuel, nitrogen oxides come to the atmosphere,

including carbon oxide, benz(a)pyren, sulfur dioxide, and oil ash in addition when burning fuel oil.

The Navoi TPP uses gas from Zevardy and Kultak deposits as the main fuel with a heating value of 8150 Gcal/nm3, hydrogen sulfide content of 0.06 – 0,1 vol.%. M-100 fuel oil with sulfur content of 2,5% and lower combustion value of 9365 kcal/kg is used as emergency fuel.

Fuel oil is supplied by railway transports, the fuel warehouse consists of four tanks of 3750m3 each and three tanks of 15000 m3, the warehouse's volume is designed for the storage of the 25-days reserve of fuel.

Currently, combustion gases from the existing boilers are emitted into the air through four flue gas ducts from the available five pipes. Boilers No. 3-10 are connected to the three ducts of 56 m high, boilers No. 11, 12 – are connected to a duct of 180 m high, CCGT No. 1 – to a duct of 60 m high.

According to the project of the Research and Design Technological Institute "Atmosphere", the technology of stepwise gas combustion through its redistribution among burner layers is introduced on all TPP boilers, which should provide increase in the emission of nitrogen oxides down to 30 or more percent, however, the project effect of increase in the emission of nitrogen oxides is not achieved.

In addition to the main sources of emissions into the air, there are emissions at the TPP when auxiliary units and equipment operate, such as overhaul divisions, fuel oil facilities, fuel and lubricants storage facilities, warehouse units. During gas pipeline blowdowns, prior to boiler start-up, salvo emissions of natural gas occur through vent stacks, the blowdown duration is 10 minutes.

Currently, at the considered enterprise, 22 pollutants are emitted from 46 sources of emissions.

The total emission of pollutants when operating the TPP equipment with maximum load is 4976,6268 t/year. The main pollutants of the air are: nitrogen dioxide (3483,5658 t/year) constituting 70% of the total emission into the air; carbon oxide (874,4503 t/year) constituting 17,57% of the total emission into the air; nitrogen oxide (577,9607 t/year) constituting 11,61% of the total emission into the air. The share of the remaining 19 pollutants is 0,82% of the total emission of the enterprise.

The model of pollutant dispersion fields in the atmospheric air of the enterprise area shows that the concentrations exceeding quotas for emission are not observed for any of the pollutants emitted by the sources of the enterprise, except for nitrogen dioxide. The nitrogen dioxide concentrations beyond the industrial site borders of the enterprise are 1.03 MAC while the emission quota is 0,25 MAC. The quota for emission of nitrogen dioxide is exceed by 4,12 times.

Water at the Navoi TPP is used for technical and household purposes.

Household quality water used for household purposes and for network feeding is supplied to the TPP from the urban hot water pipeline.

For production purposes of the plant water is supplied from the Zerafshan river. For process purposes water is used: to cool down turbine condensers; to cool down the auxiliary equipment of turbines and power units; own needs of the water treatment plant and for making up steam cycle boilers; to irrigate territories, to replenish losses in the anti-fire water reservoir, to wash industrial facilities; to supply steam to industrial enterprises.

Cooling water supply scheme is reverse and block-wise. The designed capacity of the reverse water supply is 335456,0 thousand m3 per year, the actual reverse water supply is 193031,0 thousand m3 per year.

In 2018, 577868,644 thousand m3 were taken from the Zerafshan river for production purposes, the water use limit is 860,0 million m3, water consumption above the limits did not occur in 2018.

The designed capacity of repeated water supply (a feed-up line) is 28500,0 thousand m3 per year, the actual capacity of repeated water supply is 1452,60 thousand m3/year.

The main source of pollution of surface water flows is the equipment of water treatment plants.

The water treatment system includes: a desalinating plant; a sodium hydroxide treatment plant, a condensate purification plant, a water treatment plant for making up heating networks in the water purification plant.

At the TPP, there are also flows of industrial effluents polluted with petroleum products, effluents from water and chemical washing of boilers and conservation of equipment, regenerative air heater washing effluents, effluents from blowdown of cooling towers, industrial storm effluents.

The household wastewater is directed to the treatment facilities of the urban sewage system, the industrial effluents are directed to the Zerafshan river and "Sanitary" reservoir through the designated discharges.

