APPROVED

Deputy General

Director of

Finance and Economics

Mr. Zaborskiy Alexey

MONITORING REPORT

SF_6 destruction at JSC HaloPolymer Perm

Version 2.0

6 December 2011

Monitoring period:

01.01.2011–30.09.2011

Project operator: HaloPolymer Perm JSC

REFERENCE

1 PROJECT INTRODUCTION

This Monitoring report summarizes operation of the JI project "SF_6 destruction at JSC HaloPolymer Perm" and is aimed at calculation of the emission reductions achieved by the project activity during the period covered by this report.

1.1 Monitoring period

01 January 2011 0:00 to 30 September 2011 23:59.

1.2 Emission reductions for the monitoring period

Current report takes into account CO_2 emission reduction generated during the Monitoring period. Detailed calculations are provided in the subsection 3.1.4.

The actual generation of ERUs for the monitoring period is 2 052 468 tons CO_{2eq}.

Table 1. Emission reductions in 2008-2010 and 9 months 2011

Periods	Emission reductions, tCO_{2eq}
01/01/2008 – 31/12/2008	2 347 724
01/01/2009 – 31/12/2009	2 059 009
01/01/2010 – 31/12/2010	2 346 012
01/01/2011 – 30/09/2011	2 052 468

1.3 Comments

This is the firth monitoring report since the determination of the project. The report is prepared in accordance with the determined project design documentation (PDD) "SF_6 destruction at JSC "Halogen, Perm" Version 6 dated 02 November 2011. All the data are collected and emission reductions calculation is made in accordance with the procedures described in Section D "Monitoring Plan" of the determined PDD.

On September 15, 2011 the Government of the Russian Federation adopted a resolution # 780 "On Measures for the Implementation of Article 6 of the Kyoto Protocol to the UN Framework Convention on Climate Change". This document approves Regulations on the implementation of article 6 of the Kyoto Protocol. According to paragraph 2 of the Resolution, the projects will be approved by the Ministry of Economic Development of the Russian Federation.

In accordance with the law of the Russian Federation applicable to the implementation of JI projects, the Project can be approved after a positive opinion is given by the Accredited Independent Entity.

2 GENERAL PROJECT ACTIVITY

2.1 Title of the project

SF_6 destruction at JSC "HaloPolymer Perm"

2.2 Sectoral scope:

Sector 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride.

2.3 Crediting period

01 January 2008 – 31 December 2012

2.4 Location of the project

The considered project is located in Perm, Perm Krai, Russia. The city is administrative center of the Perm Krai. It was founded in 1723. The population is 991 500 people. "HaloPolymer Perm" is a large enterprise and significant employer in the region.

2.5 Short description of the project (quoted from the PDD version 6.0)

The aim of the project is to destruct SF6 waste streams contributing thus to the improvement of environment situation in Perm-city and to reduction of GHG emissions. SF_6 is a GHG gas with a high global warming potential (GWP) that is 23 900 tons of CO2 equivalent per one ton of SF_6.

Situation existing prior to the starting date of the project (quoted from the PDD Section A.2)

SF_6 production line was put into operation in 1982. During the process a considerable part of sulphur hexafluoride (approximately 20% of SF_6 output) is lost as emissions at rectification columns.

The enterprise has relevant experience of fluorine organic compounds (FOC) destruction. Thermal destruction unit for fluorine organic compounds was installed at the plant and have been successfully operated since 1987. All equipment and technology are certified in compliance with the Russian standards and meet all applicable environmental requirements.

In the absence of the legislative and economic incentives to utilize (or destruct) wastes of SF_6 production the plant would continue to emit the SF_6 containing gaseous wastes in the atmosphere. This situation is the baseline scenario.

Realization of the proposed project activity is implemented under the second stage of modernization of the thermal destruction unit (TDU) and leads to destruction of SF_6 waste streams at the FOC thermal destruction unit and includes the following measures:

- Installation of stillage residue receiver;
- Installation of blowing-off transmission line from SF_6 production to thermal destruction unit with installation of receiver;
- Installation of measuring and control equipment.

For destruction of wastes in TDU the natural gas is directed in the TDU. SF_6 is utilized along with the gaseous wastes of HCFC-22 and monomer-4 production, but in a separate furnace unit of TDU. The technology and equipment for the project are developed by a domestic special-purpose institute and are certified in conformity with the norms of the Russian Federation and meet all environment protection requirements.

2.6 Status of the project implementation

The PDD v.6.0 for the current project was submitted to Bureau Veritas Certification Rus[1] (hereinafter AIE) for determination in September 2011. In course of the determination the PDD was amended and as a result the final version 6.0 was issued 02 November 2011. A positive expert opinion was received for the PDD v.6.0 [2]. The final version 6.0 of the PDD describes the project in full details. The destruction process had been started from 01.01.2008. The date of the first emission reductions is 01 January 2008.

The project was implemented as it is described in the final version 6.0 of the PDD. The starting date of the project is 01/11/2007, date when the installation of the project equipment started. The date when the project became operational is 01/01/2008. The implementation of the project fully corresponds to the implementation schedule presented in the PDD v6.0.
The SF_6 destruction project had been carried out under the second stage of the TDU modernization and included implementation of the following measures:

- Installation of stillage residue receiver;
- Installation of blowing-off transmission line from SF_6 production to thermal destruction unit with installation of receiver;
- Installation of measuring and control equipment.

Currently all actions according to the project are totally completed.

- Stillage residue receiver was commissioned according to the Certificate of acceptance in operation.
- Blowing-off transmission line was commissioned according to the Certificate of acceptance in operation.
- Receiver for waste collection was commissioned according to the Certificate of acceptance in operation.

All equipment had been successfully installed and is fully operational. Project data is being gathered continuously since 01.01.08.

2.7 Deviations or revisions to the PDD and the monitoring plan:

There are no deviations to the final version 6.0 of the PDD or to the established monitoring plan.

2.8 Contact information on project participants responsible for the monitoring report

Contact person on project participants:

Project operator and investor:

HaloPolymer Perm JSC, Russian Federation, 614113 Perm, Lasvinskaya str., 98

[1] Bureau Veritas Certification Rus is an Accredited Independent Entity (AIE)
[2] Positive expert opinion together with the Determination report has been provided to verifiers.

