CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Title: NOWIFA HFC-23 destruction project

Version: 1.0

Date: 4 March 2010

A.2. Description of the project activity:

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The NOWIFA Fluorocarbon Chemicals plant was constructed between 1998 and 1999 and started operation in 1999. The plant has a production capacity of 20,000 tons HCFC-22 per year. HFC-23 is an undesirable by-production in the production of HCFC-22 and is currently released to the atmosphere. There are no regulations or economic incentives other than the CDM in the host country to abate the HFC-23. The purpose of the project is to collect all of the waste stream of HFC-23 from the HCFC-22 production process and to decompose it in an incinerator installed at the project site. In the incinerator, the HFC-23 will be decomposed into CO2, HCl and HF. The flue gases will be further cleaned before release to the atmosphere. The project promotes sustainable development by sharing 50% of the revenues from selling CERs with local non-governmental organization in the province where the project is located. The revenues will be used for environmental and social projects. The flue gases are cleaned before release into the atmosphere and no significant other negative environmental impacts are expected from the project activity. Please note that this project is an example project for the purpose of demonstrating how the revised methodology is applied in the context of a CDM project activity. Please note further that the form F-CDM-AM-Rev only requires to provide a PDD for an *example* project.

A.3. Project participants:

>>
Forum Umwelt & Entwicklung (to be referred to as FUE hereafter)
Deutscher Naturschutzring (DNR)
Koblenzer Str. 65, 53173 Bonn, Germany

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>India, Andhra Pradesh - This is an example project to illustrate how the draft revised methodology is applied, as required by the form F-CDM-AM-Rev. The project can be located in any host country.

A.4.1.1. Host Party(ies):

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India - This is an example project to illustrate how the draft revised methodology is applied, as required by the form F-CDM-AM-Rev. The project can be located in any host country.

A.4.1.2. Region/State/Province etc.:

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India, Andhra Pradesh - This is an example project to illustrate how the draft revised methodology is applied, as required by the form F-CDM-AM-Rev. The project can be located in any region/state/province.

A.4.1.3. City/Town/Community etc.:

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This is an example project to illustrate how the draft revised methodology is applied, as required by the form F-CDM-AM-Rev. The project can be located in any city/town/community.

A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

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This is an example project to illustrate how the draft revised methodology is applied, as required by the form F-CDM-AM-Rev. The project can be located in any physical location.

A.4.2. Category(ies) of project activity:

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This project falls into Category 11: "Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride".

A.4.3. Technology to be employed by the project activity:

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The HFC-23 waste gas is collected from the HCFC-22 production process and subsequently stored. The HFC-23 is then fed into the incinerator together with fuel which support the combustion as well as air and steam. In the incinerator, the temperature will be about 1200-1400 degree Celsius. At this temperature the HFC-23 will be decomposed. The chemical reaction is as follows:

$CHF_3(HFC23)+H_2O+1/2\ O_2 \rightarrow CO_2 +3HF$
$CHClF_2(HCFC22)+H_2O+1/2O_2 \rightarrow CO_2 +2HF+HCl$

The flue gases from this process will be sent to a neutralization process for cooling and neutralization of the acids with alkali. post-decomposition acid gases including HF, HCl, and CO_2, *etc.*, will be sent to the neutralization process for cooling and antacid with alkali. After neutralization and cleaning, the exhaust gases will be vented to the atmosphere. The wastewater is treated in a waste water treatment process.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

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Years	Annual estimation of emission reductions in tonnes of CO2e
2011	168919
2012	160473
2013	152449
2014	144827
2015	137585
2016	130706
2017	124171
Total estimated reductions (tonnes of CO2e)	1019130
Total number of crediting years	7 years

For a detailed calculation, please see Section B.6.3

A.4.5. Public funding of the project activity:

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No public funding is involved in the project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

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The methodology applied is version 6 of AM0001: "Incineration of HFC 23 waste streams", as included as draft revised methodology in the request for revision

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

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The methodology is applicable under the following conditions:

- The project activity is the destruction of HFC 23 (CHF_3) waste streams from an existing HCFC22 production facility;
- The HCFC-22 production facility has an operating history of at least three years between beginning of the year 2000 and the end of the year 2004 and has been in operation from 2005 until the start of the project activity;
- The HFC-23 destruction occurs at the same industrial site where the HCFC-22 production occurs (i.e. no offsite transport occurs); and
- Where no regulation requires the destruction of the total amount of HFC23 waste.