A complex of industrial effluent treatment facilities of the TPP (CIETF) includes the following operating plants: a plant for purification of oily and oil contaminated effluents with a manufacturing capacity of 100 m3/hour; a plant for purification of oil contaminated condensate with a manufacturing capacity of 45 m3/hour; a plant for purification of wastewater from boiler washing and regenerative air heaters with evaporator ponds for neutralized effluents with an area of 18050 m2.

The volume of regulatory purified effluents discharged into the Zerafshan river amounted to 2182 thousand m3 in 2018.

The volume of regulatory clean effluents came to the Zerafshan river in 2018 without purification amounted to 577868,644 thousand m3. At the plant, there are seven wastewater discharges.

Currently, 37 types of waste are generated in the territory of the TPP, for all types of waste there are temporary storage facilities, some portion of waste is regenerated or reused at the enterprise and some portion is removed under contracts with special organizations for disposal or recycling.

The total generation of 1 hazard class waste is 7,203 t/year, 2 hazard class – 46,7 t/year, 3 hazard class – 9361,91 t/year, 4 hazard class – 7537,371 t/year, 5 hazard class – 1268,3 t/year.

Every power unit additional to the CCGT unit has a capacity of 650 MW, is a monoblock combined cycle gas turbine unit designed for production of power energy in a basic mode of operation with simultaneous coverage of the thermal schedule of production and heating loads.

The CCGT unit 650 MW comprises: a gas turbine unit with an electric generator; a waste heat boiler; a steam turbine plant with an electric generator; a deaerator plant; a gas boosting station with three gas boosting compressors; a compressed air compressor facility; a nitrogen generating facility, an electrolysis unit with receivers; a reserve diesel generator, household water supply and heating to make up the unit, heat networks and reverse process water supply; tank facilities; cooling towers with a pumping station to supply water to the CCGT unit; oil storage in containers.

It is envisaged to operate additional units of the CCGT unit with the use of natural gas as fuel. Gas will be supplied to the territory of the site of 2 CCGT units with a total capacity of 1330 MW along the newly built main pipelines.

It is expected that the efficiency factor of new gas turbines will be 42,3%, the efficiency factor of the CCGT unit will be 62,3%. Maximum hourly fuel consumption per one CCGT unit will be 120323,09 m3/h, the annual natural gas consumption per one CCGT unit is 1564,2 million m3, natural gas consumption by the two CCGT units will be 3128,4 million m3/year.

The designed power units are steam and gas based, i.e. they combine the two steam and gas cycles – the thermal energy in the gases generated during a fuel combustion process is used to produce steam with energy sufficient to be used in a steam turbine. Every CCGT unit consists of one gas turbine, a waste heat boiler and one steam turbine. The first cycle is represented by a

gas turbine in which rotor rotation is performed by the gases generated in the fuel combustion process. The electric generator of the gas turbine generates about 2/3 of electricity. The second cycle – the gases generated in the first cycle are fed to the waste heat boiler where thermal energy of combustion gases is transmitted to water for production of steam at high pressure, the steam is used to start the steam turbine. The electric generator of the steam turbine generates about 1/3 of electricity. The waste steam, immediately after expansion in the steam turbine, is directed to the condenser, where heat exchange occurs between steam and cooling water. The condensed water is pumped to the waste heat boiler where it is transformed into steam again closing the steam cycle.

The use of combined cycle steam and gas units allows applying energy available in the gases generated as a result of fuel combustion, which significantly reduces the costs of energy carriers and has negative environmental impact accordingly.

To avert combustion gas, the newly built CCGT units are planned to equip with individual stacks of 112 m high and a mouth diameter of 0,7m.

The project implementation with the complete conservation of outdated equipment (boilers TGM-94 No. 3, 4; TGM-84 No. 5, 7; TGM-94 No. 8, 9, TGM-84 No.10, TGME-206 No.11, 12; a peak boiler house) will allow achieving annual savings of natural as in the amount of 587 million m3 and, as a consequence, reducing gross emissions of pollutants by 1070,3209 t/year (from 4976,6268 t/year in the existing condition to 3906,3059 t/year after the project implementation), including nitrogen dioxide by 787,345 t/year (from 3483,5658 to 2696,2208 t/year), carbon oxide by 165,5808 t/year (from 874,4503 to 708,8695 t/year).