Pavel Boyko, General director
Tel.:+7 342 250 61 52, info@halopolymer-perm.com
Tel.: +7 342 250 61 52, www.halopolymer.com

Holding company:

HaloPolymer, Russian Federation, 123056 Moscow, Leningradskiy av., 31A bldg. 1
Igor Kuznetsov, Project director
Tel: +7 495 725 4400, i.kuznetsov@halopolymer.com
Tel: +7 495 725 4400, www.halopolymer.com

March 9, 2011 the extraordinary general meeting of shareholders JSC "Halogen" decided to change the brand name of a legal entity and the approval of the charter in the new edition. March 17, 2011 to the Unified State Register of Legal Entities entry was made to change the brand name of "Halogen" on "HaloPolymer Perm" and re-charter in the new edition. Changing the name is not a reorganization, not alter the rights and responsibilities of the entity. Occurring in the text of the Report of the name of the investor "Halogen" and "HaloPolymer Perm" are considered equal.

3 MONITORING PLAN AND RESULTS OF THE PROJECT MONITORING

3.1 Monitoring plan

3.1.1 Methodological approach

3.1.1.1 Baseline methodology

The baseline was developed in compliance with the "Guidance on criteria for baseline setting and monitoring"[3]. The project developer uses JI specific approach, but definitely coordinating it with the requirements set forth in Decision 9/CMP.1, Annex B "Criteria for baseline setting and monitoring"[4]

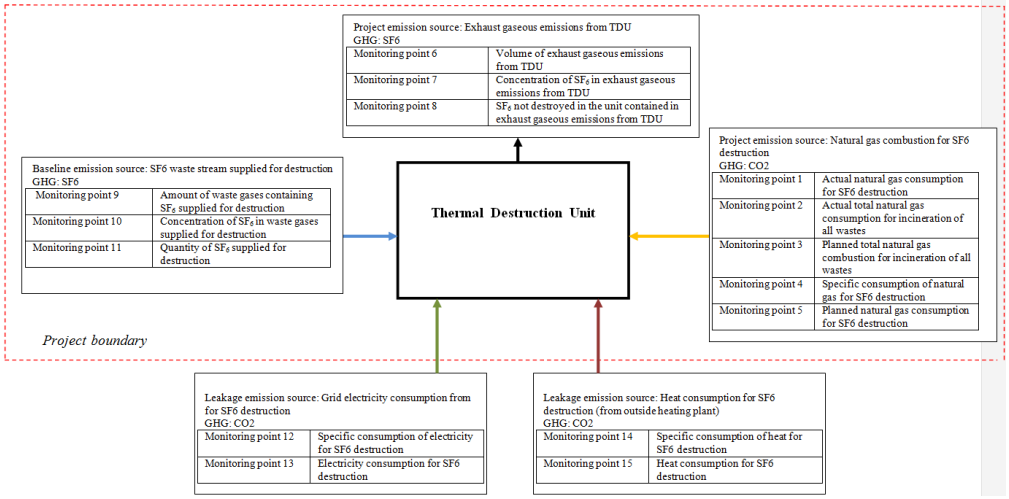
3.1.1.2 Monitoring methodology

Selection of monitoring approach was made in compliance with the "Guidance on criteria for baseline setting and monitoring" version 03 and requirements of the Decision 9/CMP.1, Appendix B "Criteria for baseline setting and monitoring". The project developer used JI specific approach for establishing the monitoring. The monitoring plan data should be stored for at least 2 years after the end of the crediting period and after the last ERU tranche under the project.

3.1.2 Monitored parameters in the project

Project boundaries and monitoring points are in the diagram below:

[3] Guidance on criteria for baseline setting and monitoring (version 03), JISC
[4] Report of the Conference of the parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005. Decision 9/CMP.1 Guidelines for the implementation of Article 6 of the Kyoto protocol. Appendix B Criteria for baseline setting and monitoring. p.12-13.



Provisions of conservatism

1. The measurement of amount of SF_6 waste supplied for destruction is made by two down-in-line stationary mass flow meters installed on the inlet pipelines to the destruction unit. The readings are automatically collected, stored and processed by Automated Process Control System (APCS). The APCS automatically calculates the conservative value of the SF_6 waste supplied for destruction based on the readings from two down-in-line mass flow meters.
2. The measurement of natural gas consumption is carried out since the start of operation of Kyoto project and is common for both HFC-23 and SF_6 destruction process. Actually the consumption of natural gas has been already taken into account in HFC-23 project and consecutive monitoring reports. But for conservatism sake the same values of natural gas consumption are also applied for SF_6 destruction project.
3. As prescribed in the paragraph 18 of Guidance on criteria for baseline setting and monitoring (Version 03) "Project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected. All sources of leakage that are included shall be quantified and a procedure for an ex ante estimate shall be provided. Only those emission sources that account for, on average per year over the crediting period, more than 1 per cent of the difference between project and baseline emissions, or which exceed an amount of 2,000 tonnes of CO2 equivalent, whichever is lower, shall be included. The leakage assessment provided below shows that these emissions are less than 1% of the difference between project and baseline emissions. Nevertheless those emissions will be taken in to account in the monitoring to be conservative.
4. When assessing CO_2 emission factor from heat consumption, it is assumed that the heat efficiency of a combined heat and power plant is 40% . However, according to a scientific article published by Novosibirsk State Technical University the heat production efficiency of CHPP is 54,7%[5]. But we take 40% to be more conservative.

3.1.2.1 GHG gases and sourse

The following GHG gases and their sources are considered in the monitoring plan (Please see the Table 2 below)

Table 2. GHC gases and their sources

Source	GHG gas
Baseline emission source: Waste SF_6 emissions that were avoided as a result of the project realization	SF_6
Project emission source: SF_6 emissions that were not destructed in TDU	SF_6
Project emission source: Emissions from natural gas combustion for destruction process	CO_2
Leakage source: Consumption of electricity for SF_6 destruction	CO_2
Leakage source: Consumption of heat for SF_6 destruction	CO_2

[5] http://www.esco-ecosys.ru/2010_3/art040.pdf. See Fig. 4.8 "Energy flows of split and combined process" on page 59.

