B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	1.q_HFC 23_y
Data unit:	kg-HFC 23
Description:	Quantity of HFC 23 supplied to the destruction process
Source of data to be used:	Based on tail gas flow meter measurement
Value of data applied for the purpose of calculating expected emission reductions in section B.5	18,106.5 * 1.64% * 1000 = 296,947 Historical maximum annual HCFC 22 production and the minimum rate in the last 3 years of operation between 2002 and 2004 are applied to calculate $q\_HFC\ 23_y$ in the case of no actual monitoring data.
Description of measurement methods and procedures to be applied:	Measured by two flow meters in series; Calibration will be done every six months by an officially accredited entity. The zero check on the flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter will be undertaken. Most of the time, both flow meters measure the same amount of HFC 23 flows simultaneously. If the flow meter readings differ by greater than twice the claimed accuracy, then the reason for the discrepancy is investigated and the fault remedied. For the sake of conservativeness the lower value of the two readings will always be used to estimate the HFC 23 waste flows. The monthly quantity of HFC23 waste flows (q_HFC23m) is the sum of the lower periodic reading of every 30 minutes of the two meters, as follow: $q\_HFC23m = \sum_{t=\text{number of period in a month}} \min^{m} (q\_HFC23_{1,t}, q\_HFC23_{2,t})$
QA/QC procedures to be applied:	A QA & QC organization will be formed. We plan to measure by two flow meters in series but read simultaneously. The flow meters will be calibrated every six months by an officially accredited entity. The zero check on the flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, and immediate calibration of the flow meter will be undertaken.
Any comment:	Monthly recorded, electronically archived. The calibration will be conducted by an external accredited entity (for example : The Center Metrology Station of Yangzi Petrochemical Co Ltd) following Chinese official standard JJG198-94.

Data / Parameter:	2.P_HFC 23_y
Data unit:	%
Description:	Purity of HFC 23 supplied to the destruction process
Source of data to be used:	Gas chromatography analysis
Value of data applied for the purpose of	Average of the weekly analysis for a month. The historical value during 2002 and 2004 is as follows: $P\_HFC\ 23_{2002}$: 91.3%

calculating expected emission reductions in section B.5	P_HFC 23_{2003}: 89.3% P_HFC 23_{2004}: 89.8% The rest of the content is assumed to be mainly air introduced in sampling process and HCFC22 residual.
Description of measurement methods and procedures to be applied:	Measured by gas chromatography analysis Details are given in Annex 4
QA/QC procedures to be applied:	Will be measured by weekly gas chromatography analysis. The recalibration of gas chromatography will be conducted monthly according to methodology AM0001/Version 05.1 The analysis will be repeated in case of doubt regarding its veracity.
Any comment:	Weekly recorded, electronically archived. A new procedure for sampling process will be implemented by preliminarily purging sampling gas cylinder to avoid the introduction of air during sample filling. A few percent of HCFC22 is assumed to be included in the tail gas. The concentration will be analyzed by gas chromatography as HFC23 purity and process parameter control improvement will allow keep HCFC22 content in tail gas very low.

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Deleted: externally once a year, pursuant to the Verification Regulation of Gas Chromatograph (JJG700-1999), using HCFC22 and HFC23 as standard substances.

Comment [A1]: Actually, our GC recalibration frequency is monthly according to the methodology AM0001/Version 05.1

Data / Parameter:	4.ND_HFC 23_y
Data unit:	kg-HFC 23
Description:	Quantity of HFC 23 in gaseous effluent
Source of data to be used:	Gas chromatography
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.001% of the quantity of HFC 23 supplied to the destruction process
Description of measurement methods and procedures to be applied:	When the thermal oxidizer stops, analysis of the effluent gas is done to check leaked HFC 23 by sampling. Details are given in Annex 4
QA/QC procedures to be applied:	Will be measured from the gas effluent of the destruction process. Its quality can be ensured through an internal audit procedure. One analyst is responsible for sampling and analyzing, and the other for checking the results. The recalibration of gas chromatography will be conducted monthly according to methodology AM0001/Version 05.1 The analysis will be repeated in case of doubt regarding its veracity.
Any comment:	While the monitoring methodology AM0001 /Version 05.1 does not specify the type of equipment used to monitor ND_HFC 23_y, the proposed project intends to use gas chromatography for the gas flow in the stack. It is reasonable to measure with gas chromatography a sample fraction (ppm) of HFC 23 in the stack to be released to the atmosphere and also measure a sample volume of such emission gas

Deleted: verification

Comment [A2]: Actually, our GC recalibration frequency is monthly according to the methodology AM0001/Version 05.1 requirement

Deleted: externally pursuant to the Verification Regulation of Gas Chromatograph (JJG700-1999), using HFC23 as standard substances.

