



ASSESSMENT

REGARDING POST REGISTRATION CHANGES

SOLVAY FLUOR KOREA CO. LTD

SF6 RECOVERY AND RECLAMATION PROJECT,

SOUTH KOREA

Report No: QT-SHC10009/12 - 12/355

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Assessment Report on post registration changes	Report No.	Rev. No.	Date of 1st issue:	Date of this rev.
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Project:	Title:		Registr. date:	UNFCCC-No.:
	SF6 recovery and reclamation project, South Korea		2011-04-01	4274
Project Participant(s):	Name:		Party:	
	Solvay Fluor Korea Co. Ltd EcoSecurities International Limited		Republic of Korea United Kingdom of Great Britain and Northern Ireland	
Applied methodology/ies:	Title:		No.:	Scope:
	Recovery of SF6 from Gas insulated electrical equipment in testing facilities		AM0079 ver.02	11 / 11.2
Post Registration Changes:	Type of requested changes		Number of changes	Prior Approval required
	<input checked="" type="checkbox"/> Temporary deviations from the MP		1	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/> Temporary deviations from the MM		1	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/> Corrections that do not affect the project		1	<input checked="" type="checkbox"/>
	<input type="checkbox"/> Change to the start date of the crediting p.		-	<input type="checkbox"/>
	<input type="checkbox"/> Permanent changes from the MP		-	<input type="checkbox"/>
	<input type="checkbox"/> Permanent changes from the MM		-	<input type="checkbox"/>
	<input type="checkbox"/> Design changes to the project activity/PoA		-	<input type="checkbox"/>
<input type="checkbox"/> Changes specific to A/R		-	<input type="checkbox"/>	
Revised PDD:	Title:		Attached in TC:	Attached clean:
	SF6 recovery and reclamation project, South Korea		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Assessment team / Technical Review and Final Approval	Assessment Team:		Technical review:	Final approval:
	TL: Rainer Winter TM: Li Yongjun TM: Yu Miao		Dirk Speyer	Dr. Jochen Schubert
Assessment Opinion:	<input checked="" type="checkbox"/>	The post registration changes require prior Approval by the Board		
	<input type="checkbox"/>	The post registration changes do not require prior Approval by the Board		
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Abbreviations

CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO₂	Carbon dioxide
CO_{2eq}	Carbon dioxide equivalent
CL	Clarification Request
DCS	Data Collection System
DVerR	Draft Verification Report
ER	Emission Reduction
FAR	Forward Action Request
GC	Gas Chromatograph
GCB	Gas circuit Breaker
GHG	Greenhouse gas(es)
GIS	Gas insulated switchgear
GIEE	Gas Insulated Electrical Equipment
KERI	Korea Electrotechnology Research Institute
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
SFK	Solvay Fluor Korea Co., Ltd
SF6	Sulphur Hexafluoride
SOP	Specific Operational Procedure SFK-SOP-SF6-086
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
XLS	Emission Reduction Calculation Spread Sheet

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1 OBJECTIVE / SCOPE

Solvay Fluor Korea Co. Ltd has commissioned the TÜV NORD JI/CDM Certification Program (CP) to assess post registration changes of the project

“SF6 recovery and reclamation project, South Korea”

This report serves for all kind of post registration changes as defined in the PS.

This report serves as an annex to the Post-registration changes request form (F-CDM-PRC).

2 GENERAL CHARACTERISTICS

2.1 Project Characteristics

Essential data of the project is presented in the following Table 2-1.