Modeling of pollutant dispersion fields in the atmospheric air showed that the largest concentrations beyond the industrial site of the Navoi TPP after the project implementation would be observed in terms of nitrogen dioxide – 0,24 MAC, did not exceed the established quota (0,25 MAC) in terms of this ingredient emission.

It should be noted that entering the quota in terms of the atmospheric pollution level is achieved only subject to disconnection of all the existing deteriorated TPP boilers.

Water supply to CCGT units No. 3 and 4 for household potable and industrial purposes is envisaged from the existing networks of the Navoi TPP.

The operation of CCGT units No. 3 and 4 will be accompanied by removal of water from the Zerafshan river and tap water. To meet the process needs of the CCGT Unit, a reverse water supply system has been adopted including cooling on fan cooling towers. The estimated technical water consumption from the Zerafshan river for two CCGT units No. 3 and 4 will be 1350 m3/h or 11705 thousand m3/year, the expected tap water consumption for household and potable purposes of two CCGT units is 15,093 thousand m3/year, the total water consumption for purposes of CCGT units No. 3, 4 will be 11720,093 thousand m3/year.

The discharge of blowdown water of the cooling towers into the Zerafshan river is forecasted at a level of 501 m3/hour (4008,0 thousand m3/year).

The design capacity of the water treatment plants of the Navoi TPP is sufficient to provide the plant after construction of the new CCGT units, however, considering their physical deterioration the project provides for the construction of a new water treatment plant.

According to Law of the Republic of Uzbekistan No. 837-XII dated 06.09.1993 "On water and water use" the system of technical water supply to the two additional CCGT units is reverse-based. The plant adopts fan cooling towers which specifications will be specified in detailed design. Replenishment of losses in the reverse system (drift droplets, evaporation, blowdown) is provided by supplying water from the Zerafshan river.

After the construction of CCGT units No. 3 and 4 the amount of discharges will remain the same – 7 discharges. The proposed additional amount of purified effluents directed to discharge No. 1 will be 5m3/hour. The quality of effluents from the CCGT units differs from effluents from the existing power units by a decreased content of suspended substances.

A significant reduction of discharging thermal water into the Zerafshan river due to the reverse system process water supply will reduce supply of heat to surface water.

The introduction of new CCGT units No. 3, 4 will not require organizing additional sources of water supply – TPP water consumption from the Zerafshan river in 2018 amounted to 577868,644 thousand m3 per year with a limit of 860000 thousand m3 per year.

Waste regenerating water from the water treatment plants are planned to supply to a drainage pumping station of the water purification plant and then to the CIETF (complex of industrial effluent treatment facilities) which includes a unit for neutralization of acid and alkali effluents of the water treatment plant for making up the steam and water cycle and a unit for processing saline effluents from both water treatment plants. Processing of saline effluents is planned to carry out according to the following scheme: soda dosing into balancing tanks, filtration of settled water on mechanical filters with further processing at the reverse osmosis plant. Saline effluents (saline solution) after the reverse osmosis will be directed to the evaporator pond, the purified water will be returned to the cycle of the water treatment plant for making up the circulation system and the steam and water cycle.

At the Navoi TPP, after commissioning of the two additional CCGT units, the same type of waste will be generated as in the existing state. Additional types of waste with regard to those generated in the existing condition are not expected. The changes concern the norms and standards for generation and limits for disposal of all types of waste, these values must be specified in the process of further environmental design.

Prior to commissioning of the considered facility a **Statement of environmental effects** must be submitted in which **environmental standards for all types of environmental impacts from the planned activities should be developed**.

The State Ecology and Environmental Protection Committee of the Republic of Uzbekistan **ratifies** the draft Statement of environmental effects for the construction of two J class combined cycle gas turbine units (No. 3, 4) with a total capacity of 1300 MW at the Navoi TPP JSC located in the Karmana district of Navoi region.

The Ecology and Environmental Protection Department of Navoi region shall take under control the compliance with the requirements of nature protection laws during construction operations.

Commissioning of the facility without a positive conclusion for the Statement of environmental effects should be avoided.

Chairman   /signed/   **B. Kuchkarov**

                                 /official seal/

STATE ECOLOGY AND ENVIRONMENT PROTECTION COMMITTEE OF THE REPUBLIC OF UZBEKISTAN

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July 23, 2019   No. 01-01/10-08-1561   city of Tashkent

CONCLUSION

On the state environmental expert examination

For: Environmental assessment of the construction of the switchyard 220/500 kV at the Navoi TPP JSC located in the Novbakhor district of Navoi region (draft EIS).