Comment [A3]: The Gas chromatography gives result by ppm instead of %.

Deleted: (%)

	with flow meter and take their product and converts it from volume to mass to yield amount (ton) of non-decomposed HFC 23. Such conversion factor is assumed to be constant as shown in Annex 3. Monthly recorded, electronically archived

Data / Parameter:	$3.Q\_FF_y$
Data unit:	m^3
Description:	Quantity of NG used by the destruction process
Source of data to be used:	NG meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	141,213.6 m^3
Description of measurement methods and procedures to be applied:	Measured by using a NG meter
QA/QC procedures to be applied:	Will be metered using NG meter NG purchase and consumption records as well as the invoices for purchased NG are used as cross-check proofs.
Any comment:	Monthly recorded, electronically archived

Data / Parameter:	$7.Q\_HCFC\ 22_y$
Data unit:	t-HCFC 22
Description:	The quantity of HCFC 22 produced in the plant generating the HFC 23 waste
Source of data to be used:	Mass flow meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	18,106.5
Description of measurement methods and procedures to be applied:	Measured by HCFC22 mass flow meter
QA/QC procedures to be applied:	Will be measured by the HCFC22 mass flow meter of the facility where the HFC 23 waste originates. The recalibration of mass flow meter will be conducted monthly according to methodology AM0001/Version 05.1.The documents, such as inventory records and sales information, are used as cross-check proofs.
Any comment:	Reference data to check cut off condition and rough estimation of $Q\_HFC\ 23_y$ Monthly recorded, electronically archived

Comment [A4]: Actually, we installed F22 mass flow meter in the facility where the HFC23 waste originates to measure F22 flow directly and continuously.

Deleted: Weight meter

Deleted: Checked by the production record monthly and aggregately yearly

Deleted: Will be obtained from production records of the facility where the HFC 23 waste originates.

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All weighing concerned equipment will be calibrated according to Chinese national regulation and standards.

Comment [A5]: Actually, our F22 mass flow meter recalibration frequency is monthly according to the methodology AM0001/version 05.1

Data / Parameter:	$Q\_HCFC\ 22_{y,max}$
Data unit:	t-HCFC 22
Description:	Maximum annual production of HCFC 22 at the originating plant that is eligible for crediting
Source of data to be used:	HCFC22 production records
Value of data applied for the purpose of calculating expected emission reductions in section B.5	18,106.5
Description of measurement methods and procedures to be applied:	The lower value between the actual HCFC 22 annual production ($Q\_HCFC\ 22_y$) and the maximum historical annual production level during any of the last three years between 2000 and 2004 ($Q\_HCFC\ 22_{Hist}$)
QA/QC procedures to be applied:	Will be obtained from production records of the facility where the HFC 23 waste originates.
Any comment:	Yearly recorded, electronically archived

Data / Parameter:	$8.HFC\ 23_y\_sold$
Data unit:	t-HFC 23
Description:	HFC 23 sold by the facility generating the HFC 23 waste
Source of data to be used:	Data sheet to be recorded using weight meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	weight meters
QA/QC procedures to be applied:	The production records of the facility where the HFC 23 waste originates are used as cross-check proof.
Any comment:	This project has not sold, and will not sell any HFC 23 in future.

Data / Parameter:	r_y
Data unit:	%
Description:	Fraction of HFC 23 subject to regulation
Source of data to be used:	Governmental authority
Value of data applied for the purpose of	0

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Estimated in consideration of governmental laws and regulations on HFC 23 control
QA/QC procedures to be applied:	It is periodically validated and evaluated by the HFC 23 Decomposition Workshop Supervisor. The results will be recorded and documented for personnel of other relevant departments to perform an internal verification or validation.
Any comment:	Yearly recorded, electronically archived

Data / Parameter:	$5.Q\_Power_y$
Data unit:	kWh
Description:	Electricity consumption by the destruction process
Source of data to be used:	Electricity meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	316,800
Description of measurement methods and procedures to be applied:	Metered Details are given in Annex 4
QA/QC procedures to be applied:	Will be metered using electricity meter. Electricity purchase and consumption records as well as the invoices for purchased electricity are used as cross-check proofs.
Any comment:	Monthly recorded, electronically archived