3.1.2.2 Data to be collected according to the monitoring plan (Please see the Table 3):

Table 3. Data to be collected

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	*Comment*
1. $FC_{NG,SF6y\_fact}$	*Actual natural gas consumption for SF_6 destruction process over a reporting period y*	*See formula D.1.-2*	*m^3*	*c*	*monthly*	*100%*	*Electronic/paper*	*Actual natural gas consumption is determined each month on a basis of the planned norm of natural gas consumption for GHG gas destruction and taken in into account overconsumption or saving of natural gas supplied in TDU over a past month.*
2. FC_{NGy_total}	*Total measured consumption of the natural gas for destruction of all wastes incinerated in TDU over a reporting period y*	*Mass flow meter*	*m^3*	*m*	*monthly*	*100%*	*Electronic/paper*	*Apart from GHG gases (HFC-23 and SF6) also wastes from other production facilities are incinerated in TDU. Only the total natural gas supplied in TDU for destruction of all wastes is measured by volume flow meter.*
3.$FC_{NG\_total\_plan}$	*Estimated total consumption of the natural gas for destruction of all wastes incinerated in TDU over a reporting period y*	*Calculation provided by the production manager of the shop 26.*	*M3*	*c*	*Monthly*	*100%*	*Electronic/paper*	*Production manager of the shop 26 (where TDU is installed) estimates each month the planned volume of natural gas consumed for destruction of all wastes. For this he multiplies the quantity of an incinerated waste by a planned norm of natural gas consumption to destruct the waste.*
4. $SFC_{NG,SF6}$	*Specific*	*The planned*	*Ths*	*c*	*Yearly*	*100%*	*Electronic/paper*	*Planned norms are*

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	*Comment*
	consumption of natural gas for destruction of SF_6	*norm of natural gas consumption for destruction of GHG gases*	*m^3/t*					*established on yearly basis by Technical Department and approved by Chief Engineer (subject to reconsideration depending on actual gas consumption norms over the year past). The actual consumption norms are calculated each month according to the Method of calculation of natural gas consumption for combustion of separate waste types approved by Chief Engineer of JSC Halogen on 29/08/08.*
5. $FC_{NG,SF6,y\_plan}$	*The planned natural gas consumption for SF_6 destruction over a reporting period y*	*Formula D1.-4*	*m^3*	*c*	*monthly*	*100%*	*Electronic/paper*	*See PDD section D 1.1.2.*
6. q_NDy	*Volume of exhaust gaseous emissions from destruction unit over a reporting period y*	*Mobile flow meter*	*m^3*	*m*	*Weekly*	*100%*	*Electronic/paper*	*Measurement of effluent gases from the destruction unit is made by analytical method. For that purpose the speed of effluent gas is measured weekly by portable flow meter. The measurements are documented and summary reports are archived during 10 years. Measurements are used for calculation of effluent gases volume (average*

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	*Comment*
								effluent gas speed for a period is multiplied by area of the venting pipe and length of period).
7. $w_{SF6,ND\ y}$	*Concentration of SF_6 in gaseous emissions from destruction unit over a reporting period y*	*Chromatograph*	*mg/m^3*	*m*	*Weekly*	*100%*	*Electronic/paper*	*Measurement of SF6 concentra-tion in effluent gases are performed by laboratory weekly based on the gas samples from the venting pipe after destruction unit. Gas samples are analyzed based on approved methods, measurements are made by chromatographs.*
8. ND_SF6 y	*Quantity of SF6 not destroyed in the unit during the reporting period y*	*Formula D.1-2*	*t*	*C*	*Quarterly*	*100%*	*Electronic/paper*	*See PDD section D 1.1.2.*
9. q_SF_6 ***y***	*Amount of waste gases containing SF_6 supplied for destruction*	*two mass flow meter*	*Kg*	*m*	*Monthly (continues measurement)*	*100%*	*Electronic/paper*	*Measured directly before thermal destruction unit. Monthly data is the sum of the accumulated data.*
10. $w_{SF6,PJ,}$***y***	*Concentration of SF_6 in waste gases supplied for destruction*	*Chromatograph*	*%*	*m*	*Weekly*	*100%*	*Electronic/paper*	*Measured once per day*
11. Q_SF6 y	*Quantity of SF_6 supplied for destruction in the unit*	*Formula D1-7*	*t*	*c*	*Quarterly*	*100%*	*Electronic/paper*	*See PDD subsection D 1.1.4*

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	*Comment*
12. $SEC_{ELEC,y}$	***Specific electricity consumption for SF_6 destruction***	*Planned electricity consumption norm for destruction of GHG gases*	*MWh/ t*	*c*	*Yearly*	*100%*	*Electronic/paper*	*For determining electricity consumption the planned consumption norm is applied at the JSC "HaloPolymer Perm". Planned norms are established on yearly basis for the next year by Technical Department and approved by Chief Engineer (subject to reconsideration depending on actual electricity consumption over the year past).*
13. EC,y	***Electricity consumption for SF_6 destruction***	*Data on monitoring of TDU operation in 2008-2010. For estimation of electricity consumption in 2011-2012 see the formula D1.-9*	*MWh*	*c*	*Monthly*	*100%*	*Electronic/paper*	*Electricity consumption for SF6 destruction is calculated by the project manager of the shop 26 and checked by the head of Technical Department*
14. $SHC_{,HEAT,y}$	***Specific heat consumption for SF6 destruction***	*Planned norm of heat consumption norm for destruction of GHG gases*	*GJ/t*	*c*	*Yearly*	*100%*	*Electronic/paper*	*For determining heat consumption the planned consumption norm is applied at the JSC "HaloPolymer Perm". Planned norms are established on yearly basis by Technical Department and approved by Chief*

