D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

The approved monitoring methodology of AM0001/version 3: "Incineration of HFC23 Waste Streams".

This methodology is available on the following website:

http://cdm.unfccc.int/methodologies/PAmethodology /approved.html.

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

AM0001 is applicable to HFC 23 (CHF3) waste streams from an existing HCFC22 production facility with at least three (3) years of operating history between beginning of the year 2000 and the end of the year 2004 where the project activity occurs and where no regulation requires the destruction of the total amount of HFC23 waste.

This proposed project activity fully meets all these three qualifications:

1、The proposed project will decompose the HFC23 (CHF3) waste stream from an existing HCFC22 production facility;

2、The decomposed HFC23 (CHF3) of the proposed project is from a HCFC22 production line of Zhejiang Juhua Co., Ltd, which had operated for 3 years and 10 months from Feb.2001 to the end of year 2004;

3、There is no regulation to restrict HFC23 emissions and there will not be such restriction in the foreseeable years in China.

Therefore, the monitoring methodology of AM0001 is applicable to the proposed project.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment
1. q_HFC23_y	mass	Quantity of HFC23 supplied to the decomposition process	kg-HFC	(m) measured by two flow meters simultaneously that are calibrated every six months with a zero check on the flow meters being conducted weekly	monthly	100%	paper	Project lifetime	Please refer to Note 1 below.
2. P_HFC23_y	%	Purity of the HFC23 supplied to the decomposition process	%	(m) measured monthly by sampling	monthly		paper	Project lifetime	Measured using gas chromatography

In addition, the quantities of gaseous effluents (CO, HCl, HF, Cl2, dioxin and NOX) and liquid effluents (PH, COD, BOD, n-H (normal hexane extracts), SS (suspended solid), phenol, and metals (Cu, Zn, Mn and Cr) are measured in a manner and with a frequency that complies with local environmental regulations.

Note 1: To measure this quantity accurately two flow meters are used. The flow meters shall be calibrated every six months by an officially accredited entity. The zero check on the flow meters shall be conducted every week. In most of the time, under normal operation, both flow meters measures the same amount of HFC 23 flows simultaneously. Where the flow meter readings differ by greater than twice their claimed accuracy (for example 10% if the accuracy is claimed to be ±5%) 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.

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

The project emissions (E_DP_y) due to the HFC23 decomposition process are:

$$E\_DP_y = ND\_HFC23_y \times GWP\_HFC23 + Q\_HFC23_y \times EF$$

Where:

ND_HFC23_y: the quantity of HFC23 not destroyed during the year measured in metric tonnes, generally very small (less than 0.01% of the quantity of HFC23).

EF: Emission factor due to the thermal decomposition process of converting the carbon in the HFC23 into CO_2, which is released to the atmosphere, equals to 0.62857.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number *(Please use numbers to ease cross-referencing to table D.3)*	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)	For how long is archived data kept?	Comment
3. Q_HCFC_y	mass	The quantity of HCFC22 produced in the plant	t – HCFC22	m	monthly	100%	paper	Project lifetime	Reference data to check cut-off condition & rough estimation of Q_HFC23_y
4. $HFC23\_sold_y$	mass	HFC23 sold by the facility	t – HFC23	m	yearly	100%	paper	Project lifetime	Reference data to check cut-off condition & rough estimation of Q_HFC23_y

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

As the decomposed quantity of HFC23 in baseline is settled on the applicable regulation, it is the quantity of waste HFC23 which should be destroyed and calculated in following formula.

$$B\_HFC23_v = Q\_HFC23y * r_y$$

Where:

r_y : The ratio of the HFC23 waste to be decomposed according to the regulation.

China is in the Annex B countries list of the Montreal Protocol, so there is no regulation of the duty for decomposition ofHFC23, $r_y = 0$. If there is any new regulation on the HFC23 emission, r_y should be modified then.

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

Not applicable.

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table D.3)*	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)	For how long is archived data kept?	Comment

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>
Not applicable.