Table 2-1: Project Characteristics

Item	Data		
Project title	SF6 recovery and reclamation project, South Korea		
Project type	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> PoA	
Project size	<input checked="" type="checkbox"/> Large Scale	<input type="checkbox"/> Small Scale	
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input type="checkbox"/>	1	Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/>	2	Energy distribution
	<input type="checkbox"/>	3	Energy demand
	<input type="checkbox"/>	4	Manufacturing industries
	<input type="checkbox"/>	5	Chemical industry
	<input type="checkbox"/>	6	Construction
	<input type="checkbox"/>	7	Transport
	<input type="checkbox"/>	8	Mining/Mineral production
	<input type="checkbox"/>	9	Metal production
	<input type="checkbox"/>	10	Fugitive emissions from fuels (solid, oil and gas)
	<input checked="" type="checkbox"/>	11	Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/>	12	Solvents use
	<input type="checkbox"/>	13	Waste handling and disposal
	<input type="checkbox"/>	14	Afforestation and Reforestation
	<input type="checkbox"/>	15	Agriculture
	<input type="checkbox"/>	16	Carbon capture and storage
Applied Methodology	Recovery of SF6 from Gas insulated electrical equipment in testing facilities, AM0079 ver.02		
Technical Area(s)	11.2: GHG capture and destruction		
CDM registration No.	4274		
Crediting period	<input type="checkbox"/>	Renewable Crediting Period (7 y)	
	<input checked="" type="checkbox"/>	Fixed Crediting Period (10 y)	

The Project activity aims to reduce emissions of SF6 from the Korea Electrotechnology Research Institute (KERI) testing facility of electro technical equipment in South Korea that would have been vented in a business-as-usual scenario. SF6 that has been used in the testing of gas insulated electrical equipment (GIEE), especially gas circuit breakers (GCB) and gas insulated switchgears (GIS) at KERI, is recovered and then reclaimed at Solvay's SF6 manufacturing facility located in Ulsan, South Korea.

The project consists of two sites, one is the SF6 recovery site and the other is the SF6 reclamation site: The used SF6 is recovered from GIS/GCB equipment by the piping system. It is then compressed and stored in dedicated cylinders which are weighed and labelled in recovery site KERI. The cylinders are transported to SF6 reclamation site SFK. The SF6 is analyzed at the laboratory once the cylinders

arrived at SFK. Then the used SF6 which meets the standard i.e. SOP is injected to SF6 production plant for reclamation.

The project was started on 23 November 2007 and the commissioning at the recovery site started on 29 April 2008. The crediting period (10 years fixed) started on 2011-04-01 (date of registration).

2.2 Overview of Post Registration Changes

Within this report post registration changes as listed in Table 2-2 are assessed.

Table 2-2: Overview Post Registration Changes

#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
1	2011-04-01 to 2011-09-30	TDfrMP	$Q_{SF6,k,y}$ (total amount of SF6 filled in the testing of equipments) was not monitored and recorded for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 during the recovery period from 2011-04-02 to 2010-09-30.
2	2011-04-01 to 2011-09-30	TDfMM	Instead of DFT_y (discount factor for testing in year y) the value of $RT_{1,y}$ or $RT_{2,y}$ (Ratio of number of eligible testing items in category k (maximum value is set at 1)) is usable as a conservative substitute.
3	2011-04-01 to 2021-03-31	CrPDD	In PDD version 8, Sub-step 3 (a), the ranges of the category k have been changed from 40-419 kV and 420- 800kV to 12-405 kV and 406-800 kV.
4	N/A	ChSD	N/A
5	N/A	PCfrMP	N/A
6	N/A	PCfMM	N/A
7	N/A	CoPD	N/A
8	N/A	CstAR	N/A

- ¹⁾
- TDfrMP : Temporary deviation from registered monitoring plan
 - TDfMM : Temporary deviation from the monitoring methodology
 - CrPDD : Corrections to the registered PDD
 - ChSD : Change to the start date of the crediting period
 - PCfrMP : Permanent changes from registered Monitoring Plan
 - PCfMM : Permanent changes from Monitoring Methodology
 - CoPD : Changes to the project design of a registered project activity / PoA
 - CstAR : Changes specific to afforestation or reforestation

2.3 Assessment team members and technical reviewers

On the basis of a competence analysis and individual availabilities a assessment team, consistent of one team leader and 2 additional team members, were appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 2-3 below.