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	*Comment*
								Engineer (subject to reconsideration depending on actual heat consumption over the year past).
15. HC,y	***Heat consumption for SF6 destruction***	*Data on monitoring of TDU operation in 2008-2010. For estimation of heat consumption in 2011-2012 see the formula D.1-11 below*	*GJ*	*c*	*Yearly*	*100%*	*Electronic/paper*	*Heat consumption for SF6 destruction is calculated at Technical Department*

3.1.3 QA/QC for the project monitoring

Table 4. QA/QC for the project monitoring

Data	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
$FC_{NG,SF6y\_fact}$	*low*	*Actual natural gas consumption for SF_6 destruction is estimated with the use of approved consumption norms taking into account actual overconsumption or saving of natural gas over the past months. The calculation is provided each month by the production manager of shop 26 according to the Method of calculation of natural gas consumption for combustion of separate waste types approved by Chief Engineer of JSC Halogen on 29/08/08. The calculation checked and analyzed against the natural consumption in previous periods by the head of Technical Department.*
FC_{NGy_total}	*low*	*Flow meter consisting of standard diaphragm DKS-06-80-A/B-1, differential pressure gage АИР-20-ДД and gas corrector SPG-762. Recalibration interval for the standard diaphragm is 5 years; for differential pressure gage is 2 years and for gas corrector is 4 years. Recalibration is provided by the Department of Chief Metrologist of JSC "HaloPolymer Perm".*

Data	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
$FC_{NG\_total\_plan}$	*low*	*Estimation of total consumption of the natural gas for destruction of all wastes incinerated in TDU is provided with the use of approved consumption norms taking into account actual overconsumption or saving of natural gas over the past months. The calculation is provided each month by the production manager of shop 26 according to the Method of calculation of natural gas consumption for combustion of separate waste types approved by Chief Engineer of JSC Halogen on 29/08/08. The calculation checked and analysed against the natural consumption in previous periods by the head of Technical Department.*
$SFC_{NG,SF6}$	*low*	*Planned norms are established on yearly basis by Technical Department and approved by Chief Engineer (subject to reconsideration depending on actual gas consumption norms over the year past).*
q_NDy	*low*	*The measurement is provided by portable flow meter TESTO according to Quantitative Chemical Analysis of Air. Procedure of measurement of SF6 mass concentration in the air of the working zone and in the industrial emissions by gas-chromatographic method. # 469-00-2010 signed by Chief Metrologist and approved by Chief Engineer dd 19/03/2010. The calibration is provided yearly by Perm Centre for Standardization, Metrology and Certification.*
$w_{SF6,ND\ y}$	*low*	*Chromatograph LKhM-80 is used. The calibration is provided yearly by Perm Centre for Standardization, Metrology and Certification according to the calibration method. Cross-checked with the previous chromatograph analysis is provided.*
$q\_SF_6\ y$	*low*	*According to QMS, the measurement, processing and storage of data on utilization of SF6 waste streams in TDU is carried out by the Automated Process Control System, namely "'"APCS of SF6 waste stream utilization". The APCS is established on a base of a programme-technical complex (PTC): SCADA-system "Cascade" (Cheboksary, Russia) and of a multifunctional microprocessor controller "Contrast" KP-500.SF6 waste streams are measured with two on-line mass flow meters PROMASS 83F15. Data from mass flow meters over two parallel channels come in modules of communication devise with object (CDO), which are included in the set the "Contrast" KP-500 controller. Having been processed the information is channeled in the work stations. Failure-tolerance of the system and data safety are guaranteed by two work stations (main and standby) working in a "hot" backup mode. Relative error of PROMASS Flow meter is 0,1%. Recalibration interval of mass flow meters is 4 years. Recalibration is provided by laboratory of the company "Endress+Hauser Flowtec AG"Quantity of SF6 not destroyed in the unit during the reporting period is determined each month with application of data (ID-4 and ID-5) that measured with checked and calibrated instruments.*
$W_{SF6,PJ,}y$	*low*	*Sampling of SF6 waste stream for determination of SF6 concentration is carried out according to the approved procedure M14UK2011 "Procedure of measurements of mass shares of oxygen, nitrogen, tetrafluormethane and sulphur hexafluoride in SF6 wastes by chromatographic method". Measurements are provided by 2 chromatographs (Cristallux-4000M) according Recalibration interval is 4 years. The calibration is provided yearly by Perm Centre for Standardization, Metrology and Certification.*
Q_SF6 y	*low*	*Quantity of SF_6 supplied for destruction is determined each month with application of data (ID-7 and ID-8) that measured with checked and calibrated instruments.*

Data	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
$SEC_{ELEC,y}$	*low*	*For determining electricity consumption the planned consumption norm is applied at the JSC "HaloPolymer Perm". Planned norms are established on yearly basis for the next year by Technical Department and approved by Chief Engineer (subject to reconsideration depending on actual electricity consumption over the year past).*
EC,y	*low*	*Electricity consumption for SF6 destruction is calculated by the project manager of the shop 26 and checked by the head of Technical Department against the electricity consumption over the previous months. If considerable distortion is found the reason of that is analyzed in order to eliminate.*
$SHC_{,HEAT,y}$	*low*	*For determining heat consumption the planned consumption norm is applied at the JSC "HaloPolymer Perm". Planned norms are established on yearly basis by Technical Department and approved by Chief Engineer (subject to reconsideration depending on actual heat consumption over the year past).*
HC,y	*low*	*Heat consumption for SF6 destruction is calculated by the project manager of the shop 26 and checked by the head of Technical Department against the electricity consumption over the previous months. If considerable distortion is found the reason of that is analyzed in order to eliminate.*

3.1.3.1 Personnel training

Training of workers and maintenance qualification upgrade for personnel has been made during the project realization.

The personnel of SPPM responsible for the boiler operation was trained by the specialists of base project equipment supplier in order to secure proper operation of the project equipment.