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number *(Please use numbers to ease cross-referencing to table D.3)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?	Comment
5. ND_HFC23_y	mass	The quantity of Un-decomposed HFC23 of gaseous effluent	Kg-HFC	m	monthly	100%	paper	Project lifetime	When the thermal oxidizer stops, analysis of the effluent gas is done to check leaked HFC23 by sampling.
6. $Q\_F_{1,y}$	energy	Electricity consumption by the decomposition process	kWh	m	monthly	100%	paper	Project lifetime	metered
7. $Q\_F_{2,y}$	energy	Steam consumption by the decomposition process	t- steam	m	monthly	100%	paper	Project lifetime	metered
8. $E\_F_{1,y}$	energy	Emission factor of electricity supply	tCO_2/kWh	m, c	monthly	100%	paper	Project lifetime	metered and calculated
9. $E\_F_{2,y}$	energy	emission factor of steam supply	$t\text{-}CO_2/t\text{-}$ steam	m, c	monthly	100%	paper	Project lifetime	metered and calculated
10. Q_T_y	mass	Solid waste	t- sludge	m	monthly	100%	paper	Project lifetime	metered
11. $E\_sludge_{,y}$	energy	CO_2 emission factor of the consumption of diesel oil during	t_CO_2 / t-sludg e	c	yearly	100%	paper	Project lifetime	Calculated (Please refer to calculation method in annex 3)

		transportation of sludge to landfill.							

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

The leakage is calculated as below:

$$L_y = \sum i\,(Q\_F_{i,y} \times E\_F_{i,y}) + ET_y$$
$$= Q\_F_{1,y} \times E\_F_{1,y} + Q\_F_{2,y} \times E\_F_{2,y} + Q\_T_{,y} \times E\_sludge_{,y}$$

Where,

$Q\_F_{1,y}$: Electricity consumption, from the self-used power plant with coal fuel during the year y (kWh).

$E\_F_{1,y}$: Emission factor of electricity supply of the self-used power plant (tCO2 / kWh).

$Q\_F_{2,y}$: Steam consumption, from the self-used boiler with coal fuel during the year y (t-steam).

$E\_F_{2,y}$: Emission factor of steam supply of the self-used boiler (tCO_2 / t-steam).

$Q\_T_{,y}$: Annual quantity of sludge produced (t- sludge)

$E\_sludge_{,y}$: CO_2 emission factor of the consumption of diesel oil during transportation of sludge (mainly CaF2) to landfill.(tCO_2 / t-sludge)

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

The project emission reductions are calculated as follows:

$$ER_y = (Q\_HFC23_y - B\_HFC23_y) \times GWP\_HFC23 - E\_DP_y - L_y$$

Where,

$ER_{y:}$ GHG emission reductions measured in tonnes of CO_2 equivalent during a given year(y).

$Q\_HFC23_{y:}$ the quantity of decomposed HFC23 measured in metric tones during the year y.

$B\_HFC23_{y:}$ the baseline quantity of the decomposed HFC23 measured in metric tones during the year y.

GWP_HFC23: The Global Warming Potential converts 1 tonne of HFC23 to tonnes of CO_2 equivalent (tonnes CO_2e/tonne HFC23). The approved Global Warming Potential value for HFC 23 is 11,700.

E_DP_y: GHG emissions in tones of CO_2e, due to the decomposition process.

L_y: GHG leakage in tones of CO_2e, due to the decomposition process.