Data / Parameter:	E_Power_y
Data unit:	tCO_2e/ kWh
Description:	Emission Factor of power
Source of data to be used:	The China power grid emission factors issued by the National Development and Reform Commission of China (NDRC) (09/08/2007) (http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1361.pdf)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	$9.0465*10^{-4}$
Description of measurement methods and procedures to be	Combined margin method specified in ACM0002 is applied: $E\_Power_y = (EF_{OM} + EF_{BM}) / 2$ $= (0.9421 + 0.8672) / 2$

applied:	=9.0465*10^{-4} tCO_2/kWh.
QA/QC procedures to be applied:	Refers to updated China power grid emission factors issued by the National Development and Reform Commission of China (NDRC)
Any comment:	Yearly recorded, electronically archived

Data / Parameter:	6.Q_Steam$_y$
Data unit:	kg-steam
Description:	Steam consumption during decomposition
Source of data to be used:	Steam meter
Value of data applied for the purpose of calculating expected emission reductions in section B.5	277,200
Description of measurement methods and procedures to be applied:	Metered Details are given in Annex 4
QA/QC procedures to be applied:	Will be metered using steam meter. Steam purchase and consumption records as well as the invoices for purchased steam are used as cross-check proof.
Any comment:	Monthly recorded, electronically archived

Data / Parameter:	E_Steam$_y$
Data unit:	t CO_2e/t steam
Description:	Emission Factor of steam
Source of data to be used:	Calculation based on steam supplier data, National Electricity Power Industries Statistics Data and IPCC default value
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.40
Description of measurement methods and procedures to be applied:	E_Steam$_y$ = coal consumption of unit steam generation (t-coal/t-steam) * Calorific Power of Coal (MJ/t-coal)*CO_2 emission factor (t CO_2e/MJ) (IPCC value)
QA/QC procedures to be applied:	Refers to updated "National Electricity Power Industries Statistics Data", Cleaner Production Standard for Coal-fired Power Plants (State Environmental Protection Administration, China) and IPCC
Any comment:	Yearly recorded, electronically archived

Comment [A6]: Actually, we use supplier's real data for each CER period.

In addition the quantities of gaseous effluents (CO, HCl, HF, Cl_2, dioxin and NO_X) and liquid effluents (PH, COD, BOD, n-H (normal hexane extracts), SS (suspended solid), phenol, and metals (Cu, Zn, Mn and Cr)

are measured every six months to ensure compliance with environmental regulations.

B.7.2 Description of the monitoring plan:

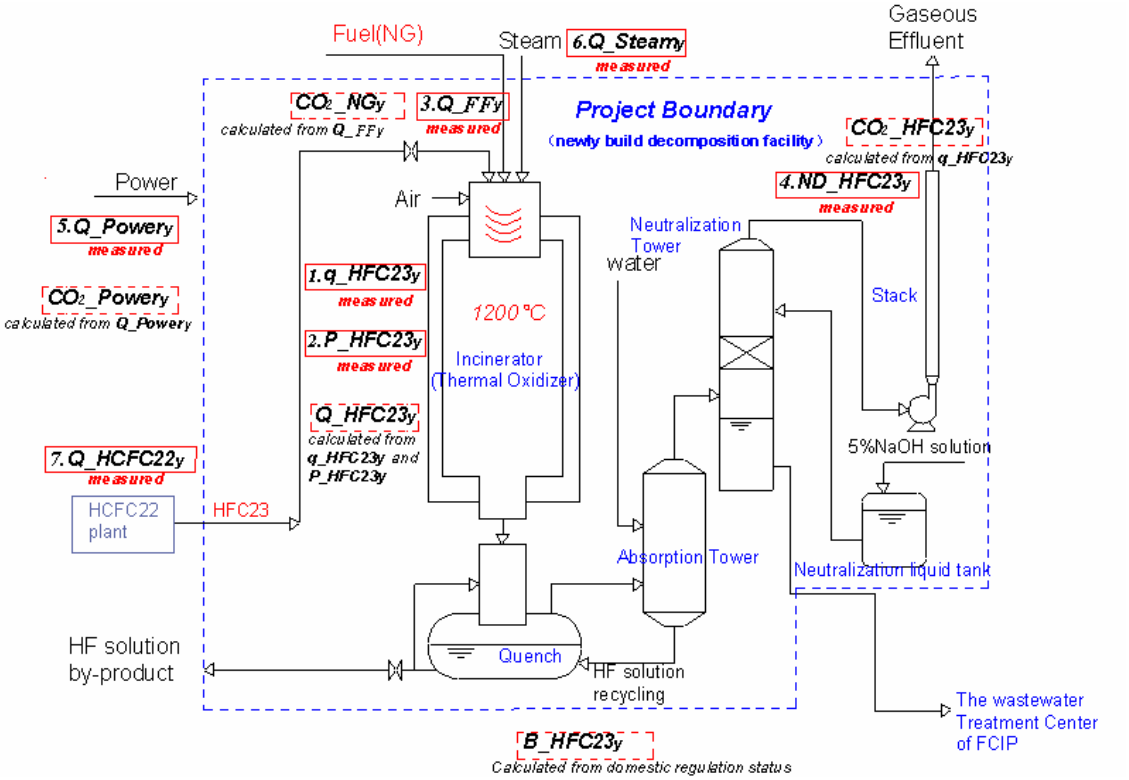
The monitoring plan (MP) defines a standard against which the project performance in terms of its greenhouse gas (GHG) reductions and conformance with all relevant Clean Development Mechanism criteria will be monitored and verified. It is therefore a tool to help coordinate all the monitoring requirements for generating certified emission reductions from the project.