Table 2-3: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Winter, Rainer	TÜV NORD CERT GmbH	TL	SA	<input checked="" type="checkbox"/>	11.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Li, Yongjun	TN China	TM ^{A)}	SA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Yu, Miao	TN China	TM ^{A)}	LA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Speyer, Dirk	TÜV NORD CERT GmbH	TR ^{B)}	LA	<input checked="" type="checkbox"/>	11.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dr. Jochen Schubert	TÜV NORD CERT GmbH	FA ^{B)}	SA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

1) TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

2) GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

3) GHG auditor status (at least Assessor)

4) As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

5) In case of verification projects

A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

B) No team member

2.4 Assessment Steps

The *assessment of post registration changes* consisted of the following steps:

- Appointment of team members and technical reviewers
- A desk review of the registered and revised PDD^{/PDD/} submitted by the client and additional supporting documents
- On-Site assessment (if required)
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Resolution of corrective actions (CARs / CLs) (if any)
- Final reporting
- Technical review
- Final approval.

2.5 Review of Documents

The registered as well as the revised PDD and supporting background documents related to the project design and the post registration changes were reviewed.

As far as required the assessment team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

2.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for CDM.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 2-4.

Table 2-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel, Solvay Fluor Korea Co. Ltd. i.e. SFK /IM01/	<ul style="list-style-type: none">- General aspects of the project- Technical equipment and operation- Changes since validation / previous verification- Monitoring and measurement equipment

Interviewed Persons / Entities	Interview topics
2. SF ₆ recovery entity, Korea Electrotechnology Research Institute i.e. KERI /IM02/	<ul style="list-style-type: none"> - Remaining issues from validation/ previous verification - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG emission reduction calculation - Procedural aspects of the verification - Maintenance - Environmental aspects

A comprehensive list of all interviewed persons is part of section 7 'References'.

2.7 Resolution of Clarification and Corrective Action Requests

2.7.1 Definition

A **Corrective Action Request (CAR)** will be established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the intended / implemented changes,
- there is a risk that the changes cannot be approved by the UNFCCC or that emission reductions would not be able to be verified and certified after the implementation of the changes.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

2.7.2 Assessment

After reviewing all relevant documents and taken all other relevant information into account, the assessment team issues all findings (in the course of a draft report, if applicable) and hands over the findings to the project proponent in order to respond on the issues raised and to revise the documentation accordingly.

The final reporting step starts after resolution of the raised CARs and CLs. In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive assessment opinion can be issued by the validation team.

The CAR(s) / CL(s) are documented in the context of the respective chapters.

2.8 Technical review

Before submission of the final assessment report a technical review is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the assessment opinion as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

2.9 Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the requested post registration changes will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the notification or the report can be forwarded to the UNFCCC (in case of a positive validation opinion).

3 CHANGES THAT DO NOT AFFECT THE PROJECT DESIGN

3.1 Assessment of Changes

Requested Deviations / Changes #1

- Type of change(s):
- ☒ Temporary Deviation from Monitoring Plan
 - ☒ Temporary Deviation from Monitoring Methodology
 - ☐ Corrections that do not affect the project design
 - ☐ Permanent Change from Monitoring Plan
 - ☐ Permanent Change from Monitoring Methodology
 - ☐ Changes specific to afforestation or reforestation

A. Description of post registration change

Start Date:

Please provide the start date of the change

2011-04-02

End Date:

Please provide the end date of the change, if applicable

2011-09-30

Description:

Please give a detailed description of the changes

Summary:

$Q_{SF6,k,y}$ (total amount of SF6 filled in the testing of equipments) was not monitored and recorded for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 during the recovery period from 2011-04-02 to 2011-09-30.

Instead of DFT_y (discount factor for testing in year y) the value of $RT_{1,y}$ or $RT_{2,y}$ (Ratio of number of eligible testing items in category k (maximum value is set at 1) is usable as a conservative substitute.

Details:

The project started commissioning at the recovery site on 2008-04-29. The project consists of two sites, one is the SF₆ recovery site and the other is the SF₆ reclamation site. The operational period during the 1st monitoring period for both sites is presented in the table below.