Among these, the quantity of waste HFC 23 destroyed (Q_HFC23y) is calculated as the product of the quantity of waste HFC 23 supplied to the decomposition process (q_HFC23y) measured in metric tonnes and the purity of the waste HFC 23 (P_HFC23y) supplied to the decomposition process expressed as the fraction of HFC 23 in the waste, i.e. $Q\_HFC23_y = q\_HFC23_y \times P\_HFC23_y$.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned.
1. q_HFC23_y	Low	Yes. A QA & QC organization will be formed and QA & QC procedures that are equivalent to JIS (Japanese Industrial Standard) in terms of equipment and analytical method will be set. Will be measured using two flow meters in parallel . The flow meters shall be calibrated every six months by an officially accredited entity. The zero check on the flow meters shall be conducted every week. If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter shall be undertaken.	QA & QC procedures are set and implemented in order to, 1. Secure a good consistency through planning to implementation of this CDM project and, 2. Stipulate who has responsibility for what and, 3. Avoid any misunderstanding between people and organization involved.
2. P_HFC23_y	Low	Will be measured using gas chromatography	Ditto
3. Q_HCFC_y	Low	Will be obtained from production records of the facility where the HFC23 consumption originates	Ditto
4. $HFC23\_sold_y$	Low	Will be obtained from production records of the facility where the HFC23 consumption originates	Ditto
5. ND_HFC23_y	Low	Will be measured from the gas effluent of the decomposition process	Ditto

6. $Q\_F_{1,y}$	Low	Will be metered using electricity meter	Ditto
7. $Q\_F_{2,y}$	Low	Will be metered using steam meter	Ditto
8. $E\_F_{1,y}$	Low	Will be got by meter & calculation	Ditto
9. $E\_F_{2,y}$	Low	Will be got by meter & calculation	Ditto
10. QT_y	Low	Will be metered using meter	Ditto
11. $E\_sludge_{,y}$	Low	Will be got by calculation	Ditto

All of the measurement instruments are to be recalibrated monthly per internationally accepted procedures except for the HFC 23 flow meters whose recalibration frequency is six months with a zero check being conducted weekly to reduce the error level . If the zero check indicates that flow meter is not stable, an immediate calibration of the flow meter shall be undertaken.

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

In order to monitor the project emission reductions and leakage, the project operator plans to establish the operational and administration structure as shown in figure 3. Details are illuminated as follows:

1、Project Operator, Zhejiang Juhua Co., Ltd. (JH) will nominator a Chinese CDM Project Director, who will supervise the operation manager and monitor manager. The respective responsibilities are as follows：

1) Chinese CDM project director：Receive the report from operation manager and monitor manager; manage the CDM project jointly with the Japanese side; Coordinate with the Chinese Government and stakeholders; submit the monitoring report to DOE.
2) Operation manager: Based on the operation manual, take care of the project operation management and supervision, and is responsible to the Chinese CDM project director.
3) Monitoring manager: Based on monitoring manual, take care of the monitor of emission reduction and leakage data, including environment influence, and is responsible to the Chinese CDM project director.

2、The Japanese CDM project director will be also be responsible for the management of the CDM project jointly with Chinese side, provide the plan for project implementation, operation and maintenance etc. , and coordinate with Japan Government.