The information included in this MP will be available at the project site. The implementation of the MP will ensure that the management at Changshu Haike can track emission reductions generated by the project.

New employees will also benefit from the existence of an MP since they can quickly be made aware of the importance of keeping emission reduction data. In addition, the MP will be useful in efficiently communicating with the Designated Operational Entity (DOE) during audits and saving valuable time.

AM0001 monitoring methodology is based on direct measurement of the amount of HFC 23 waste destroyed and of the energy used by the destruction process as shown in Figure 7.

Figure 1: Monitoring Approach



This monitoring methodology provides for direct and continuous measurement of the actual quantity HFC 23 destroyed, as well as the quantities of electricity, steam and fossil fuel used by the destruction process.

With regard to the data and parameters monitored in the Section B.7.1, the project will take the following monitoring process:

1. Four flow meters which to be divided into 2 groups and each group has 2 flow meters in series will be installed and one group of them (working flow meters) is used for normal measurement. The quantity of HFC 23 supplied to the destruction process (1.**q_HFC 23**$_y$) will be directly and continuously measured by reading two flow meters. When the flow meter readings differ by greater than twice their claimed accuracy then the reason for the discrepancy is investigated and the fault remedied. For the sake of conservativeness the lower value of the two readings will always be used to estimate the HFC 23 waste flows. In order to have more accurate data, the flow meters will be recalibrated every six months by an officially accredited entity. The zero check on the flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, and immediate calibration of the flow meter will be undertaken. When one group of flow meters is recalibrated, the

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second group of flow meters will be used to measure the quantity of HFC 23 fed to the destruction process. There will always be two flow meters on-line for simultaneous measurement.

2. The purity of HFC 23 supplied to the destruction process (2.**p_HFC 23**$_y$) will be checked weekly by sampling and using gas chromatography. Combinations of continuous flow measurement and calculation will be used to estimate quantities of other materials, e.g., air that may be in the HFCs if this is appropriate.
3. The quantity of HCFC 22 produced (7.**Q_HCFC 22**$_y$) will be measured by mass flow meter. The amount of HFC 23 generated from the HCFC 22 plant will be checked yearly by comparing the amount of HCFC 22 produced to the sum of the HFC 23 recovered for sale, and HFC 23 decomposed.
4. Maximum annual production of HCFC 22 at the originating plant that is eligible for crediting (**Q_HCFC 22**$_{y,\ max}$) will be obtained through comparing the actual HCFC 22 annual production (7.Q_HCFC 22$_y$) and the maximum historical annual production level during any of the last three years between 2000 and 2004 (9.Q_HCFC 22$_{Hist}$), and the lower one of these two data is the **Q_HCFC 22**$_{y,\ max}$ in the year y.
5. The electricity consumption (5.**Q_power**$_y$) will be measured by a meter.
6. The steam consumption (6.**Q_steam**$_y$) will be measured by a meter.
7. The fuel consumption (3.**Q_FF**$_y$) will be measured by using a fuel meter.
8. The quantity of leaked HFC 23 in gaseous effluent (4.**ND_HFC 23**$_y$) will be measured by sampling.
9. The quantities of gaseous effluents (CO, HCl, HF, organic carbon, dioxin and NO_x) will be measured twice a year to ensure that the project is in compliance with the relevant environmental standard in China (GB18484-2001: National Pollution Control Standard for Hazardous Wastes Incineration,).
10. The quantities of liquid effluents (PH, COD, BOD, SS, fluoride and metals) will be measured twice a year and checked against the relevant environmental standard in China (GB8978-1996: National Integrated Wastewater Discharge Standard).