3.1.3.2 The operational and management structure applied in order to implement the monitoring plan

All aspects of organizational and management structure of monitoring plan of SF6 destruction project are in compliance with the effective Quality Management Standard "Procedure of process organization for destruction of SF_6 " adopted at JSC "HaloPolymer Perm". Under the QMS, the head of Technical Department (TD) is a key focal point at the plant responsible for gathering of relevant parameters and submission of input monitoring data for elaborating a monitoring report. According to QMS the information addressed to him is coming from the following sources:

1. SF_6 waste streams. These data is supplied, daily and weekly, from the engineer-technologist of the shop 22 at which SF_6 is produced:
   - The engineer-technologist prepares and prints out daily reports on SF6 waste streams with a by-hour breakdown in accord with the adopted form[6].
   - The engineer-technologist prepares and prints out monthly reports on SF6 waste streams with a by-day breakdown in accord with the adopted form[7].
   The head of TD checks and signs the reports.
2. SF_6 concentration in waste streams. These data is provided from Quality Management Laboratory. Sampling of SF6 waste streams at the inlet of TDU is carried out by technological service of the shop according to a schedule of analytical control. Under analysis two parallel evaluations are carried out (two chromatograms are

[6] See form in the PDD Annex 3. Monitoring Plan
[7] See form in the PDD Annex 3. Monitoring Plan

recorded, calculated and printed out). Lab assistant fills in a chromatogram certificate that indicates a position, the date and time of sampling and surname of an operator[8]. At the end of analysis each file of chromatogram must be automatically stored in appropriate data base of a personal computer that services the chromatograph. A printed out protocol must include filled chromatogram certificate, chromatogram's curve and the table of peaks with calculation results. Printed out copies are attached in the special file. The head of QM Laboratory controls the accuracy of analysis and the results. Based on monthly data the head of QM Laboratory prepares a report on SF6 mass concentration (%) in a waste stream for all sampling points with attachment of the results of analysis and calculated average monthly concentration. The report is checked and signed by the head of the shop.

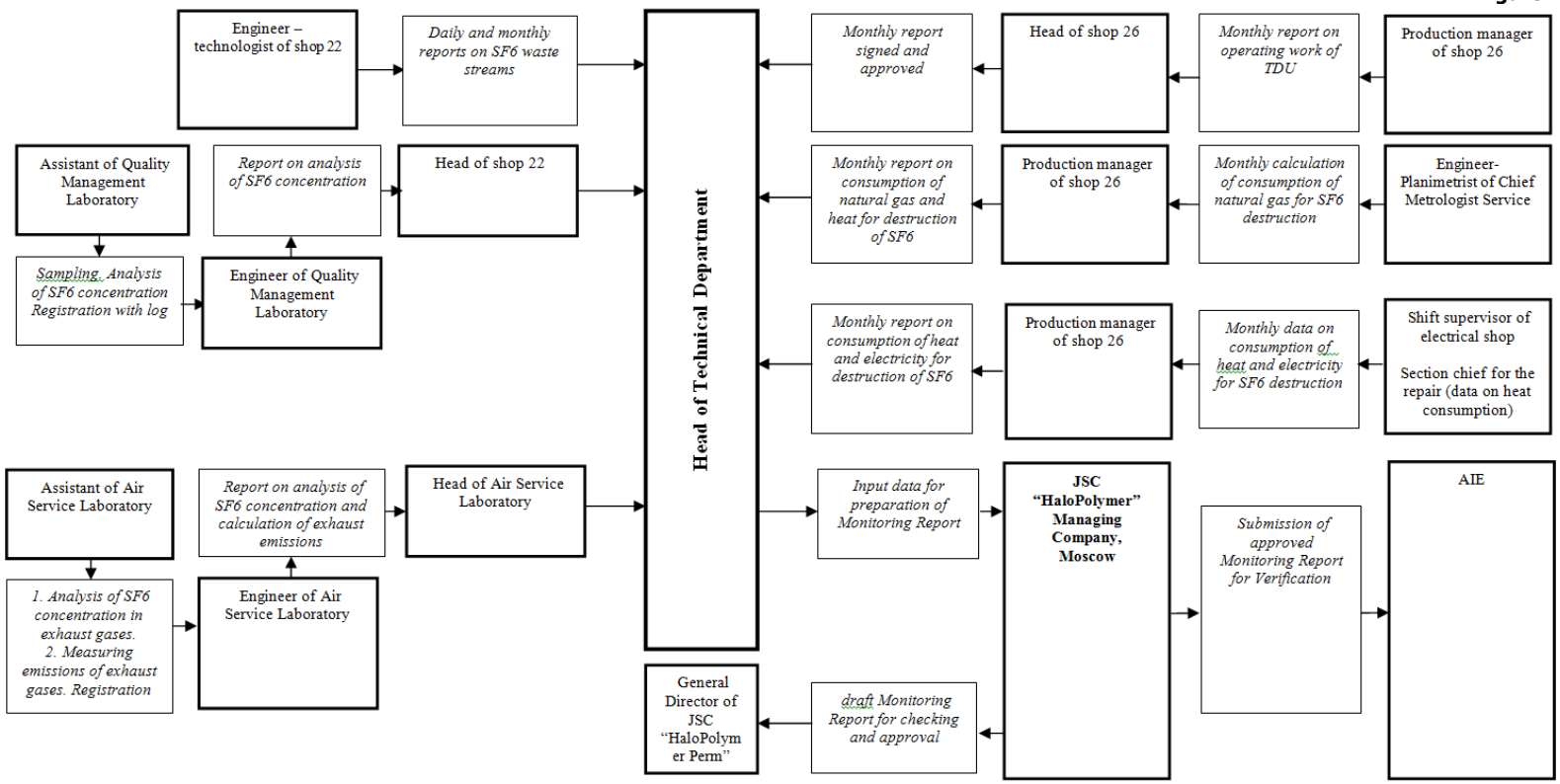
3. SF_6 quantity and concentration in waste streams not destroyed in TDU. These data are provided from the head of air service laboratory. Initial information on analysis of SF_6 concentration in exhaust gases and measuring velocity of exhaust gas stream are prepared by the lab assistant and are registered with the log. Further on the lab engineer prepares weekly and monthly reports on analysis of SF_6 concentration and calculation of exhaust emissions and submits reports to the head of air service laboratory for approval.
4. Time of operation work of TDU. The head of shop 26 (in this shop the thermal destruction unit is installed) provides approved monthly reports to the head of TD. This data is supplied from the production manager of the shop who gathers information from the automated control system.
5. Natural gas consumption for SF6 destruction. This information is submitted from the production manager of the shop 26. The initial data on measurement of total natural gas consumption is gathered and processed by the engineer-planimetrist. The results are provided to the chief metrologist who approves and send them to the production manager of the shop 26. The production manager of the shop 26 calculates each month the planned total natural gas consumption and actual natural gas consumption for destruction of SF6.
6. Electricity and heat consumption for SF6 destruction. This information provided monthly to the head of Technical Department by the production manager of the shop 26. The production manager calculates the monthly heat and electricity consumption multiplying the SF6 waste quantity supplied for destruction by the planned consumption norm of heat or electricity.