The operational period for 1st MP at KERI and SFK site:

	SF ₆ Recovery at KERI site		SF ₆ Reclamation at SFK site	
i	Recovery Period from	Recovery Period to	Reclamation Period from	Reclamation Period to

Requested Deviations / Changes #1

	CDM-11003	2-Apr-11	10-Jun-11	19-Jul-11	28-Jul-11
	CDM-11004	11-Jun-11	13-Jul-11	23-Aug-11	2-Sep-11
	CDM-11005	13-Jul-11	30-Sep-11	25-Oct-11	3-Nov-11
	CDM-11006	1-10-11	1-Dec-11	20-Dec-11	29-Dec-11
	CDM-11007	2-Dec-11	6-Feb-12	29-Feb-12	9-Mar-12
	CDM-12001	8-Feb-12	29-Mar-12	19-Apr-12	26-Apr-12

Note that recovery-reclamation cylinder i refers to each recovery-reclamation cycle that a cylinder goes through (i.e. from the moment the cylinder is taken to the recovery site until the moment the gas contained in the cylinder has been injected into the reclamation facility) and not the physical cylinder. The project uses bundles of two interconnected gas cylinders as its unit of transport; therefore one cylinder i for the purposes of the methodology refers to a “bundle”, or two connected physical cylinders, also referred to as the “cylinder bundle”.

Measurement situation during 1st monitoring period:

$Q_{SF6,k,y}$ was not monitored and recorded for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 during the recovery period from 02 April 2011 to 30 Sep 2011.

B. Assessment of post registration change – Temporary deviations from MP or MM

Accuracy:

Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.

Description:

$Q_{SF6,k,y}$ is used to determine the DFT_y (i.e. Discount factor for testing). According to AM0079 Ver.02 and registered PDD, the DFT_y is calculated as following;

$$DFT_y = \frac{\sum_k (Q_{SF6,k,y} * RT_{k,y})}{Q_{SF6,y}}$$

- DFT_y – Discount factor for testing in year y
- $Q_{SF6,k,y}$ – Total amount of SF₆ filled in the testing of equipments in category k in year y , tonnes SF₆
- $RT_{k,y}$ – Ratio of number of eligible testing items in category k (maximum value is set at 1)

As per the registered PDD, two categories have been defined to all the equipments. Hence,

Requested Deviations / Changes #1

	$DFT_y = \frac{Q_{SF6,1,y} * RT_{1,y} + Q_{SF6,2,y} * RT_{2,y}}{Q_{SF6,y}}$ <p>Two scenarios can be considered:</p> <p><i>Scenario (a):</i> $RT_{1,y} \geq RT_{2,y}$, hence $DFT_y \geq RT_{2,y}$</p> <p><i>Scenario (b):</i> $RT_{1,y} < RT_{2,y}$, hence $DFT_y > RT_{2,y}$</p> <p>Therefore, the deviation proposal is using the value of $RT_{1,y}$ or $RT_{2,y}$ under different scenarios to substitute DFT_y in the calculation.</p> <p>Justification:</p> <ol style="list-style-type: none"> The total amount of SF6 filled in the testing of equipments ($Q_{SF6,k,y}$) was not monitored and recorded for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 during the recovery period from 2011-04-02 to 2010-09-30. It is evidenced that $Q_{SF6,k,y}$ was not zero for the related period: <ol style="list-style-type: none"> the test results^{/DMR/} (including test times, success/figure) of each test for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 have been checked by DOE. Since the test record clearly indicated whether there is SF6 gas injection occurred in each test and according to the record, there are lots of times that SF6 gas injection conducted, $Q_{SF6,k,y}$ was not zero for the related period. The records of mass of used SF6 recovered into cylinder ($MR_{Gas,i,y}$) for the cylinder bundle CDM-11003, CDM-11004 and CDM-11005 have been checked by DOE. Therefore it is confirmed that $Q_{SF6,k,y}$ was not zero and the above calculation is applicable and reasonable. The formula of DFT_y calculation is derived from AM0079 Ver.02 and registered PDD, which has been checked by DOE. The inequality calculations based on the two scenarios have also been checked. It is confirmed that the usage of the deviation in the ER calculation cannot lead to higher emission reductions.
<p>Conservative-ness: Please give a detailed assessment whether conservative assumptions or discount</p>	<p>According to AM0079 Ver.02 and registered PDD, DFT_y is calculation as:</p> $DFT_y = \frac{Q_{SF6,1,y} * RT_{1,y} + Q_{SF6,2,y} * RT_{2,y}}{Q_{SF6,y}}$