All the uncertainties on the monitored values are discussed in annex 4.
They are addressed in a systematic manner so that that any unexpected variation in the values monitored will be investigated.
All the procedures that concern the project and specifically the monitoring will be included in the scope of the ISO 9000 and ISO14000 Certifications of Changshu platform, as described below in the "Management structure". All the non-conformity and remarks found during the audits (external and internal) will be taken in consideration to follow the Quality Assurance system requirements of ISO 9000.

Monitoring structure:

During the project implementation, operators of each shift will record the monitoring data both electronic and paper-based, and the shift heads should check the records to ensure their accuracy. One professional monitoring person will be assigned to collect the monitoring data and other supporting data to make a weekly report to the manager of HFC 23 decomposition facility. The manager will not only give a report to the General Manager every month, but also prepare the semi-annual monitoring report to DOE for emission reduction verification with the assistance of the monitoring personnel.

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Comment [A7]: Actually, we have installed 4 mass flow meters instead of 3 to ensure higher measurement reliability.

Comment [A8]: Actually, we check purity of HFC23 to the destruction process weekly by sampling instead of monthly.

Deleted: monthly

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Personnel from other departments will support the monitoring work of the HFC 23 decomposition. Plant manager of HCFC 22 production, quality assurance department manager and information centre personnel will provide monitoring personnel information he/she needed, such as data about HCFC 22 production, sample analysis results and computer system maintenance.

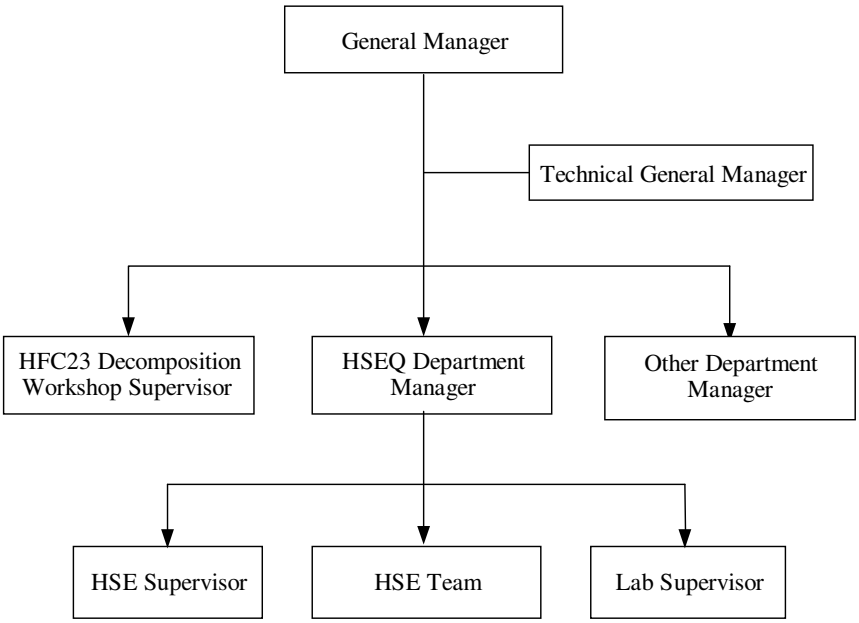
The personnel that interact with monitoring will be trained to acquire comprehensive knowledge with regards to general and technical aspects of CDM project. And the monitoring equipment supplier will provide instruction on installation, operation, maintenance and calibration of their equipments.

Management structure:

Arkema Changshu has established ISO management system through acquiring the certificates of ISO 9000 and ISO14000. These two updated certificates were issued in 2006. As part of Arkema Changshu platform, Changshu Haike will also implement the aforementioned environmental management systems, and enlarge their applicable scopes to cover the project activity after the proposed project is implemented.
The technical manager (shown in Figure 8 below), which is also deputy general manager, will be responsible for the important technical issues including the uncertainties of the parameters described in Annex 4.

Changshu Haike will establish a special environmental management department to ensure the smooth implementation of environmental management. The organization structure of environmental management for the project activity is shown in Figure 8.

Figure 2: Organization Structure of Environmental Management for the Proposed Project



The HSE (Health, Safety, and environment) Team under HSEQ (Health, Safety, environment, and quality) Department is responsible for planning and carrying out the environmental activities both during the construction and operational phases of the project. This team will consist of 11 employees.