Finally the head of TD processes the gathered information and submits it to a managing company, JSC "HaloPolymer", Moscow. Based on the input data the draft Monitoring Report is prepared and submitted it back to JSC "HaloPolymer Perm" for approval by the General Director. The approved MR is submitted by JSC "HaloPolymer" to AIE for verification. Further on the organizational chart of the monitoring for SF6 destruction project is provided.

[8] See the form in PDD Annex 3. Monitoring Plan.

3.1.3.3 Organizational chart of the monitoring for SF_6 destruction project

Figure 1



Calculations of emission reductions will be prepared by specialists of JSC "HaloPolymer" in the end of each reporting period. All data will be stored in paper and electronically at least for two years after the last ERU tranche under the project.

3.1.4 Calculation of GHG emission reductions

GHG project emissions during reporting period of 9 months of 2011, tCO_2e:

$PE_y = ND\_SF_{6\,y} * GWPSF_6 + FC_{NG,SF6y\_fact} * CF_{NG} * EF_{CO2,NG} * 10^{-6}$ (3.1.-1)

Where

$ND\_SF_{6\,y}$ is the quantity of SF_6 not destroyed in the unit during the reporting period *y*, t;

GWP SF_6 is the Global Warming Potential (GWP) for SF_6, t CO_2e/t SF_6. The approved GWP value for SF_6 is 23 900 t CO_2e/t SF_6 for the first commitment period under the Kyoto Protocol.

$FC_{NG,SF6y\_fact}$ is the actual natural gas consumption for SF_6 destruction process over a reporting period *y*, m^3;

$FC_{NG,SF6,y\_fact} = FC_{NG,SF6,y\_plan} * FC_{NGy\_total\_measured} / FC_{NGy\_total\_plan}$ (3.1.-2)

$FC_{NG\_total\ measured}$ is the measured total consumption of natural gas for destruction of all wastes incinerated in the TDU over a reporting period *y*, m^3;

$FC_{NG\_total\_plan}$ - is the planned total consumption of natural gas for destruction of all wastes incinerated in the TDU, over a reporting period *y* m^3. The estimate of the planned total consumption is provided by the production manager of the shop 26.

$FC_{NG,SF6,y\_plan}$ is the planned natural gas consumption for SF_6 destruction process over a reporting period *y*, m^3

$FC_{NG,SF6,y\_plan} = 0{,}001 * q\_SF_{6\,y} * SFC_{NGrSF6\_plan}$ (3.1.-3)

$SFC_{NGrSF6\_}$ is specific natural gas consumption for destruction of SF6; as SFC_{NGrSF6} the planned norm of natural gas consumption for destruction of GHG gases is assumed to be conservative, ths m^3/t;

$q\_SF_{6\,y}$ is the amount of waste gases containing SF_6 supplied for destruction over a reporting period *y*, kg

CF_{NG} – conversion-to-energy units factor for natural gas, equals to 33,812 TJ/mln m^3;[9]

$EF_{CO2,NG}$ – CO_2 emission factor for the natural gas combustion, equals to 56,1 tCO_2/TJ;

Table 5. Calculated CO2 project emissions associated with natural gas combustion for SF6 destruction

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Amount of waste gases containing SF6 supplied for destruction	q_SF6y	kg	11 741,75	9 653,60	13 403,70	10 519,70	8 340,75	6 688,50	11 920,50	10 754,63	8 981,10	**92 004**
2.	Specific fuel consumption for SF6 destruction process	SFC,y	m3/kg	1,83	1,93	1,41	2,08	2,68	2,19	1,81	1,88	1,94	
3.	Natural gas consumption for destruction process	FCNGy	m3	21488	18660	18923	21840	22320	14640	21624	20250	17390	**177 135**
4.	Conversion to energy units factor for natural gas	CFNG	TJ/mln m3	33,812	33,812	33,812	33,812	33,812	33,812	33,812	33,812	33,812	
5.	CO2 emission factor for the natural gas combustion	EFCO2,NG	tCO2/TJ	56,1	56,1	56,1	56,1	56,1	56,1	56,1	56,1	56,1	
6.	Project emissions due to natural gas consumption	PECO2,NG	tCO2e	41	35	36	41	42	28	41	38	33	**336**

$ND\_SF_{6\,y} = q\_ND_{\,y} * w_{SF6,ND\,y} * 10^{-9}$ (3.1-4)

q_ND y is the volume of exhaust gaseous emissions from destruction unit over a reporting period *y*, m^3;

$w_{SF6,ND\,y}$ – is the mass concentration of SF_6 in gaseous emissions from destruction unit, mg/m^3

Table 6. Calculated SF_6 project emissions, in tons of CO_2 equivalent

[9] This value is taken from National Report on Cadaster of Anthropogenic Emissions from Sources and Absorption by Sinks of Greenhouse Gases Not Regulated by Montreal Protocol for 1990-2009. Part 1. Moscow, 2011. Table 3.5, page 38.