The project meets all of these conditions:

- The proposed project is to decompose the HFC23 (CHF3) waste streams from the existing NOWIFA Fluorocarbon Chemicals HCFC-22 production facility;
- The NOWIFA Fluorocarbon Chemicals plant started operation in 1999 and continuously operated between the year 2000 and the end of the year 2004 and has been in operation from 2005;
- The HFC-23 destruction occurs at the same industrial site where the HCFC-22 production occurs; and
- In the host country, no regulation requires the destruction of the total amount of HFC23 waste.

B.3. Description of the sources and gases included in the project boundary:

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The project boundary includes the industrial site of the NOWIFA Fluorocarbon Chemicals plant, including the HFCF-22 production facility and the HFC-23 destruction unit.

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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Currently, no regulations are in place which require the destruction of HFC-23. Furthermore, the operator of the plant has no incentives to destroy the HFC-23, as this will involve costs but not generate any revenues. The continued release of HFC-23 is also not restricted by any other regulations of the host

country. This means that, according to the underlying methodology, the baseline scenario is the the continuation of release of HFC-23 to the atmosphere.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

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According to the methodology, the project activity is deemed additional if the quantity of HFC 23 emitted to the atmosphere is lower than the baseline quantity. This applies to the proposed project activity as it will destroy all HFC-23 generated (except for very small quantities due to incomplete combustion).

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Project emissions

Project emissions include only any remaining HFC-23 emissions from the plant (e.g., due to incomplete HFC-23 destruction or a by-pass). These emissions are calculated based on the difference between the HFC-23 generated and the HFC-23 destroyed, as follows:

$$PE_y = \left(Q_{HFC23,gen,y} - Q_{HFC23,destr,y}\right) \times GWP_{HFC23} \quad \textbf{(1)}$$

where:

PE_y	=	Project emissions in year *y* (tCO_2e)
GWP_{HFC23}	=	Global Warming Potential of HFC-23 valid for the commitment period
$Q_{HFC23,gen,y}$	=	Quantity of HFC-23 generated as a by-product at the HCFC-22 facility in year *y* (t HFC-23/yr)
$Q_{HFC23,destr,y}$	=	Quantity of HFC-23 destroyed in year *y* (t HFC-23/yr)

As per the methodology, emissions from electricity and fossil fuel consumption or from carbon contained in the HFC-23 are negligible compared to the overall emission reductions and are thus neglected.

$Q_{HFC23,gen,y}$ and $Q_{HFC23,destr,y}$ will be directly metered, as the per the provisions in the monitoring methodology. The GWP of HFC-23 corresponds to a value of 11,700 for the first commitment period under the Kyoto Protocol.

Baseline emissions

Baseline emissions only include HFC-23 emissions. They are calculated as the minimum between the quantity of HFC-23 that can be emitted in year *y* according to applicable regulations ($BE_{HFC23,REG,y}$) and the maximum amount of HCFC-22 production that is eligible for crediting ($Q_{HCFC22,max,y}$) multiplied by a conservative default value for the ratio between HFC-23 generation and HCFC-22 production ($w_{HFC23/HCFC22}$). A conservative default value for $w_{HFC23/HCFC22}$ is used in order to avoid incentives that (a) more HCFC-22 is produced under the project activity than would be produced in the absence of the project

activity and/or that (b) the plant is operated under the project activity at a higher HFC-23/HCFC-22 ratio than in the absence of the project activity. The amount of HCFC-22 production eligible for crediting is capped in accordance with decision 8/CMP.1.

Baseline emissions are calculated as follows:

$$BE_y = GWP_{HFC23} \times MIN\left[BE_{HFC23,REG,y}; Q_{HCFC22,MAX,y} \times w_{HFC23/HCFC22}\right] \quad \textbf{(2)}$$

where:

BE_y	=	Baseline emissions in year *y* (tCO_2e)
GWP_{HFC23}	=	Global Warming Potential of HFC-23 valid for the commitment period
$BE_{HFC23,REG,y}$	=	Quantity of HFC-23 that can be emitted in year *y* according to applicable regulations
$Q_{HCFC22,max,y}$	=	Maximum annual production of HCFC-22 at the originating plant that is eligible for crediting (t HCFC-22/yr)
$w_{HFC23/HCFC22}$	=	Waste generation rate (metric tons of HFC23 per metric tons of HCFC22)

In the case of this project activity, there are currently no regulations restricting the emissions from HFC-23. However, the emergence of any such regulations will be monitored.