During the construction phase, the HSE Team will be responsible for:

- Assisting HSEQ Department Manager for the preparation of the environmental management plans specific to the construction activities of this HFC 23 decomposition project;
- Identifying risk areas at the construction site;
- Ensuring implementation of mitigation measures;
- Reviewing the environmental management reports received from the HFC 23 decomposition workshop;
- Participating in accident investigation;
- Record keeping of environmental and safety information (e.g. accidents);
- Assisting HFC 23 decomposition workshop in preparing an emergency response plan; and
- Providing HSE training for the HFC 23 decomposition project personnel.

During the operational phase, the HSE Team will be responsible for:

- Reviewing the environmental management reports received from the HFC 23 decomposition workshop;
- Record keeping environmental information (e.g. spills, leaks, accidents);
- Participating in accident investigation;
- Assisting HFC 23 decomposition workshop in updating an emergency response plan; and
- Providing HSE training for the HFC 23 decomposition project personnel.

HSEQ Department will support HSE Team in the following areas:

- Preparing the Emergency Response Plan during the construction phase and updating the plan during the operational phase;
- Preparing the staff training plans and arrangements;
- Reviewing the environmental management reports received from the HFC 23 decomposition workshop;
- Participating in accident investigation;
- Compiling material safety data sheets for the chemicals handled in the HFC 23 decomposition project; and
- Record keeping environmental information (e.g. spills, leaks, accidents).

Staff training regarding HSE will facilitate smooth and effective implementation of the HFC 23 decomposition project during its construction and operational phases. The technology supplier will also provide specialized training for and instruction on installation, operation, maintenance and calibration of all the new equipment.

Emergency Preparedness and Response:

Environment emergency preparedness and response procedure is established in Changshu Haike to address reasonably foreseeable emergency situations, to set up an organization to develop and mitigate the

consequences of an accident, and to provide appropriate emergency preparedness information to entity personnel, contractors, emergency response organizations and the community. It includes:

1) Identifying basic situation of environment risk;
2) Emergency preparedness;
3) Environmental emergency response;
4) Emergency organization;
5) Corrective and preventive action;
6) Emergency response drill;
7) Record; and
8) Training

The procedure above will be regularly checked and revised for improvement.

In addition, the supplier of the proposed thermal decomposition system will also provide detailed technical solutions for emergency preparedness. In case the thermal destruction facility encounters emergency shutdown, all equipment will immediately switch to a safe mode.

The unintended emissions associated with the production process would be related to main failures in the incinerator and/or gas cleanup systems. If these equipment/systems cannot work properly, the following emergency measures should be initiated: 1) to stop air admission to the thermal oxidizer (incineration furnace) and then directly release tail gas of HCFC 22; or immediately stop producing HCFC 22 to avoid the generation of HFC 23 gas; 2) to immediately initiate emergency response system to ensure that the residual waste gas in the incineration system is fully purified and in compliance with national related emission standard. An emergency response system is designed and installed in the incineration system. This can cool gas with high temperature in the case of accidents instantly (avoid the generation of dioxin), fully neutralize and absorb acid gas such as HF and HCl, and finally achieve the emission in compliance with the related standard.

The fire wastewater generated in emergency case will be collected by an emergency cofferdam around the incinerator and gas cleanup systems, and then moved in a timely fashion into the wastewater treatment station of Arkema (Changshu) for further treatment. When meeting with the requirements accessing to the WTC of FCIP, it is discharged into the tailwater pond and then into the WTC through the wastewater pipe network for final treatment.

A special cofferdam will be also built for the storage tank of HF solution in case of emergent spill.

Quality Assurance and Inspection:

The quality control and inspection procedure will be established for monitoring and calibration of the proposed project activity to assure monitoring accuracy. Such procedure will include, but not limited to, following features:

- Recalibration of monitoring equipment according to methodology AM0001/version 05.1, including semi-annual recalibration by an officially accredited entity and weekly zero check of the two flow meters for HFC 23;
- Definition of malfunction of monitoring equipment;

Deleted: Annual test and

- Corrective actions in case of malfunction/breakdown or for more accurate monitoring and reporting;
- Internal audit;
- Project performance review.

Data Management System

A computer system saves and archives the data collected during monitoring process. The monitoring personnel are primarily responsible to manage the computer system and to save data also in hard copy. If the Designed Operational Entity (DOE) makes a reasonable request for information not directly related to the proposed project, Changshu Haike is responsible for its provision provided that certain confidentiality is secured and, furthermore, it should be archived in the data management system.