Requested Deviations / Changes #1

<p>factors have been have been applied to ensure that ER will not be overestimated.</p>	<p>According to the deviation:</p> <p>Scenario (a): $RT_{1,y} > RT_{2,y}$ or $RT_{1,y} = RT_{2,y}$</p> $DFT_y = \frac{Q_{SF6,1,y} * RT_{1,y} + Q_{SF6,2,y} * RT_{2,y}}{Q_{SF6,y}} > \frac{Q_{SF6,1,y} * RT_{2,y} + Q_{SF6,2,y} * RT_{2,y}}{Q_{SF6,y}}$ $DFT_y \geq \frac{(Q_{SF6,1,y} + Q_{SF6,2,y}) * RT_{2,y}}{Q_{SF6,y}} \geq RT_{2,y}$ <p>Scenario (b): $RT_{1,y} < RT_{2,y}$</p> $DFT_y = \frac{Q_{SF6,1,y} * RT_{1,y} + Q_{SF6,2,y} * RT_{2,y}}{Q_{SF6,y}} > \frac{Q_{SF6,1,y} * RT_{1,y} + Q_{SF6,2,y} * RT_{1,y}}{Q_{SF6,y}}$ $DFT_y \geq \frac{(Q_{SF6,1,y} + Q_{SF6,2,y}) * RT_{1,y}}{Q_{SF6,y}} \geq RT_{1,y}$ <p>Since the $Q_{SF6,k,y} > 0$ is confirmed, the calculation is assessed as correct. The lower value of DFT_y will be applied in the emission reduction calculation which is conservative.</p>
<p>Appendix 1 PS: Check if the changes fall under one of the scenarios of appendix 1 of the PS.</p>	<p>The changes do not fall under anyone of the scenarios of appendix 1 of the PS. The temporary changes require prior approval by the board.</p>
<p>C. Revised PDD</p>	
<p>Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.</p>	<p><input type="checkbox"/> The changes have correctly been reflected in the revised PDD.</p> <p><input checked="" type="checkbox"/> A revision of the PDD is not required (in case of temp. changes).</p> <p><input type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.</p>
<p>D. Prior Approval</p>	
<p>Prior approval: Assess whether the change requires prior approval of the board</p>	<p><input checked="" type="checkbox"/> The post registration change requires prior approval</p> <p><input type="checkbox"/> The post registration change does not require prior approval</p>

Requested Deviations / Changes #2



Requested Deviations / Changes #2

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
 - ☐ Temporary Deviation from Monitoring Methodology
 - ☒ Corrections that do not affect the project design
 - ☐ Permanent Change from Monitoring Plan
 - ☐ Permanent Change from Monitoring Methodology
 - ☐ Changes specific to afforestation or reforestation

A. Description of post registration change

Start Date: Please provide the start date of the change	2011-04-01	End Date: Please provide the end date of the change, if applicable	2021-03-31
Description: Please give a detailed description of the changes	In PDD rev 08 Sub-step 3 (a), the ranges of the category have been changed from 40-419 kV and 420- 800 kV to 12-405 kV and 406-800 kV.		