The maximum annual HCFC-22 production quantity that is eligible for crediting ($Q_{HCFC22,max,y}$) is the lower value between

(a) the actual HCFC-22 production in year y ($Q_{HCFC22,y}$); and
(b) the maximum historical annual HCFC-22 equivalent production level ($Q_{HCFC22e,hist}$) at this plant (in tonnes of HCFC22) during any of the last three (3) years between beginning of the year 2000 and the end of the year 2004. $Q_{HCFC22e,hist}$ includes the actual HCFC-22 production plus an HCFC-22 production equivalent to the CFC production at swing plants adjusted appropriately to account for the different production rates of HCFC22 and CFCs.

In this of this project activity, this provision applies to the three years 2002, 2003 and 2004. There is only one production line and no CFCs were produced during this period. Hence, the provisions in the methodology with regard to several production lines and swing plants do not apply to this project. The historical HCFC-22 production in these three years was 7,856 tons in 2002, 6,895 tons in 2003 and 8,257 tons in 2004. Accordingly, the maximum eligible amount for crediting is capped to $Q_{HCFC22,y}$ = 8,257 tons per year.

As per the requirements of the methodology, a waste generation rate $w_{HFC23/HCFC22}$ of 0.2% will be applied throughout the crediting period.

Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad \textbf{(7)}$$

where:

ER_y	are the emission reductions in year *y* (tCO_2e)
BE_y	are the baseline emissions in year *y* (tCO_2e)
PE_y	are the project emissions in year *y* (tCO_2e)

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**GWP_{HFC23}**
Data unit:	t CO_2e/t HFC-23
Description:	Global Warming Potential of HFC-23 valid for the commitment period
Source of data used:	Decision by COP3 valid for the first commitment period under the Kyoto Protocol
Value applied:	11,700 until the end of 2012, any value decided by COP/MOP for later periods
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the requirements of the Kyoto Protocol
Any comment:	The ex-ante calculation assumes the same value of 11,700 throughout the crediting period

Data / Parameter:	**$Q_{HCFC22e,hist,x}$**
Data unit:	t HCFC-22 / yr
Description:	HCFC-22 production during the year *x* where *x* are any of the last three years between beginning of the year 2000 and the end of the year 2004
Source of data used:	Records by the plant
Value applied:	2002: 7,856 tons 2003: 6,895 tons 2004: 8,257 tons
Justification of the choice of data or description of measurement methods and procedures actually applied :	Production meters have been used. The data has been cross-checked with sales data.
Any comment:	-

Data / Parameter:	**$w_{HFC23/HCFC22}$**
Data unit:	Metric tons of HFC-23 per metric tons of HCFC-22

Description:	Waste generation rate
Source of data used:	Default value provided by the methodology
Value applied:	0.2%
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the requirements of the methodology
Any comment:	-

B.6.3. Ex-ante calculation of emission reductions:

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The plant expects to produce about 7,500 tons of HCFC-22 per year in 2011 which is the first year of the crediting period. Thereafter, the production is expected to decline due to the accelerated phase-out of HCFC-22 under the Montreal Protocol. It is expected that production will decline by about 5% per year.

Moreover, we expect that the plant will be operated at an actual HFC-23/HCFC-22 waste generation rate of about 1.5%. The efficiency of the destruction facility is approximately 99,5%. Based on these ex-ante estimations, the expected emission reductions over the crediting period are illustrated in the following table.