Customer: Navoi TPP JSC

TIN: 200850647

Category: II, clause 10, Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 949 dated 21.11.2018.

Developer: Teploelektroproekt LLC

Expert: Jdanov A.V.

To Director General
of Navoi TPP JSC
K. Kh. Ganiev

CC: Ecology and Environment Protection
Department of Navoi region

The materials of the first stage of environmental assessment of construction of the switchyard 220/500 kV at the Navoi TPP JSC located in the Karmana district of Navoi region were submitted for the state environmental expert examination.

The construction of the 220/500 kV outdoor switchgear (SWYD) at the Navoi TPP is due to the need to provide power for the combined cycle gas turbine units under construction (CCGT units) No. 3 and 4 to create a reliable source of power for NMMC loads in full volume, and to reduce power deficit in the Republic of Karakalpakstan, Khorezm, Bukhara and Navoi regions.

The construction of the 220/500 kV SWYD is envisaged on a land with an area of 25 ha located in the distance of 1,875 km north of the CCGT units No. 3 and 4 construction site in the Novbakhor district of Navoi region.

The site for the proposed location of the 220/500 kV outdoor switchgear is within agricultural land. The boundaries of the construction site on all sides are agricultural land occupied by cotton and wheat crops.

The closest distance to the residential area of the Urgench village (to the south-west of the territory of the designed outdoor switchgear) is 330 m, which meets the regulatory requirements for installing sanitary protection gaps for newly designed high voltage lines in accordance with clause 2.23.4 of SanPiN No. 0350-17 "Sanitary standards and rules for protection of atmospheric air in populated areas of the Republic of Uzbekistan".

The territory allocated for the 220/500 kV outdoor switchgear is located in the western part of the Zeravshan Valley, which is a piedmont plain that rises from west to east with a slight slope towards the Zeravshan River. The mountain systems restricting the area being investigated in the north, east and south impact the air currents and stipulate local features of the climate, and wind regime in particular.

In the annual wind rose, the eastern direction is predominant with which emissions from the Navoi TPP and other large-scale enterprises of the industrial area are distributed towards opposite the city.

The construction site is located on the third right bank terrace rising above the floodplain of the Zerafshan river, it is a flat plain with a slight slope towards the river, is classified as the Golodnosteppe cycle of sediment accumulation. Within the area, a layer of quaternary sediments underlain by continental tertiary sediments is developed from above the surface.

The hydrological conditions are characterized by groundwater development as confined to the quaternary sediments of the Zerafshan river valley. The maximum level of groundwater is observed in summer and is 3-5 m, is increased as it approaches the river. Groundwater mineralization increased from 3,4 to 9,2 g/dm3, the type of mineralization is sulfate and sodium based.

The soils observed in area being investigated are light serozem distinguished by a weakly alkaline environment, high content of humus, increased content of calcium, sulfur, iron.

The vegetative cover in the site area is represented by the ephemeroid and absinthial communities and agricultural plantings in the plant area.

Among animals settling nearby the TPP, in the area distinguished by significant dustiness and noise may be only groups that can hide from noise impacts of the plant – insects in the soil and reptiles, or those species that can quickly leave unfavorable areas – such as birds.

Within the territory of the 200/500 kV outdoor switchgear it is suggested locating the following buildings and structures: 500 kV SWYD; 200 kV SWYD; a general substation control center; an autotransformer (6 pcs.); a single-phase reactor with forced air and oil circulation (3 pcs.); 10 kV indoor switchgears (2 pcs.); storage facilities and sanitary oil facilities; a fire pumping station with a 2x100m3 water storage tank; a well with a pumping station and a water tower; 200m2 and 100m3 oil collectors; a diesel engine room; end supports for 500 kV and 200 kV overhead lines.

On the territory of the 200/500 kV outdoor switchgear, it is planned to install security lighting and signaling, working lighting, lightning protection and grounding, to lay internal roads, to build cable channels and oil drains.

For the installed reactors, an automatic fire extinguishing system is organized with the construction of a separate building for a gate valve switching chamber and a piping network.

In the process of construction operations the environmental effects are determined by atmospheric pollution with incomplete combustion products of hydrocarbon fuel by the engines applied in the construction equipment and vehicles (11 units): inorganic dust in the process of excavation; iron and manganese oxides in the process of installation operations, emissions of steam of solvents in the process of decoration.