B. Assessment of post registration change –Corrections that do not affect the project design

Correctness: Please assess whether the corrected information (incl. ex-ante values) is an accurate reflection of actual project information.	<p>Description:</p> <p>The sub-index “k” has been determined in registered PDD according to the approved methodology AM0079 ver.2 and the GIEE tested during 2007^{/VAL/}. The approved methodology requires to define the maximum number of equal range categories, in kV, that contain at least 5 equipments both of the historic and project samples. In the proposed project activity, there are 56 equipments for 2007 that were tested. The capacity of these equipments ranges from 72kV to 800kV and has been organized in the following two categories;</p> <p>k=1: 40 – 419 kV k=2: 420 – 800 kV.</p> <p>In the project year, the equipment range is 12- 800 kV, according to the SF6 gas test records at recovery site during 2011-04-02 to 2012-04-26^{/DMR/}. In order to comply with the methodology that the maximum number of the range should be applied, the categories had been updated as;</p> <p>k=1: 12 – 405 kV k=2: 406 – 800 kV.</p> <p>The historic numbers of testing items in each category k have not been changed.</p> <p>Justification:</p> <p>The AM0078 ver.2, the registered PDD, validation report and SF6 gas test records at recovery site during 2011-04-02 to 2012-04-26 have</p>
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Requested Deviations / Changes #2

	been checked by DOE. The corrected information is an accurate reflection of actual project information. The Baseline and the emission reduction calculation result is not effected. The registered PDD and CER sheet have been checked.
MP/MM Compliance : Please check whether the corrected parameters are in accordance with the MM and/or MP	According to the requirement of AM0078 ver.2, the maximum number of equal range, had been applied and the categories that contain at least 5 equipments both of the historic and project samples. The corrected categories with regard to parameter $NT_{PJ,k,y}$ are in accordance with the MM and/or MP. The changes of the ranges have no influence on the historic numbers of testing items in each category k. (Therefore there is no influence on $NT_{BL,k}$ (average number of eligible testing items where venting occurred per equipment in the baseline, for category k)).
Appendix 1 PS: Check whether the affect the design of the PA.	The changes do not fall under anyone of the scenarios of appendix 1 of the PS. The correction requires prior approval by the board.
C. Revised PDD	
Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.
D. Prior Approval	
Prior approval: Assess whether the change requires prior approval of the board	<input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i> <input type="checkbox"/> <i>The post registration change does not require prior approval</i>

3.2 Related Findings

No findings have been identified in this context.

4 CHANGE TO THE START DATE OF THE CREDITING PERIOD

The post registration changes do not fall under this category.

5 CHANGES TO THE PROJECT / PROGRAMME DESIGN

The post registration changes do not fall under this category.

6 SUMMARY OF ASSESSMENT OPINIONS

The below listed changes have occurred after the registration of the project.

Type of Change occurred	Total No. of changes	No. of changes which require prior approval
<input checked="" type="checkbox"/> Temporary deviations from the MP	1	1
<input checked="" type="checkbox"/> Temporary deviations from the MM	1	1
<input checked="" type="checkbox"/> Corrections that do not affect the project	1	1
<input type="checkbox"/> Change to the start date of the crediting p.		
<input type="checkbox"/> Permanent changes from the MP		
<input type="checkbox"/> Permanent changes from the MM		
<input type="checkbox"/> Design changes to the project activity / PoA		
<input type="checkbox"/> Changes specific to AR projects		

The above listed post registration changes require prior approval of the Board.