			2011	2012	2013	2014	2015	2016	2017
A	HCFC-22 production		7500	7125	6769	6430	6109	5803	5513
B	Baseline value for w		0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%
C	Baseline emissions (t HFC-23)	= A * B	15,00	14,25	13,54	12,86	12,22	11,61	11,03
D	Baseline emissions (tCO2e)	= C * 11700	175500	166725	158389	150469	142946	135799	129009
E	Actual waste generation rate (tHFC-23/tHCFC-22)		1,5%	1,5%	1,5%	1,5%	1,5%	1,5%	1,5%
F	Actual HFC-23 generation (t HFC23)	= A * E	113	107	102	96	92	87	83
G	HFC-23 destruction rate		99,50%	99,50%	99,50%	99,50%	99,50%	99,50%	99,50%
H	Project emissions (t HFC-23)	= F * (1-G)	0,563	0,534	0,508	0,482	0,458	0,435	0,413
I	Project emissions (t CO2e)	= H * 11700	6581	6252	5940	5643	5360	5092	4838
J	Emission reductions (t CO2e)	= D - I	168919	160473	152449	144827	137585	130706	124171

B.6.4 Summary of the ex-ante estimation of emission reductions:

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The following table shows a summary of the ex-ante estimation of emission reductions.

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
2011	168919
2012	160473
2013	152449
2014	144827
2015	137585
2016	130706
2017	124171

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**$Q_{HFC23,gen,y}$ and $Q_{HFC23,destr,y}$**
Data unit:	t HFC-23/yr
Description:	Quantity of HFC-23 generated as a by-product at the HCFC-22 facility in year *y* and quantity of HFC-23 destroyed in year *y*
Source of data to be used:	Measurements by project participants
Value of data applied for the purpose of calculating expected emission reductions in section B.5	1.5%
Description of measurement methods and procedures to be applied:	Two flow meters are used for each parameter. 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, an immediate calibration of the flow meter will be undertaken. Most of the time, under normal operation, both flow meters measure 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. The higher value of the two readings will always be used to estimate $Q_{HFC23,gen,y}$. Respectively, the lower value of the two readings will always be used to estimate $Q_{HFC23,destr,y}$. The lower / higher value should be chosen for each meter reading t: $Q_{HFC23,gen,y} = \sum_t MAX\left(Q_{HFC23,gen,meter\,1,t}; Q_{HFC23,gen,meter\,2,t}\right)$ $Q_{HFC23,destr,y} = \sum_t MIN\left(Q_{HFC23,destr,meter\,1,t}; Q_{HFC23,destr,meter\,2,t}\right)$ Purity of HFC 23 is checked monthly by sampling 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.
QA/QC procedures to be applied:	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.
Any comment:	-

Data / Parameter:	$BE_{HFC23,REG,y}$
Data unit:	t HFC-23/yr
Description:	Quantity of HFC-23 that can be emitted in year *y* according to applicable regulations
Source of data to be used:	Relevant regulations
Value of data applied for the purpose of calculating expected emission reductions in section B.5	At the point of validation, there are no regulations
Description of measurement methods and procedures to be applied:	Annually
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$Q_{HCFC22,y}$
Data unit:	t HCFC-22/yr
Description:	Quantity of HCFC-22 produced in the facility in year *y*
Source of data to be used:	Measurements by the plant operator
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See table in section B.5
Description of measurement methods and procedures to be applied:	A volume flow meter will be installed
QA/QC procedures to be applied:	The measured data will be cross-checked with sales data
Any comment:	

B.7.2. Description of the monitoring plan:

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The monitoring mainly involves the measurement of the quantity of HFC-23 that is generated at the facility and that is destroyed under the project activity.

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 every six months to ensure compliance with environmental regulations.

All data collected as part of monitoring should be archived electronically and be kept at least for two years after the end of the last crediting period. 100% of the data should be monitored if not indicated differently in the comments in the tables below.

The technical leader of the HFC-23 decomposition plant will have the responsibility for implementing all monitoring provisions. The data will be recorded both electronically and on paper. The shift-heads should check the records to ensure their accuracy. The administrative department of the company will be responsible for preparing the monitoring reports.

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

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4 March 2010

Responsible entity: Forum Umwelt und Entwicklung

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

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1 January 2011

C.1.2. Expected operational lifetime of the project activity:

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25 years

C.2. Choice of the crediting period and related information:

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

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1 January 2011 or the official registration date in UNFCCC, whichever is later

C.2.1.2. Length of the first crediting period:

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7 years (to be renewed up to 21 years in total)

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
Not applicable

C.2.2.2. Length:

>>
Not applicable

SECTION D. Environmental impacts

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D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

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D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

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SECTION E. Stakeholders' comments

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E.1. Brief description how comments by local stakeholders have been invited and compiled:

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E.2. Summary of the comments received:

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E.3. Report on how due account was taken of any comments received:

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Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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