Paper information, for example maps, tables, and governmental approval on environmental impact report, is utilized to supplement the monitoring, in order to verify credibility of the saved information.
Annex 4

MONITORING INFORMATION

As shown in Annex 3, the quantitative relative scale of the baseline emissions and $\mathbf{E\_DP_y}$ (project emissions) is around the order of 10^4 as shown in section B. So, the quality control of $Q\_HFC\ 23_y$ dominates the uncertainty range of whole emission reductions.

In order to control the quality level of $Q\_HFC\ 23_y$, the following measures/procedures will be undertaken:

1). **Recalibration of the measurement.** All the measurement equipment will be recalibrated according to requirement of methodology AM0001/Version 05.1. F23 flow meters will be recalibrated every six months in order to reduce measurement error and the zero check on the F23 flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter will be undertaken; All other measurement equipments will be recalibrated monthly.

2). **Settling the loss of monitoring data**. In case of some accident to miss some monitoring data during some period happened, $Q\_HFC\ 23_y$ is calculated based on the statistical method of the past records and HCFC 22 production record. More conservative one among these are used and checked by the verifier (DOE) for its applicability. If other non-significant parameters were missing, the most conservative data is used during such a period based on the historical operation data;

3). **Checking the cut-off condition**. It is checked for every interval during each verification period for the continuous HFC 23 flow from the existing HCFC 22 facility.

The cut-off condition as well as domestic policy (under the existence of quantitative domestic regulations) and gas leakage from the valves (flow after the flow meters) is to be assessed on an *ex-post* basis. These will be verified by the DOE at the time of verification.

Assessment of Uncertainties to be addressed:

There are seven potential sources of uncertainties associated with the monitoring of $Q\_HFC\ 23y$ and other

Deleted: international rules and standards for measurement

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Comment [A9]: This modification is to clarify all measurement equipment's recalibration frequency according to methodology AM0001/version 05.1.

Deleted: once a year

Deleted: The zero check on the flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter will be undertaken;

Deleted: (annually or every 6 months usually)

Comment [A10]: Actually, our verification frequency will be adjusted according to company's plan.

Deleted: checked annually will be

parameters

1) **Mixture of HFCs of different GWPs.**

The sources of HFCs are well separated (if HFCs other than HFC 23 are to be decomposed). It is sufficient to monitor the input HFCs separately by type. (In the HCFC 22 production process, only HFC 23 is generated as a by-product among HFCs);

2) **Non-decomposed HFC 23 in the incinerator[1] (*ND_HFC 23$_y$*).**

The ND_HFC 23$_y$ in Changshu Haike's case is very small with the order of 0.001%. In order to monitor this amount, monthly sampling of emission gas from the stack will be conducted using gas chromatography, as explained in Section B.7.1. The gas chromatography shows ppm of the non-decomposed HFC 23 concentration relative to the total volume (m3) of the emission from the stack, the weight of ND-HFC23$_y$ can be calculated.

It is not necessary to check the liquid from the absorption tank because the solubility of the HFC 23 is negligible.

3) **The amount of HFC 23 supplied to the incinerator (*q_HFC 23$_y$*).**

q_HFC 23$_y$ is the product of HFC 23 flux by time, measured by gas mass flow meters. In order to improve the accuracy level, the approved monitoring methodology AM0001 stipulates recalibration and zero check as stated previously and independent monitoring of two flow meters in series as shown in Section B.7.
Calibration will be done every six months by an officially accredited entity. The zero check on the flow meters will be conducted every week. If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter will be undertaken. Most of the time, both flow meters measure the same amount of HFC 23 flows simultaneously. If the flow meter readings differ by greater than twice the claimed accuracy, then the reason for the discrepancy is investigated and the fault remedied. For the sake of conservativeness the lower value of the two readings will always be used to estimate the HFC 23 waste flows.
The monthly quantity of HFC 23 waste flows (q_HFC23$_m$) is the sum of the lower periodic reading of the two meters of every 30 minutes, as follow:

$$q\_HFC23m = \sum_{t=\text{number of period in a month}} \min^{m} (q\_HFC23_{1,t}, q\_HFC23_{2,t})$$

The overall uncertainty of designed mass flow meters (PROLINE T-MASS 65F from Endress+Hauser) is +/- 0.35%.