A total of 5,753 t/year of 13 pollutants is expected to be emitted during construction operations. The largest contribution to the total emissions during the construction process will be made by: oil solvent 34,78% (2.0 t/year), carbon monoxide 26,03% (1.5 t/year), nitrogen dioxide 8,93% (0.51 t/year), hydrocarbons 7,8% (0.45 t/year), an addition of the remaining 9 ingredients is 22.46% of the total emissions during the construction.

The analysis of dispersion fields of pollutants in the atmospheric air of the area of enterprise location for a period of 200/500 outdoor switchgear construction shows that the concentrations exceeding quotas for emission are not observed in terms of either one of the pollutants emitted by the sources of the enterprise.

When operating the electrotechnical equipment in the territory of the 200/500 kV outdoor switchgear, the emission of hydrocarbons (oil vapors) from equipment leaks during operation of oil-filled equipment (autotransformers, current transformers, voltage transformers, reactors).

At the considered facility it is planned to use SF 6 circuit breakers, rather than oil break switches or air circuit breakers, which will allow complete excluding emissions into the atmosphere of nitrogen dioxide and oil vapors in the process of their operation.

In addition to the main equipment on the territory of the 200/500 kV outdoor switchgear, a welding machine is supposed to be used to carry out current and major repairs.

The expected total emission of pollutants into the atmospheric air from the sources of 200/500 kV outdoor switchgear will be 0.0081 t/year, 96.3% is formed by emissions of hydrocarbons (0.0078 t/year).

The analysis of dispersion fields of pollutants in the atmospheric air of the area where the enterprise is located for the period of operation of the 200/500 kV outdoor switchgear shows that concentrations exceeding the emission quotas are not observed for any of the emitted pollutants.

It is assumed that the source of water supply for the outdoor switchgear will be its own artesian well.

In order to streamline water use from the artesian well, it is necessary to develop and obtain a "Permit for special water use" in the manner prescribed by law (Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 255 dated March 31, 2018) "On the procedure for registration and obtaining a permit for special water use or water consumption."

Water consumption is aimed at providing household and drinking needs and replenishing fire-fighting water storage tanks. Water consumption for production needs is not expected.

Water consumption for household purposes consists of: drinking needs of the staff and the cost of shower heads. Water consumption from the artesian well is predicted in the volume of 1.625 m3/day or 0.6 thousand m3/year.

Household wastewater is planned to be collected in a waterproof cesspool for periodic removal.

In the course of construction operations, it is assumed that 7 types of waste will be generated: waste of ferrous metal, concrete, reinforced concrete (IV class); waste of paints, cleaning material contaminated with oils (III class); waste of polymerized plastics - paint containers (IV class); household waste (IV class).

For the collection and temporary storage of waste, specially equipped places and containers are provided.

Emergency risks during operation of the 200/500 kV outdoor switchgear at the Navoi TPP are mainly associated with oil spills and its possible firing, as well as with fires in case of damage to transformers and in the event of short-circuit currents in cable facilities.

Fire safety is ensured by the use of the following design solutions provided in accordance with the instructions for the design of fire protection of power enterprises (RD 153-34.0-49.101-2003): oil drainage from transformers into a closed oil sump; lightning protection device for outdoor switchgear structures; compliance with fire-prevention gaps between structures and oil-filled equipment.

In emergency situations on the territory of the outdoor switchgear, to prevent the pollution of soils, ground and surface waters with oil, to prevent spreading of oil and subsequent firing, as well as the spread of fire in case of damage to oil-filled power transformers, it is planned to build an underground waterproofed oil sump with a capacity of 200 m3 and an oil drain system.

Prior to commissioning of the considered facility a **Statement of environmental effects** must be submitted in which **environmental standards for all types of environmental impacts from the planned activities should be developed**.

The State Ecology and Environmental Protection Committee of the Republic of Uzbekistan **ratifies** the draft Statement of environmental effects for the construction of the

220/500 kV outdoor switchgear at the Navoi TPP JSC located in the Novbakhor district of Navoi region.

The Ecology and Environmental Protection Department of Navoi region shall take under control the compliance with the requirements of nature protection laws during construction operations.

Commissioning of the facility without a positive conclusion for the Statement of environmental effects should be avoided.

Chairman /signed/ **B. Kuchkarov**

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