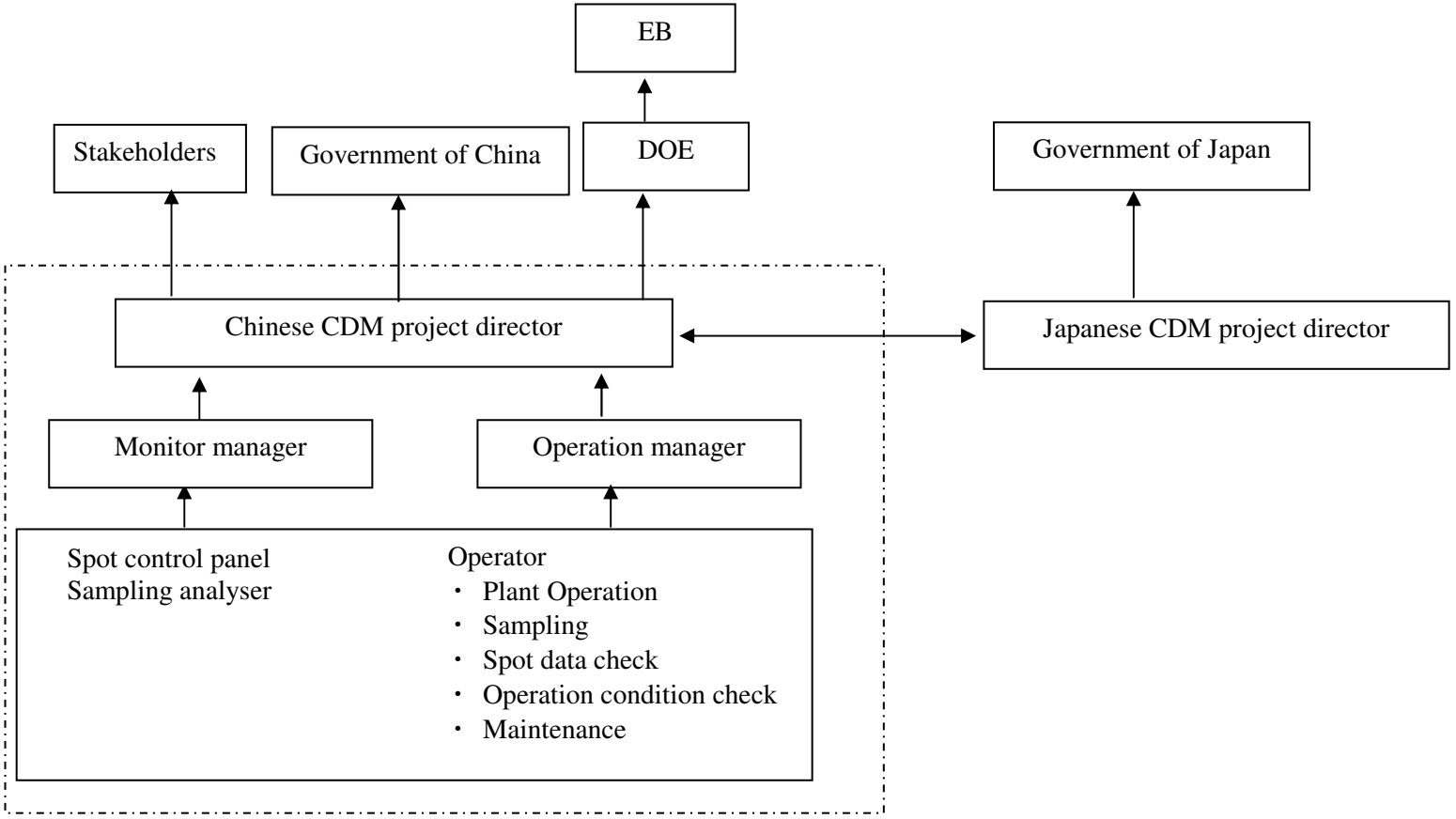


Figure3 Operational and Management Structure

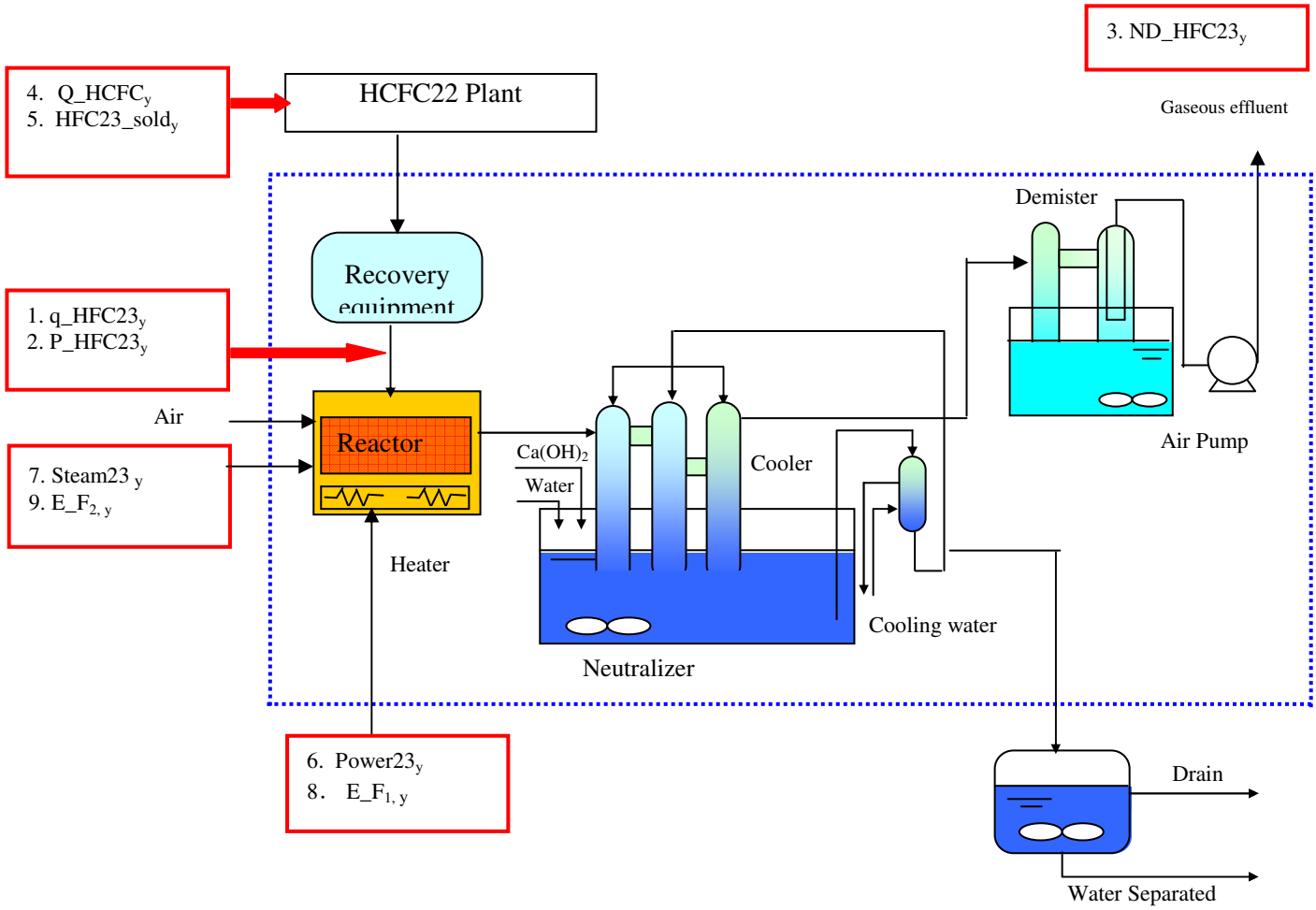
D.5 Name of person/entity determining the monitoring methodology:

Date of completing the final draft of determining the monitoring methodology: June 15, 2005.
Name of person/entity determining monitoring methodology:
Mr. Duan Maosheng, email: duanmsh@tsinghua.edu.cn , Tsinghua University
Mr. Zhou Sheng, zhshinet@tsinghua.com.cn, Tsinghua University
Tsinghua University is not one of the project proponents.

Annex 4

MONITORING PLAN

The monitoring points are shown as follows:



1. q_HFC23 $_y$: quantity of HFC23 to be supplied to the decomposition kiln
2. P_HFC23 $_y$: purity of HFC23 to be supplied into the kiln
3. ND_HFC23 $_y$: quantity of HFC23 not decomposed
4. Q_HCFC $_y$: quantify of HCFC22
5. HFC23_sold $_y$: quantify of HFC23 sold
6. Power23 $_y$＝Q_F$_{1,y}$: Electricity consumption in the decomposition process
7. Steam23 $_y$＝Q_F$_{2,y}$: Steam consumption in the decomposition process
8. E_F$_{1,y}$: emission factor for power supply (tCO_2e/kWh)
9. E_F$_{2,y}$: emission factor for steam supply (tCO_2e /t-steam)
10. Q_T $_y$: amount of solid wastes (t-sludge)
11. E _sludge$_{,y}$: CO_2 emission factor of the consumption of diesel oil during transportation of sludge to landfill.(tCO_2 / t-sludge)

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