4) **The purity of the HFC 23 supplied to the incinerator (*P_HFC 23$_y$*)**

P_HFC 23$_y$ is measured by gas chromatography. The recalibration of gas chromatography will be

Deleted: volume %

Comment [A11]: Actually, the gas chromatography gives the non-decomposed HFC 23 result by unit of ppm and we can calculate the ND-HFC23 with the unit of kg.

Deleted: a coefficient (density) is used to convert ND_HFC 23$_y$ from volume to weight. Such coefficient is fixed in original design, but in reality it varies due to water content of the emission gas. The correction for this coefficient has been conducted based on four-year lab analysis result statistics in 2002-2004 and implemented since February, 2006. However, the fraction of the non-decomposed HFC 23 is so small (0.001%) that such variation of the coefficient is negligible small compared to the monitoring error of the supplied HFC 23 and thus the coefficient can be deemed to be a constant

Comment [A12]: Actually, our F23 flow meter's uncertainty is 0.35% instead of 0.5%, more accurate.

Deleted: 0.5%.

Deleted: verification

[1] This effect is associated with project emissions, *not* baseline emissions.

conducted monthly accordingly methodology AM0001/version 05.1. The analysis will be repeated in case of doubt regarding its veracity.

The accuracy of the HFC 23 purity analysis is 0.05% and the value used for calculation will be the average of the weekly analysis for a month so the uncertainty on the analysis, already low, will be lifted.

Deleted: externally once a year, pursuant to the Verification Regulation of Gas Chromatograph (JJG700-1999), using HCFC22 and HFC23 as standard substances.

5) **The electricity consumption (*Q_Power$_y$*)**

Q_Power_y is measured by an electricity meter. The calibration of this electricity meter will be conducted monthly according to methodology AM0001/version 05.1.
Electricity purchase and consumption records as well as the invoices for purchased electricity are used as crosscheck proofs.

Deleted: once every ten years according to the Chinese regulation (SDJ9-87) and the standard used by the Chinese bureau is an accuracy of 0.5%.

6) **The Steam consumption (*Q_Steam$_y$*)**

Q_Steam_y is measured by a steam meter. This steam meter, a vortex flowmeter Prowirl 72F with a precision of 1% in the range of 0 to 100 kg/h, which is the most adapted for the forecasted flow of steam in the thermal oxidizer (35 kg/h).
Steam purchase and consumption records as well as the invoices for purchased steam are used as crosscheck proof.
The steam meter will be recalibrated monthly according to methodology AM0001/version 05.1.

Deleted: once every two years, following Chinese regulation.

7) **The Natural Gas consumption (*Q_FF$_y$*)**

Q_FF_y will be metered using an NG meter, a vortex flowmeter Prowirl 72F with a precision of 1% in the range of 0 to 50 m3/h, which will be recalibrated according to methodology AM0001.NG purchase and consumption records as well as the invoices for purchased NG are used as crosschecking proofs.
This seven uncertainties are addressed in a systematic manner so that any unexpected variation in the values monitored will be investigated.
The technical manager (shown in Figure 8), which is also deputy general manager, will be responsible for the important technical issues including the uncertainties of the parameters described above.

All the procedures that concern the project and specifically the monitoring will be included in the scope of the ISO 9000 and ISO14000 Certifications of Changshu platform, as described in the "Management structure". All the non-conformities and remarks found during the audits (external and internal) will be taken in consideration to follow the Quality Assurance system requirements of ISO 9000.

Comment [A13]: Actually, the natural gas flow meter is volume flow meter and gives the result unit as m3/h but not kg/h.

Deleted: 50 kg/h

Deleted: once a year using an internal procedure, following Chinese regulation.

The following concern is considered for the decomposition amount, which should NOT be credited:

HFC 23 to be produced more than normal rate as a by-product of HCFC 22. There is a possibility that the operating conditions of the HCFC 22 plant vary, such that the feedstock efficiency is reduced and an

increased proportion of HFC 23 is produced. In order to avoid rewarding this potential for inefficient operation, a "cutoff" level of HFC 23 generation is to be introduced. Any amount of HFC 23 produced at levels, which exceed this "cut-off" cannot be credited as reductions even though in practice it will be decomposed. The time-dependent value of "cut-off" on the baseline emissions of HFC 23 is defined as "HCFC 22 production (t) × waste generation ratio (fixed) – HFC 23 annual sales volume (t)" in each year t; and

These assessments will be also checked by the DOE responsible for verification of the emission reductions on an *ex-post* basis.

The order of magnitude of emissions from each source both in the baseline scenario and the project scenario is assessed in Annex 3