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Volume of gaseous emissions from destruction unit	q_ND_SF6 y	m3	3972215	3009224	3702681	3682084	3920893	4310830	6048971	5179216	6958110	**40784224**
2.	Concentration of SF6 in gaseous emissions from destruction unit	wGE	mg/m3	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	
3.	Quantity of SF6 not destroyed in the unit during the reporting period	ND_SF6 y	t	0,000397	0,000301	0,000370	0,000368	0,000392	0,000431	0,000605	0,000518	0,000696	**0,004078**
4.	Global Warming Potential of SF6	GWPSF6y	tCO2/tSF6	23900	23900	23900	23900	23900	23900	23900	23900	23900	
5.	Project SF6 emissions not destroyed in the TDU	ND_SF6 y	tCO2e	9	7	9	9	9	10	14	12	17	**96**

Table 7. Total GHG project emissions

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Project SF6 emissions not destroyed in the TDU	ND_SF6 y	tCO2e	9	7	9	9	9	10	14	12	17	96
2.	Project emissions due to natural gas consumption	PECO2,NG	tCO2e	41	35	36	41	42	28	41	38	33	336
3.	**Total project emissions**	**PE**	**tCO2e**	**50**	**42**	**45**	**50**	**51**	**38**	**55**	**50**	**50**	**432**

GHG baseline emissions during the reporting period of 9 months 2011, tCO_2e:

$$BE_y = Q\_SF_{6\,y} * GWPSF_{6\,y} \quad (3.1.-5)$$

Where

$Q\_SF_{6\,y}$ is the quantity of SF_6 supplied for destruction in the unit during the reporting period y, tSF_6

$$Q\_SF_{6}\,y = 0{,}001*q\_\,SF_{6}\,y * w_{SF6,y}*10^{-2} \quad (3.1.-6)$$

$q\_\,SF_{6}\,y$ is the amount of waste gases containing SF_6 supplied for destruction, kg;

$w_{SF6,y}$ is the concentration of SF_6 in waste gases supplied for destruction, %.

Table 8. Calculated baseline emissions, in tonnes of CO2 equivalent

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	**Total**
1.	Amount of SF6 waste supplied for destruction	q_SF6	kg	11 741,75	9 653,60	13 403,70	10 519,70	8 340,75	6 688,50	11 920,50	10 754,63	8 981,10	**92 004**
2.	Concentration of SF6 in the waste stream supplied for destruction	WSF6,y	%	92,59	93,43	93,00	92,88	94,02	94,30	93,86	92,89	94,33	
3.	SF6 quantity supplied for destruction	Q_SF6y	t	10,87	9,02	12,47	9,77	7,84	6,31	11,19	9,99	8,47	**86**
4.	Global Warming Potential of SF6	GWPSF6y	tCO2/tSF6	23 900	23 900	23 900	23 900	23 900	23 900	23 900	23 900	23 900	
5.	Baseline SF6 emissions (in terms of CO2)	BE	tCO2	259 793	215 578	298 033	233 503	187 376	150 809	267 441	238 761	202 433	**2 053 727**

Leakage CO2 emissions associated with grid electricity supply for SF6 destruction

Such emissions are determined according to the formula:

$$LE_{ELEC,y} = ECy*EF_{CO2,ELEC,y}*10^{-3} \quad (3.1.-7)$$

Where

ECy is consumption of the electricity for destruction of SF_6, MWh;

$$ECy = SEC_{ELEC,y} * q\_SF6,y \quad (3.1\text{-}8)$$

$SEC_{ELEC,y}$ - is the specific electricity consumption for SF6 destruction, MWh/t;

q_SF6,y - the amount of waste gases containing SF6 supplied for destruction the reporting period y, t;

Table 9. CO2 emissions due to electricity consumption for destruction of SF6

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Amount of waste gases containing SF6 supplied for destruction	q_SF6y	kg	11 741,75	9 653,60	13 403,70	10 519,70	8 340,75	6 688,50	11 920,50	10 754,63	8 981,10	**92 004**
2.	Specific electricity consumption for SF6 destruction	SEC,ELEC,y	MWh/t	7,44	6,90	6,87	15,38	20,35	17,40	13,88	14,29	16,26	
3.	Electricity consumption	EC,y	MWh	87,380	66,634	92,081	161,764	169,760	116,358	165,506	153,667	146,001	**1 159**
4.	CO2 emission factor for grid electricity[2]	EFCO2,ELEC, y	tCO2/MWh	0,668	0,668	0,668	0,668	0,668	0,668	0,668	0,668	0,668	
5.	CO2 emissions due to electricity consumption for destruction of SF6	LEELEC,y	tCO2	58	45	62	108	113	78	111	103	98	**774**

2. Leakage CO2 emissions associated with heat supply for SF6 destruction.

$$LE_{HEATy} = HCy * EF_{CO2,NG} * 10^{-3}; \quad (3.1\text{-}9)$$

HCy is the consumption of the heat for destruction unit, GJ;

$$HCy = SHC_{,HEAT,y} * q\_SF6,y \quad (3.1\text{-}10)$$

$SHC_{,HEAT,y}$ - is the specific heat consumption for SF6 destruction, GJ/t[10];

$EF_{CO2,NG}$ – CO_2 emission factor for heat consumption tCO_2/TJ. This factor equal to 140,3 tCO_2/TJ and is determined by division of CO_2 emission factor for the natural gas[11] (56,1 tCO2 – the value is taken from 2006 IPCC Guidelines for National GHG Inventories) in 0,4 (heat efficiency of a combined heat and power plant).

Table 10. CO2 emissions due to heat consumption for destruction of SF6

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Amount of waste gases containing SF6 supplied for destruction	q_SF6y	kg	11741,75	9653,6	13403,7	10519,7	8340,75	6688,5	11920,5	10754,625	8981,1	**92 004**
2	Specific heat consumption for SF6 destruction	SHC,HEAT,y	GJ/t	5,84	5,41	5,39	3,02	3,99	3,41	2,72	2,80	3,19	
3	Heat consumption	HC,y	GJ	68,542	52,269	72,230	31,722	33,291	22,818	32,456	30,135	28,631	
4	CO2 emission factor for heat consumption	EFCO2,HEAT,y	tCO2/TJ	140,3	140,3	140,3	140,3	140,3	140,3	140,3	140,3	140,3	
5	CO2 emissions due to heat consumption for destruction of SF6	LE HEAT,y	tCO2	10	7	10	4	5	3	5	4	4	**52**