Essen, 2013-03-17



Rainer Winter
TÜV NORD JI/CDM CP
Assessment Team Leader

Essen, 2013-03-17



Dr. Jochen Schubert
TÜV NORD JI/CDM CP
Final Approval

7 REFERENCES

Table 7-1: Documents provided by the project participant

Reference	Document
/ATS/	<ul style="list-style-type: none"> - Approval of the reclamation facility commissioning on 2008-04-29
/BL/	<p>Business License of</p> <ul style="list-style-type: none"> - Korean business registry, SFK incorporation notice - KOLAS (Korea Laboratory Accreditation Scheme), www.kolas.go.kr, showing that KERI is the only institution in Korea performing the high voltage tests in question involving pure and contaminated SF6 gas.
/CAL/	<ul style="list-style-type: none"> - Calibration Certificate of mass flow meter (14122007, 14111339, 14069408, 14014422, 14014074) covering the monitoring period. - Calibration standard of mass flow meter - FMT-QG-06 - Certificate of calibration entity i.e. FMTech Co., Ltd.
	<ul style="list-style-type: none"> - Calibration Certificate of GC (CN10622030) issued by SFK according to SOP. - Certificate of calibration entity issued by AGILENT Technologies, S/N: YAC080560
	<ul style="list-style-type: none"> a) Calibration certificate of weight scale for the cylinders (FR3). b) Calibration standard of weight scale - KML-CAL-M05; PH-I003 c) Certificate of calibration entity KML d) Certificate of calibration entity Pyunghwa HiTech
/SP/	<ol style="list-style-type: none"> 1. Technical Specification of mass flow meter 2. Technical Specification of GC
/DMR/	<ul style="list-style-type: none"> - SF6 gas for test records at recovery site during 2011-04-02 to 2011-09-30 - SF6 gas filling records and test records at recovery site during 2011-10-01 to 2012-04-26 - SF6 gas recovery records at recovery site - SF6 gas stored in cylinder bundle records - SF6 gas records for gas from the cylinder bundle injected into the production process - SF6 gas loss from point j during the reclamation period - SF6 Contraction of amount of SF6 loss at SFK site - SF6 concentration records from GC at SFK site - Records of the number of total testing items where recovery was done per equipment - Records of the quantity of SF6 which was being injected to the

Reference	Document
	reclamation facility during exceptional events occurred.
/IAR/	Internal Audit Report
/LOG/	1. Sample copy of project operation records. 2. Equipments daily check log.
/LOA/	- Ministry of Environment, the Republic of Korea (DNA of China), LoA (Ref. no.: 2010-7), 14 April 2010 - UK LoA, 29 April 2010
/MM/	Monitoring Manual
/NP/	- Nameplates of the operating equipment (two Compressors, Suctioning pump, Vacuum pump, Evaporator) - Nameplates of weighing scale for cylinder - Nameplates of mass flow meters
/DCS/	DCS system of the weighing scale
/O&M/	Project Operation and Maintenance Records Sample copy of O&M records
/PHT/	Photographs of Project Site
/PL/	- Project layout of the related equipment/infrastructure at the recovery site (at KERI's facilities REV-000, 2008-05-28) - Project layout of the related equipment/infrastructure at the recovery site (at KERI's facilities REV-001, 2012-01-04)
/QA/	Monitoring manual and QA/QC procedures
/RTC/	Project Responsibilities, Training and Competence Records 1. Project Organization Chart and responsibilities 2. Staff Training Records 3. Sample Copy of Operator Certificates
/SOC/	Staff operation certificates
/SOP/	Standard operation procedures
/XLS/	ER calculation sheet/SF6 Monitoring Workbook version 01
/IEC/	SF6 Quality standard IEC 60376 International Electrotechnical Commission (IEC), IEC 60480 - Guidelines for the checking and treatment of sulfur

Reference	Document
	hexafluoride (SF ₆) taken from electrical equipment and specification for its re-us, edition 2.0, Publication Date: 14 October 2004 (http://webstore.iec.ch/webstore/webstore.nsf/Artnum_PK/33279)

Table 7-1: Background investigation and assessment documents

Reference	Document
/AM79/	Recovery of SF ₆ from Gas insulated electrical equipment in testing facilities (ver. 02)
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GLMP/	Guidelines for completing the monitoring report form (EB 66 Annex 20)
/IPCC/	<ol style="list-style-type: none"> 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (F-CDM-MR) Version 2.0
/PDD/	<ul style="list-style-type: none"> - Project Design Document for CDM project: “SF₆ recovery and reclamation project, South Korea” version 7, dated 2011-03-23 - Project Design Document for CDM project: “SF₆ recovery and reclamation project, South Korea ” version 8, dated 2012-11-06
/PS/	Project Standard (EB 65 Annex 5)
/VAL/	Validation Report for CDM project “SF ₆ recovery and reclamation project, South Korea” version 2, dated 2011-03-28
/VVS/	UNFCCC Validation and Verification Standard (Version 2.0, EB 65)

Table 7-3: Websites used

Reference	Link	Organisation
/dna-HP/	http://www.mofat.go.kr/ENG/ministry/organization/organizational/index.jsp?menu=m_50_60_20	DNA of Republic of Korea
/dna-SP/	http://www.environment-agency.gov.uk/business/topics/pollution/129666.aspx	DNA of United Kingdom of Great Britain and Northern Ireland
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications

Table 7-4: List of interviewed persons

Reference	Moi ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	HoJin, Jeon	Solvay Fluor Korea Co. Ltd/ Head of production department
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	HongBo Ha	Solvay Fluor Korea Co. Ltd / Mechanical Engineer
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Zhang Shoudou	Solvay Energy Services, Orbeo / Project Manager
/IM01/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms	Wu Xia	Solvay Energy Services, Orbeo/ Project Manager
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	YongHan Li	Korea Electrotechnology Research Institute/CDH Manager
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	HackDong Yooh	Korea Electrotechnology Research Institute/operator
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	JiHar Choi	Korea Electrotechnology Research Institute/ operator

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)

APPENDIX

- A1:** Assessment of Financial Parameters
- A2:** Assessment of Barrier analysis
- A3:** Competence statements of involved personnel

APPENDIX 1: ASSESSMENT OF FINANCIAL PARAMETERS

Table A-1: Assessment of Financial Parameters (VVS, v. 2.0, §§ 120, 121 / in case financial parameters stem from FSR §122)


<input checked="" type="checkbox"/>	No financial parameters are used for additionality justification					
<input type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	
				//	<input type="checkbox"/>	

APPENDIX 2: ASSESSMENT OF BARRIER ANALYSIS

Table A-2: Assessment of Barrier Analysis (VVS, v. 2.0, §§ 124-127)

<input checked="" type="checkbox"/>		No barrier parameters are used for additionality justification		
<input type="checkbox"/>		Assessment of barriers see below		
Kind of Barrier (invest, tech, other)	Description of Barrier	Evidence used	Assessment of validation team	
			Appropriateness of information source	Explanation of final result
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	
			<input checked="" type="checkbox"/>	

APPENDIX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Rainer Winter


SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2013-07-03
J1	Senior Assessor Technical Reviewer	2013-07-03
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2013-07-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal Energy Generation	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
1.2	Renewable Energies	
4.1	Cement Sector	
4.3	Iron and Steel	
4.5	Waste Heat Recovery	
4.8	Glass	
5.1	Chemical Process Industries	
9.1	Metal Production	
11.1	Chemical Process Industries	
11.2	GHG Capture and Destruction	
12.1	Chemical Process Industries	
13.1	Waste Handling and Disposal	13.1.1 Waste Management

003 - Rev. 6, Date: 2012-10-12

003_S01-VA060-F20_2012-10-12_rev6.doc S01-VA060-F20_rev3 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Yongjun Li


SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2013-06-26
VCS / ISO 14064-2	Senior Assessor (Validation, Verification) Technical Reviewer	2013-06-26

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energies	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
13.1	Waste Handling and Disposal	

039 - Rev. 1, Date: 2012-09-11

039_S01-F003_2012-09-11_rev1.doc S01-F003 rev2 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Ms. Miao Yu

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2015-06-27
VCS / ISO 14064-2	Lead Assessor	2015-06-27

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies

164 - Rev. 3, Date: 2012-06-28

164_S01-F003_2012-06-28_rev3.doc S01-F003 rev2 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Dirk Speyer

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification) Technical Reviewer	2015-07-10
VCS / ISO 14064-2	Lead Assessor Technical Reviewer	2015-07-10

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
4.4	Refinery
5.1	Chemical Process Industries
11.1	Chemical Process Industries
11.2	GHG Capture and Destruction
12.1	Chemical Process Industries

244 – Rev. 4, Date: 2012-07-11

244_S01-F003_2012-07-11_rev4.doc

S01-F003 rev2 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Dr. Jochen Schubert

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR INCLUDE SUB-AREAS
1.2	Renewable Energies	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
13.1	Waste handling and disposal	13.1.1 Waste management 13.1.2 Waste water management

056 – Rev. 2, Date: 2011-07-29

056_S01-F003_2011-07-29_rev2

S01-F003 rev2 / 2010-04-19