Total leakage CO2 emissions

$$LEy = LE_{ELEC,y} + LE_{HEATy} \quad (3.1\text{-}11)$$

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	CO2 emissions due to electricity consumption for destruction of SF6	LEELEC,y	tCO2	58	45	62	108	113	78	111	103	98	774
2.	CO2 emissions due to heat consumption for destruction of SF6	LE HEAT,y	tCO2	10	7	10	4	5	3	5	4	4	52
3.	**Total leakage emissions**	**LE**	**tCO2**	**68**	**52**	**72**	**113**	**118**	**81**	**115**	**107**	**102**	**827**

Emission reductions during the reporting period of 9 months of 2011 in t CO_2e are calculated as follows:

$$ERy = BEy - PEy - LEy \quad (3.1\text{-}12)$$

Table 12. Emission reductions the reporting period of 9 months of 2011

#	Item	Designation	Unit	Jan. 2011	Feb 2011	March 2011	Apr 2011	May 2011	June 2011	July 2011	Aug 2011	Sept 2011	Total
1.	Baseline SF6 emissions (in terms of CO2)	BE	tCO2e	259793	215578	298033	233503	187376	150809	267441	238761	202433	2053727
2.	Total project emissions	PE	tCO2e	50	42	45	50	51	38	55	50	50	432
3.	Total leakage emissions	LE	tCO2e	68	52	72	113	118	81	115	107	102	827
4.	Emission reductions	ER	tCO2e	259675	215484	297916	233340	187207	150690	267271	238604	202281	**2052468**

[10] The planned consumption norms of energy resources adopted at JSC "HaloPolymer Perm" is available on auditors' request
[11] Main type of fuel for heat and power plants in Perm krai.

4 ENVIRONMENTAL IMPACT

The environmental work is conducted by the enterprise in the area of air protection, protection of water, recycling of wastes. HaloPolymer Perm fully obeys all requirements of Russian legislation on the environmental protection.

Удалено: ¶

HaloPolymer Perm regularly makes payments for negative impact on the environment. The company has been developed and agreed with authorities in the prescribed manner:

- Design of limits of maximum permitted emissions;
- Design of limits of permitted emissions in water bodies;
- Design of limits of wastes generation and disposal.

Monitoring compliance with environmental protection legislation is implemented in the course of inspections and audits conducted by inspecting agencies and HaloPolymer Perm department of environmental protection.

Article 32 of the Federal Law on Environmental protection #7-FZ prescribes that: "Environmental impact assessment is conducted for economic and other projects, which may directly or indirectly influence the state of the environment, irrespective of ownership type of the subjects of economic and other activities."

4.1 Impact on the air

As a result of thermal destruction there is no increase in the amounts of sulfur hexafluoride emissions into the atmosphere is going to happen. The degree of purification of the main component (SF6) is not lower than 99.99%, the content of sulfur hexafluoride in the exhaust gases from the unit below the sensitivity of the method (less than 0.1 mg/m3).

4.2 Wastewater and their impact

During destruction of sulfur hexafluoride in the thermal destruction unit an additional volume of wastewater containing salts of NaCl and Na2SO4 is produced. The total discharge of harmful substances in the water body (reservoir Votkinskoye) does not exceed the established limits.

4.3 Wastes and their impact

Solid wastes, which are additionally formed during sulfur hexafluoride destruction, are the chemical sludge of the wastewater treatment plant at the neutralization station. They are accumulated at the sludge storage.

On the basis the environment impact assessment due to the project implementation the followings findings can be set as follows:

- The project envisages the creation of the installation of high technical level that guarantees safety for its ecological environment;
- The installation will be provided by qualified personnel with experience with similar chemicals and waste;
- The project provides for conservation measures that reduce to the minimum possible negative impact on the environment (emission coefficient of purification of the gas mixture is 99.99%, the formation of liquid and solid industrial wastes within the established limits and permits).

The technical solutions under the proposed project will reduce its environmental impacts and have the following effects:

- Compliance with environmental requirements, reduction of emissions of air pollutants
- Prevention of pollution of water basins above the applicable environmental standards
- Prevention of pollution of territory, surface and ground waters, provided that the requirements for industrial waste storage, disposal and utilization are met.

Moreover, due to the project, the greenhouse gas emissions of JSC "HaloPolymer Perm" will be significantly reduced.

Since the beginning of 2010 the JSC "HaloPolymer Perm" has been developing a justification of the maximal permissible emissions (the volume of MPE). Currently the draft volume of MPE undergoes approval process with supervisory organization.

In 2008 the Company voluntarily addressed Western Ural Department of the Federal Service on Environmental, Technology and Nuclear Supervision (RosTechNadzor) with a proposal to set Maximal Permissible Emission on SF6. In 2009 RosTechNadzor established such MPE in the amount of 18,703 tonnes of SF6. The calculation of project

emissions of not destroyed SF6 in 9 months of 2011 demonstrates an insignificant level of SF6 emissions which equals to 0,004tSF6 that is far less than the set MPE level.

In 2011 the Company addresses an expert organization "BELZ" which carried out the calculation of MPE subject to compliance with the maximal permissible concentration on a boundary of the sanitary-protection zone. The calculation demonstrated that such MPE is 10 times higher than SF6 production capacity of JSC "HaloPolymer Perm". This proves that the project provides no transboundary effects.

4.4 Control of pollutant emissions

On the ground of Time Schedule for MPE Compliance Control on emission sources of JSC "HaloPolymer Perm" approved by Chief Engineer and by a Volga regional office of Federal State Agency "Center of Laboratory Analysis and Technical Measurements" the plant's air service laboratory implements the control for atmospheric pollutant emissions. The thermal destruction unit is registered as a source # 478. Gaseous effluents of HCl, HF, and NO_X are regularly measured on this source. Consolidated amount of atmospheric pollutant emissions is included in the annual report 2-TP (air), which is submitted to Federal Service for Nature Management (Rosprirodnadzor). Additionally to the control program implemented by JSC "HaloPolymer Perm" the Bashkir Republican Scientific-Research Environmental Center monitors dioxins emissions with periodicity of 2 times in a year.
Over the period of implementation of SF6 destruction project there have not been incidents associated with exceeding of consolidated annual pollutant emissions.